BAKER, Aston

From: TILDEN, Fred
Sent: Monday, 20 February 2023 12:02 PM
To: BELL, Greg
Cc: MELDON, Robyn
Subject: RE: Ventilation - status update

Thanks Greg and Robyn also – I think that presentation of outcomes and learnings is a good approach to close out so support that approach thanks

Fred

From: BELL, Greg <Greg.BELL@qed.qld.gov.au>
Sent: Friday, 17 February 2023 2:30 PM
To: TILDEN, Fred <Fred.TILDEN@qed.qld.gov.au>
Cc: MELDON, Robyn <Robyn.MELDON@qed.qld.gov.au>
Subject: FW: Ventilation - status update

Good Afternoon Fred.

Back in late August last year, advice was forwarded to discontinue ongoing air quality assessments as per the attached email.
The project is now just finalising various remediations as identified from the assessments. As you would understand some are simple repairs and others are complex building adjustments.
The Maintenance Unit has not entered into any further assessments utilising GHD, however, continues address correspondence from parents and concerned citizens. In addition to the infrastructure work, the Unit has produced a few internal communications to encourage learning spaces to be set up to provide good cross flow ventilation. Essentially work with GHD on this will complete with a summary of lessons learned. I suggest there would be value in a presentation to ISD Directors /EMT.
As per instruction, where a potential issue is identified, the first reference point will be the regional Infrastructure Advisor.

Regards
Greg

Greg Bell
Maintenance and School Facilities Operations
Infrastructure Services Branch
Department of Education
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From: MELDON, Robyn <Robyn.MELDON@qed.qld.gov.au>
Sent: Wednesday, 15 February 2023 1:53 PM
To: BELL, Greg <Greg.BELL@qed.qld.gov.au>
Subject: Ventilation - status update

Hi Greg

As discussed, I am currently finalising the following actions related to Ventilation:

- Remediation actions of the mechanical ventilation systems identified in the GHD reports – currently with QBuild (approx. 6 months)
- Remediation actions to repair/ replace natural ventilation options, mainly windows repairs that were identified in the GHD report – currently with QBuild (approx. 6 months)
- Communications actions – publication of the ventilation animation, approval of the ATP Q&A with Distinguished Professor Lidia Morawska, One Portal page on improving air quality within Qld schools. (approx. 2 months)
- Calamvale Special School – O block fresh air remediation (approx. 6-8 months)
- Narbethong Special School – UV trail installation (approx. 3-4 months)
- Final GHD wrap up report - a summary report from GHD collating all the common findings from the 110 ventilation assessments. (approx. 1 month)
- Reporting – finalising a report on all the financial implications of the program (dependent on completion date of the other actions).

Once all the infrastructure actions have been finalised, the intension is to transition across to OSW, based the 110 assessments the majority of issues were related to the actions of people as opposed to infrastructure remediations.

Let me know if you feel I have missed something or you require more detail.

Kind Regards

Robyn Meldon
Principal Facilities Services Officer
Maintenance, Infrastructure Services
Department of Education

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Queensland Government

COLE, Caroline

From: BOYS, Nicholas
Sent: Tuesday, 20 December 2022 9:32 AM
To: MELDON, Robyn
Subject: RE: Updates
Attachments: Copy of Ventilation Assessment Data 29112022.xlsx

Morning Robyn!

All spreadsheets are up to date I believe. I've attached the master sheet and all Rev 0 reports are in CM.

Regards

Nick Boys
Facilities Services Officer
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Department of Education
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From: MELDON, Robyn <Robyn.MELDON@qed.qld.gov.au>
Sent: Tuesday, 20 December 2022 9:00 AM
To: BOYS, Nicholas <Nicholas.BOYS@qed.qld.gov.au>
Subject: Updates

Hi Nick

Just received a call from GHD, all outstanding reports will be provided before Friday. How are the spreadsheets going?

Kind Regards

Robyn Meldon
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School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Albany Creek State High School	2155	Secondary school	Metropolitan	Complete - Targeted	Finalised - Released	Approved	Approved	Recommendation discussed with Principal via Regional Infrastructure Manager Metro Region		12/02/2022
Anakie State School	0474	Primary school	Central Queensland	Completed - whole school	Finalised - Released	Approved				
Aspley Special School	3031	Special school	Metropolitan	Completed - whole school	Completed - Pending report	Approved				
Aspley State School	0610	Primary school	Metropolitan	Completed - whole school	Finalised - Released	Approved				7/09/2022
Ayr State High School	2008	Secondary school	North Queensland	Completed - whole school	Finalised - Released	Approved				1/06/2022

GHD Ventilation Recommendations
In general, classrooms with several windows open, especially on at least 2 opposing sides of the room, were noted to have low CO2 levels. In most cases, CO2 levels did not exceed 800ppm. Fresh air fans, where installed, appeared to be operational. In the performing arts centre, with newer, ducted air-conditioning units and fresh air intakes, we suspect closing all doors and windows is hampering fresh air circulation by allowing no air relief. Opening the door or a window slightly during class should resolve this. In block M, the classrooms rely on the high-level clearstory windows for cross ventilation. However, as noted in M08, with no low-level windows or the door open, fresh air flow is restricted. Rooms M10, M16 and M19 all displayed significantly lower CO2 levels with windows and / or doors open. We recommend doors or windows are kept open during lessons, weather and noise permitting.
No significant or potential ventilation problems were noted at Anakie State School. All classrooms recorded CO2 levels below 800 ppm and had adequate windows and doors to facilitate natural cross ventilation. The withdrawal room within B Block was provided with an air-conditioning unit but no fresh air fan. Given that this room is only used intermittently by smaller student / teacher groups, it is recommended that the windows in this room are opened when in use. The room is not large and as such this should suffice for adequate room ventilation. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The majority of rooms were fitted with fresh air fans. Excluding R100B09, all classroom fresh air fans were operational at the time of inspection. It is recommended the fresh air fans within R100B09 be repaired or replaced. Furthermore, we recommend the repair or replacement of the axial fans serving the General Office (RG00A03) and Sick Back (RG00A04).
In general, classrooms had suitable windows and doors to naturally ventilate the teaching spaces. This was reflected in the low CO2 values observed. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fan should remain closed when the fan is in use to avoid short cycling1 . All non-operational fresh air fans (e.g., RG00P02) should be repaired or replaced.
This report is subject to, and must be read in conjunction with, the limitations set out in section 1.2 and the assumptions and qualifications contained throughout the report. This report summarises the findings of the ventilation audit of Aspley State School, Brisbane. An inspection of the school was carried out on the 7 th of September 2022. The inspection included measuring CO2 levels in classrooms using a CEM DT-967 CO2 sensor. In general, classrooms had suitable windows and doors to naturally ventilate the teaching spaces. This was reflected in the low CO2 levels observed in occupied classrooms where windows and/or doors remained opened. However, at the time of inspection, most classroom windows and doors remained closed resulting in high CO2 values. Where feasible, it is recommended that some classroom windows or doors are kept open and to provide cross ventilation during lessons to naturally ventilate the space. It is also recommended to have ceiling fans on to improve air circulation where doors or windows are only open on one side of the classroom. However, it must be noted that operating the ceiling fans does not introduce any additional fresh air to the space. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fan should remain closed when the fan is in use to avoid short cycling1 . The majority of classrooms did not have fresh air fans installed. Some classrooms (C7, E2, E3 and F2) recorded high CO2 levels with the fresh air fans running. Only classroom C7 had windows and doors closed while classrooms E2, E3 and EF had windows closed but doors open, providing relief. Therefore, it is suspected that the ventilation rate of the fresh air fans is not sufficient to maintain low CO2 levels. It is recommended the filters be checked and cleaned if necessary, and the fan selections and duties be reviewed. The Hall instrument Music room can reportedly sometimes have a high number of students occupying the space. As this is a small classroom, the space at times might be a concern, particularly in an instrument room where the pupil's activity levels are higher than normal. It is recommended that a suitably sized fresh air and relief system be installed to improve fresh air levels within the space. The ceiling grilles located at high level in the main Hall area are dirty and require cleaning. In Prep Unit 4 there were switches on the wall that referenced 'fan'. When these switched on there was a noise from the other side of the room and it is suspected that these are connected to speakers for the projector. It is recommended that this should be investigated further, and the switches should be replaced with ones that do not indicate fans. In Teaching Block B, the majority of rooms had casement windows installed on at least one side of the room. They were difficult to open, and once opened, they did not have the ability to stay open by themselves. This reduces the likelihood of the windows being used, which would limit the cross ventilation to the classrooms. It is recommended to have these windows either repaired or replaced. One of the air-conditioning units in Classroom D8 level 1 was non-operational at the time of inspection. It is recommended this unit either be repaired or replaced. The windows at high level in Classroom C6 were screwed shut on one side of the classroom and as a result, no cross ventilation is currently possible. With no fresh air fan installed, fresh air to the space is limited. It is recommended the windows be repaired and that a suitably sized fresh air and relief system be installed. In Teaching Block E, classroom E2, one of the air-conditioning units drips water. Therefore, it is recommended that this unit be repaired as required. The window / wall air-conditioning unit serving Classroom E4 is non-operational and appears to be redundant. It is recommended this unit be removed and the windows repaired. 1 Short cycling occurs when a ventilation fan air intake and discharge are too close together, and the discharged air follows the shortest path (i.e., shortest cycle) back to the intake as opposed circulating through the classroom. GHD | Department of Education | 12575432 | Ventilation Survey 19 Some air-conditioning units were observed to have dirty filters. It is recommended all air-conditioning unit filters are cleaned as part of the regular maintenance program. It is recommended that all fresh air systems are adequately labelled to promote the use of the systems and to inform the user, similar to Prep unit 1. Furthermore, it is recommended that the fresh air fan be interlocked with the air conditioning units via a wall mounted controller. In general, it is recommended all objects that are either on or blocking the windows are removed, as this can limit their ability to be opened. In M Block Classroom M02, some windows had paper on them while others were partially obstructed by folders. It must also be noted that the ceiling in Teaching Block D, Classroom D4 on Level 1, appears to show signs of mould or dampness and it is recommended this is investigated further.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation, except for Blocks I and J, where cross ventilation was unavailable. The majority of the rooms assessed recorded a CO2 value over 800 ppm as most of the doors and windows were closed during the audit. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Consideration should be given to the installation of security screens to windows to promote their use. Within I Block, further investigation is required to confirm adequate mechanical ventilation is provided to RG0I01C, as natural ventilation is unavailable. Repairs are also required to the evaporative cooler installed in L Block.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
QTU	Draft report shared with the region for school consultation				22/170554
School					22/510023
IO		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/859279
					22/749353
Region		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/643608

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Ayr State School	0451	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved				8/06/2022
Bauhinia State School	0387	Primary school	Central Queensland	Completed - whole school	Finalised - Released	Approved				11/10/2022
Beenleigh Special School	3051	Special school	South East	Completed - whole school	Finalised - Released	Approved				13/09/2022
Bounty Boulevard State School	6134	Primary school	North Coast	Completed - whole school Scheduled - Review	Finalised - Released	Approved				28/3/22-29/3/22, 14/7/22

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation, however these were not utilised. The low CO2 values observed for classrooms is likely due to the low occupancy numbers at the time of the audit. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room.
No significant or potential ventilation shortfalls were noted at Bauhinia State School. All classrooms recorded CO2 levels below 800 pp, and had adequate windows and doors to naturally ventilate the space. All A Block first floor low-level louvre windows, located within R100A01 and R100A03, were found to be non-openable or obstructed by furniture. It must be noted the remaining large louvre windows were openable and provide adequate natual ventilation. However, it is recommended that these be repaired or replaced to increase available natural ventilation. The fresh air fan within Office R100A03 was non-operational and requires repair or replacement.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. However, this was not reflected in the CO2 levels observed at the time of the inspection, as the CO2 levels in most classrooms inspected exceeded the 800 ppm threshold, with most windows and doors noted to be closed, and most mechanical fresh air systems not in use. This was reflected in the low CO2 levels observed in occupied classrooms where windows and/or doors remained opened. However, at the time of inspection, windows and doors remained closed in most classrooms due to the health and safety of the children. The CO2 levels in more than half of the classrooms inspected exceeded the 800 ppm threshold. Where the threshold was exceeded, windows and doors were observed to be closed, and fresh air systems were not in use. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters be cleaned to ensure optimum performance of the unit. The air conditioning unit within RG00E01 should be repaired or replaced.

High CO2levels were notedduring the inspection carried out on the 28th and 29th of March 2022.It issuspected thatthis wasa result of inclement weather experienced at the time. Most classroom doors and windows were noted as closed during the inspection, and students were kept indoors during breaks, resulting in increased time spent in classrooms. As noted during the reinspection carried out on 14 July 2022and through the tests conducted, with some windows and doors open, CO2levels below 800 ppm can be maintained. As such, it isrecommendedat least some classroom windows, and the classroom doors,are kept open during cooler weather. If doors and windows are kept closed while the airconditioning is run, it isrecommendedat least one window opposite the fresh air fan is left partially open to improve the efficiency of the fan and ensure adequate cross-ventilation of the room. Where classrooms are used for extended periods due to inclement weather, it isrecommendedall classroom windows and doors are opened fully to allow for adequate cross ventilationand flushing of room air with fresh air. None of the withdrawal rooms were found to be fitted with airconditioning units or fresh air fans. Given that these rooms are only used intermittently by smaller student / teacher groups, it isrecommendedthe windows in these rooms are opened when in use. The rooms are not large and as such this should suffice for adequate room ventilation.It isrecommendedthat all non-operational ventilation fans are repaired or replaced as required to ensure reliable operation when windows and doors are closed during coolerweather. In O Block, keeping the first-floorcorridor / lobby louvres windows open as far as possible (weather permitting) is recommended to ensure the corridor, and thereby all internal-facing rooms, remain suitably ventilated. Furthermore, in classrooms with fresh air fans, the classrooms doors should be kept closed when the airconditioning and fans are used to prevent short cycling1of the fan systems. At least one window opposite the door should be kept open under these circumstances to ensure adequate cross-ventilation of the classrooms. In C Block, it is recommendedthat the operation of the fresh air fan serving RG0C01B be verified, and the fan be repaired or replaced as required. It is furtherrecommendedthat windows are opened slightly while operating the airconditioning units and fresh air fans to allow for relief of the supplied outside air and thereby improve airflow and fan efficiency.In Prep B1, Prep Violet (RG0P01D), and Prep B2 (both classrooms), it is recommended that the operation of the fresh air fans be confirmed, and the fans repaired / replaced if necessary. It is further recommended that at least one window opposite the classroom door is opened slightly when the fresh air fan is running to allow for relief of the supplied fresh air and ensure adequate cross-ventilation of the room. Until the operation of the fan can be confirmed, windows and the door should be kept open during lessons to ensure adequate natural cross-ventilation of the room.WithinY4-7 / Music / Technology, the following is recommended:3.Within RG0MC01 (Music GLA), the ducted fresh air system was non-operational. It must supply a minimum of 348 L/s of outdoor air to ensure compliancewith the National Construction Code (Volume 1, Part F4.5)[1].It is recommended that the fan dutybe verified to ensure compliance.4.For RG0MC02 (Practice Room), the fresh air system was operational. It is estimated that an outdoor airflow rate of 50L/s is currently supplied.This does not meet the minimum outdoor airflow rateof 160 L/sspecified by AS 1668.2[2]. It is therefore recommended that a compliant fresh air system be installed.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region		Verification remediations forwarded to Qbuild 11/11.			22/581266
School					22/859087
IO					22/895099
QTU	Revisit site to confirm review finding in alternative weather conditions	Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/683179

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Bowen State High School	2065	Secondary school	North Queensland	Completed - whole school	Finalised - Released	Approved				6/06/2022 - 07/06/2022, 18/10/2022
Bowen State School	0010	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved		Meeting with Principal held 11/8/2022 to discuss the recommendation. Works currently scheduled with QBuild.		8/06/2022
Bremer State High School	2050	Secondary school	Metropolitan	Completed - whole school	Finalised - Released	Approved				
Brookfield State School	0016	Primary school	Metropolitan	Completed - whole school	Finalised - Released	Approved				7/4/2022 & 27/4/2022

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. RG000L5 was a lecture theatre located within L Block and was unoccupied at the time of inspection. A room of similar design was encountered at a previously audited school. It recorded CO2 levels in excess of 800 ppm while near full occupancy. It was recommended that the ventilation system be further investigated, and the room monitored in the interim using the Aranet4 CO2 logger provided by Education Queensland. The same is recommended for RG000L5, The fresh air fan within RG0A01A must supply 280.2 L/s of outdoor air to be compliant with the National Construction Code (Volume 1, Part F4.5). It is recommended that the operation of the fresh air fan be confirmed and if operational, the airflow measured using an anemometer. If the airflow rate is below 280.2 L/s, it is recommended that the ventilation strategy be reviewed, and remedial work be implemented in order to ensure compliance. All other non-operational fresh air fans should be repaired or replaced. OCT - In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. RG000L5 is a lecture theatre located within L Block and was unoccupied at the time of the initial inspection, and the nature and operation of the ventilation system could not be ascertained. The reinspection verified that the RG000L5 fresh air system supplies ~480 L/s of outside air. As this room has sufficient openable door area to comply with the National Construction Code Volume 1 [1], further fresh air provision is not required for compliance. However, it is recommended that a larger fresh air system be installed if CO2 levels above 800 ppm are regularly recorded with the provided Aranet4 logger. A Block RG0A01A does not currently comply with the National Construction Code Volume 1, Part F4.5 [1] as the space does not have 5% of its floor area in openable window / door area, and the ventilation fan serving the space is not operational. The fresh air fan within RG0A01A must supply at least 280 L/s of outdoor air to be compliant [2]. It is therefore required that the fresh air fan be repaired or replaced such that a minimum of 280 L/s of outside air is supplied. It is further recommended that a suitably sized relief system (e.g., a door grille) be installed to ensure the fan operates efficiently. Finally, it is recommended the intake position of the fan be reviewed to ensure hot condenser discharge air is not drawn into classroom RG0A01A. All other non-operational fresh air fans should be repaired or replaced.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Within B Block, it is recommended that some louvres be left open in Wet Areas on both floors. The door or windows connecting the classrooms to the wet area, as well as some external windows within the classrooms, should also remain open to promote cross ventilation. All other non-operational fresh air fans should be repaired or replaced.
In general, high CO2 levels were noted during the inspection. In most cases, high CO2 levels have been noted in classrooms where windows and doors were kept closed during lessons. Classrooms where some windows were kept open were noted to have lower CO2 levels. As such, it is recommended at least some classroom windows, and the classroom doors, are kept open during lessons. In classrooms with fresh air fans installed and running, high CO2 levels were noted when doors and windows were kept closed. It is suspected that a lack of relief for supplied outside air contributed to inefficient fan operation and air distribution. If the fresh air fans are run, it is recommended at least one window on the façade opposite the fan is opened to allow for air relief and adequate cross-ventilation of the room. Where fans are located above doors or windows, it is recommended those windows or doors are kept closed when running the fans to prevent short cycling. The ducted split unit serving the music rehearsal and practice rooms RG000M4, RG000M5 and RG000M6 in M Block is faulty and requires repair in order to effectively supply fresh air to these rooms. The fresh air system serving the ducted units in F Block (RG000F9, RG000F10 and RG000F16) must be verified to ensure compliance. The fresh air diffuser required to supply fresh air to RG000V3 is missing and requires replacement. H Block and K Block classrooms rely on a Cardiff air air-purge ventilation system for cross ventilation as natural cross-ventilation is not possible. The following air purge system were not functional at the time of the inspection and require repair: 5. H Block R100H20, 6. H Block R100H27, 7. H Block R100H28, 8. K Block RG000K5. It is recommended that the air purge systems are not run when the air conditioning units are run as the high air quantities introduced through the Cardiff air systems will adversely affect the efficiency and effectiveness of the cooling and heating systems. The following fresh air fans were not functional at the time of the inspection and require repair: 1. M Block RG000M9.
High CO2 levels were recorded during the inspection. Most classroom doors and windows were noted as closed, likely a result of the cooler weather experienced at the time of the inspections. In general, classrooms where some windows were kept open were noted to have lower CO2 levels. As such, it is recommended the classroom doors and at least some windows on the opposite façade, are kept open during cooler weather to promote cross ventilation of the classrooms. Most of the classrooms were fitted with fresh air fans and most of these fans were operational at the time of the inspection, although most were switched off due to the cooler weather. It was noted that none of the classrooms were provided with air-relief grilles or louvres. As such, if doors and windows are kept closed while the air-conditioning is run, it is recommended at least one window opposite the fresh air fan is left partially open to improve the efficiency of the fan and ensure adequate cross-ventilation of the room. The operation of the ducted fans serving C Block RG00C02 and RG00C03 must be verified, and the fans repaired or replaced if required. None of the withdrawal rooms were provided with air-conditioning units or fresh air fans. Given that these rooms are only used intermittently by smaller student / teacher groups, it is recommended that the windows in these rooms are opened when in use. The rooms are not large and as such this should suffice for adequate room ventilation.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/815394
Region		Aircon remediations forwarded to Qbuild 30/11.			22/473032
School/ Region		Referred to RRAC and QBuild for quote			22/391080
Region		Verification remediations forwarded to Qbuild 11/11.			22/353640

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Bulimba State School	0017	Primary school	Metropolitan	Completed - whole school	Finalised - Released	Approved				
Bundaberg Special School	3029	Special school	North Coast	Completed - whole school	Finalised - Released	Approved	N/A			11/05/2022
Burdekin School	3003	Special school	North Queensland	Completed - whole school	Finalised - Released	Approved				2/06/2022
Caboolture Special School	3045	Special school	North Coast	Completed - Whole school	Finalised - Released	Approved				9/08/2022
Cairns State Special School	A029	Special school	Far North Region	Completed - whole school	Finalised - Released	Approved				1/06/2022
Calamvale Special School	3055	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				18/05/2022

GHD Ventilation Recommendations
In general, low CO2 levels were noted in most classrooms during the inspection. In most cases, high CO2 levels have been noted in classrooms where windows and doors were kept closed during lessons. Classrooms where some windows were kept open were noted to have lower CO2 levels. As such, it is recommended at least some classroom windows, and the classroom doors, are kept open during lessons. In classrooms with fresh air fans installed and running, high CO2 levels were noted when doors and windows were kept closed. It is suspected that a lack of relief for supplied outside air contributed to inefficient fan operation and air distribution. If the fresh air fans are run, it is recommended at least one window on the façade opposite the fan is opened to allow for air relief and adequate cross-ventilation of the room. All windows in A Block in both classrooms and hallways must be inspected and repaired to ensure they are easily operable. The following air conditioning unit was not functional at the time of the inspection and requires repair: 1. B Block R10BF01.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Several rooms were also fitted with fresh air fans and majority were operational at the time of the inspection. It is recommended that, where feasible, at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fan should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. In RG0JC12, if the courtyard mesh door cannot be open during lessons, it is recommended that a suitable sized fresh air fan, and air-relief grille or louvre, be installed in an appropriate location to promote cross ventilation.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation except for the Administration Building Block 1. Most classrooms were fitted with fresh air fans, however, less than half were operational at the time of the inspection. There was no fan installed in classroom RG000C5. Although room RG000C5 recorded a CO2 value of 691 ppm, given the use of the space (Sensory Room), it is unlikely that windows or doors would be utilised whilst occupied. Consideration should be given to the installation of a fresh air fan to ensure adequate ventilation is provided. In RG000D2, where windows and door are kept closed, it is recommended that the air conditioning unit and fan be repaired in order to effectively control the room conditions and supply suitable fresh air ventilation to the room. It is further recommended that the operation of all installed ventilation fans be verified. It is recommended that, where feasible, at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Airconditioning should also be used where fresh air fans are installed to ensure the fresh air fans are running during lessons if windows are closed. At least one window opposite the fresh air fan should be left partially open to improve efficient of the fan and ensure adequate cross ventilation of the room. To promote the use of natural ventilation, consideration should be given to the type and location of windows installed. A substantial portion of classrooms had no security screens installed to windows reducing the likelihood that these windows are opened during class.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 levels observed in occupied classrooms where windows and/or doors remained opened. However, at the time of inspection windows and doors remained closed due to the health and safety of the children. It is recommended that at least some classroom windows, and where feasible the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters are cleaned to ensure optimum performance of all fan units. The majority of the classrooms in M Block rely on a Cardiffair air-purge ventilation system for cross ventilation as natural cross-ventilation is not possible. It is recommended that the air purge systems are not run when the air conditioning units are run as the high air quantities introduced through the Cardiffair systems will adversely affect the efficiency and effectiveness of the cooling and heating systems. It is recommended that air conditioning unit R10C204 and air purge system in RG00M02 to be repaired to ensure systems are operating in an acceptable manner.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation as well as apparent fresh air systems that supply the classrooms. Overall, only one classroom recorded a CO2 level over the 800 ppm threshold, although typically even lower levels were recorded in classrooms with atleast some external windows and doors left open and/or fresh air systems running. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. It is also recommended that graphics and prints are removed from windows to ensure the windows can be easily opened to promote cross ventilation through the classrooms.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Few rooms were also fitted with fresh air fans, and these appeared to be operational at the time of the inspection. Where classroom CO2 levels were found to exceed the 800 ppm threshold, it was suspected to be a result of closed windows and doors. It is recommended that, where feasible, at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window opposite the fresh air fan should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. O Block does not appear to comply with the National Construction Code. With no external doors, the ratio of openable windows to floor area of the classrooms is under 5% as required by Volume 1, part F4.6. A review of the O Block ventilation strategy and the implementation of remedial work in order to ensure compliance is recommended. In L Block, it is recommended the locked windows be unlocked and made to be openable in order to promote natural cross ventilation given there are no fresh air fans installed.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
School	4x Air Purifiers provided to the school				22/465664
IO		Aircon remediations forwarded to Qbuild 30/11.			22/333516
Region		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/646504
IO					22/749361
IO					22/581314
IO		Verification remediations forwarded to Qbuild 11/11.			22/509976

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Cannonvale State School	0589	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved				
Capricornia (Rockhampton Campus) School of Distance Education	3613	Primary/Secondary school	Central Queensland	Completed - whole school	Finalised - Released	Approved				15/08/2022
Carina State School	1552	Primary school	Metropolitan	Completed - whole school	Finalised - Released	Approved				2/08/2022
Charters Towers Central State School	0215	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved				27/07/2022
Charters Towers School of Distance Education	3610	Primary/Secondary school	North Queensland	Completed - whole school	Finalised - Released	Approved				27/07/2022

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Rooms were typically fitted with one or more fresh air fans, of which most were operational at the time of the inspection. This was reflected in the low CO2 values observed. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Within L Block, it is recommended that the foyer windows remain open when classrooms are used. The doors connecting the classroom or withdrawal rooms to the foyer, as well as some external windows within the classrooms, should also remain open to promote cross ventilation. The same is recommended for the Prep Area and classrooms of C Block, which was unoccupied at the time of inspection. All other non-operational fresh air fans should be repaired or replaced.
Most staff areas had suitable windows and doors to naturally ventilate the area. However, this was not reflected in the CO2 values observed as few rooms had any windows or doors open. Most rooms inspected recorded CO2 levels over 800 ppm. It is recommended that at least some windows and doors are kept open while occupied in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fan/s should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any openable windows or doors located next to a fresh air fan should remain closed to avoid short cycling2 . In Admin Block, the wall fan must be repaired or replaced. The duty must then be verified to ensure a minimum outdoor airflow flowrate of 70 L/s is achieved. This will ensure compliance with the National Construction Code Volume 1 [1]. In L Block, the following is required: • It must be confirmed whether fresh air is provided to the cassette AC units within New Rooms 7, 8, 10, 11, 13, and 14. If no fresh air is provided, the ventilation strategy must be reviewed to ensure compliance [1]. • New Room 16 (Bauhinia) currently appears non-compliant with the National Construction Code Volume 1 [1]. The ventilation strategy must be reviewed. In Mail/Teaching Block (C1 Block), it is recommended that the boards covering the external windows on the south façade be removed. This would improve natural cross ventilation. In Outstation, Staff 1 (East) and Staff 2 (West) are non-compliant with the National Construction Code Volume 1 [1]. The ventilation strategy must be reviewed. In Staff / Teaching (B Block), the apparent fresh air systems in each space must be verified for operation. In Teaching Block (C2 Block) and Teaching (D Block), operation of the fresh air fan / filter units within these buildings could not be verified. It is suspected that the dial located above each fan, on the ceiling, operates their respective fan. It is recommended these dials be tested to determine operation. It is further recommended that the fan switches be relocated to an accessible location for staff.
In general, classrooms have suitable windows and doors to promote adequate cross ventilation. However, the majority of windows and doors were closed at the time of the inspection for the following reasons: • Permanently shut for as a safety precaution for the children, as there is no mesh fitted to the openable windows, • Opening mechanisms of windows and the overall condition of windows appeared to be worn and as a result were difficult to open, • Miscellaneous items and / or curtains in front of windows prevented accessibility to windows for opening. As a result, high CO2 levels observed in almost all the occupied classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. The fitment of security mesh to low levels windows to allow for opening is recommended. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters are cleaned to ensure optimum performance of all fan units. B Block classrooms rely on a Cardiffair air-purge ventilation system for cross ventilation as natural cross ventilation is not possible. The operation of the air purge systems could not be verified at the time of inspection. It is therefore recommended that the systems be tested to ensure they are operating correctly. It is recommended that the air purge systems are not run when the air conditioning units are in use as the high air quantities introduced through the Cardiffair systems will adversely affect the efficiency and effectiveness of the cooling and heating systems. All openable doors and windows should remain open when the systems are running in order to allow ingress of sufficient make-up air to simulate a natural breeze It is recommended that air conditioning units and associated outside air ventilation fans in A Block R100A07, C Block R100C15, D Block R100D18 and the Resource Centre RG00J08 be repaired to ensure systems are operating correctly. All faulty / difficult to open windows should be repaired to allow opening and natural cross ventilation of rooms.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Most classrooms were fitted with fresh air fans; however, few were in use at the time of the inspection. It is recommended that, where feasible, at least some classroom windows, and the classroom doors, are kept open during lessons to promote cross ventilation. Airconditioning should also be used where fresh air fans are installed to ensure the fresh air fans are running during lessons if windows are closed. At least one window opposite the fresh air fan should be left partially open to improve efficient of the fan and ensure adequate cross ventilation of the room. To promote the use of natural ventilation, consideration should be given to the type and location of windows installed. A substantial portion of classrooms had no security screens installed to windows located on level 1 of buildings, which could reduce the ability to open these windows during class. The installation of mechanical ventilation in R10D001 should be considered. It is further recommended that the air conditioning unit serving RG0D004 be repaired as required.
In general, classrooms had suitable windowsand doors to promote adequate cross ventilation.All theclassrooms were fitted with fresh air fansand of those tested all were operational.It is recommended that, where feasible,at least some classroom windows, and the classroom doors, are kept open during lessons topromote crossventilation.Airconditioning should also be used where fresh air fans are installedto ensure the fresh air fans are running during lessonsif windows are closed.At least one window opposite the fresh air fan should be left partially opento improve efficient of the fan and ensure adequate cross ventilation of the room.To promote the use of natural ventilation, consideration should be given to the installation of security screens to allow the use of windows in the Main School Buildingand Annexe.Furthermore, it is recommended that all screws be removed from the windows and the opening mechanisms be repaired / serviced to allow for opening of windows to facilitate natural ventilation when required, as well as air relief.The ducted airconditioning system serving Main School Buildingand Annexerequires repair in order to supply fresh airto the building. Also, the operation of the ablutions extract system should be verified. Consideration should also be given to the installation of mechanical ventilation in the new combined room (RG0TECH/RG0TECR) of Shed 1 Kitchen

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region		Aircon remediations forwarded to Qbuild 30/11.			22/442501
School		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/691078
QTU / School					22/895048
Region		Verification remediations forwarded to Qbuild 11/11.			22/643722
Region		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/682994

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Charters Towers State High School	2006	Secondary school	North Queensland	Completed - whole school	Finalised - Released	Approved				12/08/2022
Claremont Special School	3066	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				28/07/2022
Clifford Park Special School	3087	Special school	Darling Downs South West	Completed - whole school	Finalised - Released	Approved		Meeting with Principal held to discus actions and remediations.		6/06/2022
Coomera State Special School	B016	Special school	South East	Completed - whole school	Finalised - Released	Approved				16/09/2022
Craigslea State High School	2023	Secondary school	Metropolitan	Completed - whole school	Finalised - Released	Approved				8/09/2022

GHD Ventilation Recommendations
In general, classrooms had suitable windowsand doors to promote adequate cross ventilation.Mostclassrooms were fitted with fresh air fans;however,few were in useat the time of the inspection.It is recommended that, where feasible,at least some classroom windows, and the classroom doors, are kept open during lessons topromote crossventilation.Airconditioning should also be used where fresh air fans are installedto ensure the fresh air fans are running during lessonsif windows are closed.At least one window opposite the fresh air fan should be left partially opento improve efficient of the fan and ensure adequate cross ventilation of the room.To promote the use of natural ventilation, consideration should be given to the type and location of windows installed. A substantial portion of classrooms had no security screens installed to windows located on level 1 of buildings, which could reduce the ability to open these windows during class.Windows had been nailed shut and/or were obstructed in some classrooms by installed security screens. Consideration should be given to removing and replacing to allow natural ventilation whilst occupied.Faulty air-conditioning and mechanical ventilation systems should be repaired as noted in Blocks B (RG00B25) and D(R100D33 and R100D35).
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed in occupied classrooms where windows and doors remained opened. However, at the time of inspection, windows and doors remained closed due to the health and safety of the children. It is recommended that at least some classroom windows, and where feasible the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters are cleaned to ensure optimum performance of all fan units. In B & C Block, the window mounted fresh air fans in each classroom should be upgraded and interlocked with the air conditioning units to ensure that fresh air is provided into the classrooms when the air conditioning units are operational. In E Block, it is recommended that outside air fans are installed and interlocked with the air conditioning units to ensure outside air is supplied into the room when the air conditioning units are operational.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. In the demountable blocks, this would require the stacking doors between the classrooms and withdrawal rooms to be open. As few classrooms were fitted with fresh air fans, it is recommended that at least some classroom windows are kept open during lessons in order to promote natural cross ventilation. Where opening windows is not feasible due to the safety of pupils, it is recommended that suitably sized fresh air fans are installed to mechanically ventilate the classrooms. Furthermore, the installation of air-relief grilles or louvres are recommended to allow for air relief without opening windows or doors to these rooms. Air-conditioning should be run where fresh air fans are installed to ensure that the fans are running during lessons. At least one window opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Where opening windows for air relief is not feasible, it is recommended that an air relief grille or louvre be installed to the façade opposite the fan.
Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The staff prep rooms of Blocks B and C appear to be non-compliant with Part F4.5(a) of the National Construction Code, Volume 1 [1]. This is due to having no external windows or doors. However, the mechanical ventilation system within each room may provide the required 20 L/s of outdoor air required to comply with F4.5(b). Therefore, it is recommended that the fan duty be verified to ensure compliance. The first-floor classrooms of Blocks B and C appear to be non-compliant with Part F4.5(a) of the National Construction Code, Volume 1 [1]. This is due to having only ~4.4% of the classroom floor area in openable window area. However, the mechanical ventilation system within each room may provide the required 300 L/s, or 312 L/s for classroom 108 of each building, of outdoor air required to comply with F4.5(b). Therefore, it is recommended that the fan duty be verified to ensure compliance. Storerooms 104 and 110 of Block C are currently used as staff office rooms. They are non-compliant with Part F4.5 of the National Construction Code, Volume 1 [1]. This is due to having no external windows or doors, and a lack of mechanical ventilation. It is recommended that a suitably sized fresh air and relief system be fitted to each room if the school intends to use the storerooms as occupied spaces. The Large Equipment Store G09 of Block H has been converted into an instrumental room. This space has no windows, external doors, or mechanical ventilation systems. However, the adjoining Multipurpose Court G19 appears to have suitable openable window / door area for G09 to borrow air, as specified within Part 4.7(b) of the National Construction Code, Volume 1 [1]. It is recommended that all internal G09 storeroom doors, as well as some multipurpose court G19 windows, remain open during use of the G09 room. It is further recommended that a suitably sized fresh air and relief system be fitted as the space may be used with closed doors if the court is in use.
In general, the classrooms and teaching spaces inspected appear to have sufficient openable windows and doors to be adequately naturally ventilated. Furthermore, the F Block Science laboratories were fitted with mechanical ventilation systems to ensure suitable mechanical ventilation during class and when experiments are being conducted. However, when the F Block Science fans are run, it is recommended the perimeter windows are opened to allow ingress of make-up air and improve the efficiency of the ventilation systems. In general, the classrooms and teaching spaces inspected appear to have sufficient openable windows and doors to be adequately naturally ventilated. Furthermore, the F Block Science laboratories were fitted with mechanical ventilation systems to ensure suitable mechanical ventilation during class and when experiments are being conducted. However, when the F Block Science fans are run, it is recommended the perimeter windows are opened to allow ingress of make-up air and improve the efficiency of the ventilation systems. In F Block Science, several window mechanisms were noted as faulty and as such, the associated windows could not be opened. It is recommended these mechanisms be repaired in order to ensure adequate natural ventilation to the classrooms and teaching spaces. This is particularly important in RG00F09 where none of the windows are openable . Furthermore, it is recommended the mechanical ventilation system serving RG00F09 is repaired to ensure adequate ventilation to the room when the classroom is in use. Given the nature of the room, (i.e. internal with only high level windows), it is recommended the ventilation system be interlocked with the light switch to ensure operation when the classroom is occupied. The installation of air relief (e.g., door grilles) is recommended to further ensure the efficient operation of the mechanical ventilation system. In F Block Science, RG00F07 does not appear to comply with the National Construction Code. Window-wall type units fitted to window openings have reduced the effective openable window areas to below the required levels, and the mechanical ventilation system installed was not operational at the time of the inspection. It is recommended that the redundant window-wall units be removed, and the windows be reinstated and made good, while the mechanical ventilation system be repaired as necessary. The air conditioning unit serving RG00F01 in F Block Science does not switch on and requires repair. The ventilation system serving RG00FG9 in F Block requires repair. In the K Block Staff Room, it is recommended the air conditioning unit installation be completed and the units and fresh air system commissioned.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/691105
IO					22/814979
IO					22/510356
IO					22/741922
					22/749320

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Cranbrook State School	1907	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved				29/08/2022
Currimundi Special School	3054	Special school	North Coast	Completed - whole school	Finalised - Released	Approved				1/09/2022
Currumbin Community Special School	3043	Special school	South East	Completed - whole school	Finalised - Released	Approved				24/08/2022
Darling Point Special School	3025	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				16/08/2022
Dutton Park State School	0506	Primary school	Metropolitan	Complete - whole school	Finalised - Released	Approved	Approved			11/03/2022

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Typically, rooms which did not utilise cross ventilation were found to have higher CO2 levels. Most rooms were found to have the majority of external doors and windows closed resulting in high CO2 levels recorded in several classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. Importantly, several fans were noted to have manual on / off switches located next to the fans. It is recommended that these be removed to prevent the fans being permanently switched off, and the fans be interlocked with the air-conditioning units so that they run when the air-conditioning is run. Where classrooms have no dedicated air relief system installed, at least one window or louvre opposite the fresh air fan/s should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any openable windows or doors located next to a fresh air fan should remain closed to avoid short cycling. The condition of the majority of HVAC equipment within the school were noted to be in good working order, however, equipment in some rooms were recorded as faulty and require immediate repair or replacement. Fresh air fans in classrooms RG0T1A1, RG0T1A2, RG0T1B1, RG0T3A1 and RG00T6B were all noted as non-operational. Air conditioning units in music block classrooms RG0T6MC and RG00T6B also require repair, particularly the cassette unit in RG00T6B that may pose a serious safety risk to students. It is further recommended that all fresh air filters are cleaned to ensure the fan / filter units are supplying sufficient fresh air to classrooms when running
In general, classrooms had suitable windows and doors to naturally ventilate the teaching spaces. Students also appeared to move frequently between indoor learning areas and outdoor play areas, thereby promoting natural ventilation through the opening of classroom doors. This was reflected in the low CO2 values observed. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fan should remain closed when the fan is in use to avoid short cycling1 . Within C Block, storerooms RG0CST5 and RG0CST6 have been converted into the withdrawal areas for the students. Each storeroom has no external windows, external doors, or mechanical ventilation systems installed. These rooms appear to be non-compliant with Part F4.5 of the National Construction Code, Volume 1 [1]. A suitably sized fresh air and relief system must be fitted if these rooms are to be used as habitable spaces. All E Block withdrawal rooms appear to be non-compliant with Part F4.5 of the National Construction Code, Volume 1 [1]. This is due to having no external windows or doors, and a lack of mechanical ventilation. This includes rooms RG00EW1, RG00EW2, RG00EW3, and RG00EW4. It is recommended that a suitably sized fresh air and relief system be fitted to each room. H Block has many withdrawal rooms and multi-purpose areas used by students and staff, across two floors. Most have no external windows or doors and appear to have a lack of mechanical ventilation. It is therefore suspected that these rooms do not comply with Part F4.5 of the National Construction Code, Volume 1 [1]. The ventilation strategy must be reviewed. Furthermore, in H Block, the following repairs or replacements are recommended: • HG-03.2 has a damaged ceiling tile (with grille) and a damaged airconditioning unit panel. • H1-03.2 has a damaged airconditioning unit panel. • Airconditioning controller errors to be resolved for HG-01.6, HG-01.7, HG-03.6, HG-03.7. In O Block, withdrawal rooms RG00OW2 and RG00OW3 may borrow air from their respective classrooms provided the high-level windows are of suitable size. This would thereby ensure compliance with Part F4.5 of the National Construction Code, Volume 1 [1]. These windows could not be measured on site due to being located at high-level. It is therefore recommended that these windows be measured. It is further recommended that a suitably sized fresh air and relief system be installed to these withdrawal rooms to ensure they are suitable for use when occupied with the door closed. Furthermore, in O Block, the high-level windows within the classrooms would currently require a large pole to open. It is unlikely that these windows are used as it would be difficult to open and close these windows. It is therefore recommended that an electronic opening system be installed such that the windows can be opened at low level without specialised equipment.
All classrooms had suitable windows and doors to naturally ventilate the teaching spaces. This was reflected in the low CO2 values observed. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. The fresh air systems within the sensory rooms should be operated when the space the occupied. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The doors located directly below a ducted fresh air vent should remain closed when the fan is in use to avoid short cycling1. The air-conditioning unit and fresh air system were non-operational within RG01127 (sensory room) and require repair. The classrooms within Building 31 had ducted fresh air vents located on the ceiling. They could not be verified for operation during the inspection. It is recommended that these vents be verified for operation by the Facilities Manager.
In general, classrooms had suitable windows and doors to promote natural ventilation. This was reflected in the low CO2 levels observed in occupied classrooms where windows and/or doors remained opened. However, at the time of inspection windows and doors remained closed in most classrooms due to the health and safety of the children. It is recommended that at least some classroom windows, and where feasible the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters are cleaned to ensure optimum performance of all fan units. It is recommended that air conditioning units in RG00C01, RG00D21 and RG000E6 be repaired to ensure systems are operating in an acceptable manner.
In general, most of the classrooms were fitted with fresh air fans and most appeared to be operational at the time of our inspection. This is reflected in the generally low CO2levels noted in most classrooms. In RG0DG01 (Prep M), CO2levels peaked at 863ppm with an operational fresh air fan. We recommend at least one window on the North façade (opposite the ventilation fan on South) is opened to ensure adequate cross ventilation and improve the performance of the ventilation system. In Block L, Rooms LL01 and LL02, we recommend the windows are unlocked and opened during class to allow cross ventilation. Should high CO2level still be experienced, we recommend the installation of a fresh air fan on the South façade of each classroom, opposite the door, to ensure cross ventilation in the event of all windows being closed. We recommend the library fresh air system be repaired / reinstated to ensure adequate fresh air supply to the library during peak break times.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region					22/815350
IO					22/741917
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/646775
IO					22/749380
Region	Assessment Delay - Flood 27/2	Aircon remediations forwarded to Qbuild 30/11.			22/327256

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
East Ayr State School	0902	Primary school	North Queensland	Completed - whole school	Completed - Pending report					3/06/2022

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. The majority of classrooms were fitted with fresh air fans however only 20% were operational at the time of the inspection with three (3) non-operational fans observed. It is recommended that, where feasible, at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air conditioning should also be used where fresh air fans are installed to ensure the fresh air fans are running during lessons if windows are closed. At least one window opposite the fresh air fan should be left partially open to improve efficient of the fan and ensure adequate cross ventilation of the room. To promote the use of natural ventilation, consideration should be given to the type and location of windows installed. A substantial portion of classrooms had no security screens installed to windows located on level 1 of buildings, which could reduce the ability to open these windows during class. It is recommended that the non-operational fan in B Block B 17 be repaired or replaced as required. It is further recommended that the air conditioning unit and fresh air fan serving R100D04 be repaired as required.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Emerald State High School	2112	Secondary school	Central Queensland	Completed - whole school	Revisit GHD - Term 4 Finalised - Released	Approved				22/06/22 -23/06/22, 12/10/2022

GHD Ventilation Recommendations

In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons
in order to promote cross ventilation. Where curtains cover openable windows, they should be moved out of the way or tied up. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fan/s should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room.
For F Block, the following is recommended:
• In RG0F001 and RG0F003, is it recommended that the screwed shut external windows be repaired so they are openable. This would provide both rooms with sufficient openable door/window area to comply with the National Construction Code Volume 1, Part F4.5(a). Alternatively, the fresh air fans within both rooms must supply at least 348 L/s of outdoor air to ensure compliance.
• In RG0F003, the operation of the fresh air fan must be verified, and the fan repaired or replaced if nonoperational. Once operational, the fan duty must be measured to ensure the minimum of 324 L/s of outside air is being provided to the room in order to ensure compliance.
• In RG0F005 and RG0G007, it is recommended that the high-level windows and the external doors remain open during lessons to promote cross ventilation. All screwed-shut windows should be repaired, so they are openable, and used during lessons.
• In RG0F006, it is recommended that the high-level windows remain open during lessons and the room be monitored using the Aranet4 CO2 logger provided by Education Queensland. If CO2 levels in excess 800 ppm persist, the ventilation strategy should be reviewed.
Should the above not be achievable, a detailed review of F Block's ventilation strategy is recommended in order to ensure compliance with the National Construction Code, Volume 1, Part F4.5 and improve the building ventilation. Within K Block, the fresh air fans for RG0K002 and RG0K005 must supply at least 110 L/s and 240 L/s of outdoor air, respectively, to be compliant with the National Construction Code (Volume 1, Part F4.5). It is recommended that the airflow be verified to ensure compliance. If the supplied airflow rate is lower than required, it is recommended that the ventilation strategy be reviewed, and remedial work be implemented in order to ensure compliance. For the Special Education building, it is recommended the withdrawal room divider door and window remain open during lessons in addition to some windows or the door on the classroom façade. This will promote natural cross ventilation.
It is recommended that the fresh air fan control philosophy in F Block RG0F002 and K Block RG0K002 be updated so that the light switch causes the fan to operate when the rooms are in use. All fixed, screwed, or painted windows should be repaired so they are openable. The same is recommended for RG0D008 where the windows would not remain open. All non-operational fresh air fans should be repaired or replaced.

OCT - In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Where curtains cover openable windows, they should be moved out of the way or tied up. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fan/s should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room.
For F Block,
• In RG0F001 and RG0F003, is it recommended that the screwed shut external windows be repaired so they are openable. This would provide both rooms with sufficient openable door / window area to comply with the National Construction Code Volume 1, Part F4.5(a) [1]. The fan / filter unit duties were measured during the reinspection, and do not appear to meet the minimum requirements as dictated by AS 1668.2 [2]. If the windows remain fixed, the filter should be cleaned or replaced, and then the fan duties remeasured. If values below the requirement continue to be recorded, it is recommended the ventilation system be upgraded to ensure compliance.
• RG0F002 has no external windows / doors and therefore does not comply with the National Construction Code Volume 1, Part F4.5(a) [1]. Furthermore, the ducted fresh air system does not appear to be meeting the requirements of AS 1668.2 [2]. The fan fitted is theoretically capable of meeting the compliance requirements [3] however, it is suspected that the filter for this system has not been cleaned. It is therefore recommended that the filter be cleaned or replaced, and the fan duty remeasured. A relief system should also be installed. It is further recommended that the fresh air fan control philosophy be updated so that the light switch causes the fan to operate when the room is in use.
• In RG0F005 and RG0G007, it is recommended that the high-level windows and the external doors remain open during lessons to promote cross ventilation. All screwed-shut windows should be repaired, so they are openable, and used during lessons.
• In RG0F006, the only source of natural ventilation is high-level windows that require a large pole to open /close. It is recommended that the high-level windows be updated such that they can be opened at ground level via a switch. This room should be monitored using the Aranet4 CO2 logger provided by Education Queensland. If CO2 levels in excess 800 ppm persist, additional fresh air provision may be required. For K Block, RG0K002 and RG0K005 have no external windows / doors and therefore do not comply with the National Construction Code Volume 1, Part F4.5(a) [1]. Furthermore, the fresh air fans within these rooms appear unlikely to meet the requirements of the National Construction Code (Volume 1, Part F4.5) [1].
• RG0K002's system was determined to provide approximately 30 L/s of outside air. This is sufficient for a maximum of three occupants, which is reported by staff as the typical number of occupants. If more occupants intend to use the space, the filter should be cleaned and the fan duty remeasured, as the installed fan is theoretically capable of providing 110 L/s of outside air [4]. It is further recommended that the fresh air fan control philosophy be updated so that the light switch causes the fan to operate when the room is in use.
• RG0K005's system was observed to be non-operational during the reinspection. Despite this, the fan fitted is unlikely able to supply the required 240 L/s as per AS 1668.2 [2]. A suitably sized fresh air system should be designed and installed. It is further recommended that the fresh air fan control philosophy be updated so that the light switch causes the fan to operate when the room is in use. For the Special Education building, it is recommended the withdrawal room divider door and window remain open during lessons in addition to some windows or the door on the classroom façade. This will promote natural cross ventilation. All fixed, screwed, or painted windows should be repaired so they are openable. The same is recommended for RG0D008 where the windows would not remain open. All non-operational fresh air fans should be repaired or replaced.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
IO	2x Air Purifiers supplied to the school by the region.	Aircon remediations forwarded to Qbuild 30/11.			22/581284

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Eungella State School	1353	Primary school	Central Queensland	Completed - whole school	Finalised - Released	Approved				25/07/2022
Ferny Hills State School	0250	Primary school	Metropolitan	Completed - whole school	Completed - Pending report					
Geebung Special School	3077	Special school	Metropolitan	Completed - whole school	Completed - Pending report					
Glenmore State School	0574	State School	Central Queensland	Completed - whole school	Finalised - Released	Approved				15/08/2022
Goodna Special School	3034	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				9/08/2022
Graceville State School	1515	Primary school	Metropolitan	Followup - Complete Complete - Targeted	Follow - up complete Finalised - Released	Approved	Approved	Recommendation discussed with Principal via Regional Infrastructure Manager Metro Region	Follow-up undertaken and confirmed no further action is required at this stage	10/02/2022
Gumdale State School	0212	State School	Metropolitan	Completed - whole school	Completed - Pending report	Approved				16/8/22, 24/8/22

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Veranda windows opposite the classrooms should also remain open. Airconditioning should be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The mechanical louvres within classrooms RG00AC1 and RG00AC4 were operational at the time of inspection. However, since the staff have been directed not to use these louvres, they should be examined for safe operation and repaired as necessary. Furthermore, the broken windows within RG00AC4 should be repaired. Within New Room 2, it should be determined whether the four axial fresh air fans are faulty or have been disconnected due to the inclusion of a new fan / filter unit supplying filtered fresh air. If faulty, they require repair. The airconditioning and fresh air fan in RG0AUCA was not operational as there was no power to the on / off switch. This should be repaired and the operation of the airconditioning unit and fan verified. The fresh air system within R1000AL was not verified as it was located on a high ceiling. This system should also be verified for operation. All other non-operational bar heaters should be repaired or replaced where required.
In general, classrooms had suitable windows and doors to naturally ventilate the teaching spaces. This was reflected in the low CO2values observed.Where feasible, it is recommended that some classroom windowsordoors, are kept open during lessons in order to naturallyventilate the space. Air-conditioning should also be used where fresh air fans are installedto ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fan should remain closed when the fan is in use to avoid short cycling2.ForF Block,it is recommended the HVAC systemsserving the building be investigated to determine the source of the reported odour. This may require an internal check of all ducting and the air handling unit. Within RG00F09, the fan duty must be verifiedto ensure 180 L/s of outdoor airis supplied by the fresh air system. This will thereby ensure compliance with the National Construction Code, Volume 1, Part F4.5.All non-operational fresh air fans (e.g., RG00H02)should be repaired or replaced.It is recommended the broken window opening mechanism for the louvreswithin RG00C03be repaired or replaced as appropriate.It must be noted that this room has sufficient windows to naturally ventilate the space despite some louvres being non-openable.
In general, classrooms appear to have suitable windows and doors to promote adequate natural ventilation. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available.In rooms with fresh air fans installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. In A Block, it is recommended that the duty of the fresh air fans serving the centrally located classrooms be verified to ensure compliance with AS 1668.2. The operation of the fresh air fan serving A Block JP3 shouldbe verified, and the fan repaired or replaced asnecessary. The switch controlling the operation of the airconditioning unit and ventilation fan serving L Block RG00L01is faulty and requires repair or replacement to allow the systems to be switched on.All Q Block windows must be checked for operation to allow natural ventilation. All missing louvre window handles should be replaced, and all windows screwed shut should be made to open.
In general, classrooms with several windows open, especially on at least 2 opposing sides of the room, were noted to have low CO2 levels. In most cases, CO2 levels did not exceed 800ppm. In Block F, CO2 levels exceeded 800ppm, though did not exceed 1000ppm. In room R10FC58, with the highest reading, the windows on one side of the classroom (opposite the foyer) were noted during our inspection to all be closed. This, in addition to the layout of the classroom, appears to be hampering adequate cross ventilation. We recommend that windows on both sides of the classrooms in this block are kept open in order to improve cross ventilation and reduce CO2 levels.
In general, classrooms had suitable windows and doors to promote adequate natural ventilation. However, this was not evident in the generally high CO2 levels observed on site. Where high CO2 levels were noted, classroom doors and windows were found to be closed. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. Where opening windows or doors is not feasible due to the health or safety of students, it is recommended that suitably sized fresh air systems are designed and installed. These fresh air fans should be controlled to run when the rooms are occupied (i.e., lights are switched on) as opposed to only when the airconditioning is switched on. In rooms with fresh air fans already installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The installation of air relief grilles or louvres to facades opposite the installed fans to all mechanically ventilated rooms is recommended in order to improve fresh air circulation and cross ventilation. It is recommended that all fresh air fans are cleaned and filters checked as the fresh air fan in RG00D03 appeared to be dirty or mouldy, and little airflow could be felt coming from this fan. Operation of the fresh air fan in RG00G03 must be verified as the unit would not operate during the inspection, but the teacher indicated that it does run. The fresh air fan installed in RG00J01 is noisy and it is recommended that this fan is inspected to determine and rectify the cause of this noise. In addition to this, operation of the fresh air fan installed in RG00J02 should be investigated as it was non-operational at the time of the inspection. The operation of the fresh air fan serving RG00N02 should be verified, as the fan did not turn on during the inspection. The air-conditioning unit in RG00O01 needs to be cleaned and maintained as the teacher in the room indicated that this unit spits out black particles when operated. It is recommended that operation of the air-conditioning units and fresh air fan in S02 Block are investigated as these units were non-operational at the time of the inspection. In addition to this one of the air-conditioning units serving S03 Block was non-operational and operation of the fresh air fan in this room could not be verified. It is recommended that operation of the air-conditioning unit, and associated fresh air fan serving T.03 is investigated as this unit would not turn on using the control switch in the room, and the teacher indicated the air-conditioning unit was not working that day.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
School		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/644063
Region					
IO					
		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/683023
IO		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/683096
School	Draft report shared with the region for school consultation		Yes - Reports have been received about Students utilising private CO2 monitors.		22/169398
School					22/815478

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Gympie Special School	3007	Special school	North Coast	Completed - whole school	Finalised - Released	Approved				6/09/2022
Heatley State School	0305	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved				31/08/2022
Hervey Bay Special School	3057	Special school	North Coast	Completed - whole school	Finalised - Released	Approved	N/A			9/05/2022
Home Hill State School	1380	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved				6/06/2022

GHD Ventilation Recommendations
Most classrooms and withdrawal rooms had suitable windows and doors to naturally ventilate the learning spaces. It is suspected that this, along with low occupancies and high student / staff traffic, resulted in the low CO2 values observed. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. The fresh air systems within the sensory rooms should be operated when the space the occupied. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. R10B02C of Block B02 has limited natural ventilation and cannot be cross ventilated. It is recommended that a suitably sized fresh air and relief system be fitted to improve ventilation within the classroom. The non-operational fans within RG0B01B, RG0B01A, and R10B03F should be repaired or replaced.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Typically, rooms which did not utilise cross ventilation were found to have higher CO2 levels, although most rooms were found to utilise mechanical and/or natural ventilation to good effect, resulting in low CO2 levels recorded in the majority of classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. Importantly, several fans were noted to have manual on / off switches located next to the fans. It is recommended that these be removed to prevent the fans being permanently switched off, and the fans be interlocked with the air-conditioning units so that they run when the air-conditioning is run. As the classrooms have no dedicated relief air paths installed, at least one window or louvre opposite the fresh air fan/s should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any openable windows or doors located next to a fresh air fan should remain closed to avoid short cycling. It is further recommended that all fresh air filters are cleaned to ensure the fan / filter units are supplying sufficient fresh air to classrooms when running. It was noted during the inspection that several rooms have faulty air conditioning or fan units installed that require repair or replacement. Air conditioning units in classrooms RG00H04, RG00L01, RG00L02, RG00E07, RG00J04, RGSEP01 and RGSEP02 were recorded as non-operational and require attention. Fresh air fans in classrooms RG00H04, RG00L02, RG00J02, RG00J04, RG00PA1, RGSEP01 and RGSEP02 were also noted to be non¬ operational. It is recommended that the operation of all air conditioning units and fresh air fans in the above¬ mentioned classrooms be verified and repairs made as necessary.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Several rooms were also fitted with fresh air fans and majority were operational at the time of the inspection. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation of the rooms. Air-conditioning should also be used where fresh air fans are installed to ensure the fresh air fans are running during lessons. It is further recommended that RG00D03 be monitored, with windows and doors open, using the Aranet4 CO2 logger provided by Education Queensland. Should readings in excess of 800 ppm be observed, then it is recommended that a suitably sized fresh air fan be installed. It was noted that none of the classrooms were provided with air-relief grilles or louvres. As such, if doors and windows are kept closed while the air-conditioning is run, it is recommended at least one window opposite the fresh air fan is left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. Consideration should be given to the type of windows and doors installed particularly the Preparatory Unit and windows located on the second storey. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Consideration should be given to the installation of security screens and/or the replacement of a sliding door with a wall panel and louvres to promote the use of natural ventilation in the Preparatory Unit 1 (1380-S-PR01-GRND). It is noted that a design review should be undertaken to ensure compliance under the NCC if doors are replaced. All non-operational fresh air fans and air conditioners should be repaired or replaced.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
IO					22/749393
Region					22/815338
IO		Window remediations forwarded to Qbuild 2/11.			22/332617
Region		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/643540

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Ingham State High School	2027	Secondary school	North Queensland	Completed - whole school	Revisit GHD - Term 4 Finalised - Released	Approved		Meeting Scheduled with Principal 31/08/2022		23/05/2022 -24/05/2022, 25/10/2022
Ingham State School	0450	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved				18/05/2022
Innisfail State College	6463	Primary/Secondary school	Far North Region	Completed - whole school	Revisit GHD - Term 4 Completed - Pending report					

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation with the exception of G Block. The majority of classrooms were fitted with fresh air fans, however, only 50% were in use at the time of the inspection with two (2) non-operational fans observed. It is recommended that, where feasible, at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air conditioning should also be used where fresh air fans are installed to ensure the fresh air fans are running during lessons. At least one window opposite the fresh air fan should be left partially open to improve efficient of the fan and ensure adequate cross ventilation of the room. D Block room R100D11 does not appear to comply with the National Construction Code. The ratio of openable windows to floor area of the classroom is under 5% as required by Volume 1, part F4.6. The mechanical ventilation system was also non-operational, and it is likely the control strategy would not meet compliance. We recommend a review of R100D11 ventilation strategy and the implementation of remedial work in order to ensure compliance. To promote the use of natural ventilation, consideration should be given to the type and location of windows installed. A substantial portion of classrooms had high level louvres installed that would be difficult to reach and open from the ground. There were also no security screens installed to windows located on level 1 of buildings, which could also reduce the ability to open these windows during class. OCT - In general, classrooms had suitable windows and doors to promote adequate cross ventilation with the exception of G Block. The majority of classrooms were fitted with fresh air fans, however, only 50% were in use at the time of the inspection with two (2) non-operational fans observed. It is recommended that, where feasible, at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Airconditioning should also be used where fresh air fans are installed to ensure the fresh air fans are running during lessons. At least one window opposite the fresh air fan should be left partially open to improve efficient of the fan and ensure adequate cross ventilation of the room. To promote the use of natural ventilation, consideration should be given to the type and location of windows installed. A substantial portion of classrooms had high level louvres installed that would be difficult to reach and open from the ground. There were also no security screens installed to windows located on level 1 of buildings, which could also reduce the ability to open these windows during class. The ventilation fan serving D Block room R100D11 was non-operational. It is recommended the fan be repaired as required. Furthermore, the louvre windows in R100D11 were not openable. It is recommended the window mechanisms be serviced or repaired to allow for the windows to be opened and thereby naturally cross ventilate the room. The ventilation fan serving G Block room RG00G22 was non-operational and requires replacement or repair.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. Consideration should be given to the type of windows installed, particularly high-level louvres and windows located on the second storey. The installation of security screens could promote the use of natural ventilation. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. All non-operational fresh air fans and air conditioners should be repaired or replaced. The time delay on fresh air fans should be tested and adjusted if required. Fresh air fans that were noted as non-operational after 10 minutes of switching on the air conditioning were: A Block R10AT02, A Block R10AT03, B Block R10BT08, B Block R10BT09, C Block R10CT13, D Block RG0DLS1, E Block RG0ET03, E Block RG0ET06, Prep Building RG0PT01, Prep Building RG0PT02.
In general, most classrooms had suitable windows, doors and apparent fresh air systems installed to promote adequate ventilation. However, most classrooms observed had all external windows and doors closed and no air relief systems installed. It is recommended that, at least some classroom windows, and the classroom doors are kept open during lessons to promote cross ventilation. Air conditioning should be used where fresh air systems are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air system should be left partially open to improve the efficiency of the system and ensure adequate cross ventilation of the room. Where there is no air-relief opposite the fresh air fan or system, it is recommended that a suitably sized relief damper or grille be installed. In many cases where suspected in-ceiling ERV units or ducted fresh air systems are installed, the operation of these systems could not be verified through the general inspection conducted due to the height of the air outlets. It is recommended that the operational state of these systems be confirmed, and repairs made where required. All filters should be cleaned, and the performance of all units should be verified against the specified / design duties in order to ensure adequate mechanical ventilation when in use. During the inspection it was noted that classrooms R10BF07 and RG0OG06 had no openable external doors or windows. Classrooms R10BF08 and R10XF02 also had no openable external windows, although both had openable external doors. In each case, external windows to these rooms were all fixed and could not be opened. Calculations conducted as part of this report indicate non-compliance with the NCC in regard to natural ventilation for B Block classrooms R10BF07 and R10BF08, C Block classroom RG0CG03 as well as O Block classroom RG0OG06. Compliance with the NCC may still be met should the installed mechanical ventilation systems be operational and providing fresh outside air at a rate that complies with section F4.5(b) of the NCC and Appendix A of AS 1668.2. It is recommended that the compliance of the mechanical fresh air systems be verified, and if found to be noncompliant, the windows replaced with openable windows to improve cross ventilation through the rooms. Within P Block classroom RG0PG19 it was also noted the ceiling mounted cassette unit used to cool the classroom is severely damaged with all air grilles missing and is non-operational. It is recommended that this unit be replaced to ensure adequate temperature control to the room.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region		Aircon remediations forwarded to Qbuild 30/11.			22/510364
Region		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/643796
QTU		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/647022

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Ipswich Special School	3018	Special school	Metropolitan	Complete - whole school	Finalised - Released	Approved	Approved			14/03/2022
Ipswich West Special School	3015	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				16/08/2022
Junction Park State School	0514	Primary School	Metropolitan	Completed - whole school	Finalised - Released	Approved				26/07/2022
Kedron State School	0371	Primary School	Metropolitan	Completed - whole school	Finalised - Released	Approved				27/10/2022

GHD Ventilation Recommendations
Due to the nature of the school, classroom windows are kept closed and locked and the air-conditioning is run during school hours. Therefore, mechanical ventilation systems to all classrooms are essentialto effectively ventilate occupied spaces. Few classrooms were noted as having fresh air fans installed. Where not already installed, we recommend the installation of fresh-air fan filter units suitably sized to provide the required amount of fresh air to the occupied spaces. Furthermore, we recommend the installation of a suitable air-relief system (such as a discharge louvre) to all these classrooms for adequate air flow and cross ventilation of the spaces. The installation of fans with air-relief would be requiredto the following classrooms / blockswhere not currently fitted: 1.B BlockManual Arts Room (RG000B2)2.I Block Teaching Space I1 (RG000I1)3.I Block Teaching Space I2 (RG000I2)4.J Block Teaching Space J1 (RG000J1)5.J Block Teaching Space J2 (RG000J2)6.K Block Teaching Space K1 (RG000K1)7.K Block Teaching Space K2 (RG000K2)In buildings and rooms conditioned by window/wall type units, we recommend the operation and position of the fresh air dampers be verified. Where units are not fitted with fresh air dampers, the installation of fresh air fans with air-relief would be required as per the above. This would apply to:1.B Block Home Ec / Senior Art Room (RG000B1)2.E Block Teaching Space E17 (RG00E17)3.E Block Nursery / Staff Room (New Room)We recommend all non-operational fresh air fans are repaired or replaced where necessary to ensure adequate fresh air supply to classrooms. These fans include:1.E Block Teaching Space E18 (RG00E18)2.E Block Teaching 3 (New Room)3.F Block Teaching Space F2 (R1000F2)4.F Block Activity Area (RG000F3)In A Block, which has recently been refurbished and fitted with new cooling and ventilation systems, we recommend the operation of the fresh air fans be verified, as these did not appear to be operational at the time ofour inspection (with the exception of the staff room).
In general, classrooms appear to have suitable windows and doors to promote adequate natural ventilation. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. In rooms with fresh air fans installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. In rooms with ducted units drawing fresh air in directly from outside, the units should be run during lessons in order to ensure a steady supply of fresh air. In A Block, the windows in RG00A06 and RG00A07 should be serviced and repaired where necessary in order to ensure they are openable. The installation of security mesh is recommended where required to ensure the safety of students. In E block, the operation of all fresh air fans should be verified, and the fans repaired or replaced where necessary. Furthermore, the E Block fans are provided with separate switches, allowing them to be switched off while operating the airconditioning. It is recommended the sperate switches be removed and the fans be interlocked with operation of the lights instead so that they run when the class is occupied.
In general, classrooms had suitable windows and doors to promote adequate natural ventilation. This was reflected in the low CO2values observed in approximately half the classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. In rooms with fresh air fans installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. As most of the fans are installed above or near the classroom doors, it is recommended the doors are closed to prevent short-cycling of the fresh air fans when in use. In RG0AG27, the Art Room, it is recommended that the fan controls be modified to run when the classroom is in use. Controlling the fans using the light switch or an occupancy sensor instead of the airconditioning control is recommended. Furthermore, it is recommended that the duty of the fresh air fans be verified to ensure compliance with AS 1668.2. Finally, the room should be monitored using the Aranet4 CO2sensor provided by Education Queensland and the room flagged for further investigation should the high CO2levels persist. The fan switch in A20A207 is faulty and requires replacement. The airconditioning controller in R10C105 is faulty and requires repair or replacement. The installation of a fresh air fan / filter unit to RG0DG61 is recommended. It is recommended the unit be controlled using the light switch or an occupancy sensor to allow the fan to run when the room is in use.
In general, classrooms had suitable windows and doors to naturally ventilate the teaching space. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Within A, B, and C Blocks, many windows were found to be non-openable. This was due to the windows being painted shut and/or having faulty opening mechanisms. It is recommended that these windows be repaired or replaced as necessary. This is particularly important for classroom R10AU02 and the library R10BUL1 (note, high occupancies may occur in this space), where the majority of windows were non-openable. All Hall Block rooms are unconditioned and, excluding the RG00HMP multi-purpose hall, lack mechanical ventilation. RG00HMM may be separated into two areas using the dividing partition wall, reducing the amount of natural ventilation available and making cross ventilation unavailable to the north side area. Similarly, New Room 1 cannot become cross ventilated as external windows and doors are located on the same façade. It is therefore recommended that the divider door in RG00HMM remains open, as should all external windows and doors within New Room 1, when the spaces are used for prolonged periods of time. If this is not feasible, a suitably sized fresh air system should be installed within each space. A fresh air system is not required for the northern side of RG00HMM as the two large windows provide adequate natural cross ventilation. The non-operational air-conditioning units within M Block RG00M04 and S Block RG00S01 should be repaired or replaced. The non-operational fresh air fan within M Block RG00M04 and Cardiffair exhaust system within Hall Block RG00HMP should also be repaired or replaced. The air-conditioning has missing blades in B Block RG0BUTR that require replacement.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region	* Assessment Delay - Flood 27/2 * 10x Air Purifiers provided to the principal for installation.	Forwarded to Phil Sawers for Investigation Aircon remediations forwarded to Qbuild 30/11.			22/208207
IO					22/749403
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/677144
					22/815411

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Kirwan State High School	2146	Secondary school	North Queensland	Completed - whole School	Finalised - Released	Approved				9/08/2022
Kuraby Special School	3040	Special school	Metropolitan	Completed - Whole School	Finalised - Released	Approved				11/08/2022
Lee Street State Special School	A791	Special school	North Coast	Completed - whole school	Finalised - Released	Approved				17/08/2022
Logan City Special School	3001	Special school	South East	Completed - whole school	Finalised - Released	Approved				13/09/2022

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. However, this was not reflected in the CO2 values observed as few classrooms had any windows or doors open. Several rooms were also observed to have windows screwed shut and no longer openable. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fan/s should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any openable windows or doors located next to a fresh air fan should remain closed to avoid short cycling. From the inspection of the classrooms at Kirwan State High School the following recommendations have been made: • It is recommended that the outside air flow rates supplied to the air conditioning systems supplying all levels of the English / Humanities Block classrooms be verified to meet the requirements of the AS1668.2 and DETE School Standard Air Conditioning Specification. If necessary, outside air flow rates shall be increased to improve air quality in the classrooms, pending confirmation that the air conditioning units have additional capacity to temper the additional heat load. • The outside air flow rate to classroom RG0MA03 supplied through a suspected ERV system should be verified to meet the requirements of Appendix A of AS 1668.2 and section 2.3.4 of DETE School Standard Air Conditioning Specification due to the room having no external windows or doors. • Outside air fans and air conditioning units in the Maths Demountable building should be repaired or replaced as necessary. The outside air flow rates of the fans should be verified to meet the requirements of Appendix A of AS 1668.2. Furthermore, the screws in external windows should be removed to enable adequate natural ventilation and compliance with the NCC. • A review of the ventilation strategy of the Performing Arts Block is required. Enclosing the courtyard RG0PAYZ has adversely affected natural and mechanical ventilation to RG0PA01, RG0PA02 and RG0PA03. While RG0PA01 appears to comply with the requirements of AS1668.2 and RG0PA03 complies with the National Construction Code Volume 1, the mechanical ventilation to RG0PA02, as supplied by the single compliant fresh air fan, must be verified in order to verify compliance with AS1668.2, as the room no longer complies with the requirements of the NCC, Volume 1. • Classrooms as part of the Science Demountable SC01/2/3 building currently fail to meet the ventilation requirements of the NCC due to external windows being screwed shut and no apparent fresh air systems being installed in the rooms. It is recommended that mechanical fresh air systems be installed, and screws removed from the windows to enable natural ventilation. • All screwed shut or damaged windows should be repaired so they are openable. • Security screens should be installed on all classroom windows to encourage teachers to open windows. • All non-operational fresh air fans and air conditioning units should be repaired or replaced.
In general, classrooms had suitable windows and doors to promote adequate natural ventilation or were provided with mechanical ventilation. This was reflected in the low CO2 values observed in approximately half of the classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. Where opening windows or doors is not feasible due to the health or safety of students, it is recommended that suitably sized fresh air systems are designed and installed. These fresh air fans should be controlled to run when the rooms are occupied (i.e., lights are switched on) as opposed to only when the air-conditioning is switched on. In rooms with fresh air fans already installed, the air-conditioning should also be used to ensure they are running during lessons, or the fans should be modified to run when the rooms are occupied (through interlock with the lighting or connection to existing occupancy sensors). At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The installation of air relief grilles or louvres to facades opposite the installed fans to all mechanically ventilated rooms is recommended in order to improve fresh air circulation and cross ventilation. It is recommended that operation of the fresh air fans in the following buildings be verified by maintenance staff, along with any interlocks associated with them: – E Block – H Block – J Block – M Block
In general, classrooms appear to have suitable windows and doors to naturally ventilate the teaching spaces. Classrooms that had windows opened recorded lower CO2 values. Therefore, it is recommended that at least some classroom windows are left open during lessons to provide natural ventilation and cross ventilation where possible. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons to naturally ventilate the space. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fan should remain closed when the fan is in use to avoid short cycling1 . Some classes that had the fresh air fans operating when the windows and doors were closed, still recorded CO2 values above 800 ppm. This occurred in C Block GLA 3.1, 3.2 on ground level, and GLA 3.7 on level 1, D block GLA 1.5 on ground level and I block IF-05 and IF-09 on level 1. It is suspected that a lack of air relief resulted in the high readings noted. The installation of air relief grilles is recommended. If this is not possible, it is recommended at least one window be left open to offer air relief to the room. It must also be noted that the operation of the fresh air fans in I block classrooms IG-17 and IG-21 on ground level could not be verified. Therefore, the operation of these fresh air fans should be verified. The air-conditioning unit serving Therapy 3.1 in C Block should be repaired or replaced to ensure the cooling cycle is operational. In C Block, GLA 3.5, the fan switch is incorrectly installed / labelled (off switch is on, on switch is off). This should be rectified to avoid confusion and ensure correct operation. The air-conditioning unit and fresh air fan serving classroom GLA 2.5 in GLA-E were non-operational. This could be due to a faulty switch. It is recommended the system be repaired as required. The switch controlling the operation of the air-conditioning unit and fresh air fan serving IF-02 in I Block is faulty and should be repaired or replaced, as necessary. The switch controlling the operation of the air-conditioning unit and fresh air fan serving IF-05 in I Block is faulty and should be repaired or replaced, as necessary. The toilet exhaust fan located in I Block within room IG-01 was non-operational and should be repaired or replaced as necessary.
In general, classrooms appear to have suitable windows and doors to promote adequate natural ventilation. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. In rooms with fresh air fans installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Where fresh air fans and intakes are located above or close to the classroom doors, the doors should be kept closed during operation of the ventilation systems in order to minimize the effects of short cycling. It is recommended the furniture in front of the classroom windows in E Block RG00E01 be relocated in order to facilitate window opening and not hamper natural cross ventilation, given there are no fresh air fans installed to E Block. The following fresh air ventilation systems were noted to be faulty during the inspection and require repair: • D Block: RG00D21 • H Block: RG00H01 and RG00H04 • K Block: RG00K02 • L Block: RG00L02 • N Block: RG02201 and RG02202 • P Block: OAF-2 • Q Block: OAF-1 The airconditioning unit serving R Block RG12.1 is faulty and requires repair.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region					22/895289
IO					22/749487
IO					22/895171
IO					22/895112

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
MacGregor State High School	2124	Secondary school	Metropolitan	Complete - Targeted	Finalised - Released	Approved	Approved			11/02/2022
Mackay District Special School	3082	Special school	Central Queensland	Completed - whole school	Finalised - Released	Approved				27/07/2022
Mackenzie State School	3012	State school	Metropolitan	Completed - whole school	Finalised - Released	Approved				28/07/2022
Mackenzie State Special School	3012	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				28/07/2022
Marshall Road State School	0708	State School	Metropolitan	Completed - whole school	Finalised - Released	Approved				25/08/2022
Maryborough Special School	3017	Special school	North Coast	Complete - whole school	Finalised - Released	Approved	N/A			10/05/2022

GHD Ventilation Recommendations
In general, classrooms with several windows open, especially on at least 2 opposing sides of the room, were noted to have low CO2 levels. In most cases, CO2 levels did not exceed 800ppm. In block E, the installation of electrical conduits to external windowsills hampered the opening of low-level windows, adversely affecting air circulation to these classrooms. This is evident in the CO2 levels recorded. We suggest this installation be reviewed and the conduits be relocated in order to facilitate the opening of windows. Alternatively, the opening of high-level windows must be considered, but assistance may be required in certain areas where furniture layouts hamper the opening of high-level windows. Most classrooms were fitted with fresh air fans, but the operation of the fans could not be accurately verified during our inspection given the current control logic (fresh air fan starts 10 minutes after air-conditioning unit starts). We recommend the operation of all fans be verified, and consideration given to starting the fans sooner after the air-conditioning unit starts. Furthermore, we recommend windows on the façade opposite to the installation of the fan be left partially open to facilitate the movement of fresh air across the classrooms. Finally, we recommend doors are kept open during lessons, weather and noise permitting.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The non-operational fresh air fan in RG00D08 should be repaired or replaced. The ventilation fans serving RG00B14 are not able to be switched on and require the installation of a control system / control switch.
In general, classrooms had suitable windows and doors to promote adequate natural ventilationor were provided with mechanical ventilation. This was reflected in the low CO2values observed in approximately halfthe classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. In rooms with fresh air fans already installed, the air-conditioning should also be used to ensure they are running during lessons, or the fans should be modified to run when the rooms are occupied (through interlock with the lighting or connection to existing occupancy sensors). At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The installation of air relief grilles or louvres to facades opposite the installed fans to all mechanically ventilated rooms is recommended in order to improve fresh air circulation and cross ventilation. It is recommended that the filters to all classroom fans be checked and that the fan bearings be checked for undue noise and vibration
In general, classrooms had suitable windows and doors to promote adequate natural ventilationor were provided with mechanical ventilation. This was reflected in the low CO2values observed in approximately two thirds ofthe classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. Where opening windows or doors is not feasible due to the health or safety of students, it is recommended that suitably sized fresh air systems are designed and installed. These fresh air fans should be controlled to run when the rooms are occupied (i.e., lights are switched on) as opposed to only when the air-conditioning is switched on. In rooms with fresh air fans already installed, the air-conditioning should also be used to ensure they are running during lessons, or the fans should be modified to run when the rooms are occupied (through interlock with the lighting or connection to existing occupancy sensors). At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The installation of air relief grilles or louvres to facades opposite the installed fans to all mechanically ventilated rooms is recommended in order to improve fresh air circulation and cross ventilation. It is recommended that the ducted fresh air systems serving Building 31 be rebalanced, as low air flows were noted in some classrooms, and excessive air flow and noise in others.
In general, classrooms had suitable windows and doors to promote adequate natural ventilation. This was reflected in the low CO2 values observed in over three quarters of the classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. Where opening windows or doors is not feasible due to the health or safety of students, it is recommended that suitably sized fresh air systems are designed and installed. These fresh air fans should be controlled to run when the rooms are occupied (i.e., lights are switched on) as opposed to only when the air-conditioning is switched on. In rooms with fresh air fans already installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The installation of air relief grilles or louvres to facades opposite the installed fans to all mechanically ventilated rooms is recommended in order to improve fresh air circulation and cross ventilation. The cassette unit serving R100C03 should be investigated following a report from the administration staff that this unit has been non-operational for approximately three months. The filters on the under-ceiling unit serving R100D03 need to be investigated as they are currently loose. The wall mounted unit serving the Music Room (RG0PAC2) should be investigated to determine the cause of the error code (E101) that was present on the unit at the time of inspection. The southeast cassette unit serving the Resource Centre (RG00R01) should be investigated to determine why it would not turn on along with the other units. The ceiling grilles in this room should also be cleaned. The fresh air system serving the Media Rooms in the Resource Centre (RG00R02 and RG00R03) should be rebalanced and airflow measured to ensure it is adequate for usage as a classroom, as little airflow could be felt coming from the grilles.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Several rooms were also fitted with fresh air fans and majority were operational at the time of the inspection. It is recommended that, where feasible, at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fan should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. For J and L blocks, it is recommended that the computer room dividers and windows should remain open during lessons to ensure adequate cross ventilation of the teaching spaces. The fresh air fan in RG00B11 should be repaired or replaced. In the interim, all louvres should remain open. It is further recommended that the entire space be used for lessons where feasible (i.e., open the divider). This would allow the operational fresh air fan in the staff room end to provide filtered fresh air to the class. All other non-operational fresh air fans should also be repaired or replaced.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region	Draft report shared with the region for school consultation	Forwarded to Phil Sawers for Investigation Verification remediations forwarded to Qbuild 11/11.			22/170544
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/647201
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/683105
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/683110
School		All remediations sent to Qbuild 29/11.			22/750069
IO		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/327220

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Milpera State High School	2024	Secondary school	Metropolitan	Completed - whole school	Finalised - released	Approved				1/09/2022
Mitchelton Special School	3005	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				1/08/2022
Mitchelton State School	1538	State School	Metropolitan	Completed - Targeted	Finalised - Released	Approved				15/09/2022
Moorooka State School	1637	State School	Metropolitan	Completed - whole school	Finalised - Released	Approved				1/09/2022
Mount Isa Central State School including CLAW	1067	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved		Meeting with the Principal held on 18/8/22. Remediation list provide to QBuild for action.		30/05/2022
Mount Isa Special School	3004	Special school	North Queensland	Completed - whole school	Finalised - Released	Approved				31/05/2022

GHD Ventilation Recommendations
All the rooms inspected in B Block, C Block (Teachers / TA Staff Rooms), E Block, H Block Adele Rice Centre and R Block had sufficient openable windows and doors to allow for sufficient natural ventilation of the rooms. This is reflected in the overall low CO2 levels observed. Where the CO2 level exceeded 800 ppm, windows and doors to the occupied rooms were found to be closed. In B Block, it is recommended that some windows on opposite sides of the class are opened during lessons to allow for natural cross ventilation of the rooms, as the doors are kept closed by door closers and there appears to be no fresh air fans installed. In H Block Adele Rice Centre, when the airconditioning is not running, it is recommended that some windows on opposite sides of the class are opened during lessons to allow for natural cross ventilation of the rooms. The doors are also able to be kept open. If the airconditioning is run, it is recommended that at least one window on the façade opposite the fan is left open to allow for cross ventilation of the room and relief of the supplied air. In C Block, the ducted fresh-air fan serving RG00C02 should be repaired. The wall-mounted split unit serving RG00C01 should be repaired if required or removed and the wall made good if no longer required to cool the rooms. The fresh air systems serving E Block should be repaired and reinstated. It is recommended the operation of the fans be interlocked with the light switches so that fresh air is supplied to the rooms when occupied. Both fresh air fan / filter units serving R Block require repair.
In general, classrooms had suitable windows and doors to promote adequate natural ventilation. This was reflected in the low CO2 values observed in most of the classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. In rooms with fresh air fans installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Where fans are installed close to windows or doors, as in M Block, it is recommended the doors or windows are closed to prevent short-cycling of the fresh air fans when in use. The fresh air fan serving RG00E01 is faulty and requires repair or replacement. The fresh air fan serving RG00M01 is noisy and requires attention.
All inspected classrooms, with the exception of RG00H04, had suitable windows and doors to naturally ventilate the area. It is therefore recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. The new music room created within RG00H04 appears to be non-compliant with Part F4.5 of the National Construction Code, Volume 1 [1]. This is due to the openable window / door area to floor area ratio being below 5%, and a lack of mechanical ventilation systems. It is recommended that a suitably sized fresh air fan and relief system be installed within the room.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 levels observed in occupied classrooms where windows and/or doors remained opened. However, at the time of inspection, windows and doors remained closed in most classrooms due to the health and safety of the children. It is recommended that at least some classroom windows, and where feasible the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters are cleaned to ensure optimum performance of all fan units.
In general, high CO2 levels were noted in approximately 50% of classrooms. These results can be attributed to windows and doors being kept closed during lessons and installed fresh air systems being turned off. Classrooms with fresh air fans running and/ or external doors and windows open were noted to have much lower CO2 levels. As such, it is recommended at least some classroom windows, and the classroom doors, are kept open during lessons. Where installed, fresh air systems should be run to promote cross ventilation and provide fresh air. It is recommended at least some windows on opposite walls to fresh air outlets are kept open to provide air relief, enhance air distribution and improve fan efficiency. Windows near wall mounted fresh air fans should be kept closed to prevent short cycling of the fans. Overall, most classrooms were found to have suitable windows, doors and fresh air systems installed to promote adequate fresh air distribution through the rooms. However, windows within A Block classrooms were found to be permanently blocked and cannot be opened. Despite not recording CO2 levels above the 800 ppm threshold, windows to some C Block classrooms are also permanently blocked. It is recommended that the boards blocking the classroom windows be removed and windows repaired or replaced as necessary. This will ensure adequate cross ventilation is available to these classrooms.
In general, high CO2 levels were noted in approximately 50% of classrooms. These results can be attributed to windows and doors being kept closed during lessons and installed fresh air systems being turned off. Classrooms with fresh air fans running and/ or external doors and windows open were noted to have much lower CO2 levels. As such, it is recommended at least some classroom windows, and the classroom doors, are kept open during lessons. Where installed, fresh air systems should be run to promote cross ventilation and provide fresh air. It is recommended at least some windows on opposite walls to fresh air outlets are kept open to provide air relief, enhance air distribution and improve fan efficiency. Windows near wall mounted fresh air fans should be kept closed to prevent short cycling of the fans. Overall, most classrooms were found to have suitable windows, doors and fresh air systems installed to promote adequate fresh air distribution through the rooms. However, windows within A Block classrooms were found to be permanently blocked and cannot be opened. Despite not recording CO2 levels above the 800 ppm threshold, windows to some C Block classrooms are also permanently blocked. It is recommended that the boards blocking the classroom windows be removed and windows repaired or replaced as necessary. This will ensure adequate cross ventilation is available to these classrooms.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
					22/735767
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/691089
					22/691098
School					22/749494
Region	Emailed school to set up meeting	remediation works sent to QBuild			22/510367
Region		Aircon remediations forwarded to Qbuild 30/11.			22/510342

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Mount Ommaney Special School	3088	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				
Mudgeeraba Special School	3049	Special school	South East	Completed - whole school	Finalised - Released	Approved				7/09/2022
Nambour Special School	3039	Special school	North Coast	Completed - whole school	Finalised - Released	Approved				31/08/2022
Narbethong State Special School	3140	Special school	Metropolitan	Complete - Targeted	Finalised - Released	Approved	Approved	Discussions held with RIM Metro. Email discussions with Principal around the actions from report.	Followed up with Principal re works actioned by QBuild. Works completed. Investigation underway with GHD to access possibility of UV technology trial.	18/02/2022

GHD Ventilation Recommendations
In general, CO2 levels under 800 ppm were noted in most classrooms with at least some windows and / or doors open. CO2 levels over 800 ppm were noted in two classrooms and in both these rooms, all windows and doors were closed at the time of the inspection. E Block is not fitted with a fresh air ventilation system, while the operation of the system in the Early Childhood D P building could not be verified. Based on this, it is recommended at least some classroom windows, and the classroom doors, are kept open during lessons. In classrooms with fresh air fans installed, if the fresh air fans are in use, it is recommended at least one window on the façade opposite the fan is opened to allow for air relief and adequate cross-ventilation of the room. Where fans are located above doors or windows, it is recommended those windows or doors are kept closed when running the fresh air fans to prevent short cycling. It is further recommended that the operation of the mechanical ventilation systems serving the Early Childhood D P building and J Block be verified, and the fans replaced or repaired where necessary.
In general, classrooms had suitable windows and doors to naturally ventilate the teaching spaces. Students also appeared to move frequently between indoor learning areas and outdoor play areas, thereby promoting natural ventilation through the opening of classroom doors. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Within B Block; • Classrooms R1000B1, R1000B2, R1000B3, and R1000B4 appear to not comply with the National Construction Code (NCC), Volume 1, Part F4.5(a) [1]. However, unidentified ventilation systems in each room may provide the required effective outdoor airflow rate to comply with F4.5(b). This system must be further investigated to determine if fresh air is provided to the room, at the required rate. • The internal withdrawal rooms, R1000B7 and R1000B8, are currently used as storerooms. If the school intends to use them as occupied areas in the future, it is recommended that the ventilation strategy be reviewed. Within D Block; • The two internal withdrawals, RG000D8 and RG000D9, have no external windows or doors. However, an unidentified grill was observed on the ceiling of each room and found to be operational. This grille may supply fresh air. The system must be investigated and the fan duty verified, if present, to ensure compliance with the NCC Volume 1 [1]. If it is determined that the grille does not supply fresh air, the ventilation strategy must be reviewed. • Storeroom RG000D7 is currently being used as an office space. With no external doors, windows, or fresh air systems, this space does not comply with the NCC Volume 1 [1]. A suitably sized fresh air and relief system must be fitted if the storeroom is to be used as an occupied space. Within E Block; • The internal withdrawal rooms, RG000E7 and RG000E10, have no fresh air systems installed. Instead, the connecting classroom has suitable openable window and door area to accommodate both rooms, as specified within NCC, Volume 1, Part F4.7(b)(ii) [1]. The rooms are therefore compliant. Ceiling grilles were also visible within the rooms, though their purpose could not be confirmed during the inspection. It is recommended that these systems be investigated and repaired / replaced as required. • A high-level window bracket is broken within RG000E3. This should be repaired or replaced. The dividing wall for withdrawal room New Room 1 of the Senior Intermediate building has been replaced with a fixed partition wall. The external window within the withdrawal room does not provide 5% of the floor area in openable window area and there is no fresh air system. The room is therefore non-compliant with the NCC Volume 1 [1]. Where withdrawal rooms have been modified, it is recommended a suitably sized fresh air and relief system be designed and installed to ensure compliance with the NCC Volume 1 [1]. The non-operational airconditioning units and fan within RG000L2 should be repaired or replaced.
In general, classrooms had suitable windows and doors to naturally ventilate the teaching spaces. This was reflected in the low CO2 values observed. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fan should remain closed when the fan is in use to avoid short cycling. Within Q Block General Learning, • Many withdrawal rooms have no external windows or doors. However, the doors connecting to each classroom are large enough such that air can be borrowed from the adjacent rooms as specified by F4.7(b) of the National Construction Code, Volume 1, Part F4.5 [1]. It is recommended that these doors, as well as the windows within the connecting classroom, remain open when the space is in use. • Grilles were observed within the hallway and the rooms, but the purpose could not be verified. It is recommended that the ducted systems be investigated to determine whether withdrawals are provided with fresh air. If so, these systems should be interlocked with the lights such that they operate when the room is in use. • An apparent mechanical ventilation system was observed at the ends of the hallway. As the purpose could not be verified, it is recommended that the system be investigated to determine if fresh air is provided to the hallway. If so, it is recommended that these systems be used when Q Block rooms are in use. There are no fresh air systems within the sensory room RG000H5 of H Block. As this space is likely used with windows and doors closed, it is recommended that a suitably sized fresh air system incorporating air relief be supplied to the room. The airconditioning within RG000H2 is operational but the vents are damaged. This should be repaired or replaced.
Due to the nature of the school, classroom windows are kept closed and locked and the air-conditioning is run during school hours. Therefore, mechanical ventilation systems to all classrooms need to be considered in order to effectively ventilate occupied spaces. Very few classrooms were noted as having fresh air fans installed. Where not already installed, we recommend the installation of fresh-air fan filter units suitably sized to provide the required amount of fresh air to the occupied spaces. Furthermore, we recommend the installation of a suitable air-relief system (such as a discharge louvre) to all these classrooms for adequate air flow and cross ventilation of the spaces. In buildings such as A Block, with redundant ducted air conditioning systems, the existing installations can be reviewed, and consideration given to modifying these to provide fresh air only to the already installed newer split units. We recommend the library ducted system with fresh air intake grilles be checked for correct installation and operation.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
IO		Verification remediations forwarded to Qbuild 11/11.			22/386385
IO					22/741888
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/690249
School	Draft report shared with the region for school consultation 1 x Air purifier provided to the school	Forwarded to Phil Sawers for Investigation			22/170529

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Nursery Road State Special School	3084	Special school	Metropolitan	Completed - whole school	Finalised- Released	Approved				30/08/2022
Oakleigh State School	0331	State School	Metropolitan	Completed - Whole School	Finalised - Released	Approved				2/08/2022
Oonoonba State School	0556	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved				30/08/2022
Pacific Pines State High School	1745	Secondary school	South East	Completed - whole school	Finalised- Released	Approved				22/8/22, 23/8/22

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 levels observed in occupied classrooms where windows and/or doors remained opened. However, at the time of inspection windows and doors remained closed due to the health and safety of the children. It is recommended that at least some classroom windows, and where feasible the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters are cleaned to ensure optimum performance of all fan units. In J Block, it is recommended the wall mounted filter / fan unit in each classroom to be interlocked with the respective air conditioning unit in each classroom. This will ensure outside air is supplied into the classrooms when the air conditioning units are running. It is recommended that air conditioning units in RG000E3 and RG000J1 be repaired to ensure systems are operating in an acceptable manner.

In general, classrooms had suitable windows and doors to naturally ventilate the teaching spaces. This was reflected in the low CO2values observed.Where feasible, it is recommended that some classroom windowsordoors, are kept open during lessons in order to naturallyventilate the space. Air-conditioning should also be used where fresh air fans are installedto ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fanshould remain closed when the fan is in use to avoid short cycling2.Many rooms had windows which were difficult to open, difficult to keepopen, or completely non-openable. These windows should be repaired or replaced where required. Buildings identified as requiring window repair include C Block, the P&C Building, and the Teaching Block.RL0R109within the Resource Centre Building, does not comply with the National Construction Code Volume 1, Part F4.5[1], as an occupied space. Staff have reported that the room is used for storage however a student and relief staff member were observed using the room at the time of inspection. The ventilation strategy must be reviewed if the school intends to use the space as a general learning area. However, if the room is to be used for storage, no remedial work is required.

In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Typically, rooms which did not utilise cross ventilation were found to have higher CO2 levels although most rooms were found to utilise mechanical and/or natural ventilation to good effect resulting in low CO2 levels recorded in the majority of classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fan/s should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any openable windows or doors located next to a fresh air fan should remain closed to avoid short cycling. Several HVAC components at Oonoonba State School were found to be damaged or non-operational at the time of inspection. Air conditioning units in classrooms RG00E01, RG00E02, RG00D01, RG00D03 and RG00D04 were found to be non-operational and should be repaired or replaced as necessary. It is also recommended that the operation of the fresh air fan in classroom RG00P10 be verified, and necessary repairs or replacement made.

In general, classrooms had suitable windows and doors to promote adequate cross ventilation. However, this was not reflected in the CO2 values observed as few classrooms had any windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Where cross ventilation is not possible, it is recommended most doors and Air┐conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fan/s should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any openable windows or doors located next to a fresh air fan should remain closed to avoid short cycling. Cardiffair exhaust systems were installed throughout many buildings. For classes that cannot be naturally cross ventilated, it is recommended these systems be used during lessons when the airconditioning is not in use. Some windows or the door must remain open to provide adequate makeup air to the room. The lowest speed / setting of the system is suitable for all classrooms. For the General Studies block, the Storeroom R10G203 has been converted into an office for the school nurse. This space has no windows, external doors, or fresh air systems installed. This room does not comply with the National Construction Code Volume 1, Part F4.5, as a habitable room. The ventilation strategy must be reviewed if the room is to be used as an occupied office Within the ground floor of the Performing Arts Building, R10MU01, R10MU02, R10MU05, R10MU10 and R10MU13 have insufficient openable window / door area to comply with the National Construction Code Volume 1, Part F4.5(a)(i) [1]. The following is recommended: • For R10MU01, it appears that windows at the rear of the classroom have been covered with wood. It is recommended that these windows be investigated to determine if 2.35 m2 of additional openable window area can be provided. This would ensure compliance. If this cannot be achieved, the ventilation strategy must be reviewed. Additionally, it is currently unfeasible to open some windows as they are located above wall-mounted student desks. This issue should beinvestigated to allow the staff and students to open these windows safely during lessons. • For R10MU02, the fresh air fan duty must be verified to ensure a minimum of 290 L/s of outside air is being provided to the room. This will ensure compliance. • For R10MU05, the fresh air fan duty must be verified to ensure a minimum of 288 L/s of outside air is being provided to the room. This will ensure compliance. Furthermore, when the fresh air system was tested, the makeup air being drawn into the room from under the door could be heard. The fresh air system should be investigated to determine if supply and exhaust amounts can be adjusted. If not, it is recommended a suitably sized door grille be added to the door. • For R10MU10, the fresh air system must be repaired and the fan duty verified to ensure a minimum of 140 L/s of outside air is being provided to the room. This will ensure compliance. In the interim, it is recommended that the door remain open when the space is in use. • For R10MU13, the fresh air fan duty must be verified to ensure a minimum of 324 L/s of outside air is being provided to the room. This will ensure compliance. All VL Building classrooms can become cross ventilated provided the corridor louvre doors (both floors) and high┐level louvres (first floor only) remain open during classroom use. It is therefore recommended that these louvres remain open during lessons, weather permitting, so the corridor can act as a breezeway. This is particularly important for VL06 and VL205 as both rooms have no external windows or doors. All non-operational fresh air fans and exhaust systems should be repaired or replaced.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
IO					22/814966
Region					22/683119
Region					22/859180
IO		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/691071

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Palmview State Special School	A905	Special school	North Coast	Completed - whole school	Finalised- Released	Approved				30/08/2022
Patricks Road State School	1864	Primary school	Metropolitan	Complete - whole school	Finalised - Released	Approved	N/A			07/04/2022 & 26/04/2022
Pine Rivers Special School	3011	Special school	North Coast	Completed - whole school	Completed - Pending report					
Proserpine State High School	2090	Secondary school	North Queensland	Completed - whole school	Finalised - Released	Approved		Meeting with the Principal held on 23/8/22. Remediation list provide to QBuild to undertake works.		25/05/2022 - 26/05/2022
Proserpine State School	0779	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved		Meeting with the Principal held on 22/8/22. Remediation list send to the Principal 26/08/22 to confirm jobs for QBuild.		23/05/2022 - 24/05/2022
Queensland Academy for Science Mathematics and Technology	5684	Secondary school	Metropolitan	Completed - whole school	Finalised - Released	Approved				30/08/2022

GHD Ventilation Recommendations
All classrooms and most withdrawal rooms had suitable windows and doors to naturally ventilate the learning spaces. It is suspected that this, along with low occupancies and high student / staff traffic, resulted in the low CO2 values observed. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. The fresh air systems within the sensory rooms should be operated when the space the occupied. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Within the SS-02 collaboration spaces without external doors or windows, the fresh air fan duty must be verified to ensure a minimum of: • 84 L/s of outside air is being provided to the ground floor collaborative spaces G.06, G.11, and G.20. This will ensure compliance with the National Construction Code Volume 1, Part F4.5(b) [3]. • 96 L/s of outside air is being provided to the room. This will ensure compliance with the National Construction Code Volume 1, Part F4.5(b) [3].
In general, classrooms where some windows were kept open were noted to have lower CO2 levels. As such, it is recommended that some windows and doors are kept open during lessons, particularly where cross ventilation can be achieved. For RG0F007 (instrumental music room), it is recommended that the air conditioning be used any time the space is in use. This will ensure the ducted system, which operates on a 10-minute delay with the air-conditioning, is operational when the space is in use. For New Room 1 (Library), it is recommended that all windows remain open while the space is in use and that exhaust fans be operated when significant numbers of occupants are present. It is further recommended that three non-operational exhaust fans be repaired, or fresh air fans be installed on the west façade to promote cross ventilation. Finally, the area should be monitored over a longer period, using the Aranet4 CO2 logger provided by Education Queensland, to ensure the recommended measures are suitable during typical use. It is further recommended all other non-operational ventilation fans are repaired or replaced as required to ensure reliable operation.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. For RG00E01 within E Block, the door should remain open as there are no windows on that façade. It should be monitored during lessons using the Aranet4 CO2 logger provided by Education Queensland. If CO2 values in excess of 800 ppm persist, it is recommended that the ventilation strategy for the room be reviewed. For RG00F04 within F Block, it is recommended that all external windows, louvres, and doors remain open with the fresh air fan running during lessons. Furthermore, the windows and louvres connecting to RGFPRAC, as well as RGFPRAC's external windows, should remain open so that both spaces can be cross ventilated. For the MEDIA ROOM within P Block, it is recommended that the window remain open with the exhaust fan running. It is further recommended to limit the number of students within the space to avoid exceeding the ventilation limits of the space. For the Science & Language Centre, it is recommended that RG00SL1 open some windows and the door on the opposing façades to promote cross ventilation. For RG00SL3, it is recommended that the ventilation system design be further investigated. In the interim, it is recommended that the room be monitored during lessons using the Aranet4 CO2 logger provided by Education Queensland. All other non-operational fresh air fans should be repaired or replaced.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. Rooms were typically fitted with one or more fresh air fans, of which most were operational at the time of the inspection. This was reflected in the low CO2 values observed. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. When RG0RB07 is used, it is recommended that the window and door remain open with the air-conditioning on, to ensure the fresh air fan is running. For larger classes, it is recommended that the divider to RG0RB06 be opened, with all windows and the doors open to promote adequate ventilation. All other non-operational fresh air fans should be repaired or replaced.
In general, classrooms appear to have suitable windows and doors to promote adequate natural ventilation, though this was not reflected in the CO2 levels recorded during the inspection. CO2 levels over 800 ppm were noted in most of the classrooms inspected. On the day of the inspection, most classroom doors and windows were found to be closed, and most airconditioning systems were not in use. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. In rooms with fresh air fans installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. In rooms with ducted units drawing fresh air in directly from outside, the units should be run during lessons in order to ensure a steady supply of fresh air. Care should be taken in larger open plan teaching spaces where classes are "doubled up", as the fresh air systems do not appear suitably sized for 50 – 60 students. In this case, it is recommended windows on opposite sides of the rooms are opened to ensure adequate natural ventilation. The method of fresh air introduction to the Auditorium-Gym-Student Service building should be verified given some of the lower ground teaching spaces are not near openable windows. The fresh air fan serving RG0EST1 was noted as not operational and requires repair or replacement. Furthermore, none of the Cardiffair fans serving the EST building were operational. It is recommended these fans are repaired and reinstated.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
IO		Verification remediations forwarded to Qbuild 11/11.			22/646428
Region					22/298841
IO					
Region		Aircon remediations forwarded to Qbuild 30/11.			22/472871
Region		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/419025
IO					22/815469

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Rainworth State School	1491	Primary school	Metropolitan	Complete - whole school	Finalised - Released	Approved	Approved			Completed
Red Hill Special School	3085	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				
Redcliffe Special School	3009	Special school	North Coast	Completed - whole school	Completed - Pending report					
Redland District Special School	3033	Special school	South East	Completed - whole school	Finalised - Released	Approved				18/08/2022
Rockhampton North Special School	3038	Special school	Central Queensland	Completed - whole school	Completed - Pending report	Approved				20/06/2022
Rockhampton Special School	3010	Special school	Central Queensland	Completed - whole school	Finalised - Released	Approved				22/06/2022

GHD Ventilation Recommendations
In general, classrooms had suitable windows, louvres, and/or doors to promote adequate cross ventilation. This was reflected in the generally low CO2 levels recorded. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross-ventilation of the rooms. In classrooms with fresh air fans installed, if doors and windows are kept closed while the air-conditioning is run, it is recommended at least one window opposite the fresh air fan is left partially open to improve the efficiency of the fan and ensure adequate cross-ventilation of the room.
In general, classrooms had suitable windows, doors, and apparent fresh air systems to promote adequate cross ventilation. The majority of the fresh air systems were operational at the time of the inspection. It is recommended that, where feasible, at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air systems are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air system should be left partially open to improve the efficiency of the system and ensure adequate cross ventilation of the room. Where there is no air-relief opposite the fresh air fan or system, it is recommended that a suitably sized relief damper or grille be installed. For R200241 and R200243 within Stage 1 Level 2, it is recommended that the storeroom windows remain open during the lessons. This will ensure the fresh air supply operates efficiently and promotes cross ventilation of the room. Furthermore, it is recommended that the NEWROOM (hallway) high-level louvres be repaired, and the classroom doors and louvres remain open. For Block 1, it is recommended that some classroom windows remain open during lessons. Where feasible, classroom doors and the veranda windows/louvres opposite, should also remain open to promote cross ventilation. When the fresh air fan is used, it is recommended the windows beneath the fan remain closed to prevent short cycling2. For Block 3, it is recommended that the exhaust fans be repaired, then used during lessons. All other non-operational fresh air fans should be repaired or replaced. Furthermore, all non-openable louvres within Block 1 should be repaired or replaced.
In general, classrooms had suitable windows and doors to promote adequate natural ventilation. In all classrooms with high CO2 levels, cross ventilation was available but not used. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. Where opening windows or doors is not feasible due to the health or safety of students, it is recommended that suitably sized fresh air systems are designed and installed. These fresh air fans should be controlled to run when the rooms are occupied (i.e., lights are switched on) as opposed to only when the air-conditioning is switched on. In rooms with fresh air fans already installed, the air-conditioning should also be used to ensure they are running during lessons, or the fans should be modified to run when the rooms are occupied (through interlock with the lighting or connection to existing occupancy sensors). At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The installation of air relief grilles or louvres to facades opposite the installed fans to all mechanically ventilated rooms is recommended in order to improve fresh air circulation and cross ventilation. Operation of one of the air-conditioning units in RG00A15 in A Block, and the fresh air fan in the same room should be investigated. It is recommended the operation of the fresh air fan be interlocked with the operation of the air conditioning unit to operate when the air conditioning is running, or a motion sensor to operate when the classroom is occupied. It is recommended that the ducted fresh air systems serving T Block be rebalanced, as low air flows were noted in some classrooms. It is recommended that operation of the air-conditioning units in T1.33 is investigated as these would not switch on during the inspection and the teacher indicated that this classroom regularly has issues with the units not operating. The indicator light on the control switch in TG.28 was not working at the time of inspection, and this should be investigated and rectified. It is recommended that maintenance is carried out on fan filter units where they have been installed as the unit in classroom RG00P07 in P Block was noisy, indicating either a dirty filter, or worn bearings.
In general, classrooms had suitable windows and doors to promote adequate natural ventilation. This was reflected in the low CO2 values observed in approximately half the classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. Where opening windows or doors is not feasible due to the health or safety of students, it is recommended that suitably sized fresh air systems are designed and installed. These fresh air fans should be controlled to run when the rooms are occupied (i.e., lights are switched on) as opposed to only when the air conditioning is switched on. In rooms with fresh air fans already installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The installation of air relief grilles or louvres to facades opposite the installed fans to all mechanically ventilated rooms is recommended in order to improve fresh air circulation and cross ventilation. With only the ventilation fans in RG000B6 and RG000C1 operational at the time of the inspection, the repair or replacement of the non-operational fresh air fans and Energy Recovery Ventilation (ERV) units to both buildings is recommended. This is particularly important to B Block where natural cross ventilation is not possible to all classrooms. The fresh air fans serving G Block also require repair or replacement. The performance of the cassette unit serving RG000B1 should be investigated following a report by the teacher in the classroom that the unit struggles to cool in summer. Furthermore, the fan in the left wall-mounted air conditioning unit in RG000G1 must be checked for excessive noise and vibration. Finally, the cassette unit serving L1 requires repair. It is recommended the operation of the ventilation system serving the library (J Block) is verified.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed in almost all the occupied classrooms. It is recommended that at least some classroom windows, and where feasible the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters are cleaned to ensure optimum performance of all fan units. In E Block, the fresh air fans serving RG00E05 and RG00E14 were non-operational and require repair. It is further recommended that the fan controls for RG00E05 be relocated from RG00E04 to RG00E05. The high-level window opening mechanism in RG00E11 requires repair or replacement of the handle.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
School		Verification remediations forwarded to Qbuild 11/11.			22/265167
IO		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/418893
IO					
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/691219
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			
IO		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/581244

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Rosella Park School	3002	Special school	Central Queensland	Completed - whole school	Finalised - Released	Approved				21/06/2022
Sandgate District State High School	2047	Secondary school	Metropolitan	Completed - whole school	Finalised - released	Approved				23/08/2022
Sarina State High School	2101	Secondary school	Central Queensland	Completed - whole school	Finalised - released	Approved				26/7/2022, 19/10/2022
Sherwood State School	0078	Primary school	Metropolitan	Complete - whole school	Finalised - Released	Approved	Approved			23/2/2022-24/02/2022
Southport Special School	3026	Special school	South East	Completed - whole school	Finalised - Released	Approved				6/09/2022

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed in almost all the occupied classrooms. It is recommended that at least some classroom windows, and where feasible the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. In A Block, the fresh air fans serving RG00A01 and RG00A02 were non-operational and require repair. In I Block, the fresh air fans serving RG00I01 and RG00I02 were non-operational and require repair. Also, the air conditioning unit serving RG00I01 requires the filter to be cleaned. In J Block the fresh air fans serving RG00J01 and RG00J02 were found to be non-operational and require repair. In K Block, it is recommended the air conditioning switch serving both rooms is modified and separated to allow each classroom system to be operated independently. Furthermore, the left air conditioning unit serving RG00K014 is faulty and requires repair.
The majority of the H Block classrooms and all the N Block classrooms and studios at Sandgate District State High School appear to have suitableopenable doors and windows for adequate natural ventilation. Some of the steel window frames and window ironmongery require repair to enable easy opening of windows. The H Block H Practice Room(RG0HG06) is only mechanically ventilated by the installed window / wall type airconditioning unit. This units needs to run in order to provide fresh air to the room. It is recommended that a mechanical ventilation system, designed in accordance with the requirements of AS 1668.2[2],be installed to the room instead so the room can be ventilated without the need to heat or cool when required. Furthermore, it is recommended the ventilation system be interlocked with a motion sensor or the light switch, so that the fan is run whenever the room is in use. The H Block H5 Instrumental Classroom (RG0HG05) does not appear to be mechanicallyventilated and is not provided with any openable external windows or doors to provide natural ventilation. It is recommended that a mechanical ventilation system, designed in accordance with the requirements of AS 1668.2[2],be installed to the room, interlocked with a motion sensor or light switch, so that the room is mechanically ventilated when the room is in use. Modification of the installed ventilation grille and attenuator can be considered for this. In H Block H4Staff Room (RG0HG04), the installation of a mechanical ventilation systemis recommended. The system should be designed in accordance with the requirements of AS 1668.2[2]andinterlocked with the light switch or a motion sensorto allow the room to be mechanically ventilated when occupied. The fresh air fans serving N Block RG0NG01 and RG0NG02 require repair.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. However, this was not reflected in the CO2 values observed as few classrooms had any windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fan/s should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any openable windows or doors located next to a fresh air fan should remain closed to avoid short cycling. For L Block, L0.1155 and L0.1157 have insufficient openable window / door area to comply with the National Construction Code Volume 1, Part F4.5(a) [1]. The reinspection identified that the installed fresh air systems do not appear to meet the requirements of AS 1668.2 [2]. A detailed review of the ventilation strategy to L Block is recommended. All screwed shut or damaged windows should be repaired so they are openable. All non-operational fresh air fans should be repaired or replaced.
In general, classrooms with several windows open, especially on at least 2 opposing sides of the room, were noted to have low CO2 levels. In most cases, CO2 levels did not exceed 800ppm. During our inspection we noted that when the air-conditioning was switched on, windows to classrooms were kept closed. With very few fresh air fans installed, the closed windows were resulting in poor fresh air flow and subsequent high CO2 levels. In buildings with enclosed verandas, such as E Block and F Block, we recommend the veranda windows are also opened to improve cross ventilation through the building.
In general, classrooms appear to have suitable windows and doors to promote adequate natural ventilation. This was evident in the generally low CO2 levels recorded during the inspection. CO2 levels over 800 ppm were noted in very few classrooms, and in all cases, windows and doors were closed and fresh air fans were not installed or where installed, not running. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. In rooms with fresh air fans installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. In rooms with ducted units drawing fresh air in directly from outside, the units should be run during lessons in order to ensure a steady supply of fresh air. General maintenance and filter cleaning appears to be lacking, as evident in the dirty return air filters noted in Block 36 (Seabreeze) and GLA Teaching 34. Regular and adequate maintenance of air conditioning units and filters is imperative for the efficient and reliable operation of the units. Dirty filters can adversely affect air flow and thereby reduce unit performance, and this can inadvertently affect compressor longevity and reliability. It is recommended the operation of the fresh air fans serving Block 29 be interlocked with the operation of the airconditioning units so that the fans run when the airconditioning in in operation. Furthermore, it is recommended the controls / power supply to the fresh air fan serving RG00021 in Junior Teaching Block 2 be repaired to ensure the correct operation of the fan. Both fresh air fans serving Teaching Block 25 are not operational and require repair. It is also recommended the cover of the wall unit serving RG00258 in Teaching Block 25 be replaced or repaired.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
IO		Aircon remediations forwarded to Qbuild 30/11.			22/581324
		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/683128
School		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/815403
School	Draft report shared with the region for school consultation	Forwarded to Phil Sawers for Investigation Aircon remediations forwarded to Qbuild 30/11.			22/169312
IO					22/895312

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Spinifex State College - Mount Isa - Junior Campus	5151	Primary school	North Queensland	Completed - whole school	Finalised - Released	Approved				1/06/2022
Springfield Lakes State School	5556	Primary school	Metropolitan	Complete - whole school	Finalised - Released	Approved	N/A			20/04/2022
Stanthorpe State High School	2064	Secondary school	Darling Downs South West	Completed - whole school	Finalised - Released	Approved		Meeting with Principal held to discuss actions and remediations.		
Stretton State College	5554	Primary/Secondary school	Metropolitan	Completed - Targeted	Finalised - Released	Approved				2/8/22,8/8/22,31/8/22

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation although in most cases, cross ventilation was not utilised. Most rooms also had fresh air fans installed with most appearing in good, working order. In many cases, CO2 levels were significantly reduced when fresh air fans were operational. If high CO2 levels persist in rooms where fans are run, it is recommended that all fan filters are cleaned to ensure optimum operation of fan / filter units and the performance of the fan units be verified. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. For Admin Level 1, B Block & F Block classrooms, it is recommended that at least some windows on opposite facades are opened with fresh air fans running to promote cross ventilation. Where possible, the internal wall between classrooms R1JAU01 and R1JAU02 in Admin Level 1 should be kept open to allow cross ventilation between both rooms. For classroom RGJJGYM as part of J Block, calculations from the information provided suggest the room fails to meet the requirements of the NCC for natural ventilation. However, it is possible that compliance with the NCC is met should the fresh air fan be capable of providing the required outside air flow rates required as per AS 1668.2. It is recommended that the non-openable windows be replaced, and security screens removed to allow the windows to be opened. Once repaired, windows on opposing facades should be kept open to promote cross ventilation and fresh air fans should be run during lessons. For K Block classrooms, it is recommended that windows and doors are kept open to promote cross ventilation. As there is no fresh air fan installed in classroom RG00JK2, despite complying with the natural ventilation requirements of the NCC, it is recommended that an outside air system is installed so that fresh air is supplied to the room when windows and doors are kept closed. It is also recommended that windows to the H Block classrooms are replaced with openable windows despite the room complying with natural ventilation requirements of the NCC to ensure adequate cross ventilation of the space.
In general, high CO2 levels were noted during the inspection. In most cases, high CO2 levels have been noted in classrooms where windows have been kept closed during lessons. Classrooms where some windows were kept open were noted to have lower CO2 levels. As such, it is recommended at least some classroom windows, and the classroom doors, are kept open during lessons, especially in classrooms without fresh air fans installed. In classrooms with fresh air fans installed and running, high CO2 levels were noted when doors and windows were kept closed. It is suspected that a lack of relief for supplied outside air contributed to inefficient fan operation and air distribution. If the fresh air fans are run, it is recommended at least one window on the façade opposite the fan is opened to allow for air relief and adequate cross-ventilation of the room. Where fans are located above doors or windows, it is recommended those windows or doors are kept closed when running the fans. The resource centre ventilation system was not operating at the time of the inspection. It is recommended this system is repaired. It must be noted that at least some windows or the resource centre door should be kept open when running the system, to allow for the ingress of fresh make-up air. The music block does not appear to be fitted with a fresh air ventilation system and doors and windows appear to be kept closed during rehearsals to reduce noise emittance. It is recommended that a suitable fresh air system be designed for and installed to the music block in order to ensure adequate fresh air supply when doors and windows are kept closed.
In general, low CO2 levels were noted during the inspection. In most cases, high CO2 levels have been noted in classrooms where windows and doors were kept closed during lessons. Classrooms where some windows were kept open were noted to have lower CO2 levels. As such, it is recommended at least some classroom windows, and the classroom doors, are kept open during lessons. In classrooms with fresh air fans installed and running, high CO2 levels were noted when doors and windows were kept closed. It is suspected that a lack of relief for supplied outside air contributed to inefficient fan operation and air distribution. If the fresh air fans are run, it is recommended at least one window on the façade opposite the fan is opened to allow for air relief and adequate cross-ventilation of the room. The following fresh air fans were not functional at the time of the inspection and require repair: 1. C Block R100C01, 2. C Block R100C02, 3. D Block RG0DL02. The following kitchen exhaust system was not functional at the time of the inspection and requires repair: 1. K Block RG00K02. In D Block, RG0DL01, we recommend the vertical sliding windows are repaired to allow for easy opening by staff and students.
The CO2levels in most classrooms exceeded 800 ppm. It is suspected that this is a result of a lack of adequate natural or mechanical ventilation to the classrooms inspected.In the Performing Arts Centre, most of the airconditioning units were off at the time of the inspection. The designs of the fresh air systems to this building require the indoor units to be operational and running in order to supply fresh air to the classrooms. Furthermore, the internal doors and windows open into an enclosed corridor,andthe external windows are limited to opening no more than 120mm, thereby limiting natural ventilation to the classrooms. Given the above, it is recommended that the control strategy of the PAC airconditioning system is reviewed, and that the airconditioning units are set to operate when the classrooms are occupied, through interlocking with a light switch or occupancy sensor. In the Primary Learning Centre, the configuration of the classrooms and open walkways allows for the classrooms to be naturally cross ventilated. Furthermore, the installation of ducted fresh air systems to all classrooms allows for mechanical ventilation. However, with the opening of all upper-level external windows limited to 120 mm and all internal doors and windows being kept closed, natural ventilation to the first and second floors is severely restricted. Also, it is suspected that a lack of air relief to the classrooms could be reducing the efficiency of the mechanical ventilation systems. In the Primary Learning Centre, it is recommended that the internal high-level louvre windows be left open to ensure permanent natural ventilation of the classrooms. During lessons, it is recommended the external widows be opened to ensure cross-ventilation.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region					22/815327
Region	1 x air purifier has been provided to the school	Aircon remediations forwarded to Qbuild 30/11.			22/333634
Region		Aircon remediations forwarded to Qbuild 30/11.			22/442501
IO	20 x air purifers have been provided				22/683135

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Sunnybank Special School	3078	Special school	Metropolitan	Completed - whole school	Finalised-Released	Approved				13/09/2022
Toowoomba West Special School	3032	Special school	Darling Downs South West	Completed - whole school	Finalised - Released	Approved				8/06/2022
Townsville Community Learning Centre - A State Special School	2376	Special school	North Queensland	Completed - Whole School	Finalised - Released					9/08/2022
Warwick East State School	0225	Primary school	Darling Downs South West	Completed - whole school	Finalised - Released	Approved				15/09/2022
Wavell State High School	2048	Secondary school	Metropolitan	Completed - Targeted	Finalised - Released	Approved				13/09/2022

GHD Ventilation Recommendations
Classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 levels observed in occupied classrooms where windows and/or doors remained opened. However, at the time of inspection windows and doors remained closed due to the health and safety of the children. It is recommended that at least some classroom windows, and where feasible the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters are cleaned to ensure optimum performance of all fan units. It is recommended that non-operational air conditioning unit and broken external window in Classroom T3A in Temporary GLA be repaired or replaced.
In general, classrooms had suitable windows and doors to promote adequate natural ventilation. This was reflected in the low CO2 values observed in approximately half the classrooms. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote natural ventilation and cross ventilation where available. Where opening windows or doors is not feasible due to the health or safety of students, it is recommended that suitably sized fresh air systems are designed and installed. The control systems of these systems should run the fans when the rooms are occupied (i.e. lights are switched on) as opposed to only when the air conditioning is switched on. In rooms with fresh air fans already installed, the air-conditioning should also be used to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. The installation of air relief grilles or louvres to facades opposite the installed fans to all mechanically ventilated rooms is recommended in order to improve fresh air circulation and cross ventilation. A review of the ventilation strategy to B Block is recommended. The installed Xpelair extract fans are not suitable for the application and appear to be undersized to provide adequate ventilation to any of the classrooms served. The fans serving RG00BC3 and RG00BC4 are faulty and require repair but replacement with more suitable systems is recommended. The fresh air fan serving G Block RG00GC2 is faulty and requires repair or replacement. The fresh air system serving J Block RG00JC1 requires remedial work to ensure the correct operation of the fresh air fan when the room is occupied. It is recommended that the fan control is modified to run when the lights are on (i.e. the room is occupied) as opposed to when the air conditioning is run.
n general, classrooms had suitable windows and doors to promote adequate cross ventilation. However, this was not reflected in the CO2 values observed as few classrooms had any windows or doors open. Several rooms were also observed to have windows screwed shut and no longer openable. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be switched on where fresh air fans are installed to ensure outside air is provided to the room at all times At least one window or louvre opposite the fresh air fan/s should be left partially open to provide a relief air path and improve the efficiency of the fan, while ensuring adequate cross ventilation of the room. Any openable windows or doors located next to a fresh air fan should remain closed to avoid short cycling. From the inspection conducted at Townsville Community Learning Centre the following is recommended: • Mechanical fresh air fans should be installed in classroom RG000D5 as part of D Block Teaching and RG000E5 as part of E Block Teaching to enable fresh air supply to the rooms when all external doors and windows are closed, and air conditioning systems are running. All screwed shut or damaged windows in classroom RG000D5 should also be repaired or replaced to ensure they can be opened. • Fresh air fans in Block L Teaching classrooms should be interlocked with room air conditioning systems rather than running on separate switches to ensure the fans are always running when the air conditioning is on. This will prevent classroom teachers from switching the fans off. • Mechanical fresh air fans should be installed in Block O Teaching classrooms to enable fresh air supply to the rooms when all external doors and windows are closed, and air conditioning systems are running. • Non-operational or noisy fresh air fans in classrooms RG000D2, RG000D3 and RG000N1 should be repaired or replaced. • Graphics and prints blocking windows from opening should be removed to allow windows to be opened.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 values observed for classrooms with some windows or doors open. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Non-operational fresh air fans within R100A04, New Room 1 (B Block), RG00M01, and RG00M03, should be repaired or replaced.
All inspected rooms, with the exception of New Room 1 and RG00B08, had suitable windows and doors to naturally ventilate the area. Most H Blk rooms were also fitted with operational fresh air fans. It is therefore recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. Air┐conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fan should remain closed when the fan is in use to avoid short cycling1 . Within B Blk, • It is recommended that the New Room 1 louvre windows be repaired or replaced. The internal boards covering the windows should also be removed. It is further recommended that a suitably sized fresh air fan be installed. • RG00B08 has no openable windows, external doors, or fresh air systems installed. Furthermore, it cannot borrow air from adjoining rooms. This room is therefore non-compliant with the National Construction Code Part, Volume 1, Part 4.5 [1]. A suitably sized fresh air and relief system should be designed and installed. • Non-openable windows within RG00B02, RG00B03, RG00B04, and RG00B05 should be repaired or replaced. The non-operational fresh air fan within R100H01 requires repair or replacement.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
IO					22/814950
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/581298
Region					22/859156
IO		Aircon remediations forwarded to Qbuild 30/11.			22/645802
					22/741877

School	Centre Code	School Type	Region	Assessment Status	GHD Status	ADG / ED - IO / Director	ADG - Approval	Recommendations discussed with the Principal	Follow-up and completion	Date of Assessment
Wellers Hills State School	1844	Primary school	Metropolitan	Complete - whole school	Finalised - Released	Approved	N/A			14/4/2022 & 05/05/2022
West End State School	0212	State School	Metropolitan	Completed - whole school	Finalised - Released	Approved				8/09/2022
Western Suburbs State Special School	3014	Special school	Metropolitan	Completed - whole school	Finalised - Released	Approved				
Woody Point Special School	3042	Special school	North Coast	Completed - Whole School	Finalised - Released	Approved				9/08/2022
Wooloowin State School	1463	Primary school	Metropolitan	Completed - whole school	Finalised - Released	Approved				4/4/2022 & 28/4/2022
Yeppoon State High School	2123	Secondary school	Central Queensland	Completed - whole school	Finalised - Released	Approved				

GHD Ventilation Recommendations
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the generally low CO2 levels recorded. It is recommended that at least some classroom windows, and the classroom doors, are kept open during lessons in order to promote cross ventilation of the rooms. It is further recommended that the windows in R100G04 are repaired.
In general, classrooms had suitable windows and doors to promote adequate cross ventilation. This was reflected in the low CO2 levels observed in occupied classrooms where windows and/or doors remained opened. However, at the time of inspection windows and doors remained closed due to the health and safety of the children. It is recommended that at least some classroom windows, and where feasible the classroom doors, are kept open during lessons in order to promote cross ventilation. If low level windows are not opened due to the safety of the students, it is recommended that high-level windows be used where required. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and promote adequate cross ventilation of the room. It is further recommended that all fresh air fan filters are cleaned to ensure optimum performance of all fan units. Although O Block appears to meet the requirements of the National Construction Code Volume 1 [1] and is therefore compliant, the mechanical ventilation systems appear inadequate to supply sufficient fresh outside air to the classrooms to maintain CO2 levels below 800 ppm. It is recommended that some windows are opened during extended music practice sessions in order to assist with ventilation to the practice rooms when required.
In general, classrooms had suitable windows, doors, and apparent fresh air systems to promote cross ventilation. However, the majority of the fresh air fans were not running at the time of inspection despite the air conditioning systems being switched on in some classrooms. The operational state of some fans could not be verified in all classrooms, particularly where the air conditioning systems were not already running, so as to minimise classroom disruptions. Fans installed in classrooms RG000I1, RG000I3 and RG000L02 appear to be non- operational despite the air conditioning systems running at the time of inspection. It is recommended that these fans be repaired or replaced where necessary. It is recommended that, where feasible, at least some classroom windows, and the classroom doors are kept open during lessons to promote cross ventilation. Air- conditioning should also be used where fresh air systems are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air system should be left partially open to improve the efficiency of the system and ensure adequate cross ventilation of the room. Windows or doors adjacent to or underneath fresh air fans should be kept closed when the fans are running to prevent short cycling1. Where there is no air- relief opposite the fresh air fan or system, it is recommended that a suitably sized relief damper or grille be installed.
In general, classrooms had suitable windows and doors to naturally ventilate the teaching spaces. This was reflected in the low CO2values observed.Where feasible, it is recommended that some classroom windowsordoors, are kept open during lessons in order to naturallyventilate the space. Air-conditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fan should remain closed when the fan is in use to avoid short cycling2.Several rooms across E Block and H Block appear to be non-compliant with Part F4.5 of the National Construction Code, Volume 1[1]. This isdue tothe openable window / door area to floor area ratiobeingbelow 5%,and a lackofmechanical ventilation systems. This includes rooms ‘Therapy’, E01, and E02within E Block, and RG0HGL2 within H Block. The ventilation strategies within these rooms require review. The non-operational fresh air fan within the West Room of T2 Block should be repaired or replaced.The high-level louvres within RG00BMPof the Gymnasiumbuilding were difficult to operate and some mechanisms were broken. It is recommended that these louvres be repaired or replaced.
Few classrooms observed CO2 levels under 800 ppm however, those that did were cross ventilated. As such, it is recommended that some windows and doors are kept open during lessons, particularly where cross ventilation can be achieved. D, E, and G block veranda windows and doors should also remain open, where feasible, to promote cross ventilation. All operational fresh air fans should be used during lessons. Any doors or windows directly beneath an operating fresh air fan should remain closed to avoid short cycling2. Furthermore, it is recommended at least one window on the façade opposite the fan is opened to promote cross ventilation and improve the fan efficiency. For G block, it is recommended that the ducted HVAC system design be reviewed to ensure the fresh air supply is suitable for the space. In the interim, it is recommended that the school use the Aranet4 logger supplied by Education Queensland to monitor the rooms. The classroom doors and windows should remain open during lessons, as should the windows on the veranda. Many windows were found to be non-openable due to being painted over or fitted with acrylic sheeting panels to create a “double glazed” system. This prevented several rooms from being adequately cross ventilated. This was particularly relevant for R1OC103 (the library) and RG0DG03 (D Block ground veranda). It is therefore recommended that all non-openable windows and louvres be repaired or replaced, and all acrylic sheeting panels be removed. It is further recommended all other non-operational ventilation fans are repaired or replaced.
In general, classrooms had suitable windows and doors to naturally ventilate the teaching spaces. This was reflected in the low CO2 values observed. Where feasible, it is recommended that some classroom windows or doors, are kept open during lessons in order to naturally ventilate the space. This is particularly important in rooms that cannot become cross ventilated. Airconditioning should also be used where fresh air fans are installed to ensure they are running during lessons. At least one window or louvre opposite the fresh air fans should be left partially open to improve the efficiency of the fan and ensure adequate cross ventilation of the room. Any windows or doors located directly below a fresh air fan should remain closed when the fan is in use to avoid short cycling1. All broken or screwed shut windows should be repaired or replaced. This is particularly relevant for E Block ground floor, as most rooms had louvres with broken or missing mechanisms. All non-operational fresh air fans should be repaired or replaced within: RG00M02, R100B07, R100B09, RG0G201, RG00E13, R100B03, RG00F03, RG00M01, RG00L03, RGTTC06, R100C05, RG00E14, RG0G203, RG00L01 & RG0G101.

Assessment Request	Additional Comments & Observations	Forwarded to RRAC and QBuild Investigation	CO2 Monitoring - Outside GHD Assessment	Budget	Content Manager 50/33/2630
Region		Window remediations forwarded to Qbuild 2/11.			22/302913
IO					22/895302
IO		Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/510035
IO		Window remediations forwarded to Qbuild 2/11. Verification remediations forwarded to Qbuild 11/11. Aircon remediations forwarded to Qbuild 30/11.			22/683168
Region		Referred to QBuild to quote of the window remediation			22/390015
School					22/647117