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Combustible façade cladding – preliminary fire safety assessment

ACT Health Procurement and Capital Works

Centenary Hospital for Women and Children, Garran, ACT

CA170095

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Amendment schedule

Version	Date	Information relating to report			
FSA1.0	28/07/2017	Reason for issue	Draft preliminary fire safety assessment issued to ACT Health Procurement and Capital Works (PCW) for review, comment and distribution.		
			Prepared by	Reviewed by	Approved by
		Name	Stephen Wise	Chris Jamieson	Stephen Wise
		Signature			
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			Prepared by	Reviewed by	Approved by
		Name	Stephen Wise	Chris Jamieson	Stephen Wise
		Signature			
		Reason for issue			
			Prepared by	Reviewed by	Approved by
		Name			
		Signature			
		Reason for issue			
			Prepared by	Reviewed by	Approved by
		Name			
		Signature			

Executive summary

This advice summarises the findings of on-site inspections and a desktop review of the information provided by ACT Health Procurement and Capital Works in relation to the installation of external aluminium composite panels (ACPs) at the Centenary Hospital for Women and Children (CHWC) project. As part of the review the Kingspan sandwich panels attached to the external walls are also reported on. Defire undertook the assessment at the request of ACT Health Infrastructure Procurement and Capital Works.

This review was undertaken with the aim of providing our professional fire safety engineering opinion regarding the capability of the ACPs as installed to meet the relevant performance requirements of the Building Code of Australia 2010 (BCA) – the code in force at the time of building approval – instead of compliance with the deemed-to-satisfy (DTS) provisions. Where additional information is required this has also been identified. The compliance of the Kingspan sandwich panels was also assessed as part of this report.

Arcadis façade engineers have been engaged to assist in the fire engineering review. Their preliminary report is attached in Appendix B.

Inspections of the Centenary Hospital for Women and Children (CHWC) were undertaken by Stephen Wise of Defire and Todd Byrnes of Arcadis on 25 and 26 July 2017. The inspections were completed in company with Shannon Keevers and Casper Matthee of ACT Health Procurement and Capital Works (PCW).

The building façade is predominantly Kingspan sandwich panels with ACPs as feature panelling in a number of areas. It has been identified that the dark grey ACP is an Alucobond polyethylene (PE) panel[1] and the coloured panels are Vitrabond PE panels[2].

The outcome of this assessment is that works related to the ACPs are recommended to be undertaken as priority 1 works, and further assessment of the Kingspan panels is recommended as part of priority 2 works.

Priority 1 recommendations

Table 1 provides the key hazards and recommendations in relation to PE core ACPs.

Hazards	Recommendations
• PE core ACPs are installed in a number of locations as feature walls around and at the front of the building. A number of these panels are installed in a continuous arrangement from ground floor to level 3. The ACPs that are installed continuously between levels represent a credible risk of fire spread up the façade of the building. • ACPs are installed adjacent and / or above the discharge location of fire-isolated exits or other exits serving the public areas of the building. As such the cladding could represent a risk of obstruction or injury to evacuating occupants. This could occur as a result of direct flame impingement or radiant heat exposure, dripping of the core material or delamination and mechanical failure of the panels.	• Considering the occupant characteristics and potential evacuation difficulty associated with the building, it is recommended that the ACPs with a PE core be replaced with a low fire hazard alternative. • It is acknowledged that the building will remain occupied whilst specific remediation works are undertaken. This is considered acceptable on the basis that the building has and maintains the existing passive and active fire prevention measures. These measures include but are not limited to fire and smoke compartmentation, access to alternative exits, hydrants, hose reels, sprinklers, extinguishers, smoke detection, stairway pressurisation, a building emergency warning system and an emergency management plan. • The building works associated with the façade replacement will need to comply with ACT building legislation requirements – ie obtain a building approval and certificate of occupancy. Confirmation of compliance with the performance requirements of the BCA will need to be provided via meeting the deemed-to-satisfy provisions or developing a performance solution if required. • The works are likely to take up to 16 weeks[3] to complete once the building approval is provided. A construction zone fire safety strategy and an ACT Health Risk Control Action Plan will need to be developed to address risks during this period.

[1] Martin, W – email correspondence from Wade Martin of Alucobond dated 2 August 2017
[2] Richards, W – Erincole Building Services – phone conversation dated 3 August 2017
[3] Richards, W – Erincole Building Services – phone conversation dated 3 August 2017

Hazards	Recommendations
• Alucobond PE panels installed around window reveals with a potential to cause fire spread into the building at windows.	• The Alucobond PE panels installed around window reveals are unlikely to represent an undue risk of fire spread due to the limited extent and physical separation between the panels up the façade. No action is recommended in relation to the ACPs installed around window reveals only.

Table 1 Hazards and recommendations related to ACPs

Priority 2 recommendations

Table 2 provides key hazards and recommendations in relation to the Kingspan sandwich panels.

Hazards	Recommendations
• The Kingspan EVOLUTION panels could represent a path for rapid vertical fire spread via the building façade.	• PIR panels will typically char and are unlikely to result in rapid vertical fire spread. • The building is sprinkler protected which further mitigates the risk of a fire developing to a size which could result in ignition of the external Kingspan EVOLUTION panels on the façade. The successful activation of the sprinkler system is considered to reduce the risk of the external wall finishes being exposed to flaming and temperatures which could result in ignition or flame propagation for a fire occurring within the building.
• The Kingspan EVOLUTION panels are installed adjacent and / or above the discharge location of fire-isolated exits or other exits serving the public areas of the building. As such the cladding could represent a risk of obstruction or injury to evacuating occupants. This could occur as a result of delamination or mechanical failure of the panels.	• The Kingspan panels have been deemed an attachment with fire hazard properties that comply with the DTS provisions of the BCA. • International testing / data notes that the panels achieve a fire resistance level of between -/30/30 to -/110/70 and as such are not considered to represent a large risk to occupants within the building. • Based on the limited fire test data reviewed for the Kingspan panels, they are unlikely to represent an undue risk of vertical fire spread. • The fire test data provided to date does not include full scale façade testing. It is recommended that Kingspan is contacted to determine if any full-scale façade testing – such as NFPA 285 – has been conducted on the subject panels or similar panels which would further establish the fire spread properties. It is recommended that a further assessment be undertaken as part of priority 2 works. • The original determination made by BCA Certifiers – that the panels comply with clause 2.4 of specification C1.1 of the BCA as an attachment – appears reasonable, subject to further confirmation via full scale test data.

Table 2 Hazards and recommendations related to Kingspan sandwich panels

Contents

1. Introduction

This advice summarises the findings of on-site inspections and a desktop review of the information provided by ACT Health Procurement and Capital Works in relation to the installation of external aluminium composite panels (ACPs) at the Centenary Hospital for Women and Children (CHWC) project. As part of the review the Kingspan sandwich panels attached to the external walls are also reported on. Defire undertook the assessment at the request of ACT Health Infrastructure Procurement and Capital Works.

This review was undertaken with the aim of providing our professional fire safety engineering opinion regarding the capability of the ACPs as installed to meet the relevant performance requirements of the Building Code of Australia 2010 (BCA) – the code in force at the time of building approval – instead of compliance with the deemed-to-satisfy (DTS) provisions. Where additional information is required this has also been identified. The compliance of the Kingspan sandwich panels was also assessed as part of this report.

Arcadis façade engineers have been engaged to assist in the fire engineering review. Their preliminary report is attached in Appendix B.

Inspections of the Centenary Hospital for Women and Children (CHWC) were undertaken by Stephen Wise of Defire and Todd Byrnes of Arcadis on the 25 and 26 July 2017. The inspections were completed in company with Shannon Keevers and Casper Matthee of ACT Health Procurement and Capital Works (PCW).

The building façade is predominantly Kingspan sandwich panels with ACPs as feature panelling in a number of areas. It has been identified that the dark grey ACP is an Alucobond polyethylene (PE) panel[4] and the coloured panels are Vitrabond PE panels[5].

The outcome of this assessment is that works related to the ACPs are recommended to be undertaken as priority 1 works, and further assessment of the Kingspan panels is recommended as part of priority 2 works. Refer to sections 8.2 and 8.3 respectively.

2. Scope

The scope of this report is as follows:

- Document the findings of site inspections and a desktop review of relevant design documentation including architectural drawings, façade details, and relevant test certificates relating to the products forming the external walls and attachments.
- Provide a preliminary assessment which provides guidance to ACT Health Procurement and Capital Works regarding compliance, the potential fire hazard associated with the panels and identify whether a more detailed assessment of the façade is necessary.

3. Previous involvement

Defire was engaged by CPB Contractors (formally known as Leighton Contractors) as the fire safety BCA consultants and fire safety engineers for the CHWC project during design and construction from 2008 to 2013.

The most recent Defire BCA fire safety assessment was at Final Sketch Plan stage – report CA080065 BCA2.1, dated 24 June 2010. It is noted that item 1 of table 4 in section 5.2 of this report highlighted this combustible cladding issue stating that '*Referenced drawings indicate that the building will incorporate an external composite metal cladding. Ensure that the products meet the requirements for non-combustibility – or are otherwise addressed in an alternative solution*'.

[4] Martin, W – email correspondence from Wade Martin of Alucobond dated 2 August 2017
[5] Richards, W – Erincole Building Services – phone conversation dated 3 August 2017

The most recent fire engineering report is documented in alternative solution report CA080065 revision R1.7 dated 4 August 2013. No departures to the DTS provisions of the BCA were identified in relation to façade cladding by the certifier at the time of construction and as such no performance assessments were undertaken related to cladding as part of the fire engineering assessments previously undertaken by Defire.

It is noted that the compliance of the Kingspan cladding was confirmed as compliant with the DTS provisions of the BCA by the certifiers for the project – BCA Certifiers. Refer to Appendix C. At this time we have not been able to identify a similar approval for the use of the Alucobond ACP.

It is also noted that the Defire alternative solution report includes an assessment relating to the omission of protection of openings from separate fire compartments and between separate buildings. Refer to assessment 4 of Defire alternative solution report CA080065 revision R1.7 dated 4 August 2013. This is relevant to the Kingspan panels installed as the assessment relied upon the fire hazard properties of the materials – refer to section 9.6 of the report.

4. Building description

CHWC is the extension and refurbishment of the existing Maternity Building (Building 11) at the Canberra Hospital, Woden, ACT. The four storey building contains mixed uses, including storage (class 7b), patient care areas (treatment and ward areas-class 9a), offices (class 5) and family accommodation (class 3). The building is joined to Canberra Hospital Building 1 through a common enclosed walkway link and a link /lift lobby. It also has a common wall with Building 10. The building is divided into six separate blocks, referred to as blocks A – F as shown in Figure 1.

The site is bounded by Yamba Drive to the west, Kitchener Street to the north-west, Gilmore Crescent to the north-east, Building 10 to the east, Building 1 to the south, Building 12 to the south-west and the northern carpark to the north-west –refer to Figure 1.

Fire safety systems in the buildings include fire and smoke separation, hydrants, hose reels, sprinklers, smoke detection, smoke hazard management, stair pressurisation and a sound system and intercom system for emergency purposes (SSISEP).

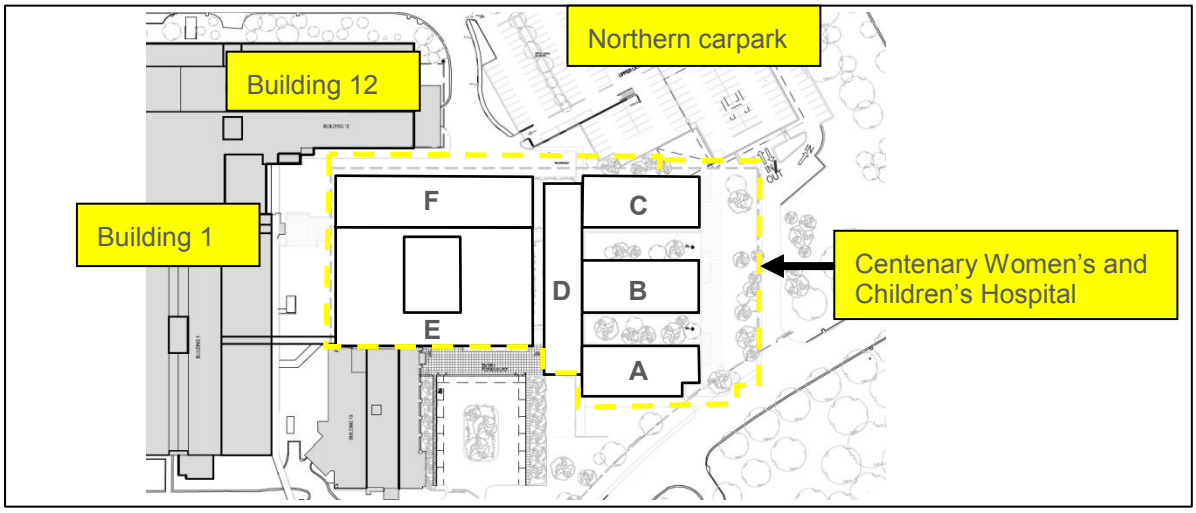


Figure 1 Site plan

A description of the main characteristics of the building to determining compliance with the BCA is given in Table 3. The use and classification of the building or part in accordance with clause A3.2 of the BCA is described in Table 4. The information provided in these tables was current at the time of completion of the building in 2011.

Characteristic	BCA clause	Description
Effective height	A1.1	Approximately 14.4m
Type of construction required	C1.1	Type A
Rise in storeys	C1.2	4 (see note)
Note: Level 0 is included in the rise in storey calculation given that its average height above ground is greater than 1m in accordance with clause C1.2 of the BCA.		

Table 3 Main building characteristics

Part of building	Use	Classification (A3.2)
Level 0	Plant and storage	Class 7b
Level 1	Health care	Class 9a
Level 2	Health care, offices and family accommodation	Class 9a, 5 and 3
Level 3	Health care	Class 9a

Table 4 Use and classification

5. DTS provisions of the BCA

The following sub-sections provide a description of the DTS requirements of the BCA for façade combustibility for a building of type A construction.

5.1 External walls

- BCA definition of external wall *'an outer wall of a building which is not a common wall'.*
- The Australian Buildings Codes Board (ABCB) advisory note 2016-3 on 'Fire performance of external walls and cladding' explains that the following elements are part of an external wall:
  - external cladding including masonry, concrete panels, composite panels and sheet materials
  - framing
  - spandrels
  - insulation
  - internal lining of an external wall
- Clause 3.1(b) of specification C1.1 requires external walls of buildings of type A construction to be non-combustible.

5.2 BCA definition of non-combustible

- Part A1.1 states that non-combustible means:
  - Applied to a material – not deemed combustible as determined by AS 1530.1-1994 – Combustibility Tests for Materials.
  - Applied to construction or part of a building – constructed wholly of materials that are not deemed combustible.

5.3 BCA concessions for non-combustibility

- BCA clause C1.12 specifies several materials that may be used wherever a non-combustible material is required, the following materials are listed:
  - Plasterboard
  - Perforated gypsum lath with a normal paper finish

- Fibrous-plaster sheet
- Fibre-reinforced cement sheeting
- Pre-finished metal sheeting having a combustible surface finish not exceeding 1mm thickness and where the Spread-of-Flame Index of the product is not greater than 0.
- Bonded laminated materials where:
  i. each laminate is non-combustible, and
  ii. each adhesive layer does not exceed 1mm in thickness, and
  iii. the total thickness of the adhesive layer does not exceed 2mm, and
  iv. the Spread-of-Flame Index and the Smoke-Developed Index of the laminated material as a whole does not exceed 0 and 3 respectively.

5.4 BCA concessions for combustible attachments

- A combustible material may be used as a finish or lining to a wall …, or other attachment to a building element which has the required FRL if—
  - the material is exempted under C1.10 or complies with the fire hazard properties prescribed in Specification C1.10; and
  - it is not located near or directly above a required exit so as to make the exit unusable in a fire; and
  - it does not otherwise constitute an undue risk of fire spread via the facade of the building.
- The attachment of a facing or finish, or the installation of ducting or any other service, to a part of a building required to have an FRL must not impair the required FRL of that part.

5.5 Attachment of part of external wall

- The ABCB guidance note[6] explains that a building element is considered part of an external wall if it is integral to the construction of the wall.
- An external wall panel may be considered as an attachment where the removal of panel does not affect the ability of the external wall to function as an external wall – ie weather proofing, energy efficiency and fire resistance.

[6] ABCB Advisory Note 2016-3, Fire Performance of External Walls and Cladding, revised September 2016

6. BCA Certifiers determination

6.1 PE core panels

At this time we have not been able to identify a review or approval for the use of the Alucobond or Vitrabond PE core panels. Further advice will need to be sought from BCA Certifiers for this information.

6.2 Kingspan panels

Independent advice in relation to the BCA compliance of the Kingspan sandwich panels and their application to CHWC was undertaken by Aurecon (formally Connell Wagner)[7] at the time of construction. A summary of the relevant conclusions to the installed Kingspan panels from the Aurecon advice is as follows:

'Based on the above review and assessments it is considered that the letters of opinion provided as Appendix A and the following conclusions can be supplied:

- *The results of ISO/FDIS 13784-1 tests indicate that the Kingspan KS 1000 RW (80 mm thick) panel is a Group 1 material. It also has a SMOGRA of not more than 100.*
- *The results of ASIISO 9705 tests indicate that the Eurofoam PIR panel 150mm thick is a Group 2 material. It also has a SMOGRA of not more than 100.*
- *It appears that the thicker the panel the lower the Group rating to BCA clause C1.10a.*
- *Test data carried out on one panel KS 1200 CS (150 mm thick PIR core) showed that a Spread of- Flame Index of 0 and Smoke-Developed Index of 2 was achieved meeting the relevant BCA requirement of fire hazard properties for materials and assemblies in buildings. It is likely that the rest of the relevant Kingspan panel product range will meet the BCA requirements for fire hazard properties as they are constructed of same core material and steel facings.*
- *The non-combustible construction requirements for the building elements within type A and B buildings mean that Kingspan panels are unlikely to be allowed for use unless they are tested and pass AS 1530.1.*
- *It is considered that Kingspan panels could be utilised in type C construction in fire rated walls of the relevant rating as the non-combustible requirement does not apply.'*

The advice attached at Appendix C from BCA Certifiers[8] notes that:

> *'BCA Certifiers has reviewed the proposal to use Kingspan panels as the external wall cladding at the ACT Women's and Children's Hospital. As you are aware combustible materials such as Kingspan must not be used as the external walls in a building requiring Type A fire-resisting construction. However, combustible materials may be used as an attachment to the external wall of such buildings, provided they comply with Specification C1.10 and C1.10a of the BCA. The technical data and test reports provided by Kingspan confirm the product complies with both Specifications.*
>
> *Based on the drawings and details provided by BVN Architecture, BCA Certifiers is satisfied that the Kingspan panels on the external walls of the subject building are an attachment. The wall materials located behind the panels including a steel frame and 0.7mm zinc sheeting provide adequate weatherproofing and would perform as an external wall in their own right should the Kingspan panels be removed.'*

As such, the Kingspan panels were deemed an attachment provided that the zinc sheeting was installed on the walls before the panels. A review of drawings and spot checks undertaken during the on-site inspections confirmed that this was the method of construction.

Refer to the Arcadis façade engineering report in Appendix B for the preliminary assessment of the façade and the specific advice documents prepared by Aurecon and BCA Certifiers for a more comprehensive discussion regarding the relevant fire testing outcomes and requirements of the BCA.

[7] Connell Wagner – Report – Kingspan Panels, Advice on panel performance during fire – 15 October 2007 – Ref 29386-001
[8] BCA Certifiers – Letter- Use of Kingspan as external cladding – 21 July 2011 – Ref CC080414.

7. Departures from the DTS provisions of the BCA

Table 5 identifies areas where ACPs may not comply with the DTS provisions of the BCA, and also where the use of Kingspan panels has been considered as compliant with the DTS provisions of the BCA by the project certifier.

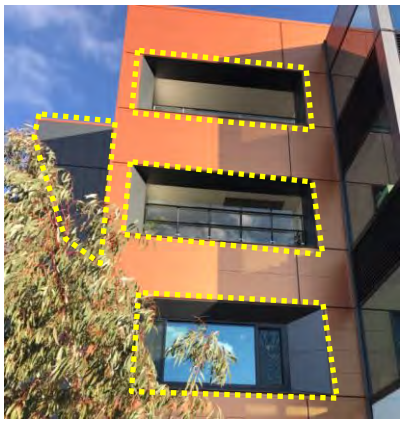
No	Location / extent	Panel	Comments
1.	Installed as a façade cladding to parts of the external walls as feature walls – ie feature wall (multi-coloured panels). 	Vitrabond PE	• No information has been able to be identified regarding the use of Alucobond or Vitrabond PE panels during the design / construction process. We have not been able to find documentation that it was considered as compliant by BCA Certifiers. • The locations where the PE ACPs are installed are feature walls and around window reveals. • Some of the panels have been used above / adjacent to exits. • The installation of the PE ACPs which are located above the exits and/or continuously between levels may not comply with clause 2.4(a)(ii) of specification C1.1 of the BCA. **Note:** Refer to Appendix D for plans and photos showing main areas where Alucobond PE is installed on external walls.
	Installed as a façade cladding to parts of the external walls, around window reveals and feature walls (dark grey panels – highlighted by yellow outline below). 	Alucobond PE	
2.	Installed as a façade cladding to majority of the external walls of the building (orange panels). 	Kingspan EVOLUTION	• The Kingspan EVOLUTION panels were identified as a potential compliance issue during the design / construction process, but was reviewed by the project building certifier and deemed to be compliant with the DTS provisions of the BCA. This is on the basis that they were installed to external walls as an attachment to comply with clause 2.4 of specification C1.1 of the BCA. Refer to Appendix C. No alternative solution was therefore required to be undertaken.

Table 5 Locations of the sandwich panels and ACPs on the subject building

8. Preliminary assessment

The works related to the ACPs are recommended to be undertaken as priority 1 works, and further assessment of the Kingspan panels is recommended as part of priority 2 works. Refer to sections 8.2 and 8.3 respectively.

8.1 Benefits of sprinkler protection

The building is provided with sprinkler protection in accordance with AS 2118.1-1999. The sprinkler system is provided with a grade 2 water supply. It is noted that the sprinkler system was the subject of an alternative solution to omit protection of the level 0 substation.

Note: As there are no ACPs around the sub-station, the deletion of sprinklers in this room has no impact.

The successful operation of the sprinkler system is expected to control or extinguish the fire and mitigate fire spread beyond the area of origin. The BCA acknowledges the reliability and efficacy of sprinkler systems and provides a number of concessions to the fire rating requirements when sprinklers are provided. This includes clause C2.6 of the BCA which allows vertical fire separation provided between storeys to be omitted in a sprinkler protected building. This acknowledges the benefit of sprinklers in mitigating the risk of vertical fire spread via openings in the external facade.

The BCA also allows a general relaxation of the requirements for wall and ceiling linings where sprinklers are provided. The material groups permitted under table 3 of specification C1.10 can be reduced to include materials with lower fire hazard properties where sprinklers are provided. For example, in a class 5 building in a public corridor, only group 1 and 2 materials are permitted where the building is unsprinklered, whereas group 1, 2 and 3 materials may be used where sprinklers are provided. Similarly the critical radiant heat flux requirements for floor materials may be less fire resistant where sprinklers are provided. These requirements acknowledge the general reduction in fire hazard and risk of fire spread when sprinklers are provided in a building.

The successful activation of the sprinkler system can be expected to reduce the risk of the external wall finishes being exposed to flaming and temperatures which could result in ignition or flame propagation for a fire occurring within the building.

8.2 Priority 1 works – Alucobond and Vitrabond PE ACPs

It has been identified that the dark grey ACP is an Alucobond polyethylene (PE) panel[9] and the coloured panels are Vitrabond PE panels[10].

Warranty information has been provided by PWC for the Vitrabond panels. Whilst warranty information was not provided by PWC for the Alucobond ACP, it has been confirmed as being available[11].

8.2.1 Product description – Alucobond and Vitrabond PE

Alucobond PE (4mm) is a laminated composite panel comprising:

- 0.5mm thick aluminium to front and rear face
- 3mm polyethylene (PE) core

8.2.2 Fire properties of polyethylene

Polyethylene (PE) is a hydrocarbon and as such is a combustible fuel source. It burns quickly when exposed to an open flame. PE is a thermoplastic and will tend to melt and drip when exposed to fire. This can lead to the delamination of the external aluminium lining which further exposes the PE core to the fire source. Additionally, the dripping of the core may result in secondary pool fires below the exposed panels.

[9] Martin, W – email correspondence from Wade Martin of Alucobond dated 2 August 2017
[10] Richards, W – Erincole Building Services – phone conversation dated 3 August 2017
[11] Martin, W – email correspondence from Wade Martin of Alucobond dated 2 August 2017

A range of piloted and non-piloted ignition temperatures are listed, with the lowest numbers quoted below for conservativeness: [12]

- Piloted – 270°C
- Non-piloted – 349°C

Table 6 summarises ignition times for 6mm PE exposed to various radiant heat intensities. It is noted that the performance of ACPs will differ as the core is lined with an external layer of aluminium which can be expected to delay ignition.

Heat flux	20 kW/m^2	30 kW/m^2	40 kW/m^2	50 kW/m^2
Ignition times	403s	171s	91s	58s

Table 6 Ignition times for polyethylene – 6mm thick

8.2.3 Location and installation

The ACPs are utilised on feature walls, façade highlights and also some around window reveals. Some of the panels are installed where evacuating occupants are required to pass below.

Note: Refer to Appendix D for further plans and additional photos showing main areas where ACPs are installed on external walls.

The panels are understood to be installed as decorative façade finishes and do not form part of the external wall. The ACPs were not identified as a compliance issue during construction. Subsequently it was not addressed via a performance solution.

8.2.4 Fire hazard properties of Alucobond PE

The product has been subject to the following Australian testing and approvals.

Standard	Result	Comment
AS ISO 9705	Group 3	**Class 5 or 7b** • Complies with specification C1.10 of the BCA for use as a wall of ceiling lining in public corridors, specific areas and other areas a sprinkler protected building / part. **Class 3 or 9a** • Complies with specification C1.10 of the BCA for use as a wall of ceiling lining in specific areas and other areas a sprinkler protected building / part. • Does not comply with specification C1.10 of the BCA for use as a wall of ceiling lining in public areas in a sprinkler protected building / part.
AS 1530.3	Indices: • Flammability index: – • Spread-of-flame: 0 • Smoke developed: 0-1	Would be an acceptable material for use in general areas of a building including within a fire control room or fire-isolated exit under specification C1.10 of the BCA. **Note:** This is a surface test only and does not provide a true indication of the core performance.
Notes: Specific areas means: • For a class 3 building or part, a sole-occupancy unit; • For a class 5 building or part, open plan offices with a minimum floor dimension/floor to ceiling height ratio > 5; • For a class 9a health-care building or part, patient care areas.		

Table 7 Alucobond PE fire hazard properties

[12] Babrauskas V, Ignition Handbook, Fire Science Publishers, 2003.

8.2.5 Fire hazard properties of Vitrabond PE

The product has been subject to the following Australian testing and approvals.

Standard	Result	Comment
AS 1530.3	Indices: • Ignitability • Heat evolved: 0 • Spread-of-flame: 0 • Smoke developed: 0	Would be an acceptable material for use in general areas of a building including within a fire control room or fire-isolated exit under specification C1.10 of the BCA. **Note:** This is a surface test only and does not provide a true indication of the core performance.

Table 8 Vitrabond PE fire hazard properties

8.2.6 Key hazards and recommendations

Table 9 provides the key hazards and recommendations in relation to ACPs.

Hazards	Recommendations
• PE core ACPs are installed in a number of locations as feature walls around and at the front of the building. A number of these panels are installed in a continuous arrangement from ground floor to level 3. The ACPs that are installed continuously between levels represent a credible risk of fire spread up the façade of the building. • ACPs are installed adjacent and / or above the discharge location of fire-isolated exits or other exits serving the public areas of the building. As such the cladding could represent a risk of obstruction or injury to evacuating occupants. This could occur as a result of direct flame impingement or radiant heat exposure, dripping of the core material or delamination and mechanical failure of the panels.	• Considering the occupant characteristics and potential evacuation difficulty associated with the building, it is recommended that the ACPs with a PE core be replaced with a low fire hazard alternative. **Note:** Refer to Appendix D for plans and photos showing main areas where Alucobond PE is installed on external walls. • It is acknowledged that the building will remain occupied whilst specific remediation works are undertaken. This is considered acceptable on the basis that the building has and maintains the existing passive and active fire prevention measures. These measures include but are not limited to fire and smoke compartmentation, access to alternative exits, hydrants, hose reels, sprinklers, extinguishers, smoke detection, stairway pressurisation, a building emergency warning system and an emergency management plan. • The building works associated with the façade replacement will need to comply with ACT building legislation requirements – ie obtain a building approval and certificate of occupancy. Confirmation of compliance with the performance requirements of the BCA will need to be provided via meeting the deemed-to-satisfy provisions or developing a performance solution if required. • The works are likely to take up to 16 weeks[13] to complete once the building approval is provided. A construction zone fire safety strategy and an ACT Health Risk Control Action Plan will need to be developed to address risks during this period.
• Alucobond PE panels installed around window reveals with a potential to cause fire spread into the building at windows.	• The Alucobond PE panels installed around window reveals are unlikely to represent an undue risk of fire spread owing to the limited extent and physical separation between panels up the façade. • No action is recommended in relation to the ACPs installed around window reveals only.

Table 9 Hazards and recommendations related to ACPs

[13] Richards, W – Erincole Building Services – phone conversation dated 3 August 2017

8.3 Priority 2 works – Kingspan EVOLUTION – majority of façade

8.3.1 Product description

The external facade of the building incorporates Kingspan sandwich panels. The 50mm Kingspan EVOLUTION panels are a rigid polyisocyanurate (PIR) insulation foam cladded in 0.5mm thick pre-painted steel[14] comprising:

- 0.5mm thick Bluescope Colourbond steel facing to front and rear face
- Panels are nominally 2400mm x 1200mm
- ~50mm core containing rigid polyisocyanurate (PIR) insulation foam
- Adhesive layers
- Painted finish

8.3.2 Location and installation

The Kingspan EVOLUTION panels are installed as an attachment to the external non-loadbearing walls to majority of the façade of the building. The typical wall construction is described in the Arcadis Façade engineers preliminary report. Refer to Appendix B.

8.3.3 Fire hazard properties

The product has been subject to the following Australian testing and approvals.

Standard	Result	Comment
AS ISO 9705	Group 2	Panel tested was the 150mm specimen. Mid-range group number. Would be an acceptable material for use internally as a wall or ceiling lining in any area within a sprinkler protected building under specification C1.10 of the BCA.
ISO/FDIS 13784-1:2001(E)	Group 1	Panel tested was the 80mm specimen. SMOGRA was less than 100 under specification C1.10 of the BCA.
AS 1530.3-1999	Indices: Ignitability: 0 Spread-of-flame: 0 Heat: 0 Evolved smoke developed: 2	Panel tested was the 150mm specimen. Would be an acceptable material for use in a fire control room or fire-isolated exit under specification C1.10 of the BCA.

Table 10 Kingspan fire hazard properties

International testing

The product has been tested to British standards LPS 1181 and LPs 1208, which tests fire growth and fire spread. During the test, specimens are exposed to temperatures of up to a 1000°C. The results of the Kingspan testing, indicates that limited flame spread occurred [15]. The product has also been tested to BS 476 part 22 clause 5 which tests the FRL of a wall assembly. Depending on the thickness of the foam, the product can be expected to achieve an FRL in accordance with BS 476 of between -/30/30 to -/110/70[16]. Although not directly comparable to an FRL as defined by AS 1530.4-1994, which is referenced by the BCA, the results still indicate that the panels will provide some form of protection against fire spread.

[14] Branz Fire, Fire test Certificate Kingspan Insulated Panels - certificate number 498, Branz Ltd, March 2009
[15] Kingspan, Property and business fire protection insulated panels, Kingspan Insulated Panels, April 2007
[16] Connell Wagner, Kingspan Panels Advice on Panel Performance during Fire- reference 29386-001 rev 0, October 2007

8.3.4 Discussion of fire hazards and preventative and protective measures

Table 11 provides key hazards and recommendations in relation to the Kingspan sandwich panels.

Hazards	Recommendations
• The Kingspan EVOLUTION panels could represent a path for rapid vertical fire spread via the building façade.	• PIR panels will typically char and are unlikely to result in rapid vertical fire spread. • The building is sprinkler protected which further mitigates the risk of a fire developing to a size which could result in ignition of the external Kingspan EVOLUTION panels on the façade. The successful activation of the sprinkler system is considered to reduce the risk of the external wall finishes being exposed to flaming and temperatures which could result in ignition or flame propagation for a fire occurring within the building.
• The Kingspan EVOLUTION panels are installed adjacent and / or above the discharge location of fire-isolated exits or other exits serving the public areas of the building. As such the cladding could represent a risk of obstruction or injury to evacuating occupants. This could occur as a result of delamination or mechanical failure of the panels.	• The Kingspan panels have been deemed an attachment with fire hazard properties that comply with the DTS provisions of the BCA. • International testing / data notes that the panels achieve a fire resistance level of between -/30/30 to -/110/70 and as such is not considered to represent a large risk to occupants within the building. • Based on the limited fire test data reviewed for the Kingspan panels, they are unlikely to represent an undue risk of vertical fire spread. • However, as the fire test data provided to date does not include full scale façade testing. It is recommended that Kingspan is contacted to determine if any full-scale façade testing – such as NFPA 285 – has been conducted on the subject panels or similar panels which would further establish the fire spread properties. • As such the original determination made by BCA Certifiers – that the panels comply with clause 2.4 of specification C1.1 of the BCA as an attachment – appears reasonable, subject to further confirmation via full scale test data. • It is recommended that a further assessment be undertaken as part of priority 2 works.

Table 11 Hazards and preventative / protective measures related to the assessment

Appendix A Drawings and information

Drawing title	Dwg no	Date	Drawn
Elevations Block A	AR-E-XX-10 issue Z	14 August 2012	BVN Architecture
Elevations Block B	AR-E-XX-11 issue Z	14 August 2012	BVN Architecture
Elevations Block C	AR-E-XX-12 issue Z	14 August 2012	BVN Architecture
Elevations Block D North and South	AR-E-XX-14 issue Z	14 August 2012	BVN Architecture
Elevations Block D	AR-E-XX-15 issue Z	14 August 2012	BVN Architecture
Section Block F	AR-E-XX-17 issue Z	14 August 2012	BVN Architecture
Elevations Block F	AR-E-XX-19 issue Z	14 August 2012	BVN Architecture
WCH Fire compartment Level 1	AR-D-01-01	28 February 2012	BVN Architecture
WCH Fire compartment Level 2	AR-D-02-01	28 February 2012	BVN Architecture
WCH Fire compartment Level 3	AR-D-03-01	28 February 2012	BVN Architecture

Appendix B Arcadis preliminary report findings

ARCADIS Design & Consultancy for natural and built assets

Stephen Wise
DEFIRE
2/ 11 Murray Cst,
Manuka, ACT 2603

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Locked Bag 6503
NORTH SYDNEY, NSW 2060
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Fax No: +61 2 8907 9001
arcadis.com

26 July 2017

Description of the Façade Fixturing in relation to Building 11 at the Canberra Hospital, Yamba Drive.

Dear Stephen,

Find below our preliminary observations regarding the as-built façade fixturing and attachment detail for the external panelling associated with Building 11, Women's and Children's Hospital as requested by our client, DEFIRE.

Summary

ARCADIS and DEFIRE conducted an inspection of the cladding and fixturing of Building 11 at the Canberra Women's and Children's Hospital on the 25th and 26th of July.

It appears there 3 types of cladding are in use – the majority being an orange coloured KINGSPAN panel, with some limited occurrences of ALUCOBOND panelling for drainage insets, soffits, etc. The coloured façade at the Eastern Entrance appears to be composed of VITRABOND panels.

The majority of the panels are screwed onto a framework of galvanised steel channelling which acts as the support frame. Directly *between* the vertical façade panelling and the support framework, is a 0.7mm continuous galvanised metal sheet.

The support framework in turn is supported or suspended from the building concrete superstructure by galvanised steel purlins. The purlins in turn are bolted to the floor slabs.

The interior of the building (walls) and ceilings is fibre cement sheeting. The observed materials and fixturing appear to correspond to the as-built drawings.

This report is a factual record only of the observed fixturing and draws no conclusions. Any recommendations regarding the actual type, nature and flammability of the panels, safety and suitability of the design, compliance with relevant building codes or actions arising out of any findings of non-compliance - have been left to DEFIRE.

Background

The Canberra Hospital on Yamba Drive in Garran was built in 2010 and some buildings feature extensive use of Aluminium Composite Panelling (ACP) as the external cladding. ACT Health requested a review of this façade configuration on building 11, given the recent issues of flammability highlighted in ACP façade panels.

Figure 1. Location of Inspected Building

Observations

Panel Types

Building 11 is a 4-story building, the clear majority of which is clad in what is described to be 50mm KINGSPAN polyisocyanurate (PIR) continuous horizontal panels. All panel types are powder coated, the KINGSPAN being a vivid metallic orange.

There is occasional ALUCOBOND polyethylene (PE) panels. The ALUCOBOND was observed to have a black core material. The ALUCOBOND is mainly used on soffits, window sills, corners and drain pipe recesses but occasionally features as a full wall cladding in limited areas such as the children's open-air playground/courtyard, an inset in the North-East corner, etc. The ALUCOBOND is identified by its charcoal grey colour (marked as AL-01 in the drawings).

There is an isolated occurrence of coloured panels exclusive to the eastern entrance (Hospital Road). The drawings (see EB-E-XX-2004) insinuate that those panels are ALUCOBOND (the coloration is indicated in an identical way; AL-22, AL-31) but the advice from the suppliers and installers was that VITRABOND was used, as evidenced by a warranty supplied to that effect. Multiple colours were employed.

Façade Support Frame

In **Figure 2**, the horizontal floor slabs defining each floor level are shown. Coming out from the slabs at an angle, are the steel purlins which attach to the façade support frame. The steel stubs are bolted to the floor slab. The façade support frame is composed of a square grid of galvanised steel channelling.

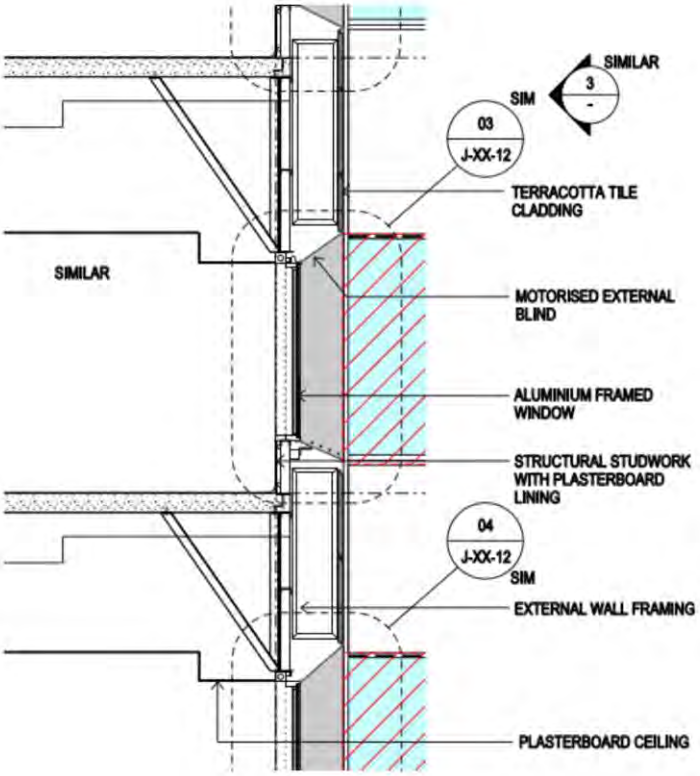

Figure 2. Floor Slabs Typical panel attachment detail (AR-F-XX-01).

Panel Attachment

In general, the exterior panels are screwed onto a grid of galvanised steel channels which make up the façade support structure. Between the exterior panels and the façade support structure is continuous 0.7mm galvanized steel sheeting (also called 'Zinc Sheet' and occasionally in the drawings, it appears to be mentioned as a 'membrane'). Removal of the outside panels is likely to reveal a continuous membrane of zinc sheet, at least in the areas inspected. Only detailed scrutiny of all the drawings would reveal if this is indeed the standard practice or not.

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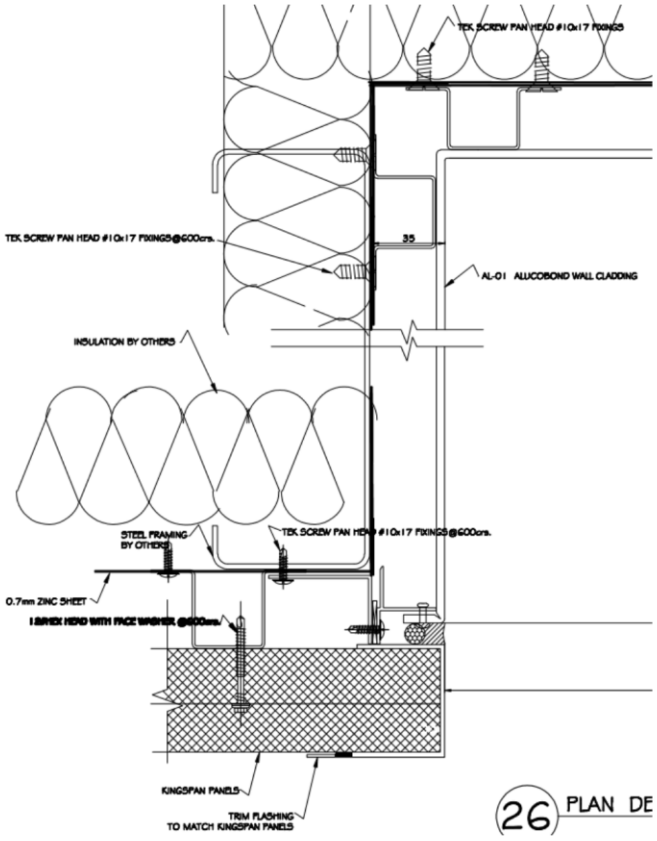

Figure 3. Typical ALUCOBOND Attachment Detail. Note Zinc Sheet and backing channels / purlins (EB-G-XX-2026)

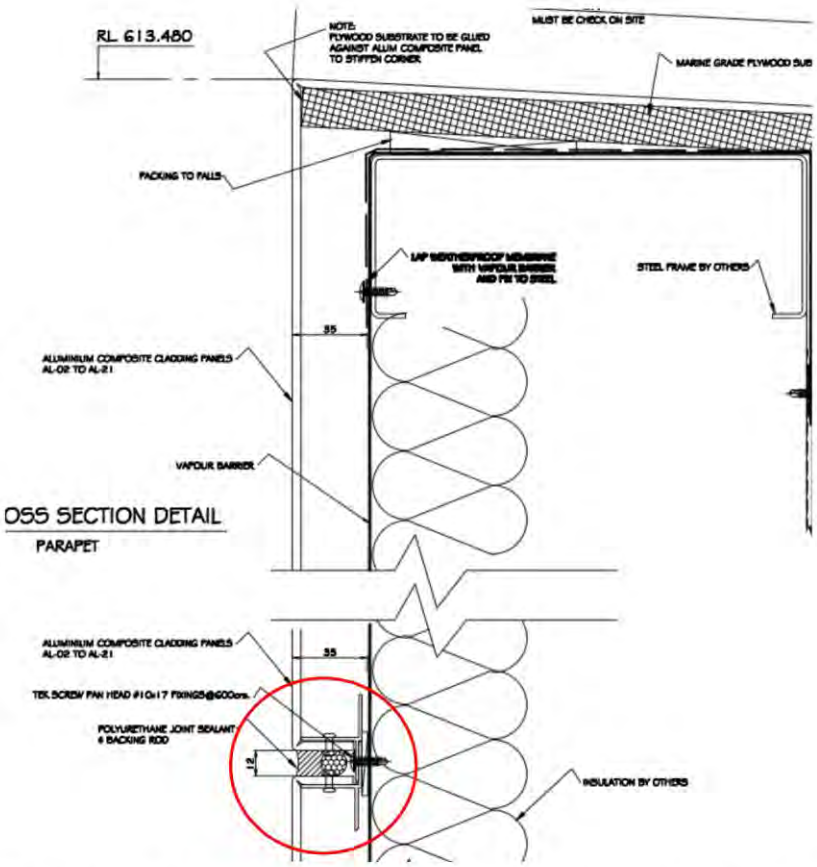

Figure 4. Typical ALUCOBOND Attachment Detail. Note Zinc Sheet and backing channels / purlins (EB-G-XX-2014)

Figure 5. ALUCOBOND being used as a soffit sheeting. Note the black core material.

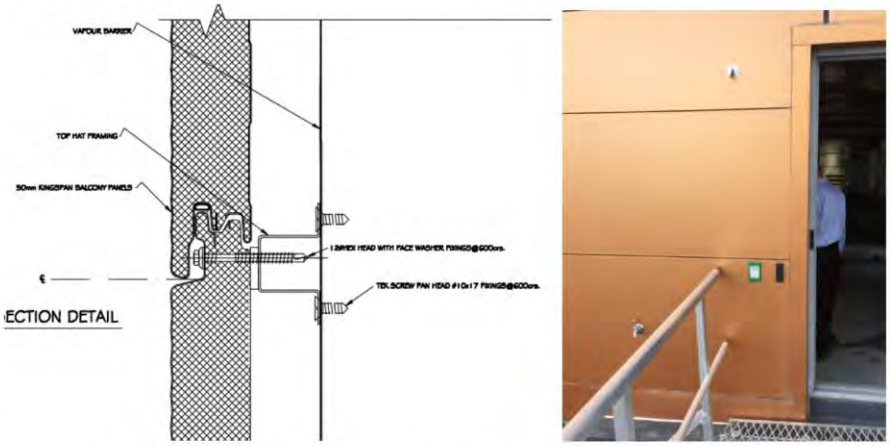

Figure 6. Suspected KINGSPAN fixing strategy for closely spaced panels (EB-G-XX-2019)

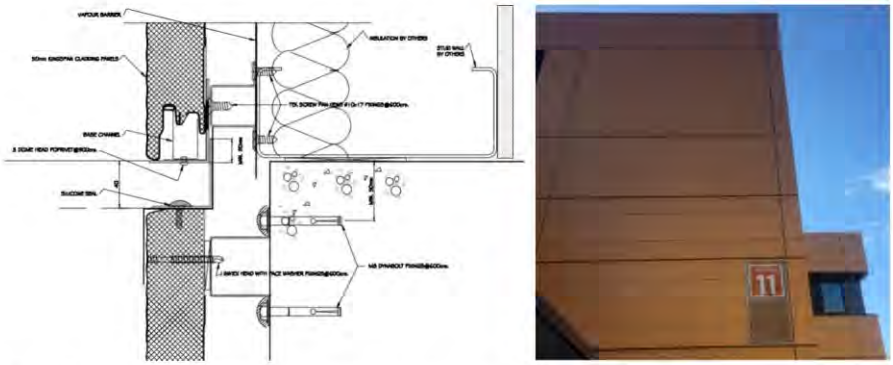

Figure 7. Suspected KINGSPAN fixing strategy where a gap is required (EB-G-XX-2020)

Considerations

- It is assumed that the panels are correctly identified in the as-built drawings. No confirmatory testing was attempted by ARCADIS to establish the actual nature of the panel core material.
- The overall safety of the panelling both separately and as part of the overall façade construction has been left to DEFIRE to determine. ARCADIS has merely recorded its observations of the façade construction as requested by its client DEFIRE.
- A detailed report was not possible in the short-time frame requested. There are a variety of connection types and variations which have not been addressed.
- A complete understanding of the façade fixturing and construction over the entire building would require drawings for all those areas; to which ARCADIS had only partial access.

Referenced Drawings

EB-G-XX-2026 – Typical ALUCOBOND Fixturing

EB-E-XX-2004 – Placement and Type of Coloured Panels at Eastern Entrance

AR-F-XX-01 - Connection detail between façade support frame and floor slabs

EB-G-XX-2019 - Observed KINGSPAN attachment details (closely spaced panels)

If you have any questions or concerns, please contact me at the details below.

Yours sincerely

T. Byrnes

Todd Byrnes
Principal Engineer
042 6233 031
todd.byrnes@arcadis.com

ATTACHMENT A - Images

Figure 8. Building 11 - Eastern Exposure (coloured panels)

Figure 9. Building 11 - Northern Exposure

Figure 10. Building 11 - Western Exposure

Figure 11. Typical presentation of KINGSPAN and ALUCOBOND panelling in an internal courtyard

Figure 12. Typical connection detail between floor slab and façade support frame. The frame appears to be suspended from galvanised purlins bolted to the underside of the floor slab. The purlin-frame connection is hidden behind the fibre cement sheeting.

Figure 13. Typical façade support consisting of galvanised channelling. Note the presence of the 'zinc sheet' behind the framework and separating the framework from the exterior panels. The screws attaching the panels appear to go through both the zinc sheeting and the galvanized channels (support frame). The zinc sheet appears to be acting as a membrane. Normally the entire configuration is hidden behind fibre cement (removed here) which acts as the *interior* cladding.

Figure 14. View of the underside of the soffit (fibre cement) for the ground floor cladding prior to removal.

Figure 15. Inside the soffit break-out, showing the façade frame to the ground floor slab connection.

Figure 16. Connection between the ground floor slab and façade frame via bolted steel angle iron. The heavier iron is possibly employed as the support frame is held up, rather than suspended from the floor slabs.

Figure 17. Exterior panelling to façade frame connection (screwed)

Figure 18. Exterior panelling (left) to façade frame (right) connection, and at higher magnification.

Figure 19. Exterior panelling (right) to façade frame connection – underneath and inside views

Appendix C BCA Certifiers Kingspan determination

BCA CERTIFIERS (AUST) PTY LIMITED
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BCA certifiers

Project Name:	**Project No:**
ACT Women's & Children's Hospital	CC080414

Date: 21/07/2011	No. of pages:	1		☐ Fax	Hand
	(including this page)			Courier	Mail

From: Michael Sorensen

To	Cc	Company	Attention	Fax Nº.
☐		BVN Architecture	Warwick Simmonds	

SUBJECT: Use of Kingspan as External Cladding

Dear Warwick

BCA Certifiers has reviewed the proposal to use Kingspan panels as the external wall cladding at the ACT Women's and Children's Hospital. As you are aware combustible materials such as Kingspan must not be used as the external walls in a building requiring Type A fire-resiting construction. However, combustible materials may be used as an attachment to the external wall of such buildings, provided they comply with Specification C1.10 and C1.10a of the BCA. The technical data and test reports provided by Kingspan confirm the product complies with both Specifications.

Based on the drawings and details provided by BVN Architecture, BCA Certifiers is satisfied that the Kingspan panels on the external walls of the subject building are an attachment. The wall materials located behind the panels including a steel frame and 0.7mm zinc sheeting provide adequate weatherproofing and would perform as an external wall in their own right should the Kingspan panels be removed.

Should you wish to discuss this further, I can be contacted on 6285 1199.

Kind Regards

Michael Sorensen

Appendix D Alucobond locations (continuous panels), fire compartments and exits

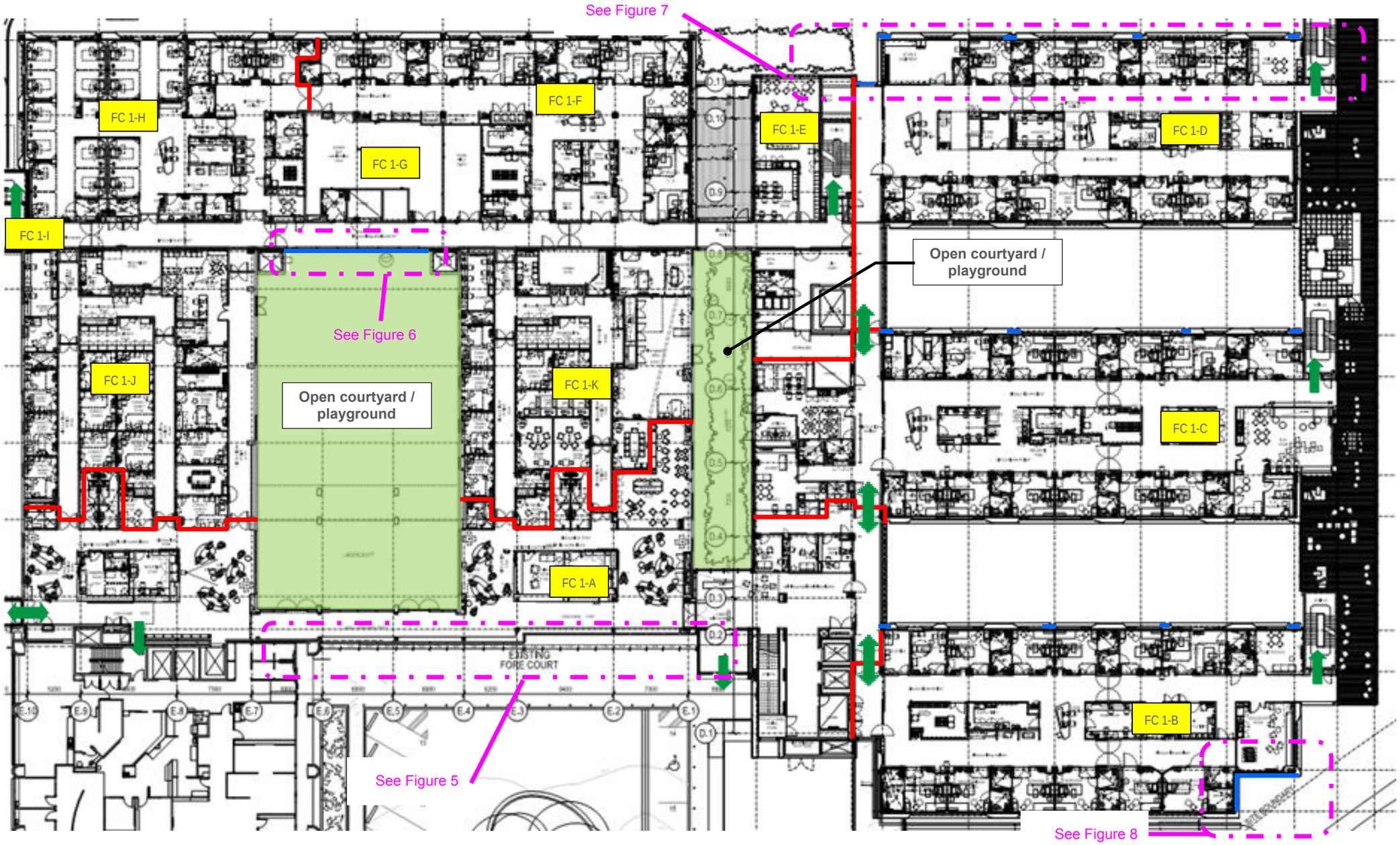


Figure 2 Level 1

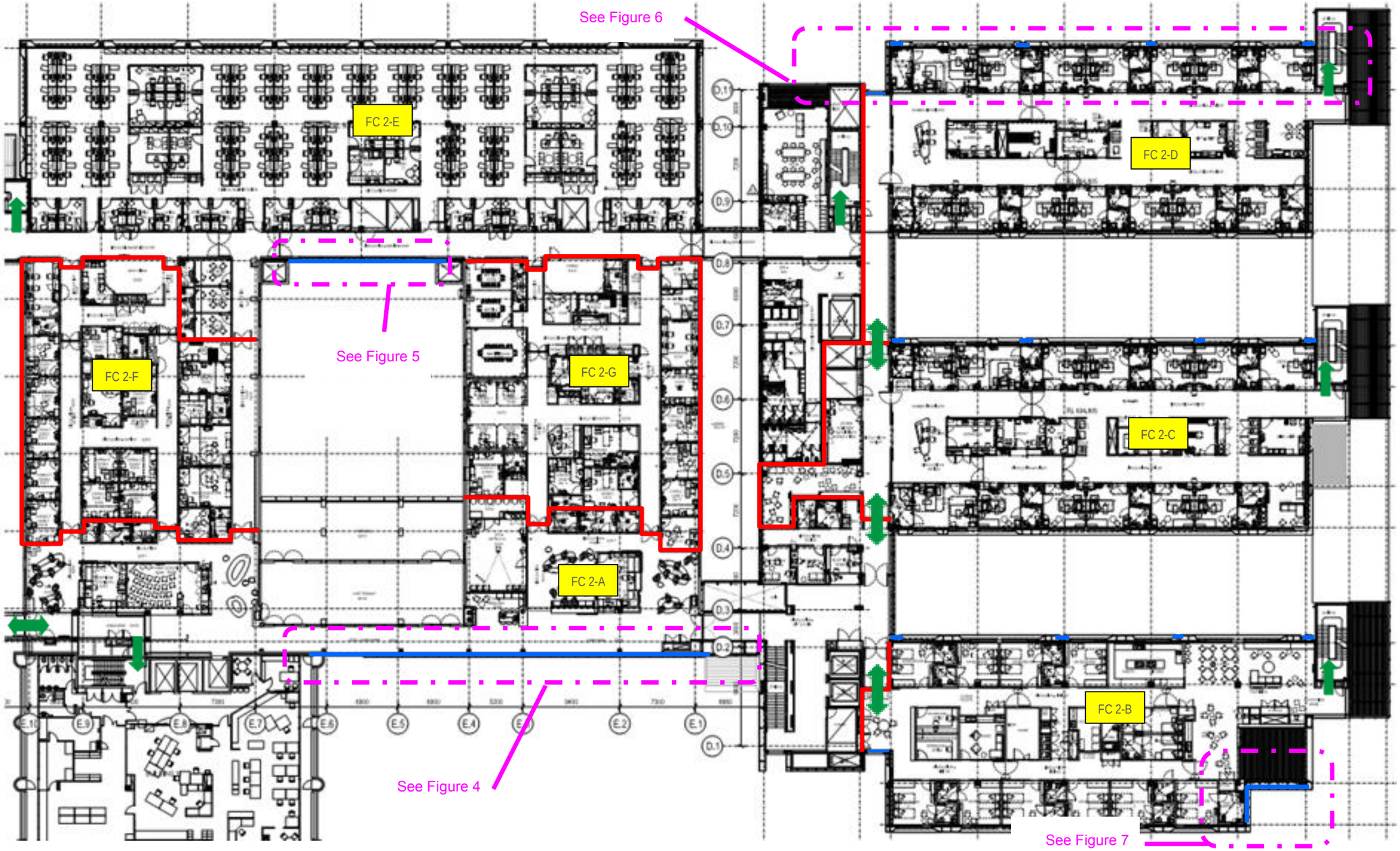


Figure 3 Level 2

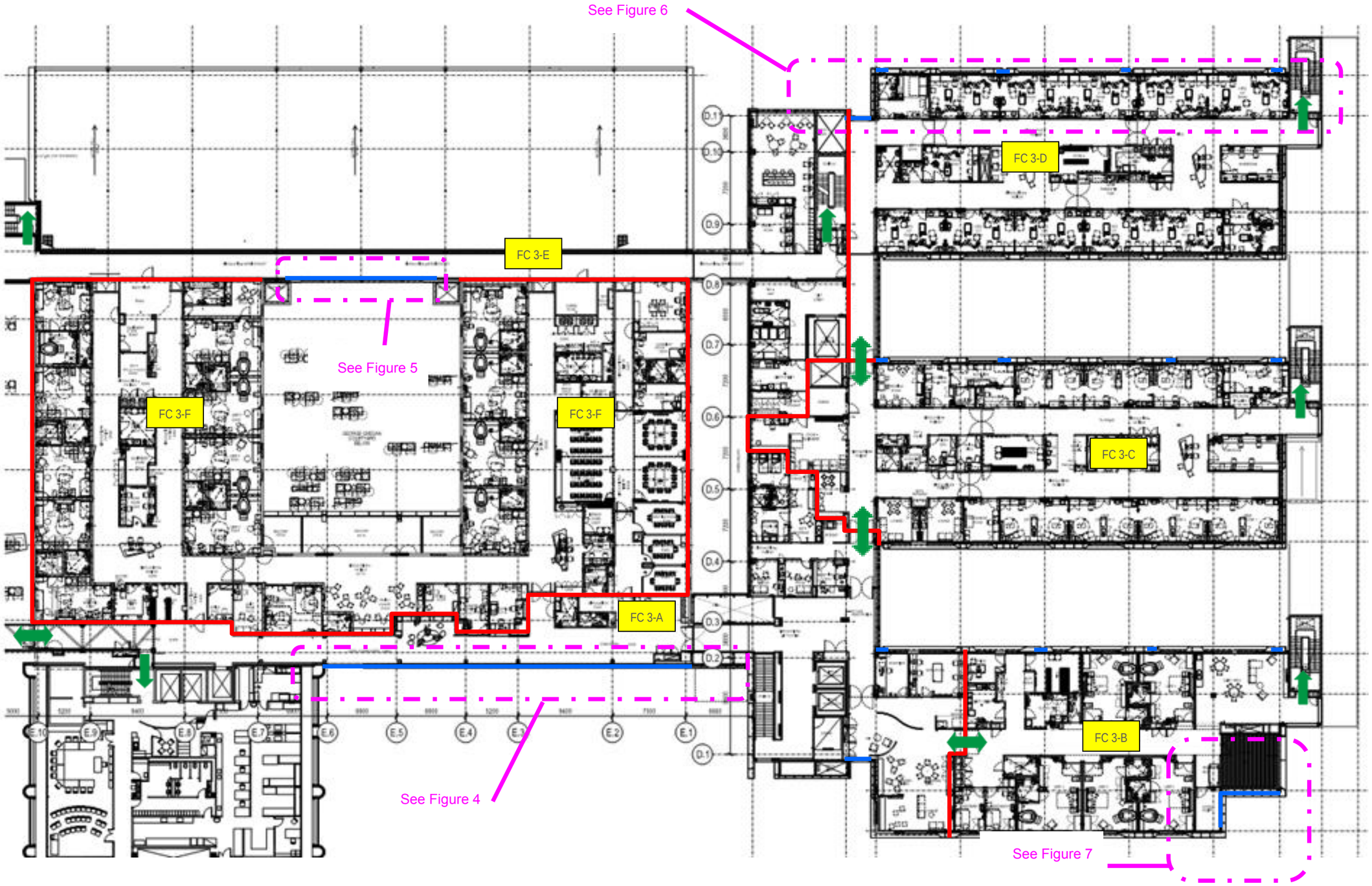
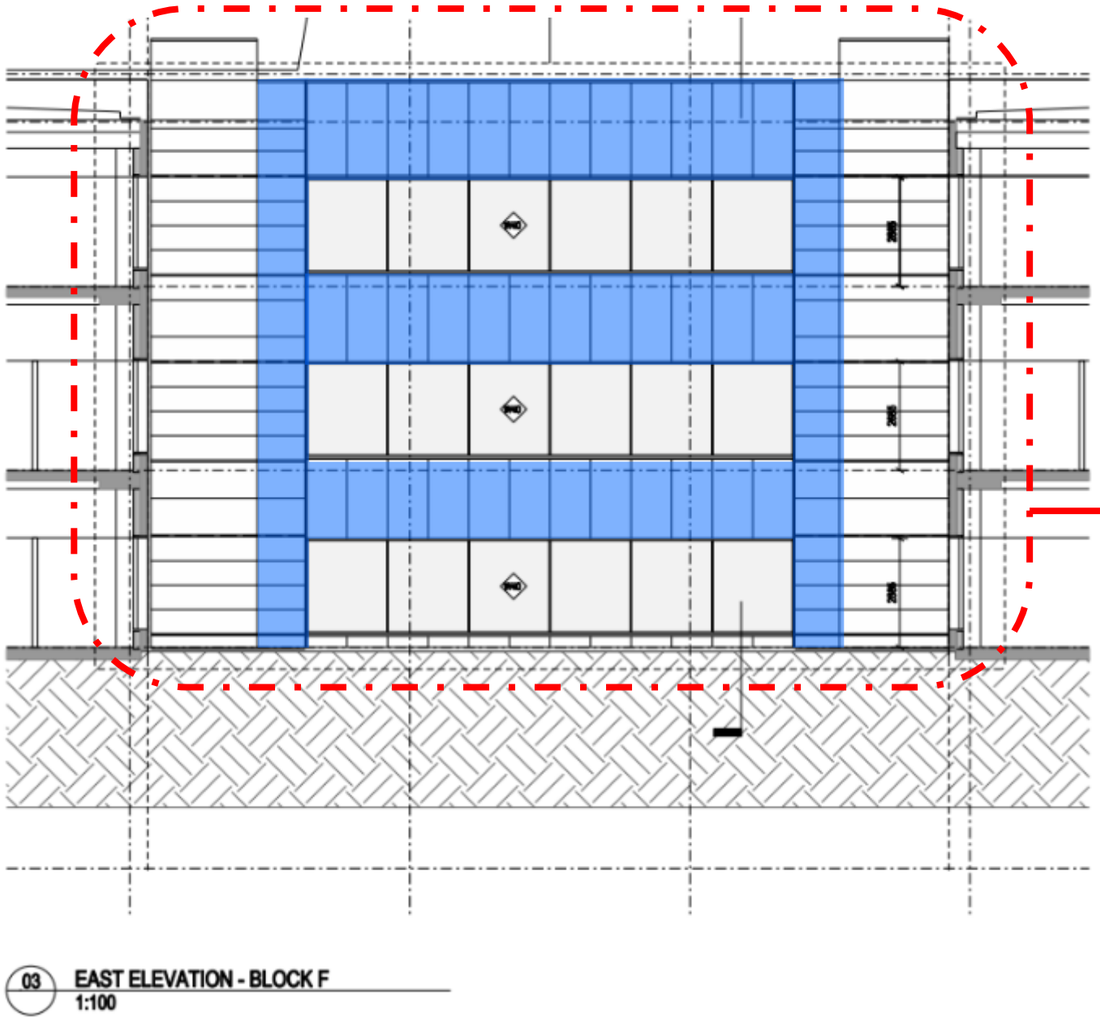


Figure 4 Level 3

Figure 5 Block E – east elevation (main entry)



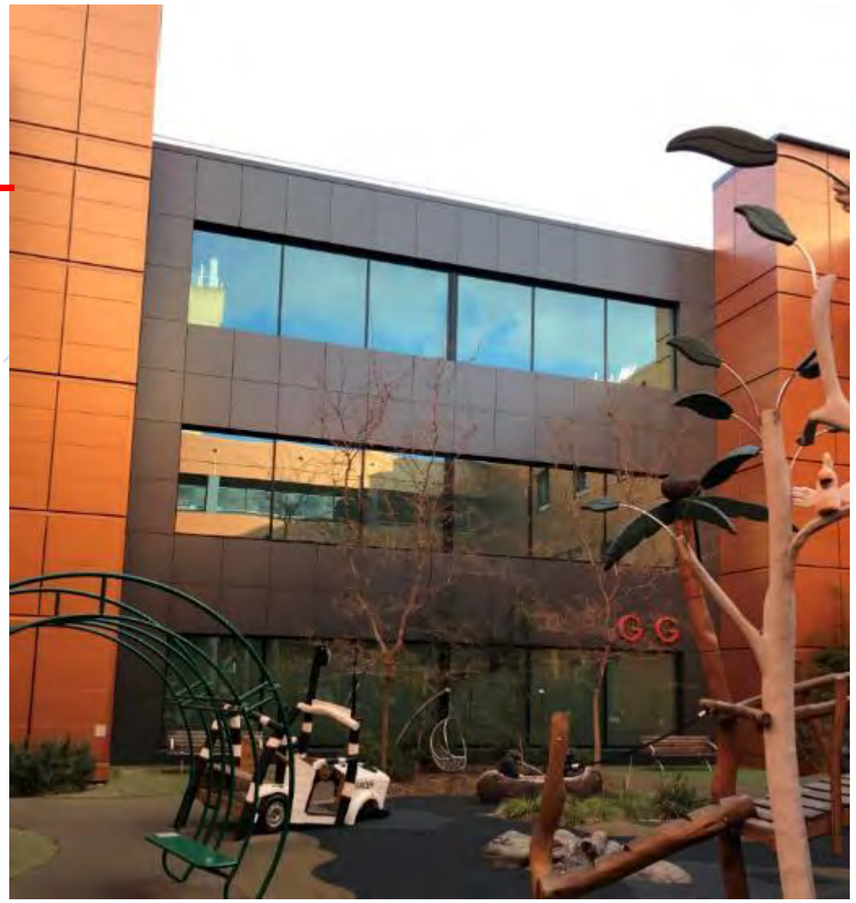


Figure 6 Block F – east elevation (internal courtyard)

Figure 7 Block C – west elevation example (similar for blocks A and B)

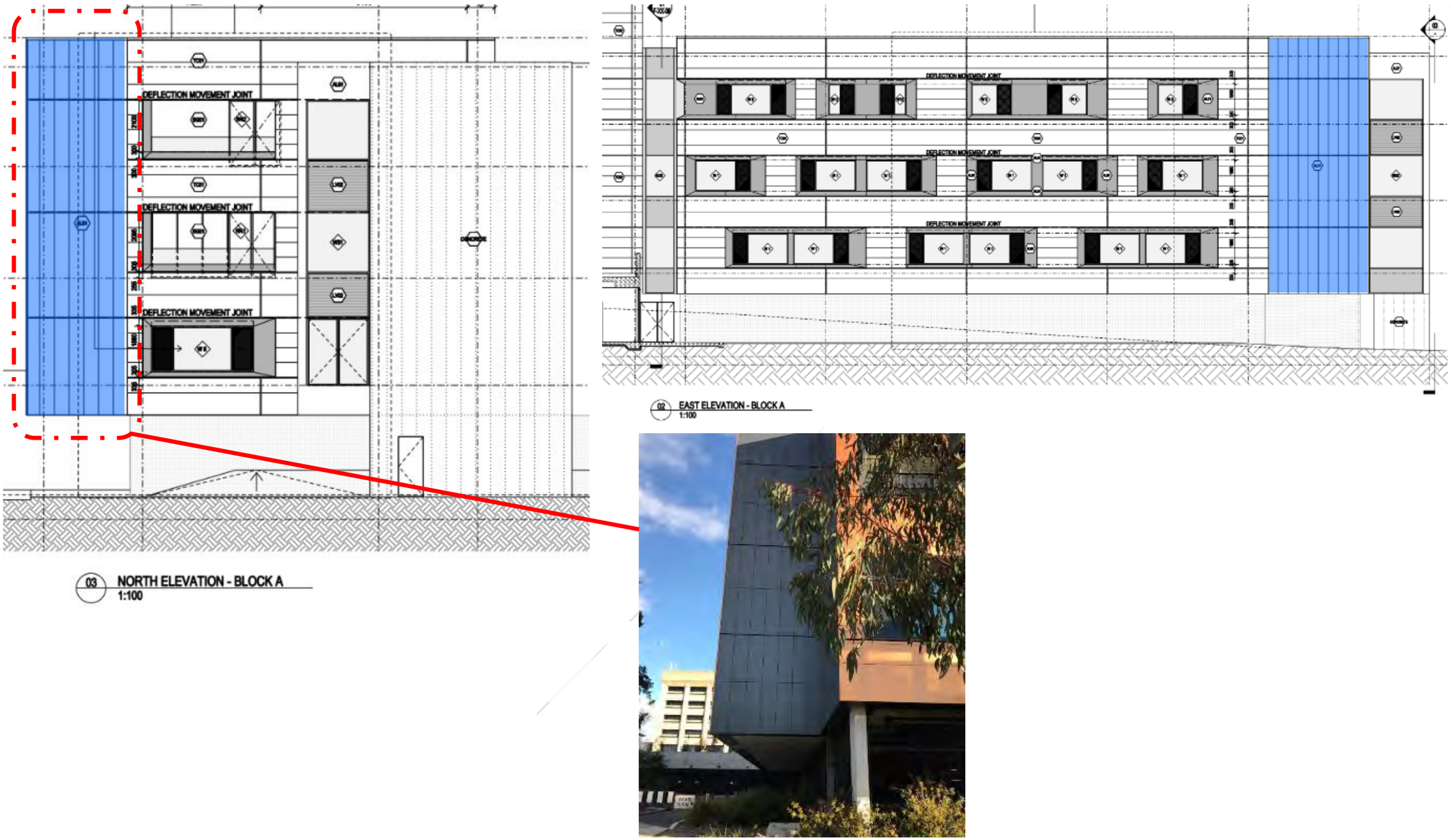


Figure 8 Block A – north and east elevation

Attachment B – Table compiled by ACT Health

Aluminium Composite Panels
Summary of Findings
Phase 1 Audit - 30 June 2017

Building	Cladding Type	Product Description
Adult Acute Mental Health Unit	CFC express wall Weathertex cladding Thermawall Insulation	N/A
Belconnen Community Health Centre	Alpolic FR	ACM: 2x 0,5mm Aluminium, Mineral filling
Building 12 Emergency Department - ED/ICU Extension	Trespa Meteon HPL	HPL (High-pressure Compact Fibre laminate) Blend of 70% Fibre and thermosetting resins
Building 12 Emergency Department Expansion	8mm FC 'Scyon Matrix' WP	8mm Fibre Cement product painted over 2x Waterproof fire check
Building 15	Alucobond Plus	ACM: 2x 0,5mm Aluminium, 70% Mineral filling
Capital Region Cancer Centre	BlueScope steel Azure facade system	1,2mm Galvabond steel and 0,55 Aluminium with cavity
Centenary Hospital for Women and Children - Stage 1	Kingspan	No Information available. Product Specification Sheet Shows indexes for Ignitability, Spread of Flame and Heat Evolved as 0 and a Smoke Development index of 2. The product also meets AS/ISO 9705 - "Fire Tests- Full Scale Room Test for Surface" products
Centenary Hospital for Women and Children - Stage 2	4mm Vitrabond	ACM: 2x 0,5mm Aluminium, Polyethylene core
Dulwah Secure Mental Health Unit	Alpolic FR	ACM: 2x 0,5mm Aluminium, Mineral filling
Gungahlin Health Centre	Terracade, fired clay products Com Tex Facade panel	N/A
Ngunnawal Bush Healing Farm	Brick and Rammed Earth	Brick and Rammed Earth
Southern Car park	3mm perforated aluminium sheeting	N/A
University of Canberra Public Hospital	Alpolic FR	ACM: 2x 0,5mm Aluminium, Mineral filling

2017

THE LEGISLATIVE ASSEMBLY FOR THE AUSTRALIAN CAPITAL TERRITORY

REPORT IN RESPONSE TO ASSEMBLY MOTION OF 20 SEPTEMBER 2017

ALUMINIUM COMPOSITE CLADDING

Presented by

Mick Gentleman MLA

Minister for Planning and Land Management

Background

On 20 September 2017, the Assembly passed a motion for the ACT Government to provide the Assembly in the first week of the October 2017 sittings with:

a) an update on planning and works to remove and replace aluminium composite panels at the Centenary Hospital for Women and Children;

b) a list of ACT Health buildings assessed for aluminium composite cladding and the findings of the ACT Health desktop audit;

c) a copy of the Report 'Combustible facade cladding—preliminary fire safety assessment ACT Health Procurement and Capital Works Centenary Hospital for Women and Children, Garran, ACT CA 170095';

d) an update on the audit of ACT Government buildings, including findings to date; and

e) a report on issues raised by the ACT Government in 2009-2010 relating to the non-compliant use of aluminium composite panels and how the ACT Government ensures the fire safety of all buildings.

Update on planning and works to remove and replace aluminium composite panels at the Centenary Hospital for Women and Children

This section relates to items a) and c) of the motion.

Preliminary audit

In June 2017, ACT Health undertook a preliminary internal audit to investigate all healthcare facilities constructed since 2008 (the Phase One audit).

The Phase One audit found that the Centenary Hospital for Women and Children (CHWC) contained a small portion of polyethylene (PE) filled aluminium composite panels (ACP) on the façade of the CHWC.

A subsequent assessment by DeFire was undertaken to further investigate the ACP panels on the CHWC. A copy of the report '*Combustible facade cladding—preliminary fire safety assessment ACT Health Procurement and Capital Works Centenary Hospital for Women and Children, Garran, ACT CA 170095*' (item c) of the motion) is at Attachment A.

Replacement of ACP Panels at CHWC

ACT Health agreed to the recommendations of the DeFire assessment and the affected panels at CHWC will be removed as soon as is practicable. It is estimated approximately five to ten per cent of the total cladding on the hospital is ACP panels and these will be replaced.

ACT Health has commenced a procurement process to procure a building contractor to remove and replace the ACPs. Replacement will occur through a two stage process;

- An initial Expressions of Interest (EOI) process is currently underway.

- A shortlist of suitable contractors will be identified through the EOI and will be invited to submit a tender for the works through a Request for Tender (Stage Two).

To inform the market and enable the shortlisted contractors to scope and price the works, further investigation of the ACP façade panels has been necessary. This work will inform the Statement of Requirements (SOR) which will be shared with suitable contractors during the RFT second stage.

On behalf of ACT Health, Infrastructure Finance and Capital Works (IFCW), Treasury, have engaged structural Engineering consultant Arcadis to develop the SOR.

Temporary Panel Removal at CHWC to inform procurement

To inform the SOR, a small area of affected panels have been removed from four locations on the CHWC façade in the week of the 9 October 2017. The selected panels have been temporarily removed to ensure different fixing and structural arrangements inform the replacement methodology.

The four locations were selected to undertake detailed investigations based on different façade materials, different panel sizes, fixing details adjoining windows and in large façade expanses. These four areas are located on the northern façade on Gilmore Crescent, the eastern main entrance facade on Hospital Road, the northern facade between blocks A/B and B/C; and the eastern facade of the George Gregan Courtyard.

It is planned to temporarily reinstall the removed panels in two of the four locations being the northern façade on Gilmore Crescent and the eastern main entrance façade (on Hospital Road).

Removed panels on the northern façade between blocks A/B and B/C and the eastern facade of the George Gregan courtyard were damaged when removed during the assessment process, so will be replaced with an appropriate interim cladding material.

Advice about early removal of the entirety of ACP Panels at CHWC

Early verbal advice received from Arcadis indicates the interim removal of the ACP panels, pending permanent replacement, is not advisable due to the impact that any interim solution will have on the building's stable façade system. This advice is fully supported by ACT Fire and Rescue.

ACT Health are working in close collaboration with ACT Fire and Rescue and the Inter-Agency Review Group to ensure timely replacement of the ACP Panels from the CHWC building.

Update on audit and assessments

This section responds to items b) and d) in the motion.

The priority has been on class 2, 3 and 9 buildings owned or occupied by the Territory or its tenants. Class 2 and 3 buildings are residential apartment buildings and other forms of residential accommodation. Class 9 buildings are public buildings such as schools and hospitals. In these buildings there is a possibility that occupants will be asleep when a fire breaks or be less able to evacuate a building quickly or without assistance.

The work has involved identifying buildings that have ACP and require further investigation and risk assessment, for example where the ACP is combustible or is not specified and an ACP without fire resistance would not generally be suitable. Further assessment can include reviewing an alternative performance solution for the building or conducting more detailed physical investigation of the cladding.

The Interagency Review Group are also developing risk assessment instruments which, along with expert engineering advice, will provide a consistent method of assessing the risks posed by PE ACPs on different buildings across the ACT Government property portfolio.

ACT Health buildings

Phase One

In June 2017, ACT Health undertook a preliminary internal audit to investigate all healthcare facilities constructed since 2008 (the Phase One audit). Of the 13 buildings assessed, seven buildings were identified as having no ACP specified, four had a form of ACP with a level of fire resistance specified, one had a panel product that could not be determined as an ACP but appeared to meet fire safety requirements (Kingspan is a brand name that includes a variety of different panels with different cores and outer layer materials). One building, the Centenary Hospital for Women and Children, was identified as containing polyethylene (PE) filled ACP. Of buildings that were identified as including ACPs there were a variety of locations for the ACP on the building façade.

Attachment B shows the findings from the ACT Health Phase One internal audit.

Phase Two

Following the initial Phase One Desktop Audit conducted in June 2017, ACT Health have conducted a more detailed review of all ACT Health properties, irrespective of construction date, to confirm the presence of ACP façade cladding material on ACT Health buildings. These activities are considered to be Phase Two activities.

To date, Phase Two activities have identified five additional buildings that contain PE ACP materials. Three of these buildings are located at the Canberra Hospital:

- Building 4 constructed in 2006
- A decorative façade detail on the western elevation of Building 20 constructed in 2007;
- Aspects of Building 12 constructed in the early 1990s.

The Health Protection Services building in Holder, refurbished in 2004 also utilises PE ACP as a façade cladding. This is a single storey building and it is currently estimated that approximately 16 per cent of the façade is PE ACP.

The Phase Two review has also identified that the Belconnen Community Health Centre contains some PE material. At the time of initial Phase One desktop audit in June 2017, it was understood that the Belconnen Health Centre only contained a fire retardant version of ACPs, referred to as Alpolic FR. Following a full examination of the available building drawings and follow up with the original façade installation contractor, a number of façade locations using the PE core ACPs have subsequently been identified. It is currently estimated that approximately 8 per cent of the façade is PE ACP.

Each of these buildings vary in size, function, service delivery requirements and the amount of ACP materials found to be present. The varying characteristics of each of the buildings need to be taken into consideration when determining the level of potential risk that is posed by the presence of PE ACP cladding.

The next phase

In parallel with the commencement of ACT Health Phase Two activities, ACT Health will liaise closely with the Review Group on assessing the risks associated with the use of PE ACP on each individual building.

ACT Government schools

A desktop audit has been carried out on all ACT Government schools. This included reviewing plans and contracts for buildings built since 2007, reviewing via aerial photography (ACTmapi) and street view and then physical inspection as required. 46 school sites were identified as having a building or buildings with some form of ACP. The majority of the buildings are single storey buildings on which any form of ACP poses a low risk to building occupants and is likely to provide an acceptable safety level under building standards. All schools all are managed under comprehensive fire management procedures and have other fire protection infrastructure.

The current priority is to confirm the type and location of ACP and identify any associated risks and need for risk mitigation. While this is being undertaken, the Education Directorate continues to work with ACT Fire and Rescue to provide information on risk management procedures for schools that may present a risk.

Housing ACT

Housing ACT has identified seven sites with ACPs. The ACPs are in small amounts as decorative and low maintenance features. Housing ACT is working to identify the type of panelling installed at each of the sites and undertake a further risk assessment. This process includes reviewing building documentation such as designs, building files, and Housing ACT construction files.

Relevant fire safety standards and compliance activities

This section relates to item e) of the motion.

Building code

The protection of building occupants from building fires is mainly regulated through building laws that rely on compliance with the ACT building code (the code). The code adopts the National Construction Code (NCC) as the primary technical standard in the ACT. Buildings that comply with the code provide minimal risk to occupants of death or serious injury in a building fire.

The code aims to minimise the risks of occupants being injured or killed in a building fire and allow them to safely evacuate the building. In certain buildings where occupants are at a higher risk of not being able to safely evacuate, the code also requires that tenable conditions are maintained and the building's materials and assemblies must resist the spread of fire and limit the generation of smoke and heat and any toxic gasses likely to be produced for an appropriate time to allow safe evacuation.

The NCC is performance-based. There is no one definitive way to comply with the NCC. Although the prescriptive 'deemed-to-satisfy' pathways are often represented as mandatory requirements, other alternative solutions are permitted.

Fire safety standards apply to all classifications of building. However, there are more stringent requirements for class 2 – 9 buildings (buildings other than single and attached individual dwellings such as townhouses). Provisions that are intended to limit the spread of fire between buildings apply to all building classifications. The provisions are based on the proximity to the boundary or another building.

Provisions that relate to the spread of fire within a building generally apply only to class 2-9 buildings (excludes detached and attached dwellings, small boarding houses and non-habitable buildings and structures). Standards are based on risk to occupants and the configuration of the building.

The larger and more complex a building, or the more difficult a building would be to evacuate – for example, due to its height, the greater the fire protection and suppression required to meet the performance standard.

The National Construction Code can be accessed for free by registering at www.abcb.gov.au

Deemed-to-satisfy provisions

The prescriptive pathways in the Code are known as the 'deemed-to-satisfy' provisions. As noted above, they are not mandatory and may also offer more than one option or combination of options for compliance.

In relation to resisting the spread of fire between buildings, the deemed-to-satisfy prohibits combustible products on buildings within 1.8m of a neighbouring building, or for a vacant block, within 900mm of the property boundary.

Under this pathway, combustible materials cannot generally be located near or directly above a required exit so as to make the exit unusable in a fire, and cannot constitute an undue risk of fire spread via the facade of the building. Standards differentiate between attachments to a wall and materials that are an integral part of the external wall.

The deemed-to-satisfy pathway categorises buildings as Type A, B or C construction depending on risk – Type A being highest risk. For example, all class 2 and 3 residential buildings and class 9 healthcare buildings over two storeys and all other buildings over 4 storeys are classified as Type A construction.

The higher the category, the greater the fire resistance required in materials and design. A Type A construction may require fire isolated stairs and compartmentation of different parts of the building to prevent the spread of fire. Further, the deemed-to-satisfy provisions require buildings over 25 metres (around 8 storeys) in height to have a sprinkler system throughout the building and incorporate a comprehensive range of fire safety measures, including air handling and zone pressurisation systems.

Alternative solutions

Alternative solutions allow a proponent to propose a different way of meeting the performance standards. Under an alternative solution a design may include a material or system that doesn't align with the deemed-to-satisfy pathway. To be compliant, it must be demonstrated the alternative solution achieves the overall required level of safety required by the performance standard.

Alternative solutions are assessed on a case by case basis. There are no specific qualification requirements for people preparing alternative solutions, but anyone preparing one should have an appropriate level of expertise. There may be approved alternative solutions that incorporate cladding with a degree of combustibility, as the solution they are part of have been assessed as meeting minimum safety requirements.

ACT Building Approval Process

The *Building Act 2004* (Building Act) outlines the process for building work to be approved, inspected and certified in the ACT. The Building Act requires that a building approval application includes sufficient information for the building certifier to determine whether the building if constructed would comply with the Building Act (including the code). The existing law is subjective and different certifiers require different levels of information.

The Building Act may also require building approval applications for certain types of construction to be referred to other entities before an approval can be issued.

All building approval applications for a new building or part of a building over 500m^2 (excluding class 1, 10a and 10b structures), or where an alternative solution relating to fire protection is proposed must be referred to the Emergency Services Commissioner (ACT Fire & Rescue). Replacement of external materials requires a building approval but does not necessarily require a referral to ACT Fire & Rescue.

Referral entities do not regulate compliance with the Building Act and cannot put higher standards than those in the Code on a building, but can give the certifier and applicant advice on any aspect of the building design or intended operation that may prevent them carrying out their own legislated responsibilities. As an example, the building may be designed in a way that does not give the ACT F&R reasonable access for firefighting. A building approval cannot be issued that is inconsistent with the advice.

Building certifiers must also check that any cladding to be used on the building is specified in the building approval and appropriate for use as specified.

During construction, completion of certain structural elements and completion of the building are mandatory inspection stages. The building certifier must inspect the building for compliance with the Building Act. The inspection is a visual inspection.

Other bodies may also inspect the building including referral entities. ACT Fire & Rescue inspect all new class 2 (apartment) buildings to review them against the approval and their earlier advice. This is also a visual inspection.

Non-compliant ACPs can't be identified by visual inspection alone. It may also be difficult for a visual inspection to indicate whether compliant ACPs have been installed in a non-compliant way. Therefore, at the completion of the project, the building certifier must also provide supporting documentation they have received from the builder and other entities during the project, which may include installation certificates outlining the products installed in the building.

In 2016 the ACT Government announced a series of reforms to improve the quality and compliance of our buildings. The main aim of these reforms is to prevent compliance problems, particularly those that have serious consequences for the health and safety of building occupants and the public. A new auditing system is currently under development. Improvements to building documentation and increased oversight on building projects will help to identify and address any problems early.

Issues raised by the ACT Government in 2009-2010 relating to the non-compliant use of aluminium composite panels

In 2009 ACT officials met with an ACT private sector fire engineer and ACT Fire and Rescue personnel to discuss possible non-compliant use of combustible ACP on multi-storey buildings, particularly the possibility of panels with very low fire resistance being used on higher-risk buildings.

In 2009-10 ACT Fire and Rescue officers, an officer from the then ACT Planning and Land Authority, and a local private sector fire engineer spoke at a large meeting of local private sector building certifiers and fire engineers about possible non-compliant use of combustible ACP on multi-storey buildings. A similar meeting followed some months later. The later meeting was attended by representatives of two major suppliers of ACP.

ACT officials also raised the issue with interstate colleagues. Information shared between jurisdictions highlighted that certain ACPs were not capable of passing the combustibility test under Australian Standard AS 1535.1 used in the deemed-to-satisfy pathway. Discussions within the ACT and with interstate colleagues prompted a decision to require ACPs on buildings that could be classified as Type A or Type B, other than minor exempt uses such as attachments and signs, to be subject to an alternative solution. ACT Fire and Rescue also resolved to check that new building approval application plans they received were treating ACPs appropriately.

Following this decision, some ACP manufacturers contracted a private sector fire engineering firm to prepare a proposal for change to amend national building standards to allow wider use of combustible ACPs under the deemed-to-satisfy provisions. The proposal for change was considered by the Australian Building Codes Board's Building Codes Committee (BCC). The BCC membership includes officials from each state and territory including the ACT, a representative for the peak fire fighters body, a representative of the CSIRO and representatives from various industry groups. The proposal for change was not successful.

The ACT still treats the use of panels with a degree of combustibility under the processes established in 2009-10. ACT officials have also helped to clarify the requirements in previous and current revisions to the National Construction Code.

The ACT Government will continue to use its laws and powers to help prevent the non-compliant use of combustible ACPs in the Territory.

2017

THE LEGISLATIVE ASSEMBLY FOR THE AUSTRALIAN CAPITAL TERRITORY

RESPONSE TO ASSEMBLY MOTION ALUMINIUM COMPOSITE CLADDING

TABLING STATEMENT

Presented by
Mick Gentleman MLA
Minister for Planning and Land Management

Madam Speaker, I table a report in response to the Assembly's motion of 20 September 2017 on Aluminium Composite Cladding. The report includes:

- an update on planning and works to remove and replace aluminium composite panels at the Centenary Hospital for Women and Children,
- a list of ACT Health buildings assessed for aluminium composite cladding and the findings of the ACT Health desktop audit,
- an update on the audit of ACT Government buildings, including findings to date, and
- a report on issues raised by the ACT Government in 2009-10 relating to the non-compliant use of aluminium composite panels and how the ACT Government ensures the fire safety of all buildings.

I also table a copy of the report 'Combustible facade cladding—preliminary fire safety assessment ACT Health Procurement and Capital Works Centenary Hospital for Women and Children, Garran, ACT CA 170095'.

Madam Speaker, as the report outlines our highest priority to date is to work through the buildings that provide residential accommodation and buildings where it may be difficult for occupants to evacuate on their own, such as hospitals and schools.

The report outlines that ACT Health has identified five additional buildings for further investigations and there are other Government buildings that do have ACPs.

The Whole of Government Working Group is continuing to work through the implications of this type of cladding. The Working Group, along with expert engineering advice, will assess the suitability of use of ACP materials on all building types across the ACT Government property portfolio.

Where the use of ACP has been identified, current indications are that it is often used as an attachment or on buildings where its use would pose a low risk. Work will be finalised to confirm the type and fire resistance of ACPs used on buildings and that the use and location of any ACP does not pose a risk to occupants safely evacuating a building in a fire.

Madam Speaker, when Building Ministers met in early October we all agreed to use our laws and powers to help prevent the non-compliant use of combustible ACPs. The report I am tabling today outlines the ACT's building approval process and how combustible ACPs are treated under that process. This is a great example of how our laws and regulations continue to be applied to make sure ACPs are used appropriately in the Territory.

I thank the members for their interest in this matter and look forward to providing further updates as the review progresses.

Mick Gentleman MLA

COPY

Member for Brindabella

Manager of Government Business
Minister for Police and Emergency Services
Minister for the Environment and Heritage
Minister for Planning and Land Management
Minister for Urban Renewal

Obj: 17/25818

ACT LEGISLATIVE ASSEMBLY QUESTION

Questions on Notice Paper No. 10

Question No. 621

MRS DUNNE - Asked the Minister for Planning and Land Management on 15 September 2017:

MRS DUNNE: To ask the Minister for Planning and Land Management—

(1) In relation to the Ministerial Statement, *Update on the Aluminium Cladding Working Group*, tabled in the Assembly on 17 August 2017, what action did the Government take to ensure ACT Health was aware of the concerns, held since 2009, about the fire safety risks associated with aluminium composite panels before it took the decision to install polyethylene panels on the exterior of the Centenary Hospital for Women and Children.

(2) What action did the Government take to ensure all ACT Government directorates and agencies were aware of these concerns.

(3) Did ACT Health seek the advice of the planning and land management agency and the police and emergency services agency before deciding to install these panels at the Centenary Hospital for Women and Children.

(4) How do fire services inside the building mitigate the (a) risk of external cladding catching fire and (b) risks to the safety of people and property in the building's external precinct.

(5) What technology or other warning systems inside the building are triggered if external cladding catches fire.

(6) What emergency systems and procedures on the building's exterior will be triggered to ensure the safety of people and property in the building's external precinct in the event of external cladding catching fire.

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@GENTLEMANMick MickGentleman

MR GENTLEMAN: The answer to the Member's question is as follows:

(1) The focus of relevant Government agencies was on alerting and educating those directly involved in specifying, designing and certifying both private and public buildings about potential non-compliant use of different aluminium composite panels – such as fire engineers, builders, architects, designers and building certifiers, who usually determine and approve the materials to be used in a building. ACT officials have met with a wide range of local private sector building certifiers and fire engineers about possible non-compliant use of combustible ACP on multi-storey buildings. ACT Fire & Rescue has reminded industry members of the requirements under the building code in meetings and seminars in subsequent years.

(2) As above. In general, when any form of potential non-compliance is identified, education is primarily aimed at those responsible for ensuring compliance with building standards.

(3) The project was subject to the approval, inspection and certification processes under the Building Act. Consultants contracted through ACT Government, including the building certifier, ensured that the proposed building work was referred to ACT Fire & Rescue for advice as required and that the approval was not inconsistent with their advice.

(4) ACT Health has comprehensive safety measures and emergency procedures in place at the Centenary Hospital, together with a robust fire suppression system which includes internal sprinklers throughout the building, fire drenchers over windows within three meters of a fire compartment, passive fire and smoke compartments such as fire doors, spray fireproofing and ventilation are in place and smoke alarms, fire hose reels and fire extinguishers.

(5) The fire services inside the building are compliant and have been recently tested and confirmed to be in fully functional and in good working order. These services include smoke detection, Wet Fire Sprinkler systems, Fire compartmentalisation, Fire Extinguisher systems, and robust planned evacuation procedures. The risk to the safety of people on the external of the building is low to negligible. ACT Fire & Rescue is aware of the risk and can attend a call within minutes to protect the spread of external proliferation. In the event of a fire ACT Health have reactive procedures in place to ensure immediate evacuation of internal and external areas of all buildings.

(6) ACT Health does regular fire system checks on the Centenary Hospital and is in regular contact with members of the ACT Emergency Services Agency and the Access Canberra building regulator. Fire System testing has been increased from annual testing to testing conducted every 8 weeks. This additional regime will continue until the panels are removed.

Approved for circulation to the Member and incorporation into Hansard.

MG

Mr Mick Gentleman MLA, Minister for Planning and Land Management Date: 23/10/17

Aluminium Composite Panels
Summary of Findings

Building	Cladding Type	Product Description
Adult Acute Mental Health Unit	CFC express wall Weathertex cladding Thermawall Insulation	N/A
Belconnen Community Health Centre	Alpolic FR	ACM: 2x 0,5mm Aluminium, Mineral filling
Building 12 Emergency Department - ED/ICU Extension	Trespa Meteon HPL	HPL (High-pressure Compact Fibre laminate) Blend of 70% Fibre and thermosetting resins
Building 12 Emergency Department Expansion	8mm FC 'Scyon Matrix' WP	8mm Fibre Cement product painted over 2x Waterproof fire check
Building 15	Alucobond Plus	ACM: 2x 0,5mm Aluminium, 70% Mineral filling
Capital Region Cancer Centre	BlueScope steel Azure facade system	1,2mm Galvabond steel and 0,55 Aluminium with cavity
Centenary Hospital for Women and Children - Stage 1	Kingspan	No Information available. Product Specification Sheet Shows indexes for Ignitability, Spread of Flame and Heat Evolved as 0 and a Smoke Development index of 2. The product also meets AS/ISO 9705 - "Fire Tests- Full Scale Room Test for Surface" products
Centenary Hospital for Women and Children - Stage 2	4mm Vitrabond	ACM: 2x 0,5mm Aluminium, Polyethylene core
Dulwah Secure Mental Health Unit	Alpolic FR	ACM: 2x 0,5mm Aluminium, Mineral filling
Gungahlin Health Centre	Terracade, fired clay products Com Tex Facade panel	N/A
Ngunnawal Bush Healing Farm	Brick and Rammed Earth	Brick and Rammed Earth
Southern Car park	3mm perforated aluminium sheeting	N/A
University of Canberra Public Hospital	Alpolic FR	ACM: 2x 0,5mm Aluminium, Mineral filling

Donne, Genevra

From: Matthee, Casper
Sent: Tuesday, 24 October 2017 9:39 AM
To: Gray, Sophie
Cc: Paul, Douglas
Subject: FW: ACT Health Directorate. - Centenary Hospital for Women and Children (CHWC) [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

FYI

From: [redacted]@bcacertifiers.com.au]
Sent: Tuesday, 24 October 2017 9:22 AM
To: Matthee, Casper <Casper.Matthee@act.gov.au>
Cc: Gray, Sophie <Sophie.Gray@act.gov.au>; [redacted]@capitalcertifiers.com.au>
Subject: RE: ACT Health Directorate. - Centenary Hospital for Women and Children (CHWC) [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Casper,

I've discussed with [redacted] his advice to [redacted] concerning the use of Kingspan as an external cladding.

This advice was generic in nature as it was discussing the differences between an external wall and an attachment to an external wall.

His comment "such as" covers of the use of Kingspan, Vitrabond and ACP panels.

Please contact me if I can be of further assistance in this matter.

regards

[redacted]

Equal Assurance - AS 4801 Mark - Colour Small (Issue 1)Equal Assurance - ISO 9001 Mark - Colour Small (Issue 1)Equal Assurance - ISO 14001 Mark - Colour Small (Issue 1)

Sponsors of the ACT Chapter of the Australian Institute of Architects Contemporary Australian Architects Speaker Series 2017.

From: Matthee, Casper [mailto:Casper.Matthee@act.gov.au]
Sent: Friday, 20 October 2017 11:50 AM
To: [redacted]@bcacertifiers.com.au [redacted]@bcacertifiers.com.au> >
Subject: FW: ACT Health Directorate. - Centenary Hospital for Women and Children (CHWC) [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Hello [redacted]

I left a message at reception. Can please advise on the below email?

Thanks & Kind regards

From: Matthee, Casper
Sent: Thursday, 19 October 2017 4:35 PM
To: 'mail@bcacertifiers.com.au' <mail@bcacertifiers.com.au <mailto:mail@bcacertifiers.com.au> >
Subject: ACT Health Directorate. - Centenary Hospital for Women and Children (CHWC) [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

For Attention: [redacted]

Dear Sir,

The Centenary Hospital for Women and Children

The ACT Health Directorate is busy with an assessment of the fire integrity of all the facades on their buildings. In assessment of the CHWC it was noted that Kingspan Evolution, Vitrabond and Alucobond were used in façade attachments in external cladding. We noted in the attached confirmation of BCA Certifiers that the reference is only to Kingspan. Can you kindly confirm that the statement covers all three façade products (Kingspan, Vitrabond & Alucabond) to the external facades?

Thank You & Kind Regards

Casper Matthee | Project Officer |

Phone 02 6174 8641

Chief Minister, Treasury and Economic Development Directorate | ACT Government

Level 1, Building 3, Canberra Hospital, Yamba Drive, Garran, ACT 2605 | PO Box 818, Dickson ACT 2602 | www.act.gov.au

ACT Government
Environment, Planning and Sustainable Development

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CAVEAT BRIEF

To:	Chief Minister Minister for Planning and Land Management	**Tracking No.:** 17/25043 Rec'd Minister's Office …/…/…
From:	Deputy Director-General, Land, Strategy and Environment	
Subject:	Update on Inter-agency Building Cladding Review Group	

- The Inter-agency Building Cladding Review Group met again on 7 September.

<u>ACT Government Building Audit – initial findings</u>

- Health reviewed 13 buildings as part of their Phase 1 activities which primarily covered healthcare facilities constructed between 2008 and current date. Arising from this investigation one building, the Centenary Hospital for Women and Children was identified to contain ACP cladding. Approximately 7 to 10% of façade materials will be replaced , subject to finalisation of replacement project statement of requirements
- Health have commenced a Phase 2 audit whereby they have included all ACT Health property locations (an additional 68 properties) to confirm material specifications, irrespective of construction date.

- The Working Group will start to identify at-risk buildings through building approval and other data and potentially visual verification of the presence of ACPs.
- Powers are available for government regulators to take samples off buildings for testing, however at this stage, this is not proposed.

Alternative cladding products

Sourcing alternative cladding products may also prove difficult as there has been a global surge in demand. New products are coming on the market each week.

Unforeseen expenditure

The cost of rectification work at the Women's and Children's Hospital will not be insignificant, if this

approach is taken on other buildings, and given the supplier issues there may be a case to call on additional appropriation or Treasurers' Advance.

Signatory name: Geoffrey Rutledge Phone: 75001

CAVEAT BRIEF

To: Meegan Fitzharris MLA, Minister for Health and Wellbeing

Cc: N/A

Through: Michael De'Ath, Director-General, ACT Health

Subject: **ALUMINIUM COMPOSITE PANEL REPLACEMENT AND MATERIAL SELECTION AT THE CENTENARY HOSPITAL FOR WOMEN AND CHILDREN**

- ACT Health were made aware of a fire risk posed by the type of Aluminium Composite Panel (ACP) cladding attached to the Centenary Hospital for Women and Children (CHWC) building following a desktop audit conducted in June 2017 on healthcare facilities constructed since 2008, and the subsequent assessment by independent fire safety consultants, Defire, in early August 2017.
- The report Defire prepared, which is titled *Combustible façade cladding – preliminary fire safety assessment Revision FSA 1.1*, was presented to ACT Health on 3 August 2017. The report recommended a portion of ACP panels on the CHWC be replaced with an alternative suitable material.
- On 15 September 2017 a façade consultant, Arcadis, was appointed to prepare a scoping document/Statement of Requirements (SoR) for the replacement of ACP attached to specified areas of the CHWC building.
- A two stage process to engage a suitable contractor to replace identified ACP cladding on the CHWC building commenced in October 2017 and concluded in December 2017, with the appointment of Manteena to undertake the required works as detailed in the Arcadis SoR.
- Concurrent with the contractor procurement process, the Arcadis SoR was developed in consultation with key members of the Whole of Government (WHoG) ACP working group as follows:
    - ACT Fire & Rescue
    - Environmental Planning and Sustainable Development Directorate
    - Infrastructure Finance and Capital Works
    - ACT Health Directorate
- Following a meeting of the above group on 10 November 2017 to confirm the Arcadis SoR the agreed content was issued to selected contractors to complete the concurrent Request for Tender process.
- The Arcadis SoR document outlined options for replacement panels to meet the latest Building Code requirements.
- The replacement material for the CHWC ACP panel replacement project is Vitracore G2.
- Physical ACP panel replacement works commenced in late February 2018 following final material selection in early February 2018.

- On 8 March 2018 an issue was raised by Manteena's fire consultant, Defire, about the compliance status of the chosen replacement material relative to possible future updates of the National Construction Code (NCC) – Building Code of Australia (BCA).
- To address this issue a meeting with key project stakeholders was convened on 15 March 2018, following which, confirmation of the acceptability of the chosen replacement material, Vitracore G2, was received from :
    - The Building Certifier – CBS
    - ACT Fire & Rescue
    - Defire (Manteena's fire consultant)
- Works are currently around 80% complete with construction completion remaining on program for July 2018.
- The current value of all committed works and consultancies for the project is $1,206,593 (GST Excl)
- A meeting of the WhoG ACP working group was convened on the 7 June 2018 to discuss the latest status of the ACT WHoG risk assessment tool. Actions arising from this meeting are as follows:
    - An initial trial of the Victorian Government risk assessment tool will commence before the end of June 2018.
    - Two ACT Health buildings, Building 12 Canberra Hospital and Belconnen Community Health Centre, will be included as part of this trial activity.
- Upon completion of the initial assessment of ACT Health buildings, using the WhoG risk assessment tool, a summary of remediation actions, if any, will be developed. The expected date for completion of this assessment tool trial is end of July 2018.
- A timetable for completion of the remaining ACT Health buildings will be available at the end of July 2018 based on the findings of the initial assessment trial.

Cleared:	Karen Doran
Contact Number:	02 6205 2248
Date:	7 June 2018