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# **Vipac Engineers & Scientists**

# **FVA Group Pty Ltd**

# Fairview - AS 4284 testing on facades

# **Test Report - Vitracore G2 with Rigid Membrane**

30B-19-0059-TRP-6774696-1

11 November 2020





Job Title: Fairview - AS 4284 testing on facades

**Report Title:** Test Report - Vitracore G2 with Rigid Membrane

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Date: 11 November 2020

#### **REVISION HISTORY:**

| Rev. #  | Comments / Details of change(s) made             | Date       | Revised by: |
|---------|--|------------|-------------|
| Rev. 00 | Original issue                                   | 02/04/2020 | R.Dyck      |
| Rev. 01 | Updated company name and pipe penetration detail | 11/11/2020 | R.Dyck      |
| Rev. 02 |  |            |             |

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## **EXECUTIVE SUMMARY**

Vipac Engineers and Scientists were commissioned by Fairview Pty Ltd / FVA Group Pty Ltd (the client) to perform AS/NZS 4284:2008 and NZBC E2/VM1 testing for their cladding system.

The sample was installed by the client at the Vipac test laboratory in Port Melbourne, and the sample was tested by Vipac Engineers and Scientists during February of 2020.

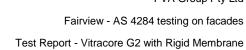
The test sample was found to have the below results for AS/NZS 4284:2008 compliance:

| Test Date  | AS/NZS4284:2008 Test                                     | Result   |
|------------|--|--|
| 04/02/2020 | Clause 8.2   | Complies   |
|            | Preliminary tests  | +3500Pa, -4000Pa SLS Preload                                   |
| 04/02/2020 | Clause 8.3 Structural test at serviceability limit state | Complies with Span deflection requirements at +3000Pa, -3500Pa |
| 05/02/2020 | Clause 8.5 Static water test                             | Complies<br>1050Pa   |
| 05/02/2020 | Clause 8.6   | Complies   |
|            | Cyclic water test  | Stage 1: 525Pa – 1050Pa  |
|            |  | Stage 2: 700Pa – 1400Pa  |
|            |  | Stage 3: 1050Pa – 2100Pa                                       |
| 05/02/2020 | Clause 8.8   | Complies   |
|            | Structural test at ultimate limit state                  | +5000, -6000   |

Table 1: Test results summary

The test sample complied with test conditions of E2/VM1.

Full details are contained within this report.





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## 1 INTRODUCTION

**Document Type:** Test Report

Company: Fairview Pty Ltd / FVA Group Pty Ltd

**Product:** Vitracore G2 with Siniat Board membrane

**Test Date:** February 2020

**Testing Authority:** Vipac Engineers & Scientists

## 2 TEST REFERENCE & APPLICATION STANDARD

AS/NZS 4284:2008 Testing of Building Facades

## 3 TEST SPECIMEN



Figure 1: Test sample prior to testing

Details of the test sample can be found in Appendix B and C of this report.



## **4 TEST EQUIPMENT**

| Measurement     | Instrument Type/Make    | Model                           | Vipac Serial Number    |           |
|-----------------|-------------------------|---------------------------------|------------------------|-----------|
|                 |                         |                                 | 000034597              |           |
|                 |                         |                                 | 000033756              |           |
| Deflection      | Dial gauges/ Mitutoyo   | 3058S-19 000034596<br>000033758 | o 3058S-19 000034596   | 000034596 |
|                 |                         |                                 | 000033758              |           |
|                 |                         |                                 | 000033758<br>000034598 |           |
| Distance        | Tape Measure / Stanley  | 8m                              | 000033666              |           |
| Pressure        | Digital Manometer / PCE | PCE-PDA-10L                     | 000033540              |           |
| Water flow rate | Flow meter/ Siemens     | Mag 6000                        | 000031229              |           |
| Time            | Stopwatch/ Dick Smith   | Y1299                           | 000033567              |           |

Table 2: Instruments used throughout testing

## 5 TEST RESULTS AS/NZS 4284

#### 5.1 CLAUSE 8.2 - PRELIMINARY TESTS

**Test Standard:** AS/NZS 4284:2008 – Testing of Building Facades

**Test Date:** 04/02/2020

5.1.1 CRITERIA: STATIC PRESSURE

Test sample shall withstand the Serviceability Limit State pressure with no structural

damage or distortion.

Applied Load: Nominated Serviceability Pressure: +3.5 kPa, -4.0 kPa

Duration: 10 seconds

#### 5.1.2 CRITERIA: STATIC AND CYCLIC WATER TESTS

Under static and cyclic water tests there shall be no leaks. A leak is considered to occur when one or more of the following occur:

- a) Water appears on any inside surface of the façade, visible from an occupied space.
- b) Uncontrolled water appears on any inside surface of the façade (uncontrolled water is defined as any leakage not contained and drained away after 5 minutes).
- c) Water appears that is likely to wet insulation, fixtures and finishes.
- d) Water appears in other locations specified as unacceptable by the Specifier

Static water test: Applied Load: Nominated pressure: +1.050 kPa

Duration: water spray operated for 5 minutes at 0 kPa chamber pressure, followed by water spray and pressure at the test pressure for 15 minutes. Observe for 5 minutes after removal of both water and air pressure.

Cyclic water test: Applied Load: Nominated pressures:

| Stage                   | Lower pressure | Upper pressure | Cycle Duration |
|-------------------------|----------------|----------------|----------------|
| Stage 1 0.525 kPa 1.050 |                | 1.050 kPa      | 5 minutes      |
|                         | 0 k            | kPa 2 minutes  |                |
| Stage 2                 | 0.700 kPa      | 1.400 kPa      | 5 minutes      |
| 0 kPa                   |                | 2 minutes      |                |
| Stage 3                 | 1.050 kPa      | 2.100 kPa      | 5 minutes      |
| Observation             | 0 kPa          |                | 5 minutes      |

Table 3: Cyclic pressure lower and upper limits, cycle time of 3 seconds to 5 seconds

**Applied Water:** Water spray rate: 3.0 L/m<sup>2</sup>min

Measured spray area: 8.6 m<sup>2</sup>

Resulting spray flow rate: 25.9 l/min

**Results:** The preliminary static and cyclic water tests were completed successfully.

Conclusion: The preliminary test of the façade complies with the requirements of AS/NZS

4284:2008



## 5.2 CAUSE 8.3 - STRUCTURAL TEST AT SERVICEABILITY LIMIT STATE (SLS)

Test Standard: AS/NZS 4284:2008 – Testing of Building Facades

**Test Date:** 04/02/2020

**Formulae:** The net mid-span deflection (*d*) of each member is given by the following:

 $d = D_m - D_e$ 

where:

D<sub>m</sub> = Mid span displacement

D<sub>e</sub> = Average of end displacements

Criteria: According to AS/NZS4284:2008 no framing member shall deflect by an amount

greater than span/250mm. Successive member displacement shall not exceed 3.0mm. The maximum displacement of a framing member shall not exceed 20mm. All components of the sample are required to remain structurally intact as detailed on test

sample drawings with no signs of visible damage or distortion.

**Applied Load:** +3.0kPa, -3.5kPa

Results:

| Span Detail  | Span<br>[mm] | Pressure<br>direction | Measured<br>pressure<br>[Pa] | Measured<br>Span<br>Deflection<br>[mm] | Span<br>deflection<br>Ratio |
|--------------|--------------|-----------------------|------------------------------|--|-----------------------------|
| Span 1       | 1150         | Positive              | 3021                         | 1.19                                   | 966                         |
| (Node 1,2,3) |              | Negative              | -3518                        | -1.58                                  | 730                         |
| Span 2       | 1150         | Positive              | 3021                         | 1.07                                   | 1080                        |
| (Node 3,4,5) |              | Negative              | -3518                        | 2.39                                   | 481                         |
| Span 3       | 2300         | Positive              | 3021                         | 7.30                                   | 315                         |
| (Node 1,3,5) |              | Negative              | -3518                        | 6.25                                   | 368                         |

Table 4: Span deflection results - +3.0kPa, -3.5kPa

|            | a.o.o opa |        |        |        |        |
|------------|-----------|--------|--------|--------|--------|
| Zero Stage | Node 1    | Node 2 | Node 3 | Node 4 | Node 5 |
|            | [mm]      | [mm]   | [mm]   | [mm]   | [mm]   |
| <b>Z</b> 1 | 0.00      | 0.00   | 0.00   | 0.00   | 0.00   |
| <b>Z2</b>  | 0.13      | 0.21   | 0.21   | 0.17   | 0.06   |
| <b>Z</b> 4 | -1.22     | -1.89  | -2.12  | -1.81  | -0.71  |
| <b>Z</b> 5 | -1.37     | -2.05  | -2.29  | -1.95  | -0.76  |
| <b>Z</b> 7 | 0.01      | 0.01   | -0.03  | -0.05  | -0.02  |

Table 5: Residual deflection result - +3.0kPa, -3.5kPa





Figure 2: Node locations (1-5 from bottom to top)

**Conclusion:** 

The test sampled complied with the structural span deflections limits of Span/250.



#### 5.3 CLAUSE 8.5 - STATIC WATER TEST

**Test Standard:** AS/NZS 4284:2008 – Testing of Building Facades

**Test Date:** 05/02/2020

Criteria: Under static water test there shall be no leaks. A leak is considered to occur when

one or more of the following occur:

a) Water appears on any inside surface of the façade and is visible from an occupied

space.

b) Uncontrolled water appears on any inside surface of the façade.

c) Water appears that is likely to wet insulation, fixtures and finishes.

d) Water appears in other locations specified as unacceptable by the Specifier

Applied Load: Nominated Pressure: +1.050 kPa

Duration: water spray operated for 5 minutes at 0 kPa chamber pressure, followed by

water spray and pressure at the test pressure for 15 minutes. Observe for 5 minutes

after removal of both water and air pressure.

**Applied Water:** Water spray rate: 3.0 L/m<sup>2</sup>min

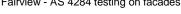
Measured spray area (inside pressure chamber): 8.64 m<sup>2</sup>

Resulting spray flow rate: 25.9 l/min

**Results:** The Static water test was completed with no uncontrolled water penetration occurring.

Conclusion: The Static water results of the test sample comply with the specified limits set out in

AS/NZS 4284:2008.





## 5.4 CLAUSE 8.6 - CYCLIC WATER TEST

**Test Standard:** AS/NZS 4284:2008 – Testing of Building Facades

Test Date: 05/02/2020

Criteria: Under cyclic water test there shall be no leaks. A leak is considered to occur when

one or more of the following occur:

a) Water appears on any inside surface of the façade and is visible from an occupied

space.

b) Uncontrolled water appears on any inside surface of the façade.

c) Water appears that is likely to wet insulation, fixtures and finishes.

d) Water appears in other locations specified as unacceptable by the Specifier

**Applied Load:** Nominated Pressures:

| Stage             | Lower pressure | Upper pressure | Cycle Duration |
|-------------------|----------------|----------------|----------------|
| Stage 1           | 0.525 kPa      | 1.050 kPa      | 5 minutes      |
|                   | 0 k            | Pa             | 2 minutes      |
| Stage 2           | 0.700 kPa      | 1.400 kPa      | 5 minutes      |
|                   | 0 kPa          |                | 2 minutes      |
| Stage 3 1.050 kPa |                | 2.100 kPa      | 5 minutes      |
| Observation       | 0 kPa          |                | 5 minutes      |

Table 8: Cyclic pressure lower and upper limits, cycle time of 3 seconds to 5 seconds

Water spray rate: 3.0 L/m<sup>2</sup>min **Applied Water:** 

Measured spray area (inside pressure chamber): 8.64 m<sup>2</sup>

Resulting spray flow rate: 25.9 l/min

Results: The Cyclic water test was completed with the test was completed with no uncontrolled

water penetration occurring.

Conclusion: The Cyclic water results of the test sample comply with the specified limits set out in

AS/NZS 4284:2008.



## 5.5 CLAUSE 8.8 - STRUCTURAL TEST AT THE ULTIMATE LIMIT STATE

**Test Standard:** AS/NZS 4284:2008 - Testing of Building Facades

**Test Date:** 05/02/2020

Criteria: There shall be no disengagement or partial disengagement of any framing member or

panel, no failure of fixings, stops or locking devices. No repeated glass breakage or

cracking of glass.

**Applied Load:** Ultimate Limit State Pressures: +5.0 kPa, -6.0kPa

Apply the pressure from zero to ultimate limit state in 50-60 seconds, apply ultimate

limit state for 10 seconds.

Results:

| Test Pressure [kPa] | Results          |
|---------------------|------------------|
| + 5.1               | All criteria met |
| - 6.1               | All criteria met |

Table 9: Results, Ultimate Limit State

**Conclusion:** The Ultimate limit state results of the test sample comply with the requirements of

AS/NZS 4284:2008.



## 6 TEST RESULTS NZBC E2/VM1

| Test                                      | Result   |
|---|--|
| Series 1: Static Water Penetration        | Compliant  |
| Test pressure 455 Pa                      | Compliant  |
| Duration 15 minutes                       |  |
| Series 1: Cyclic Water Penetration        | Compliant  |
| Test pressure 455 – 910 Pa                | Compliant  |
| Duration 5 minutes                        |  |
| Series 2: Water Management Tests          | Compliant  |
| Static Water Penetration                  | ·  |
| Test pressure 455 Pa                      | *Appendix A has images of the locations of the water   |
| Duration 15 minutes                       | management holes introduced to the sample  |
| Series 2: Water Management Tests          | Compliant  |
| Cyclic Water Penetration                  | ·  |
| Test pressure 455 – 910 Pa                | *Appendix A has images of the locations of the water   |
| Duration 5 minutes                        | management holes introduced to the sample  |
| Series 3: Wetwall Test                    | Compliant  |
| Static Water Penetration                  | Compliant  |
| Test pressure 50 Pa                       |  |
| Duration 15 minutes                       |  |
| Additional water penetration requirements | N/A  |
| Comments                                  | A leak was observed in the top left corner of the test sample during testing. This leak was observed to be between the perimeter of the sample and the test rig. As this was not representative of a typical install, this leak did not affect the compliance of the sample. |

Table 10: E2/VM1 Results



## Appendix A E2/VM1 WATER MANAGEMENT HOLES



Figure 3: 8mm hole at 3/4 window height



Figure 4: 8mm hole above horizontal control joint



Figure 5: 8mm hole above parapet feature



Figure 6: 8mm hole in panel joint caulking



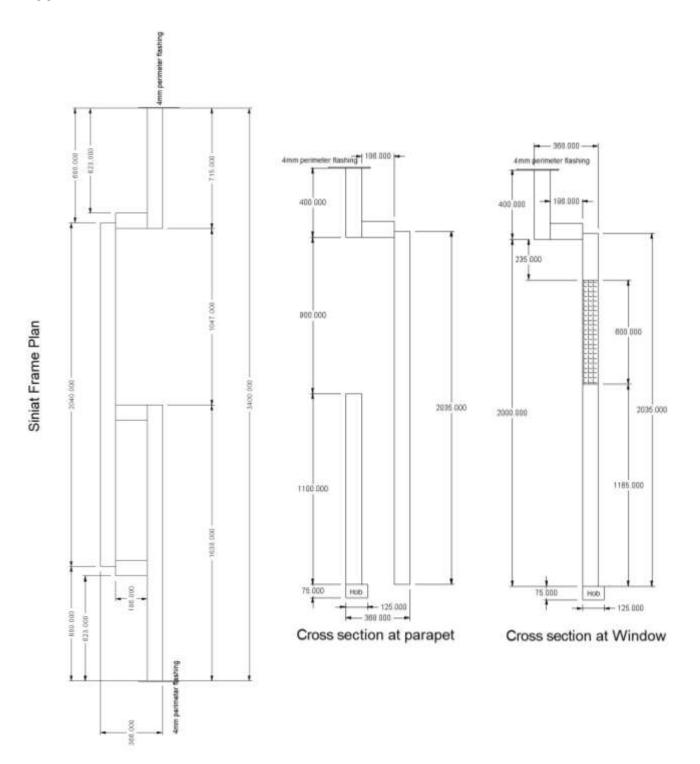
Figure 7: 8mm hole above pipe penetration



Figure 8: 8mm hole at 3/4 window height in caulking

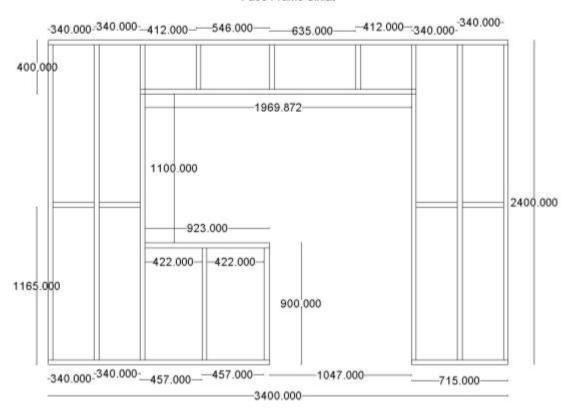


## Appendix B TEST SAMPLE STRUCTURE

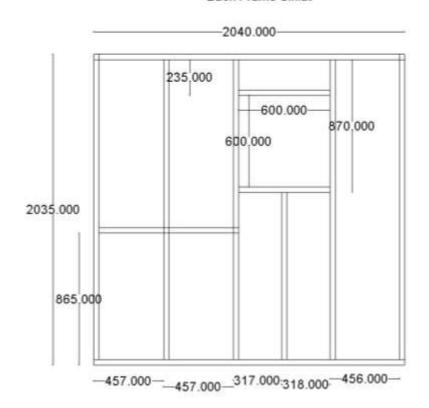




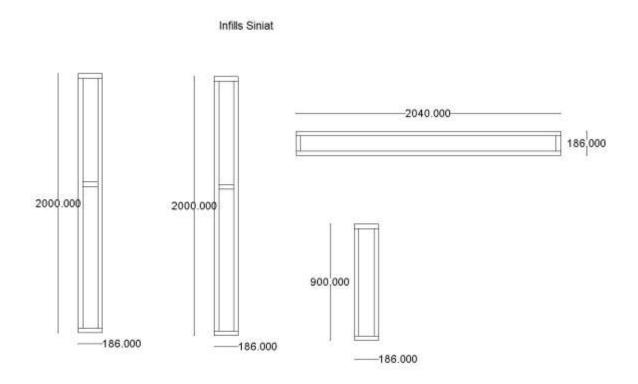
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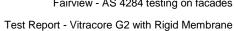


## Back Frame Siniat







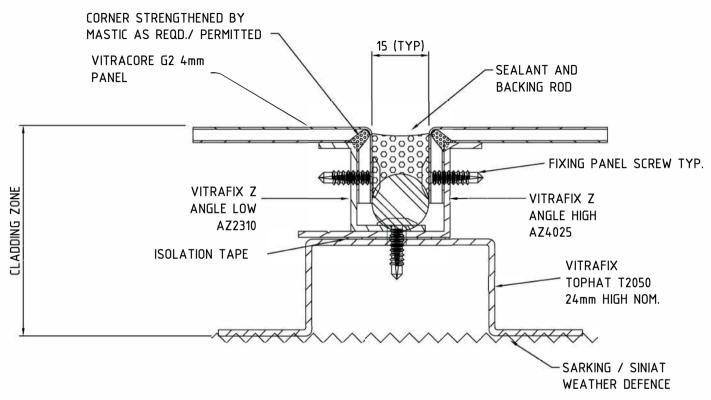




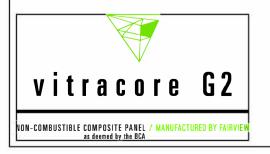
## Appendix C TEST SAMPLE DETAILS

This page is blank and the details are attached in the following pages.

# VITRACORE G2 AS4284 INSTALLATION DETAILS



# 1. TYPICAL VERTICAL PANEL JOINT DETAIL



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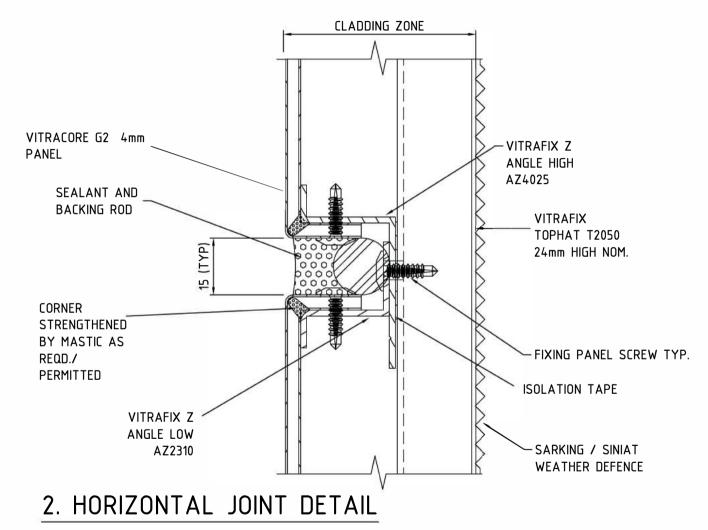


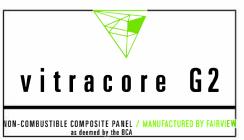
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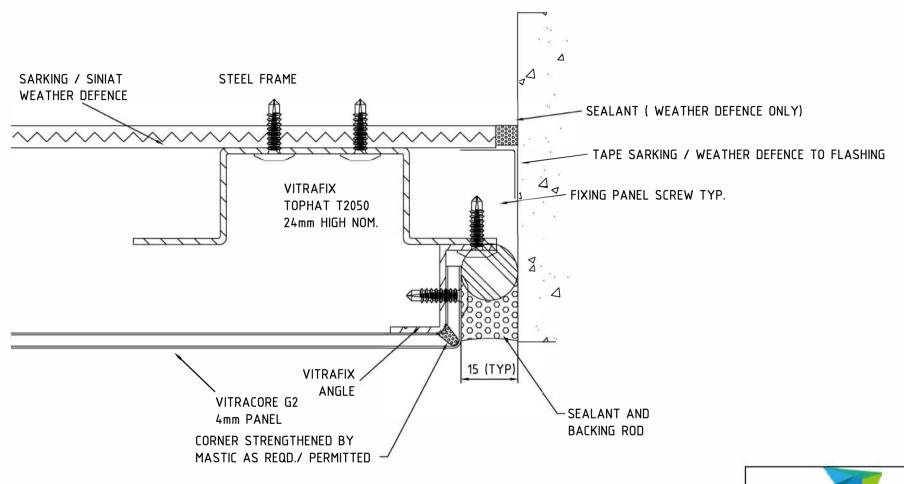
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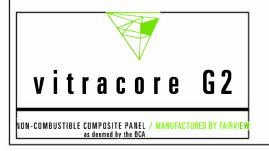
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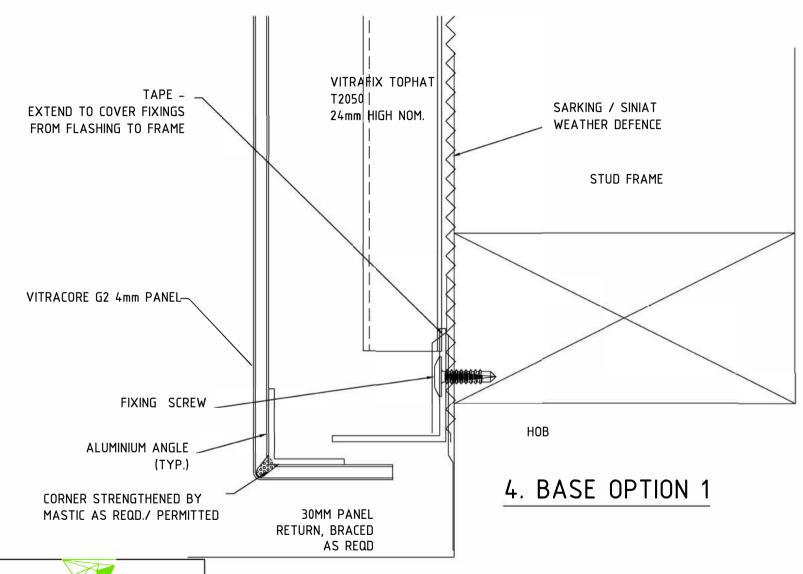


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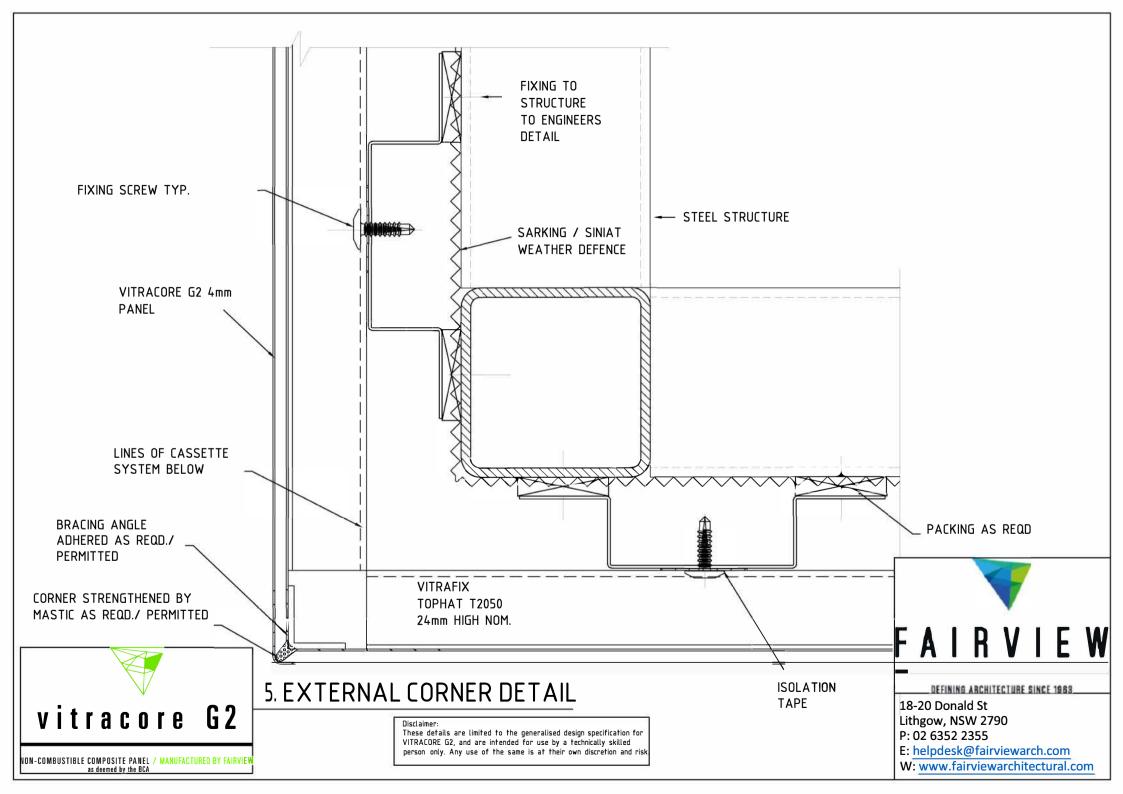
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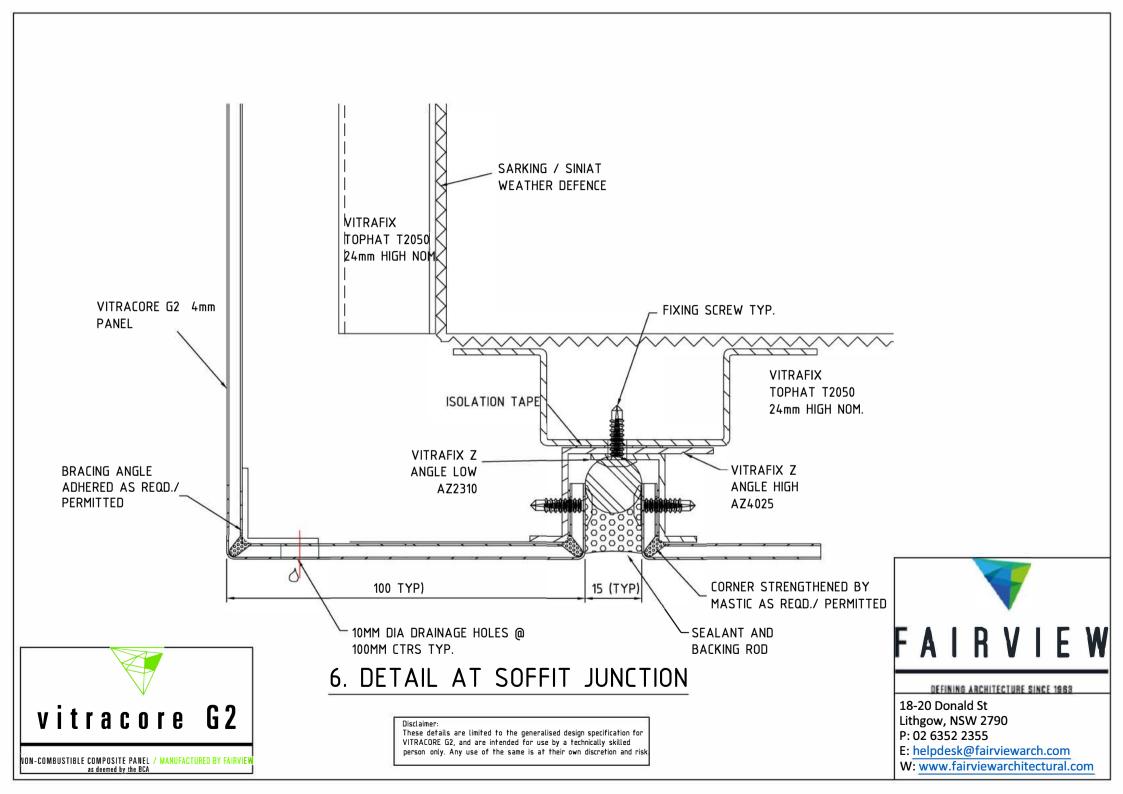


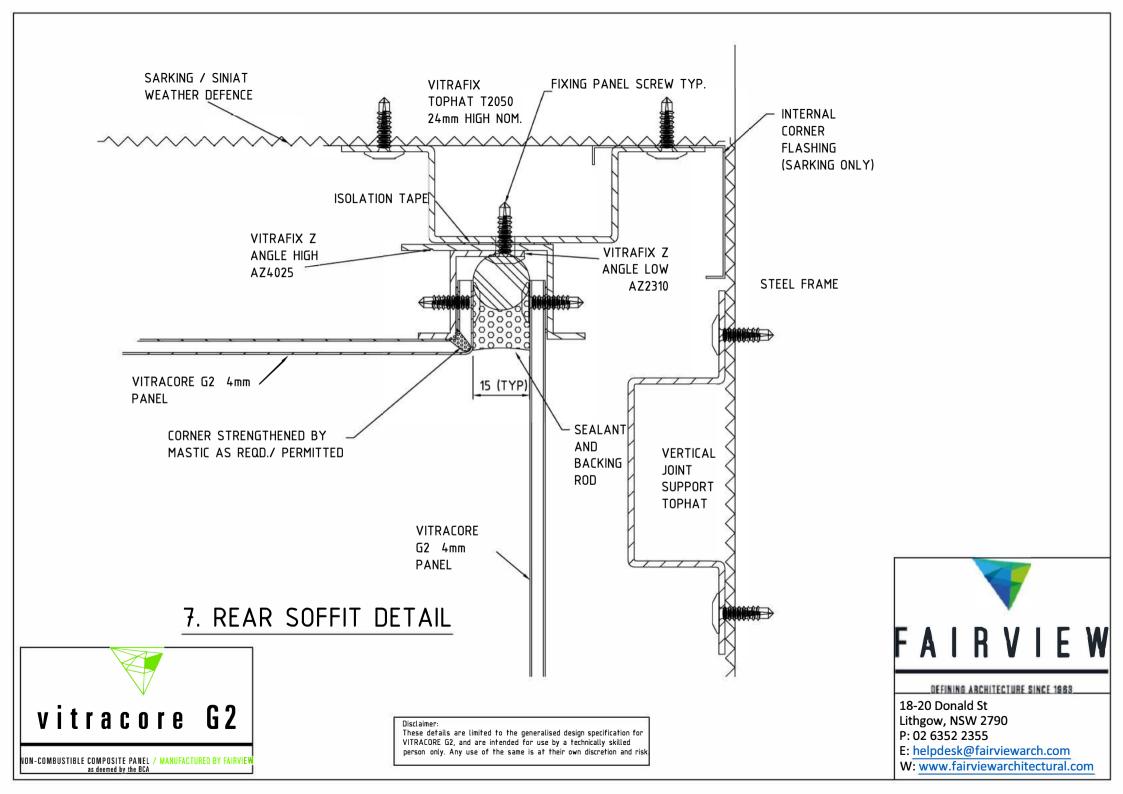
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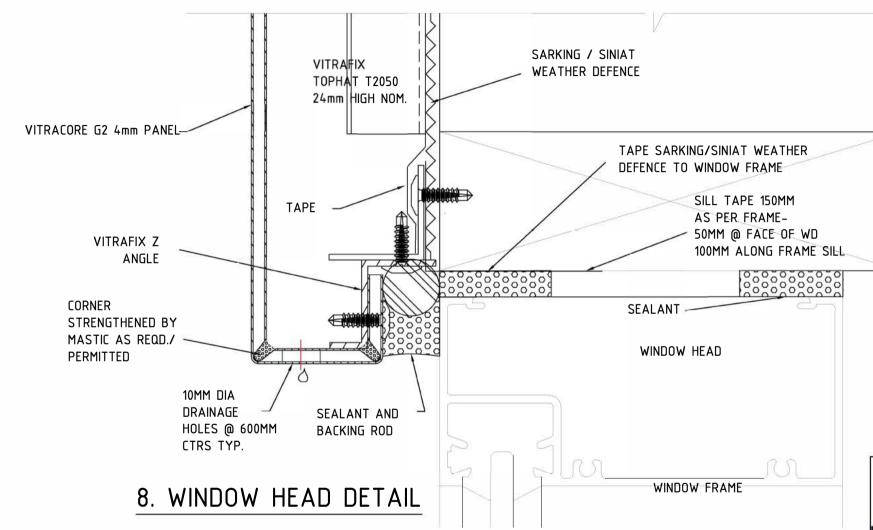
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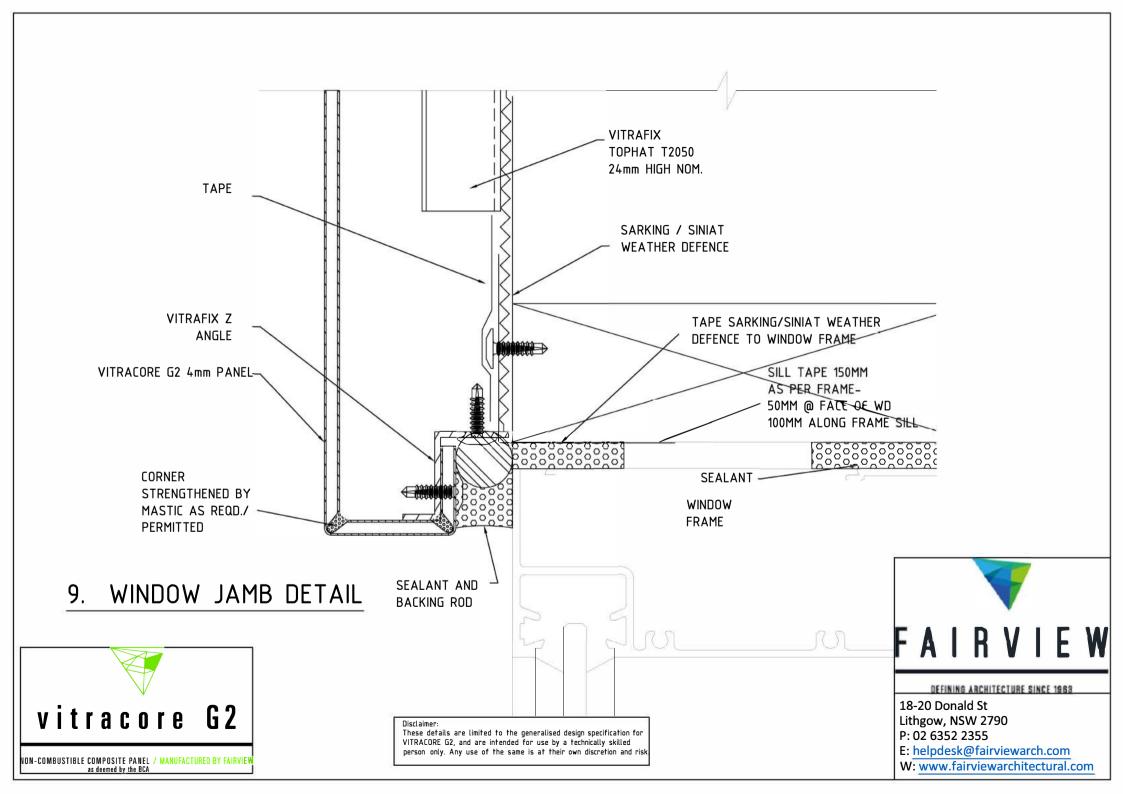
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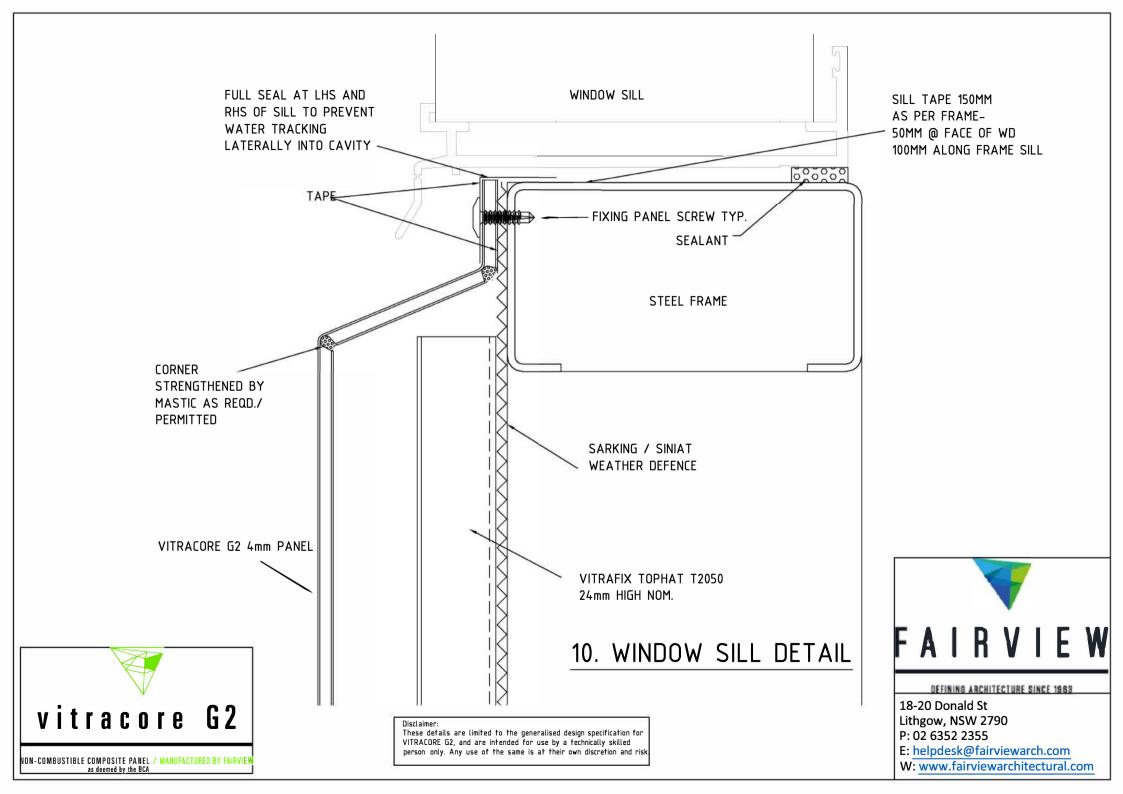


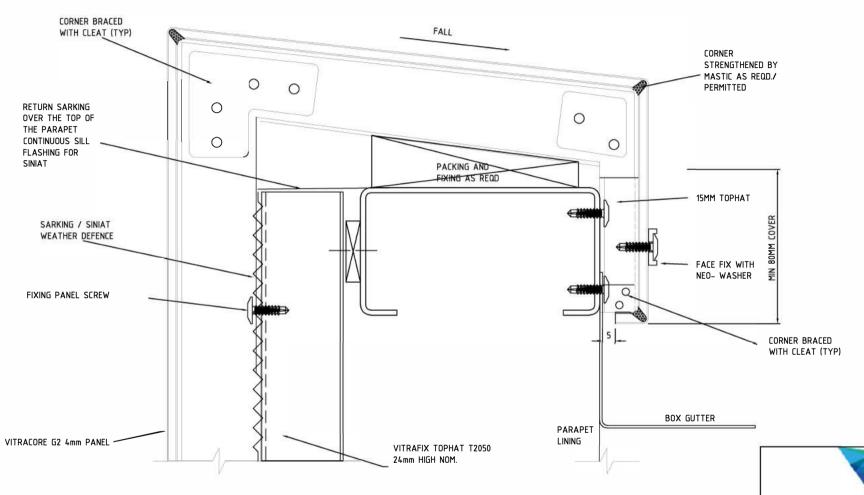
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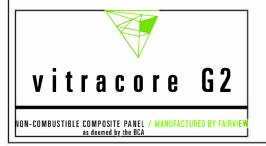
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## 11. PARAPET CAPPING DETAIL



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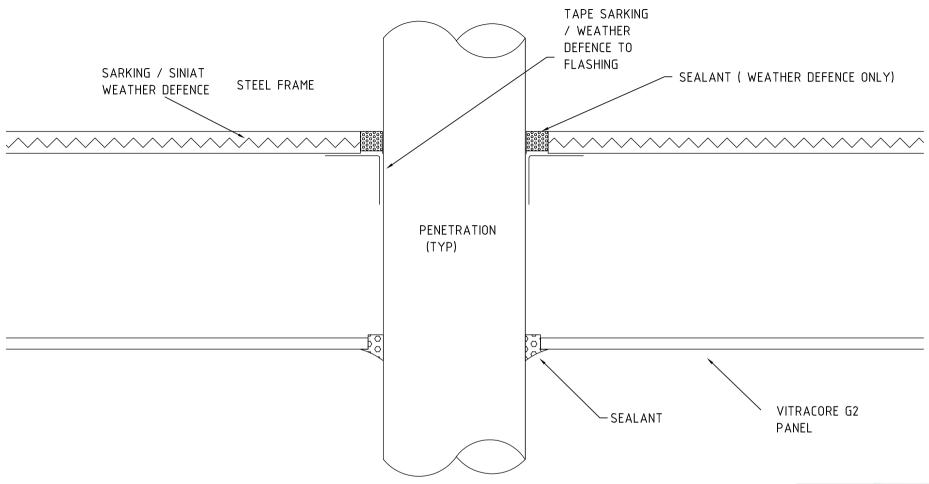
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FAIRVIEW

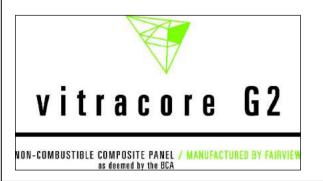
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# 12. TYPICAL PENETRATION DETAIL



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