



Rewarding Learning

General Certificate of Secondary Education
2022

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

Construction and the Built Environment

Unit 2
Sustainable Construction



GCN21

[GCN21]

THURSDAY 16 JUNE, MORNING

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Answer **all eight** questions.

Questions **1, 2, 6, 7** and **8** should be answered in relation to the previously issued pre-release material.

You should **not** bring any of the material previously issued into this examination.

You will be provided with a clean copy of the pre-release material.

INFORMATION FOR CANDIDATES

The total mark for this paper is 120.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in questions **6** and **8**.

A scale ruler is required.

A calculator is required.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	

Total Marks	
-------------	--

BLANK PAGE
(Questions continue overleaf)

4 Complete a cutting list for the stool shown in Fig. 2.

The stool, apart from the top, should be made from solid ash timber.

All timber rails should have an additional 27 mm of timber at each end, added to their length in order to cut the tenon joint. The ash timber will be finished with 4 coats of varnish.

The stool top will be cut to size from 40 mm thick MDF. This MDF will be spray painted so no edging strips will be required. The stool top is shown in Fig. 3. Fig. 4 shows the jointing method used to join the rails to the legs.

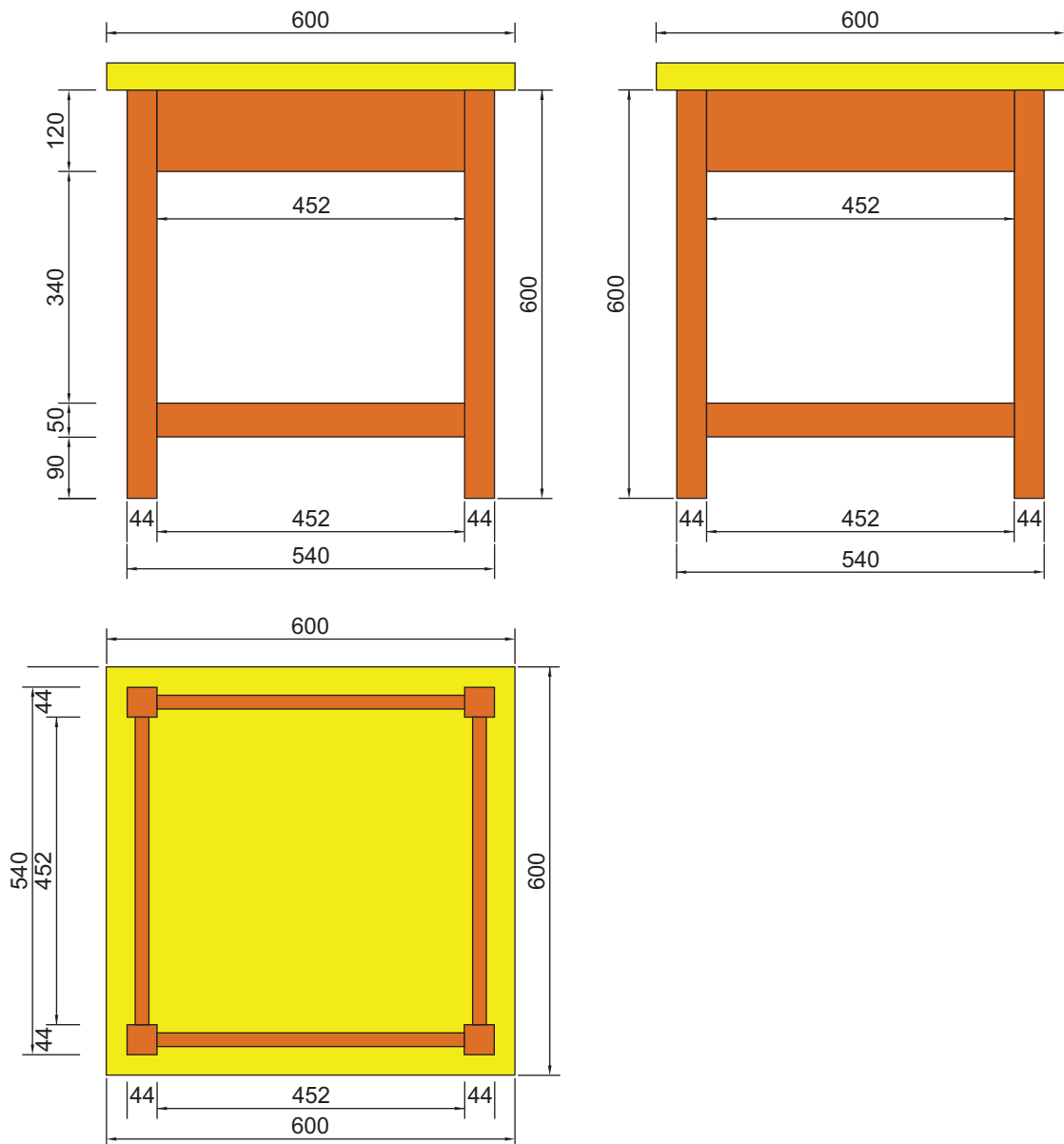


Fig. 2

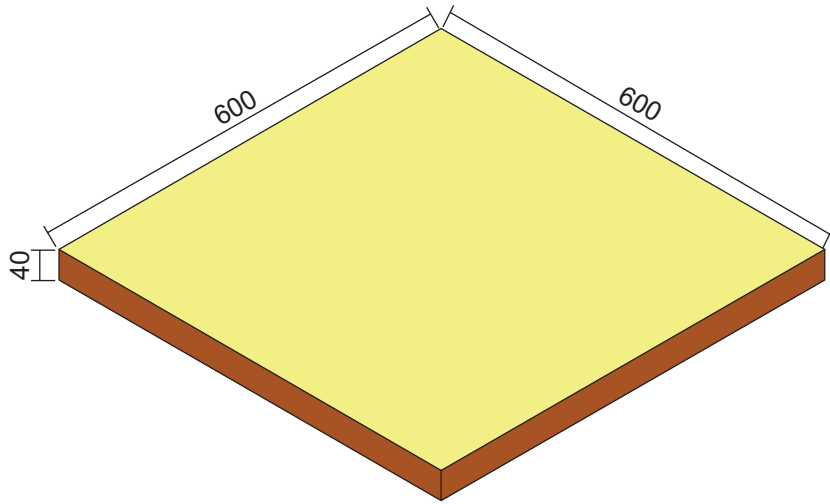


Fig. 3

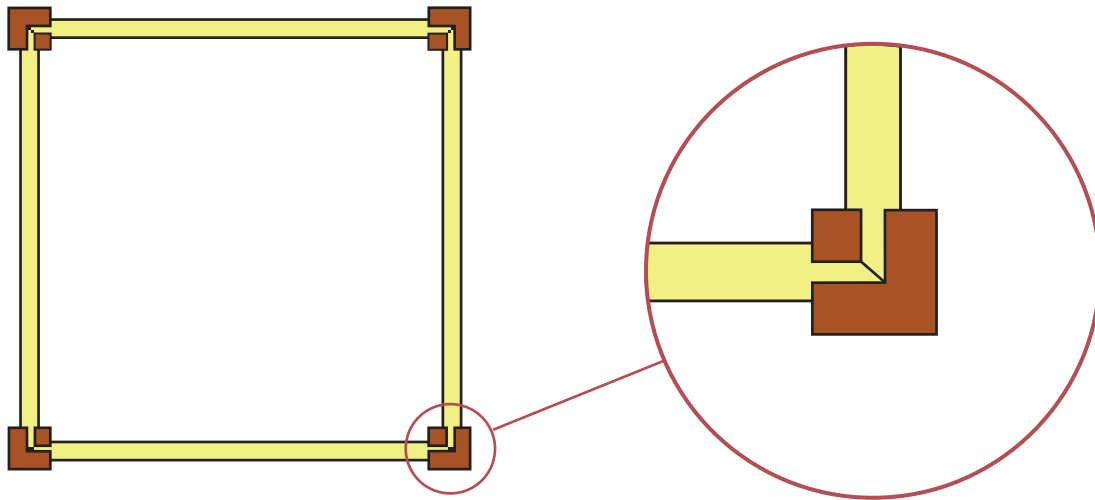
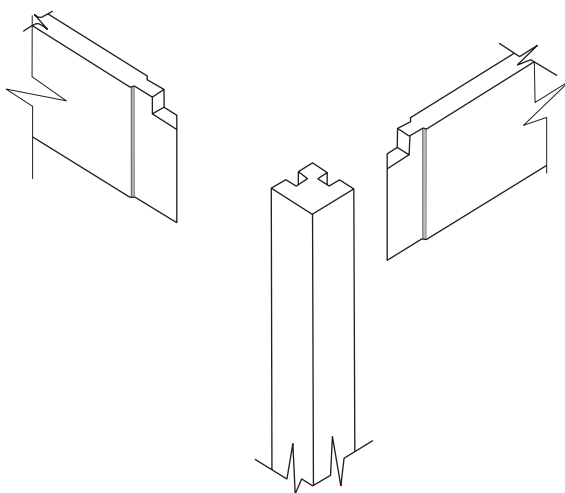


Fig. 4



Mortise and Tenon joints used to join the rails of the stool to the legs as shown in Fig. 4

The cost of the materials to be used in your stool are shown below.

The cost of 44 mm square section ash timber is **£6.76** per linear metre.

Top rails 120 mm × 20 mm planed all round (PAR) ash timber is **£6.95** per linear metre.

Bottom rails 50 mm × 20 mm planed all round (PAR) ash timber is **£4.54** per linear metre.

MDF 40 mm thick costs **£71** for a sheet measuring 2440 mm × 1220 mm. You will be able to cut 8 stool tops from one sheet of MDF.

Remember to allow 27 mm each end of the rails for cutting out the Tenon Joints.

Examiner Only	
Marks	Remark

Item	Part	Quantity	Description of material required	Length in mm	Width in mm	Thickness in mm	Total length required	Total cost
1	Legs	4	Ash	600	44			
2	Top Rails							
3	Bottom Rails							
4	Top						8 stool tops from one sheet	
Total cost of glue, connection blocks, varnish etc.								£4.70
Total cost of stool								£

Complete the shaded boxes in the cutting list above.

Use the next page for calculations where necessary.

[25]

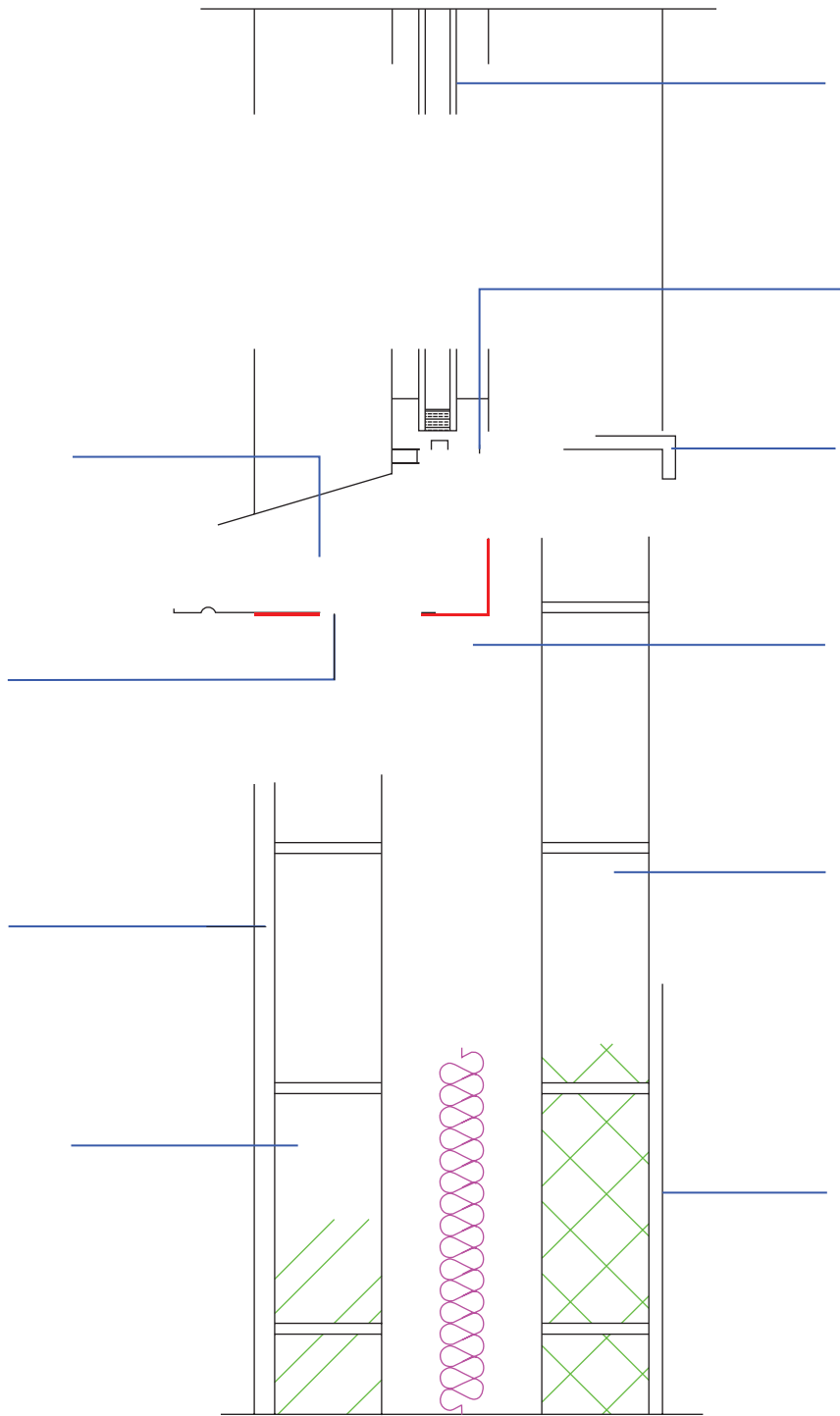


Fig. 5

BLANK PAGE

(Questions continue overleaf)

[10]

Examiner Only	
Marks	Remark

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.



Rewarding Learning

**General Certificate of Secondary Education
2022**

Construction and the Built Environment

Unit 2

Sustainable Construction

[GCN21]

THURSDAY 16 JUNE, MORNING

INFORMATION FOR CANDIDATES

A copy of the pre-release information for this examination is included in the following pages.

You must use this clean copy of the Pre-release Material in the examination and not your own annotated copy.

Scenario

A client has purchased a brownfield site in an urban area. The site is in an area of two storey detached dwellings. The client has appointed an architect and has stated a brief as follows:

- Floor Area – 200 to 300 m²
- Accommodation – 3 or 4 bedrooms with 1 en-suite, kitchen, toilet/bathroom facilities, living room or rooms and a dining area.
- The design must also include a home office with small conference suite/boardroom to accommodate 8 people with access to a toilet and simple catering facilities.
- Double garage either attached or detached could be included but is not a necessity.
- The design must include at least one renewable energy source.
- The budget is £370,000

The local planning authorities have indicated that the proposals must complement the surrounding area with a maximum ridge height of 7.5m *adhered to*, to match existing adjacent properties. A site investigation indicates the soil is of typical boulder clay of good bearing capacity at a typical depth of 500 mm. Ground water does not appear to create any problems and no unduly high levels of sulphates were found.

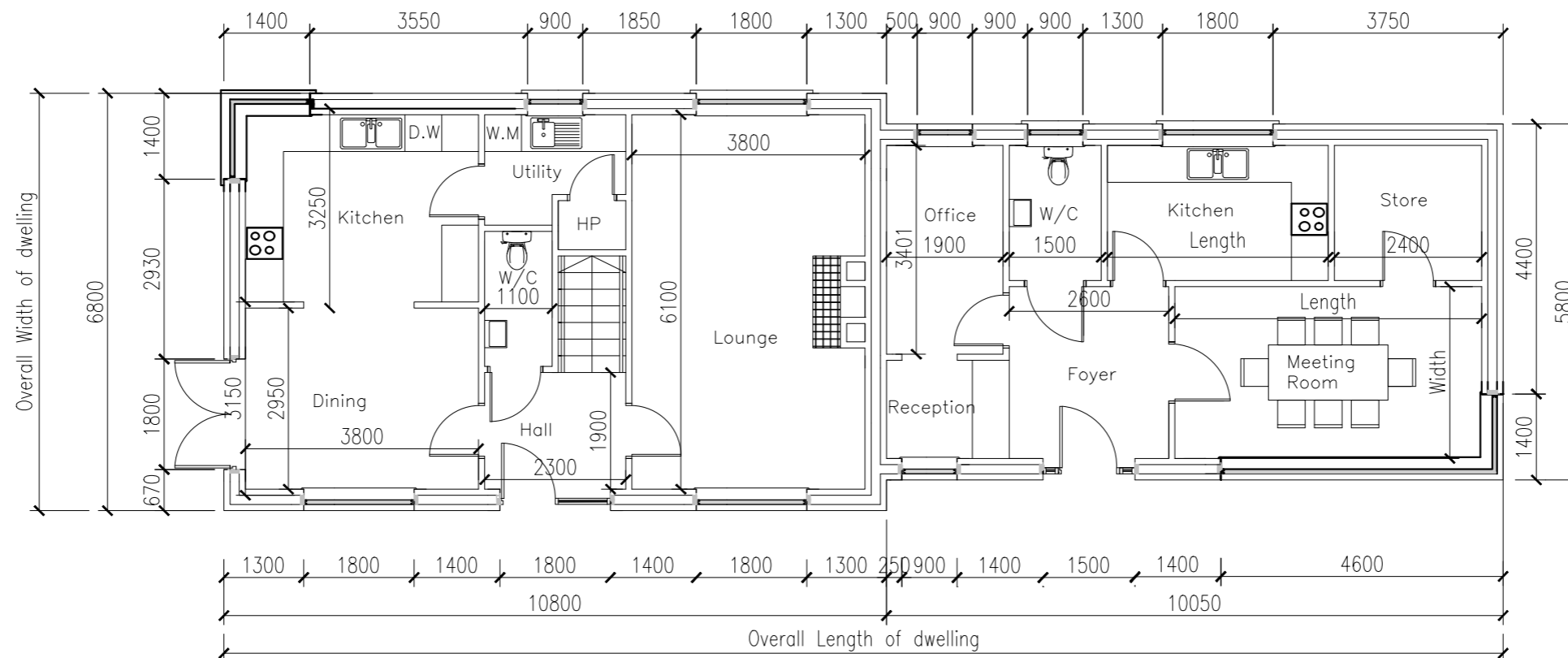
The design team has produced the drawings, which will be sufficient to satisfy the requirements of the local planning and building control authorities.

Specification notes for construction:

- **Walls:** Cavity wall construction comprising: 100 mm outer clay facing brickwork skin, 150 mm cavity with pumped insulation beads, 100 mm inner concrete blockwork skin with plastered finish.
- **Roof:** 35 degree pitched trussed roof comprising: 200 mm × 38 mm trusses spaced at 400 mm centres, 200 mm × 38 mm ceiling joists spaced at 400 mm centres supported on 100 mm × 50 mm timber wall plate. Tegral Thrutone slates.
- **Floor Construction:** Solid concrete floor comprising: 100 mm concrete slab, 125 mm Kingspan floor insulation, 25 mm to perimeter of slab, 1200-gauge damp proof membrane, 100 mm subfloor concrete on 20 mm blinding with 150 mm crusher run hardcore below.
- **First floor Construction:** Timber floor joist with T&G floorboards and plasterboard ceiling to underside.
- **Renewables:** Solar panels on the front south facing elevation providing hot water for the heating system.
- **Level threshold external doors:** Ground level to be graded at 1:20 to all external door exits.
- **Windows and doors:** Triple glazed engineered timber.
- **Damp proof course:** Vertical D.P.C. to all window and external door jambs, horizontal D.P.C. behind and under sills and stepped lintels. Wall D.P.C. to external skin, layers at 150 mm minimum above finished ground levels. D.P.C. to internal walls to overlap and be bonded to floor D.P.M. by a minimum of 215 mm.

NOTE Students will require the use of a scale ruler and calculator during the examination.

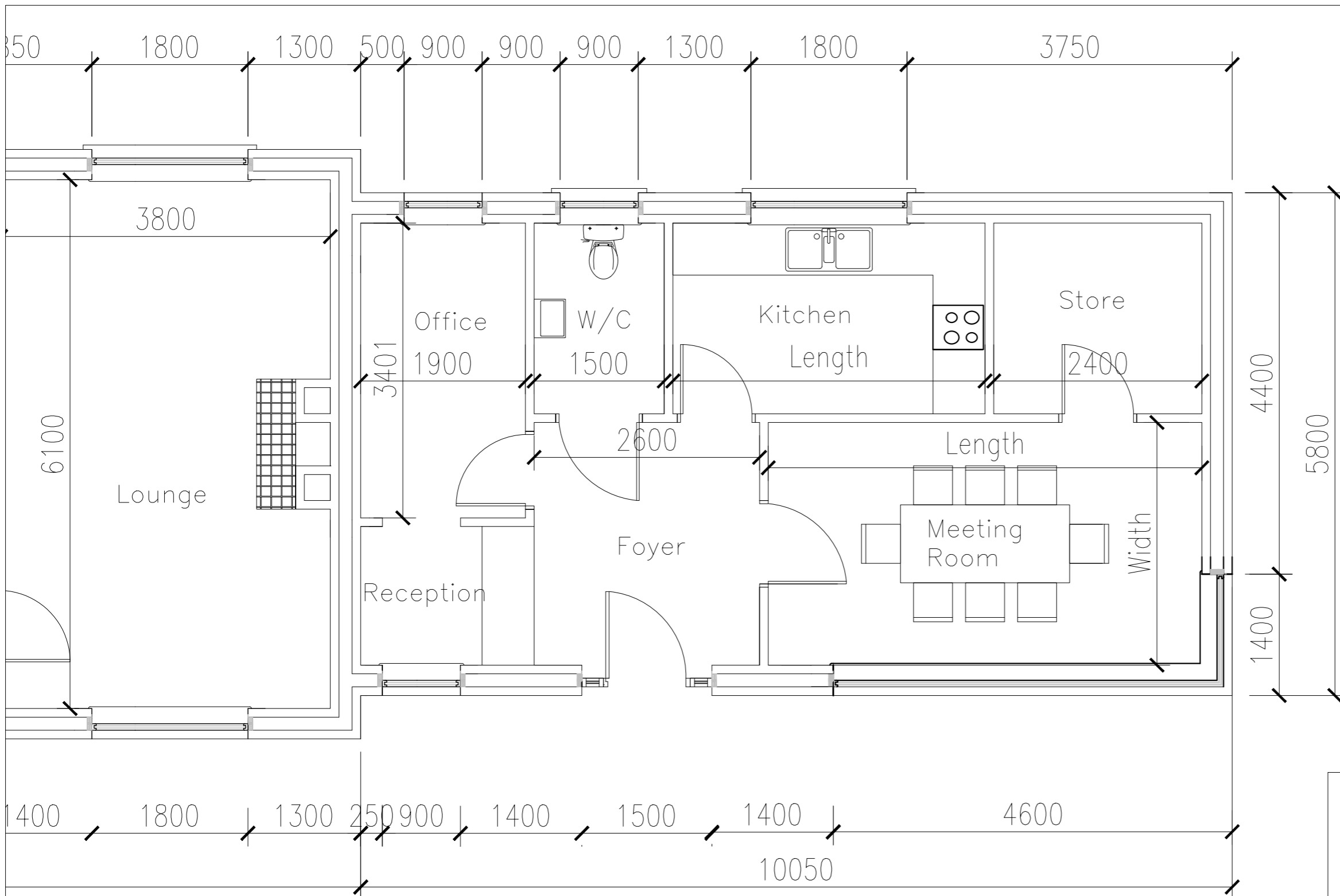
Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.



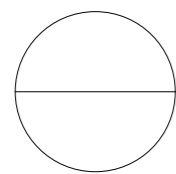
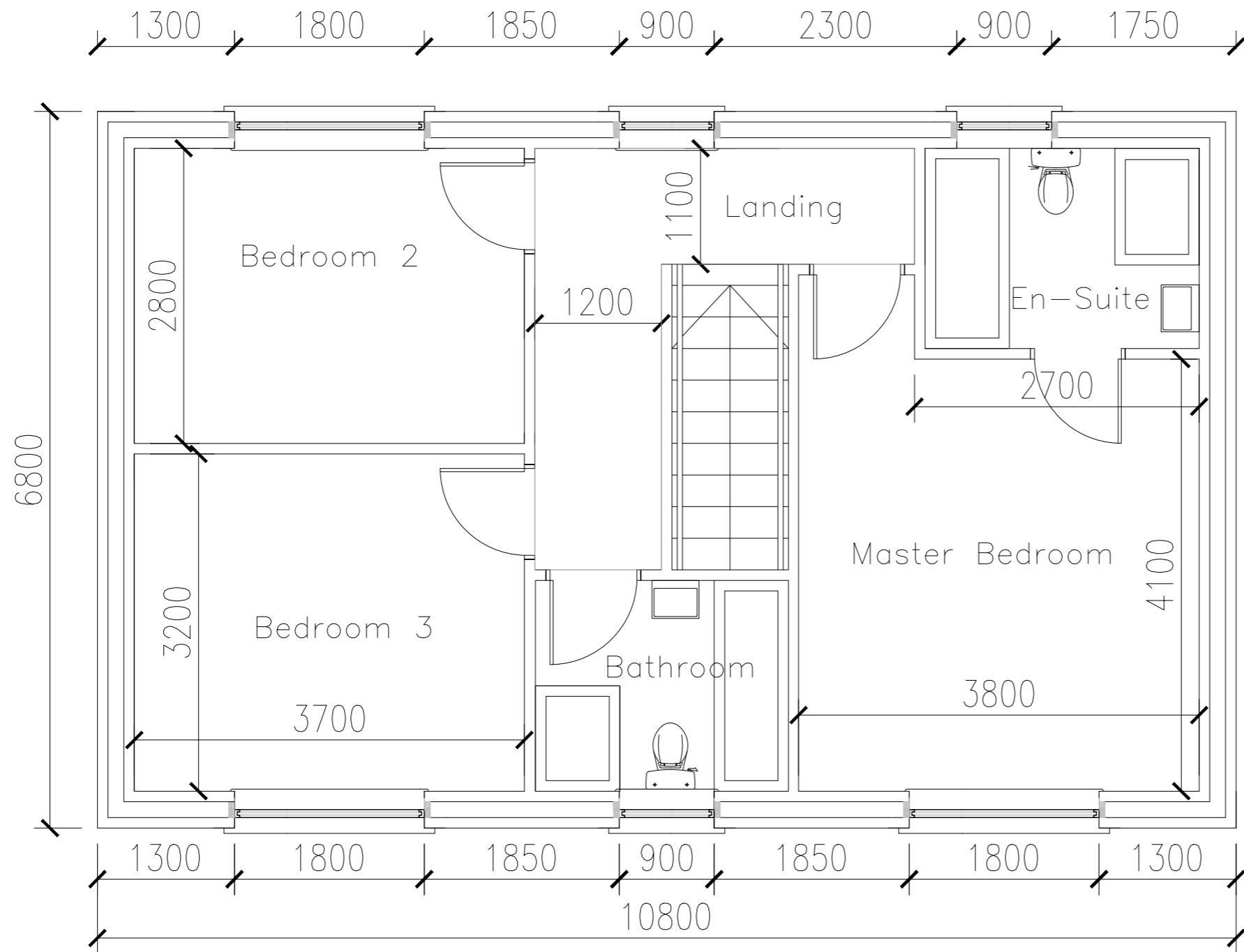
 **Ground Floor Plan**

GCSE Construction & The Built Environment

Drawing Name:	Ground Floor
Drawing Number:	01
Scale:	1:100
Date:	Summer 2022
Drawn By:	CCEA



GCSE Construction & The Built Environment	
Drawing Name:	Ground Floor
Drawing Number:	02
Scale:	1:50
Date:	Summer 2022
Drawn By:	CCEA



First Floor Plan

GCSE Construction & The Built Environment

Drawing Name:	First Floor
Drawing Number:	03
Scale:	1:50
Date:	Summer 2022
Drawn By:	CCEA

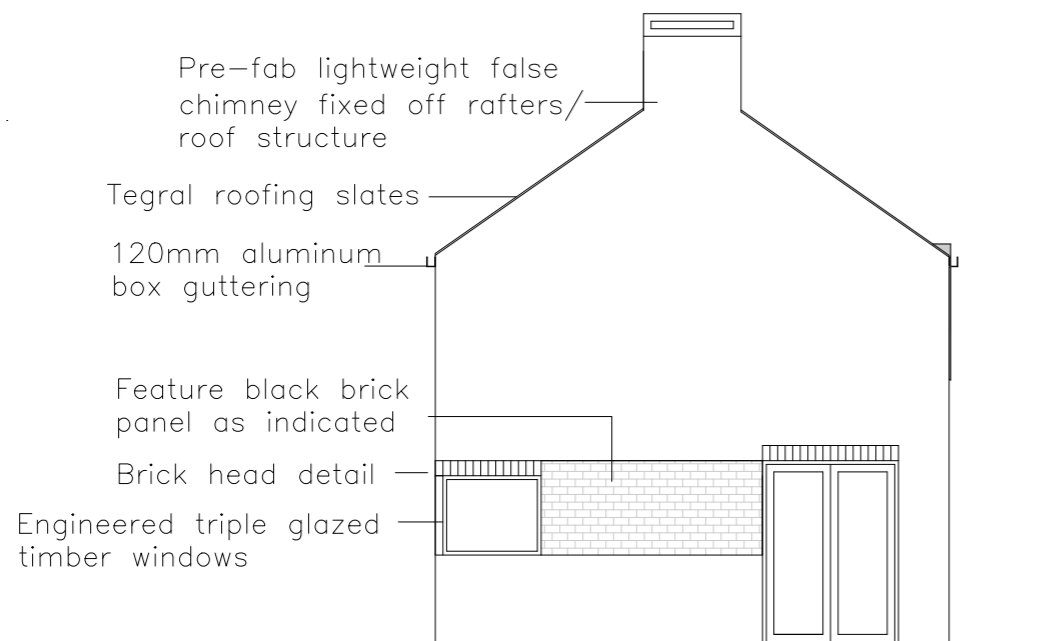


○ **Front Elevation**

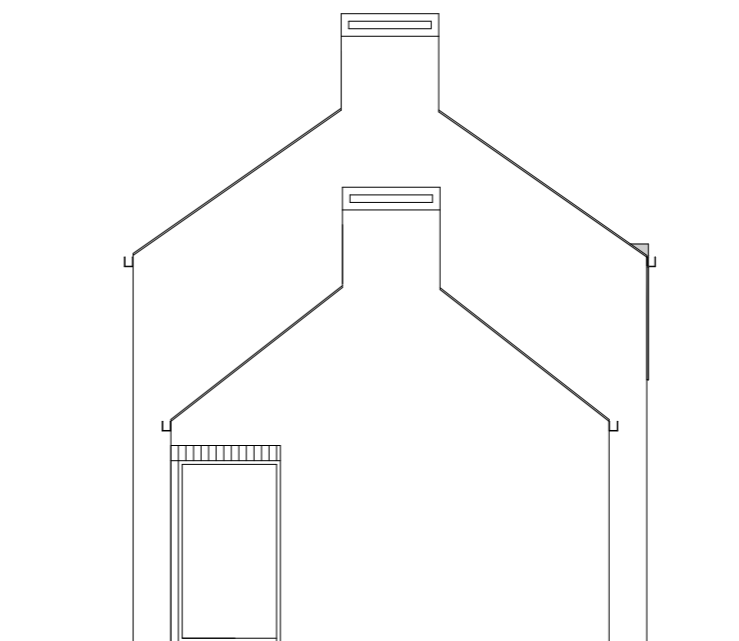


○ **Rear Elevation**

GCSE Construction & The Built Environment	
Drawing Name:	Elevations
Drawing Number:	04
Scale:	1:100
Date:	Summer 2022
Drawn By:	CCEA



○ **Left Side Elevation**



○ **Right Side Elevation**

**GCSE Construction
&
The Built Environment**

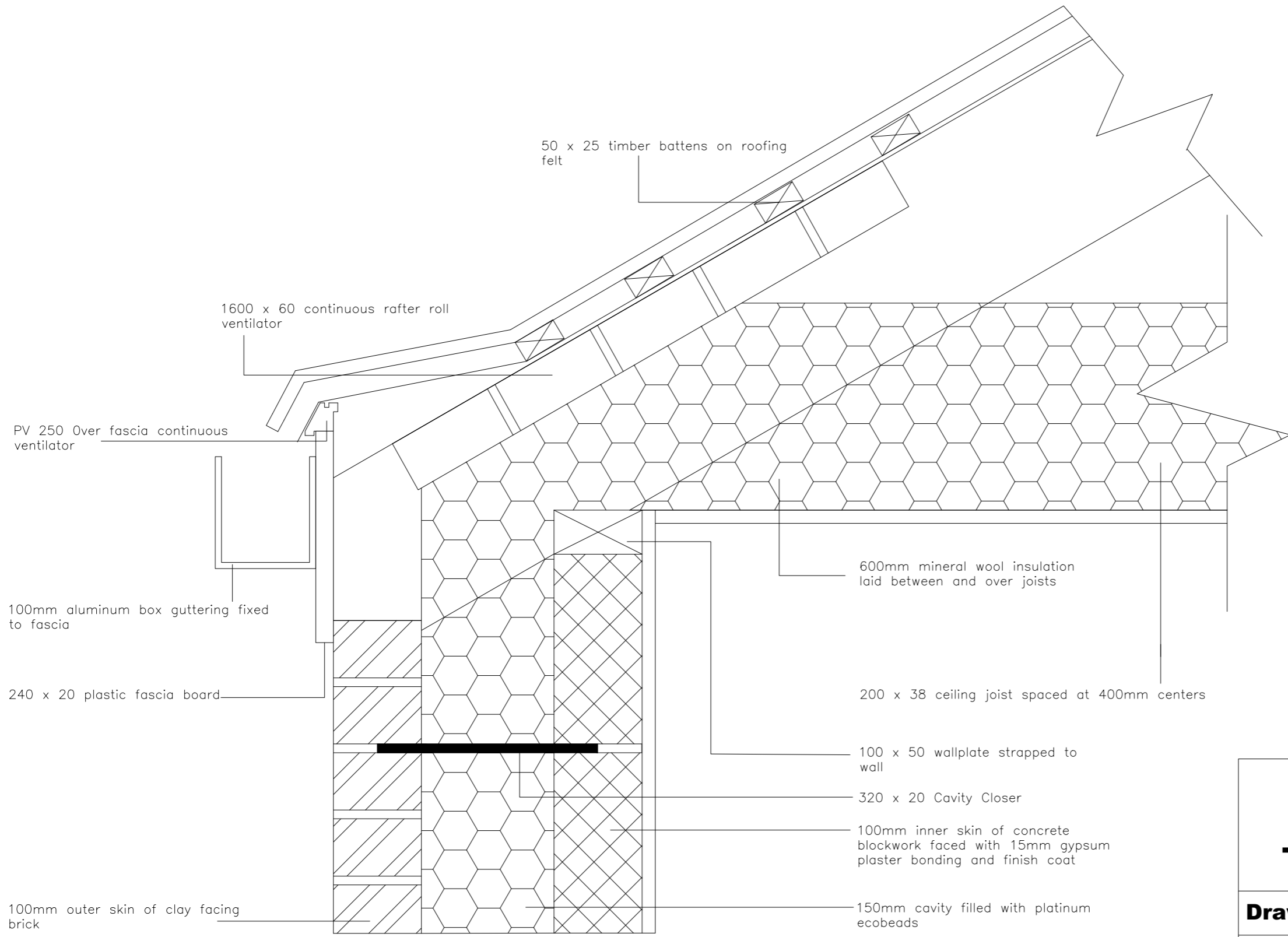
Drawing Name: Elevations

Drawing Number: 05

Scale: 1:100

Date: Summer 2022

Drawn By: CCEA



GCSE Construction & The Built Environment

Drawing Name:	Eaves Detail
Drawing Number:	06
Scale:	Not to Scale
Date:	Summer 2022
Drawn By:	CCEA

