

TORSION CONSULT Ltd CIVIL & STRUCTURAL ENGINEERS T 01625 470781 M 07799 327846 E mail@torsionconsult.co.uk W www.torsionconsult.co.uk	JOB No. TC-6678		SHEET No 1
	DESIGNER MB	DATE Dec '22	CHECKED
CONTRACT 91 BLACKCARR ROAD		DRAWING REFERENCE	

STRUCTURAL DESIGN CALCULATIONS
FOR THE PROPOSED EXTENSION TO THE PROPERTY

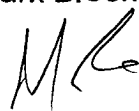
AT

91 BLACKCARR ROAD
WYTHENSHAW
MANCHESTER
M23 1PW

REFER TO DRAWINGS – TC-6678 – 100, 101, 102, 103, 104 & 105

Prepared by - Mark Brooker CEng MStructE

Checked by -



Date - December 2022

TORSION CONSULT Ltd CIVIL & STRUCTURAL ENGINEERS T 01625 470781 M 07799 327846 E mail@torsionconsult.co.uk W www.torsionconsult.co.uk	JOB No. TC-6678		SHEET No 2	
	DESIGNER MB	DATE Dec '22		CHECKED
CONTRACT 91 BLACKCARR ROAD		DRAWING REFERENCE		

CALCULATIONS GENERAL NOTES

These calculations have been produced by Torsion Consult Ltd for Building Regulations / construction purposes and are in accordance with all relevant Building Regulations documents and British Standards.

It is the Client's / Architect's / Contractor's responsibility to issue these calculations to the appropriate Council's Building Regulations Department.

The Client / Contractor should ensure that all areas of these calculations have been approved by the Building Inspector / Building Regulations prior to commencement of work on site. Commencement of work on site prior to Building Regulations approval is entirely at the Contractors own risk.

Design calculations have been produced using dimensions measured from Architects drawings.

It is the Contractors responsibility to check all dimensions and details on site prior to commencing works on site.

Torsion Consult Ltd should be contacted immediately should site dimensions or details not correspond with those shown in the calculations.

All member sizes and details shown within the calculations should be adopted by the Contractor. Should the Contractor require to alter sizes or details Torsion Consult Ltd are to be contacted immediately prior to any alterations being made.

Where new beams are shown supported on existing walls it has been assumed that these walls are load bearing. The Contractor is to confirm this on site prior to commencing works.

The Contractor is to confirm the size and depth of existing foundations below walls prior to commencing works to determine their adequacy.

Calculations for foundations assume good ground with allowable ground bearing capacity of 80KN/m² unless noted otherwise. Contractor to confirm on site.

Calculations assume that all new and existing load bearing walls are constructed from blockwork with minimum bearing capacity of 5KN/m².

Where sections of walls providing structural stability to the building are to be removed with the remaining masonry length being less than one third of the overall wall width a steel stability frame will be introduced. Stability frames rely on the moment connection between the beam and the column and as such the steel columns are essential to provide the stability required.

To provide maximum headroom below beams and reduce downstands, beam depths are kept to a minimum.

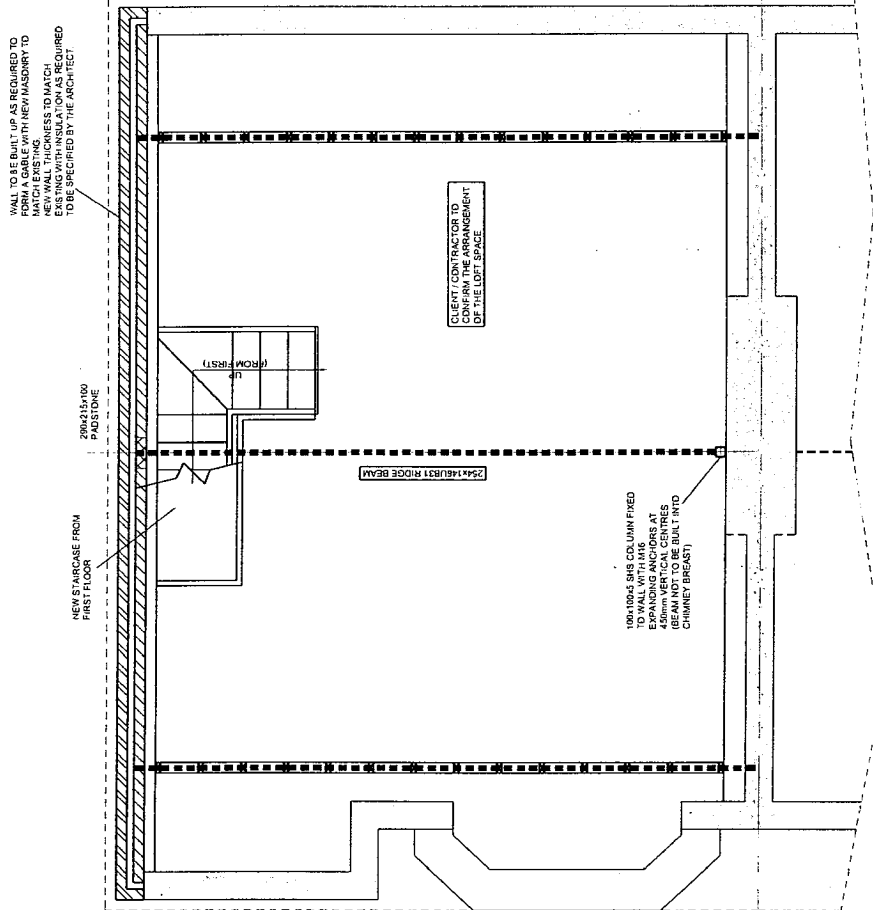
The design has been carried out with due consideration for the works to be carried out and to reduce the risks and hazards that may be encountered. It is the Contractors responsibility to prepare a method statement as to how the works are to be carried out. It is the Contractors responsibility to design and provide all temporary works required to carry out the works.

It should be noted that when structural alterations are made to a property there will be a certain degree of movement within the building structure which may cause movement / cracking of existing walls. New beams are designed to keep vertical deflections to a minimum.

Should there be any queries with these calculations, prior or during construction Torsion Consult Ltd are to be contacted.

TORSION CONSULT Ltd CIVIL & STRUCTURAL ENGINEERS T 01625 470781 M 07799 327846 E mail@torsionconsult.co.uk W www.torsionconsult.co.uk		JOB No.		SHEET No																									
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CONTRACT 91 BLACKCARR ROAD		DESIGNER	DATE		CHECKED																								
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LOADING ON STRUCTURE																													
PITCHED ROOF DEAD LOADING																													
<table> <tr> <td>TILES</td> <td>=</td> <td>0.65 KN/m²</td> </tr> <tr> <td>BATTENS</td> <td>=</td> <td>0.10 KN/m²</td> </tr> <tr> <td>FELT</td> <td>=</td> <td>0.02 KN/m²</td> </tr> <tr> <td>INSULATION</td> <td>=</td> <td>0.01 KN/m²</td> </tr> <tr> <td>PLASTERBOARD & SKIM</td> <td>=</td> <td>0.15 KN/m²</td> </tr> <tr> <td>RAFTERS</td> <td>=</td> <td>0.15 KN/m²</td> </tr> <tr> <td>TOTAL DL ON PLAN</td> <td>=</td> <td><u>1.25KN/m²</u></td> </tr> <tr> <td colspan="3">(1.08 / Cos 30)</td> </tr> </table>						TILES	=	0.65 KN/m ²	BATTENS	=	0.10 KN/m ²	FELT	=	0.02 KN/m ²	INSULATION	=	0.01 KN/m ²	PLASTERBOARD & SKIM	=	0.15 KN/m ²	RAFTERS	=	0.15 KN/m ²	TOTAL DL ON PLAN	=	<u>1.25KN/m²</u>	(1.08 / Cos 30)		
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ROOF IMPOSED LOADING																													
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Drawing Title
ROOF PLAN



NOTE
THIS IS A PRELIMINARY DRAWING AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES WITHOUT THE WRITTEN CONSENT OF TORSION CONSULT LTD. THE CONTENTS OF THIS DRAWING MAY NOT BE REPRODUCED WITHOUT THE WRITTEN CONSENT OF TORSION CONSULT LTD.

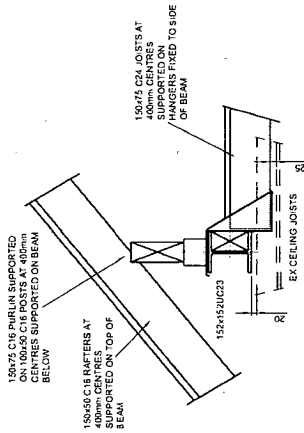
NOTE
PRIOR TO COMMENCING WORKS THE CONTRACTOR MUST CONFIRM THAT ALL WORK IS AVAILABLE FOLLOWING THE BUILDING REGULATIONS REQUIREMENTS.

PROPOSED LOFT FLOOR PLAN
(SHOWING STRUCTURE ABOVE)

NOTE
PRIOR TO COMMENCING WORKS THE CONTRACTOR MUST CONFIRM THAT ALL WORK IS AVAILABLE FOLLOWING THE BUILDING REGULATIONS REQUIREMENTS.

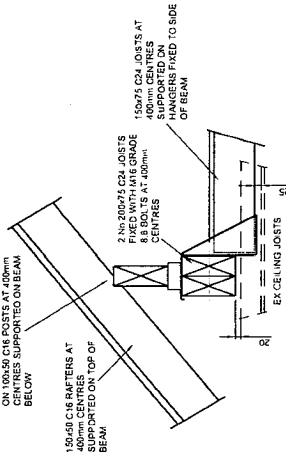
Rev	Description	By	Date	Chd
A	ISSUED FOR BUILDING REGULATIONS	MB	18/12	MB
91 BLACKCARR ROAD				
PROPOSED EXTENSION TO THE PROPERTY AT				
91 BLACKCARR ROAD				
WYTHENSHAW, MANCHESTER				
TORSION CONSULT LTD				
CIVIL & STRUCTURAL ENGINEERS				
Tel: 01625 470781 Mob: 07798 327846				
email: mail@torsionconsult.co.uk				
www.torsionconsult.co.uk				
Drawn by	MB	DATE	DECEMBER 2022	
Checked by	MB	Scale (in A1)	1:25	
Contract No	TC-6678	Drawing No	101	Rev
				A

Not to scale. All dimensions are to the face of the work unless otherwise stated. The contractor is responsible for confirming the accuracy of the information provided and for obtaining all necessary permissions and approvals prior to commencing work.



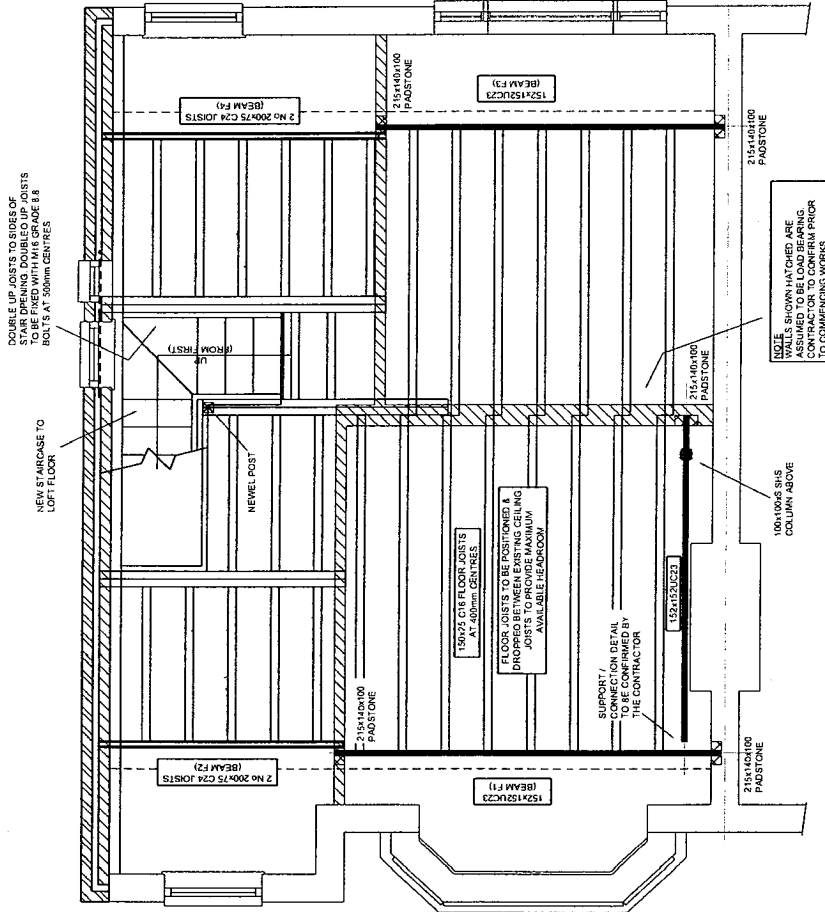
SECTION THROUGH
BEAM F1 & F3
152x152UC23

NOTE
IF THERE IS A VAULT TO THE EXISTING
CEILING ADJACENT THE WALL EXISTING
CEILING JOISTS TO BE REMOVED
EXISTING RAFTERS & FIXED TO SIDE OF
EXISTING BEAM TO BE CONFIRMED PRIOR
TO COMMENCING WORK.



SECTION THROUGH
BEAM F2 & F4
2 No 200x75 C24 JOISTS

NOTE
ALL DIMENSIONS & DETAILS TO BE
CONFIRMED ON SITE BY THE
CONTRACTOR PRIOR TO COMMENCING
WORKS ON SITE. ORDERING FABRICATING
STEELWORK.



NOTE
PRIOR TO COMMENCING WORKS THE
CONTRACTOR SHALL BE RESPONSIBLE FOR
CONFIRMING THAT ALLOWABLE HEADROOM
REQUIREMENTS ARE MAINTAINED THROUGHOUT
THE BUILDING.

NOTE
ALL DIMENSIONS & DETAILS TO BE
CONFIRMED ON SITE BY THE
CONTRACTOR PRIOR TO COMMENCING
WORKS ON SITE. ORDERING FABRICATING
STEELWORK.

PROPOSED LOFT FLOOR JOISTS PLAN

91 BLACKCARR ROAD		MB	12/12/21	MB
PROPOSED EXTENSION TO THE		By	Done	Check
PROPERTY AT				
91 BLACKCARR ROAD				
WYTHENSHAW, MANCHESTER				
TORSION				
CONSULT LTD				
CIVIL & STRUCTURAL ENGINEERS				
Tel: 01625 420785 Mob: 07799 327846				
email: mail@torsionconsult.co.uk				
www.torsionconsult.co.uk				
Drawn By	MB	Done	DECEMBER 2022	
Checked By	MB	Scale (or A1)	1:25 = 1:10	
Contract No	102	Drawing No		Rev
TC-6678				A

10075 C16 WALLPLATE F1-ED TO HEAD
CENTRES NOTCHED OVER & STRAPS AT 100mm CENTRES

150x50 C16 RAFTERS AT 400mm
CENTRES NOTCHED OVER & STRAPS AT 100mm CENTRES

10075 C16 WALLPLATE F1-ED
TO FACE OF WALL WITH W16
EXPANDING ANCHORS AT
400mm CENTRES

WALL ABOVE TO BE BUILT UP AS
MASONRY TO MATCH EXISTING
NEW WALL THICKNESS TO MATCH
EXISTING MASONRY AND REQUIRED
TO BE SPECIFIED BY THE ARCHITECT.

CONTRACTOR TO CONFIRM
THAT THE NEW WALL ABOVE
IS ADEQUATE TO SUPPORT THE
NEW WALL ABOVE

NEW STAIRCASE TO
LOFT FLOOR

UP (TO LOFT)

UP (FROM GROUND)

DOWN (TO LOFT)

DOWN (TO GROUND)

DOWN (TO LOFT)

DOWN (TO GROUND)

DOWN (TO LOFT)

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152x152 UC23

215x140 H100

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215x140 H100

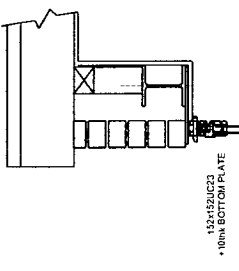
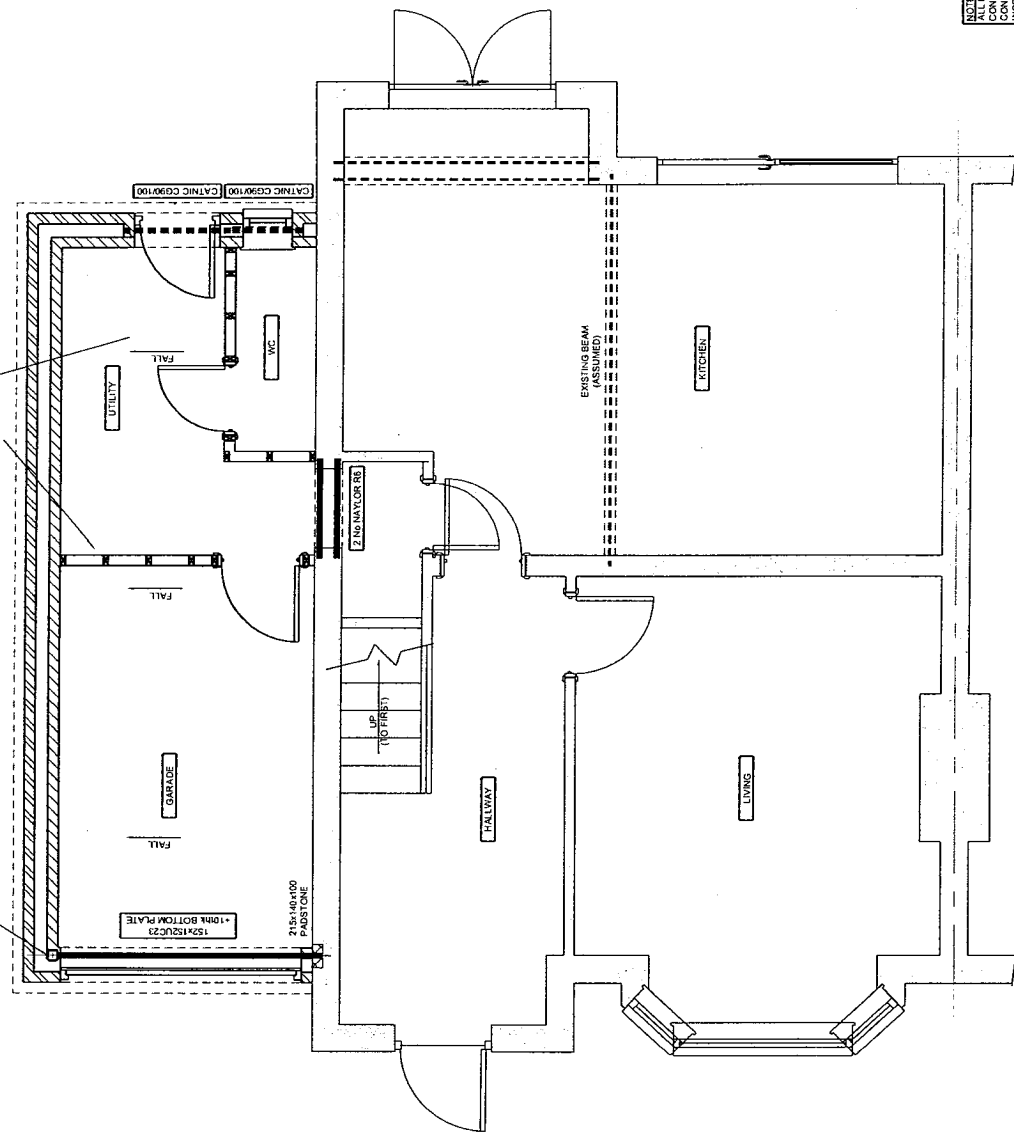
215x140 H100

215x140 H100

For information only, this drawing is not to be used for construction purposes. It is for reference only. The client is responsible for ensuring that the design is suitable for the intended use. The client is responsible for ensuring that the design is suitable for the intended use. The client is responsible for ensuring that the design is suitable for the intended use.

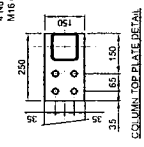
100x100x4 SHS COLUMN
BUILT INTO WALL WITH
SHOT FRED TIES AT 450mm
VERTICAL CENTRES

PARTITION TO HAVE 17mm
FALL TO FORM A DIAPHRAGM
TO RESTRAIN SIDE WALL

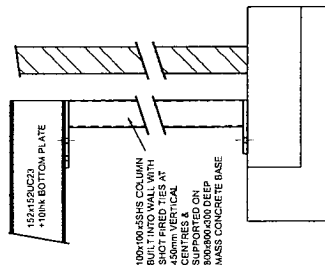


SECTION THROUGH BEAM
ABOVE GARAGE DOORS
152x152UC23
+ 101mm BOTTOM PLATE
(GALVANISED)

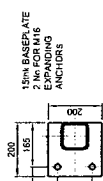
15mm TOP PLATE
4 M16 BOLTS FOR
M16 GRADE 8.8 BOLTS



COLUMN TOP PLATE DETAIL



100x100x4 SHS COLUMN
BUILT INTO WALL WITH
SHOT FRED TIES AT
450mm VERTICAL
CENTRES &
SUPPORTED ON
800x800x300 DEEP
MASS CONCRETE BASE



COLUMN BASE PLATE DETAIL

NOTE:
ALL DIMENSIONS & DETAILS TO BE
CONFIRMED ON SITE BY THE
CONTRACTOR PRIOR TO COMMENCING
WORKS. SITE ORDERING / FABRICATING
STEELWORK.

PROPOSED GROUND FLOOR PLAN
(SHOWING STRUCTURE ABOVE)

GARAGE DOOR BEAM
SUPPORT COLUMN DETAILS

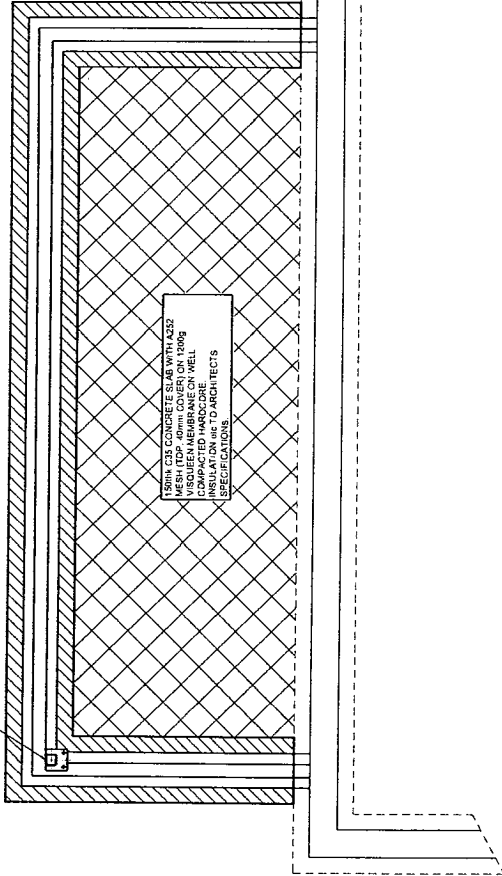
Rev	Issued For Building Regulations	MB	3/1/22	MB
A	Occupation	By	Date	Client

91 BLACKCARR ROAD
PROPOSED EXTENSION TO THE
PROPERTY AT
91 BLACKCARR ROAD
WYTHENSHAW, MANCHESTER

TORSION CONSULT LTD
CIVIL & STRUCTURAL ENGINEERS
Tel: 01625 420161 Mob: 07789 327846
email: mail@torsionconsult.co.uk
www.torsionconsult.co.uk

Drawn By	MB	Date	DECEMBER 2022
Checked By	MB	Scale	(as A1)
Contract No	TC-6678	Drawing No	104
Rev	A		

100x100x5 SHE COLUMN
BUILT INTO WALL WITH
VERTICAL CENTRES 450mm
SUPPORTED ON STRIP
FOOTING



100x100x5 SHE COLUMN
BUILT INTO WALL WITH
VERTICAL CENTRES 450mm
SUPPORTED ON STRIP
FOOTING

NOTE
IT HAS BEEN ASSUMED THAT TRADITIONAL STRIP FOOTINGS
CAN BE USED TO SUPPORT NEW STRUCTURE.
PRIOR TO PRICING / COMMENCING WORKS THE CONTRACTOR IS
TO INVESTIGATE THE GROUND CONDITIONS AND
Determine if this type of footing is suitable for this type of footing.
REQUIRED TO FORMATION LEVEL. TO BE CONFIRMED BY THE
BUILDING INSPECTOR.
BASEMENTS MAY DETERMINE FOUNDATION TYPES & DEPTH
PILED FOUNDATIONS TO BE USED IF REQUIRED

NOTE
ALL DIMENSIONS & DETAILS TO BE
CONFIRMED ON SITE BY THE
CONTRACTOR PRIOR TO COMMENCING
WORKS ON SITE. ORDERING / FABRICATING
STEELWORK.

PROPOSED FOUNDATION PLAN

A		ISSUED FOR BUILDING REGULATIONS	MB	03/12/22	MB
Rev		Description	By	Date	Checked
91 BLACKCARR ROAD					
PROPOSED EXTENSION TO THE PROPERTY AT 91 BLACKCARR ROAD WYTHENSHAW, MANCHESTER					
 TORSION CONSULT LTD CIVIL & STRUCTURAL ENGINEERS Tel: 01625 470781 Mob: 07799 327846 email: mail@torsionconsult.co.uk www.torsionconsult.co.uk					
Drawn By	MB		Date		DECEMBER 2022
Checked By	MB		Scale (if A1)		1:25
Contract No	TC-6678		Drawing No	105	Rev
					A

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JOB No

TC 6678

SHEET No

DESIGNER

MB

DATE

Dec 22

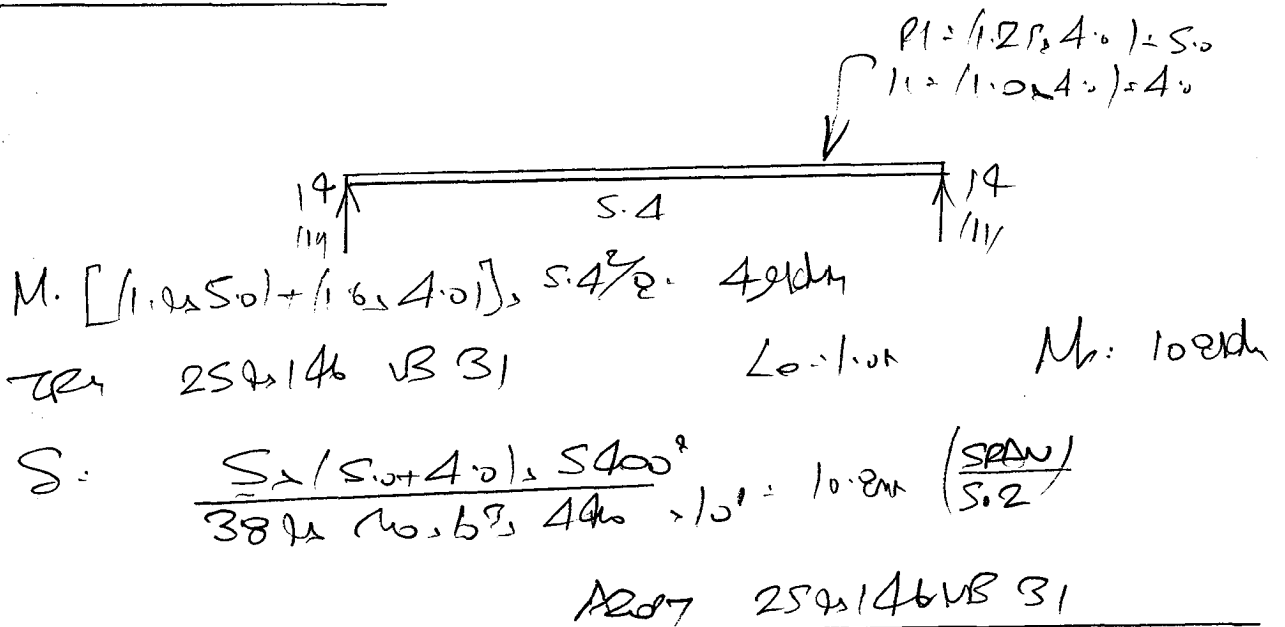
CHECKED

CONTRACT

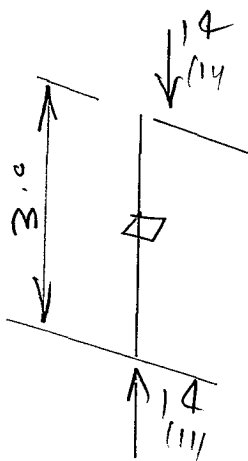
91 BLACK CARR RD

DRAWING REF.

RIDGE BEAM



COLUMN



$AXIAL = [(1.0 \times 14) + (1.6 \times 11)] = 37kN$
 $M_x = (37 \times 0.05) = 3kNm$
 $Upl = 100 \times 100 \text{ S SUS } L_o = 3m$

$$\frac{37}{389} \pm \frac{3}{15.4} = 0.29 < 1.0$$

A2007 100x100S SUS

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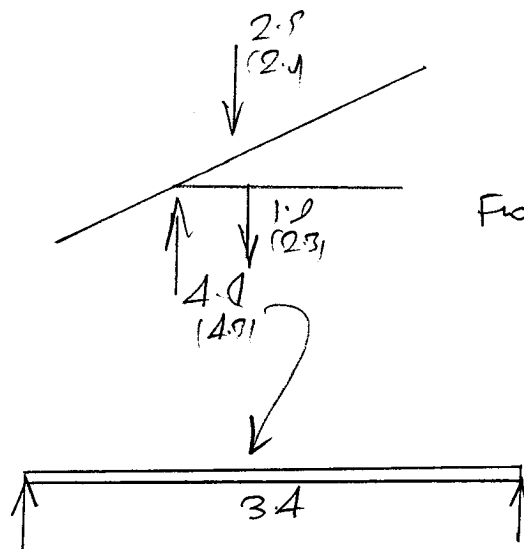
CHECKED

CONTRACT

21 BLACK CREEK ROAD

DRAWING REF.

BEAM F1 & F3



Roof

$$1.0 \times (1.2 \times 2.0) = 2.4$$

$$1.0 \times (1.0 \times 2.0) = 2.0$$

Floor

$$1.0 \times (1.2 \times 1.5) = 1.8$$

$$1.0 \times (1.0 \times 1.5) = 1.5$$

$$M = [1.0 \times 4.4 + 1.0 \times 4.3] \times 3.4^2 / 2 = 19.4 \text{ kNm}$$

Use 150x152 UC 23

$$L = 3.4 \text{ m} \quad M = 4.0 \text{ kNm}$$

S:

$$S_x = (4.4 + 4.3) \times 3.4^2 / 2 = 5.8 \text{ kNm} \quad (S_{20})$$

$$3.8 \text{ kNm} \quad (S_{20}) \quad 12.5 \text{ kNm} \quad (S_{20})$$

Roof 150x152 UC 23

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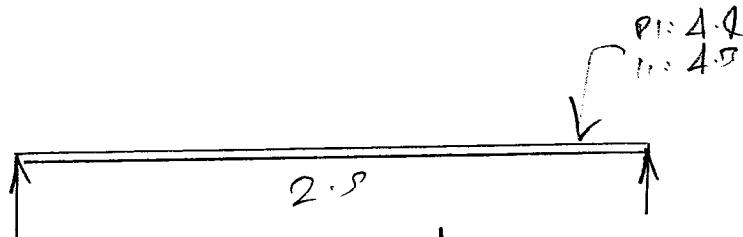
CHECKED

CONTRACT

21 BLACK OAK ROAD

DRAWING REF.

BEAM F2 & F4 - LOAD AS BEAM F1



$$M = (4.4 + 4.3) \times 2.8^2 / 2 = 6.2 \text{ kNm}$$

$$Z_{reqd} = \frac{6.2 \times 10^6}{7.5 \times 10^6 \times 1.05 \times 10^6} = 207.6 \text{ mm}^3$$

$$\text{prop } 2 \times 200.75 \text{ C24 } 251 \text{ mm}^3$$

$$Z_{act} = 2 \times 7.5 \times 200^2 / 6 = 1.0 \times 10^6 \text{ mm}^3$$

$$I = 2 \times 7.5 \times 6.3^3 / 12 = 10000 \text{ cm}^4$$

$$S = \frac{S_y (4.4 + 4.3) \times 2800^2}{38 \times 108000 \times 10000 \times 10^6} = 4.1 \text{ mm}$$

$$S_{allow} = (0.003 \times 2800) \times 7.5 \text{ mm}$$

$$\text{Prop } 2 \times 200.75 \text{ C24 } 251 \text{ mm}^3$$

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JOB No

TC6672

SHEET No

DESIGNER

MB

DATE

Dec 22

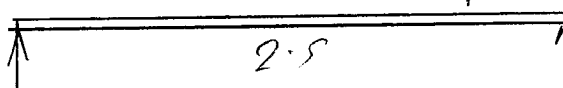
CHECKED

CONTRACT

21 BLACKHILL ROAD

DRAWING REF.

STAR VOID TUNNEL



$\mu = 1.2 \times 1.8 \times 1.5$
 $\mu = 1.5 \times 1.2 \times 1.8$

$$M = (1.5 + 1.8) \times 2.5^2 / 2 = 2.6 \text{ kNm}$$

$$Z_{pl} = \frac{2.6 \times 6^3}{7.65 \times 10^6 \times 1.0 \times 1.0} = 347.6 \text{ mm}^3$$

per 2N 150 75 C24 2015

$$Z_{pl} = 2.7 \times 150^3 / 6 = 563.6 \text{ mm}^3$$

2015 2N 150 75 C24 2015

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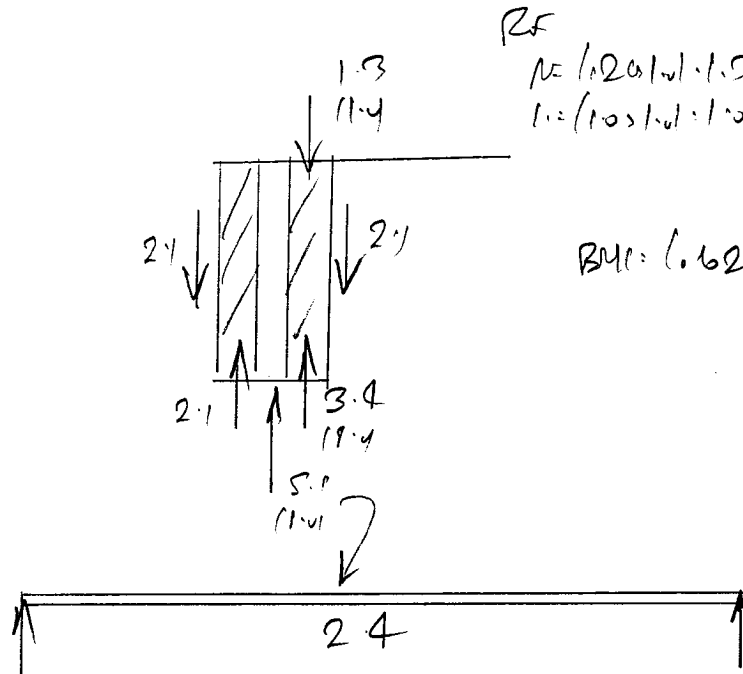
CHECKED

CONTRACT

91 BLACKHILL ROAD

DRAWING REF.

BDM ABUT GARAGE DOOR



$$BM = (1.62 \times 0.6) \times 1.01 = 2.1$$

$$M = [(1.62 \times 0.6) + (1.6 \times 1.0)], 2.4 \times 0.714$$

120mm 150mm 152mm 23

16mm BOTTOM PLATE