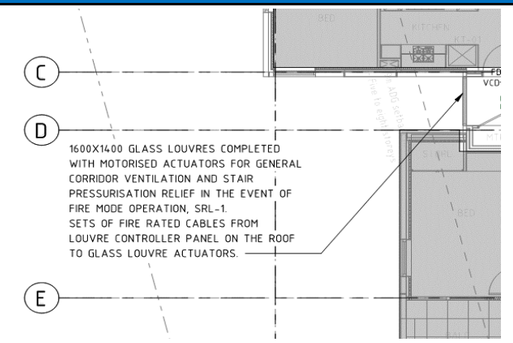
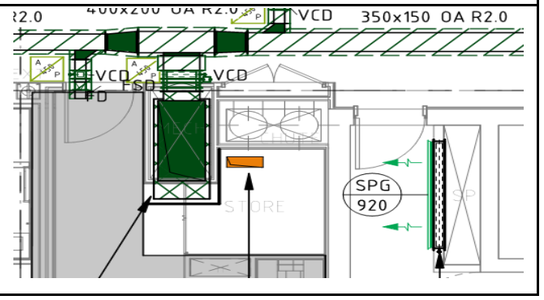
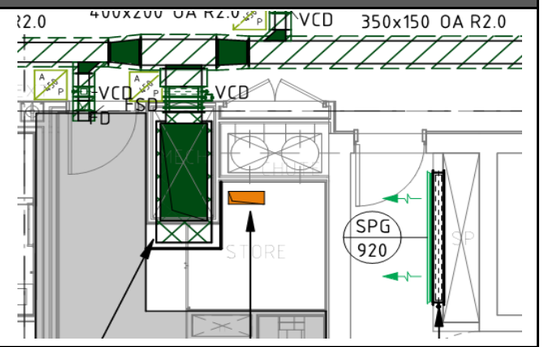
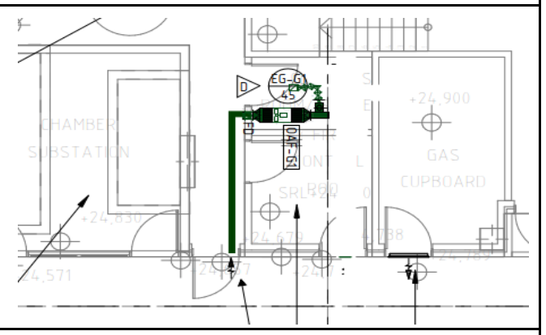
11 Gibbons St, Redfern - SSD 7749

Attachment 3 - IPC Independent Peer Review Responses - 31 July 19

Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
Fire & Smoke Control in Buildings – Two MS, Report No: 01630, Rev A, 24 July 19 Response led by Northrop with input from Core Engineering					
1	1	7	Missing stair pressurisation relief system for the fire isolated stairwells. This is a critical part of the required Smoke Hazard Management and must be implemented to the full requirements of BCA 2016 Amendment-1, Part E2.2, and referenced Australian and New Zealand Standard AS/NZS1668.1-2015.	Further detail is now provided to confirm stair pressurisation relief will be achieved via natural relief openings from louvres at both ends of all floors, in accordance with BCA 2019 and AS1668.1:2015. The size and type with details is shown in further developed mechanical drawing number GIB-MD31700-[Rev A] Level 17 HVAC Layout	
2	2	7	Missing Zone Pressurisation System for the Ground Floor Class 5 and 6 Tenancies. This is critical and is required under the DTS provisions of BCA 2016 Amendment-1, Part E2.2, and referenced Australian and New Zealand Standard AS/NZS1668.1-2015. Alternatively, a Fire Engineered Performance Based Solution, may be suitable to achieve the Performance Requirements.	Zone pressurisation is a requirement for Ground Floor Class 5 and 6 zones, however we are looking to take advantage of the concession for an otherwise Class 2 building as per BCA 2019 (Table E2.2(a) Note 2.)	
3	3	7	Missing Smoke Dampers for all the residential Outside Air ductwork, including for the main branches from the OA riser shaft, and all OA branches to the Apartment Units. These are required under the DTS provisions of BCA 2016 Amendment-1, Part E2.2, and referenced Australian and New Zealand Standard AS/NZS1668.1-2015. Typical for all residential Levels	Provisions have been made for fire-smoke dampers within the penetration from the central riser to lobby/corridor to remove the risk of smoke spread. The ductwork into each apartment has an aggregate opening area less than 0.1m². AS1668.1:2015 deems this area too small to be a risk for smoke to travel from one zone to another and smoke dampers are not required into every apartment - refer to Amd 1:2018 Clause 1.4.41.	
4	4	7	Missing fire rating of the main residential Outside Air (OA) main duct branches as it crosses the Fire Isolated Stairs, from the OA shaft to the Lobby. Typical for each residential level.	This issue has been designed out during the design development phase. The OA duct no longer runs within Fire Isolated Stairs. Refer to drawing GIB-MD31700-[Rev A] Level 17 HVAC Layout for further clarification.	

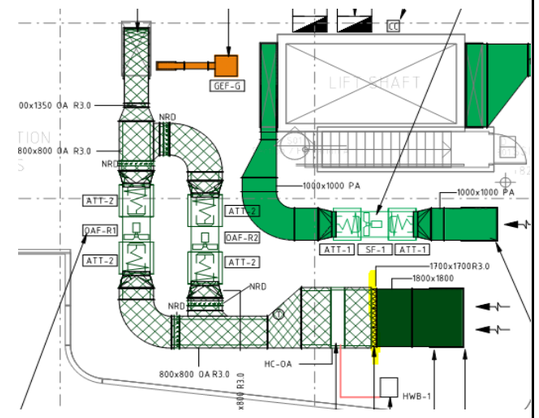
Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
5	5	7	Missing Fire Damper on the main residential Outside Air (OA) main duct branches, as it crosses the Fire Isolated Stairs, and into the Lobby. Typical for each residential level.	This issue has been designed out during the design development phase. The OA duct no longer runs within Fire Isolated Stairs. Refer to drawing GIB-MD31700-[Rev A] Level 17 HVAC Layout for further clarification.	
6	6	7	Missing design details, including no specification and no description of controls operation in fire mode. It is critical that the fire mode operation is in full compliance with the DTS provisions of BCA 2016 Amendment-1 and referenced Australian and New Zealand Standard AS/NZS1668.1-2015 and the Fire Engineer Report. This applies to all Mechanical Services equipment and systems.	The Mechanical Specification has advanced following further development of the design. The following systems will be designed in accordance with BCA 2019, AS1668.1:2015 and the Fire Engineer Report. **Fire Trip** *Upon receipt of a fire alarm the following mechanical plant shall be switched on:* •*Stair pressurisation supply fans – SF-1 & SF-2* •*Lobby relief louvres at all floors to open 100% within 60 seconds – SRL-1* *All other fans and fan coil units served by non essential mechanical switchboards shall be shut down.* ***This includes the Central Outside Air System (COAS). The COAS is deemed a shutdown system and is to not run in the event of a fire, in accordance with AS1668.1:2015.*** *Stair pressurisation relief air louvres in lobby to have a motorised damper serving each floor and facade, are to automatically open fully in the event of a fire, and are to fail safe open.* Refer to Mechanical Roof drawing GIB-MD-31800-[Rev A] for stair pressurisation and COAS fans	
7	7	7	Missing details of the power supply types. It is critical that all power supplies including, but not limited to Essential Power supplies to all fire and smoke hazard management systems and devises are in full compliance with the DTS provisions of BCA 2016 Amendment-1 and referenced Australian and New Zealand Standard AS/NZS1668.1-2015, AS/NZS3000 and AS1670.1-2015.	The Main Switchboard is provided with an essential/safety services section, as a separate chassis in accordance with the requirements of Clause 7.2 AS3000:2018 (Safety Services). All services (such as fire detection, occupant warning and smoke management systems) are provided with AS/NZS3013 compliant fire rated cabling and support systems. All power supplies to Safety Services (Fire and Life Safety/Essential Services) are being documented in full compliance with the DTS provisions of BCA 2019 and referenced Australian and New Zealand Standards AS/NZS1668.1-2015, AS/NZS3000, AS1670.1-2018 and AS/NZS3013.	

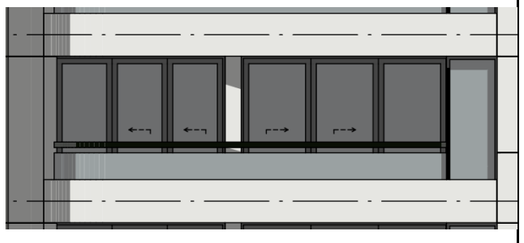
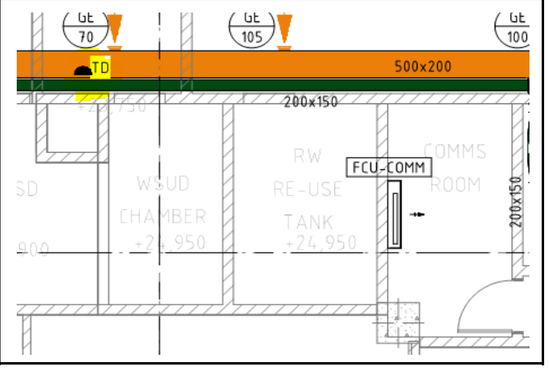
Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
8	8	7	The Ground Floor Hydrant pump room ventilation has been designed as Natural ventilation via a 1.7 sqm façade louvre. There is no evidence that such ventilation complies with the DTS provisions of BCA 2016 Amendment-1 and referenced Australian Standard AS2941. This standard has strict and explicit specification re the required cooling ventilation. It is recommended that the consultant provides verification for the suitability of the proposed natural ventilation. Otherwise it is recommended that this room has mechanical exhaust in order to comply with cooling ventilation requirements.	The natural ventilation opening will be sized to ensure fire pumps receive sufficient ventilation for the pumps. Minimum ventilation rates will be provided by the pump manufacturer and the ventilation opening will be sized to comply with manufacturer's requirement as per AS2941:2013.	
9	9	8	The Ground floor mechanical services drawing shows the Cleaners Room ventilation duct crossing the Fire Control Room. This is non compliant with the DTS provisions of BCA 2016 Amendment-1, Specification E1.8, and must be rectified.	Further details are now provided to confirm the Cleaners Room ventilation will be redirected away from Fire Control Room, in accordance with BCA 2019. Refer to Ground floor drawing showing mark-up of mechanical ventilation system relocation, GIB-MD-20000-[Rev A]	
10	10	8	It is not clear what is the proposed ductwork material for the residential apartments ventilation including for the OA, wet areas exhaust (Bath rooms and Laundry) and Range hood exhaust. It is critical that the ductwork material is fully compliant with the DTS provisions of BCA 2016 Amendment-1, Section C and referenced Australian Standards including but not limited to AS4254 and AS1530.	All ductwork within the development will be designed in accordance with BCA 2019 and all relevant Australian Standards including AS4254. This detail will be included within the final design documentation provided as part of the relevant Construction Certificate to satisfy DPE recommended Condition B6 and ensure the system can satisfy Condition E29 of the draft DA Consent prior to occupation.	
11	11	8	The trickle ventilator material proposed as part of the apartment ventilation system, have been presented as PVC, Aluminium and Wood material. It is critical that the proposed material is fully compliant with the DTS provisions of BCA 2016 Amendment-1, Section C, and referenced Australian Standards including but not limited to AS4254 and AS1530.	Trickle ventilation material will be aluminium to match the architectural intent and window system, and in accordance with BCA 2019. More details are provided within Acoustic Logic's response.	

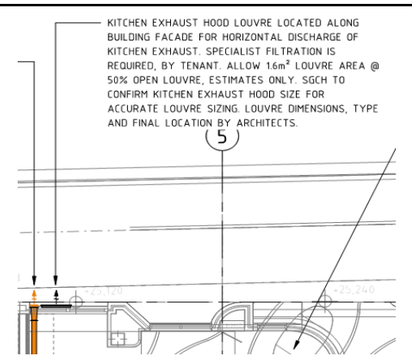
Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
12	12	8	Based on the above findings, the design does not comply with the DA consent clause B6, which requires compliance with the BCA to achieve and maintain acceptable standards including fire safety. Similarly, clause E29 of the DA consent, calls for installation and performance of the mechanical systems, to comply with the BCA and AS1668.	The system has been further designed in accordance with BCA 2019 (BCA 2016 for Section J as per the ABCB allowances) and all relevant Australian Standards. Final design documentation that will provided as part of the relevant Construction Certificate will demonstrate compliance with the provisions of the BCA, satisfying DPE recommended Conditions B6 and E29 of the drafted DA Consent. The system has been designed as fit for purpose - a requirement for occupation, and the applicant has committed under proposed draft Condition F18 to providing the Department with documentary evidence of annual inspections.	
Mechanical Ventilation System Review - Team Catalyst, Issue 1 - 24 July 19 Response led by Northrop					
13	3.1	5	The design concept for the ventilation systems seems to be: • central supply outside air (COAS) system fan on the roof • distributed through the building via a central supply duct • at each level there are duct branches to each apartment, via fire dampers, terminating in header box in each apartment • supply ducts to each bedroom only, from header box in each apartment • these supply ducts seem to be twin 75mm “supply air tubes” • trickle vents on windows designed to act as relief paths • local (each apartment) exhaust systems for bathroom and laundry • local exhaust system for kitchen rangehood	This concept has been further developed and below is the mechanical concept design description: • central supply outside air (COAS) system fan on roof with full redundancy • gas fired heating hot water generator located at roof level to provide air tempering to the COAS. • at each level there are duct branches to each apartment, via fire dampers, terminating in each apartment above the wardrobe • supply ducts to each bedroom via side blown grille • trickle vents on windows designed to act as make-up and relief air path depending on each apartments current mechanical ventilation activations • local (each apartment) exhaust systems for bathroom and laundry to facade • local exhaust system for kitchen rangehood to facade • local ceiling fans are provided to all bedrooms and living areas to assist with air movement and comfort	

Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
14	3.1	5	No functional description document detailing a control strategy was provided, however, there is a sketch (Image 2 below) and the following paragraph given in the document extract provided by NSW IPC entitled "3 Response to issues raised pages 9 – 18.pdf" (italics are the author's)	As part of design development, the following functional description is documented in Northrop Mechanical Performance Specification. Excerpt for COAS below; The central outside air fan will run on a time clock. The system can be centrally controlled to reduce speed and/or shut down for periods of time to assist with managing comfort during unfavourable ambient conditions. Air will be tempered as required during winter months using a gas fired heating hot water generator. Temperature setpoints will be adjustable for future amendments and controlled via outside temperature sensors and supply air temperature sensor.	
15	3.2	6	It is not clear how this minimum level of unconditioned outside air is predicted to provide thermal comfort in the habitable spaces, particularly on cold winter nights and hot summer days. Justification for how this mechanical ventilation system addresses thermal comfort in the apartments has not been sighted.	This concern has been addressed during the design development phase via adaptive thermal comfort modelling undertaken by Northrop. This has resulted in the implementation of the addition of a heating hot water coil for air tempering during winter hours as this was deemed the worst time of the year based on the modelled results. During summer, ceiling fans are provided for cooling via convection mixed, to be locally controlled. The thermal performance of the envelope (8 Star NatHERS) is predicted to provide adequate comfort in the dwellings. In addition, a control strategy has been adopted to modulate the frequency of fresh air supplied to the space. The central outside air fan is to be switched. The system can be centrally controlled to reduce speed and/or shut down for periods of time to assist with managing comfort during unfavourable ambient conditions.	
16	3.2	6	Table A1 in AS 1668.2 requires 10 L/s/person for bedrooms and also for "living rooms and general". Since the proposed ventilation system seems to supply outside air only to the bedrooms; it would seem that the design as proposed may not fully comply with the minimum requirements of AS 1668.2.	The central outside air system comprises one part of the ventilation system for this building, which also includes trickle vents used in conjunction with the apartment kitchen and toilet/laundry exhaust fans which draws outside air from the external façade. As a whole, the system is designed to meet the minimum requirements of AS1668.2:2012 and is capable of complying with DPE's recommended Condition B34 and providing 10 L/s/person to habitable rooms. It is also noted that Draft Condition E29 requires the applicant to undertake testing and provide evidence to the PCA prior to occupation that the performance of the system complies with relevant codes/standards.	

Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
17	3.2	6	It is not clear how the system will "automatically balance". The control strategy to show how balancing would be achieved has not been sighted.	The balancing of the central outside system will be established at commissioning and rebalancing during operation will not be required. The system will be balanced via manual adjusted dampers at each floor, and in each apartment to ensure the air quantity matches the designed amount. Generally, 12 months following practical completion as part of SGCH's maintenance regime as the building owner, the airflow values will be reassessed and adjusted where required. Evidence of this testing at installation and on an annual basis will be required to be provided by recommended Conditions E29 and F19 of the draft DA Consent.	
18	3.2	6	The sketch in Image 2 above indicates that the Invisivent trickle ventilation system is being proposed as a path for relief air, with supply air being provided by the COAS system. However, a review of the Invisivent brochure indicates that the product seems to be designed to be used in a supply configuration.	The proprietary trickle ventilation system Invisivent offers both make-up and relief paths, as confirmed by manufacturer.	
19	3.2	6	All Invisivent product representations in their brochures show installation above a DGU (double glazed unit) window system. Is the installation of this product appropriate above a single glazed window system framing as noted in the drawings?	All residential windows have been specified on the plans and will be delivered as double glazed units to all the residential windows.	
20	3.2	7	Have fan performance curves been considered to meet the system pressures required to provide rated airflow capacity for the exhaust system ductwork configurations as proposed? The proposed duct runs are significantly longer than typical for such systems.	Appropriate exhaust fans have been selected to meet the ventilation system's requirements. Static pressure calculations will be completed by mechanical contractor as part of the Construction Certificate documentation.	
21	3.2	7	Has condensation potential been considered for these long exhaust system ductwork? Any condensation in these ducts (particularly the kitchen ducts, which must handle steam from cooking), could increase the risk of mould growth and associated negative impacts on health.	The way the system deals with ventilation (including steam and odour related to cooking) is no different to any conventional kitchen odour exhaust system for a residential apartment building. No additional risks associated with condensation are expected.	

Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
22	3.2	7	The main COAS fan does not allow for filtration on the proviso that the air intakes are located on the roof. However, the apartments are located between two line sources of significant car exhaust pollution (Gibbons and Regent streets), and it is recommended that air quality measurements are reviewed, either by measurement or by modelling, to test this premise. CO, SOx, NOx and PM10 particulate concentrations would be some of the variables to be reviewed.	Further details are provided in Mechanical Roof Drawing GIB-MD-31800-[Rev A]. The main COAS has been designed with G4 filtration located at roof level compliant in accordance with AS1668.2:2012.	
23	3.3	7	As the mechanical ventilation system (not the exhaust systems) is to run continuously, the apartment will be subject to continuous air exchange with outside ambient air. This outside ambient air, particularly on winter nights, is being supplied directly into the bedrooms, where residents will be sleeping. A rough estimate, using 20 L/s per bedroom suggest this rate of outside air supply is between 0.5 and 0.8 ACH; and this figure could double if AS 1668.2 requirements for living rooms are also included. That is, on a cold night, when the outside temperature is say 4C, all of the air in the apartment has the potential to be replaced with air at 4C within one to two hours. This air exchange has the potential to increase thermal discomfort quite significantly in habitable spaces, particularly the bedrooms in winter as no air-conditioning (heating or cooling?) is envisaged. The situation would be reversed for hot days, and also for warm humid nights, predicted to increase in frequency due to climate change and global warming. Warm humid nights could also result in high levels of thermal discomfort for these apartments.	This concern has been addressed during the design development phase via adaptive thermal comfort modelling undertaken by Northrop. This has resulted in the addition of a preheating coil for air tempering during winter periods when required as this was deemed the worst time of the year based on the modelled results. The system can be centrally controlled to reduce speed and/or centrally shut down for periods of time to assist with managing comfort during unfavourable ambient conditions.	
24	3.3	8	Thermal bridging is not required to be accounted for when carrying out the NatHERS energy analysis. In practise, depending on the construction systems being used, thermal bridging may cause the R-values to be de-rated by 20 – 30%. This theory-to-practise disconnect would also serve to increase thermal discomfort within the habitable spaces as no air-conditioning systems are proposed.	The apartments have been designed to an 8 Star NatHERS standard. This is above and beyond industry practice let alone minimum code compliance (5 Star NatHERS equivalent). While thermal bridging contributes to the overall heat losses and gains (despite it not forming part of the ventilation system under review), it is determined to have minimal impact on thermal comfort.	

Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
25	3.3	8	We would strongly recommend the use of double glazed units for all windows. While the NatHERS analysis may show little improvement in terms of energy/GHG reductions, there are real improvements in space Mean Radiant Temperatures (MRT) for occupants.	All residential windows have been specified on the plans and will be delivered as double glazed units to all the residential windows.	
26	3.3	8	The exhaust systems for kitchen, bathroom and laundry, it is presumed, will be run on an intermittent basis as required. They would exhaust much larger quantities of indoor air to the outside (as compared to the mechanical ventilation systems). This would also result in large quantities of outdoor air (hot in summer, cold in winter) being pulled under negative pressure through the trickle vent (Invisivent) system, although, it is hoped, for much shorter time periods. These situations will also result in potential increase of occupant thermal discomfort. It is noted that in this situation, the Invisivent would act as a supply (inlet) air path.	The proprietary trickle ventilation system Invisivent offers both make-up and relief paths, as confirmed by the manufacturer. The make up air being provided via trickle vents is envisaged to be no different to make up air being supplied from other means in a conventional system. The system and building as a whole has been designed to provide adequate thermal comfort for the occupants and adaptive thermal modelling has been completed as part of the design development phase.	
27	3.3	8	No window system detail has been sighted. In extremely hot weather conditions, expected to increase in frequency due to climate change, if there is a grid failure, operable windows would be a critical component to provide some measure of psychological relief for occupants. Are the proposed window systems able to opened or are they fixed pieces of glazing?	All windows and the doors leading to the balconies are operable. This is indicated on the elevations in the BASIX stamped drawings submitted with the DA.	
28	3.4	8	The comms room on the ground floor is not provided with fresh air, and is considered to be non-compliant with AS 1668.2 for technicians working in the space for extended periods of time.	The comms room is not defined as an occupied space and has been designed to comply with AS1668.2:2012. Notwithstanding this, the comms room door is capable of being left open periodically during maintenance.	
29	3.4	8	There is no tundish or adequate drainage shown for the comms room FCU, and it is therefore non-compliant with AS366 microbial standard.	Further details of the tundish are provided in the Ground floor mechanical drawing, GIB-MD-20000-[Rev A] - indicated in yellow in the adjacent snapshot to comply with AS366 microbial standard.	

Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
30	3.4	9	The cleaner's room on ground floor should be provided with an exhaust air system, and not an outside air system as shown on the current plans.	Noted. Adjustments to the type of mechanical ventilation system will be addressed as part of the detailed design documentation.	
31	3.4	9	The ground floor retail/commercial tenancy does not seem to comply with DA condition of B35 exhaust system provisions.	Further details are provided on Ground floor mechanical drawing, GIB-MD-20000-[Rev A] The ground floor Café tenancy has been designed with provisions for horizontal kitchen exhaust discharge. The design and installation of any odour and grease removal of the horizontal kitchen exhaust is a requirement that will be completed by the future tenant if needed. The Commercial tenancy kitchen exhaust provisions have not been designed as they are not deemed a Retail tenancy. Horizontal discharge of kitchen exhaust is generally not a DTS compliant solution.	

Query #	Section	Page ref	Comment from Peer Review	Consultant Team's Response	Detailed Design Document Reference / Detail
Acoustic Review, Trickle Vent System - WSP, Rev 2 - 22 July 19. Response led by Acoustic Logic.					
32		2	The sound insulation performance of the proposed system in the open position (6 dB RW) is much lower than the minimum required sound insulation ratings of the glazing assembly as outlined in the RTA acoustic report (27 dB to 40 dB RW). Therefore, the proposed trickle vent system, in combination with the proposed glazing systems as per the RTA acoustic report, may not result in compliance with the internal noise criteria outlined in the ISEPP.	Further design development and calculations based on the data provided by CSIRO indicates that the internal noise will be satisfactory with trickle vent open. If this specific proprietary product is used, Acoustic Logic has recommended internal lining within the chamber of air passageway be included to provide further noise reduction based on research carried out by Sydney University. Please refer the Acoustic Logic & Northrop memos (Attachments 4 & 5). Acoustic Logic's analysis of the trickle vent and façade assembly indicates that the internal noise will be within the acceptable limits to comply with NSW Planning "Development Near Busy Road and Rail Corridor" with windows/ doors open" criteria, as required by DPE recommended Condition B12 of the draft DA Consent.	Please refer the Acoustic Logic & Northrop memos (Attachments 4 & 5)
33		2	Given the outcome of this assessment, it is recommended that detailed noise modelling of the whole facade assembly (i.e. solid façade, window, door, frame and trickle vent in open position) is conducted by a qualified acoustic engineer to ascertain compliance further noise mitigation measures if deemed to be non-compliant. with the ISEPP noise criteria, and determine and determine further noise mitigation measures if deemed to be non-compliant.	SGCH would accept a condition to undertake detailed noise modelling of the whole façade assembly prior to the issue of the relevant construction certificate.	