



ARCH7033_24837 Studio: Hybrid Multi-storey

Project 3: Proposed Detailing

R00229832

09/11/2024

Contents:

Section 1

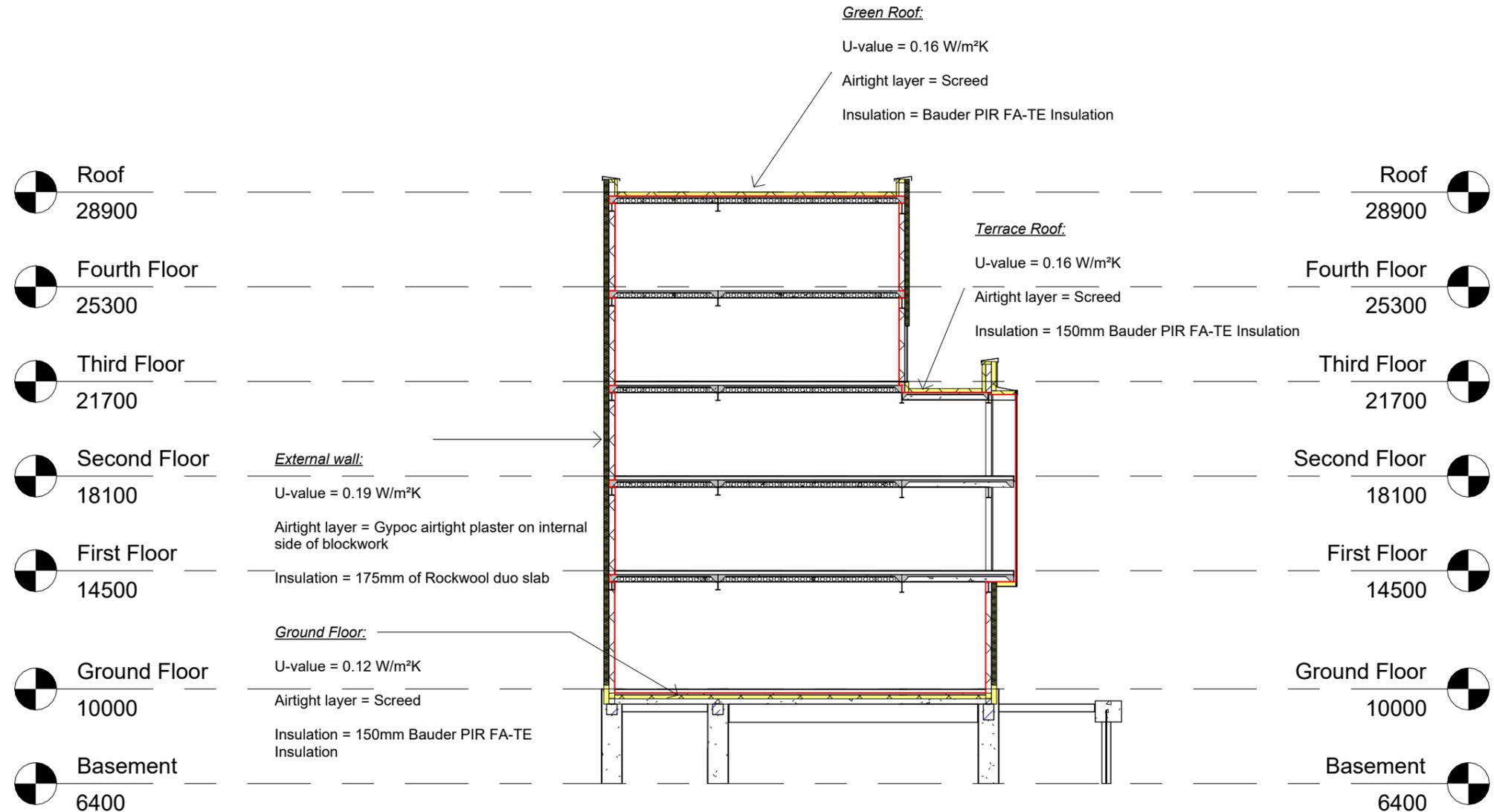
- Exploded Axonometric
- Air tightness and thermal layers strategy

Section 2

- Detailed Sketches
- Development Sketches

Section 3

- Build desk print outs



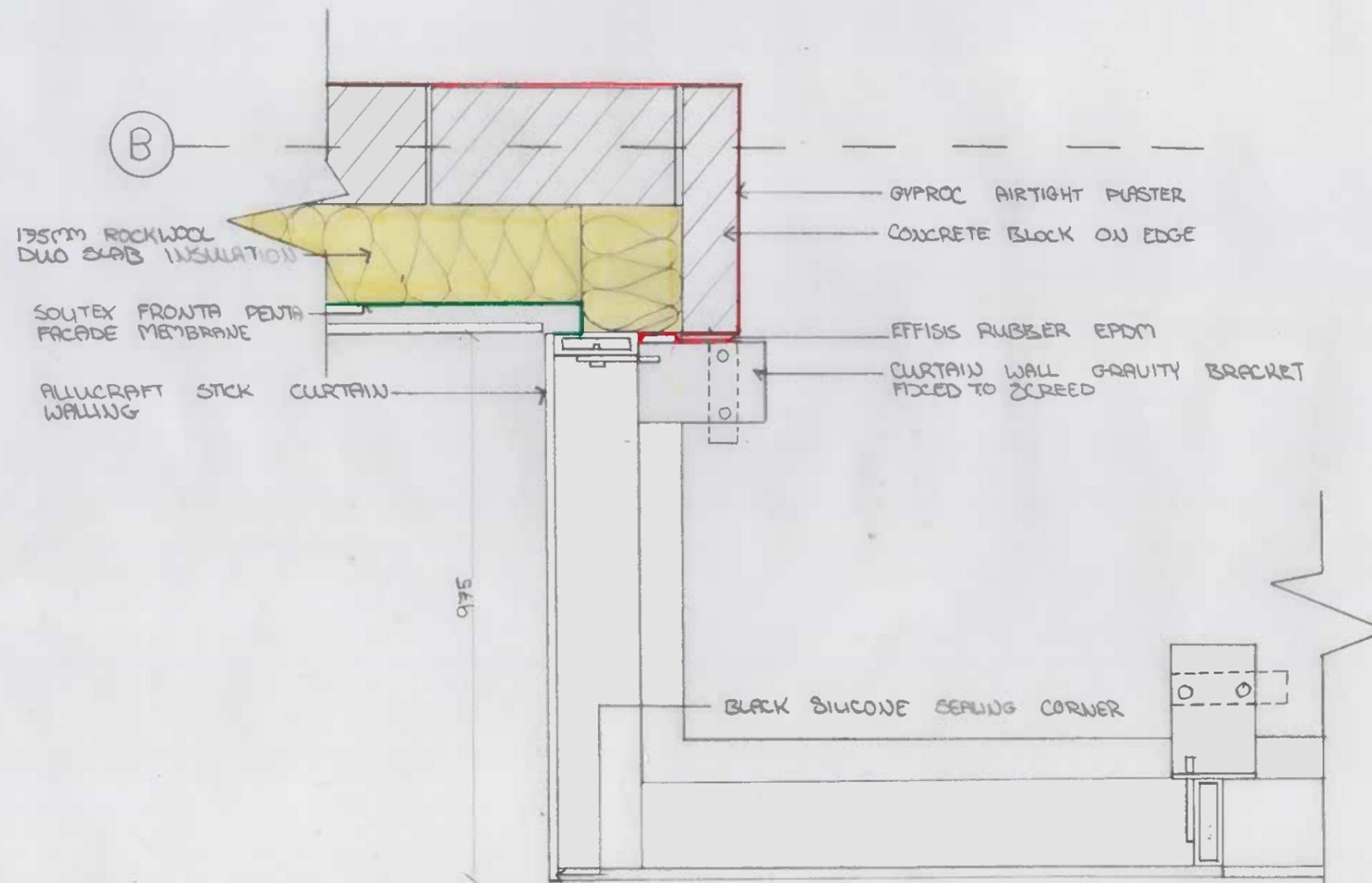
1 Cross Section
 1 : 200

| No. | Description | Date |
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|  www.autodesk.com/revit | | | |
| CODE | STATUS | SUITABILITY DESCRIPTION | PURPOSE OF ISSUE |
| | | | |

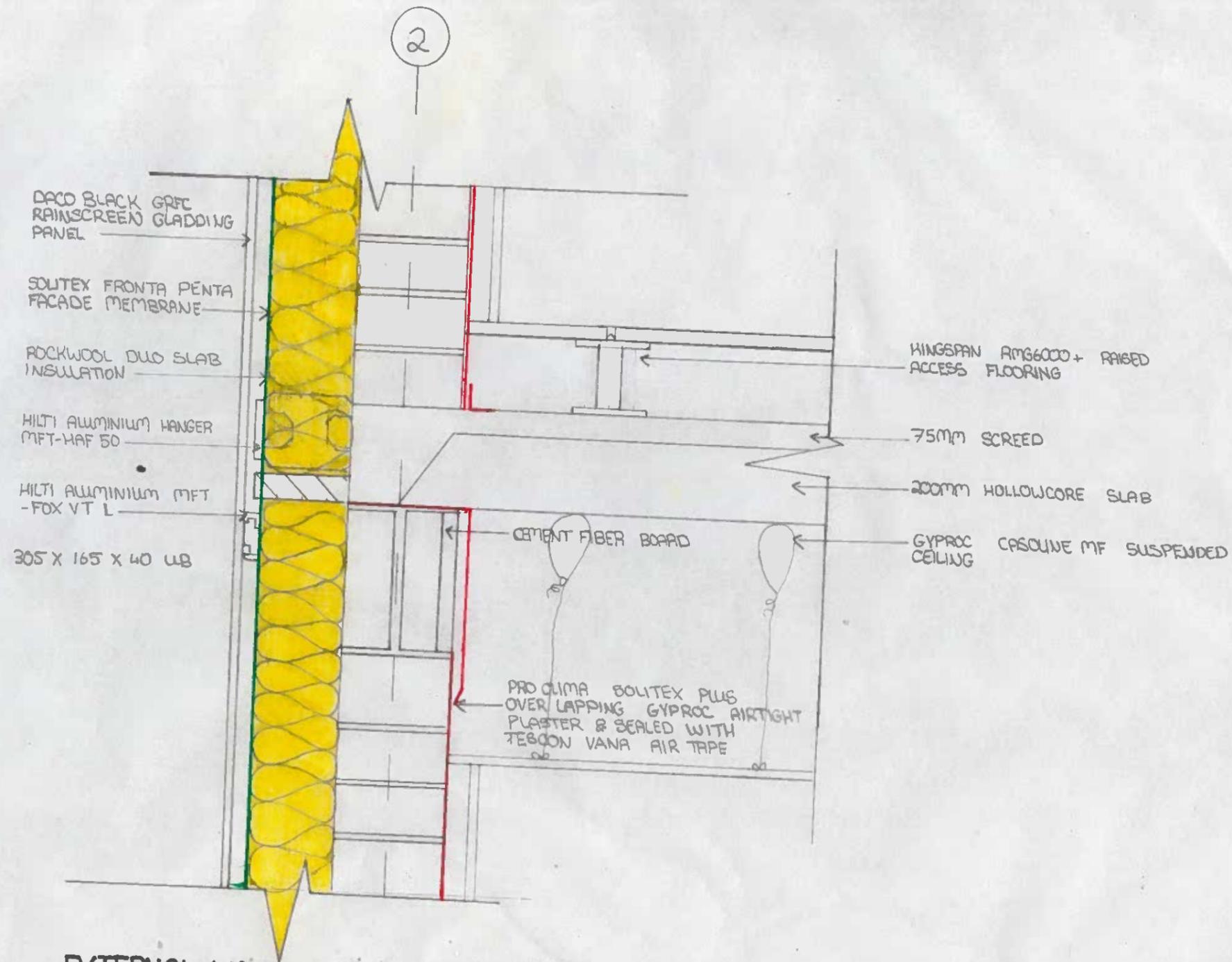
| | |
|---------|-----------------------------|
| PROJECT | Studio: Hybrid multi-storey |
| SHEET | Cross Section |

| | | | | | |
|------------|----------------|--------------|---------------|--|--|
| CLIENT | | | Derek O'Leary | | |
| Date | Project number | Scale (@ A3) | | | |
| 09/11/2024 | 2 | 1 : 200 | | | |
| Drawn by | DRWAING NUMBER | REV | | | |
| R00229832 | A002 | | | | |
| Checked by | | | | | |
| D.O'L | | | | | |



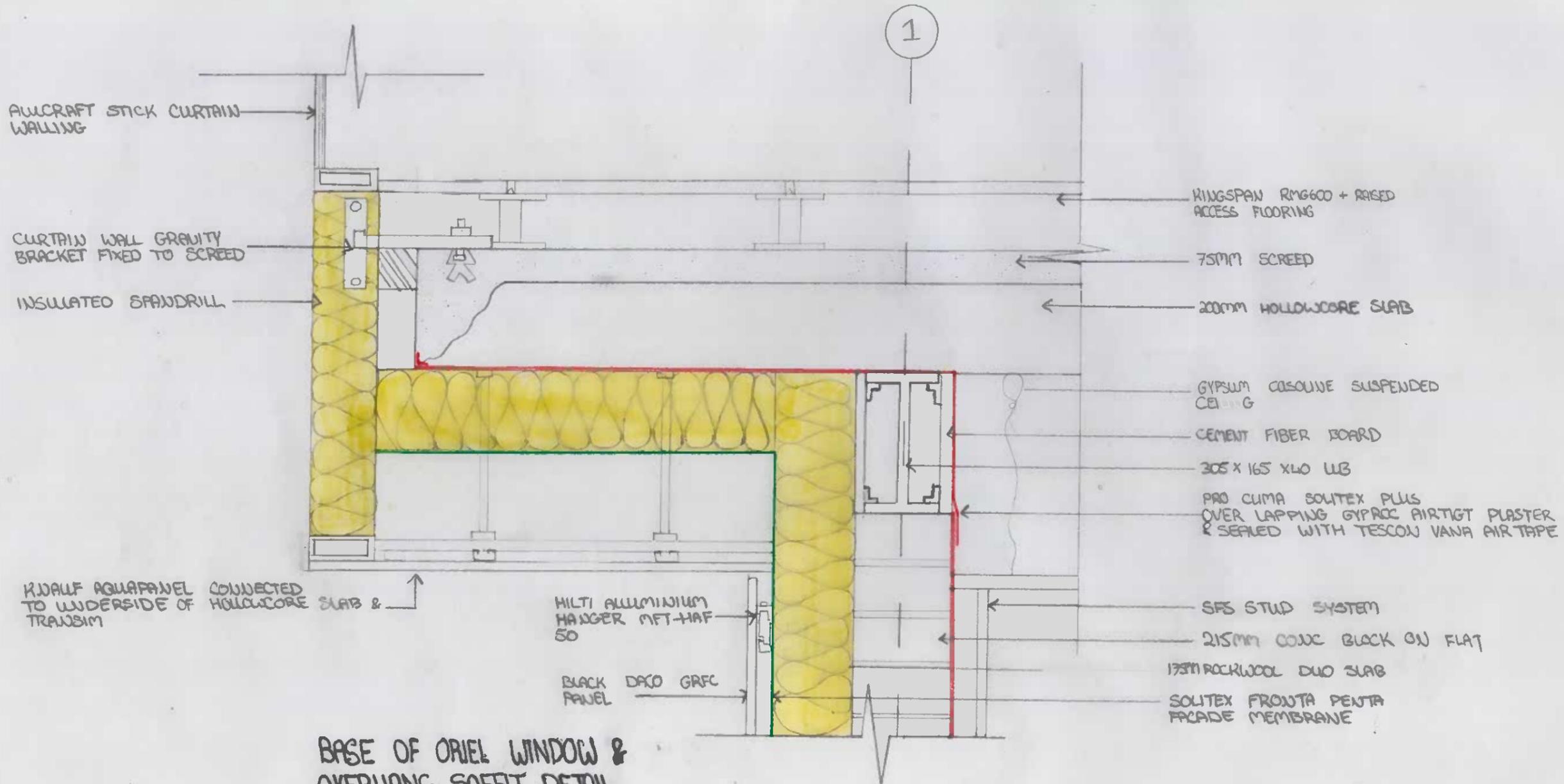
PLAN OF EXTERNAL WALL & CURTAIN
WALL JUNCTION
SCALE 1:10

| | | | |
|-----------------------------|------------|-------|--|
| STUDIO: HYBRID MULTI STOREY | | | PLAN OF EXTERNAL WALL & CURTAIN WALL JUNCTION |
| R00229882 | | | |
| 1:10 | 08/11/2024 | D.O'L | |



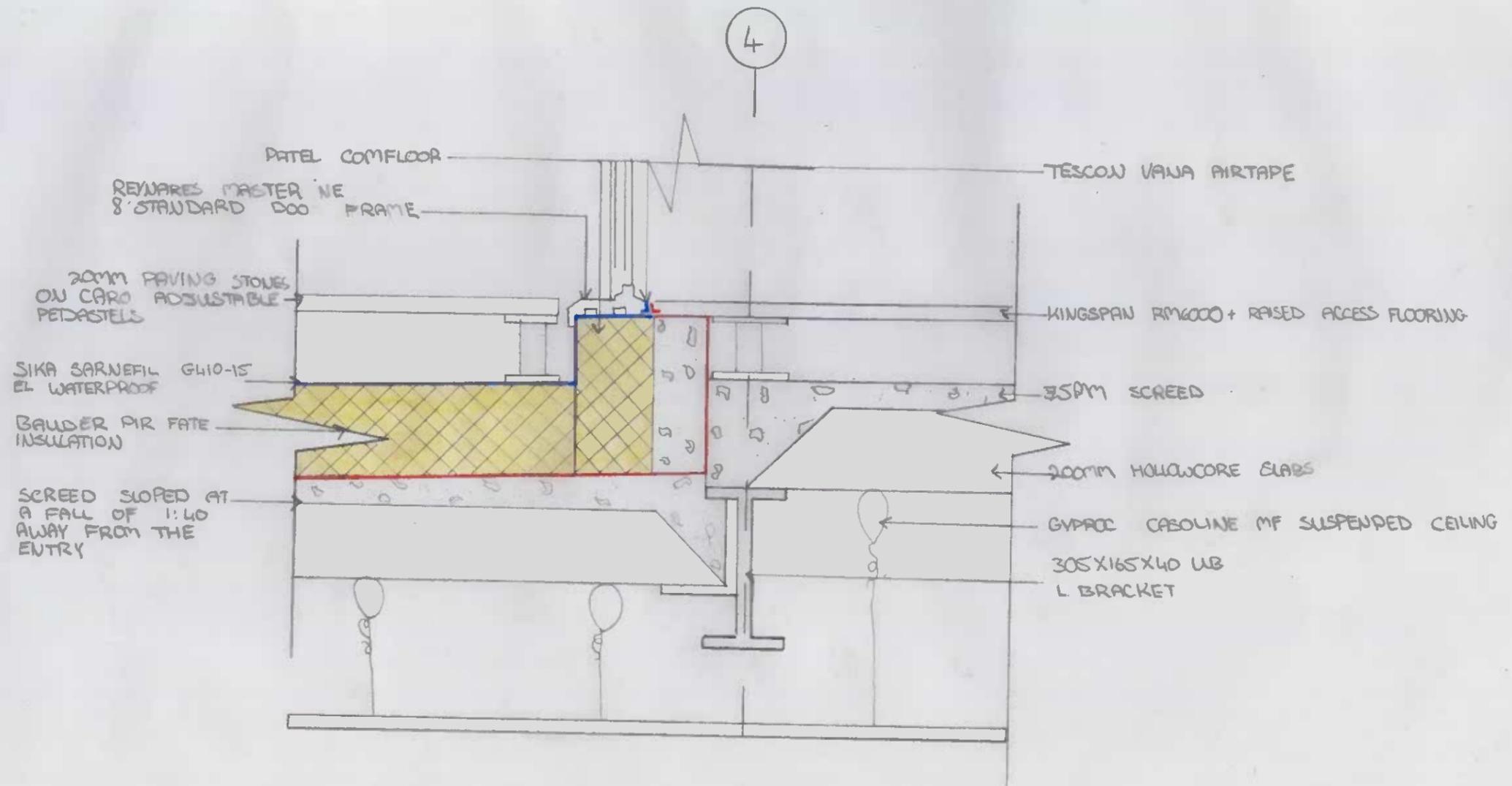
EXTERNAL WALL TO INTERMEDIATE FLOOR JUNCTION AT NORTH ELEVATION
SCALE 1:10

| | | | |
|-----------------------------|------------|-------|--|
| STUDIO: HYBRID MULTI STOREY | | | EXTERNAL WALL TO INTERMEDIATE FLOOR JUNCTION |
| R00220852 | | | |
| 1:10 | 09/11/2024 | D.O'L | |



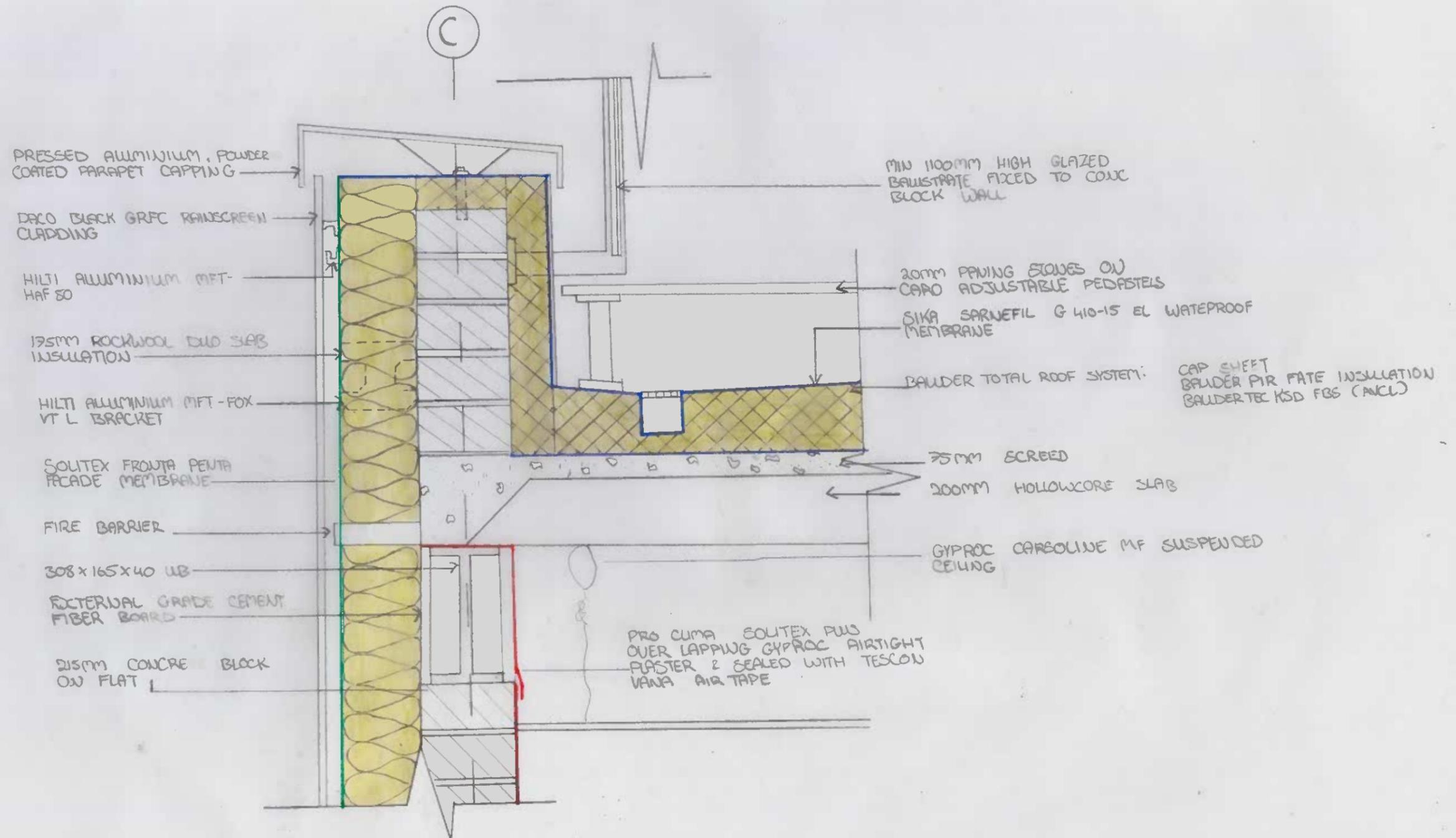
BASE OF ORIEL WINDOW &
OVERHANG SOFFIT DETAIL
SCALE 1/10

| | | | |
|----------------------------|------------|-------|---|
| STUDIO: HYBRID MULTI-STORY | | | BASE OF ORIEL WINDOW & SOFFIT DETAIL |
| R00220932 | | | |
| 1:10 | 09/11/2024 | D.O'L | |



LEVEL ENTRY THRESHOLD DETAIL
AT THIRD FLOOR

| | | | |
|-----------------------------|------------|-------|---------------------------------|
| STUDIO: HYBRID MULTI STOREY | | | TERRACE TO EXTERNAL WALL/PARPET |
| R00229832 | | | |
| 1:10 | 08/11/2024 | D.O'L | |



PRESSED ALUMINIUM, POWDER COATED PARAPET CAPPING

DURO BLACK GRC RAINSCREEN CLADDING

HILTI ALUMINIUM MFT-HAF 50

175MM ROCKWOOL DUO SLAB INSULATION

HILTI ALUMINIUM MFT-FOX VTL BRACKET

SOLITEX FRONTA PENTA FACADE MEMBRANE

FIRE BARRIER

308x165x40 UB

EXTERNAL GRADE CEMENT FIBER BOARD

215MM CONCRETE BLOCK ON FLAT

MIN 1100MM HIGH GLAZED BALUSTRADE FIXED TO CONC BLOCK WALL

20MM PAVING STONES ON CARO ADJUSTABLE PEDASTELS

SIKA SARNEFIL G 410-15 EL WATERPROOF MEMBRANE

BALDER TOTAL ROOF SYSTEM: CAP SHEET BALDER PIR FATE INSULATION BALDER TEC KSD FBS (ANCL)

75MM SCREED

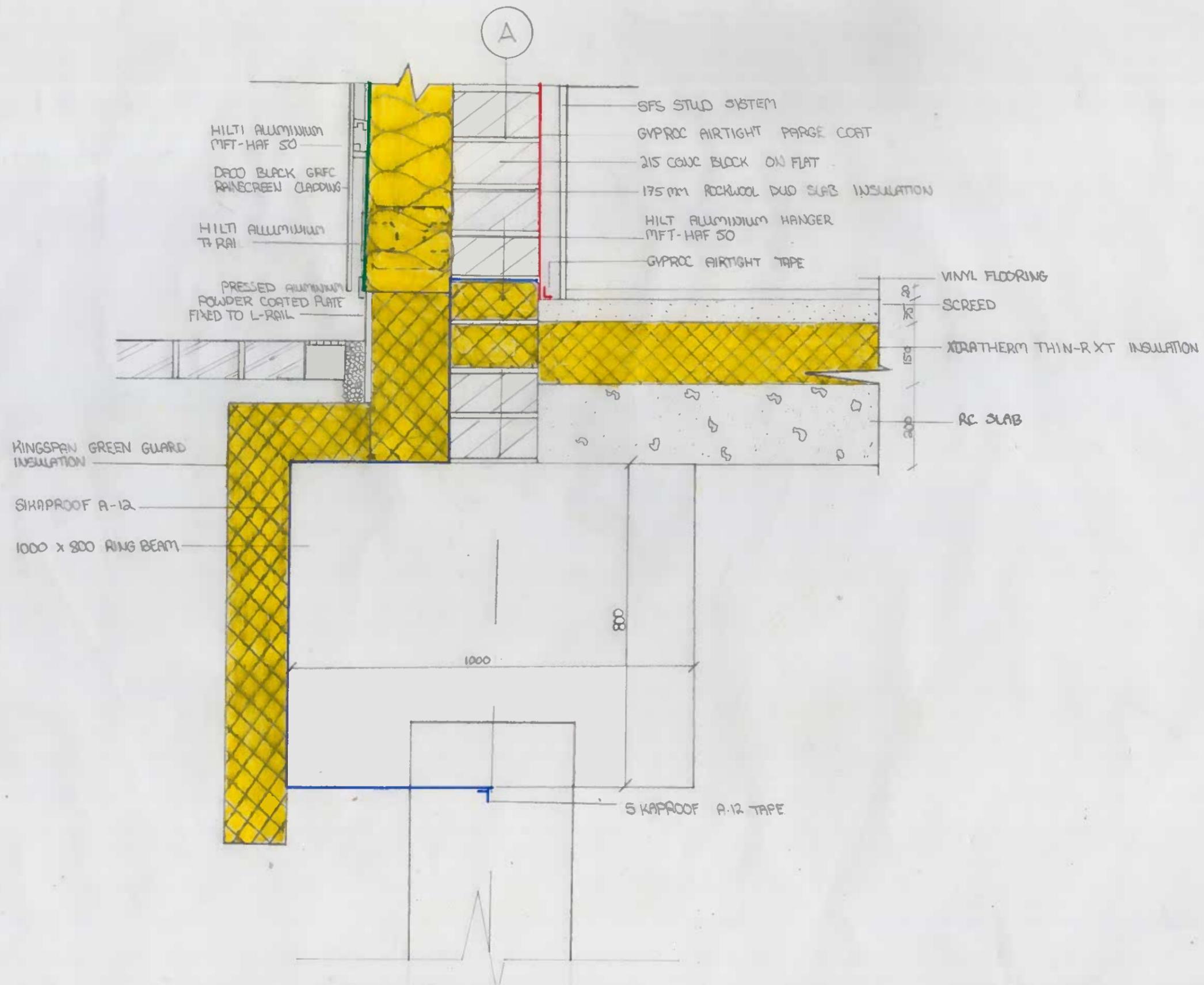
200MM HOLLOWCORE SLAB

GYPROC CARBOLINE MF SUSPENDED CEILING

PRO CUMA SOLITEX PLUS OVER LAPPING GYPROC AIRTIGHT PLASTER & SEALED WITH TESCON VANA AIR TAPE

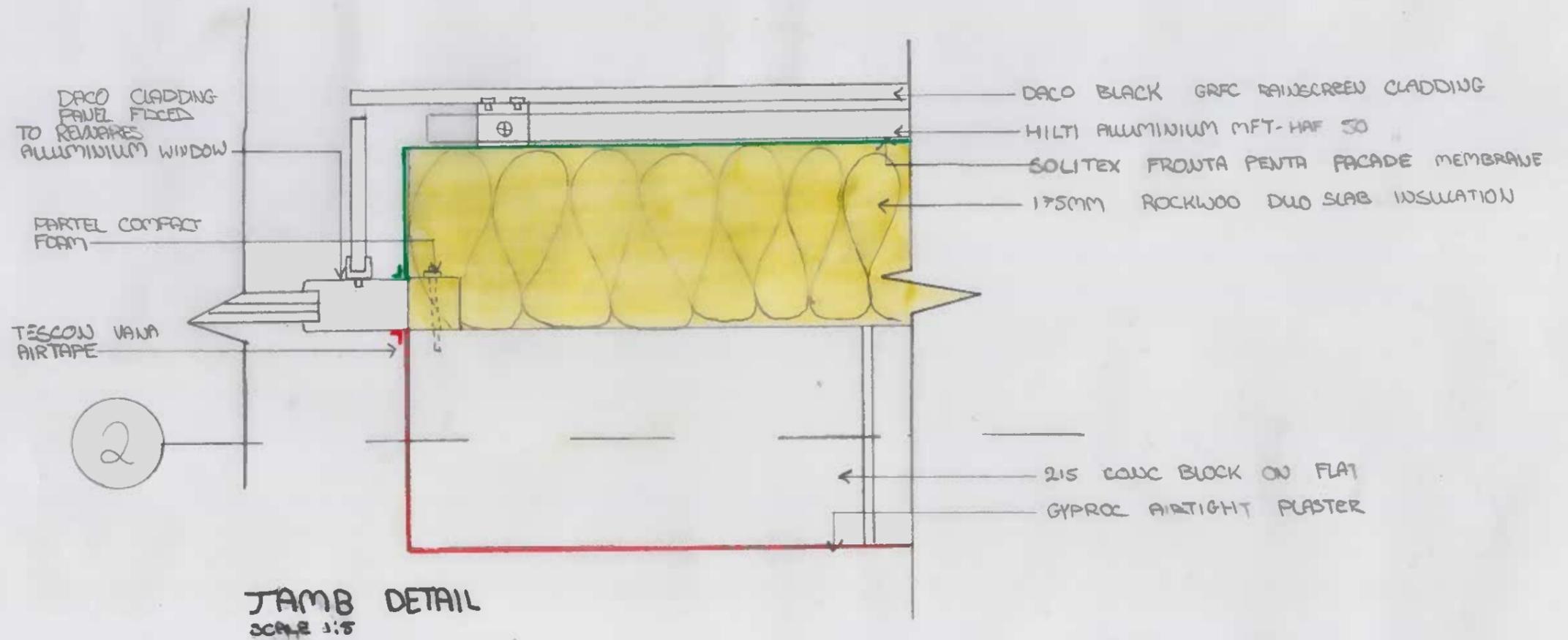
TERRACE TO EXTERNAL WALL / PARAPET
SCALE 1:10

| | | | |
|-----------------------------|------------|-------|---|
| STUDIO: HYBRID MULTI STOREY | | | TERRACE TO EXTERNAL THRESHOLD AT GROUND FLOOR |
| R00229882 | | | |
| 1:10 | 08/11/2024 | D.O.V | |

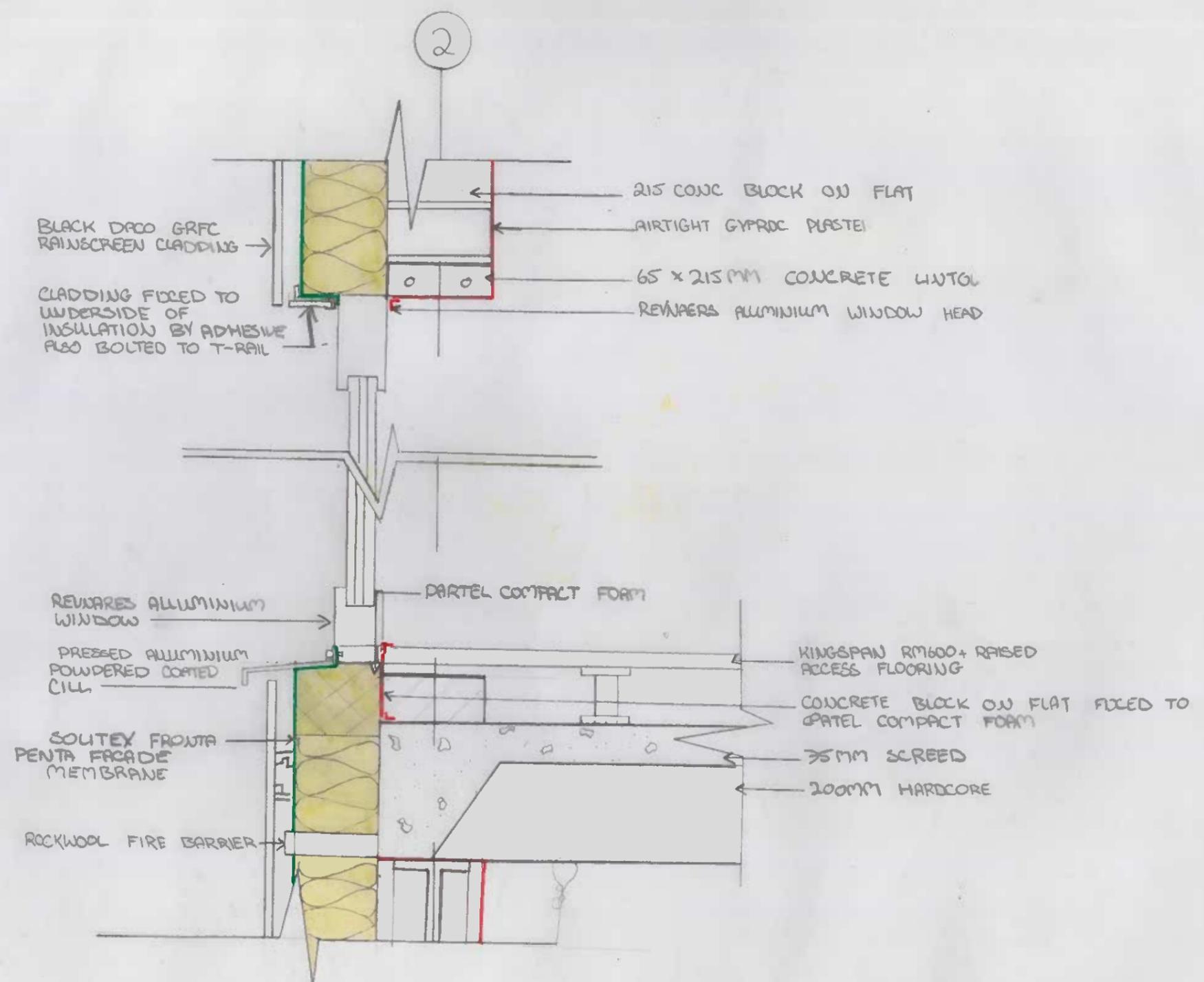


GROUND FLOOR EXTERNAL WALL JUNCTION
 AT WEST ELEVATION
 SCALE 1:10

| | | | |
|-----------------------------|------------|-----|-------------------------------|
| STUDIO 'HYBRID' MULTI STORY | | | GROUND FLOOR TO EXTERNAL WALL |
| R00229832 | | | |
| BY | 07/11/2024 | D.L | |

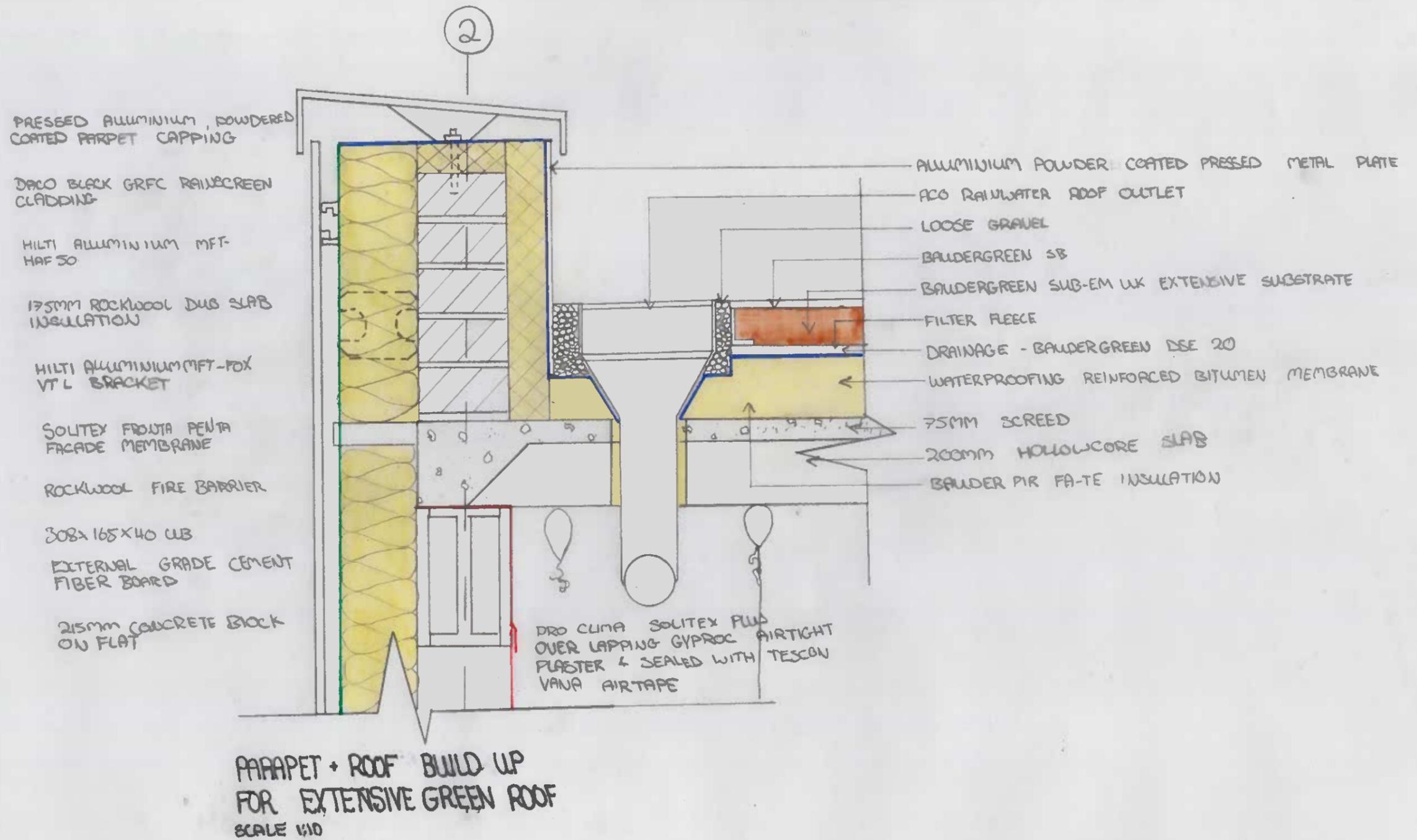


| | |
|----------------------------|-------------|
| STUDIO HYBRID MULTI STOREY | JAMB DETAIL |
| R00229832 | |
| 1:10 09/11/2024 P.O'L | |

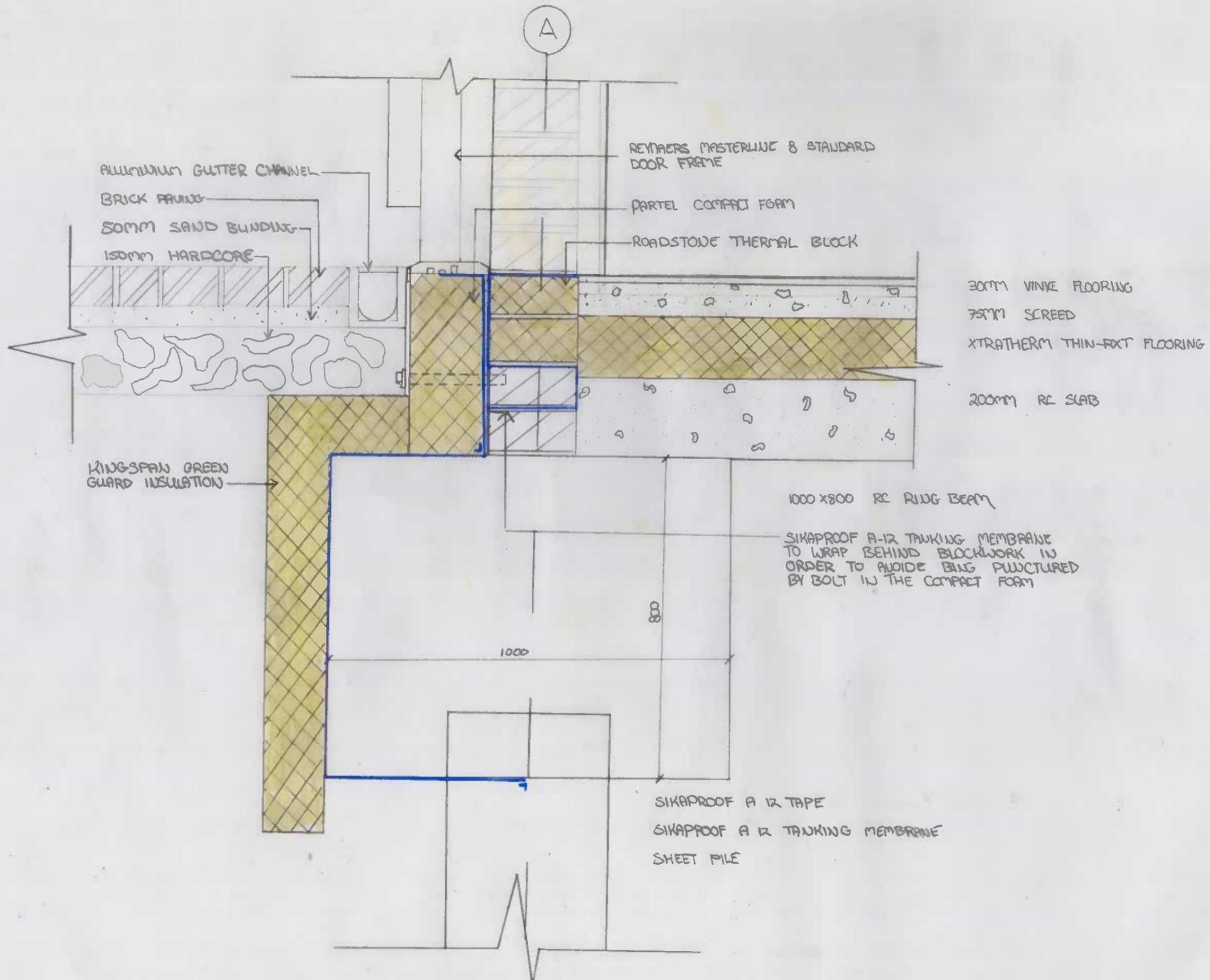


HEAD & CILL DETAIL
SCALE 1:10

| | | |
|----------------------------|----------|--------------------|
| STUDIO HYBRID MULTI STOREY | | HEAD & CILL DETAIL |
| R00229832 | | |
| 1:10 | 08/11/12 | |



| | | | |
|-----------------------------|------------|-------|---|
| STUDIO: MULTI STOREY HYBRID | | | PARPET + ROOF BUILD UP FOR EXTENSIVE GREEN ROOF |
| ROO221832 | | | |
| 1:10 | 08/01/2024 | D.O'L | |



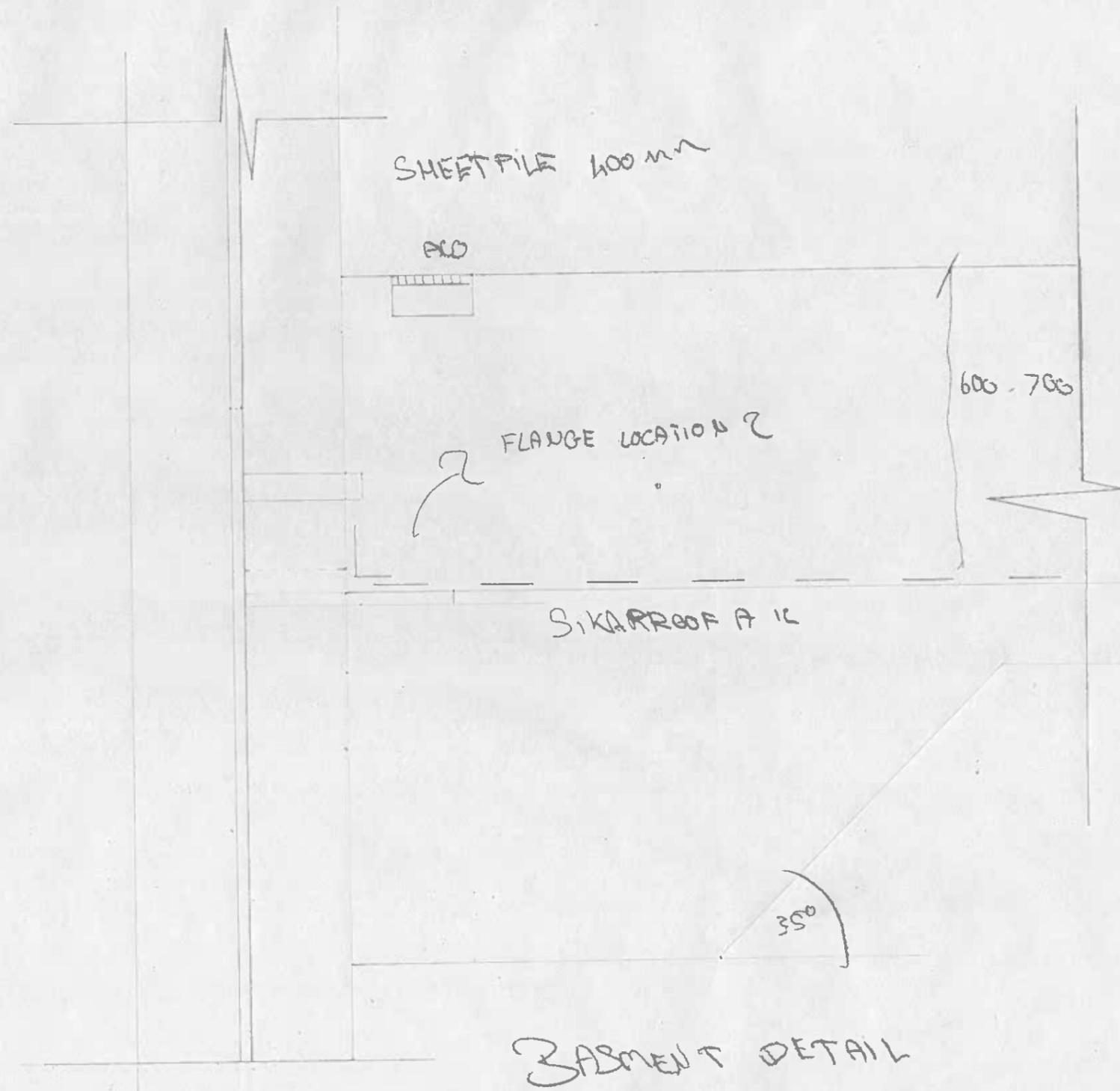
LEVEL ENTRY THRESHOLD AT GROUND FLOOR
SCALE 1:10

| | | | |
|-----------------------------|------------|-------|---------------------------------------|
| STUDIO : HYBRID MULTI STORY | | | LEVEL ENTRY THRESHOLD AT GROUND FLOOR |
| R00229832 | | | |
| 1:10 | 07/11/2024 | D.O'L | |



BASEMENT RETAINING WALL/FLOOR
SLAB JUNCTION DETAIL SECTION
SCALE 1:10

| | |
|-----------------------------|-------------------------------|
| STUDIO : HYBRID MULTI STORY | BASMENT WALL TO SLAB JUNCTION |
| R00229832 | |
| 1:10 07/11/2022 D-L | |



200mm
Rockwool
insulation

DOCS 12mm
Cladding

GRID LINE

Gyproc Airtight

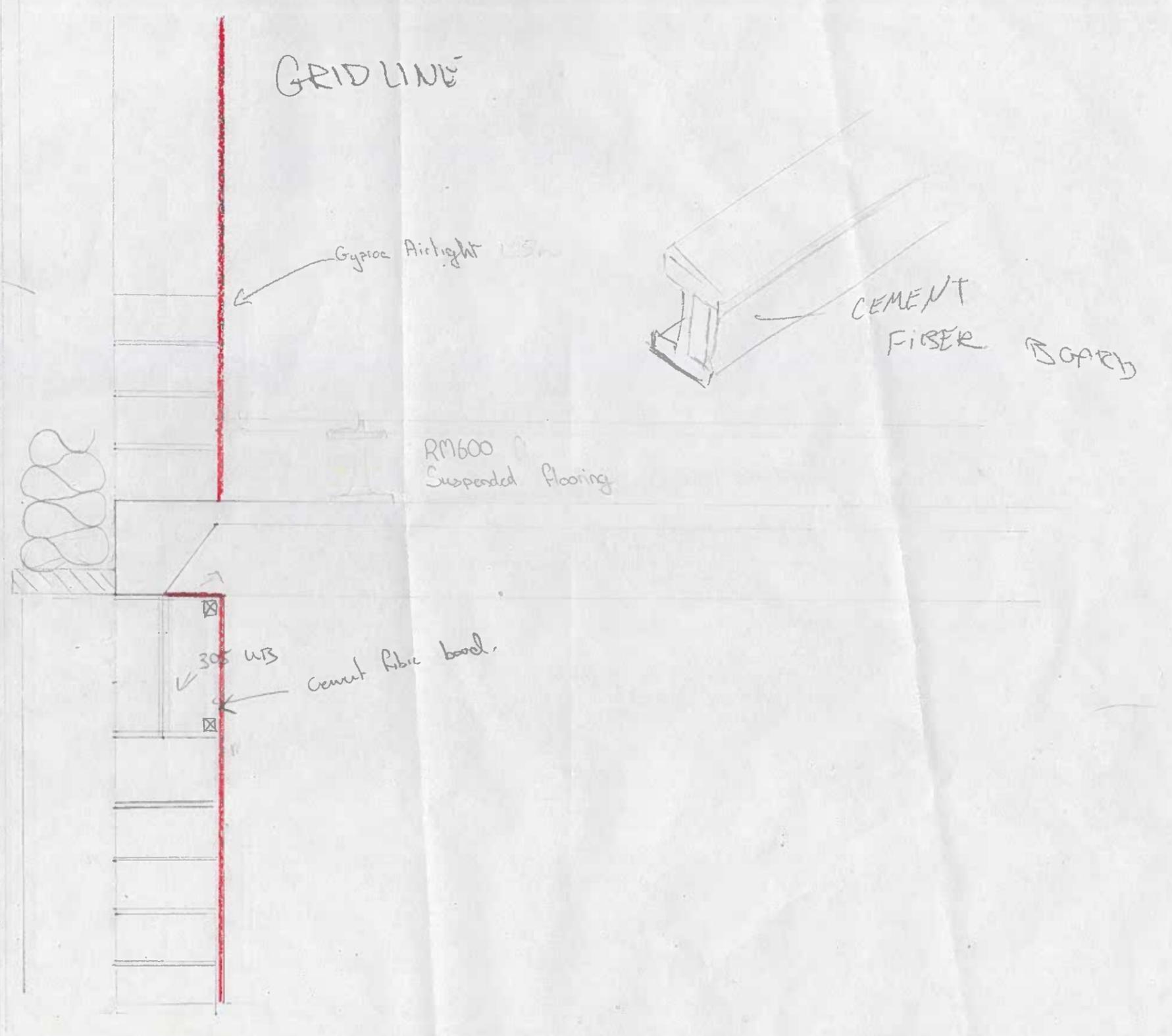
RM600
Suspended flooring

CEMENT
FIBER
BOARD

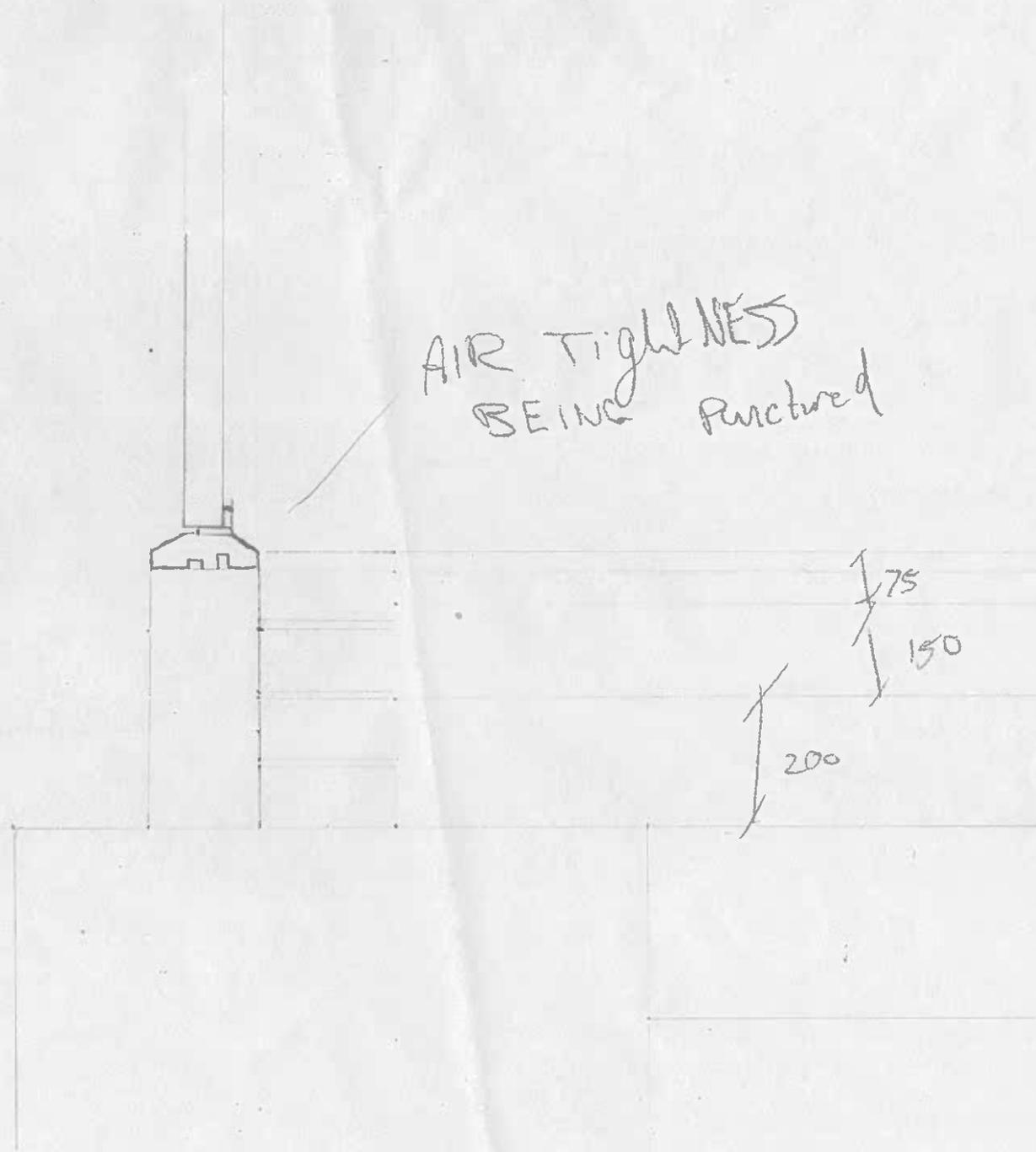
305
WS

Cement fibre board

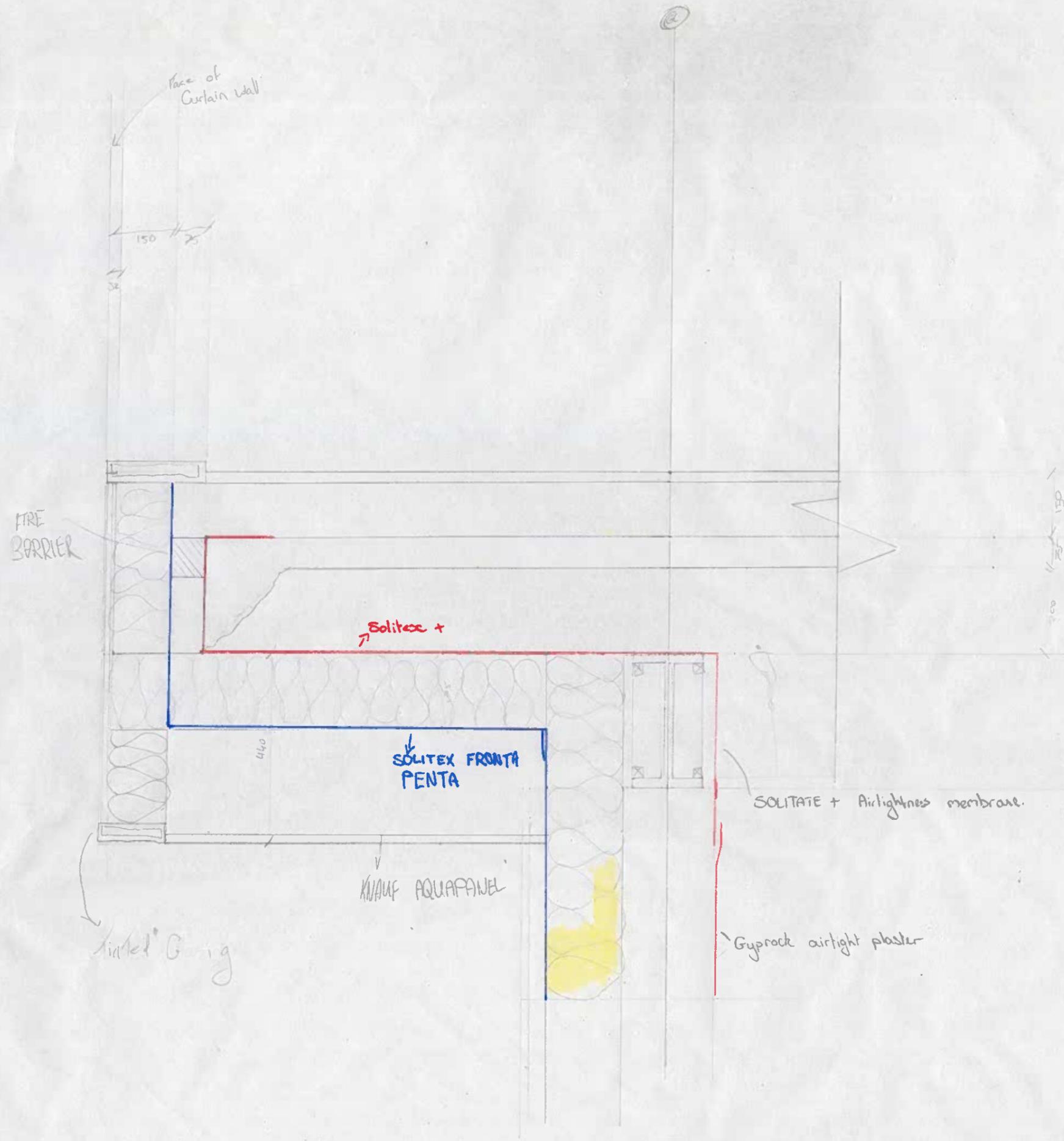
D. External wall to intermediate floor
junction



AIR TIGHTNESS
BEING PUNCTURED



VINYL FLOORING



Face of
Curtain wall

150

FIRE
BARRIER

Solitex +

SOLITEX FRONTH
PENTA

440

KNAUF
AQUAPANEL

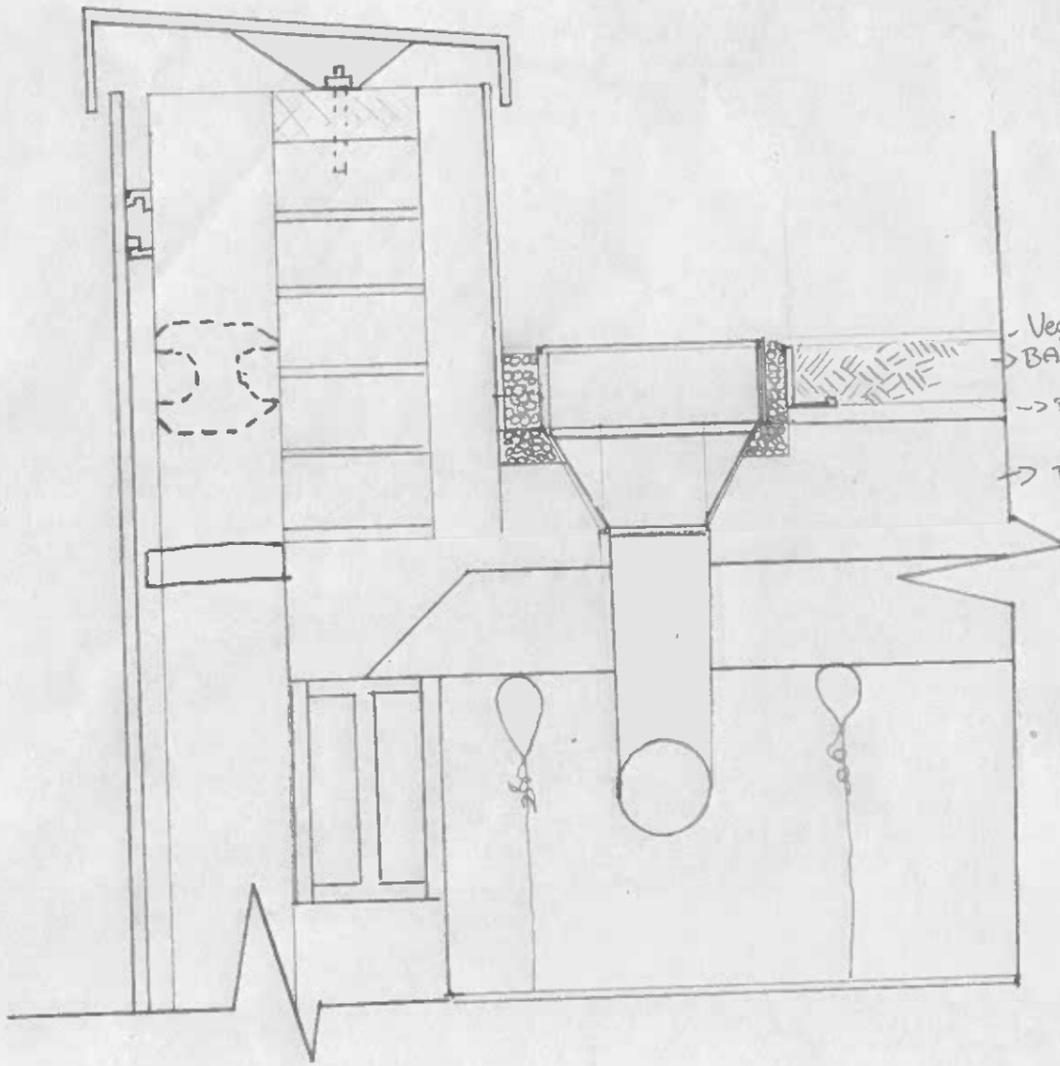
SOLITATE + Airtightness membrane.

Gyprock airtight plaster

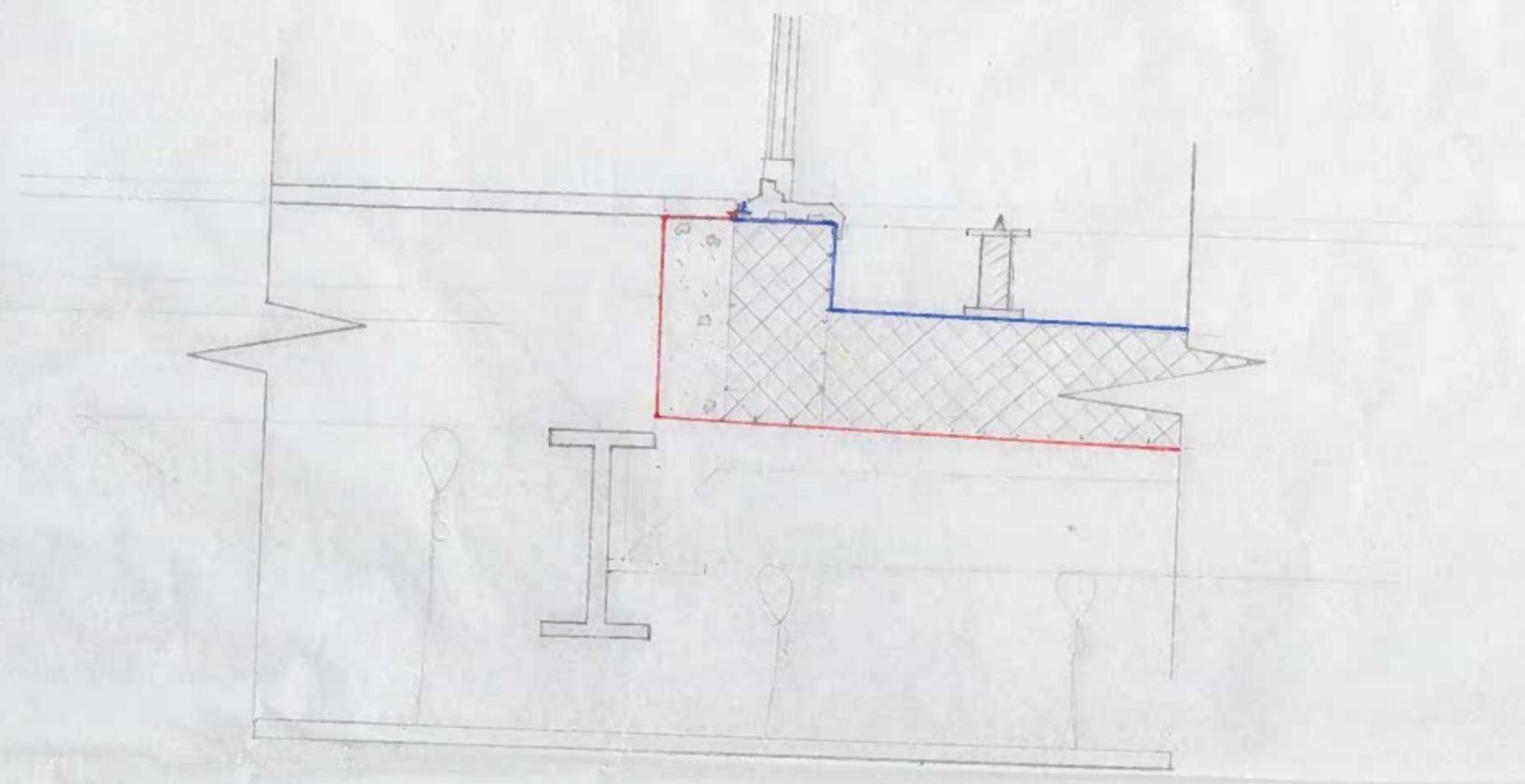
lined G...g

150
100

2



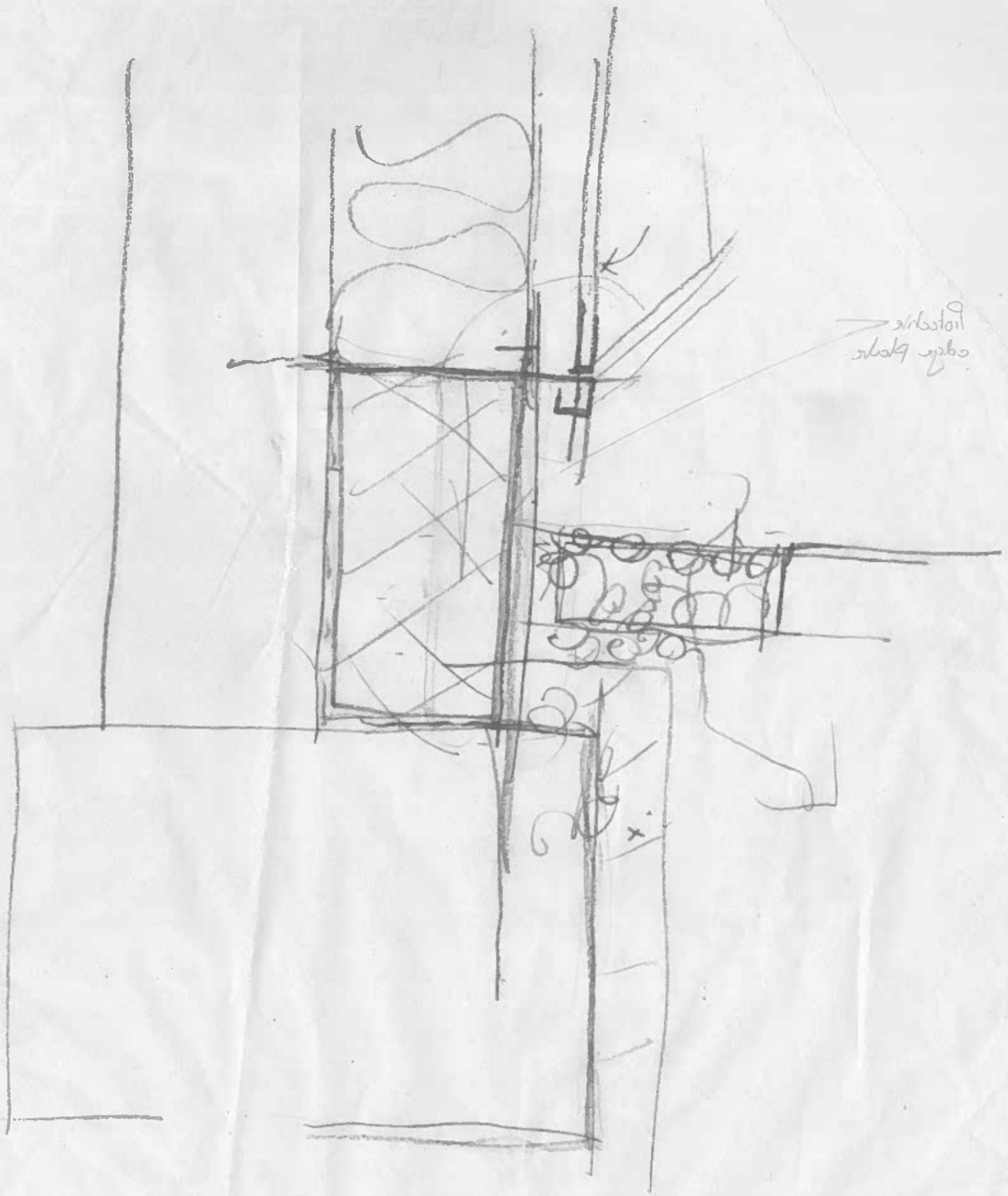
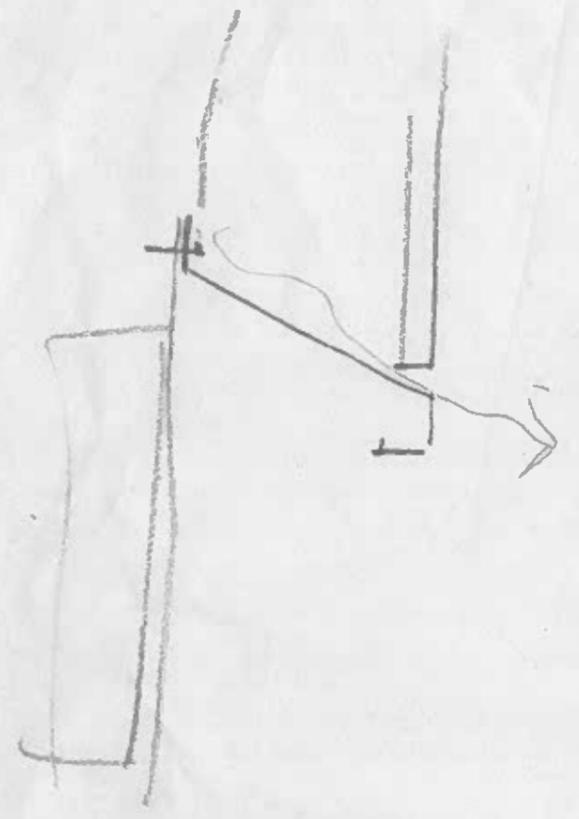
- Vegetation
-> BAUDERGREEN SUB-EM UK EXTENSIVE SUBSTRATE
-> BAUDERGREEN DSE20
-> BAUDERPIR FA-TE INSULATION



AT THIRD FLOOR
LEVEL ENTRY THRESHOLD DETAIL

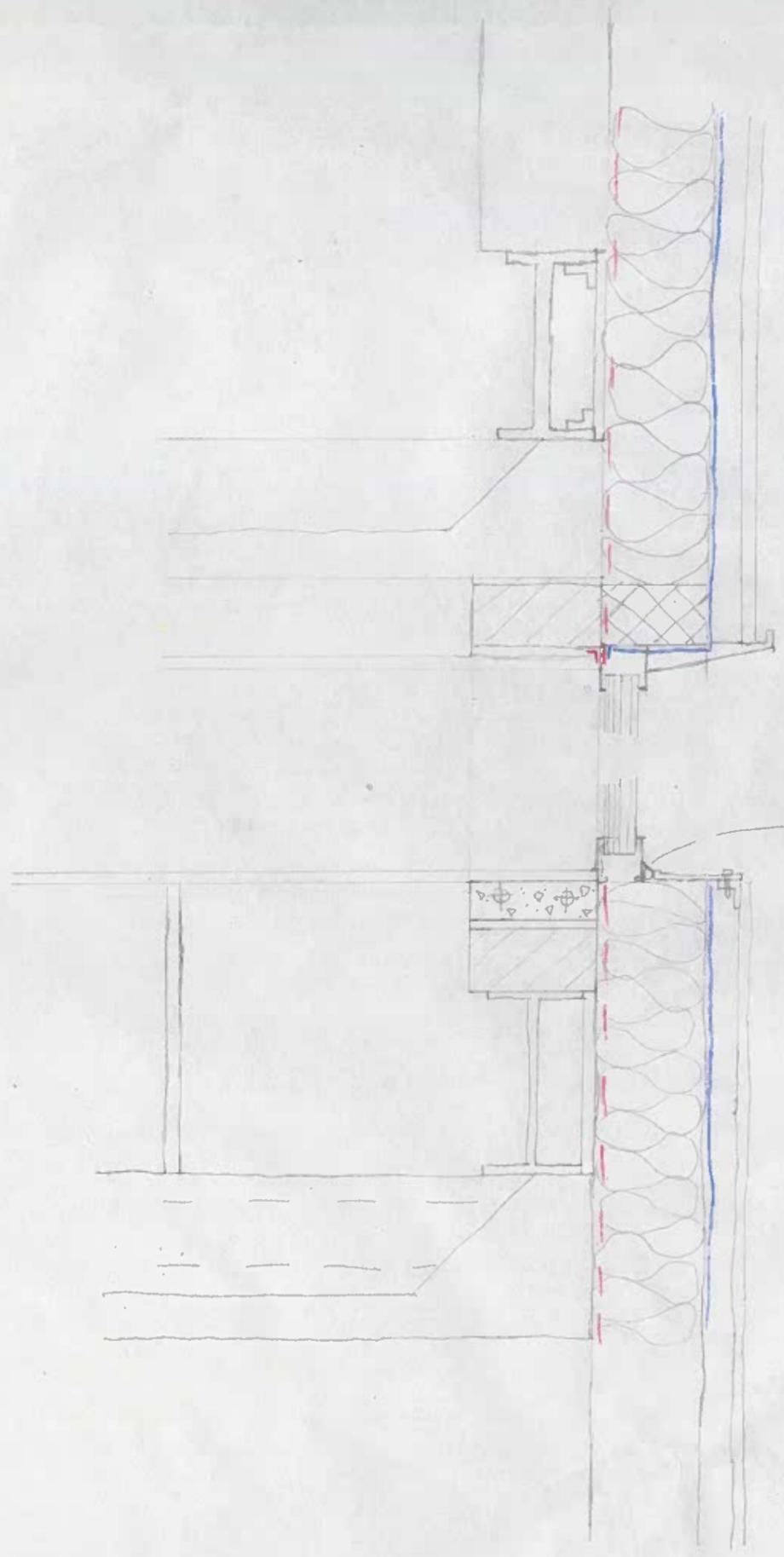


G-RFC
Circuit



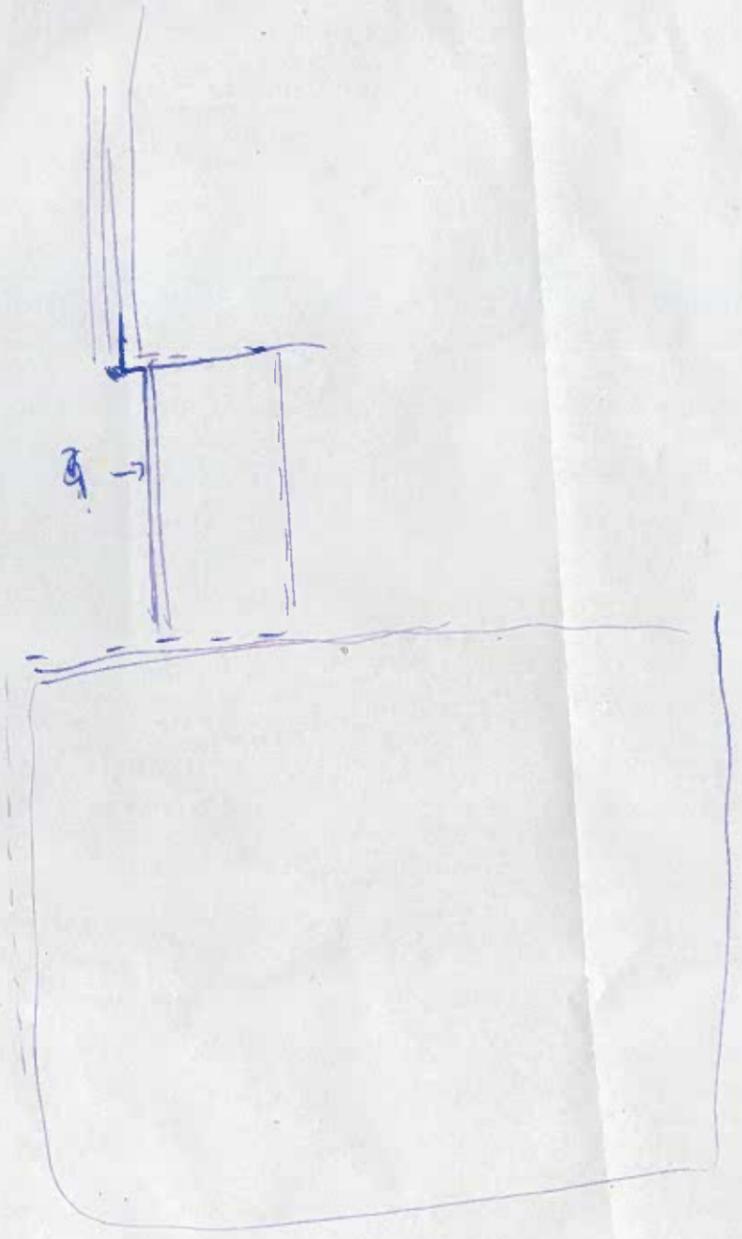
optical
fiber

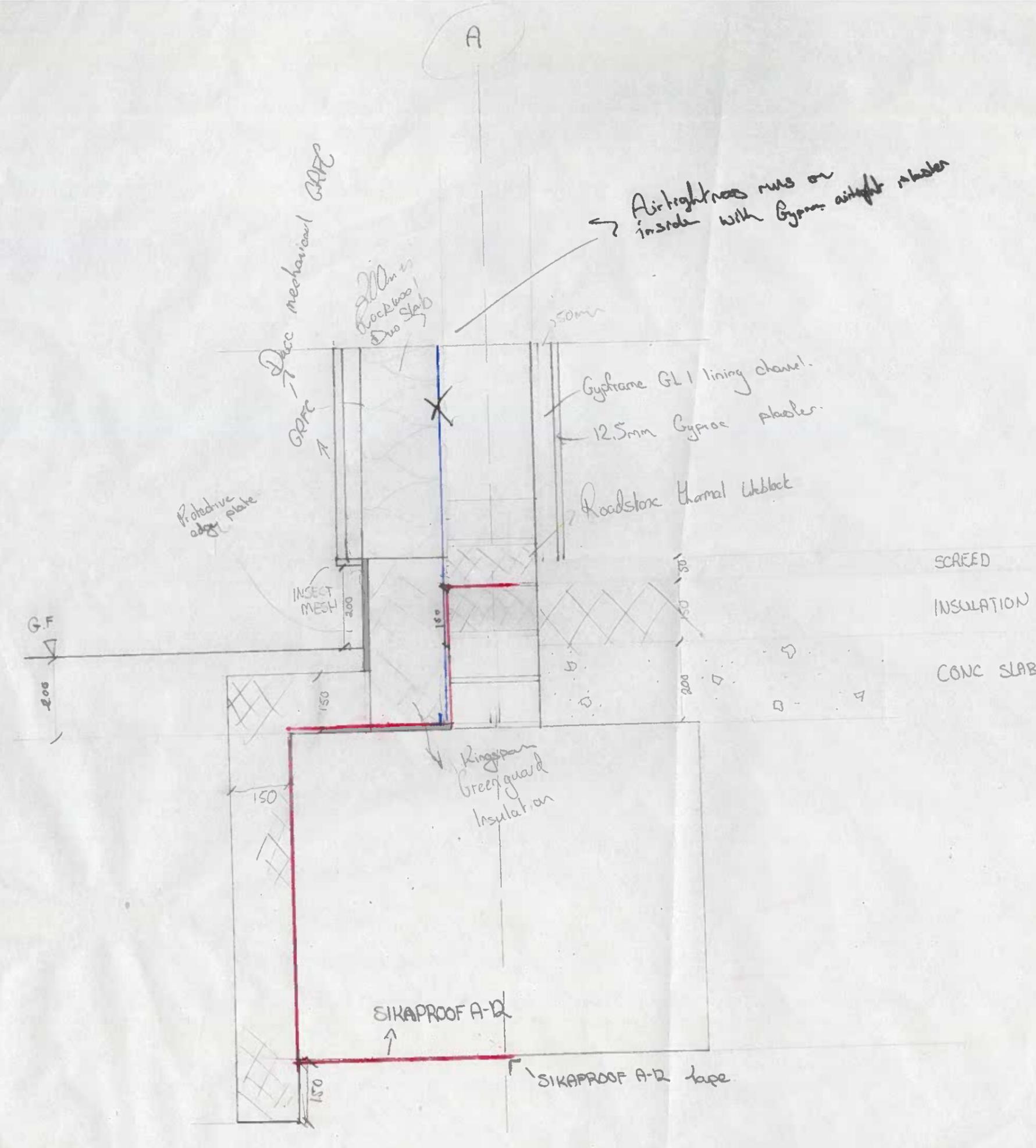
well



Comprband
E Tape to prevent
moisture

4

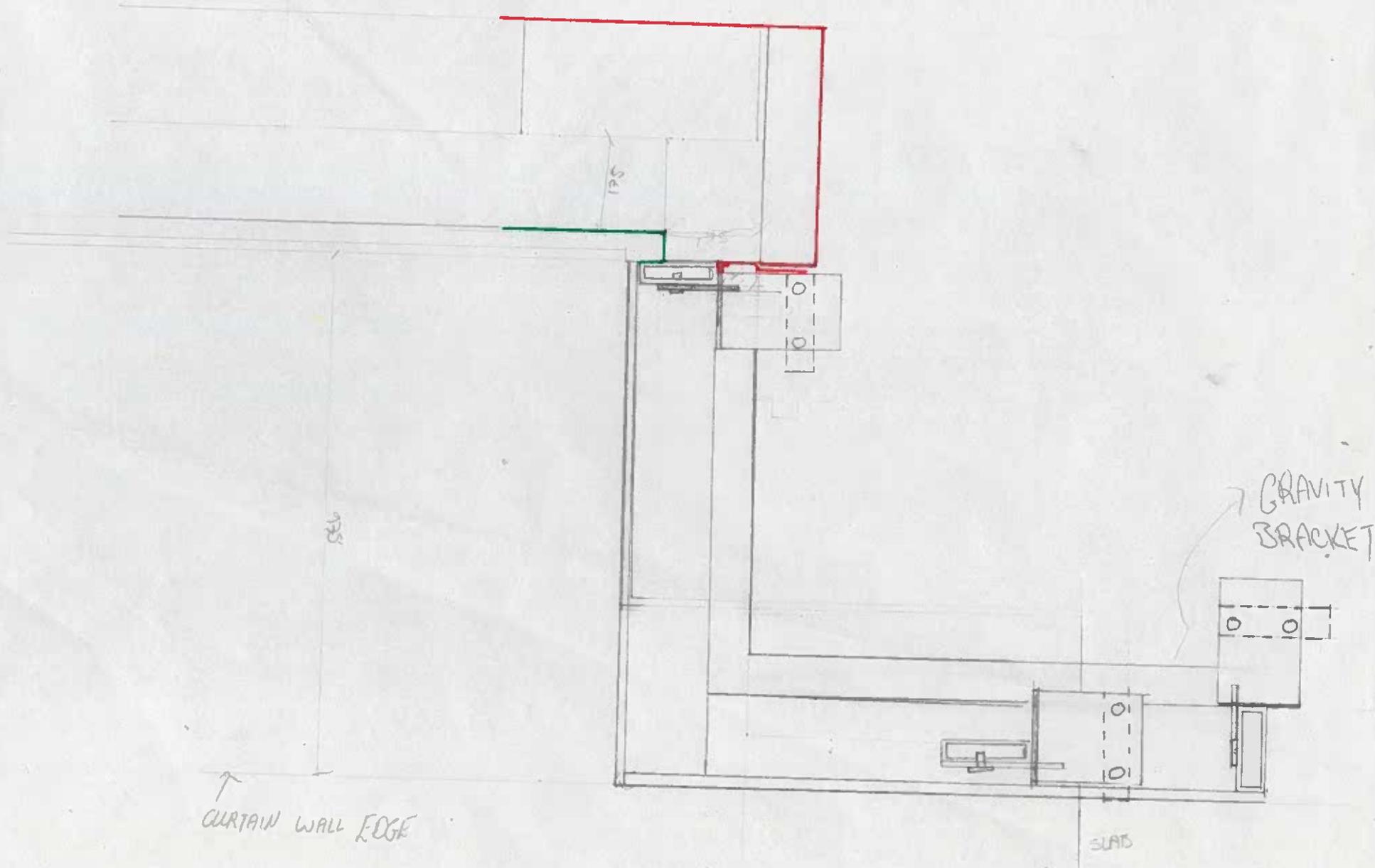


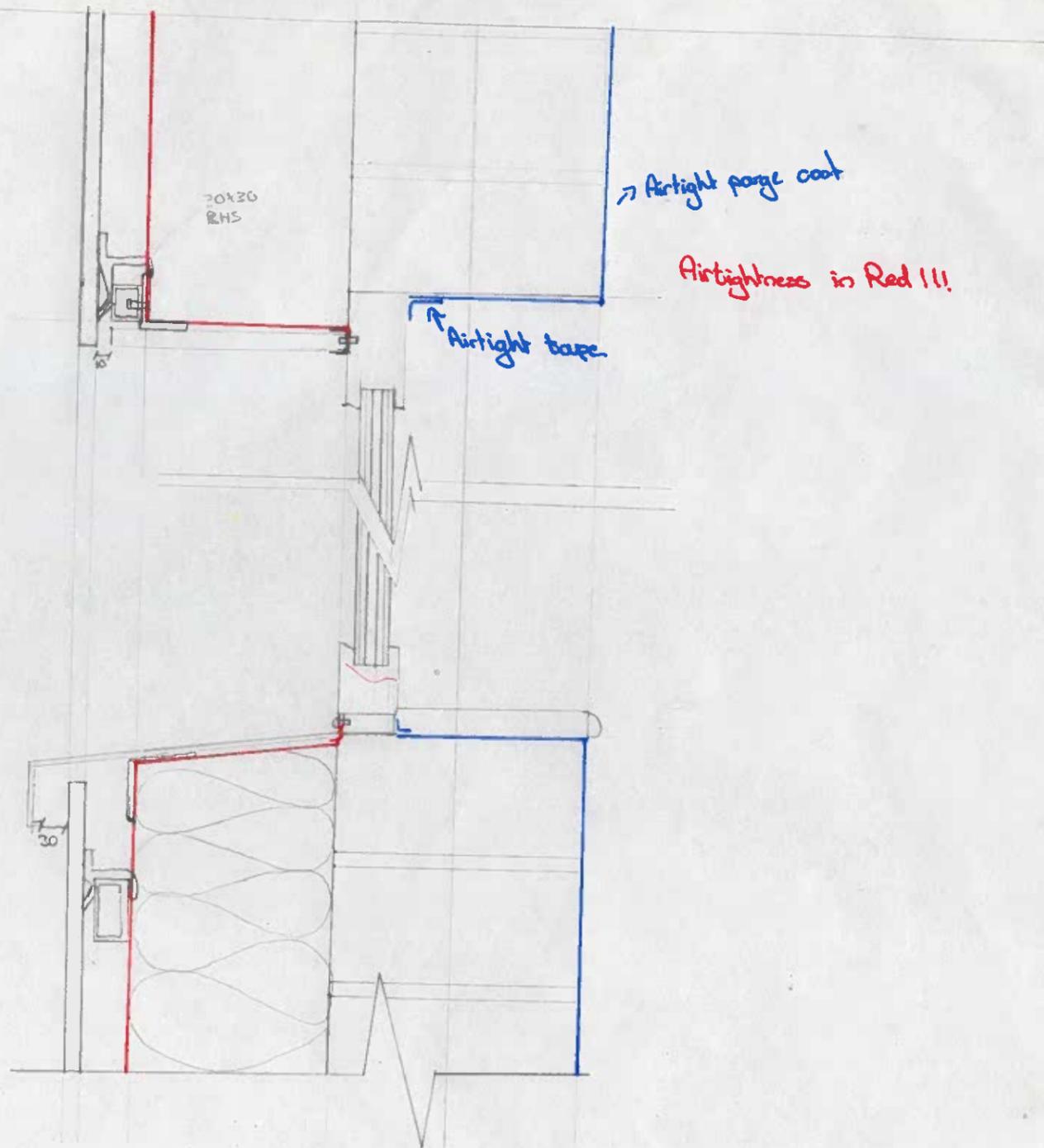


Airtightness runs on inside with Gyproc airtight plaster

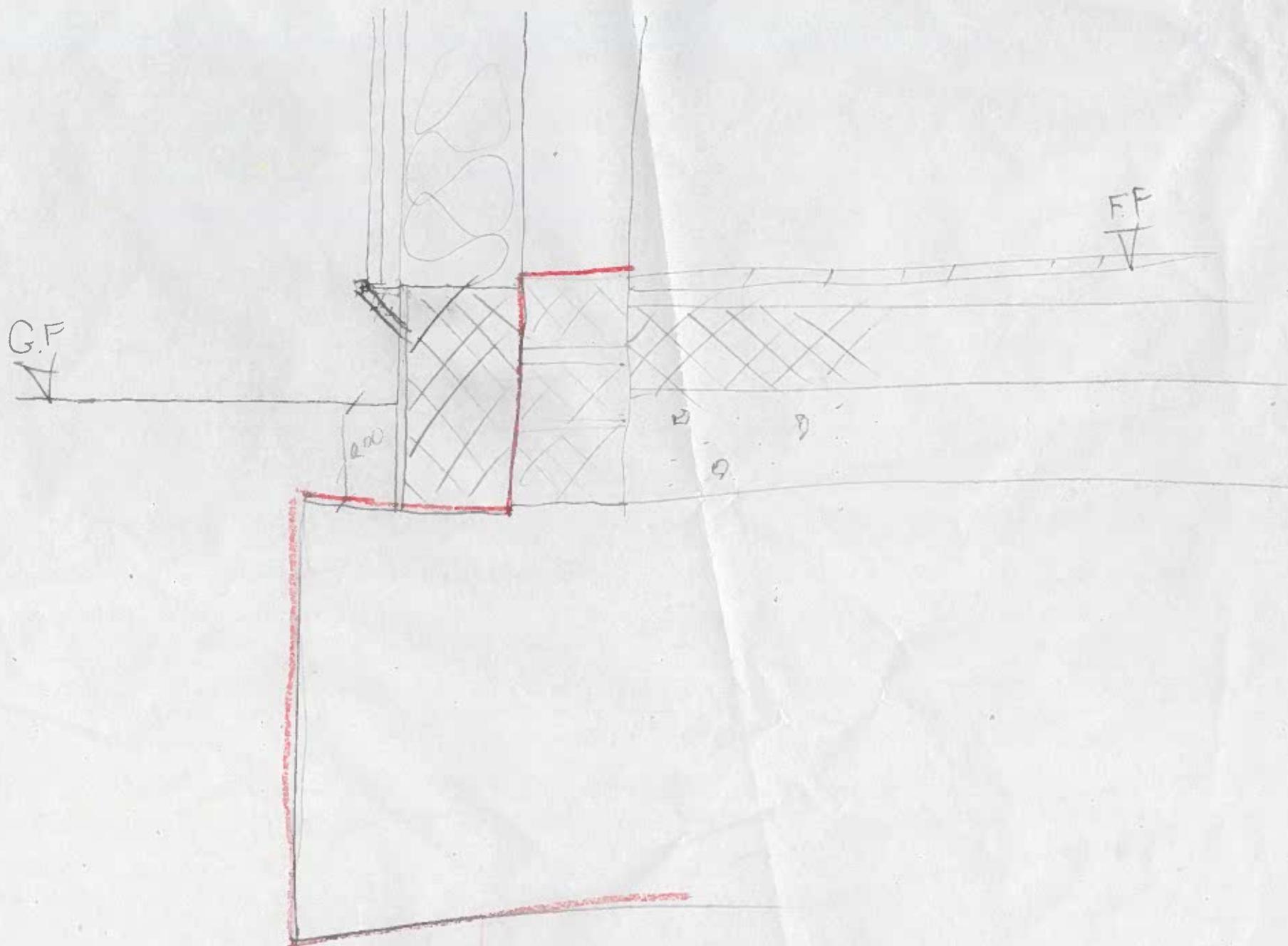
- Airtightness over tanking membrane?
- Protective edge plate facing.
- Raised Access flooring?

3





WINDOW CILL & HEAD
1.5



Aluminium capping

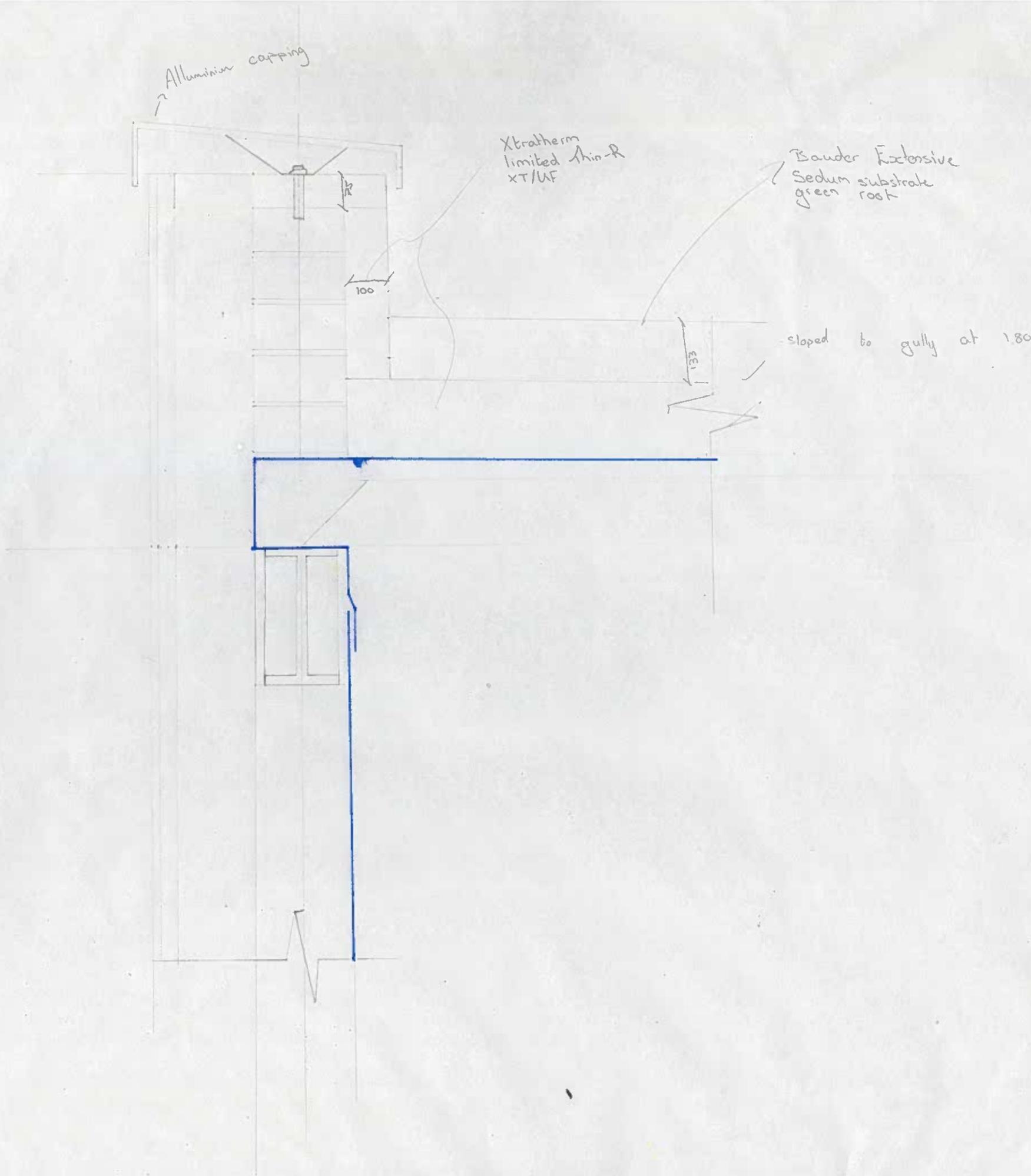
Xtratherm
limited thin-R
XT/WF

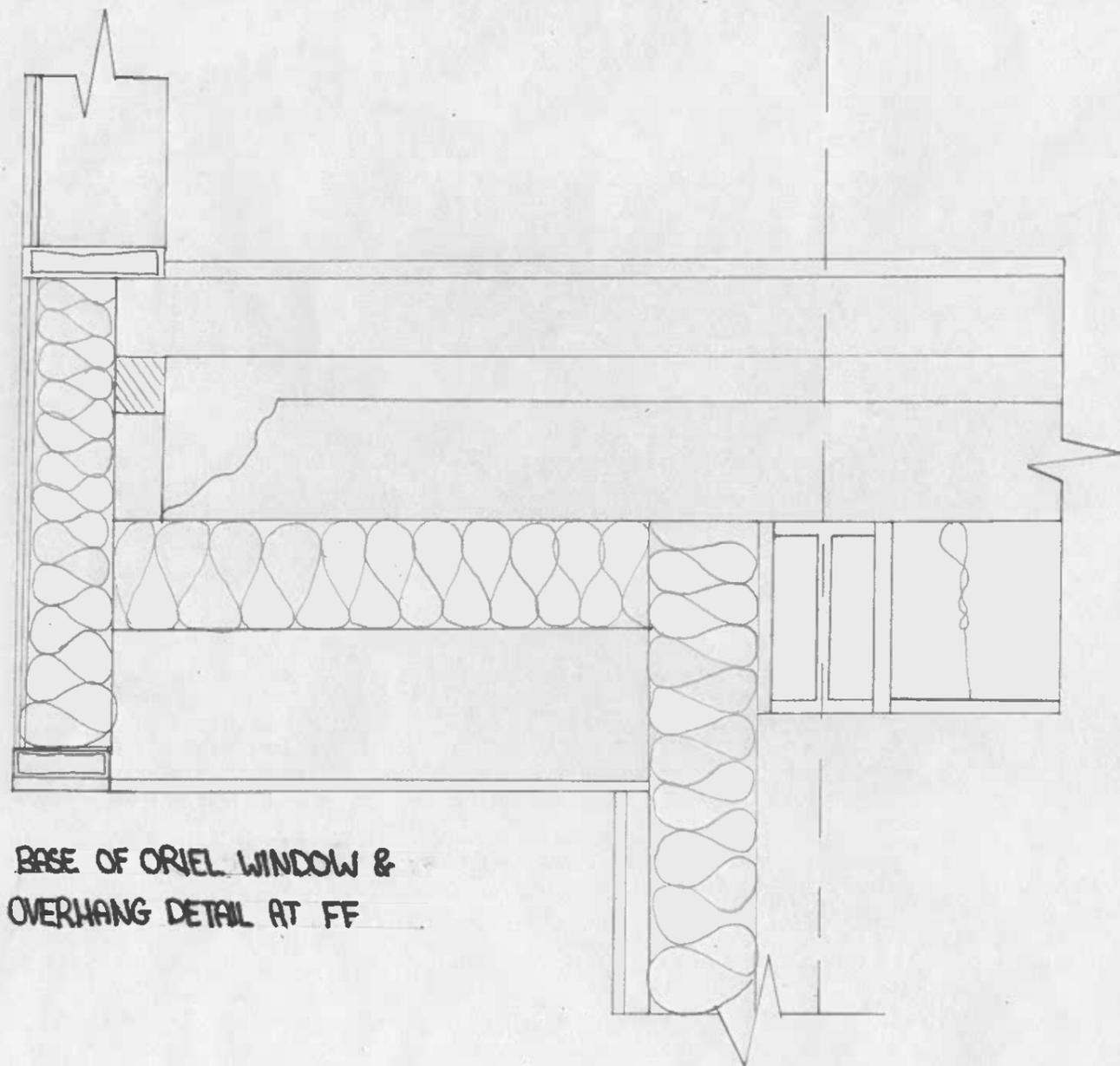
Bauder Extensive
Sedum substrate
green roof

100

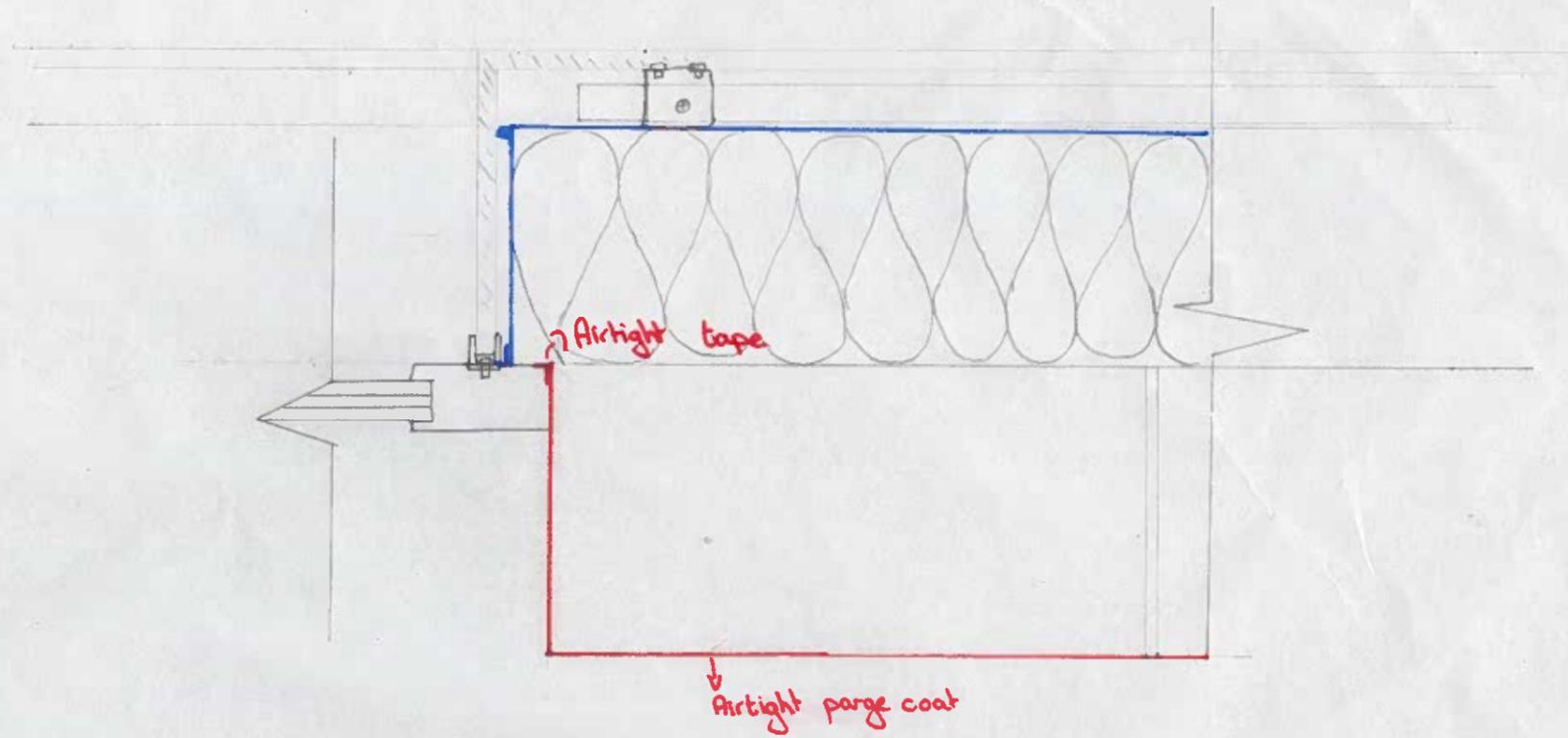
133

sloped to gully at 1.80





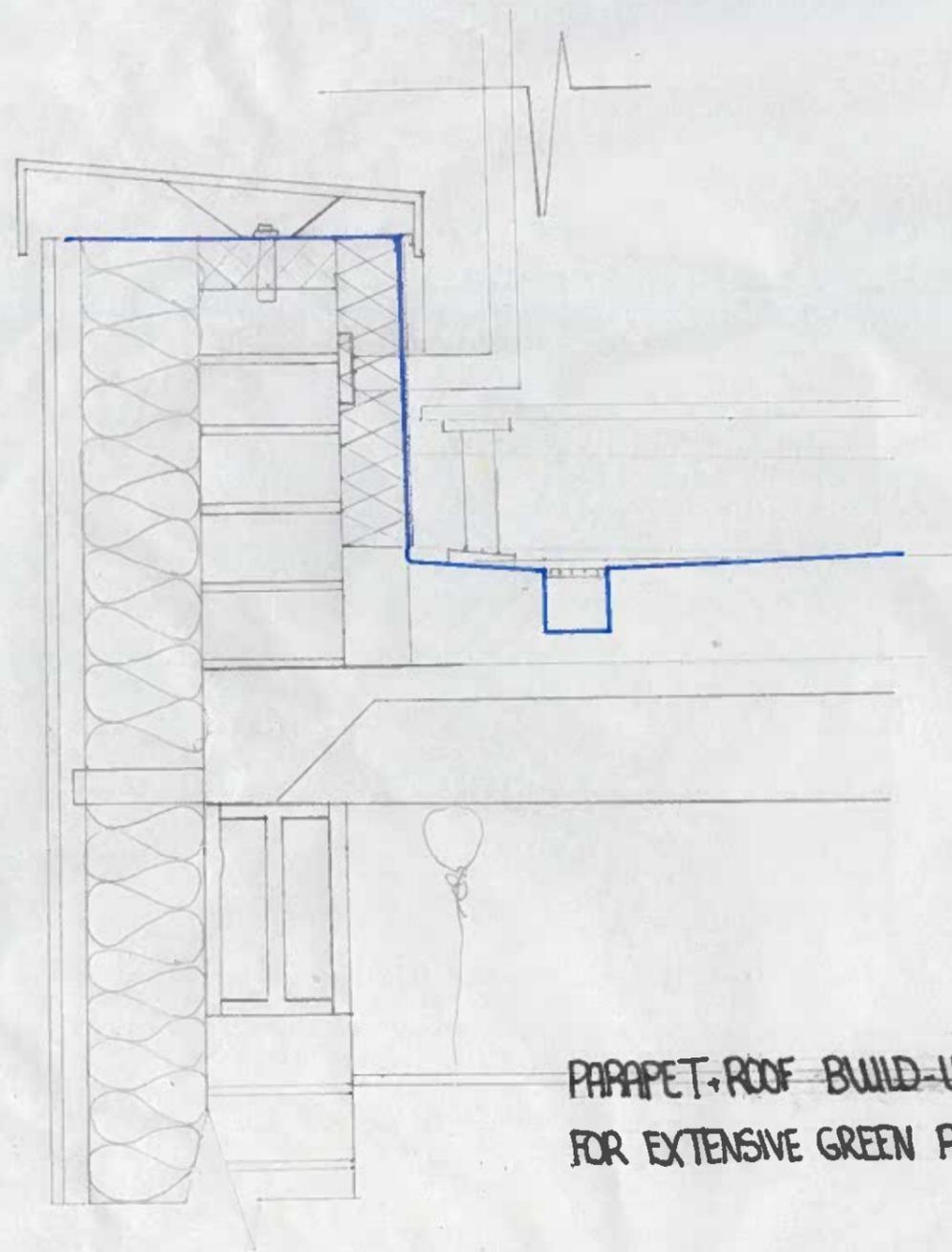
BASE OF ORIEL WINDOW &
OVERHANG DETAIL AT FF



WINDOW JAMB
1:5

Cement fiber board
Weather

BAU



PARAPET-ROOF BUILD-UP
FOR EXTENSIVE GREEN ROOF

Documentation of the component
Thermal transmittance (U-value) according to Digest 465

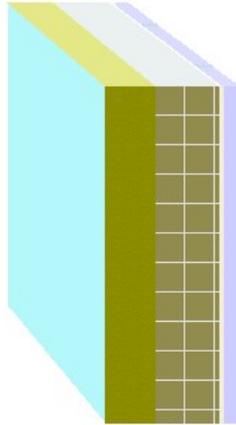
9. November 2024
Page 1/3

Source: **own catalogue - External walls**

Component: **External wall build up**

OUTSIDE

INSIDE



This illustration of inhomogeneous layers is provided only to assist in visualising the arrangement.

Assignment: External wall

| | Manufacturer | Name | Thickness [m], number | Lambda [W/(mK)] | Q | R [m²K/W] |
|-------------------------------------|--------------|----------------------------|---|--------------------|-----------------|--------------|
| | Rse | | | | | 0.0400 |
| <input checked="" type="checkbox"/> | 1 | Somprema | Solitex fronta penta | 0.0011 | 0.800 E | 0.0014 |
| <input checked="" type="checkbox"/> | 2 | Rockwool Ltd | Rainscreen Duo-Slab 035 (100-225mm) | 0.1700 | 0.035 B | 4.8571 |
| | | Fixings | Plastic insulation anchors No./m²: | 2.5/m² | 0.500 D | - |
| | | Fixings | equivalent diameter: 0.01 m / alpha: 0.800 | | | |
| | | Air gaps | Level 1: dU" = 0.01 W/(m²K) | | | |
| <input checked="" type="checkbox"/> | 3 | Generic Building Materials | Concrete block (dense) inner leaf (1800 kg/m³) & Mortar outer leaf (f = 0.000 / automatic disregard acc. BRE 443) | 0.2150 | 1.130 D | 0.1903 |
| <input checked="" type="checkbox"/> | 4 | Gyproc | Gyproc airtight plaster | 0.0125 | 0.190 E | 0.0658 |
| <input checked="" type="checkbox"/> | 5 | Light steel-frame | consisting of: | 0.0500 | ∅ 0.361 | 0.1386 |
| | 5a | BS EN ISO 6946 | Unventilated air layer: 50 mm, horiz. heat flow | 99.83 % | 0.278 D | - |
| | 5b | BS EN 12524 | Steel | 00.17 % | 50.000 D | - |
| | Rsi | | | | | 0.1300 |
| | | | 0.4486 | | | |

$$R_T = p \cdot R_T' + (1-p) \cdot R_T'' = 5.46 \text{ m}^2\text{K/W}$$

| Correction to U-value for | according to | delta U [W/(m²K)] |
|---------------------------|------------------------|----------------------|
| Mechanical fasteners | Digest 465 | 0.0007 |
| Air gaps | BS EN ISO 6946 Annex F | 0.0079 |
| | | 0.0086 |

$$U = 1/R_T + \sum \Delta U = 0.19 \text{ W/(m}^2\text{K)}$$

- Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following
- A** .. A: Data is entered and validated by the manufacturer or supplier. Data is continuously tested by 3rd party.
 - B** .. B: Data is entered and validated by the manufacturer or supplier. Data is certified by 3rd party
 - C** .. C: Data is entered and validated by the manufacturer or supplier.
 - D** .. D: Information is entered by BuildDesk without special agreement with the manufacturer, supplier or others.
 - E** .. E: Information is entered by the user of the BuildDesk software without special agreement with the manufacturer, supplier or others.

$$U = \boxed{0.19 \text{ W/(m}^2\text{K)}} \quad R_T = \boxed{5.46 \text{ m}^2\text{K/W}}$$

Documentation of the component
Thermal transmittance (U-value) according to Digest 465

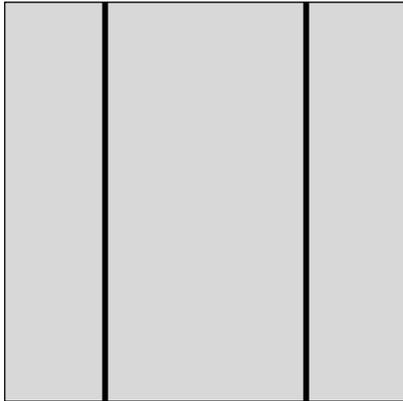
9. November 2024
Page 2/3

Source: **own catalogue - External walls**

Component: **External wall build up**

Steel percentage: 0.17 %

Light steel-frame sections
The portion is given in %.



| | | | |
|---|---|---|----------|
| A |  | consisting of material layers: 1, 2, 3, 4, 5a | = 99.83% |
| B |  | consisting of material layers: 1, 2, 3, 4, 5b | = 0.17% |

Upper limit of the thermal transfer resistance R

$$U_A [W/(m^2K)] = \frac{1}{(\sum R_{i,A}) + R_{si} + R_{se}} = \frac{1}{5.29 + 0.13 + 0.04} = 0.18$$

$$U_B [W/(m^2K)] = \frac{1}{(\sum R_{i,B}) + R_{si} + R_{se}} = \frac{1}{5.12 + 0.13 + 0.04} = 0.19$$

$$R_T' = \frac{1}{A * U_A + B * U_B} = 5.46 \text{ m}^2\text{K/W}$$

Lower limit of the thermal transfer resistance R

| | | | |
|--|--|--|--------|
| $R_{se} [m^2K/W]$ | | | = 0.04 |
| $R_1'' [m^2K/W] = d_1 / \lambda_1 =$ | | 0.0011 / 0.800 | = 0.00 |
| $R_2'' [m^2K/W] = d_2 / \lambda_2 =$ | | 0.1700 / 0.035 | = 4.86 |
| $R_3'' [m^2K/W] = d_3 / \lambda_3 =$ | | 0.2150 / 1.130 | = 0.19 |
| $R_4'' [m^2K/W] = d_4 / \lambda_4 =$ | | 0.0125 / 0.190 | = 0.07 |
| $R_5'' [m^2K/W] = d_5 / (\lambda_{6a} * A + \lambda_{6b} * B) =$ | | 0.0500 / (0.278 * 99.83% + 50.000 * 0.17%) | = 0.14 |
| $R_{si} [m^2K/W]$ | | | = 0.13 |

$$R_T'' = \sum R_i'' + R_{si} + R_{se} = 5.42 \text{ m}^2\text{K/W}$$

| | |
|-----------------------|---------------------------|
| Kind of frame: | Hybrid frame |
| Flange width: | known not to exceed 50 mm |
| Stud spacing s [m]: | 0.600 |
| Stud depth d [m]: | 0.050 |
| Web thickness t [m]: | 0.00100 |
| Steel percentage [%]: | 0.17 |

Weight factor p

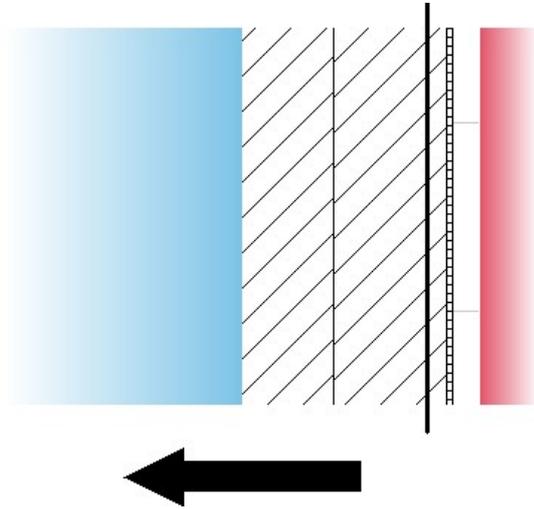
$$\text{Formula: } p = 0,8 * (R_T''/R_T') + 0,32 - 0,2 * (0,6/s) - 0,04 * (d/0,1) = 0.894$$

$$R_T = p * R_T' + (1-p) * R_T'' = 5.46 \text{ m}^2\text{K/W}$$

Source: **own catalogue - External walls**
Component: **External wall build up**

OUTSIDE

INSIDE



The list of materials shown below may differ from those in the U-value calculation printout. Only material layers which are used in the heat capacity calculation are listed.

Single material layers shown in the U-value calculation printout may be separated to meet the exclusion criteria:

- A .. The total thickness of the layers exceed 0.1 m.
- B .. The mid point in the construction is reached.

For insulation layers the following criteria applies:

- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

| Name | Thickness [m] | lambda [W/(mK)] | Q | Thermal capacity [kJ/(kgK)] | Q | Density [kg/m³] | Q | Thermal mass kJ/(m²K) | Criteria Exclusion |
|---|---------------|-----------------|----------|-----------------------------|----------|-----------------|----------|-----------------------|--------------------|
| End of calculation - Cold | | | | | | | | | |
| 1 Solitex fronta penta | 0.0011 | 0.800 | F | 1.90 | F | 1.1 | F | 0.0 | A, -, C |
| 2 Rainscreen Duo-Slab 035 (100-225mm) | 0.1700 | 0.035 | B | 1.03 | C | 60.0 | C | 0.0 | A, -, C |
| 3 Concrete block (dense) inner leaf (1800 kg/m³) & Mortar outer leaf (f = 0.000 / automatic disregard acc. BRE 443) | 0.1775 | 1.130 | D | 1.00 | D | 1800.0 | D | 319.5 | A, -, - |
| 3 Concrete block (dense) inner leaf (1800 kg/m³) & Mortar outer leaf (f = 0.000 / automatic disregard acc. BRE 443) | 0.0375 | 1.130 | D | 1.00 | D | 1800.0 | D | 67.5 | -, -, - |
| 4 Gyproc airtight plaster | 0.0125 | 0.190 | F | 1.00 | F | 680.0 | F | 8.5 | -, -, - |
| 5 Light steel-frame consisting of: | 0.0500 | | | | | | | 0.4 | -, -, - |
| 5a Unventilated air layer: 50 mm, horiz. heat flow | 99.83% | 0.278 | D | 1.01 | D | 1.2 | D | 0.1 | -, -, - |
| 5b Steel | 00.17% | 50.000 | D | 0.45 | D | 7800.0 | D | 0.3 | -, -, - |
| Start of calculation - Warm | | | | | | | | | |
| | 0.4486 | | | | | | | 76.4 | |

Heat capacity = 76.4 kJ/(m²K)

The following exclusion criteria apply:

- A .. The total thickness of the layers exceed 0.1 m.
- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following

- A** .. A: Data is entered and validated by the manufacturer or supplier. Data is continuously tested by 3rd party.
- B** .. B: Data is entered and validated by the manufacturer or supplier. Data is certified by 3rd party
- C** .. C: Data is entered and validated by the manufacturer or supplier.
- D** .. D: Information is entered by BuildDesk without special agreement with the manufacturer, supplier or others.
- E** .. E: Information is entered by the user of the BuildDesk software without special agreement with the manufacturer, supplier or others.



Documentation of the component
Thermal transmittance (U-value) according to BS EN ISO 6946

9. November 2024
Page 1/2

Source: **own catalogue - Flat roofs**
Component: **Green Roof**

OUTSIDE



INSIDE

Assignment: Flat roof

| | Manufacturer | Name | Thickness [m], number | Lambda [W/(mK)] | Q | R [m ² K/W] |
|-------------------------------------|--------------|----------------------------|---|--------------------|----------------|---------------------------|
| | | Rse | | | | 0.0400 |
| <input checked="" type="checkbox"/> | 1 | BS EN 12524 | Bitumen felt/sheet | 0.0100 | 0.230 D | 0.0435 |
| <input checked="" type="checkbox"/> | 2 | Bauder | Bauder PIR FA-TE Insulation | 0.1500 | 0.024 E | 6.2500 |
| | | Air gaps | Level 1: dU" = 0.01 W/(m ² K) | | | |
| <input checked="" type="checkbox"/> | 3 | Bauder | Baudergreen SB | 0.0003 | 0.250 E | 0.0012 |
| <input checked="" type="checkbox"/> | 4 | Generic Building Materials | Concrete screed (1800 kg/m ³) | 0.0750 | 1.150 D | 0.0652 |
| <input checked="" type="checkbox"/> | 5 | BS EN 12524 | Concrete, Medium density 1800 | 0.2000 | 1.150 D | 0.1739 |
| | | Rsi | | | | 0.1000 |
| | | | 0.4353 | | | |

$$R_T = R_{si} + \sum R_i + R_{se} = 6.67 \text{ m}^2\text{K/W}$$

| Correction to U-value for | according to | delta U [W/(m ² K)] |
|---------------------------|------------------------|-----------------------------------|
| Air gaps | BS EN ISO 6946 Annex F | 0.0088 |
| | | 0.0088 |

$$U = 1/R_T + \sum \Delta U = 0.16 \text{ W/(m}^2\text{K)}$$

- Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following
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$$U = \boxed{0.16 \text{ W/(m}^2\text{K)}} \quad R_T = \boxed{6.67 \text{ m}^2\text{K/W}}$$



Documentation of the component

9. November 2024

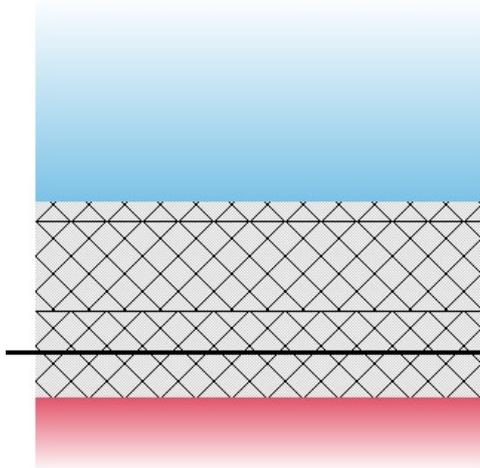
Heat capacity

Page 2/2

Source: own catalogue - Flat roofs

Component: Green Roof

OUTSIDE



INSIDE

The list of materials shown below may differ from those in the U-value calculation printout. Only material layers which are used in the heat capacity calculation are listed.

Single material layers shown in the U-value calculation printout may be separated to meet the exclusion criteria:

- A .. The total thickness of the layers exceed 0.1 m.
- B .. The mid point in the construction is reached.

For insulation layers the following criteria applies:

- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

| Name | Thickness [m] | lambda [W/(mK)] | Q | Thermal capacity [kJ/(kgK)] | Q | Density [kg/m³] | Q | Thermal mass kJ/(m²K) | Criteria Exclusion |
|------------------------------------|---------------|-----------------|---|-----------------------------|---|-----------------|---|-----------------------|--------------------|
| End of calculation - Cold | | | | | | | | | |
| 1 Bitumen felt/sheet | 0.0100 | 0.230 | D | 1.00 | D | 1100.0 | D | 44.0 | A, -, C |
| 2 Bauder PIR FA-TE Insulation | 0.1500 | 0.024 | F | 1.40 | F | 3.0 | F | 0.0 | A, -, C |
| 3 Baugreen SB | 0.0003 | 0.250 | F | 1.80 | F | 360.0 | F | 0.2 | A, -, - |
| 4 Concrete screed (1800 kg/m³) | 0.0750 | 1.150 | D | 1.00 | D | 1800.0 | D | 435.0 | A, -, - |
| 5 Concrete, Medium density 1800 | 0.1000 | 1.150 | D | 1.00 | D | 1800.0 | D | 480.0 | A, -, - |
| 5 Concrete, Medium density 1800 | 0.1000 | 1.150 | D | 1.00 | D | 1800.0 | D | 180.0 | -, -, - |
| Start of calculation - Warm | | | | | | | | | |
| | 0.4353 | | | | | | | 180.0 | |

Heat capacity = 180.0 kJ/(m²K)

The following exclusion criteria apply:

- A .. The total thickness of the layers exceed 0.1 m.
- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following

- A** .. A: Data is entered and validated by the manufacturer or supplier. Data is continuously tested by 3rd party.
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Documentation of the component
Thermal transmittance (U-value) according to BS EN ISO 6946

9. November 2024
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Source: **own catalogue**
Component: **New ground floor**

INSIDE



OUTSIDE

Assignment: Suspended ground floor

| | Manufacturer | Name | Thickness [m], number | Lambda [W/(mK)] | Q | R [m ² K/W] |
|-------------------------------------|--------------|----------------------------|---|--------------------|----------------|---------------------------|
| | | Rsi | | | | 0.1700 |
| <input checked="" type="checkbox"/> | 1 | Generic Building Materials | Concrete screed (1800 kg/m ³) | 0.0750 | 1.150 D | 0.0652 |
| <input checked="" type="checkbox"/> | 2 | Xtratherm Limited | Thin-R XT/UF Underfloor | 0.1500 | 0.022 C | 6.8182 |
| <input checked="" type="checkbox"/> | 3 | BS EN 12524 | Concrete, Medium density 2000 | 0.2000 | 1.350 D | 0.1481 |
| | | Rse | | | | 0.1700 |
| | | | 0.4250 | | | |

U = 0.12 W/(m²K)

Explanation see next page

- Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following
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$$U = \boxed{0.12 \text{ W/(m}^2\text{K)}} \quad R_T = \boxed{7.37 \text{ m}^2\text{K/W}}$$



Documentation of the component
 Thermal transmittance (U-value) according to BS EN ISO 6946
 Source: **own catalogue**
 Component: **New ground floor**

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Suspended floor according to BS EN ISO 13370

U_f - thermal transmittance of the floor between internal environment and basement according to BS EN ISO 6946

| | | | |
|-------|---|-------|---|
| R_T | Total thermal resistance [m ² K/W] | 7.372 | ($R_T = R_{si} + \sum(d/\lambda) + R_{se}$) |
| U_f | Thermal transmittance [W/(m ² K)] | 0.140 | |

Further input data:

| | | | |
|---------------|--|--------|--|
| λ | Thermal conductivity [W/(mK)] | 1.50 | (Thermal conductivity of the ground) |
| A | Floor area [m ²] | 50.00 | |
| P | Exposed perimeter [m] | 28.50 | |
| R_g | Thermal resistance [m ² K/W] | 0.0 | (any insulation on the base of underfloor space) |
| w | Thickness of basement wall w [m] | 0.30 | (walls of underfloor space) |
| U_w | Thermal transmittance [W/(m ² K)] | 1.70 | (walls of underfloor space) |
| h | Height of floor above ground [m] | 0.225 | |
| ε | Ventilation openings [m ² /m] | 0.0015 | |
| v | Average wind speed at 10m height v [m/s] | 5.0 | |
| f_w | Wind shielding factor [-] | 0.05 | |

Intermediate results:

| | | |
|-------|--|-------|
| B' | Characteristic dimension [m] | 3.509 |
| d_g | Equivalent thickness [m] | 0.615 |
| U_g | Thermal transmittance [W/(m ² K)] | 0.758 |
| U_x | Thermal transmittance [W/(m ² K)] | 0.373 |

U = 0.12 W/(m²K)

$L_s = 6.2$ W/K

Thermal Transmittance

Steady-state thermal coupling coefficient



Documentation of the component

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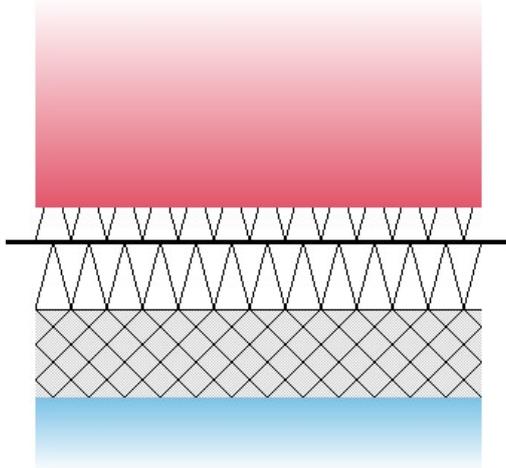
Heat capacity

Page 3/3

Source: own catalogue

Component: New ground floor

INSIDE



OUTSIDE

The list of materials shown below may differ from those in the U-value calculation printout. Only material layers which are used in the heat capacity calculation are listed.

Single material layers shown in the U-value calculation printout may be separated to meet the exclusion criteria:

- A .. The total thickness of the layers exceed 0.1 m.
- B .. The mid point in the construction is reached.

For insulation layers the following criteria applies:

- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

| Name | Thickness [m] | lambda [W/(mK)] | Q | Thermal capacity [kJ/(kgK)] | Q | Density [kg/m³] | Q | Thermal mass kJ/(m²K) | Criteria Exclusion |
|------------------------------------|---------------|-----------------|----------|-----------------------------|----------|-----------------|----------|-----------------------|--------------------|
| Start of calculation - Warm | | | | | | | | | |
| 1 Concrete screed (1800 kg/m³) | 0.0750 | 1.150 | D | 1.00 | D | 1800.0 | D | 135.0 | - , - , - |
| 2 Thin-R XT/UF Underfloor | 0.0250 | 0.022 | C | 1.40 | C | 32.0 | C | 0.0 | - , - , C |
| 2 Thin-R XT/UF Underfloor | 0.1250 | 0.022 | C | 1.40 | C | 32.0 | C | 0.0 | A , - , C |
| 3 Concrete, Medium density 2000 | 0.2000 | 1.350 | D | 1.00 | D | 2000.0 | D | 400.0 | A , - , C |
| End of calculation - Cold | | | | | | | | | |
| | 0.4250 | | | | | | | 135.0 | |

Heat capacity = 135.0 kJ/(m²K)

The following exclusion criteria apply:

- A .. The total thickness of the layers exceed 0.1 m.
- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

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Documentation of the component
Thermal transmittance (U-value) according to BS EN ISO 6946

9. November 2024
Page 1/2

Source: **own catalogue - Flat roofs**

Component: **Terrace Floor**

OUTSIDE



INSIDE

Assignment: Flat roof

| | Manufacturer | Name | Thickness [m], number | Lambda [W/(mK)] | Q | R [m²K/W] |
|-------------------------------------|----------------------------|---|-----------------------------|--------------------|----------|--------------|
| | | R _{se} | | | | 0.0400 |
| <input checked="" type="checkbox"/> | Sika | Sika Sarnafil G410-15 EI waterproof | 0.0001 | 0.170 | E | 0.0006 |
| <input checked="" type="checkbox"/> | Bauder | Bauder PIR FA-TE Insulation Level 1: dU'' = 0.01 W/(m²K) | 0.1500 | 0.024 | E | 6.2500 |
| <input checked="" type="checkbox"/> | Generic Building Materials | Concrete screed (1800 kg/m³) | 0.0750 | 1.150 | D | 0.0652 |
| <input checked="" type="checkbox"/> | BS EN 12524 | Concrete, Medium density 1800 | 0.2000 | 1.150 | D | 0.1739 |
| | | R _{si} | | | | 0.1000 |
| | | | 0.4251 | | | |

$$R_T = R_{si} + \sum R_i + R_{se} = 6.63 \text{ m}^2\text{K/W}$$

| Correction to U-value for | according to | delta U [W/(m²K)] |
|---------------------------|------------------------|----------------------|
| Air gaps | BS EN ISO 6946 Annex F | 0.0089 |
| | | 0.0089 |

$$U = 1/R_T + \sum \Delta U = 0.16 \text{ W/(m}^2\text{K)}$$

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$$U = \boxed{0.16 \text{ W/(m}^2\text{K)}} \quad R_T = \boxed{6.63 \text{ m}^2\text{K/W}}$$

Documentation of the component

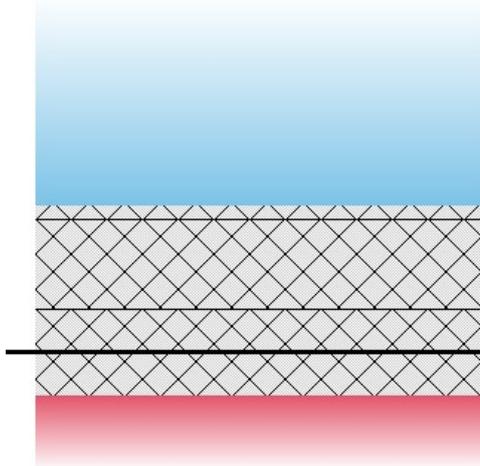
9. November 2024

Heat capacity

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Source: **own catalogue - Flat roofs**Component: **Terrace Floor**

OUTSIDE



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For insulation layers the following criteria applies:

- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

INSIDE

| Name | Thickness [m] | lambda [W/(mK)] | Q | Thermal capacity [kJ/(kgK)] | Q | Density [kg/m³] | Q | Thermal mass kJ/(m²K) | Criteria Exclusion |
|---------------------------------------|---------------|-----------------|----------|-----------------------------|----------|-----------------|----------|-----------------------|--------------------|
| End of calculation - Cold | | | | | | | | | |
| 1 Sika Sarnafil G410-15 EI waterproof | 0.0001 | 0.170 | E | 1.80 | E | 350.0 | E | 0.1 | A, -, C |
| 2 Bauder PIR FA-TE Insulation | 0.1500 | 0.024 | E | 1.40 | E | 3.0 | E | 0.0 | A, -, C |
| 3 Concrete screed (1800 kg/m³) | 0.0750 | 1.150 | D | 1.00 | D | 1800.0 | D | 135.0 | A, -, - |
| 4 Concrete, Medium density 1800 | 0.1000 | 1.150 | D | 1.00 | D | 1800.0 | D | 180.0 | A, -, - |
| 4 Concrete, Medium density 1800 | 0.1000 | 1.150 | D | 1.00 | D | 1800.0 | D | 180.0 | -, -, - |
| Start of calculation - Warm | | | | | | | | | |
| | 0.4251 | | | | | | | 180.0 | |

Heat capacity = 180.0 kJ/(m²K)

The following exclusion criteria apply:

- A .. The total thickness of the layers exceed 0.1 m.
- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

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