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**PHIL PASSENGER M.I.C.E**  
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Willowdene, 26A Church Lane, Newland, Witney, Oxon. OX28 3JZ

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**SITE:** 181 WROSLYN ROAD FREELAND  
**JOB:** PCP 409  
**DATE:** AUG 19

**NOTES TO CLIENT & BUILDER**

**CDM OBLIGATIONS**

My service only provides a specification for steel beams and posts required for your project. Unfortunately, I am unable to provide principal designer duties for your project. This role should be undertaken by your architect or designer who will manage the pre-construction phase of the work as required by the Construction Design and Management Regulations 2015. I am however, able to provide additional structural information if requested by the principal designer.

**SITE DIMENSIONS**

All beam and post lengths should be taken from site dimensions & then have the bearing lengths added. You should NOT use the dimensions in these calculations.

**STEEL SPECIFICATIONS**

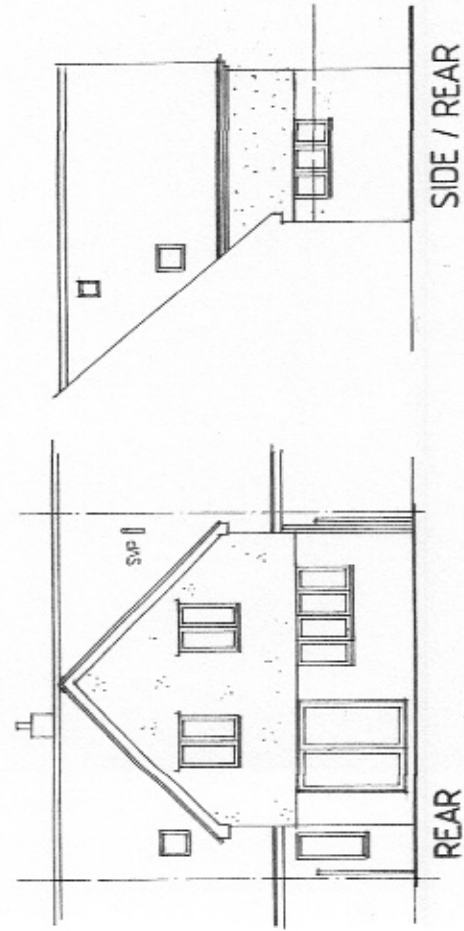
All steelwork elements to be fabricated to a required CE Marketing Execution Class of EXC2 to BS EN 1090-2.

Double beams do not need to be bolted together unless the calculations provide a specific detail.

All beams & posts to be coated with zinc oxide primer prior to delivery to site.  
Beams to be galvanised if considered necessary, but the bottom plate of beams designed to support an external cavity wall should be given a coat of galverfroid paint, applied in accordance with the manufacturer's instructions.

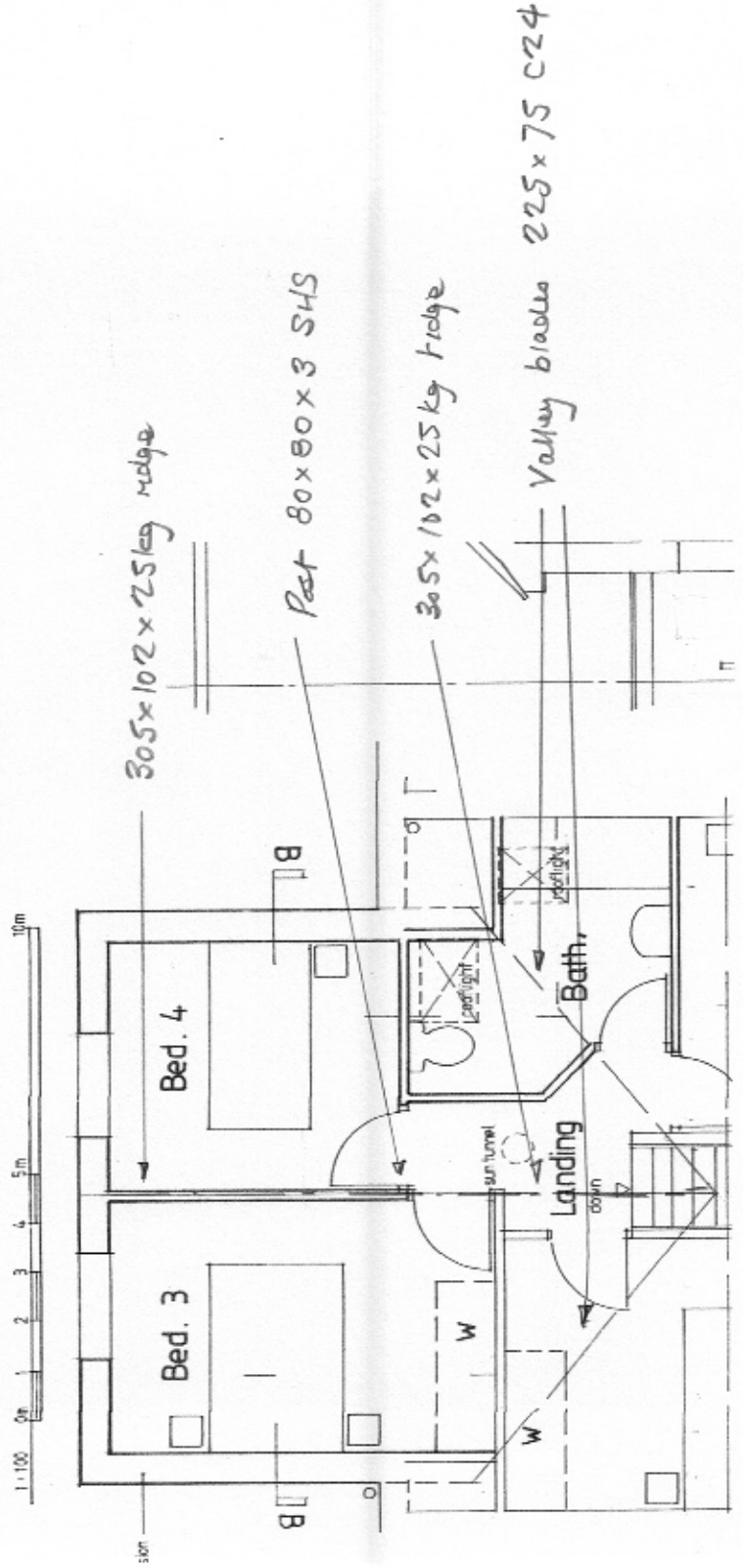


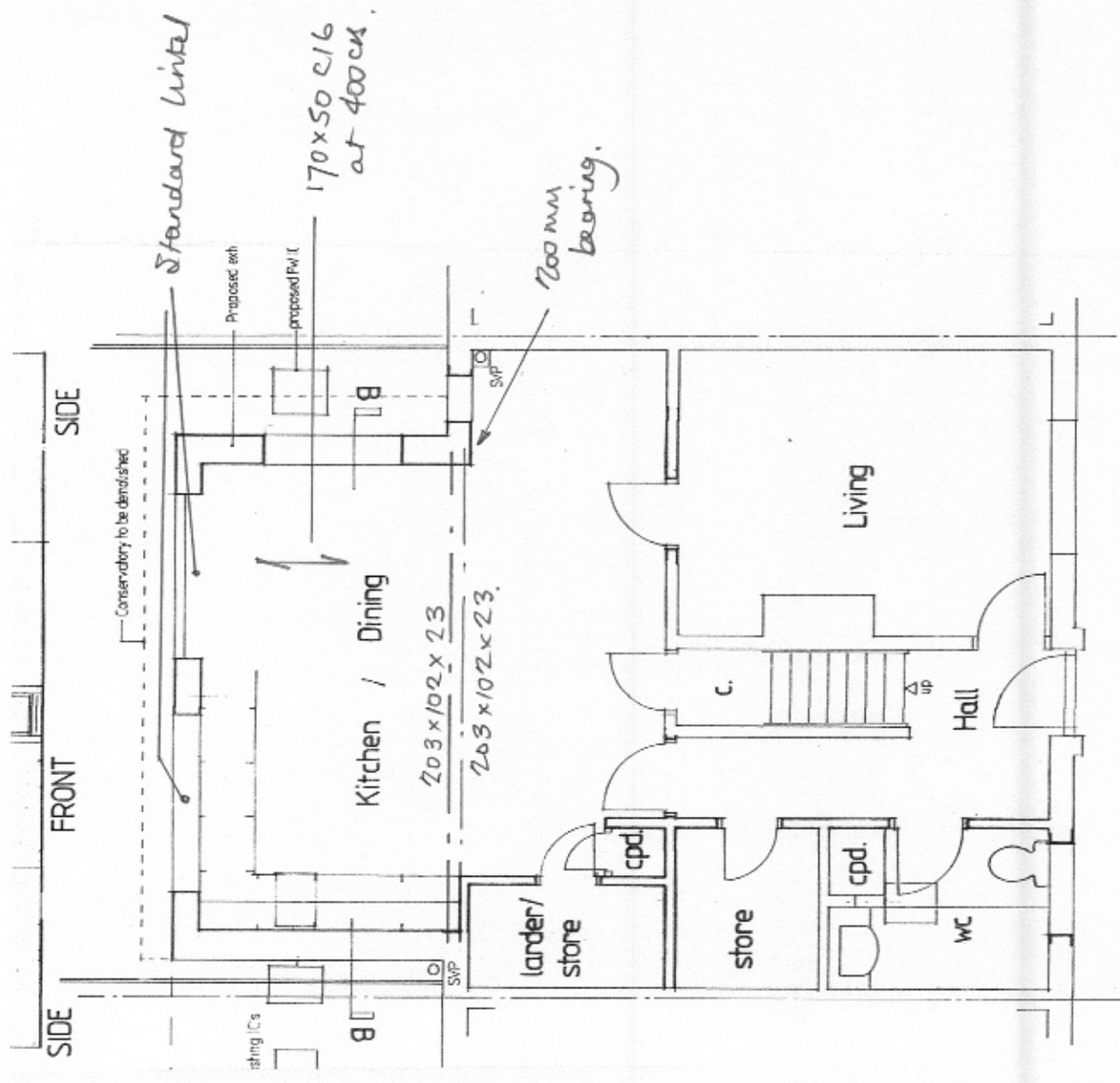
Scale 1:73.



Roof rafters 150x50 C16 at 400cs.

Ceiling rafters 150x50 C16 at 400cs.



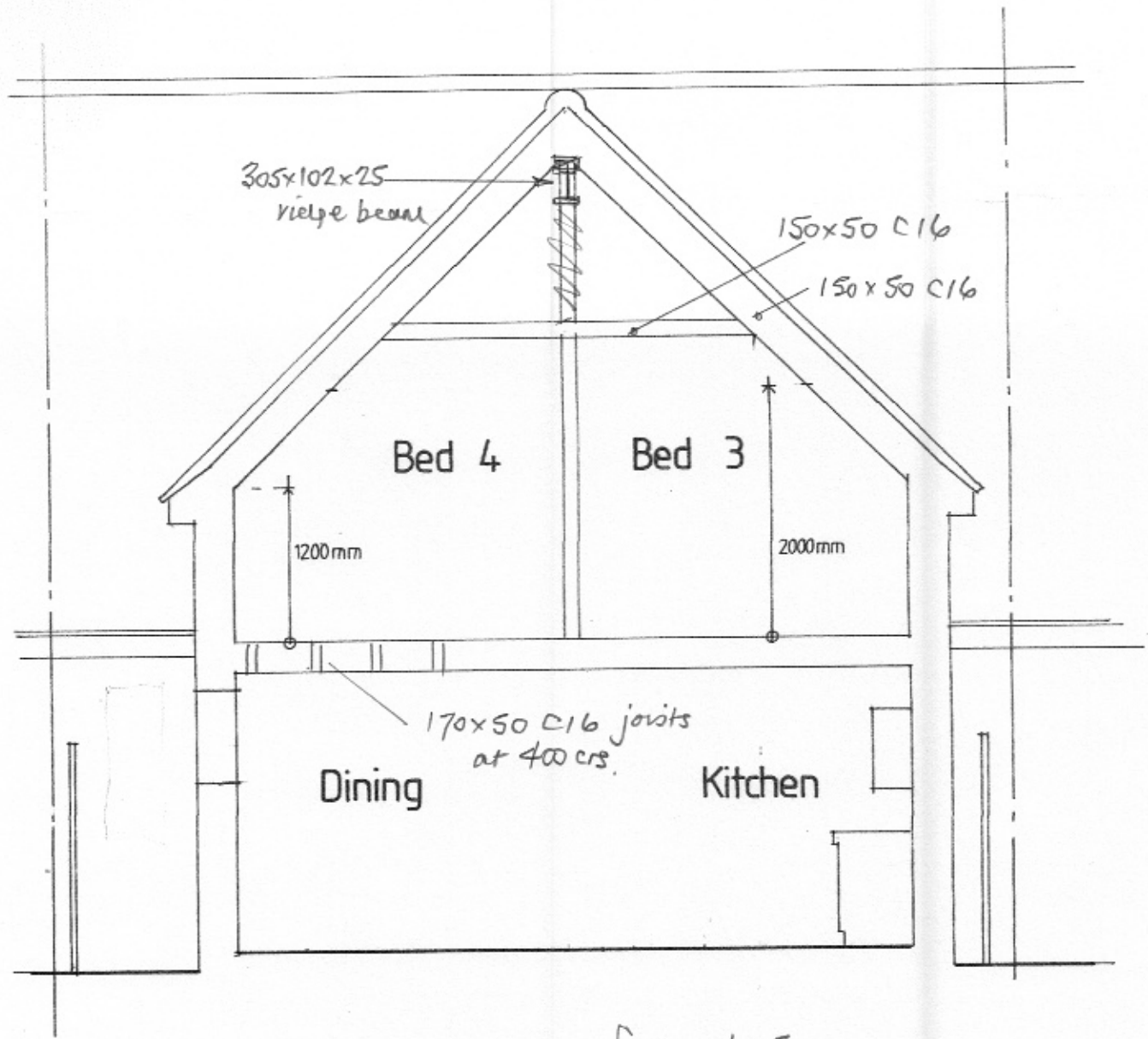


GROUND FLOOR PLAN



REAR

SIDE / REAR



SECTION B - B

Scale 1:50.

Project 181 WROSLYN ROAD FREELAND OXON

Drawing Title Proposed floor plans, elevations and section

Date June 2019

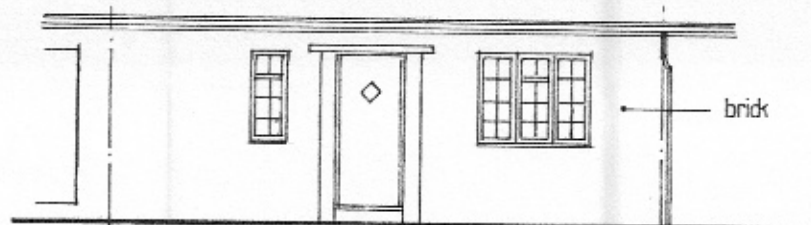
Scale 1:50 1:100

Drawing Number 958:02 (b)

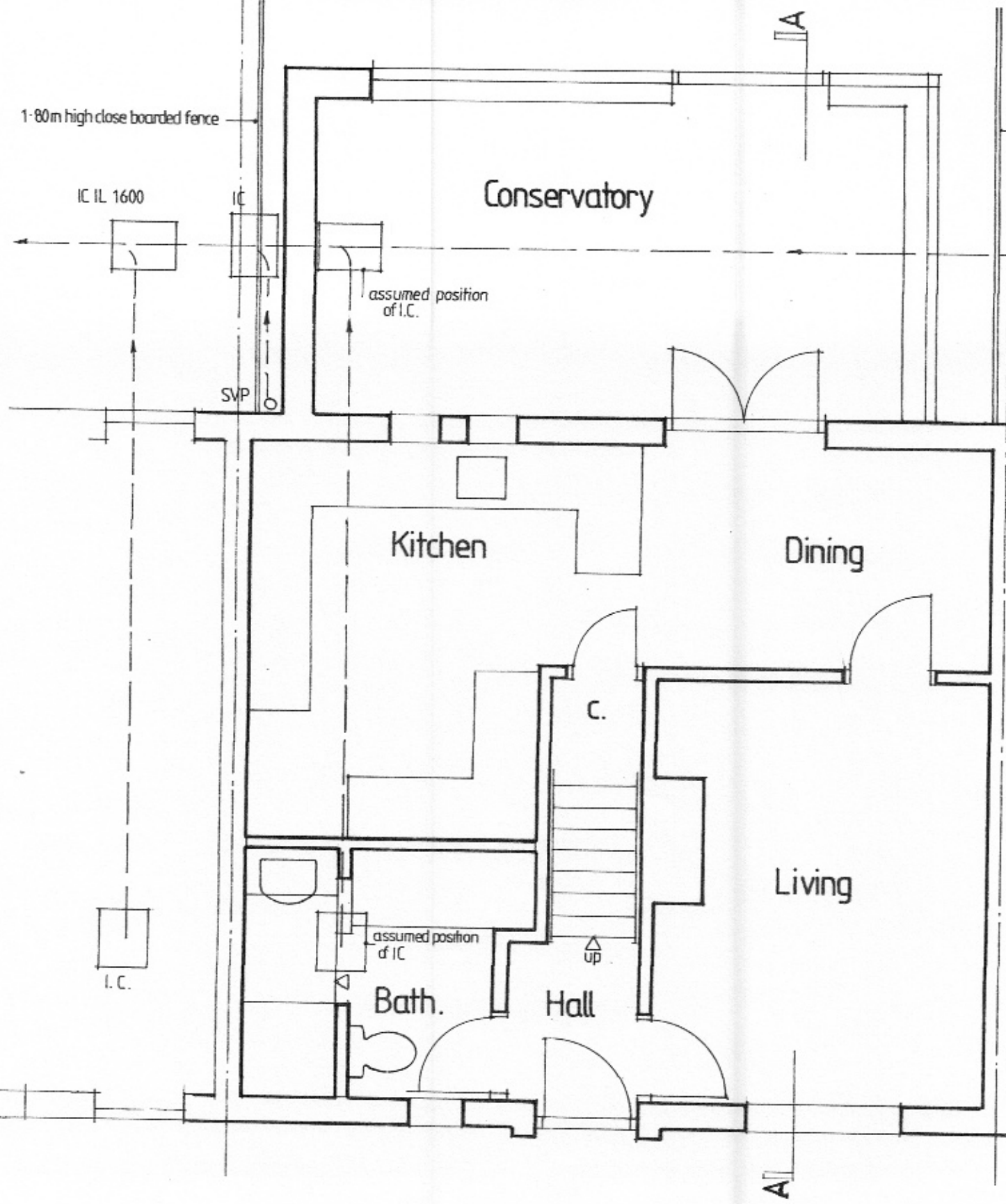
Rev a) July '19. c) July '19

Malcolm Harding Residential Design 37 Manor Road Bladon Oxon OX20 1RU Tel: 01993 812944

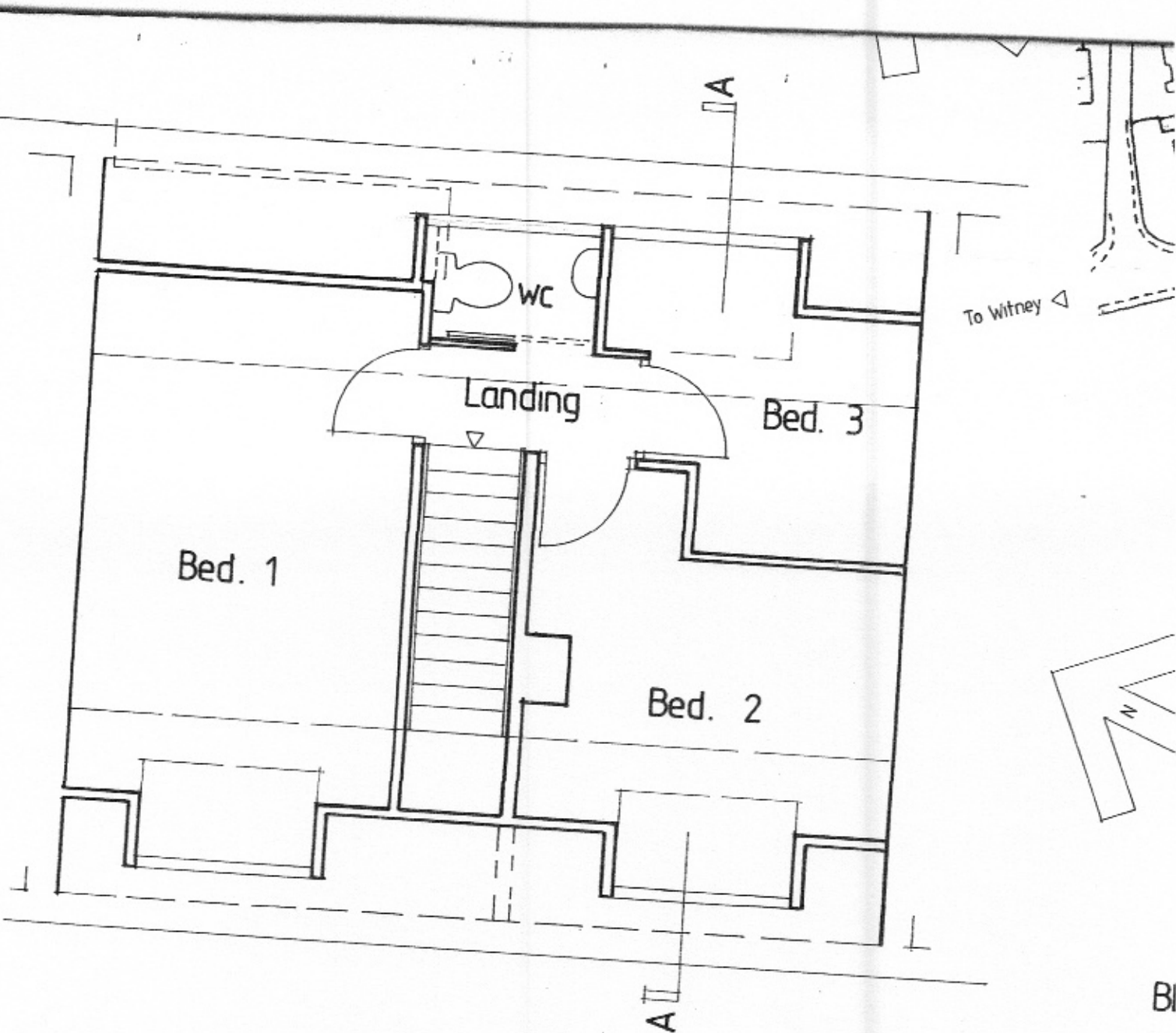
10m



ELEVATIONS FRONT



GROUND FLOOR PLAN

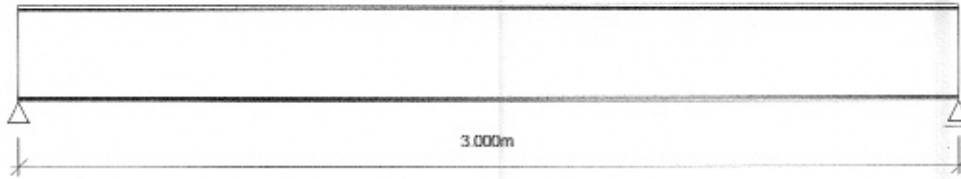


FIRST FLOOR PLAN



Project	181 WRC
Drawing Title	Exist
Date	June 2019
Drawing Number	91
Malcolm Harding Reside	

**REFERENCE: Beam 1**



**Beam**

Section Size, Grade	Span, L [m]
Rolled, UKB 305x102x25, S275	3.000

**Restraints**

Fully Restrained

**Design Loadcases**

**Loadcase 1, Type: Dead**

Load Type	F kN	g1 kN/m	g2 kN/m	a m	b m	Stability type
UDL	-	4.7	-	0.0	3.000	Normal

**Loadcase 2, Type: Imposed**

Load Type	F kN	g1 kN/m	g2 kN/m	a m	b m	Stability type
UDL	-	1.7	-	0.0	3.000	Normal

**Design Combinations**

**Combination 1**

Loadcase	Factor
Self weight - steel beam only	1.400
Loadcase 1	1.400
Loadcase 2	1.600

**End Reactions Summary by Loadcase (Unfactored)**

Loadcase	Reactions at supports	
	Left support [kN]	Right support [kN]
Self weight - steel beam only	0.4	0.4
Loadcase 1	7.0	7.0
Loadcase 2	2.6	2.6

**End Reactions Summary by Combination (Factored)**

Combination	Reactions at supports	
	Left support [kN]	Right support [kN]
Combination 1	14.5	14.5

**Design Summary**

Design Condition	Status	Combination	Critical Value	Capacity \ Limit	Units	Ratio
Class	Pass	1	Class 1			
Shear Vertical	Pass	1	14.5	292.0	kN	0.050
Shear Web Buckling	Pass	1	47.569	70.000		n/a
Moment	Pass	1	10.8	94.1	kNm	0.115
Deflection	Pass	1	0.6	6.0	mm	0.095
Notes						



**Combination 1**

**Moment check**

Position	Critical Value	Capacity	Units	Ratio	Status
1.500 m	10.8	94.1	kNm	0.115	Pass

**Deflection check**

Condition	Critical Value	Limit	Units	Ratio	Status
Dead	0.6	6.0	mm	0.095	Pass
Imposed	0.2	8.3	mm	0.024	Pass
Total	0.8	15.0	mm	0.051	Pass

Bearing reaction at gable wall 14.5 kN.

Allowable load on 3.5 N block is

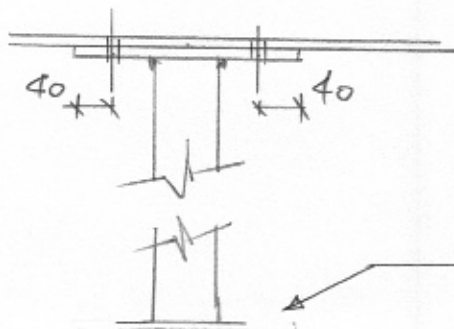
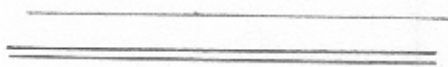
$$\frac{3.5}{3.1} \times 1.5 \times 102 \times \frac{100}{10^3} = 17.2 \text{ kN}$$

∴ no padstone required.

Internal support, steel SHS column.

Reaction	Factored 14.5	Unfactored 7.4 + 2.6
from Beam 2	28.1	14.9 + 4.5
	<u>42.6 kN.</u>	<u>22.3 + 7.1</u>

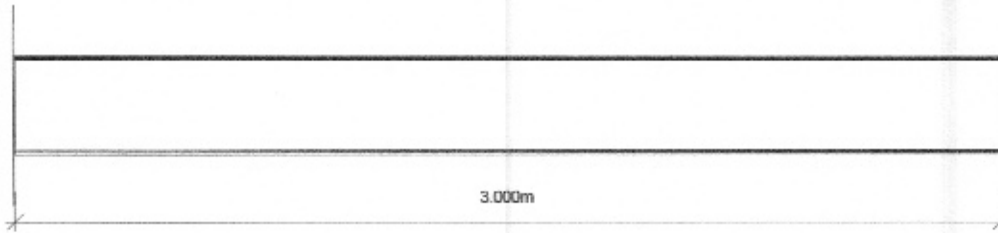
Use 80x80x3 S355 column section, 3700 long  
Allowable load > 85.7 kN (Blue book D-26)



Head plate 300x102x10 mm  
plate with 6 mm fillet welds and  
4 M16 Grade 8.8 bolts,

Base plate

**REFERENCE: Beam 2**



**Beam**

Section Size, Grade	Span, L [m]
Rolled, UKB 305x102x25, S275	3.000

**Restraints**

Fully Restrained

**Design Loadcases**

**Loadcase 1, Type: Dead**

Load Type	F kN	g1 kN/m	g2 kN/m	a m	b m	Stability type
VDL	-	4.7	0.0	0.0	3.000	Normal
Point load	7.1	-	-	3.000	-	Normal

**Loadcase 2, Type: Imposed**

Load Type	F kN	g1 kN/m	g2 kN/m	a m	b m	Stability type
VDL	-	1.7	0.0	0.0	3.000	Normal
Point load	2.0	-	-	3.000	-	Normal

**Design Combinations**

**Combination 1**

Loadcase	Factor
Self weight - steel beam only	1.400
Loadcase 1	1.400
Loadcase 2	1.600

**End Reactions Summary by Loadcase (Unfactored)**

Loadcase	Reaction/Moment at left support	
	Reaction [kN]	Moment [kNm]
Self weight - steel beam only	0.7	1.1
Loadcase 1	14.2	28.3
Loadcase 2	4.5	8.5

**End Reactions Summary by Combination (Factored)**

Combination	Reaction/Moment at left support	
	Reaction [kN]	Moment [kNm]
Combination 1	28.1	54.9

**Design Summary**

Design Condition	Status	Combination	Critical Value	Capacity \ Limit	Units	Ratio
Class	Pass	I	Class I			

Design Condition	Status	Combination	Critical Value	Capacity\Limit	Units	Ratio
Shear Vertical	Pass	1	28.1	292.0	kN	0.096
Shear Web Buckling	Pass	1	47.569	70.000		n/a
Moment	Pass	1	54.9	94.1	kNm	0.584
Deflection	Pass	1	8.7	12.0	mm	0.721
Notes						

**Combination 1****Moment check**

Position	Critical Value	Capacity	Units	Ratio	Status
0.000 m	54.9	94.1	kNm	0.584	Pass
3.000 m	0.0	94.1	kNm	0.0	Not Checked

**Deflection check**

Condition	Critical Value	Limit	Units	Ratio	Status
Dead	8.7	12.0	mm	0.721	Pass
Imposed	2.5	16.7	mm	0.148	Pass
Total	11.1	30.0	mm	0.371	Pass

For support see P. 9

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OX28 3JZ

Contract: 181 Wrosllyn Rd Free land

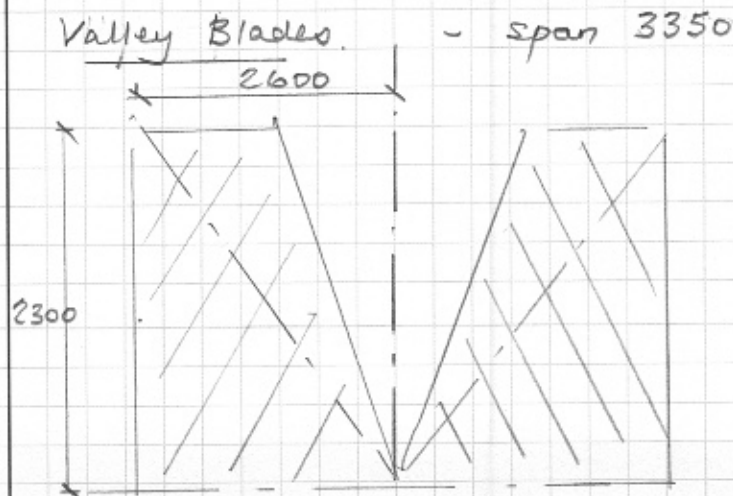
Job No: PCP 409

Date: Aug 19

Calcd: PCP

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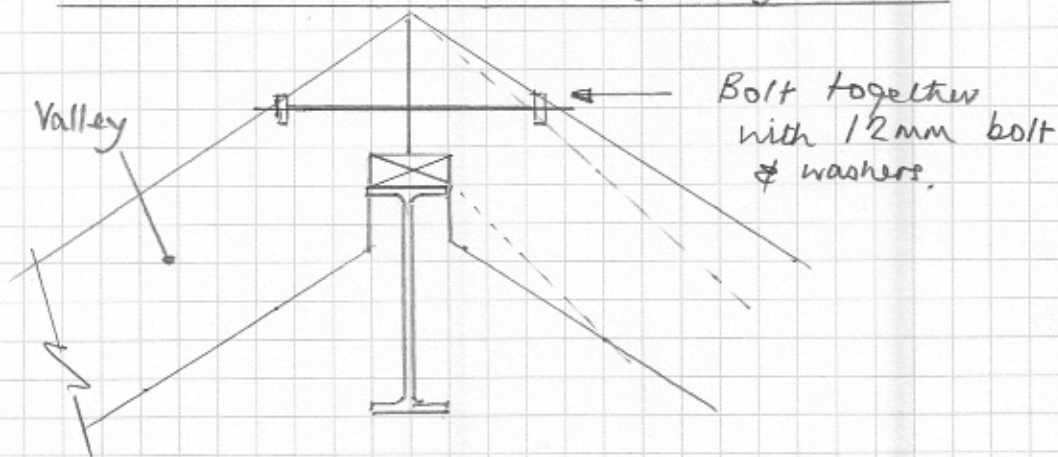
$$2.3 + \frac{2.6}{2} (1.75 + 0.5) \\ = 6.3 + 1.8$$

$$\therefore \text{moment } 0.128 \times \frac{1}{2} \times 3.35^2 \times 8.1 = 5.8 \text{ KNm.}$$

$$\text{Use } 225 \times 75 \text{ C24 rafter } M.R = \frac{7.5 \times 1.25 \times 75 \times 225^2}{6 \times 10^6} \\ = 5.9 \text{ KNm}$$

(also support valley blade on side wall to stairs and dwarf wall to bedroom 1.)

Connection to 305 x 102 x 25 kg ridge beam



Join valleys together to prevent slipping off ridge beam.



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Contract: 181 Wrosllyn Rd Freeland

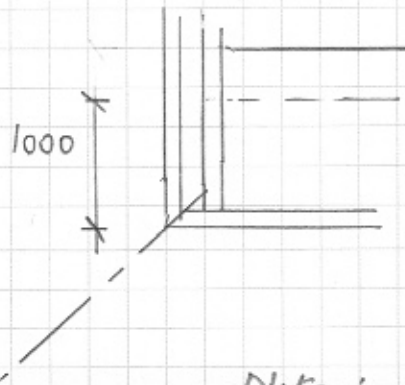
Job No: PCP 409

Date: Aug 19

Calcd: PCP

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Bathroom detail



New side wall in  
 stud built up off  
 existing floor joists

Note: Check existing joists and add  
 additional double joint to support valley blade  
 if there is no joint directly under new wall.

Beam across Kitchen divider. - span 5300

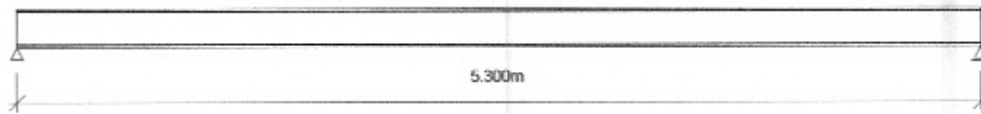
Floor joists in extension span 2700, use 170x50  
 C16, similar to existing, with support beam  
 under.

Loading.

Beam 4 Outer beam - floor  $\frac{2.7}{2} (0.5+1.5) = 0.7 + 2.0$   
 stud point load  $2.3 \times \frac{2.7}{2} \times 0.7 = 2.2$

Beam 3 Inner beam floor  $\frac{2.1}{2} (0.5+1.5) = 0.5 + 1.6$   
 stud wall  $2.3 \times 0.7 = 1.6$   
 $\frac{0.5 + 1.6}{2.1 + 1.6}$

Use twin 203x102x19 kg beams with 200 mm  
 bearing each end (Cals 14-17)

**REFERENCE: Beam 3****Beam**

Section Size, Grade	Span, L [m]
Rolled, UKB 203x102x23, S275	5.300

**Restraints**

Left hand support type 3      Compression flange laterally restrained.  
Nominal restraint against torsion.  
Both flanges free to rotate on plan.

Start position [m]	End position [m]	Sub-beam length [m]	Normal eff. length [m]	Destab. eff. length [m]
0.0	5.300	5.300	1.000L	1.200L

Right hand support type 3      Compression flange laterally restrained.  
Nominal restraint against torsion.  
Both flanges free to rotate on plan.

**Design Loadcases****Loadcase 1, Type: Dead**

Load Type	F kN	g1 kN/m	g2 kN/m	a m	b m	Stability type
UDL	-	2.1	-	0.0	5.300	Normal

**Loadcase 2, Type: Imposed**

Load Type	F kN	g1 kN/m	g2 kN/m	a m	b m	Stability type
UDL	-	1.6	-	0.0	5.300	Normal

**Design Combinations****Combination 1**

Loadcase	Factor
Self weight - steel beam only	1.400
Loadcase 1	1.400
Loadcase 2	1.600

**End Reactions Summary by Loadcase (Unfactored)**

Loadcase	Reactions at supports	
	Left support [kN]	Right support [kN]
Self weight - steel beam only	0.6	0.6
Loadcase 1	5.6	5.6
Loadcase 2	4.2	4.2

**End Reactions Summary by Combination (Factored)**

Combination	Reactions at supports	
	Left support [kN]	Right support [kN]
Combination 1	15.4	15.4

**Design Summary**

Design Condition	Status	Combination	Critical Value	Capacity \ Limit	Units	Ratio
Class	Pass	1	Class 1			
Shear Vertical	Pass	1	15.4	181.1	kN	0.085
Shear Web Buckling	Pass	1	31.370	70.000		n/a

Design Condition	Status	Combination	Critical Value	Capacity/Limit	Units	Ratio
Moment	Pass	1	20.4	64.4	kNm	0.317
Buckling	Pass	1	20.4	22.0	kNm	0.927
Deflection	Pass	1	5.5	10.6	mm	0.523
Notes						

**Combination 1****Moment check**

Position	Critical Value	Capacity	Units	Ratio	Status
2.650 m	20.4	64.4	kNm	0.317	Pass

**Lateral Torsional Buckling check**

Sub Beam	Critical Value	Capacity	Units	Ratio	Status
Sub Beam 1	20.4	22.0	kNm	0.927	Pass

**Deflection check**

Condition	Critical Value	Limit	Units	Ratio	Status
Dead	5.5	10.6	mm	0.523	Pass
Imposed	3.8	14.7	mm	0.259	Pass
Total	9.3	26.5	mm	0.353	Pass

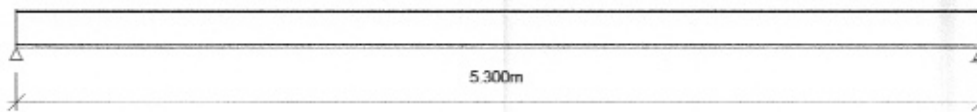
Bearing reaction 15.4 kN

Allowable load on 3.5 N block is, with 200 mm bearing

$$\frac{3.5}{3.1} \times 1.25 \times 200 \times \frac{100}{10^3} = 28 \text{ kN}$$

∴ no padstones required.

**REFERENCE: Beam 4**



**Beam**

Section Size, Grade	Span, L [m]
Rolled, UKB 203x102x23, S275	5.300

**Restraints**

Left hand support type 3      Compression flange laterally restrained.  
Nominal restraint against torsion.  
Both flanges free to rotate on plan.

Start position [m]	End position [m]	Sub-beam length [m]	Normal eff. length [m]	Destab. eff. length [m]
0.0	5.300	5.300	1.000L	1.200L

Right hand support type 3      Compression flange laterally restrained.  
Nominal restraint against torsion.  
Both flanges free to rotate on plan.

**Design Loadcases**

**Loadcase 1, Type: Dead**

Load Type	F kN	g1 kN/m	g2 kN/m	a m	b m	Stability type
UDL	-	0.7	-	0.0	5.300	Normal
Point load	2.2	-	-	2.650	-	Normal

**Loadcase 2, Type: Imposed**

Load Type	F kN	g1 kN/m	g2 kN/m	a m	b m	Stability type
UDL	-	2.0	-	0.0	5.300	Normal

**Design Combinations**

**Combination 1**

Loadcase	Factor
Self weight - steel beam only	1.400
Loadcase 1	1.400
Loadcase 2	1.600

**End Reactions Summary by Loadcase (Unfactored)**

Loadcase	Reactions at supports	
	Left support [kN]	Right support [kN]
Self weight - steel beam only	0.6	0.6
Loadcase 1	3.0	3.0
Loadcase 2	5.3	5.3

**End Reactions Summary by Combination (Factored)**

Combination	Reactions at supports	
	Left support [kN]	Right support [kN]
Combination 1	13.5	13.5

**Design Summary**

Design Condition	Status	Combination	Critical Value	Capacity \ Limit	Units	Ratio
Class	Pass	1	Class 1			
Shear Vertical	Pass	1	13.5	181.1	kN	0.074



Design Condition	Status	Combination	Critical Value	Capacity\Limit	Units	Ratio
Shear Web Buckling	Pass	1	31.370	70.000		n/a
Moment	Pass	1	19.9	64.4	kNm	0.309
Buckling	Pass	1	19.9	22.4	kNm	0.887
Deflection	Pass	1	3.8	10.6	mm	0.357
Notes						

**Combination 1**

**Moment check**

Position	Critical Value	Capacity	Units	Ratio	Status
2.650 m	19.9	64.4	kNm	0.309	Pass

**Lateral Torsional Buckling check**

Sub Beam	Critical Value	Capacity	Units	Ratio	Status
Sub Beam 1	19.9	22.4	kNm	0.887	Pass

**Deflection check**

Condition	Critical Value	Limit	Units	Ratio	Status
Dead	3.8	10.6	mm	0.357	Pass
Imposed	4.8	14.7	mm	0.323	Pass
Total	8.5	26.5	mm	0.323	Pass

Bearing reaction 13.5 kN.

Allowable load with 200 mm bearing is 28 kN

∴ no padstones required.

Typical detail

