Rewarding Learning

Centre Number

71

Candidate Number

General Certificate of Secondary Education
January 2011

Construction and the Built Environment

Assessment Unit 1: The Construction Industry for the 21st Century

assessing

The Construction Industry

[GCB11]

TUESDAY 11 JANUARY, AFTERNOON

GCB11

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 nine** questions.
Questions **1**, **2**, **3**, **6**, **7**, **8** and **9** should be answered in relation to the enclosed Barn conversion drawings and specifications previously issued as 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 **7** and **9**.

A scale rule is required.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Section A

Answer **all** questions.

Use the Pre-Release Material (Barn conversion drawings and specifications) to assist with answering questions 1, 2 and 3.

1 (a) Label the cross section in **Fig. 1** below using the following terms:

Dig up and remove ground floor and replace with new insulated solid concrete floor as specified.

Purlin

Sole plate of stud partition

Ceiling constructed from 12.5 mm plasterboard

Wall plate

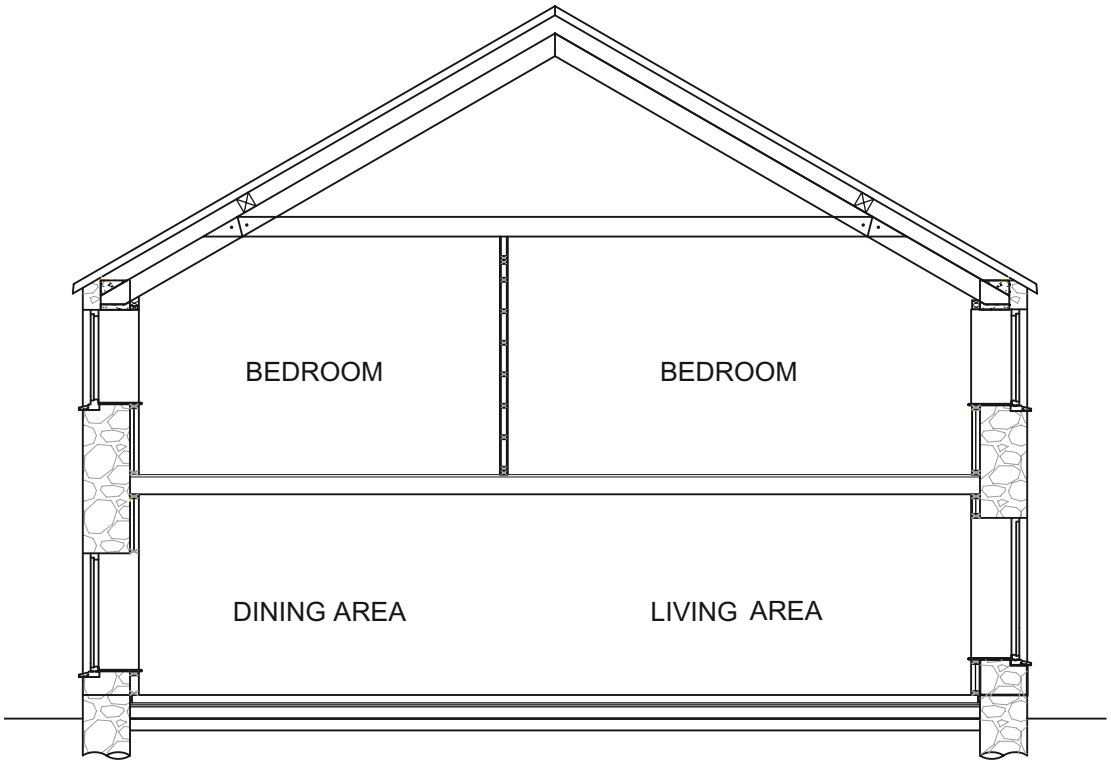

Fig. 1

[5]

Examiner Only

Marks	Remark

(b) What do the following symbols indicate?

SA _____ [1]

SG _____ [1]

HD _____ [1]

(c) What is the width of the structural opening required for an internal door?

_____ [1]

(d) How thick is the insulation which is required for the external walls?

_____ [1]

(e) What is the cross sectional size of the timber studs required for the stud walls?

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

2 **(a)** Explain **three** of the main roles that an Architect would have in relation to the barn conversion shown in the Pre-Release Material.

Architect

1. _____

_____

2. _____

_____

3. _____

_____ [3]

(b) Identify **three** of the main roles that the following craft operatives would have for the project shown in the Pre-Release Material.

Joiner

1. _____

_____

2. _____

_____

3. _____

_____ [3]

Plasterer

1. _____

_____

2. _____

_____

3. _____

_____ [3]

Examiner Only	
Marks	Remark

3 Using the attached Pre-Release Material, give the following internal room dimensions in millimetres and the areas in square metres. Some dimensions may need to be scaled.

(a) The length and width of the lounge.

Length _____ Width _____ [4]

The length and width of the utility room.

Length _____ Width _____ [4]

(b) The overall length of the barn from the outside of the walls.

Length _____ [2]

(c) The width and height of the dining area window at the rear of the house. Take this height at the highest point of the window.

Width _____ Height _____ [4]

(d) The total floor area of the Entrance Hall including the area under the stairs in square metres.

Floor area _____ [2]

(e) The floor to ceiling height of the rooms downstairs.

Height _____ [2]

Examiner Only	
Marks	Remark

4 The image shown in **Fig. 2** is typical of a specific type of framed construction.

Fig. 2

(a) Name the type of building structure shown in **Fig. 2**.

_____ [2]

(b) List **three** examples of the type of building occupancy this type of structure would be used for.

1. _____

2. _____

3. _____ [3]

(c) Why does this type of structure make it particularly well suited to the types of building occupancies listed in **(b)**?

_____

_____

_____ [2]

(d) List **two** disadvantages of using a framed structure like the one shown in **Fig. 2**.

1. _____

2. _____ [2]

(e) List **four** advantages of using a framed structure like the one shown in **Fig. 2**.

1. _____

2. _____

3. _____

4. _____ [4]

5 Three different materials have been outlined below. Provide **one** example of each material and **two** examples of where these materials would be used in a domestic dwelling.

(a) Give the name of **one** type of hardwood.

1. _____

Where would this hardwood be commonly used in domestic construction?

2. _____

3. _____ [3]

(b) Give the name of **one** type of softwood.

1. _____

Where would this type of softwood be used in domestic construction?

2. _____

3. _____ [3]

(c) Give the name of **one** type of paint.

1. _____

Where would this type of paint be used in domestic construction?

2. _____

3. _____ [3]

Examiner Only

Marks	Remark

Section B

Answer **all** questions.

Examiner Only	
Marks	Remark

6 **(a)** List **five** types of renewable energy which could be used to heat the barn.

1. _____

2. _____

3. _____

4. _____

5. _____ [5]

(b) Describe how **two** of the above types of renewable energy could be applied to the barn conversion shown in the Pre-Release Material to reduce energy costs.

1. _____

_____

_____

_____ [4]

2. _____

_____

_____

_____ [4]

Examiner Only	
Marks	Remark

7 **(a)** List **four** methods of construction, which could be used in the barn conversion, which will reduce the impact the construction process will have on the environment.

1. _____

2. _____

3. _____

4. _____ [4]

(b) Explain how and why both the client and contractor would want to reuse all of the existing materials from the site in the barn conversion where possible.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ [10]

Examiner Only	
Marks	Remark

8 The internal floor space within the structure of the barn shown in the Pre-Release Material is to be subdivided by timber stud partitions, or a one brick thick wall.

(a) In the box below complete the drawing showing the arrangement of stretcher bond brickwork.

[6]

(b) What is the typical horizontal spacing of wall ties?

_____ [2]

(c) What is the typical vertical spacing of wall ties?

_____ [2]

(d) What is the vertical spacing of wall ties at window and door jambs?

_____ [2]

(e) Name **one** material from which wall ties would commonly be made.

_____ [1]

9 The pitched roof of the barn shown in the Pre-Release Material is constructed using solid Oak timbers and natural slate.

Roof structures and their coverings have changed considerably in the United Kingdom over the last two centuries.
Using notes and annotated sketches show some of the stages in this development.

The following statement may help you with your answer.

Thatch roofing with natural timbers
Traditional cut roof structure
Trussed rafters
Composite sheet coverings [20]

Examiner Only	
Marks	Remark

Continue on next page

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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New Specification

Rewarding Learning

General Certificate of Secondary Education

January 2011

Construction and the Built Environment

Pre-Release Material

Assessment Unit 1: The Construction Industry for the 21st Century

assessing

The Construction Industry

[GCB11]

TUESDAY 11 JANUARY, AFTERNOON

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

6453.03
111509

Construction and the Built Environment

The following materials contain drawings and specifications relating to a barn constructed from stone.

The drawings and specifications relate to an existing barn which is constructed near a small river. The barn is in a rural area well sheltered by mature trees. The site is fairly flat with only a gentle fall towards the river.

The client intends to live in the property once completed.

He has employed an Architect to prepare his designs.

The contractor will be appointed on the basis of selective tendering. The contractor will employ the following team:

- Site Manager
- Joiner
- Plasterers
- Plumber
- Electrician

All other trades will be sub-contractors appointed by the main contractor.

Your client is very interested in environmental issues and wants to make best use of the existing materials already used in the barn. The client also would like to use all possible sustainable resources available on site to reduce his Carbon Footprint when living in the barn.

NOTE Students will require the use of a scale rule during the examination.

NOTE:-
ALL STRUCTURAL TIMBER TO BE 'DRY OR KD' (KILN DRIED)

STUD WALLS:
TO BE 100mm x 38mm STUDDING AT 400mm CENTRES WITH 9.5mm PLASTERBOARD AND SKIM FINISH TO EACH SIDE. INSTALL NOGGINS AT MAXIMUM 800mm CENTRES WITH 75mm FIBRE INSULATION BETWEEN STUDS.

COVED CEILING INSULATION:
100MM THICK KINGSPAN K7 ROOF BOARD PANELS FRICTION FITTED BETWEEN RAFTERS

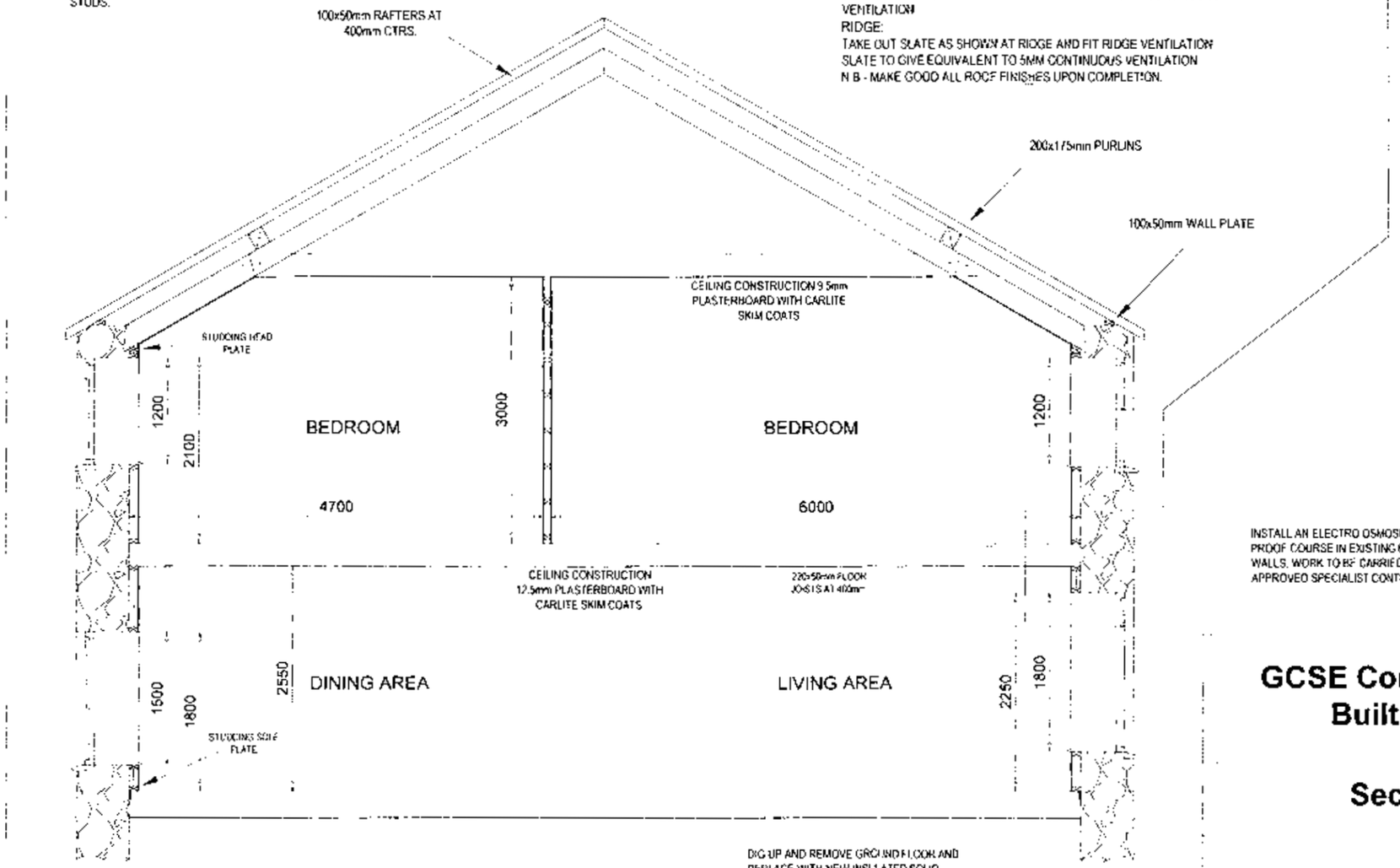
WALL INSULATION:
100MM THICK FIBRE GLASS QUILT

FLOOR INSULATION:
50MM THICK KINGSPAN K3 FLOOR BOARD.

EAVES / GABLE CLOSER / CAVITY CLOSER:
PROVIDE 12.5mm SUPALUX BEDDED IN 10mm MORTAR TO CLOSE CAVITY AT EAVES AND GABLE PEAKS TO PREVENT SPREAD OF FLAME. CAVITY WALLS TO BE CLOSED AT TOP BY SLATE OR BRICK BUILT ACROSS OR BY 12.5mm SUPALUX

FIRESTOPPING:
BUILD UP ALL BOUNDARY WALLS TO UNDERSIDE OF ROOF COVERING AND PROVIDE FIRE STOP WITH FIBRE QUILT

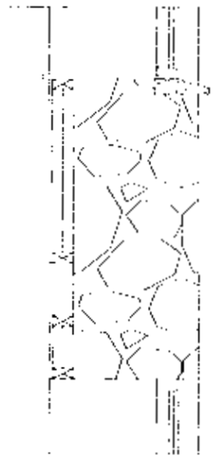
ROOF VENTILATION:
EAVES:
STRIP OFF FIRST RUN OF SLATES AT EAVES LEVEL AND FIT GLIDEVALE OVER FASCIA VENTILATOR IN CONJUNCTION WITH GLIDEVALE RAFTER VENTILATOR AT EAVES TO GIVE EQUIVALENT TO 10MM CONTINUOUS VENTILATION
RIDGE:
TAKE OUT SLATE AS SHOWN AT RIDGE AND FIT RIDGE VENTILATION SLATE TO GIVE EQUIVALENT TO 5MM CONTINUOUS VENTILATION
N B - MAKE GOOD ALL ROOF FINISHES UPON COMPLETION.



DAMP PROOF COURSE
TO COMPLY WITH BS743 AND TO BE A MIN OF 150mm ABOVE FINISHED GROUND OR PATH LEVEL. PROVIDE VERTICAL DPC AT ALL DOOR AND WINDOW JAMBS AND PROVIDE STEPPED DPC OVER ALL LINTELS. PROVIDE A MIN 100mm WIDE HORIZONTAL DPC TO OUTER SKIN OF EXTERNAL CAVITY WALL WITH 250mm DPC TO INNER SKIN LAPPED WITH FLOOR DPM

DIG UP AND REMOVE GROUND FLOOR AND REPLACE WITH NEW INSULATED SOLID CONCRETE FLOOR AS SPECIFIED.

SECTION A - A



Larger scale section.

INSTALL AN ELECTRO OSMOSIS DAMP PROOF COURSE IN EXISTING 600mm THICK WALLS. WORK TO BE CARRIED OUT BY APPROVED SPECIALIST CONTRACTOR.

GCSE Construction and the Built Environment

Sectional Detail

Unit 1
PRE - RELEASE MATERIALS
EXAMINATION SERIES 2010/2011
Scale 1:50

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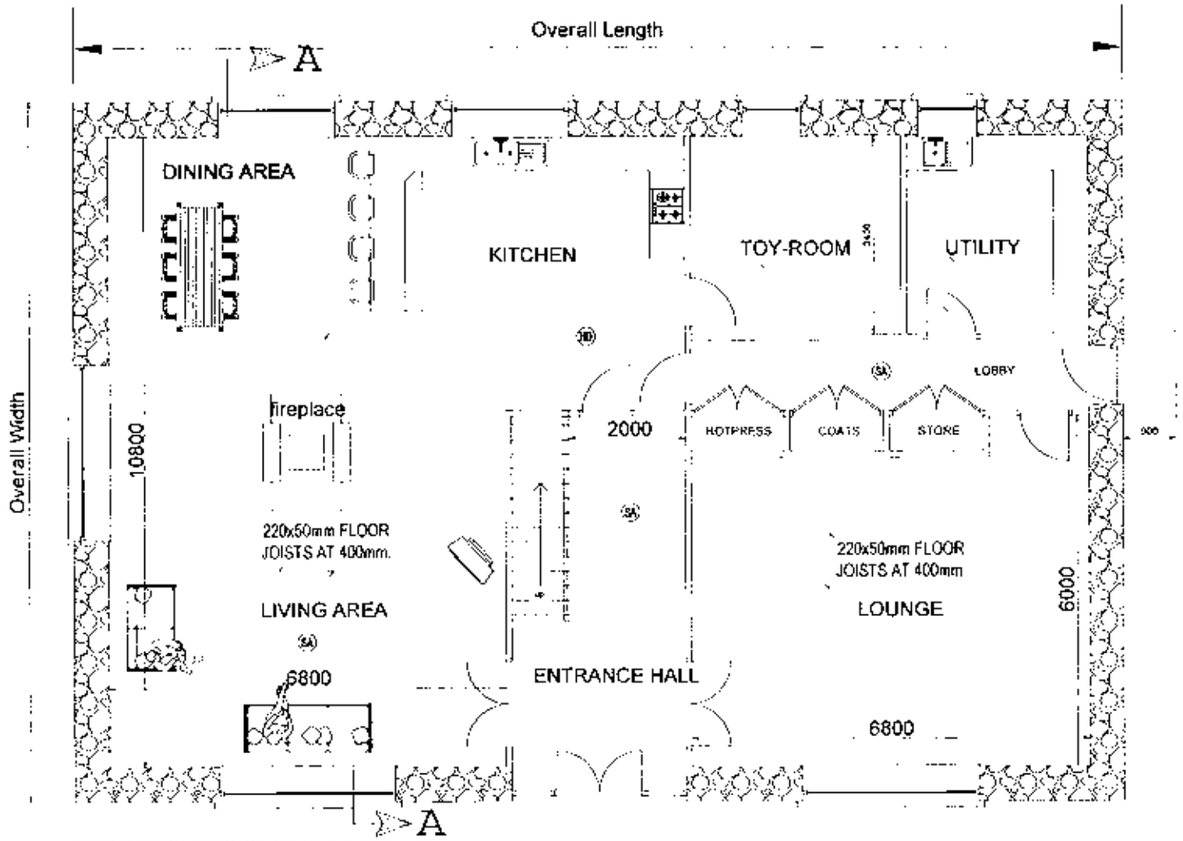
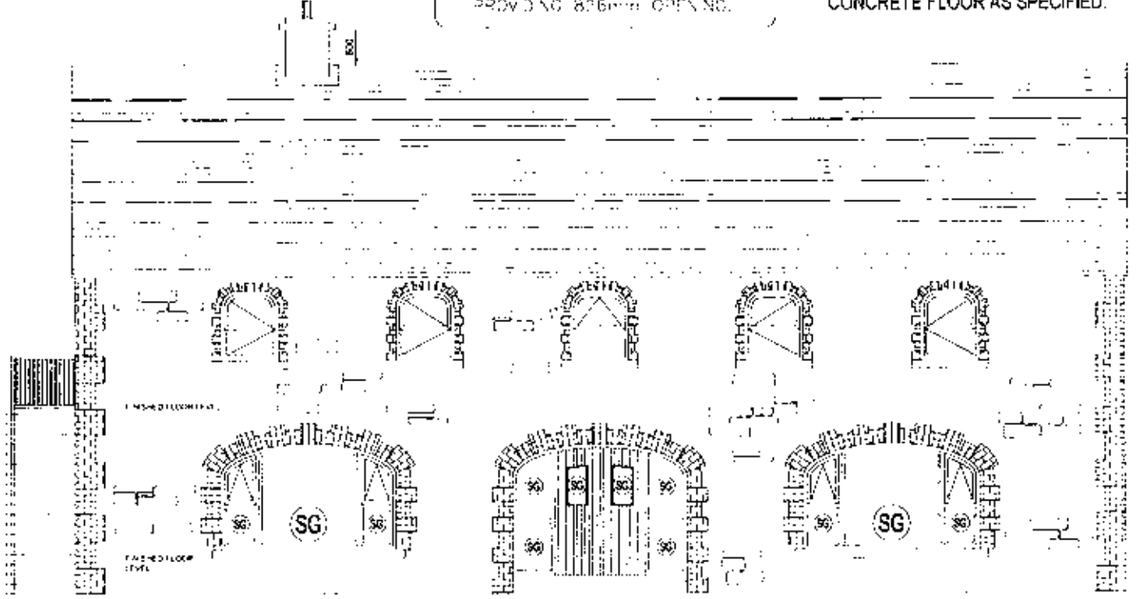


GROUND FLOOR PLAN (PROPOSED)

ALL INTERNAL DOORS TO BE 926mm STRUCTURE OPENING PROVIDING 826mm OPENING.

DIG UP AND REMOVE GROUND FLOOR AND REPLACE WITH NEW INSULATED SOLID CONCRETE FLOOR AS SPECIFIED.



FRONT ELEVATION (PROPOSED)

(SG) -INDICATES SAFETY GLAZING

(SA) -INDICATES SMOKE ALARM WITH SOUNDER

(HD) -INDICATES HEAT DETECTOR WITH SOUNDER

-INDICATES MECHANICAL EXTRACTION FAN

-INDICATES WALL STAT FOR BOILER

GROUND FLOOR CONSTRUCTION:
MINIMUM 100mm CONCRETE SCREED ON 50mm K3 FLOORBOARD PANELS ON VISQUEEN 1200 DPM ON MINIMUM 100mm CONCRETE SUB-FLOOR ON MINIMUM 150mm HARD-CORE COMPACTED IN MAXIMUM 225mm LAYERS. DPM TO BE TAKEN UP AT PERIMETER AND LAPPED WITH DPC. DPC TO BE MINIMUM 150mm ABOVE FINISHED GROUND LEVEL.

FLOOR JOISTS SPANNING IN EXCESS OF 2.5M SHALL BE STRUTTED BY ONE OR MORE ROWS OF SOLID OR HERRINGBONE STRUTTING IN ACCORDANCE WITH PART D OF THE BUILDING REGULATIONS TABLE 2.3. SOLID STRUTTING SHALL BE AT LEAST 38MM TIMBER THICKNESS EXTENDING AT LEAST 0.75 TIMES THE DEPTH OF THE JOISTS. HERRINGBONE STRUTTING SHALL BE AT LEAST 38X38MM TIMBER SIZE BUT SHALL NOT BE USED WHERE THE DISTANCE BETWEEN JOISTS IS GREATER THAN THREE TIMES THE DEPTH OF THE JOISTS.

ON COMPLETION:
ON COMPLETION OF DWELLING THE FOLLOWING INFORMATION MUST BE SUBMITTED OR CONFIRMED TO THE LOCAL COUNCIL:

- DWELLING CARBON EMISSIONS RATE (DER)
- SAP ENERGY RATING NOTICE (COPY MUST BE DISPLAYED IN THE DWELLING) A FURTHER CALCULATION ON APPROVED SAP 2005 SOFTWARE SHALL BE SUPPLIED AT COMPLETION STAGE TO CONFIRM THE DWELLING EMISSION RATE 'AS BUILT' (D.E.R.) COMPLIES WITH THE TARGET EMISSION RATE (T.E.R.), SAME TO BE PROVIDED WITHIN 5 DAYS OF COMPLETION.
- CONFIRMATION OF COMPLIANCE WITH THE DEPARTMENT FOR COMMUNITIES AND LOCAL GOVERNMENT (DCLG) " ACCREDITED CONSTRUCTION DETAILS" OR EQUIVALENT LEVEL OF PERFORMANCE.
- RESULTS OF AIR PERMEABILITY AND AIR PRESSURE TESTING.
- NOTICE SIGNED BY A SUITABLE QUALIFIED PERSON CONFIRMING THAT ALL FIXED SERVICES HAVE BEEN PROPERLY COMMISSIONED.
- CONFIRMATION THAT THE BUILDING OWNER HAS BEEN GIVEN SUFFICIENT INFORMATION INCLUDING OPERATIONAL AND MAINTENANCE INSTRUCTIONS TO ENABLE THE DWELLING AND ITS SERVICES TO BE OPERATED AND MAINTAINED IN AN ENERGY EFFICIENT MANNER.
- A DURABLE NOTICE SHALL BE FIXED AT AN APPROPRIATE LOCATION IN THE DWELLING FOR EACH HEARTH, FIREPLACE AND FLUE STATING:

1. LOCATION,
2. TYPE OF APPLIANCE THAT CAN BE ACCOMMODATED,
3. TYPE, SIZE AND MANUFACTURER OF FLUE OR LINER,
4. INSTALLERS NAME AND DATE OF INSTALLATION.

CEILINGS:
ALL GROUND FLOOR CEILINGS TO BE FACED WITH 12.5mm PLASTERBOARD AND FINISHED WITH 3mm GYPSUM PLASTER SKIM TO GIVE A MODIFIED ½ HOUR FIRE RESISTANCE. VAPOUR CONTROL LAYER TO WARM SIDE OF INSULATION TO ROOF AREA.

ROOFSPACE:
ROOF SPACE ACCESS HATCH TO BE 900mmx600mm AND INSULATED WITH POLYSTYRENE CUT TO FIT WITH NO GAPS AND SECURELY FIXED AREAS OF 1200mm MINIMUM AROUND ROOF SPACE ACCESS HATCH TO BE FLOORED WITH 20mm CHIPBOARD.

GCSE Construction and the Built Environment

Proposed changes to Existing Barn

Unit 1
PRE - RELEASE MATERIALS
EXAMINATION SERIES 2010/2011
Scale 1:100

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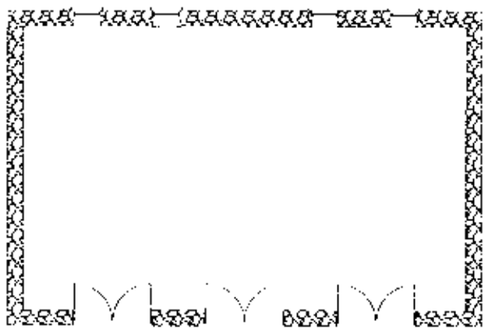
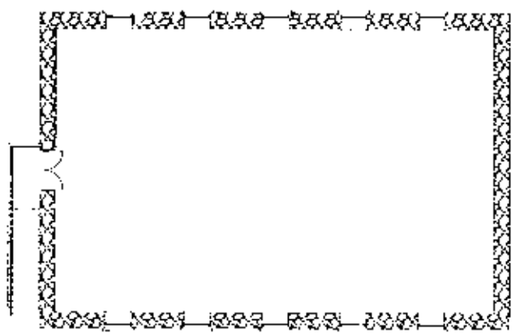
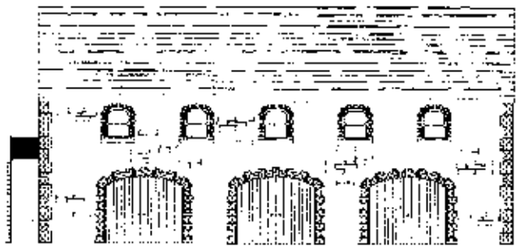


GROUND FLOOR PLAN (EXISTING)

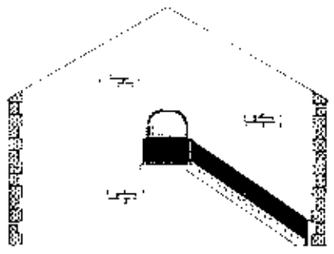


FIRST FLOOR PLAN (EXISTING)



FRONT ELEVATION (EXISTING)

REAR ELEVATION (EXISTING)



SIDE ELEVATION (EXISTING)

SIDE ELEVATION (EXISTING)

GCSE Construction and the Built Environment

Survey Details for Existing Barn

Unit 1
PRE - RELEASE MATERIALS
EXAMINATION SERIES 2010/2011
Scale 1:200

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