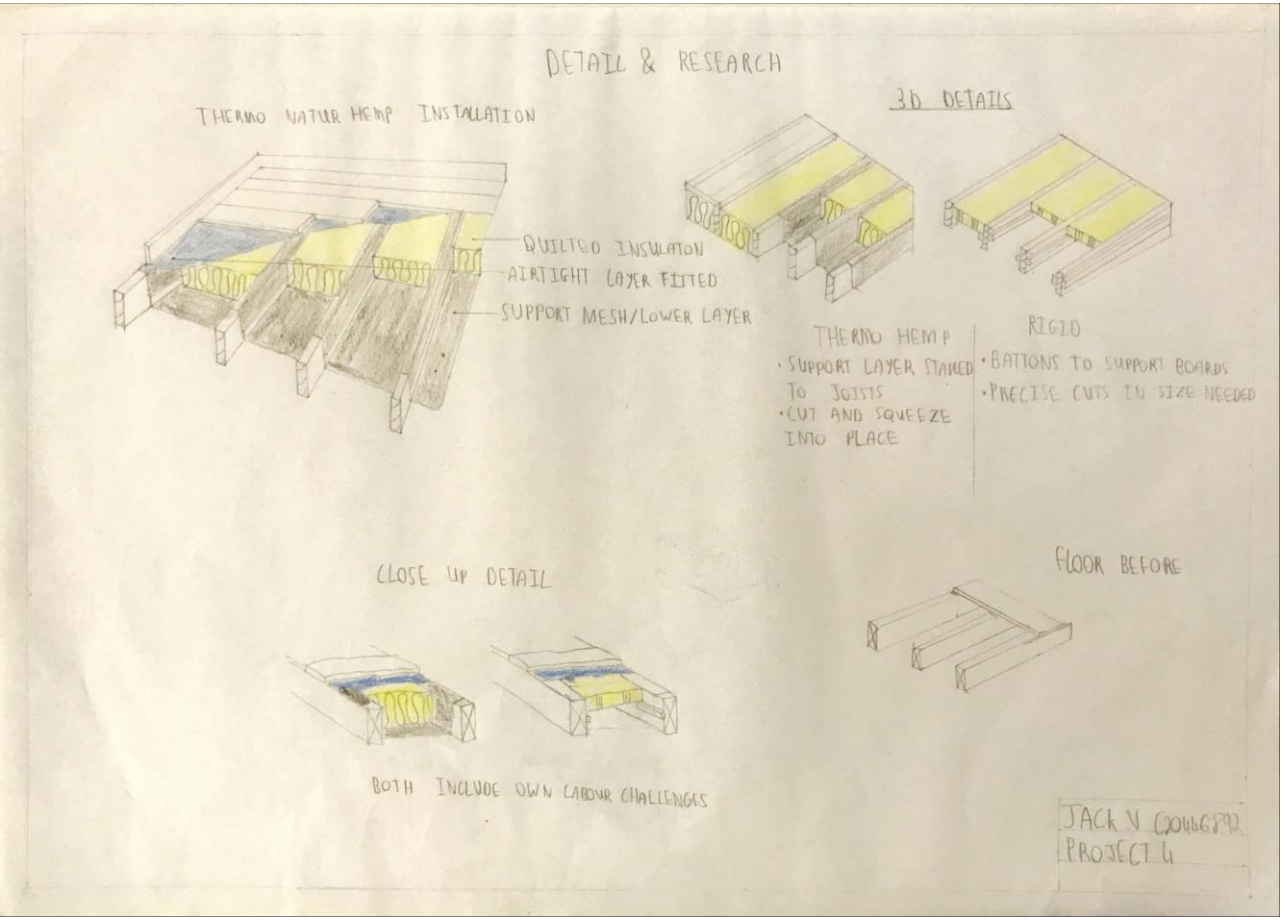
TU831 TECH1106 TDS

Project 4 Part B: Garden
Shed Office Retrofitting Details

Group B1 – Sean Molloy, Emma Byrne, Odeta Gudonyte, Ling Zhao, Jack Vaughan.

Floor details and upgrades



- Original floor is basic floor solely for support
- There is no present membrane or insulation present in the floor
- Build up consists of timber joists on a sleeper wall with t&g floorboards
- By adding sufficient insulation between the joists with an airtightness layer we can meet the regulations in accordance with TGD L

Jack Vaughan

Materials and options

- Thermo Natur Thermo Hemp

supported by

- Pro Clima Solitex Plus hemp quilt.

Alternatives

Using rigid insulation

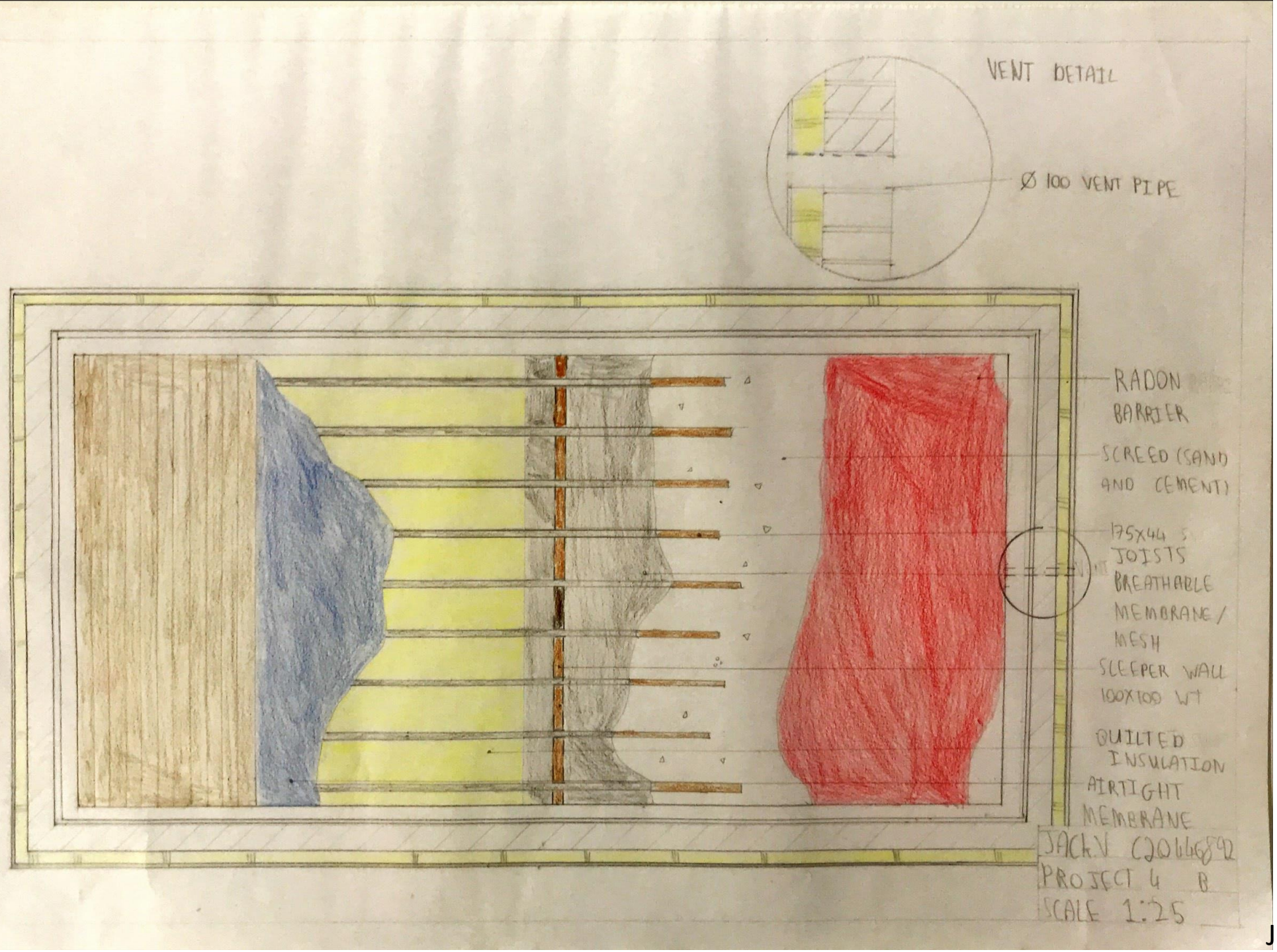
Battens in place of the

Fig.1

Fig.2

Fig.3

Jack Vaughan



Jack Vaughan

Floor

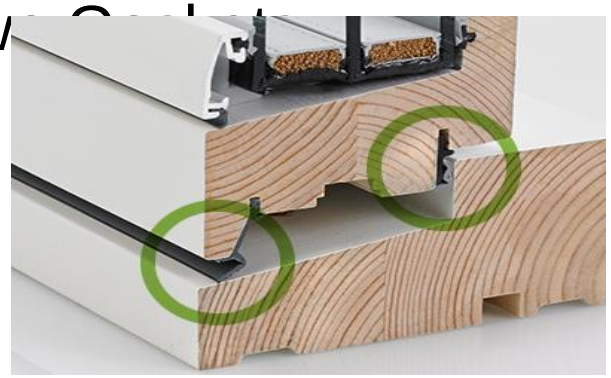
Using Thermo Natur Thermo Hemp we were able to meet the u-value standards for floors ending up at .=0.178W/M²k meeting the 0.18W/M²k level for new dwellings and the .45W/M²k rating for existing dwellings floors

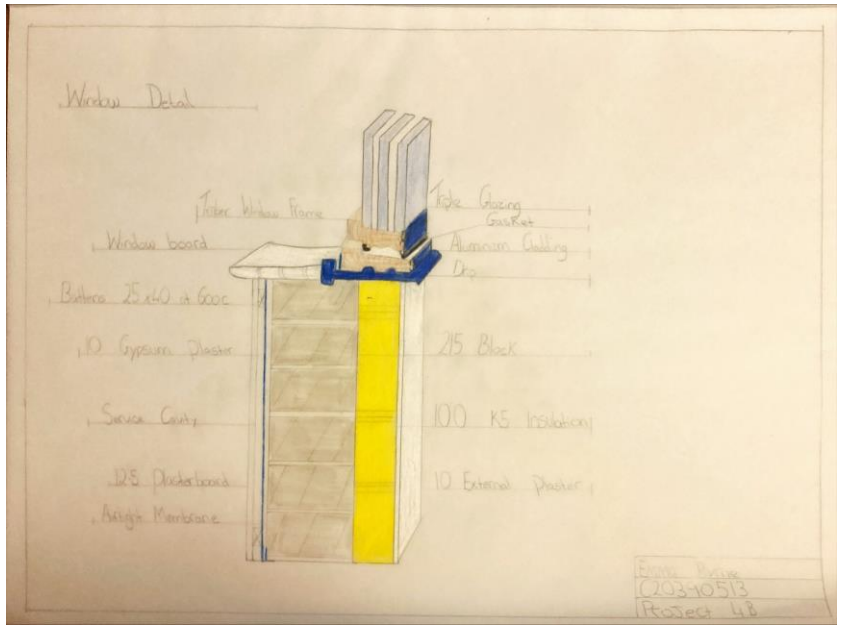
Floor Construction	Thickness (in meters, d)	Thermal Conductivity (W/mK, l)	Thermal Resistance (m^2K/W) R = d/l
External Resistance			0.06
Thermo Natur Thermo Hemp	0.16	0.04	4.00
Timber Joist	0.175	0.13	1.35
Floorboard	0.025	0.17	0.15
Airtight layer	0.00045	0.17	0.00
Insulation support	0.00055	0.17	0.00
Internal Resistance			0.06
Total Resistance			5.62
U-value			0.178

Jack Vaughan

Windows & Doors

- Rationel Timber Aluminum Modern Window.
- Triple glazing, Timber Frame aluminum clad.
- The Cladding is durable.
- hey have tw





https://www.rationel.ie/windows/modern-style/aura-plus

Emma Byrne

Windows

The bottom of the window opening should be a minimum of 800mm and no more than 1100mm from the floor. Guarding is required if less than 800mm. **(T.G.D.B)**

U-Value: The triple glazing has a U-Value of **0.79 W/m2 K**

Sound Reduction of **42 dB Rw.**

Emma Byrne

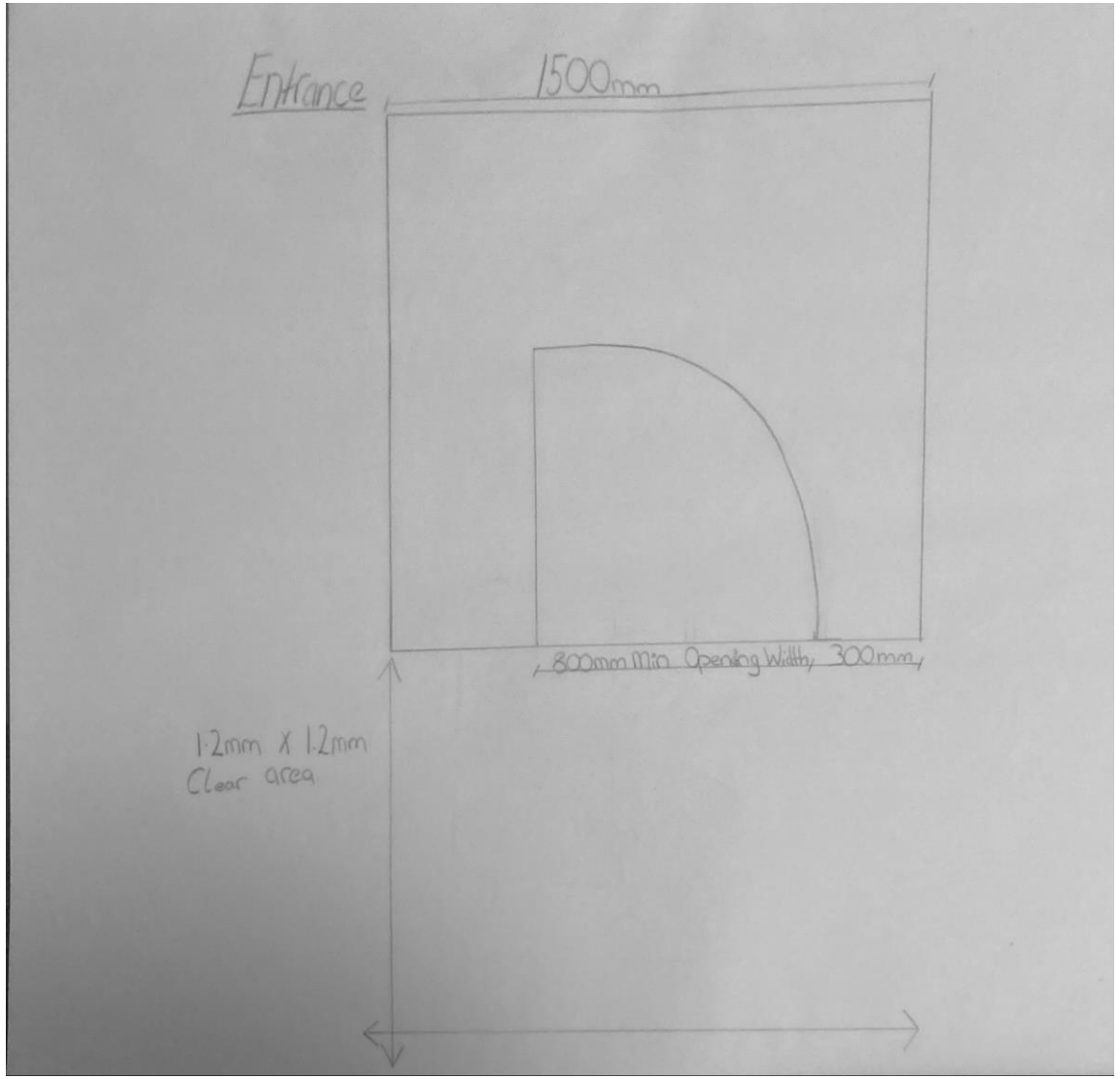
Doors

The entrance door:

The minimum effective clear opening width of the entrance door should be 800 mm. **(T.G.D.M)**

The headroom for the entrance should be 2100 mm. **(T.G.D.M)**

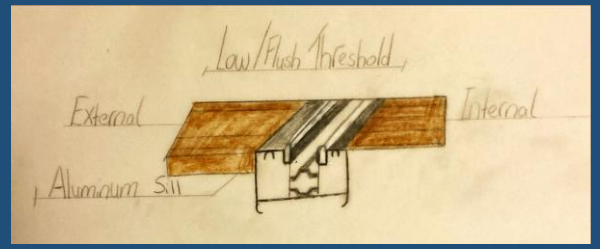
The main entrance to the dwelling should have a clear area at least 1.2mm wide and at least 1.2mm deep in front of the entrance.



Emma Byrne

Patio Doors

- **Bi-Fold Door**
  - Available in Low/Flush Threshold, ideal for wheelchair/Disabled access.

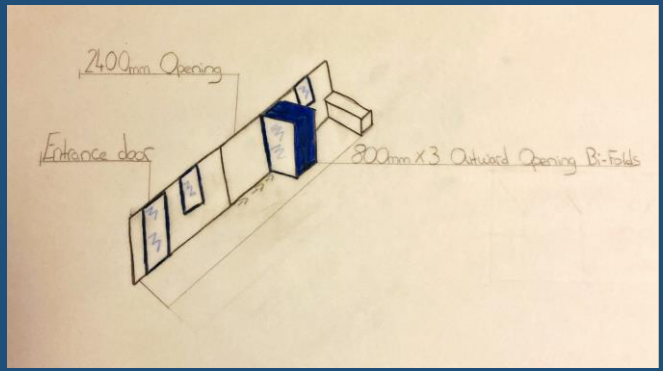


  - Available in inward and outward opening, Opening outward is better for wheelchair users as the door won't cause any internal obstruction and you don’t have to worry about any furniture being in the way of the door opening like you would with an internal opening.
  - Although there is more room for thermal bridging in bi-folding doors as there is more frame in them, the Fairco Bi-Folding doors are fitted with a thermal break to combat this issue.
  - You don’t have to open the whole door completely as there's a standard-style door at one end, which you can use to go in and out without having to fold the panels.

https://fairco.ie/doors/bi-folding/

- **Sliding Door**
  - Typically have a higher Threshold than bi-fold doors which is unsuitable for wheelchair access.

  - https://fairco.ie/doors/sliding-doors/
  - Less Versatile than a bi-folding door.
  - Sliding doors are typically better at keeping heat in as there is more glazing.

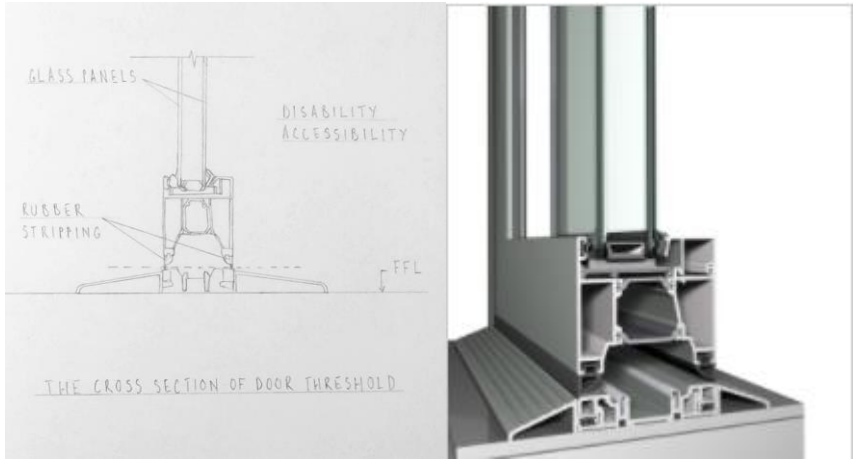


Outward Opening Bi-Folds

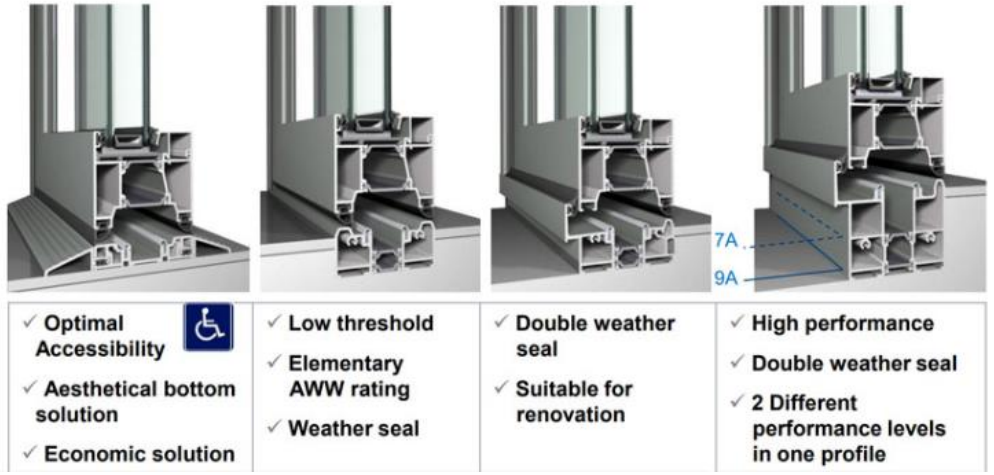
Emma Byrne

Bi-Fold Door Thresholds Comparison

Ease of Access



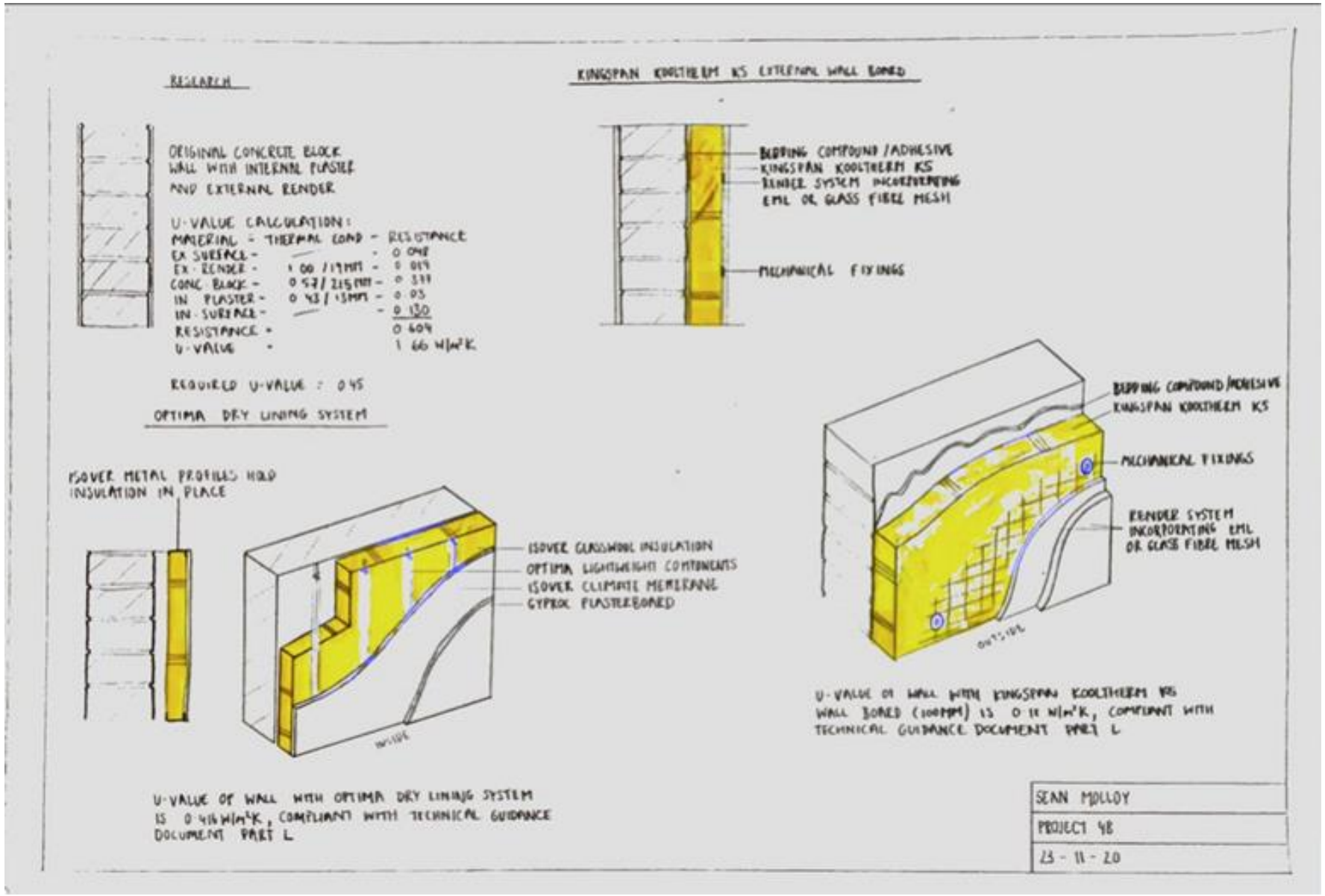
Better Weathering Capabilities



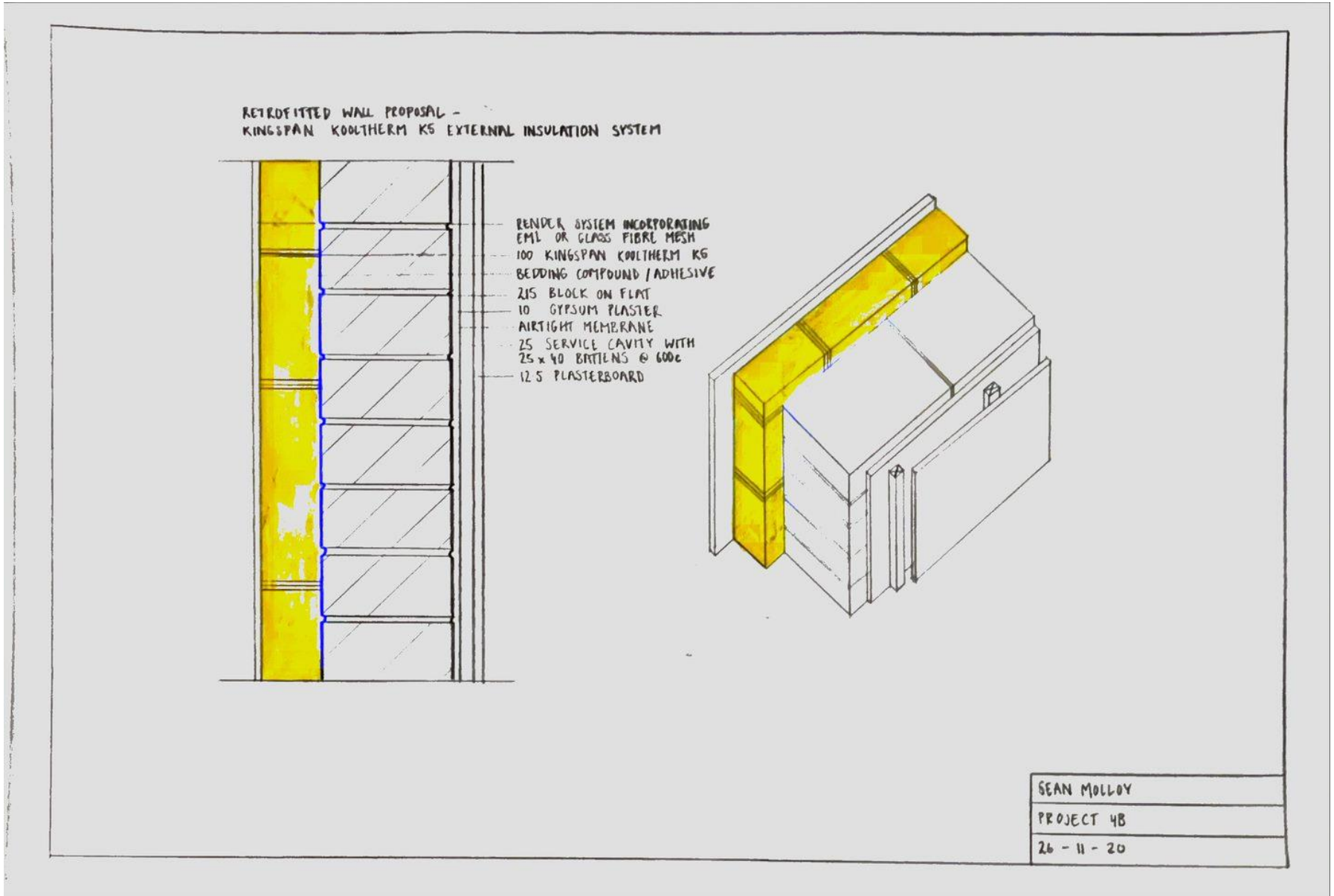
https://www.hnsaluminium.co.uk/reynaners-bifold-doors-threshold-solutions

Ling Zhao

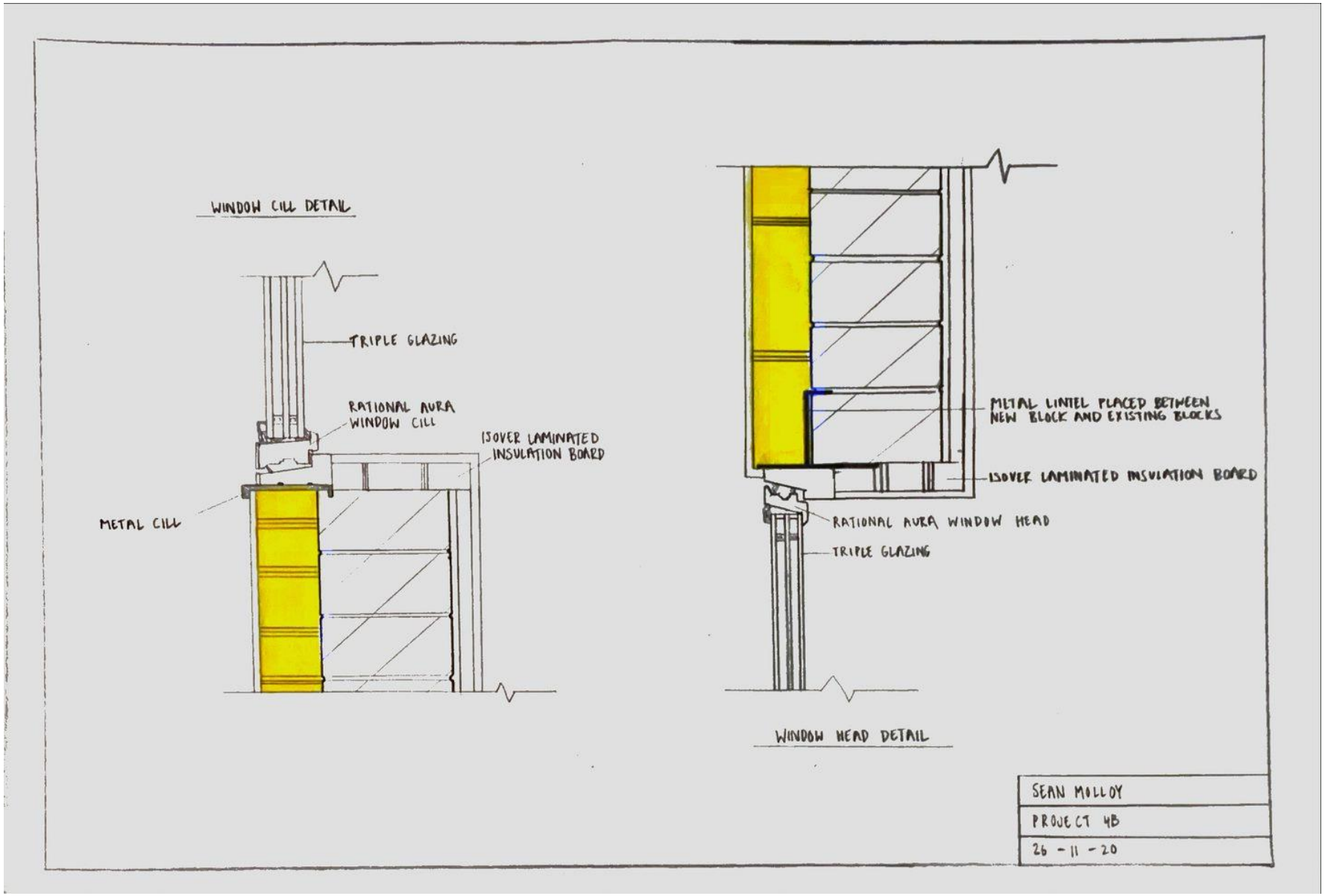
Wall Research



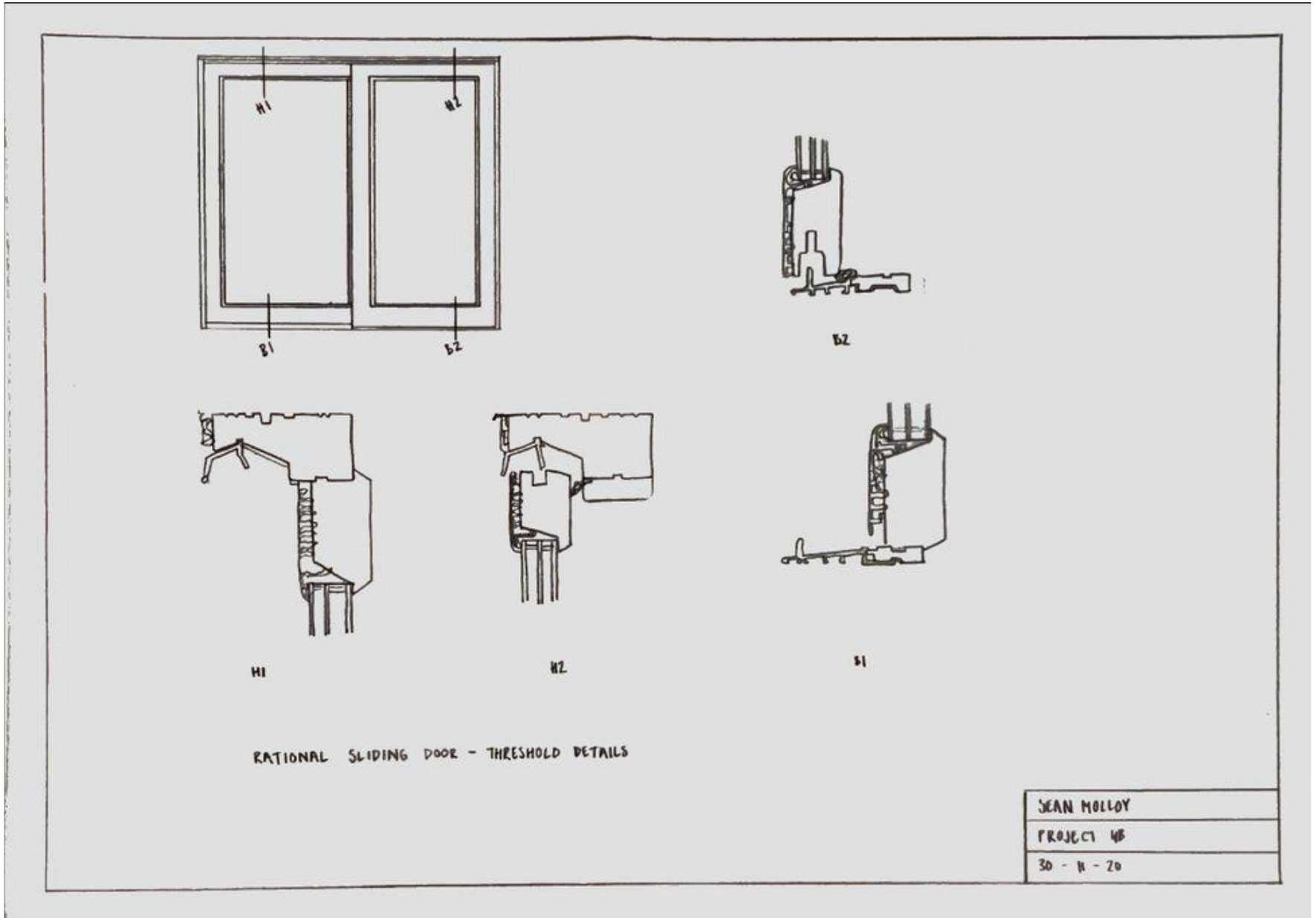
Complete Wall Detail

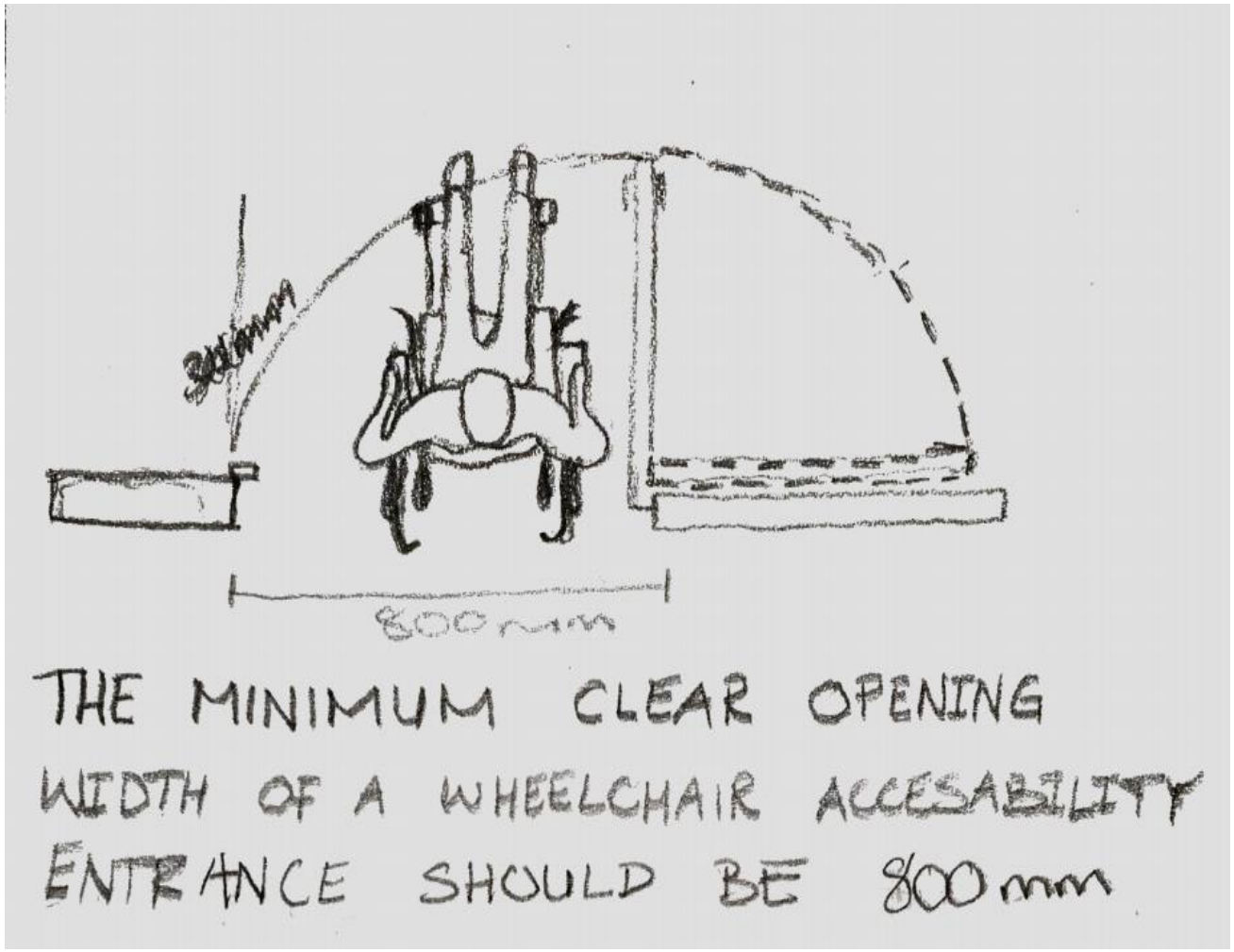


Window Cill and Head Detail



Sliding Door Threshold Detail

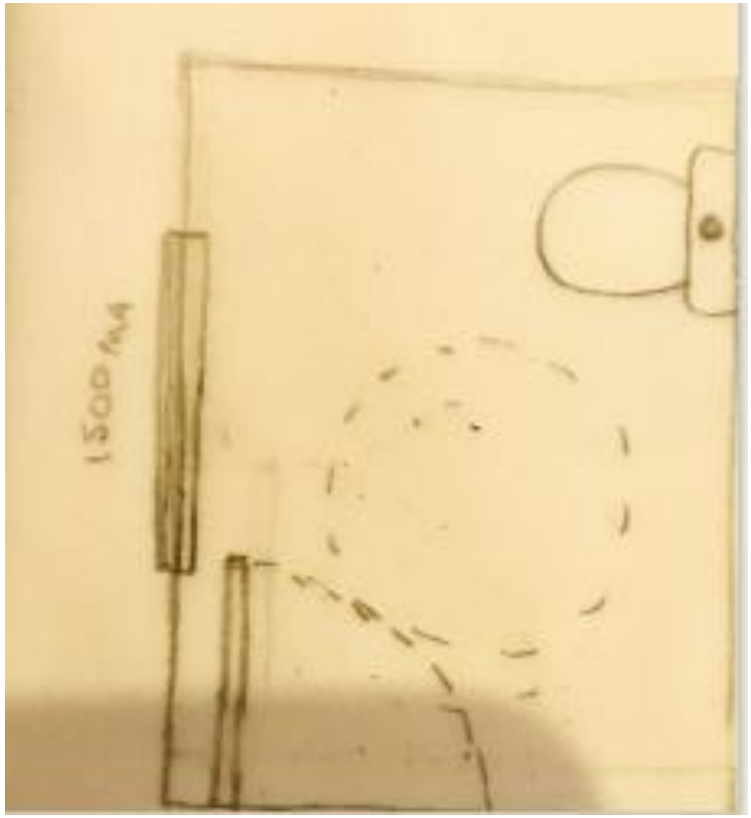




Doors would need to have a minimum clear opening of 800mm

The threshold ideally should be flush with the floor surface (otherwise max height 15mm)

And also doorbell at a height between 900 mm and 1200 mm

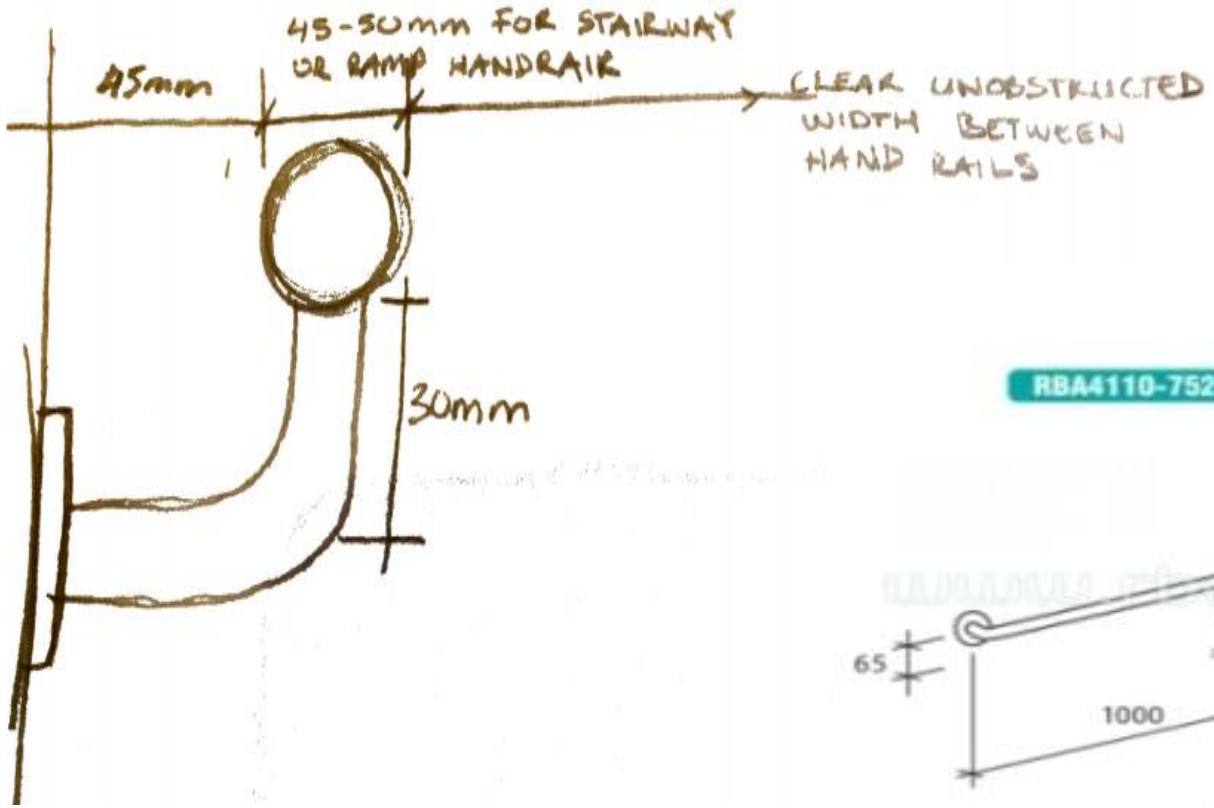


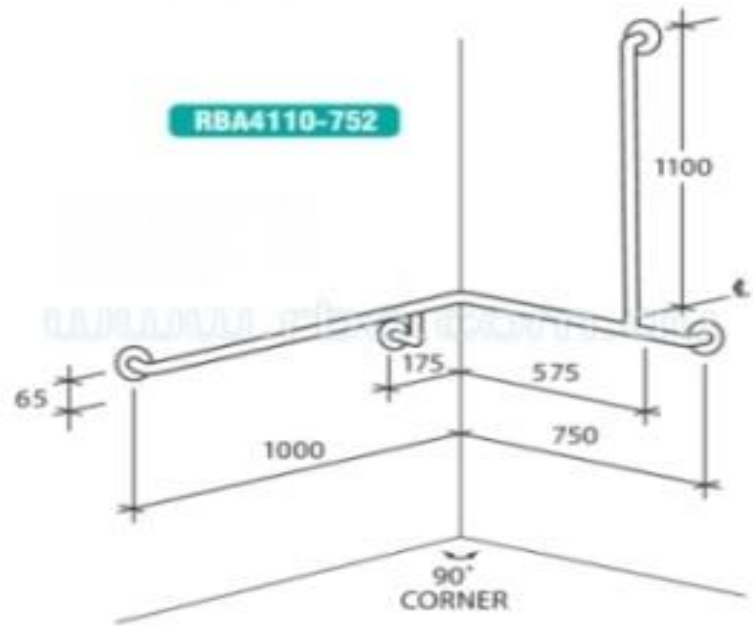
Fold up grab rail 400 mm long on open side of toilet should be provided

Lever type handle fitted to toilet for ease of use

Minimum door length should be 800mm for wheelchair access

Odeta Gudonyte

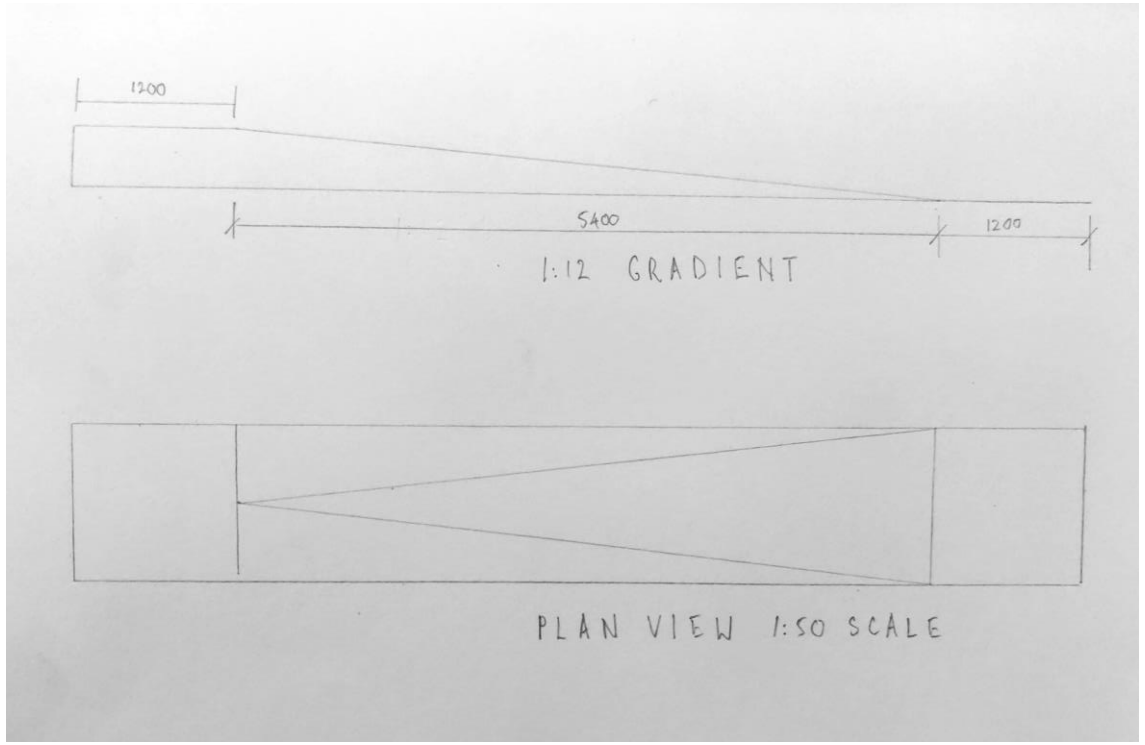




This is the types of handrails that also should be provided for disabilities for easier access

Odeta Gudonyte

Access Ramp



- Decision to with a 1 in 12 Gradient Ramp (1:12) .
- FFL is 450 mm above GL. External decking is 1500x7500.
- Ramp is to be installed on the front left side of the structure.

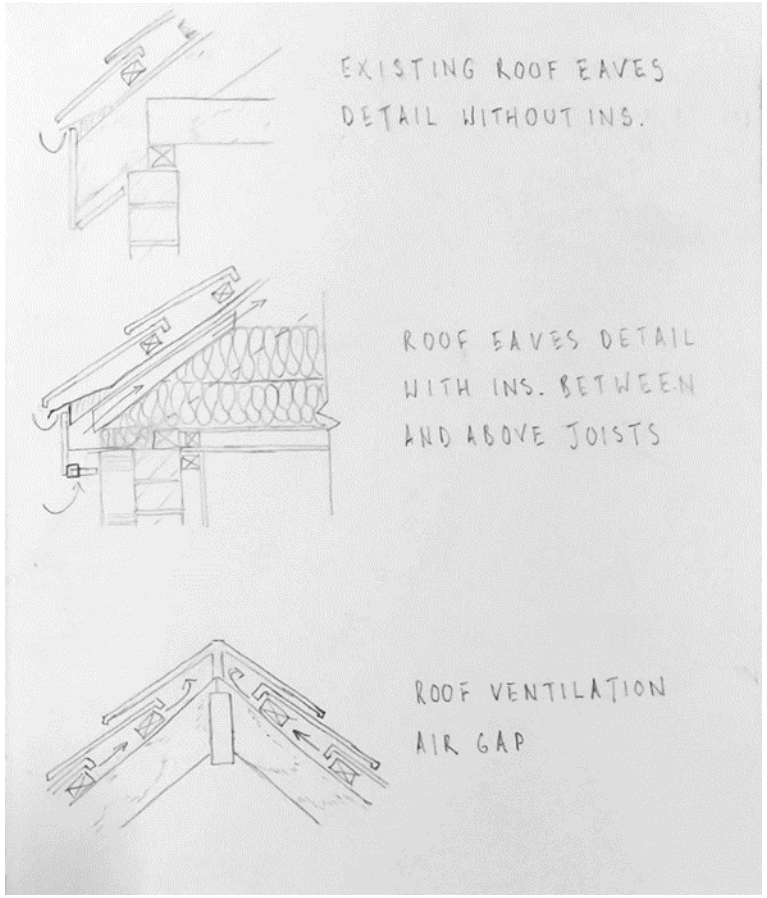
Ling Zhao

Roof and Eaves Details

- Roof is a close couple "cut" structure.
- Current roof has no insulation or airtight membrane.
- Roof covering is comprised of 600 x 300 slates on sarking felt on battens.
- By adding adequate insulation and membrane layers, the building can be brought up to current regulations in accordance with TGD part L.

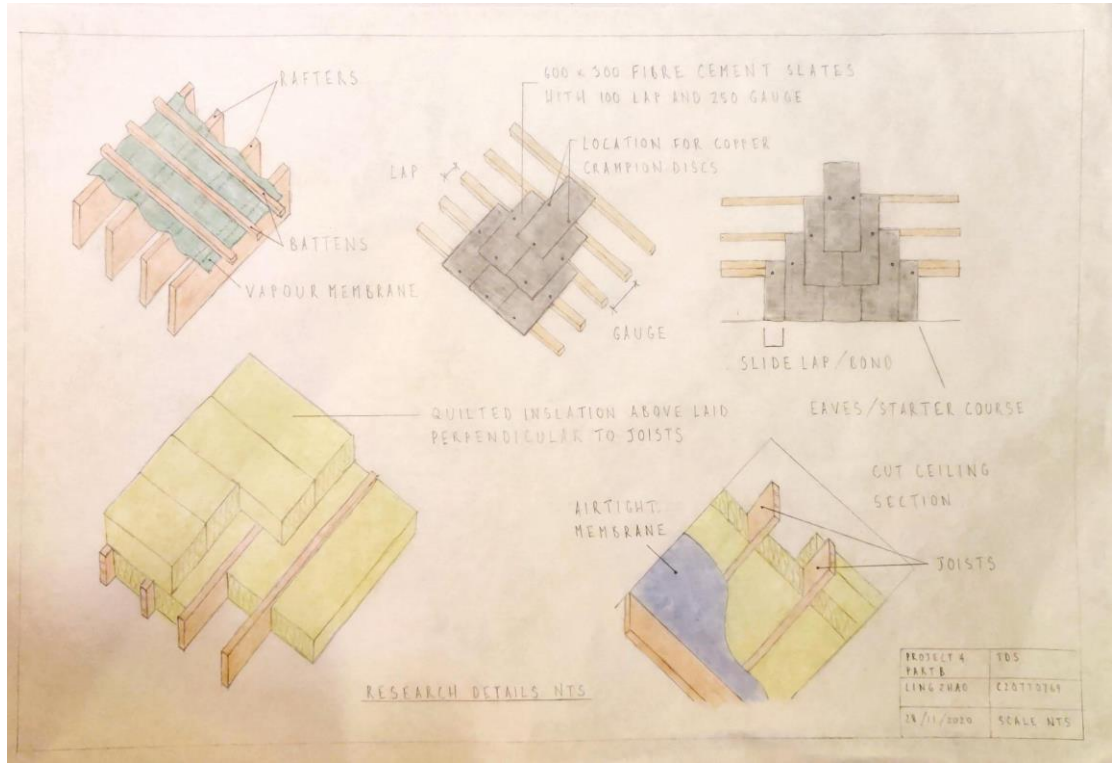
Ling Zhao

Eaves Detail Research



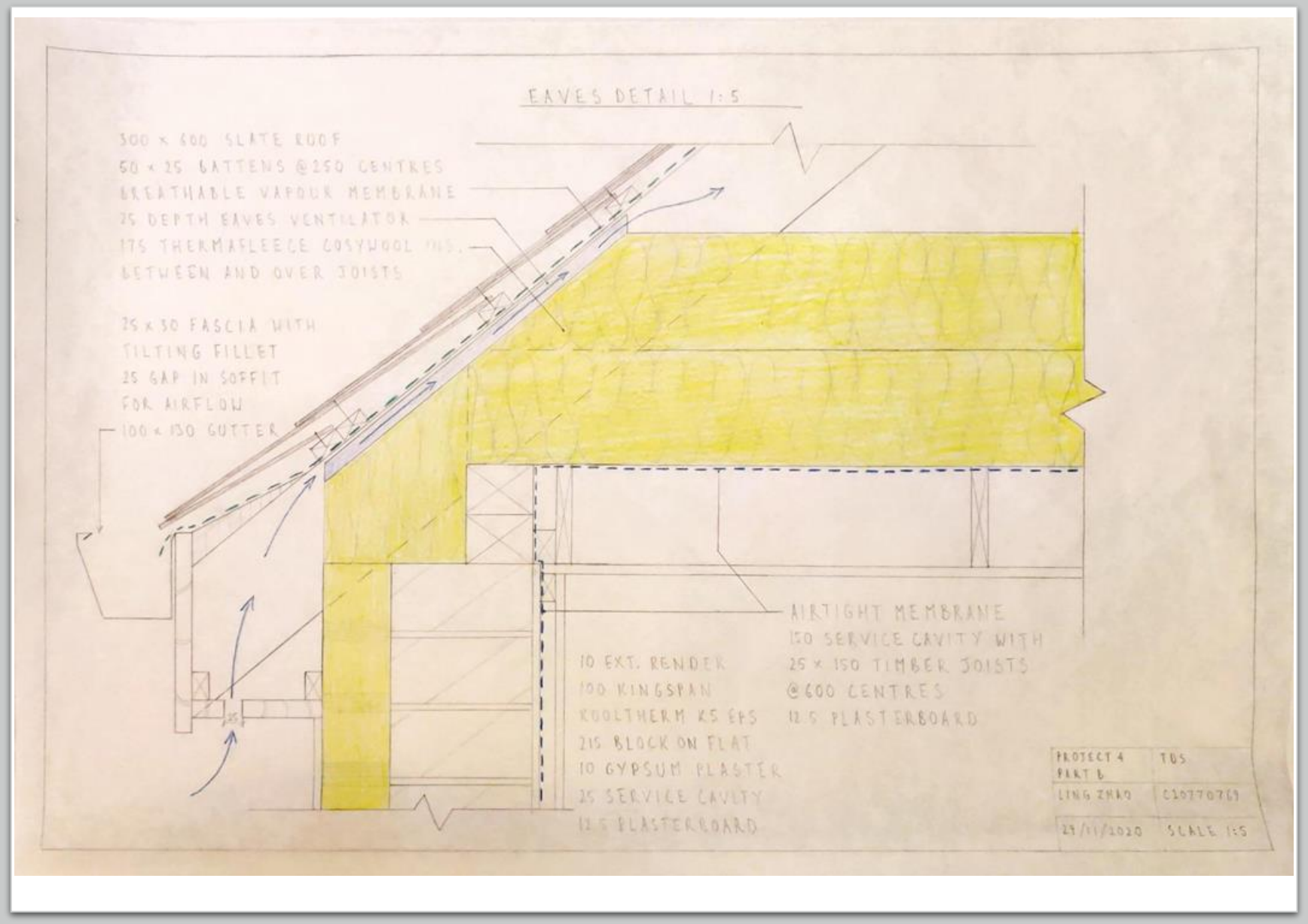
- Decision of making it a cold roof structure.
- Process of adding quilted insulation to the ceiling joists.
- Insulation envelopes the room with little to no cold bridges.
- Roof ridge ventilation lets air flow allowing the roof to “breathe”.

Eaves Detail Research (cont.)



- A breathable vapour control membrane is laid under the battens.
- Slates are to be lapped, starting with a half slate for a flush finish.
- Insulation above is laid perpendicular to the joists to prevent cold bridges.
- Airtight membrane layer placed under ceiling joists.

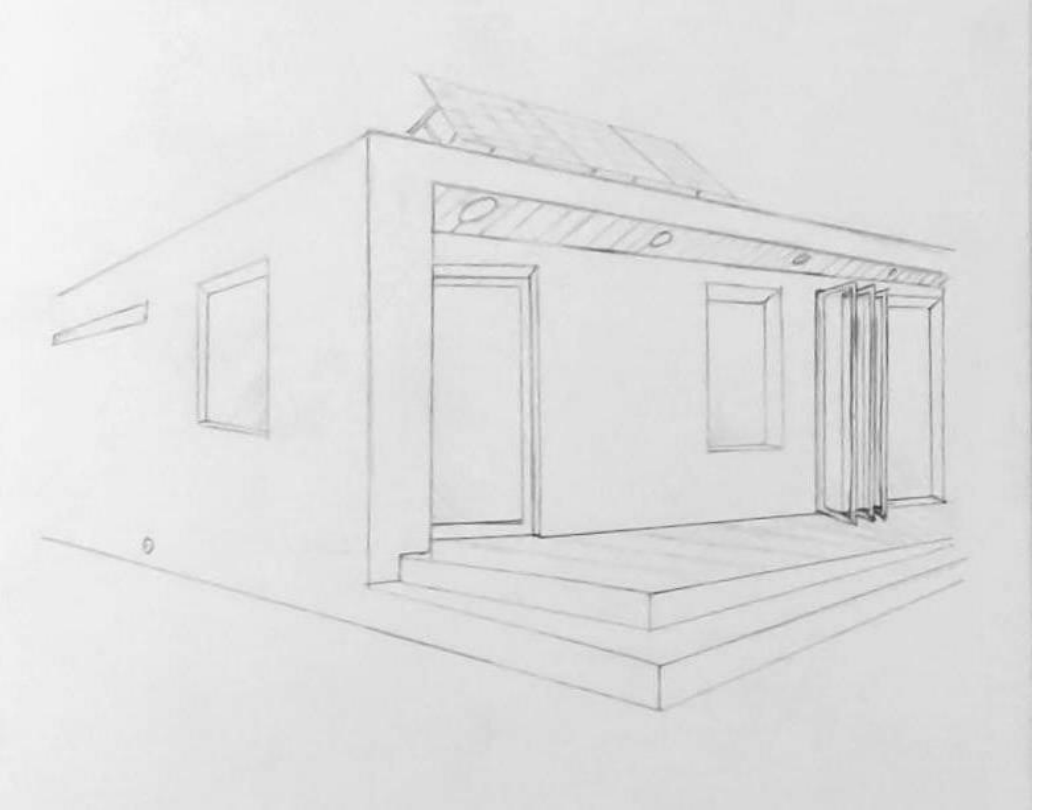
Eaves Detail Scale 1:5

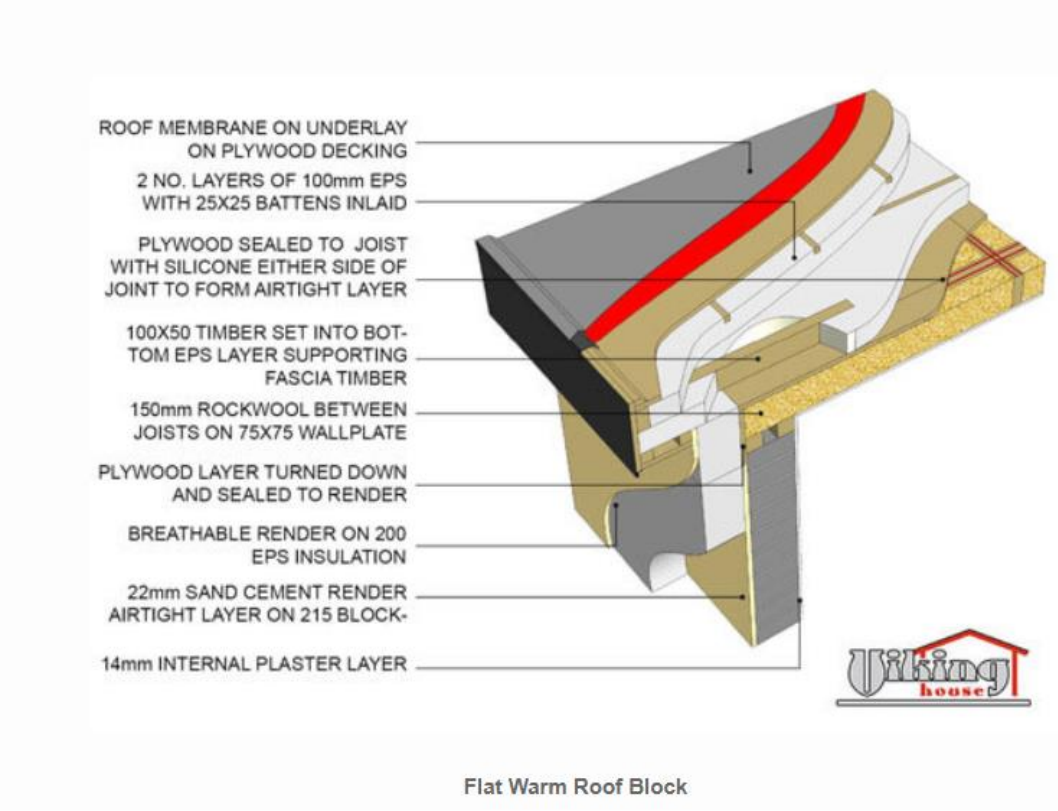


Alternative Considerations

- Using a flat room in place of a cut pitched roof.
- Flat roof would be insulated and meet the regulations of TGD part L of having a 0.16 – 0.2 W/m^2K U-value.
- Using Kingspan U-value calculator, a 0.16 W/m^2K with 70 mm cold flat roofing and 72.5 plasterboard.
- Compared to pitched roof 0.11 W/m^2K U-value.

Flat Roof Sketches and Ideas





http://www.viking-house.ie/timber-frame-warm-stud.html

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- Fig.1,.2,.3: https://www.ecologicalbuildingsystems.com/product/thermo-hemp
- https://www.ecologicalbuildingsystems.com/product/solitex-plus
- https://www.ecologicalbuildingsystems.com/product/da

Thanks for listening.

- Any questions?