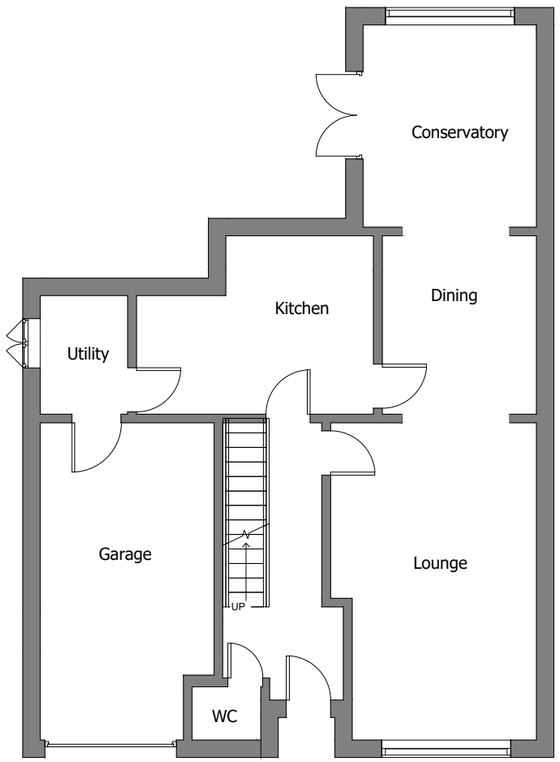
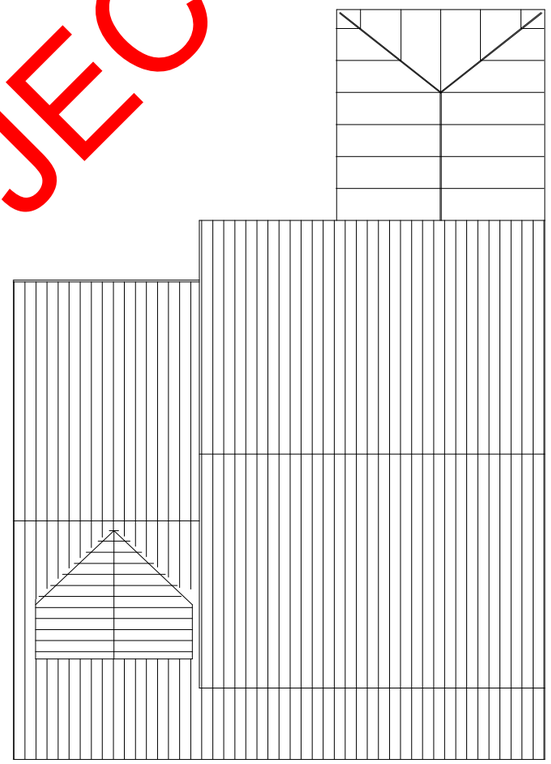


GROUND FLOOR PLAN

FIRST FLOOR PLAN



ROOF PLAN

Note: The dimension deviation can be up to +/-75mm due to the tolerances and human errors as the dimensions are recorded manually.
All the dimensios must check on site by contractor and such dimensions to be their responsilbility

Client Name

x

Project Address

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Section

GARAGE CONVERSION

Stage

ARCHITECTURAL

Drawing Title

EXISTING PLANS

Drawing Status

FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW		
Drawing No.	PLANNING-002		
Revision	00		
Scale at A3	1:100		
Date	06-03-24		
Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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Client Name

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Project Address

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Section

GARAGE CONVERSION

Stage

ARCHITECTURAL

Drawing Title

EXISTING ELEVATIONS

Drawing Status

FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW
Drawing No.	PLANNING-003
Revision	00
Scale at A3	1:100
Date	06-03-24

Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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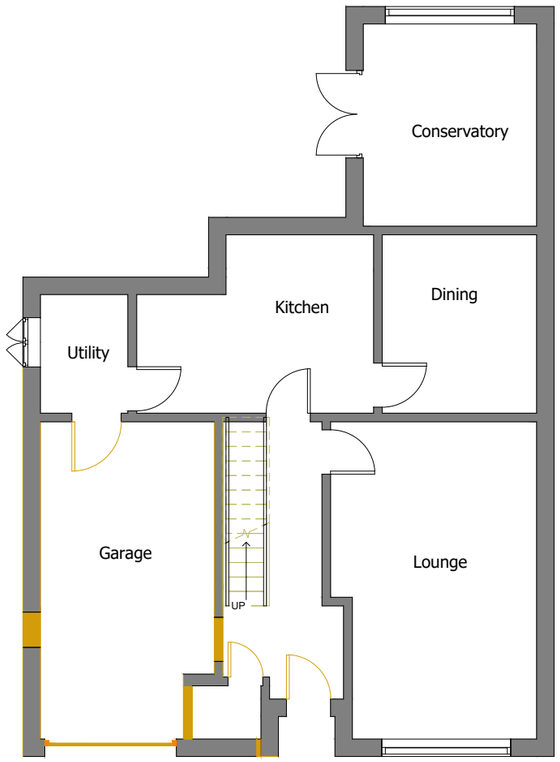
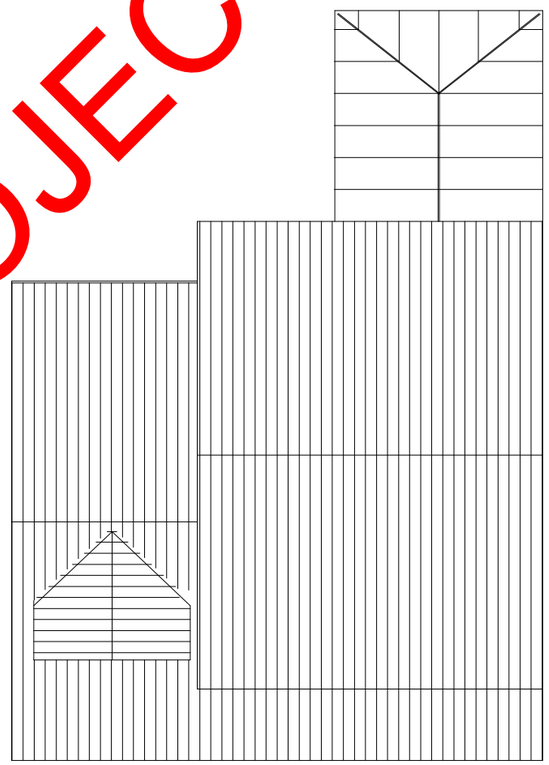


GROUND FLOOR PLAN

FIRST FLOOR PLAN



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Client Name
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Project Address
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Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
DEMO PLANS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW
Drawing No.	PLANNING-004
Revision	00
Scale at A3	1:100
Date	06-03-24
Designed	MM
Checked	MM
Drawn	MM
Approved	MM

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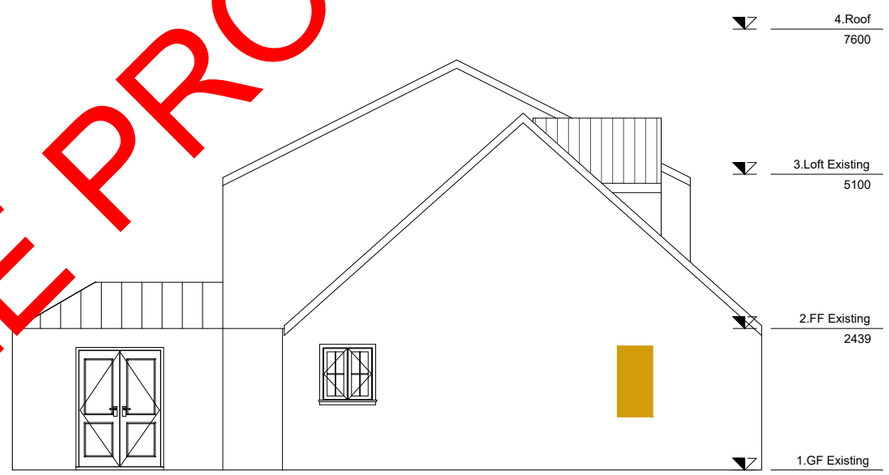

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Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
DEMO ELEVATIONS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW
Drawing No.	PLANNING-005
Revision	00
Scale at A3	1:100
Date	06-03-24

Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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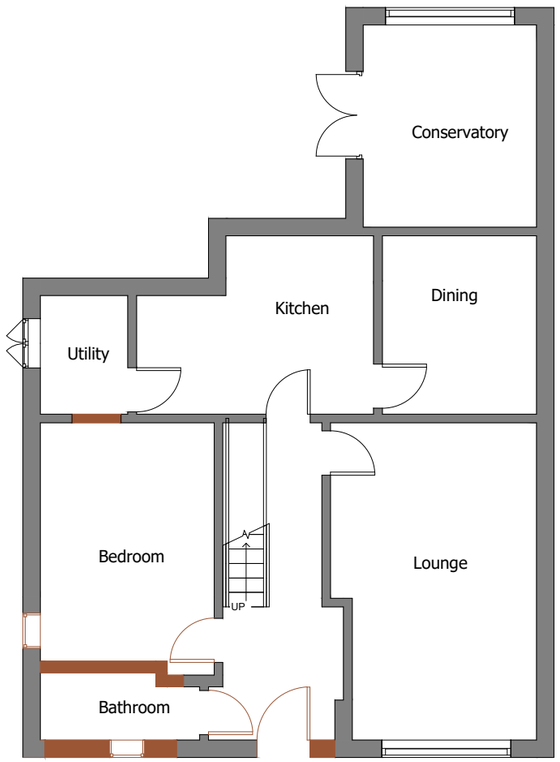
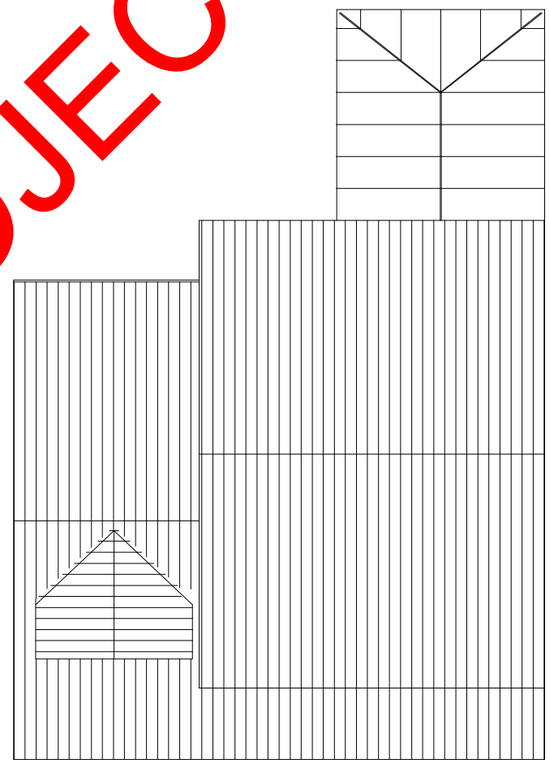


GROUND FLOOR PLAN

FIRST FLOOR PLAN



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Client Name
ANIL WANGOO

Project Address
5 IRIS CLOSE CR08XW

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
PROPOSED PLANS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	
Drawing No.	PLANNING-006
Revision	00
Scale at A3	1:100
Date	06-03-24
Designed	MM
Checked	MM
Drawn	MM
Approved	MM

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Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
PROPOSED ELEVATIONS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW
Drawing No.	PLANNING-007
Revision	00
Scale at A3	1:100
Date	06-03-24

Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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General Notes

1. All drawings to be read in conjunction with all relevant specifications, architect's drawings and services engineer's drawings.
2. For setting out refer to architect's drawings.
3. All dimensions are in millimetres unless noted otherwise.
4. Do not scale from the drawings or the computer digital data. Only figured dimensions to be used.

5. The contractor is to provide any temporary bracing necessary to maintain structural stability during construction.
6. The works have been designed and shall be constructed in accordance with the following codes. This list is not exhaustive and is only intended to list the principal codes:

a) BS EN 1991-1-1:2002, BS EN 1991-1-7:2006: Code of practice for dead and imposed loads.
b) BS EN 1991-1-4:2005+A1:2010: Code of practice for wind loads.
c) BS EN 1991-1-3:2003: Code of practice for imposed roof loads.
d) BS EN 1997-1:2004 : Code of practice for foundations.
e) BS EN 1992-1-1:2004: Structural use of concrete.
f) BS EN 1993-1-1:2005, BS EN 1993-1-5:2006, BS EN 1993-1-10:2005, BS EN 1993-5:2007, BS EN 1993-6:2007, BS EN 1993-1-8:2005: Structural use of steelwork in buildings.
g) PD 6697:2010, BS EN 1996-3:2006, BS EN 1996-2:2006, BS EN 1996-1-1:2005+A1:2012: Structural use of un-reinforced masonry.
h) BS EN 1995-1-1:2004+A1:2008: Structural use of timber.

7. The works have been designed for the finish state. The following superimposed loads have been used in the design:
Floor loads - See structural engineer's calculations.
Roof loads - See structural engineer's calculations.
8. All works shall comply with the Building Regulations and other relevant statutory notices e.g. Health and Safety Bylaws, COSHH etc
9. The client / appointed contractor must take their own assurances on:

a) Soil conditions on site and the gradient of land;
b) Suitability / existing methods of storm water drainage;
c) Trees (existing or removed) and their affect on foundations;
d) Position and condition of main sewer.

10. Extensions/alterations to existing structures are subject to revision depending upon such being fully exposed. The client/thier contractor must take their own assurances that any structure designated for demolition/removal are not load bearing or that alternative methods of permanent support are put in place prior to removal. Existing walls, lintels and foundations that are intended to take additional loads, must first be fully exposed and checked for adequacy prior to the commencement of works.

Foundations

1. The depth of the proposed foundations are subject to ground conditions and building control approval. These are to be minimum 1000mm deep subject to be founding in good ground of minimum 100kN/m2 bearing stratum (based on London Clay).
2. The excavations should be free from any mature tree roots. If there are large trees in the vicinity then the foundations depth is to be in accordance with NHBC standards guidelines for building near trees.
3. Where new foundations are to abut existing foundations, a soft joint of 75mm is to be formed using 'Claymaster' or similar approved unless noted otherwise on the drawings.
4. Any foundations deeper than 1.5m should have suspended floors to avoid any heave. Where the foundations are cast within highly shrinkable soils, then anti-heave precautions such as compressible materials or void formers are to be applied to the foundations.

Notes for Timber

1. These notes are to be read in conjunction with relevant architect's and services engineer's drawings and specification.
2. All timber-work shall comply with BS EN 1995-1-1:2004+A1:2008.
3. Roof area:

a) Roof joists shall be grade C24. Evidence of grading shall be provided before work commences;
b) Blocking and battens shall be grade C24 softwood;
c) The sizes shown on the drawings are finished sizes;
d) In joint zones wanes, shakes and knots are not permitted;
e) Timber to be carefully cut and planed to ensure tight fit and continuous bearing against metalwork;
f) All gaps between timber and metalwork to be resin-grouted, to the approval of the engineer.

4. All connectors, bolts, nails etc. shall be galvanised to BS 729.
5. Adhesive shall be to BS1204: Part 1: 1970, Type WBP.
6. All timber to be treated in accordance with the British Wood Preservative and Damp-proofing Association Commodity Specification C3 for 40 years desired service life.

Notes for Fire Resistance

1. These notes are to be read in conjunction with relevant architect's services engineer's drawings and specifications.
2. All habitable doors to stairs enclosure and the kitchen to be filled with self-closing devices.
3. Any glazing within the stair enclosure, including glazing to doors, to be fire-resisting.
4. Mains powered interconnected smoke alarms to be provided to entrance lobby and all stairs landings.
5. Class 1 flame spread to be provided to all new walls and ceilings.

Notes for Masonry

1. These notes are to be read in conjunction with relevant architect's services engineer's drawings and specifications.
2. All brickwork shall comply with PD 6697:2010, BS EN 1996-3:2006, BS EN 1996-2:2006, BS EN 1996-1-1:2005+A1:2012 .
3. All bricks shall have a minimum crushing strength of 20N/mm².
4. Blockwork shall have a minimum crushing strength of 7N/mm².
5. Mortar shall be a Class (ii) cement: lime putty: sand mix (1:1/2:4), unless indicated otherwise.
6. All vertical joints shall be completely filled. Bricks shall be laid frog up. The voids in perforated bricks shall be filled.
7. Fissured bricks or bricks with voids shall not be used.
8. Horizontal chases are prohibited. Vertical chases and builderswork holes shall be agreed with the architect.

Notes for Structural Steelwork

1. These notes are to be read in conjunction with relevant architect's and services engineer's drawings and specifications.
2. All steelwork shall comply with BS EN 1993-1-1:2005, BS EN 1993-1-5:2006, BS EN 1993-1-10:2005, BS EN 1993-5:2007, BS EN 1993-6:2007, BS EN 1993-1-8:2005.
3. Unless noted otherwise stipulated structural steelwork shall confirm to BS EN: Weldable structural steels.
4. Unless noted otherwise all steel shall be grade S355. Steel grade shall conform with EC-3.
5. Unless noted otherwise all butt welds shall be full penetration.
6. Unless noted otherwise all fillet welds shall be full profile with a minimum leg length of 6mm.
7. Unless noted otherwise all ordinary bolt assemblies shall be Grade 8.8.
8. Unless noted otherwise all bolts shall be M16.
9. Unless noted otherwise all holding down bolts shall be M16 Grade 8.8 anchored a minimum of 200mm depth into the supporting concrete with a 100 x 100 x 8 thick washer plate at the embedded head of the bolt.
10. The clearance of base plates from supporting concrete shall be a minimum of 20mm and on completion of erection this shall be grouted solid under the full area of the base plate with 1:2 sand: cement grout.
11. Corrosion protection:

a) Surface protection - blast clean to SA 2.5 quality BS EN ISO 8501-1.
b) Prefabricator primer - epoxy zinc phosphate hb: 50 microns (DFT).
c) Finishing coat - see arch's spec.
d) See arch's specification for details on colour and texture.

12. Fire protection:
30min - One layer of plasterboard and skim coat or intumescent paint to manufacturer's specification.
60min - Two layers of plasterboard with joints staggered and skim coat or intumescent paint to manufacturer's specification.
13. Weather protection: Any steelwork exposed to external weather is either to be galvanized or stainless steel UNO.
14. All steel beams carrying load-bearing masonry walls wider than their flanges are to have 12mm thick top/bottom flange plates continuously welded along the length to suit the wall width UNO.

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Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
GENERAL NOTES

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW		
Drawing No.	PLANNING-001		
Revision	00		
Scale at A3	1:100		
Date	06-03-24		
Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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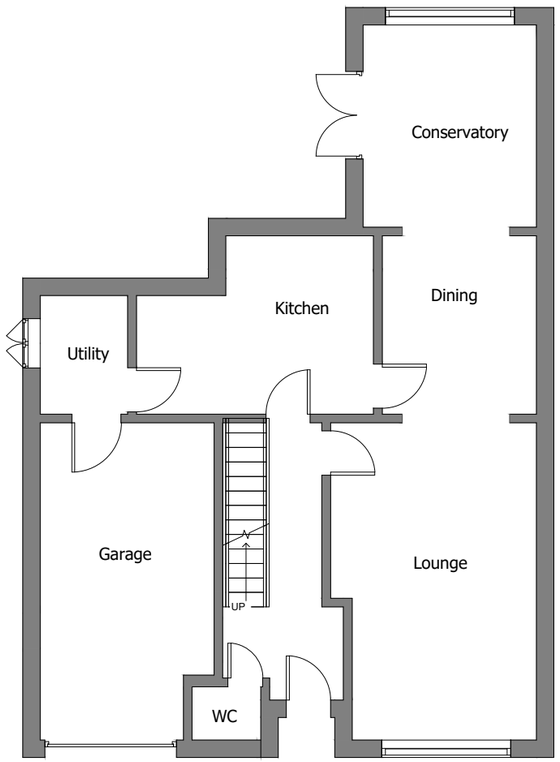
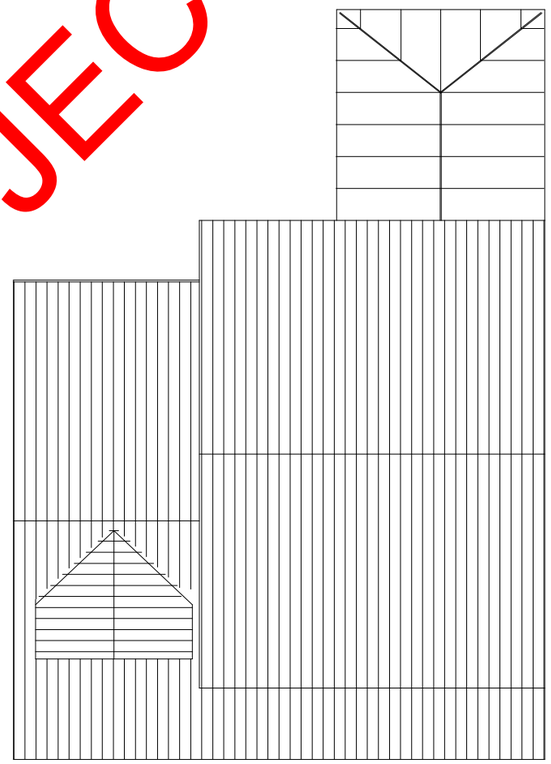


GROUND FLOOR PLAN

FIRST FLOOR PLAN



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Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
EXISTING PLANS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW		
Drawing No.	PLANNING-002		
Revision	00		
Scale at A3	1:100		
Date	06-03-24		
Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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Client Name

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Drawing Title
EXISTING ELEVATIONS

Drawing Status
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Revisions and Notes

Project No.	2024-03-CR0 8XW
Drawing No.	PLANNING-003
Revision	00
Scale at A3	1:100
Date	06-03-24

Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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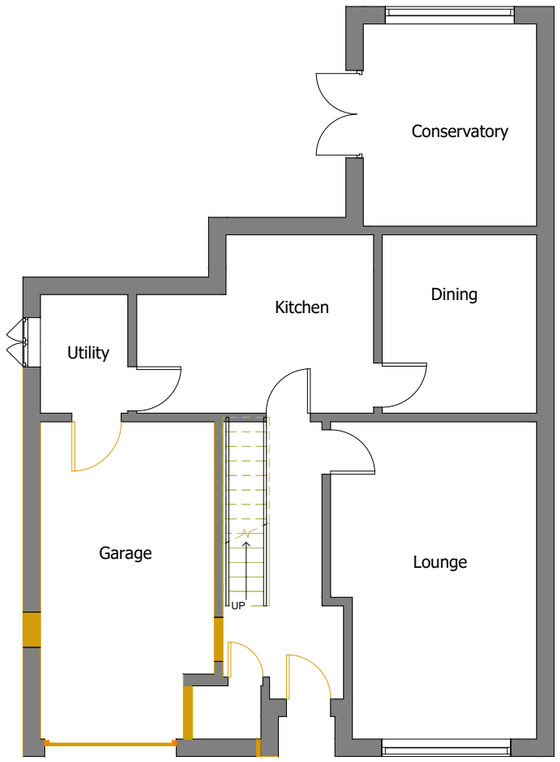

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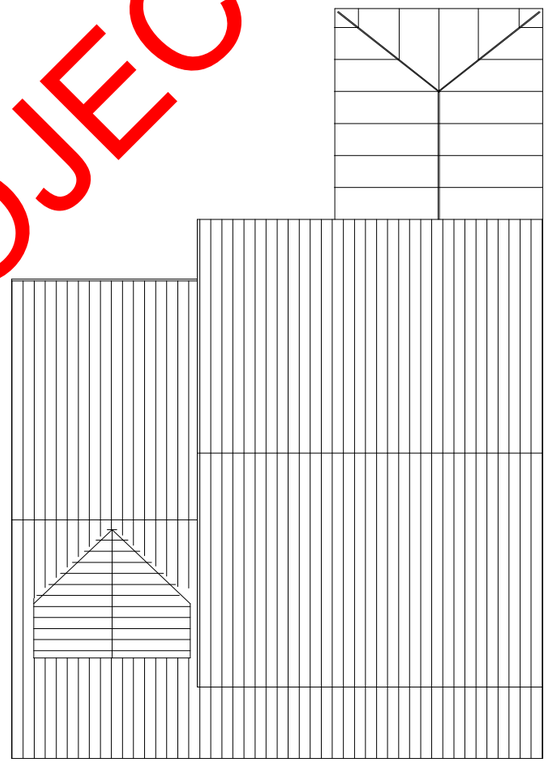

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Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
DEMO PLANS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW		
Drawing No.	PLANNING-004		
Revision	00		
Scale at A3	1:100		
Date	06-03-24		
Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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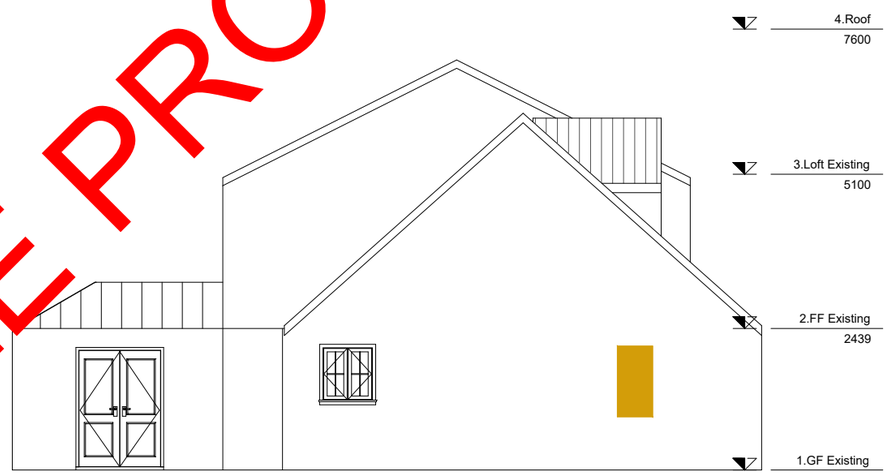

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Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
DEMO ELEVATIONS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW
Drawing No.	PLANNING-005
Revision	00
Scale at A3	1:100
Date	06-03-24

Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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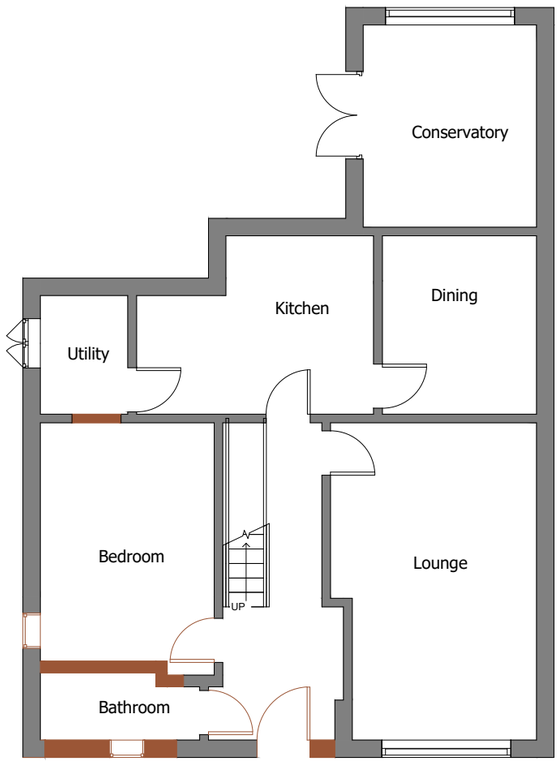

GROUND FLOOR PLAN

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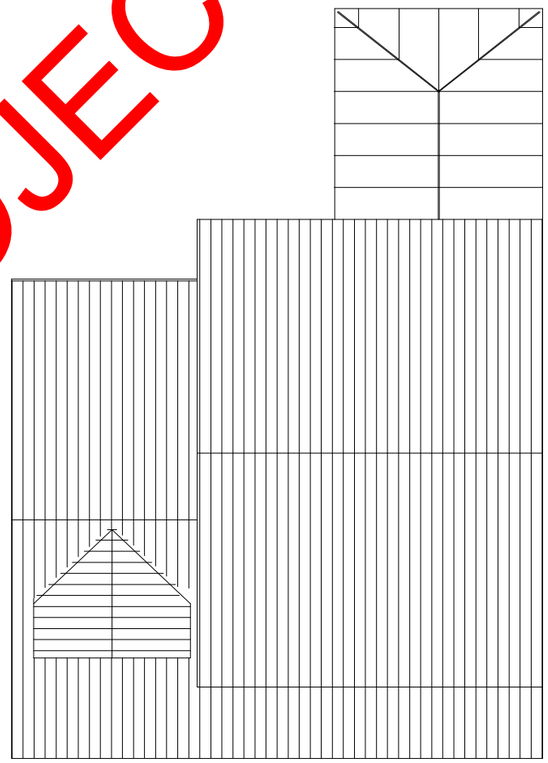

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Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
PROPOSED PLANS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW
Drawing No.	PLANNING-006
Revision	00
Scale at A3	1:100
Date	06-03-24

Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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ARCHITECTURAL

Drawing Title
PROPOSED ELEVATIONS

Drawing Status
FOR APPROVAL

Revisions and Notes

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Drawing No.	PLANNING-007
Revision	00
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Date	06-03-24

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ELECTRICAL

ALL ELECTRICAL WORK REQUIRED TO MEET THE REQUIREMENTS OF PART P (ELECTRICAL SAFETY) MUST BE DESIGNED, INSTALLED, INSPECTED AND TESTED BY A COMPETENT PERSON REGISTERED UNDER A COMPETENT PERSON SELF CERTIFICATION SCHEME SUCH AS BRE CERTIFICATION LTD, BSI, NICEIC CERTIFICATION SERVICES OR ZURICH LTD. AN APPROPRIATE BS7671 ELECTRICAL INSTALLATION CERTIFICATE IS TO BE ISSUED FOR THE WORK BY A PERSON COMPETENT TO DO SO. A COPY OF A CERTIFICATE WILL BE GIVEN TO BUILDING CONTROL ON COMPLETION.

INTERNAL LIGHTING

INSTALL LOW ENERGY LIGHT FITTINGS THAT ONLY TAKE LAMPS HAVING A LUMINOUS EFFICIENCY BETTER THAN 80 LUMENS PER CIRCUIT WATT. ALL FIXED TO HAVE LIGHTING CAPACITY (LM) 185 X TOTAL FLOOR AREA, TO COMPLY WITH PART L OF THE CURRENT BUILDING REGULATIONS AND THE DOMESTIC BUILDING SERVICES COMPLIANCE GUIDE.

SMOKE DETECTERS:
L3 FIRE ALARM SYSTEM TO BS 5839 TO BE INSTALLED (PROTECTION OF ESCAPE ROUTES). MAINS POWERED SMOKE DETECTORS(SD), WITH BACKUP BATTREY, TO BE FITTED IN HALLWAY AND UPPER LANDINGS, ALL LINKED TO EACH OTHER AND ON AN INDEPENDANT CIRCUIT WITH A SEPERATE FUSE.

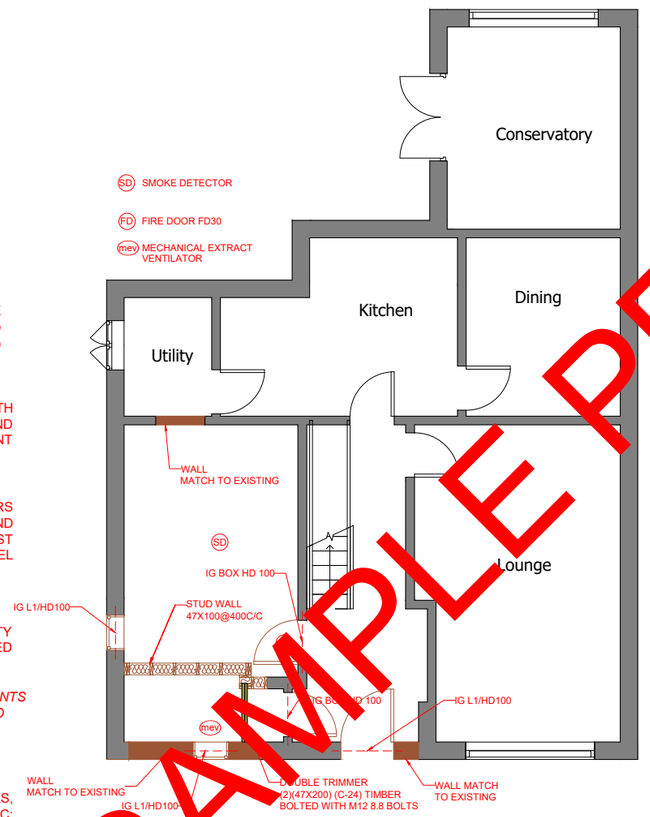
ALL SMOKE DETECTORS(SD) & ALARMS (TO BS 5446-1) TO BE MAINS POWERED, WITH BACKUP BATTERY AND TO BE FITTED IN THE CIRCULATION SPACE IN HALLWAY AND ALL UPPER LANDINGS, ALL LINKED TO EACH OTHER AND ON AN INDEPENDENT CIRCUIT WITH A SEPARATE FUSE. EXACT POSITIONS TO BE CONFIRMED ON SITE

FIRE DOORS
ALL DOORS TO HABITABLE ROOMS WITHIN STAIR ENCLOSURE TO BE FD30 DOORS FITTED WITH A PERKOMATIC SELF CLOSER. 25X38MM DOOR STOPS GLUED AND SCREWED TO FRAME. THIS IS NOT REQUIRED FOR A TWO STORY (GROUND+FIRST FLOOR) BUILDING BUT STRONGLY RECOMMENDED. DOORS TO BE FULL PANEL DOORS WITH NO GLAZING.

DETAILS ON CABLING FOR COMPUTERS AND NETWORKING, TELEPHONE, SECURITY SYSTEM, MUSIC SYSTEM, DOOR ENTRY AND CONTROL SYSTEM, ETC. TO BE AGREED SEPARATELY.

ALL ELECTRICAL WIRING & INSTALLATIONS TO CONFORM TO BS7671 "REQUIREMENTS FOR ELECTRICAL INSTALLATIONS" AND ANY OTHER REGULATIONS APPLICABLE TO SIMILAR RESIDENTIAL HOUSES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL THE TEMPORARY WORKS, THE STABILITY OF THE EXISTING STRUCTURE, EARTHWORKS,EXCAVATIONS, ETC; THE CONTRACTOR WILL ENSURE THAT THE BUILDINGS WILL BE ADEQUATELY SUPPORTED AT ALL STAGES OF CONSTRUCTION, INCLUDING ANY EARTHWORK SUPPORTS MADE NECESSARY BY EXCAVATIONS AND GROUND CONDITIONS. THE SUPPORTS AND PROPS TO BE PROVIDED TILL THE FINAL RETAINING WALL IS IN PLACE.



GROUND FLOOR WALL & LINTEL PLAN

NEW AND REPLACEMENT WINDOWS

NEW AND REPLACEMENT WINDOWS TO BE DOUBLE GLAZED WITH 16-20MM ARGON GAP AND SOFT COAT LOW-E GLASS. WINDOW ENERGY RATING TO BE BAND B OR BETTER AND TO ACHIEVE U-VALUE OF 1.4 W/M²K. THE DOOR AND WINDOW OPENINGS SHOULD BE LIMITED TO 25% OF THE EXTENSION FLOOR AREA PLUS THE AREA OF ANY EXISTING OPENINGS COVERED BY THE EXTENSION.
INSULATED PLASTERBOARD TO BE USED IN REVEALS TO ABUT JAMBS AND TO BE CONSIDERED WITHIN REVEAL SOFFITS. FULLY INSULATED AND CONTINUOUS CAVITY CLOSERS TO BE USED AROUND REVEALS.
WINDOWS AND DOOR FRAMES TO BE TAPED TO SURROUNDING OPENINGS USING AIR SEALING TAPE.
WINDOWS TO BE FITTED WITH TRICKLE VENTS TO PROVIDE ADEQUATE BACKGROUND VENTILATION IN ACCORDANCE WITH APPROVED DOCUMENT F.

NEW AND REPLACEMENT DOORS

NEW AND REPLACEMENT DOORS TO ACHIEVE A U-VALUE OF 1.4W/M²K. GLAZED AREAS TO BE DOUBLE GLAZED WITH 16-20MM ARGON GAP AND SOFT LOW-E GLASS. GLASS TO BE TOUGHENED OR LAMINATED SAFETY GLASS TO BS 6206, BS EN 14179 OR BS EN ISO 12543-1 AND PART K OF THE CURRENT BUILDING REGULATIONS.
INSULATED PLASTERBOARD TO BE USED IN REVEALS TO ABUT JAMBS AND TO BE CONSIDERED WITHIN REVEAL SOFFITS. FULLY INSULATED AND CONTINUOUS CAVITY CLOSERS TO BE USED AROUND REVEALS.
WINDOWS AND DOOR FRAMES TO BE TAPED TO SURROUNDING OPENINGS USING AIR SEALING TAPE.
THERMAL BRIDGING
CARE SHALL BE TAKEN TO LIMIT THE OCCURRENCE OF THERMAL BRIDGING IN THE INSULATION LAYERS CAUSED BY GAPS WITHIN THE THERMAL ELEMENT, (I.E. AROUND WINDOWS AND DOOR OPENINGS). REASONABLE PROVISION SHALL ALSO BE MADE TO ENSURE THE EXTENSION IS CONSTRUCTED TO MINIMIZE UNWANTED AIR LEAKAGE THROUGH THE NEW BUILDING FABRIC.

MATERIALS AND WORKMANSHIP
ALL WORK WILL COMPLY WITH THE THE CURRENT BUILDING REGULATIONS AND WILL BE CARRIED OUT TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.

ALL STAGES OF WORK ARE TO BE CHECKED AND AGREED ON SITE WITH THE BUILDING INSPECTOR BEFORE COVERING OVER.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL THE TEMPORARY WORKS, THE STABILITY OF THE EXISTING STRUCTURE, EARTHWORKS,EXCAVATIONS, ETC; THE CONTRACTOR WILL ENSURE THAT THE BUILDINGS WILL BE ADEQUATELY SUPPORTED AT ALL STAGES OF CONSTRUCTION, INCLUDING ANY EARTHWORK SUPPORTS MADE NECESSARY BY EXCAVATIONS AND GROUND CONDITIONS. THE SUPPORTS AND PROPS TO BE PROVIDED TILL THE FINAL RETAINING WALL IS IN PLACE.

Note: The dimension deviation can be up to +/-75mm due to the tolerances and human errors as the dimensions are recorded manually.
All the dimensios must check on site by contractor and such dimensions to be their responsilbility

Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
STRUCTURAL PLAN

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW
Drawing No.	PLANNING-008
Revision	00
Scale at A3	1:100
Date	06-03-24
Designed	MM
Checked	MM
Drawn	MM
Approved	MM

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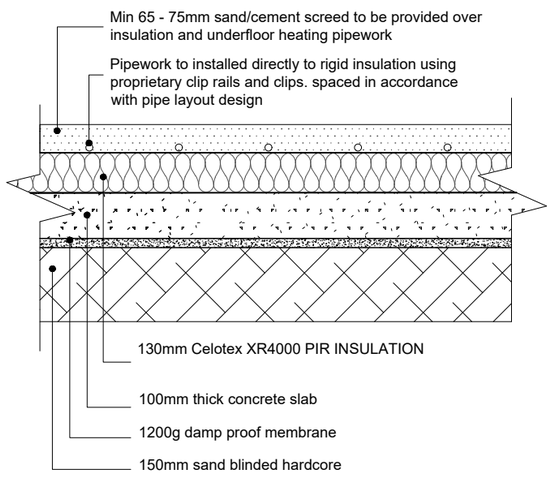
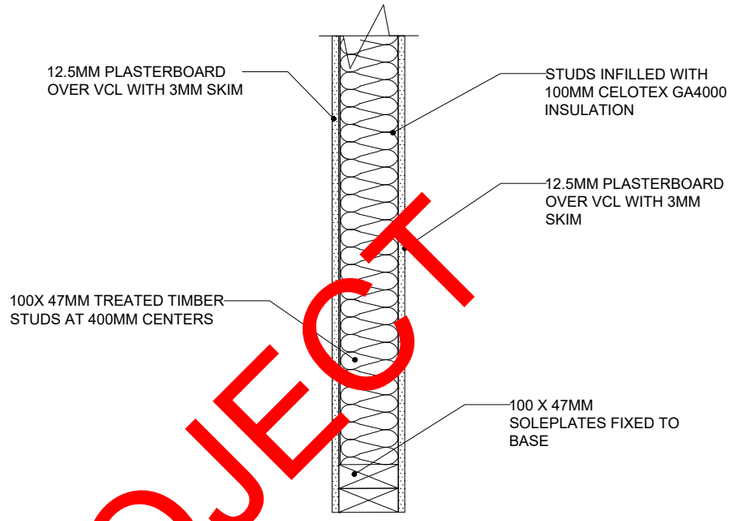
Installation to be designed and specified as an integrated package by the system manufacturer
Pipework loops design, layout and sizing of the system to be in accordance with BS EN 1264[1-5]



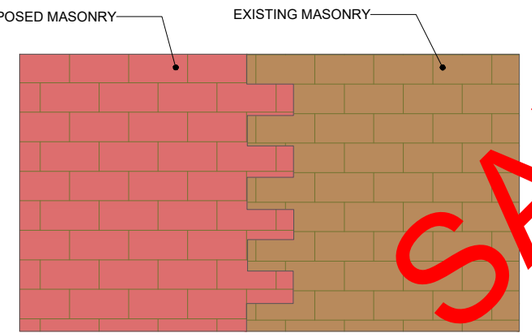
SOLID GROUND FLOOR

U-VALUE 0.13 W/M^{2}K
P/A RATIO 0.5

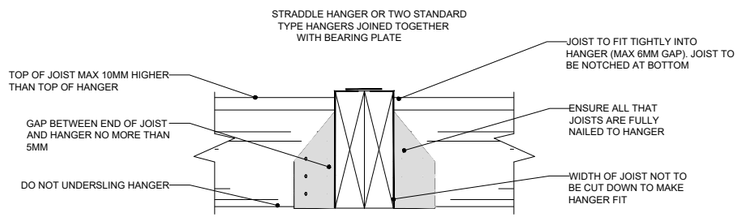


STUD WALL

U-value 0.18 W/m^{2}k



TOOTHING OUT DETAIL



STRADDLE TIMBER HANGER

Note: The dimension deviation can be up to +/-75mm due to the tolerances and human errors as the dimensions are recorded manually.
All the dimensios must check on site by contractor and such dimensions to be their responsilbility

Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
STRUCTURAL DETAILS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW
Drawing No.	PLANNING-009
Revision	00
Scale at A3	N.T.S
Date	06-03-24

Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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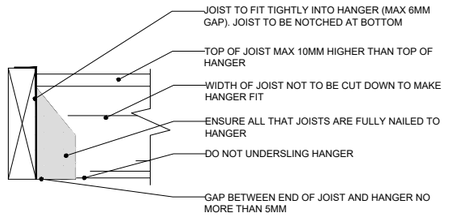
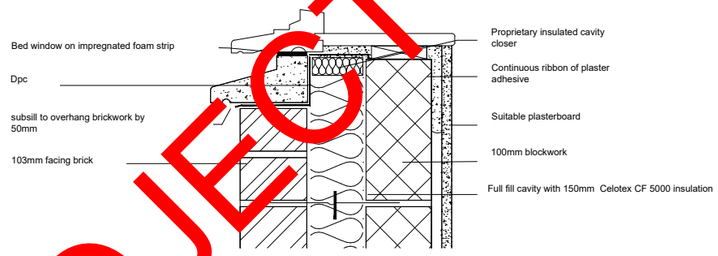
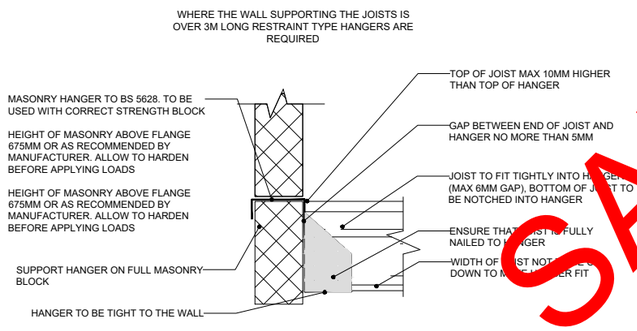


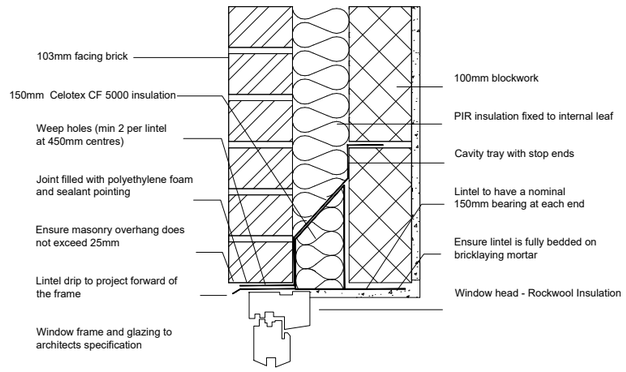
STANDARD TIMBER HANGER



WINDOW SILL



RESTRAINT MASONRY HANGER



WINDOW HEAD AND LINTEL

Note: The dimension deviation can be up to +/-75mm due to the tolerances and human errors as the dimensions are recorded manually.
All the dimensios must check on site by contractor and such dimensions to be their responsilbility

Client Name

Project Address

Section
GARAGE CONVERSION

Stage
ARCHITECTURAL

Drawing Title
STRUCTURAL DETAILS

Drawing Status
FOR APPROVAL

Revisions and Notes

Project No.	2024-03-CR0 8XW		
Drawing No.	PLANNING-010		
Revision	00		
Scale at A3	N.T.S		
Date	06-03-24		
Designed	MM	Checked	MM
Drawn	MM	Approved	MM

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PEARL ENGINEERS, PLANNERS & PROJECT MANAGERS

STRUCTURAL CALCULATION REPORT

Client Name Axxxx

Client Address xxxx

Project Reference: 2024-03- CR08XW

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Project: xxx		Sheet No./Rev. 2
Job Ref. 2024-03-CR08XW	Structural Engineer MM	Date 22/03/2024

Document Control:

Purpose/Status	Date	Rev.	Comments	Structural Engineer
Approval Issue	22/03/2024		B'Regs Issue	MM

Disclaimer

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Project: xxx		Sheet No./Rev. 3
Job Ref. 2024-03-CR08XW	Structural Engineer MM	Date 22/03/2024

Project Information

Design Codes – Eurocodes and their respective National Annexes:

BS EN 1990. Eurocode 0: 'Basis of structural design'

BS EN 1991. Eurocode 1: 'Actions on structures'

BS EN 1992. Eurocode 2: 'Design of concrete structures'

BS EN 1993. Eurocode 3: 'Design of steel structures'

BS EN 1995. Eurocode 5: 'Design of timber structures'

BS EN 1996. Eurocode 6: 'Design of masonry structures' BS EN

1997. Eurocode 7: 'Geotechnical Design'

ASSUMPTIONS

THE FOLLOWING ASSUMPTIONS ARE MADE ABOUT THE SITE. THEY ARE TO BE CHECKED ON SITE BY THE CONTRACTOR AND BUILDING CONTROL OFFICER PRIOR TO THE START OF THE WORKS. ANY DIFFERENCES ARE TO BE REPORTED TO PEPP IMMEDIATELY.

1. The existing masonry is assumed to be minimum 3.6N/mm^2 blockwork in a 1:2:8 mortar
2. Floor joists are assumed to span as indicated on the drawings.
3. The external walls are assumed to be cavity brickwork.

NOTES

Contractor to check all dimensions before ordering any steel.

All materials and workmanship must fully comply with all relevant current British Standard and Codes of practice.

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Project: xxx		**Sheet No./Rev.** 4
Job Ref. 2024-03-CR08XW	**Structural Engineer** **MM**	**Date 22/03/2024**

ITEMS

1. **LOADING DETAILS**
2. **TIMBER DESIGN**

- **Stud Wall** 47 x 100 @ 400 c/c (C-24)
- **Double Trimmer** (2) (47x200) (C-24)

3. **LINTEL**

- **IG L1/HD 100** (For Cavity Wall)
- **IG Box HD 100** (For Solid Wall)

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Project: xxxXW UK		Sheet No./Rev. 5
Job Ref. 2024-03-CR08XW	Structural Engineer MM	Date 22/03/2024

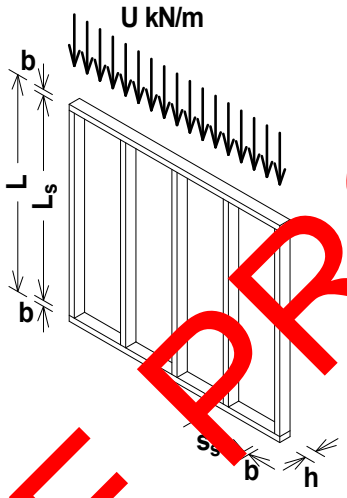
1. LOADING DETAILS

PITCHED ROOF			
Clay Tiles	=	0.65	KN/m²
Felt and battens	=	0.05	KN/m²
Timber rafters	=	0.1	KN/m²
Insulations and other membranes	=	0.1	KN/m²
Ceiling and services	=	0.2	KN/m²
Total dead load on the slope	**=**	**1.1**	**KN/m²**
Live Load	**=**	**0.6**	**KN/m²**
LOFT FLOOR			
Plywood Flooring	=	0.15	KN/m²
Timber Joists	=	0.2	KN/m²
Insulation	=	0.05	KN/m²
Ceiling and services	=	0.2	KN/m²
Partitions	=	0.5	KN/m²
Total dead load	**=**	**1.10**	**KN/m²**
Live Load	**=**	**1.5**	**KN/m²**
FIRST FLOOR			
Plywood Flooring	=	0.15	KN/m2
Timber Joists	=	0.2	KN/m2
Insulation	=	0.05	KN/m2
Ceiling and services	=	0.2	KN/m2
Partitions	=	0.5	KN/m²
Total dead load	=	1.10	**KN/m²**
Live Load	=	1.5	**KN/m²**
WALL LOAD			
Brick wall (102 mm)	=	2	KN/m²
Brick wall with plaster	=	1.9	KN/m²
Glazing	=	0.5	KN/m²

2. TIMBER DESIGN

- **Stud Wall** 47 x 100 @ 400 c/c (C-24)

TIMBER STUD DESIGN (BS5268-2:2002)



Stud details

Stud breadth;	b = **47** mm
Stud depth;	h = **100** mm
Number of studs;	N_s = **1**

Strength class C24 timber (Table 8 BS5268:Pt 2:2002)

Section properties

Cross sectional area;	$A = N_s \times b \times h$ = **4700** mm^2
Section modulus;	$Z = N_s \times b \times h^2 / 6$ = **78333** mm^3
Moment of inertia in the major axis;	$I_x = N_s \times b \times h^3 / 12$ = **3916667** mm^4
Moment of inertia in the minor axis;	$I_y = N_s \times h \times b^3 / 12$ = **865192** mm^4
Radius of gyration in the major axis;	$r_x = \sqrt{(I_x / A)}$ = **28.9** mm
Radius of gyration in the minor axis;	$r_y = \sqrt{(I_y / A)}$ = **13.6** mm

Panel details - Studs restrained by sheathing in the plane of the panel

Panel height;	L = **2400** mm
Stud length;	$L_s = L - (2 \times b)$ = **2306** mm
Standard stud spacing;	s_s = **400** mm
Panel opening;	O = **0** mm
Loaded panel length;	$s = \max(s_s, (O + s_s) / 2)$ = **400** mm
Effective length in the major axis;	$L_{ex} = 0.85 \times L_s$ = **1960** mm
Slenderness ratio;	$\lambda = L_{ex} / r_x$ = **67.90**

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Project: xxxxx		Sheet No./Rev. 7
Job Ref. 2024-03-CR08XW	Structural Engineer MM	Date 22/03/2024

Vertical loading details	**Dead loads**	**Imposed loads**
Roof UDL;	U_{r_d} = **5.00** kN/m;	U_{r_i} = **5.00** kN/m
Floor UDL;	U_{f_d} = **5.00** kN/m;	U_{f_i} = **5.00** kN/m
Imposed floor load duration;	**Long term**	

Modification factors

Section depth factor; $K_7 = (300 \text{ mm} / h)^{0.11}$ = **1.13**

Load sharing factor; K_8 = **1.10**

Consider axial compression without bending under medium term loads

Load duration factor; K_3 = **1.25**

Vertical loading; $F = (U_{r\_d} + U_{f\_d} + U_{r\_i} + U_{f\_i}) \times s$ = **6.00** kN

Check compressive stress on stud

Compression member factor; K_{12} = **0.57**

Compression parallel to grain; σ_c = **7.900** N/mm²

Permissible compressive stress; $\sigma_{c\_adm} = \sigma_c \times K_3 \times K_8 \times K_{12}$ = **6.200** N/mm²

Applied compressive stress; $\sigma_{c\_max} = F / (N_s \times b \times h)$ = **1.702** N/mm²

PASS - Applied compressive stress under medium term loads is within permissible limits

Check compressive stress on rail

Bearing stress modification factor; K_4 = **1.24**

Compression perpendicular to grain (no wane); σ_{cp1} = **2.400** N/mm²

Permissible compressive stress; $\sigma_{cp1\_adm} = \sigma_{cp1} \times K_3 \times K_4$ = **3.717** N/mm²

Applied compressive stress; $\sigma_{cp1\_max} = F / (N_s \times b \times h)$ = **1.702** N/mm²

PASS - Applied compressive stress under medium term loads is within permissible limits

Consider axial compression without bending under long term loads

Load duration factor; K_3 = **1.00**

Vertical loading; $F = (U_{r\_d} + U_{f\_d} + U_{f\_i}) \times s$ = **6.00** kN

Check compressive stress on stud

Compression member factor; K_{12} = **0.61**

Compression parallel to grain; σ_c = **7.900** N/mm²

Permissible compressive stress; $\sigma_{c\_adm} = \sigma_c \times K_3 \times K_8 \times K_{12}$ = **5.301** N/mm²

Applied compressive stress; $\sigma_{c\_max} = F / (N_s \times b \times h)$ = **1.277** N/mm²

PASS - Applied compressive stress under long term loads is within permissible limits

Check compressive stress on rail

Bearing stress modification factor; K_4 = **1.24**

Compression perpendicular to grain (no wane); σ_{cp1} = **2.400** N/mm²

Permissible compressive stress; $\sigma_{cp1\_adm} = \sigma_{cp1} \times K_3 \times K_4$ = **2.974** N/mm²

Applied compressive stress; $\sigma_{cp1\_max} = F / (N_s \times b \times h)$ = **1.277** N/mm²

PASS - Applied compressive stress under long term loads is within permissible limits

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Project: xxx		Sheet No./Rev. 8
Job Ref. 2024-03-CR08XW	Structural Engineer MM	Date 22/03/2024

- **Double Trimmer** (2) (47 x 200) (C-24)

TIMBER BEAM ANALYSIS & DESIGN TO BS5268-2:2002

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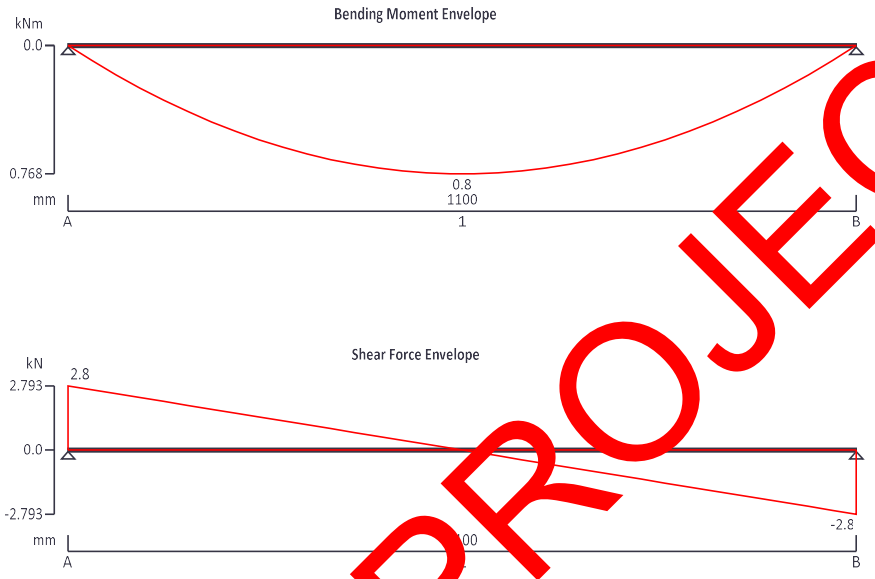
Project: xxxxxxxxE CR08XW UK		Sheet No./Rev. 9
Job Ref. 2024-03-CR08XW	**Structural Engineer MM**	**Date 22/03/2024**



Applied loading

Beam loads

SW	Dead self weight of beam ´ 1
DL	Dead full UDL 3.000 kN/m
LL	Imposed full UDL 2.000 kN/m

Load combinations

Load combination 1	Support A	Dead ´ 1.00
		Imposed ´ 1.00
	Span 1	Dead ´ 1.00
		Imposed ´ 1.00
	Support B	Dead ´ 1.00
		Imposed ´ 1.00

Analysis results

Maximum moment;	M_{max} = **0.768** kNm;	M_{min} = **0.000** kNm
Design moment;	M = max(abs(M_{max}),abs(M_{min})) = **0.768** kNm	
Maximum shear;	F_{max} = **2.793** kN;	F_{min} = **-2.793** kN
Design shear;	F = max(abs(F_{max}),abs(F_{min})) = **2.793** kN	
Total load on beam;	W_{tot} = **5.585** kN	
Reactions at support A;	R_{A_max} = **2.793** kN;	R_{A_min} = **2.793** kN
Unfactored dead load reaction at support A;	R_{A_Dead} = **1.693** kN	
Unfactored imposed load reaction at support A;	$R_{A\_Imposed}$ = **1.100** kN	
Reactions at support B;	R_{B_max} = **2.793** kN;	R_{B_min} = **2.793** kN

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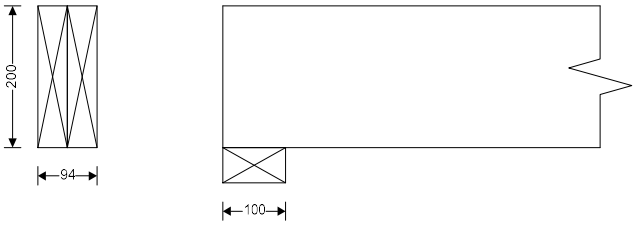
Unfactored dead load reaction at support B; R_{B_Dead} = **1.693** kN

Unfactored imposed load reaction at support B; $R_{B\_Imposed}$ = **1.100** kN



Timber section details

Breadth of sections; b = **47** mm

Depth of sections; h = **200** mm

Number of sections in member; N = **2**

Overall breadth of member; b_b = N × b = **94** mm

Timber strength class; **C24**

Member details

Service class of timber; **2**

Load duration; **Long term**

Length of span; L_{s1} = **1100** mm

Length of bearing; L_b = **100** mm

Section properties

Cross sectional area of member; $A = N \times b \times h$ = **18800** mm^2

Section modulus; $Z_x = N \times b \times h^2 / 6$ = **626667** mm^3

$Z_y = h \times (N \times b)^2 / 6$ = **294533** mm^3

Second moment of area; $I_x = N \times b \times h^3 / 12$ = **62666667** mm^4

$I_y = h \times (N \times b)^3 / 12$ = **13843067** mm^4

Radius of gyration; $i_x = \sqrt{(I_x / A)}$ = **57.7** mm

$i_y = \sqrt{(I_y / A)}$ = **27.1** mm

Modification factors

Duration of loading - Table 17; K_3 = **1.00**

Bearing stress - Table 18; K_4 = **1.00**

Total depth of member - cl.2.10.6; $K_7 = (300 \text{ mm} / h)^{0.11}$ = **1.05**

Load sharing - cl.2.9; K_8 = **1.00**

Lateral support - cl.2.10.8

Ends held in position

Permissible depth-to-breadth ratio - Table 19; **3.00**

Actual depth-to-breadth ratio; h / (N ´ b) = **2.13**

PASS - Lateral support is adequate

Compression perpendicular to grain

Permissible bearing stress (no wane); $\sigma_{c\_adm} = \sigma_{cp1}$ ´ K_3 ´ K_4 ´ K_8 = **2.400** N/mm^2

Applied bearing stress; $\sigma_{c\_a} = R_{A\_max} / (N \cdot b \cdot L_b) =$ **0.297** N/mm^2

$\sigma_{c\_a} / \sigma_{c\_adm} =$ **0.124**

PASS - Applied compressive stress is less than permissible compressive stress at bearing

Bending parallel to grain

Permissible bending stress; $\sigma_{m\_adm} = \sigma_m \cdot K_3 \cdot K_7 \cdot K_8 =$ **7.842** N/mm^2

Applied bending stress; $\sigma_{m\_a} = M / Z_x =$ **1.225** N/mm^2

$\sigma_{m\_a} / \sigma_{m\_adm} =$ **0.156**

PASS - Applied bending stress is less than permissible bending stress

Shear parallel to grain

Permissible shear stress; $\tau_{adm} = \tau \cdot K_3 \cdot K$ **710** N/mm

Applied shear stress; $\tau_a = 3 \cdot F / (2$ A) = **0.2** N/mm^2

$\tau_a / \tau_{adm} =$ **0.31**

PASS - Applied shear stress is less than permissible shear stress

Deflection

Modulus of elasticity for deflection; E_{mi} = **7200** N/mm^2

Permissible deflection; δ_{adm} = min(551 in, 0.003 · L_{s1}) = **3.300** mm

Bending deflection; δ_{b_s1} = **0.215** mm

Shear deflection; δ_{v_s1} = **0.109** mm

Total deflection; $\delta_a = \delta_{b\_s1} + \delta_{v\_s1} =$ **0.323** mm

$\delta_a / \delta_{adm} =$ **0.098**

PASS - Total deflection is less than permissible deflection

3. LINTEL

- **IG L1/HD 100** (For Cavity walls with 90-105mm cavity)

We had taken loadings being applied on our lintel:

- Floor Load
- Cavity wall Load

Our load derivation for each source for lintel is as follows;

Floor Load;

Dead Load: 1.1 kN/m^2

Live Lead: 0.6 kN/m^2

Tributary Length = 1.5 m

Dead Load (UDL) = 1.1 x 1.5 = 1.65 kN/m

Live Load (UDL) = 0.6 x 1.5 = 0.96 kN/m

Cavity Wall Load;

Dead Load: 4.4 kN/m^2

Dead Load (UDL) = 11.2 kN/m

Total Dead Load (UDL): = 13.85 KN/m

Total Live Load (UDL): = 1 KN/m

Total Load (UDL): = 13.85 KN/m

Hence

Required Load Carrying Capacity = 13.85 KN Required

Length = 1000 (with bearing on both sides)

IG L1/HD 100 Lintel for 100 mm cavity of 1000 mm as Per Requirement can carry = 22 KN

Load Carrying capacity of Provided Lintel = 22 KN

Hence,

Provided > Required

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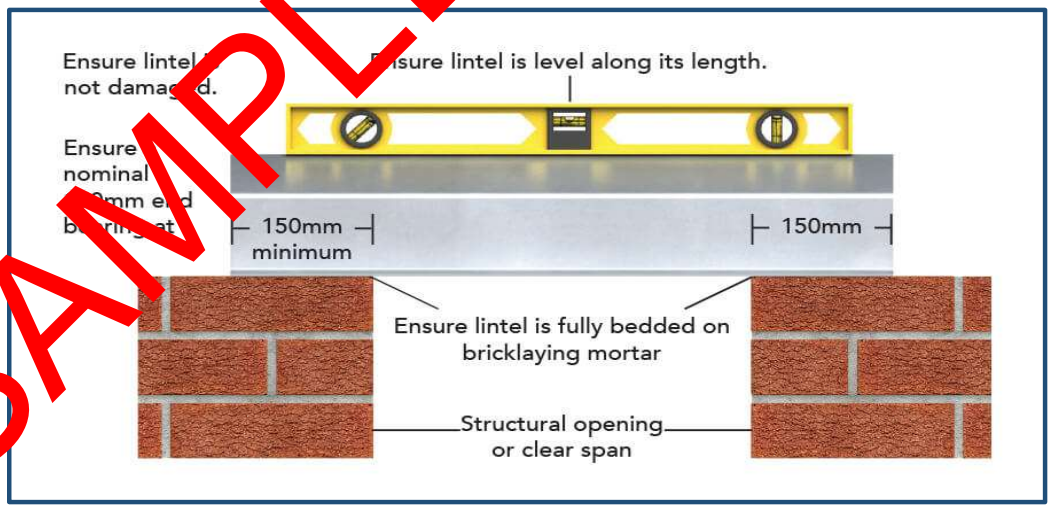
Select a suitable lintel according to the span

Length	Height	Thickness	Total UDL KN 3:1	Total UDL KN 19:1
600	110	2.9	30	22
1200				
1350	135	2.9	30	
1500				
1650	163	2.9	40	35
2100				
2250	203	2.9		35
2550				
2700	203	3.2	40	35
3000				
3150	203	3.2		32
3600				
3750	203		33	28
4200				

Installation

Provide a minimum bearing of 150mm on both sides



- **IG Box HD 100** (For solid wall)

Select a suitable lintel according to the span

Length (mm)	Height (mm)	Thickness (mm)	Total UDL kN
600	150	2.5	50
1200			
1350	150	2.5	45
1800			
1950	215	2.5	50
2400			
2550	215	2.5	40
2700			

Installation

Provide a minimum bearing of 150mm on both sides