



31 LONGWOOD AVE
COWPLAIN

SINGLE STOREY REAR EXTENSION
(PILED)

STRUCTURAL INFORMATION

Rev A P1-23 .

For: Ben Mugford

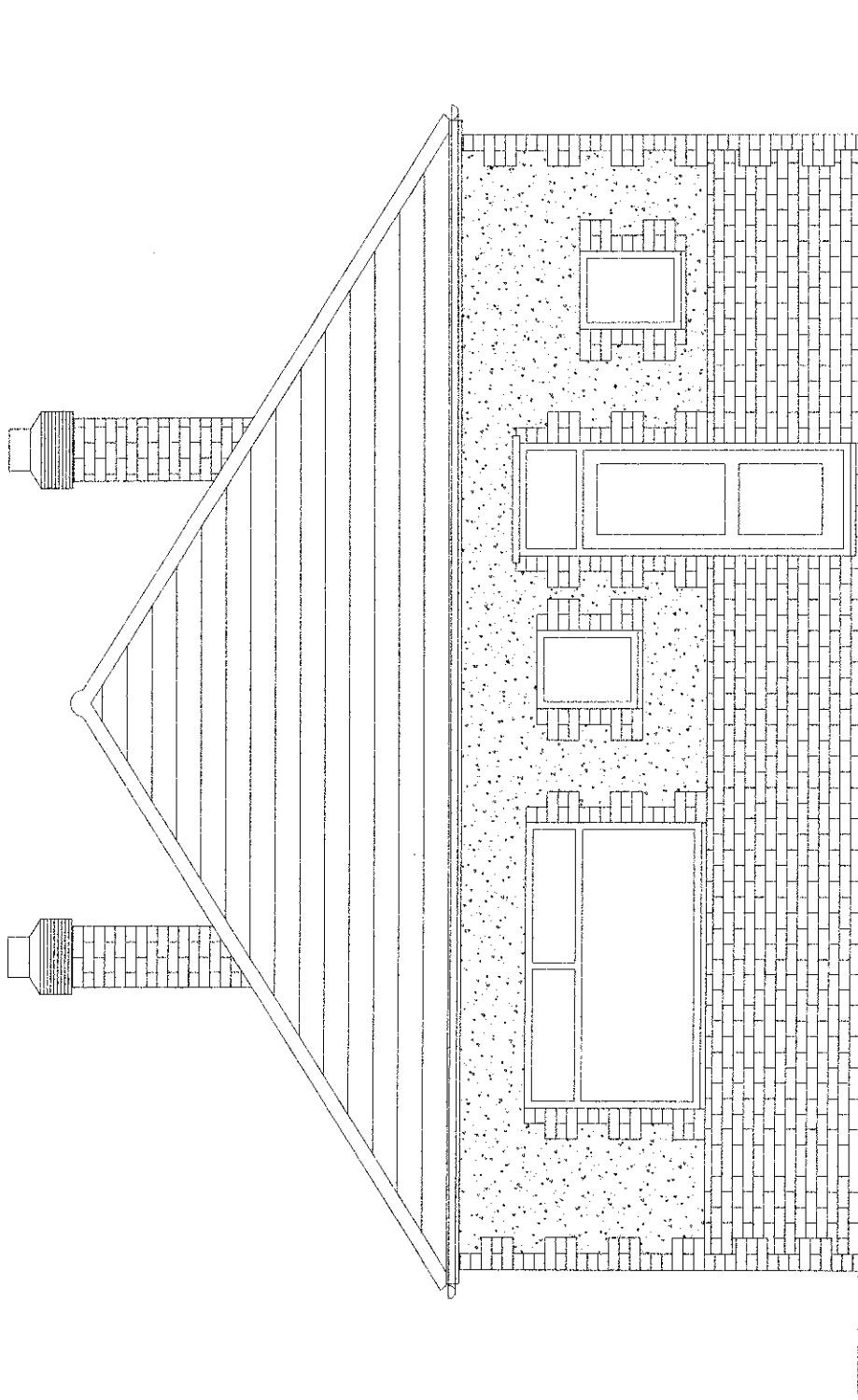
Date : Jan 2014

*Rev A FOR
P1-23 BUILDING
REGS
APPROVALS*

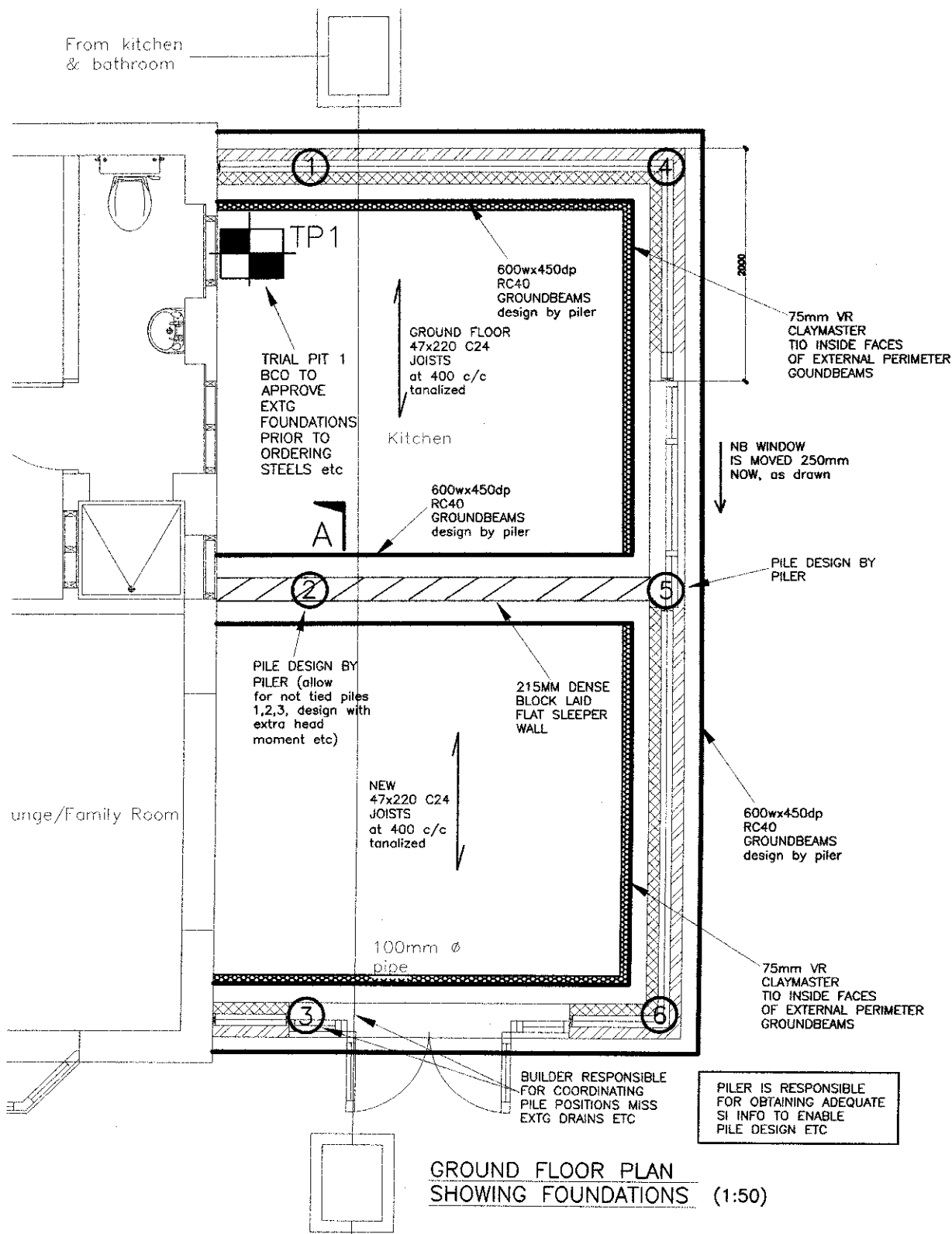
emailed to :-

• BEN MUGFORD.

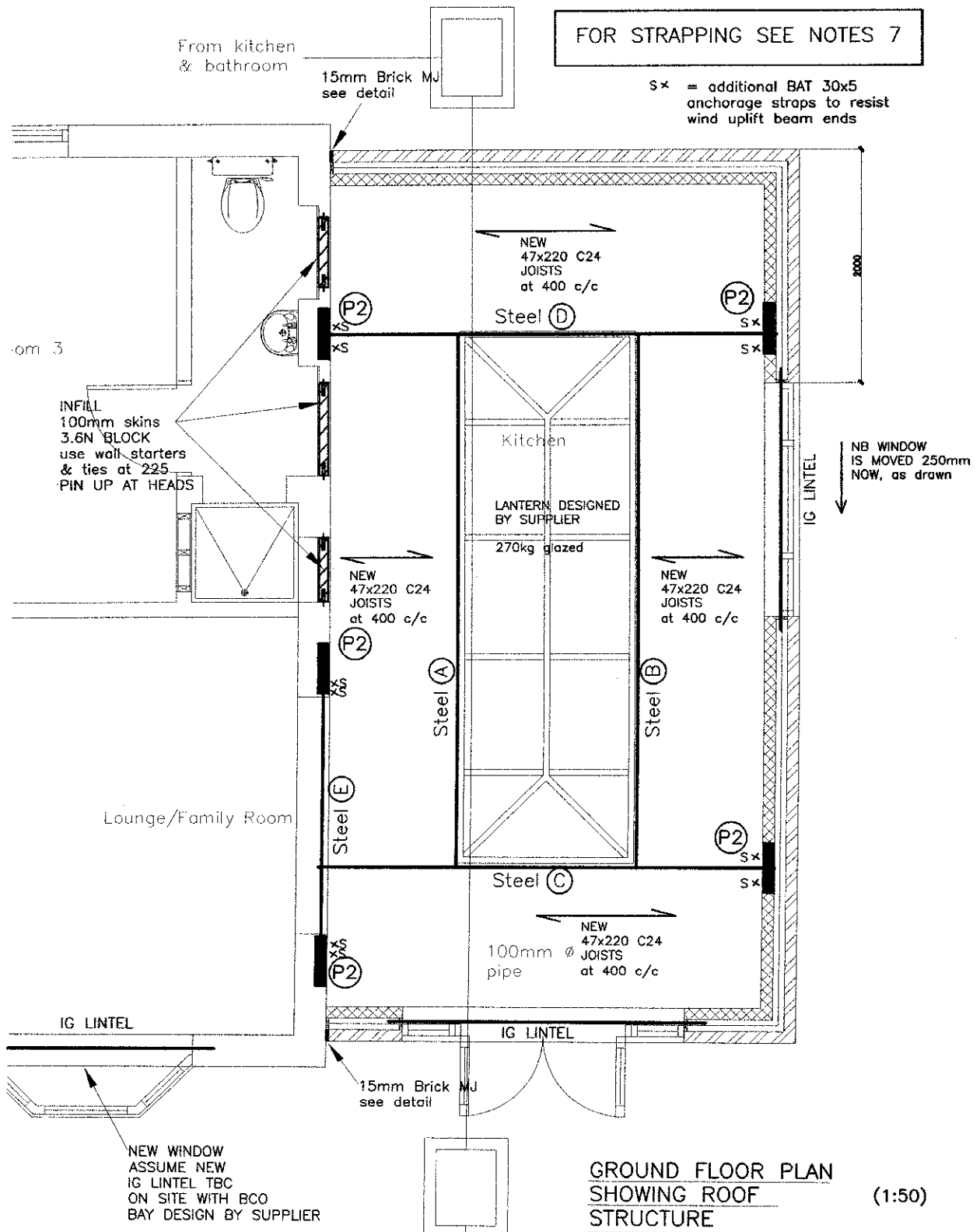
*(See to forward
to B. Control,
peters etc)*



EXISTING REAR
ELEVATION



					Project 31 LONGWOOD AVE COWPLAIN		 P. J. DAVIES ASSOCIATES LTD Chartered Structural Engineers	
					Drawing Title STRUCTURAL DETAILS (1)		4 Vensley Gardens Emsworth Hants PO10 7RA T: 01243 377836 M: 0796 220 6734 E: na@pjdassociates.co.uk	
A	PRELIMINARY	Jan 14	PJD	PJD	Scales As shown		Drawing No 1018/S/01	rev. A
Rev	Issued For/Revision Details	Date	Drawn By	Approved by				



					Project 31 LONGWOOD AVE COWPLAIN		 P. J. DAVIES ASSOCIATES LTD Chartered Structural Engineers	
					Drawing Title		4 Vensley Gardens Emsworth Hants PO10 7RA T: 01243 377836 M: 0796 220 6734 E: info@pjdassociates.co.uk	
					STRUCTURAL DETAILS (2)			
A	PRELIMINARY	Jan 14	PJD	PJD			Drawing No	
Rev	Issued For/Revision Details	Date	Drawn By	Approved by	Scales	As shown	1018/S/02	Rev. A

STEEL BEAMS (S275J2H Hot Rolled +
2 coats primer
unless noted)

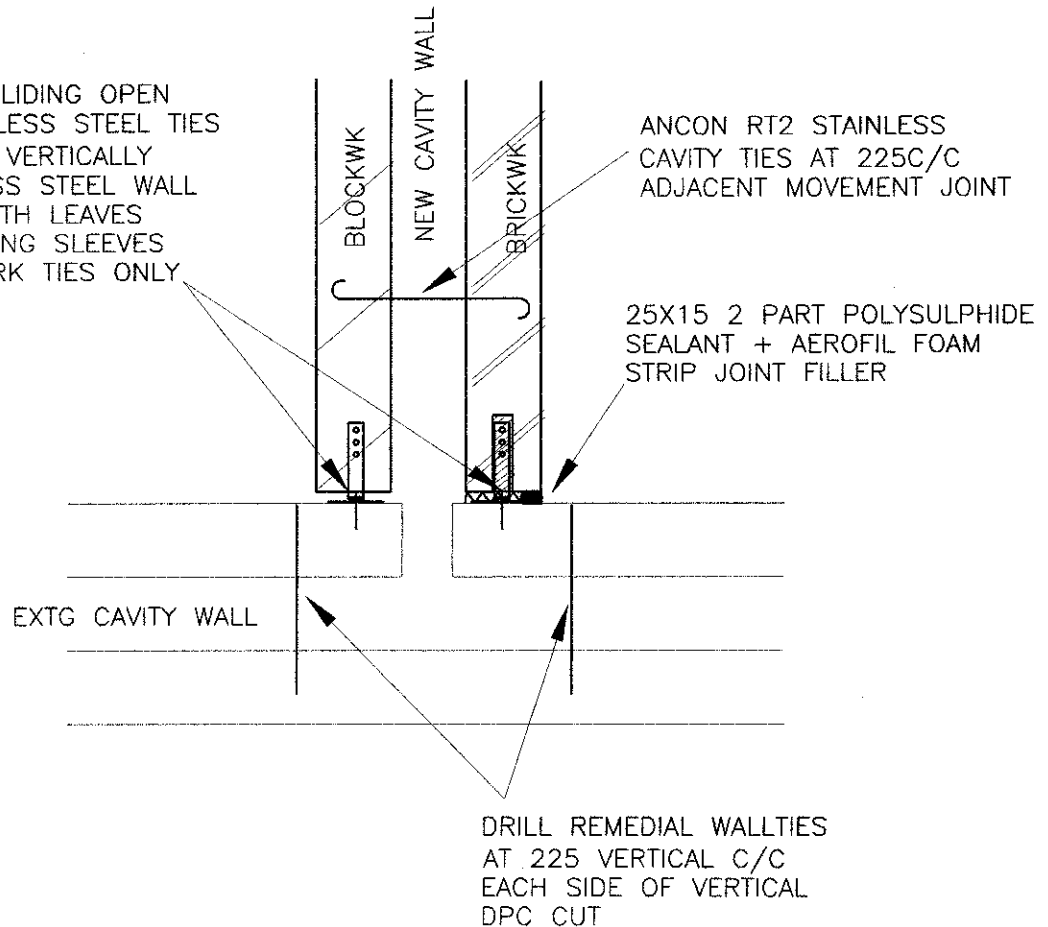
- (A) 203x102x23 UB
- (B) 203x102x23 UB
- (C) 203x102x23 UB
- (D) 203x102x23 UB
- (E) 178x102x19 UB (200mm brgs both ends)

PADSTONES (types)

- (P1) 215L x100W x150 DP 50N CLASS B
ENGINEERING BRICKWORK M4 MORTAR
- (P2) 440L x 100W x 215 DP
C30 CONCRETE

					Project 31 LONGWOOD AVE COWPLAIN	 P. J. DAVIES ASSOCIATES LTD Chartered Structural Engineers 4 Vensley Gardens T: 01243 377836 Ensworth M: 0796 220 6734 Herts E: na@pjdaviesassociates.co.uk PO10 7RA Drawing No 1018/S/03 rev. A	
					Drawing Title		
					STRUCTURAL DETAILS (3)		
Rev							
A	PRELIMINARY	Jan 14	PJD	PJD			
Issued For/Revision Details		Date	Drawn By	Approved by	Scales	As shown	

VERTICALLY SLIDING OPEN
ENDED STAINLESS STEEL TIES
AT 225 C/C VERTICALLY
USE STAINLESS STEEL WALL
STARTERS BOTH LEAVES
USE DEBONDING SLEEVES
ON BRICKWORK TIES ONLY
AS SHOWN

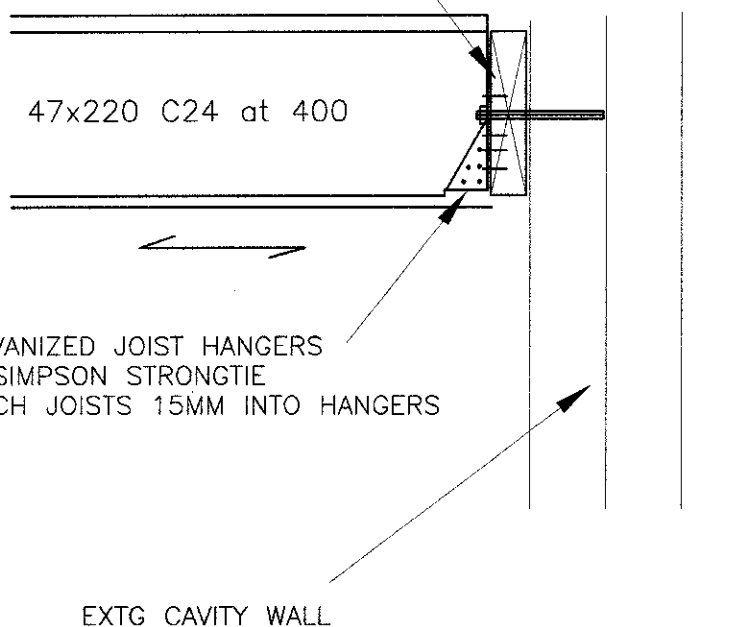


BRICK MOVEMENT JOINT DETAIL (TYPICAL)

(1:10 at A4)

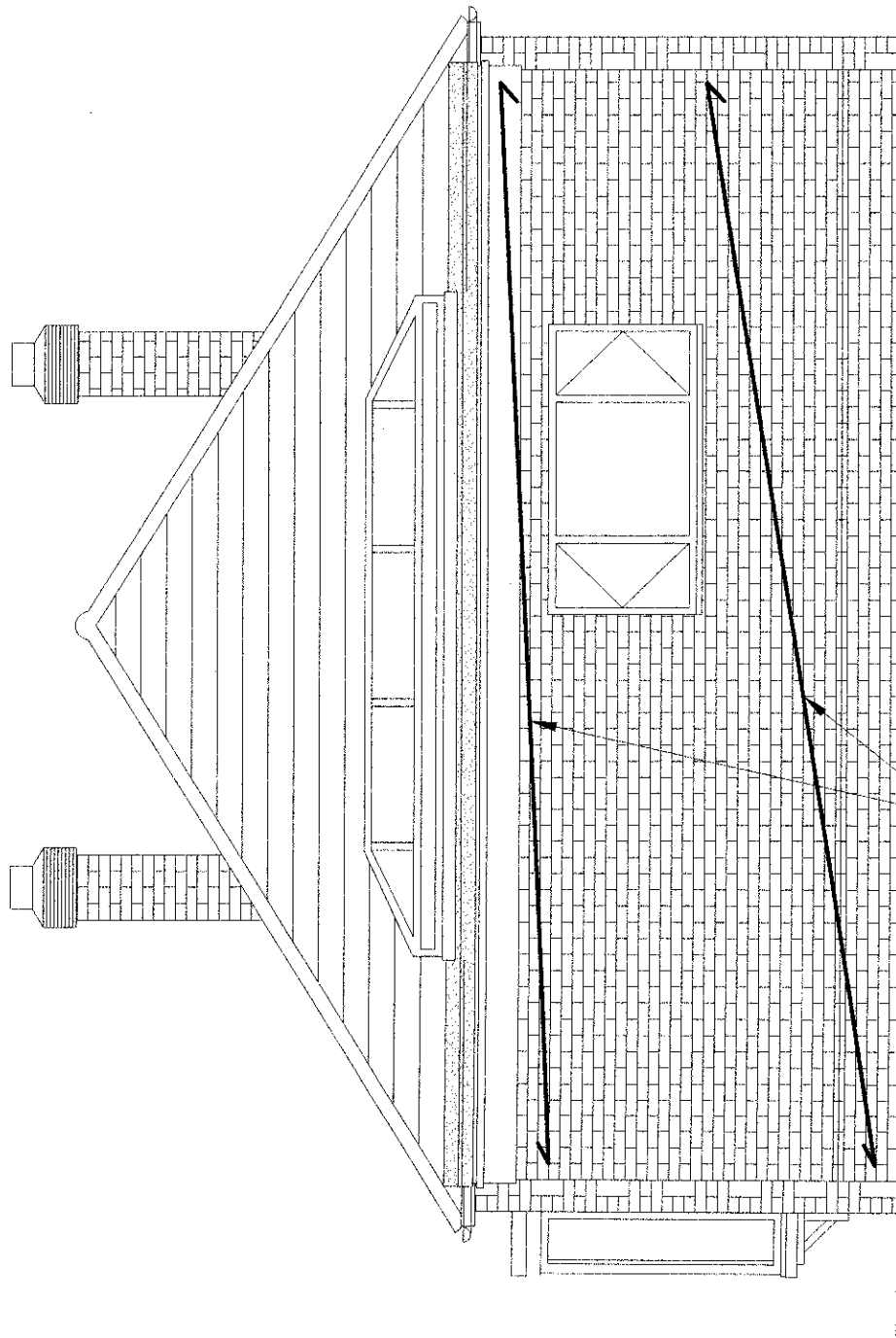
					Project 31 LONGWOOD AVE COWPLAIN	 P. J. DAVES ASSOCIATES LTD Chartered Structural Engineers	
					Drawing Title STRUCTURAL DETAILS (4)	4 Versley Gardens Emsworth Hants PO10 7RA T: 01243 977836 M: 0796 220 6734 E: info@pjdassociates.co.uk	
Rev						Drawing No 1018/S/04	REV. A
A	PRELIMINARY	Jan 14	PJD	PJD	Scales As shown		
Issued For/Revision Details		Date	Drawn By	Approved by			

47x220 treated plate
FIXED TO EXTG WALL USING
M12 HILTI RESIN ANCHORS
AT 400 C/C



SUPPORT NEW FLAT ROOF
OFF EXTG WALLS (1:10 at A4)

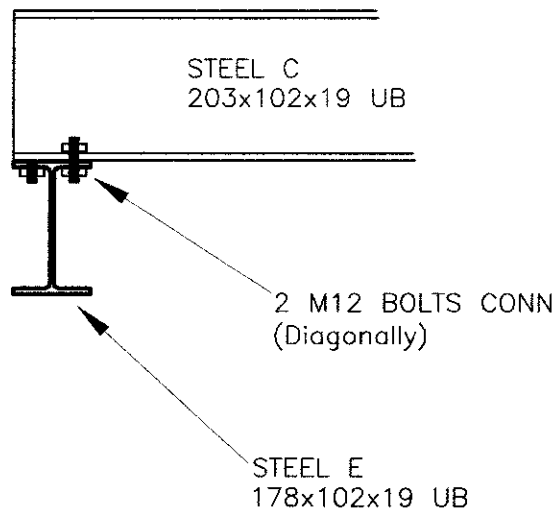
					Project 31 LONGWOOD AVE COWPLAIN		 P. J. DAVIES ASSOCIATES LTD Chartered Structural Engineers 4 Vensley Gardens Emsworth Hants PO10 7RA T: 01243 377836 M: 0796 229 6734 E: mail@pjdaviesassociates.co.uk	
					Drawing Title			
					STRUCTURAL DETAILS (5)			
A	PRELIMINARY	Jan 14	PJD	PJD			Drawing No	
Rev	Issued For/Revision Details	Date	Drawn By	Approved by	Scales As shown		1018/S/05	
							Rev. A	



include BRC BRICKTOR STAINLESS STEEL
BED JOINT REINFORCEMENT AT 225c/c
IN BOTH INNER BLOCK & OUTER BRICKWORK LEAVES
ie EVERY 3rd BRICK COURSE, & EVERY BLOCK COURSE
(JUST FOR WALL BELOW WINDOWS & 4 BLOCK COURSES OVER WINDOWS)

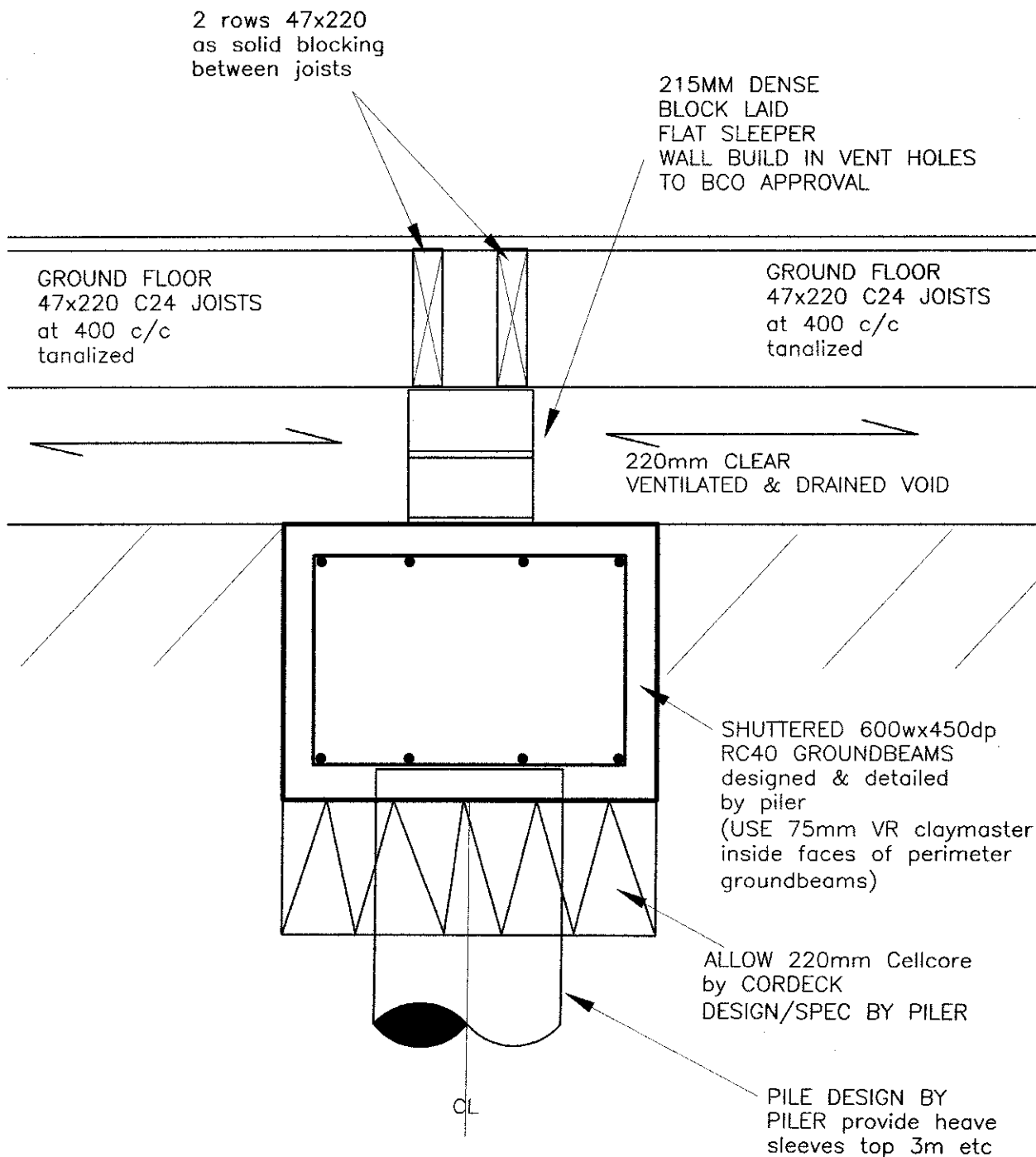
REAR ELEVATION (1:50 at A4)

					Project 31 LONGWOOD AVE COWPLAIN		 P. J. DAVIES ASSOCIATES LTD Chartered Structural Engineers	
					Drawing Title STRUCTURAL DETAILS (6)		4 Wensley Gardens Ensworth Herts PQ10 7RA T: 01243 377836 M: 0796 220 6734 E: mail@pjdaviesassociates.co.uk	
Rev							Drawing No	rev.
A	PRELIMINARY	Jan 14	PJD	PJD	Scale	As shown	1018/S/06	A
Issued For/Revision Details		Date	Drawn By	Approved by				



STEEL E & D (1:10 at A4)

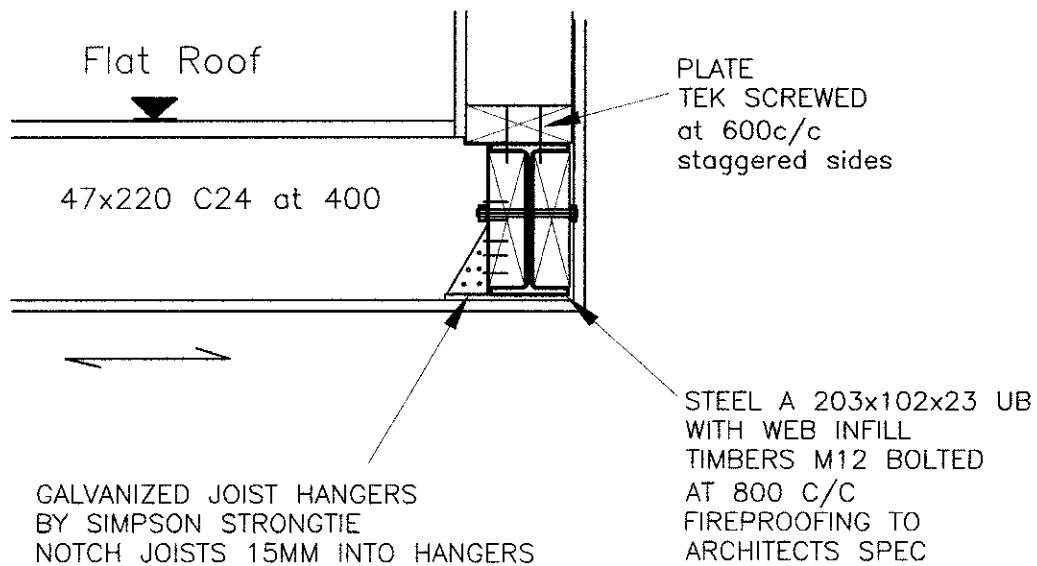
					Project 31 LONGWOOD AVE COWPLAIN		 P. J. DAVIES ASSOCIATES LTD Chartered Structural Engineers 4 Wensley Gardens Epsom, Surrey Surrey, Surrey PO10 7RA T: 01243 377836 M: 0796 220 6734 E: mail@pjdaviesassociates.co.uk		
					Drawing Title STRUCTURAL DETAILS (7)				
A PRELIMINARY					Jan 14	PJD	PJD	Drawing No 1018/S/07	Rev. A
Rev	Issued For/Revision Details				Date	Drawn By	Approved by	Scales As shown	



SECTION A-A
(1:10 at A4)

DPMs DPCs
TO ARCHITECTS
SPEC & DETAIL

					Project 31 LONGWOOD AVE COWPLAIN	 P. J. DAVIES ASSOCIATES LTD Chartered Structural Engineers	
					Drawing Title STRUCTURAL DETAILS (8)		
Rev	Issued For/Revision Details	Date	Drawn By	Approved by	Scales	As shown	4 Wensley Gardens Emsworth Hants PO10 7BA T: 01243 377896 M: 0796 220 6734 E: na@pjdaviesassociates.co.uk
A	PRELIMINARY	Jan 14	PJD	PJD	Drawing No 1018/S/08		Rev. A



STEEL A DETAIL

(1:10 at A4)

					Project 31 LONGWOOD AVE COWPLAIN	 P. J. DAVIES ASSOCIATES LTD Chartered Structural Engineers 4 Vensley Gardens Emsworth Hants PO10 7RA T: 01243 377636 M: 0796 220 6734 E: pdj@pjdassociates.co.uk	
					Drawing Title STRUCTURAL DETAILS (9)		
Rev	A	PRELIMINARY	Jan 14	PJD	PJD	Drawing No 1018/S/09	rev. A
Issued For/Revision Details			Date	Drawn By	Approved by	Scale As shown	

Standard Structural Notes (to be read in conjunction with P. J. Davies Associates Ltd. Drawings/A4 sketches and other general specification notes)

1. This structural information is to be submitted to and approved by Building Control prior to implementation.
2. These notes and the structural drawings and sketches are to be read in conjunction with the Architects drawings/specification. Any discrepancies are to be brought to the attention of the Engineer and Architect. Do not scale off the drawings. For dimensional queries, refer to Architect. All steelwork heights/levels/headrooms etc are to be verified by Architect & Contractor prior to commencement on site, call engineer to revise structure if required. The Architect is responsible for dimensional coordination of the project.
3. The Client is to allow a contingency sum (say £2K) for any additional structure that may be required as project progresses to site and through to completion.
4. Builder is responsible for agreeing any variations to architects elevations resulting from structure with Architect prior to ordering steelwork/timbers/ prior to construction.
5. Our role is structural only, we take no responsibility for planning permissions that may be required, the client is either to address these issues himself with the planners or preferably to employ architects etc for this purpose.

TIMBER

6. All timbers to be strength grade C24 unless noted otherwise, kiln dried, pressure impregnated preservative treated and free of splits, shakes and large knots. Timbers must be kept dry at all stages. Check that moisture content is less than 16% before fixing plasterboard and finishes. All cut, built in ends and joints to be given two further coats of Protim Solignum Cut End preservative on site. Any floor spans greater than 2.4m to have central row of solid noggins or herringbone strutting at mid span, also rows of noggins along edges to support chipboard edges. All double/triple timber beams to be well nailed together (3.75mm diameter galvanized nails at 150mm c/c staggered, or M10 bolted at 400c/c staggered with 3mm plate washers, or use Fasten master Timberlok screws at 300mm c/c). Minimum bearing for all timbers is 100mm. All oak timbers to be min grade B, and seasoned/air dried. Oak connections are to specialist oak suppliers details & design. Must use stainless steel nails/fixings in contact with any unseasoned oak. All chipboard floors are to be installed in strict accordance with manufacturers instructions, (either glued & screwed approach or glued only approach) to avoid squeaky floors. Drill holes/notching for services in timber joists to be in strict accordance with A4 sketch (see attached sheet). Note, wane is not permitted at bearing positions of any timbers. Provide min 40mm clear gap off chimneys when trimming around.
7. All wallplates to be 50 x 100 C24 treated softwood timber bedded on mortar, in min 3m lengths lap jointed. Strap all roof eaves wallplates down with BAT galvanized 30x5 straps 100/1200 min 10 no 10 screws in lower leg. Straps at max 1.5m c/c. 30 x 5 BAT straps also to be provided at max 1.5m c/c around perimeter of any new first floor areas to tie walls to floor, use min 100/1200. Notch straps into top of first floor joists. Nog out at strap locations where wall is parallel to the span of the floor joists. Noggins to be min 2/3 depth of floor joists & tightly fitted. Also add BAT straps around full perimeter of any gable end walls at 1.5m c/c, use noggins etc, to tie gable walls into roof and ceiling structures.
8. Joist hangers to be by Simpson Strong Tie (or Cullen) only. Install hangers in strict accordance with manufacturers recommendations. Where type/reference of hanger is not given on structural drawings, builder is to check any heavily loaded hanger specs with structural engineer for approval prior to purchasing, so that Safe Working Load of hanger can be checked against design loading etc.
9. For all cut timber roofs, all timber to timber connections to be M12 bolted. Use 40 x 3 plate washers and use Nylok nuts. Provide tooth plate connectors also if indicated on structural drawings. Roof battens sizes to tile manufacturers recommendations, fixed to BS 5534.
10. All flat roofs to be sheathed in min 18mm WBP ply. Ply to be laid in staggered sheets all edges & joist lines nailed at 150mm c/c to form a rigid diaphragm. Strap flat roof back to main house wall using BAT 30x5 straps 100/1000 at 750mm c/c.
11. All ground & first floor studwork walls to have edge stud M10 rawlbolted to outer masonry walls at 300c/c, so studwalls provide buttressing to outer cavity walls.
12. All roofing/cladding etc is to be fixed in accordance with manufacturers instructions.

13. Builder is responsible for coordinating with structural engineer to ensure any handrailing/balustrading that is to be built has been approved/designed by the structural engineer for the necessary horizontal loadings to BS6399. Do not build any balustrading/balcony railings without prior design & approval from structural engineer.
14. Builder to open up existing floors where building new stair flights off, and agree structure for stair support with engineer.
15. All timber floor finishes to be installed with min 10mm perimeter gap all round, to be in accordance with manufacturers recommendations.

STEELWORK

16. All steelwork to be grade S275JR hot rolled unless noted otherwise. All steelwork to be shot blasted and painted off site with 2 coats high build zinc phosphate primer. Any steelwork with faces into cavities to have those faces painted on site with 2 additional coats of heavy duty bitumen paint. All steelwork closer than 40mm to cavity face of outer leaf brickwork, or externally exposed to be hot dip galvanized 85 microns thickness.
Bolts to be min M12 grade 8.8 zinc plated
17. All pairs of steel beams to be M12 bolted together at 800 c/c, use steel tube spacers. Each steel to be centred on centreline of the leaf of wall it is supporting. Bolt all steel beams to padstones using 2 M10 resin anchors min 80 pen into padstone. Strap all padstones down to walls using min 2 No BAT 30x5 100/1500 straps use min 10 No 10 screws in each long leg. (Unless actual detail is given in calcs, then use detail given)
18. Any steelwork below ground is to be concrete encased with RC40 concrete, +100mm all round, D49 wrapping fabric 50mm cover. Encase up to underside of ground floor.
19. All steelwork connections to be designed and detailed by the fabricator to the loads indicated (if none shown, assume = 75kN) Provide min 4 M12 8.8 bolts. Steel fabrication drawings should be forwarded to the engineer and architect for checking at least 7 working days before commencement of fabrication. Beams to have min 100mm bearing onto padstones/spreader plates. All welds to be 6mm fillet welds unless notes otherwise, to be carried out by a qualified & coded welder.
20. Beams are to bear only onto loadbearing walls with adequate foundations. Padstones to be 440x100x215 dp C30 concrete unless noted otherwise, bed padstones using stiff 1:3 mix mortar.
21. Padstones to be RC30 concrete, mass concrete foundations to be GEN3 (20N), reinforced concrete foundations to be RC 40, concrete encasement to be RC40, cavity fill to be GEN 1.
22. The principal contractor is responsible for the design and installation of all temporary needles, props, bracings etc to provide adequate temporary support and stability to the structure during the works
23. Fireproofing is all to architects specification & details.
24. All 'MAN-SAFE' Systems and Anchor Points are to be designed by the contractor

MASONRY

25. Blockwork below ground to be fully dense 7N concrete blocks, or use Class B 50N engineering brickwork. Standard mortar mix below DPC to be 1:0.5:4 cement:lime:sand. Above DPC standard mortar to be 1:1:6. Do not lay in temperatures below +5 degrees Celsius.
26. Wall Constructions:- For Brick Cavity walls ,Outer leaf to be 102mm min 10N frost resistant brickwork. Cavity width refer to Architects drawings. Blockwork inner leaf to be 100mm 3.6N lightweight block above DPC unless noted otherwise. Block bond all corners/returns, but not internal wall junctions (see note 12). **All internal loadbearing walls to be 7N blockwork.** Provide proprietary head restraint ties at 900mm c/c to all internal walls.
27. Cavity wall ties to be Ancon stainless steel RT2 ties length to ensure min 50mm embedment into both leaves of cavity wall. Provide ties at 450mm vertical centres and 750mm horizontal centres generally, but 225 c/c vertically to sides of door/window openings etc. Also, all internal blockwork walls are to be tied to the external walls using open ended wall ties at 225c/c.
28. Provide 15mm brick movement joints in outer leaf where indicated on the plan/ at junctions between new/existing. Provide additional wall ties at 225c/c each side of joint. Use foam strip joint filler and 15x25 2-part polysulphide sealant, colour to Architects approval. Against existing walls, use proprietary stainless steel wall starter system with vertically sliding stainless ties at 225 c/c, on both leaves. At junctions of new cavity walls onto existing where chasing new cavities into existing by saw-cutting existing outer leaf, builder is to drill remedial wall ties at 225mm vertical centres both sides of cut to stabilize existing cavity wall.

29. Provide BRC Bricktor stainless steel bed joint reinforcement at 225 c/c to all new brick & block leaves over 6m in continuous straight length, including internal walls. Only exception is where heavier bed joint reinforcement is shown.
30. All ground & first floor studwork walls to have edge stud M10 rawlbolted to outer masonry walls at 300c/c, so studwalls provide buttressing to outer cavity walls.
31. All lintels are to have min 150mm bearing. All proprietary lintels to be stainless steel. Install all lintels in strict accordance with manufacturers guidance. Heavy point loads should not be applied above lintels or openings unless suitable beams have been specified by the Engineer. Where possible new loads should not be applied above extg lintels or openings. Existing lintels should be exposed and checked for adequacy to the satisfaction of the Building Inspector, and replace where necessary.
32. Provide Gen 1 cavity fill concrete up to 225mm below DPC.
33. The Contractor is responsible for the stability of the works at all stages. Allow for all necessary temporary support works required. Builder is responsible for checking condition/adequacy of existing walls to support new steel beams etc. Rebuild walls in new work as necessary.

FOUNDATIONS/SUBSTRUCTURE

34. Any existing foundations subject to increased loadings builder is responsible for exposing foundations & obtaining inspection and approval from building control.
35. New foundations to be RC30 mass concrete unless noted otherwise, for widths refer to plan. Founding levels to be set by BCO to suit ground conditions/ trees etc. (Allow 1.5m depth for tender say unless specific depths are indicated) BCO to approve a safe bearing pressure of 100kN/m². If in any doubt, call engineer to site. On clay soils use 75mm VR Claymaster on **inner face** of perimeter foundations if trees/bushes are removed within footprint of extension & use 75mm VR Claymaster on **outer face** of foundation if any trees are within 8m distance of foundations. Install Claymaster in accordance with manufacturers recommendations. Do not place concrete in temperatures below +5 degrees Celsius. If trench not being concreted immediately, blind base using 75mm concrete.
36. All new foundations generally are to be tied to adjacent existing foundations using min 2T12 dowel bars 500mm long, resin grouted 150mm into existing.
37. Due to the influence of tree root action in shrinkable clay, the existing walls may be subject to movement and cracking, particularly in times of hot dry weather. For example mature oak trees can cause damage to buildings over 25metres away. Even though the existing foundations may be considered as adequate to support additional load from extensions/first floors/roofs etc, no guarantee can be provided against possible ground movement associated with tree root action. Any such ground movement would therefore be entirely at the Clients' risk.
38. We usually require ground floor construction to be a suspended concrete beam & block (or tanalized timber) floor with a 150mm clear ventilated (and drained) void under when subsoils are clay and foundations are 1.5m deep or more due to proximity of trees etc, Or when depth of fill/made ground exceeds 600mm. Design of beam & block floor is by manufacturer, live loading 1.5kN/m² or 1.4kN point load whichever worst case. Gas protection measures to be included in all ground floor constructions whether solid or suspended, all to architects details. Ground floor construction is to be agreed with BCO on site to suit ground conditions. Solid slabs to be 150mm RC40 concrete with A142 mesh in top 40mm cover, ensure slab is properly cured & protected/covered for min 7 days, if in doubt contact engineer. We can accept no responsibility for any long term movements in solid ground bearing floors on clay subsoils. If risk of long term movements cannot be accepted by client due to high quality finishes etc then a suspended floor must be used to avoid this, builder is responsible for discussing this with the Client.
39. All floor screeds are to be to specialist manufacturers design, architect & builder to coordinate.
40. Drainage design (above & below ground) is by others. BCO to approve all drainage works on site. When installing new drainage within existing buildings, it is the contractors responsibility to obtain record drawings and to check that the concrete floors to be sawcut for new drains do not incorporate reinforced concrete ground beams or suspended slabs. If no record drawings are available, contractor is to carry out careful investigations to check if any reinforcement etc prior to cutting slabs. If in any doubt stop work & call engineer and architect to site.
41. Client is to refer to structural engineer for advice prior to carrying out any new planting of trees/hedges or removal of trees in vicinity of new extension, to avoid any future subsidence to foundations.

42. Builder to provide for basic radon gas protection. Provide a 1200g (300 micron) radon gas membrane under floor slabs lapped 300mm double welged and taped with gas proof tape at joints & service entry points, carry membrane over cavities, all to architects or specialists details,

PARTY WALL SERVICE

43. Party Walls – Any alterations/additions to structural loads that are shown added to a party wall or excavations within 3m may require a party wall notice letter to the neighbours etc, and agreement with neighbours should be achieved prior to builder confirming costs to client or ordering any steelwork/timberwork. This Party Wall service is not included in our fee. We can provide this service for an additional fee, please contact us to discuss. The first structural proposals may change pending the result of the party wall arrangements. Any changes to the structural design required as a result will usually be charged at hourly rate. It is the responsibility of the property owner to ensure that all requirements of the Party Wall Act are complied with.

HEALTH & SAFETY

Anyone having construction or building work carried out has legal duties under the Construction (Design & Management) Regulations 2007 (CDM 2007), unless they are a domestic client. A domestic client is someone who lives or will live in the premises where the work is carried out. The premises must not relate to any trade, business or other undertaking. Although a domestic client does not usually have duties under CDM 2007, those who work for them on construction projects will.

A project is usually deemed 'non notifiable' if the construction phase is likely to involve less than 30 days or 500 person days of construction work.

But importantly, note if a domestic client is planning to employ separate workers directly themselves & manage how they will carry out their work, then they become the 'contractor' for the purposes of the legislation and the project become notifiable under CDM 2007.

All contractors must comply with all current Health & Safety legislation and the following Health & Safety Executive Approved Codes of Practice:-

- Management of Health & Safety at Work
- Managing Construction for Health & Safety

CALCULATIONS

Project		31 LONGWOOD AVE		Project No:		Drg No:		Date:	
Part of Structure		REAR EXTENSION		Calc by:		Checked by:		Calc. Sheet No	
REF	CALCULATIONS								
LOADINGS:-									
1/	Pitched Roof - Main House					kN/m2			
				Dead			Live		
		Tiles	say			0.6			
		Battens				0.04			
		Felt				0.06			
		Rafters				0.1			
								0.6	
				Total		0.8		0.6	
		Pitch=	30	degrees	approx				
		Plan		Loading		0.92 kN/m2		0.6 kN/m2	
2/	Roof Space								
		Joists				0.1			
		ins				0.05			
		plaster				0.15			
		chipboard				0.2			
		live						0.25	
						0.5 kN/m2		0.25 kN/m2	
3/	Studwork Walls								
		studs				0.1			
		plasterboard 2 side				0.4			
						0.5 kN/m2			
						0.7 tiled one side			
						0.9 tiled 2 sides			
4/	Cavity Walls NEW EXTN								
		102 Brick				2			
		100 block				1			
		plaster				0.2			
		ins				0.1			
						3.3 kN/m2			
5/	Timber GF								
		Finishes				0.15			
		Boards				0.2			
		Joists				0.15			
		live						1.5	
						0.5 kN/m2		1.5 kN/m2	
6/	Glazing								
		Glazing	LANTERN LIGHT 270kg	say		0.5 kN/m2		0.75	
7/	FLAT ROOF NEW EXTN								
		SPM/finishes				0.2			
		ply				0.2			
		joists				0.1			
		insulation				0.1			
		plasterboard				0.2			
						0.8 kN/m2		0.75 kN/m2	

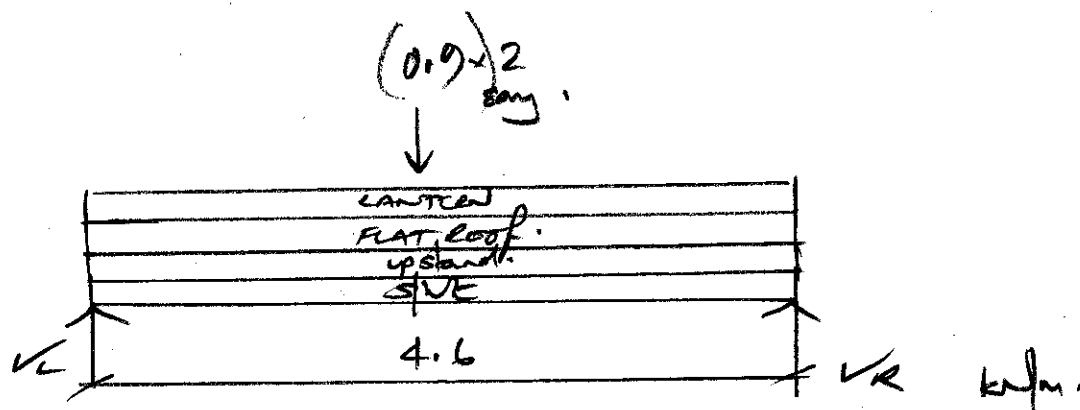
Project Title: 31 LONGWOOD AVE			Project No: 1031		
Calcs. by: PJO	Prelim./Final	Checked by:	Category of Check:	Sht.	
Date: Jan '14	—	Date: —	—		

STEEL

(A)

(2B SIMILAR)

$$L = 4.6 \text{ m}$$



LANTERN	0.75×0.5	0.38	
	$\times 0.75$		0.56
FLAT ROOF	$1.2/2 \times 0.8$	0.48	
	0.75		0.45
UPSTAND	0.3×0.5	0.15	
	—		—
g/wc		0.3	—

(1.31) (1.01)

T adds →

203 x 102 x 23 UB

 Tedds P J Davies Associates Ltd 4 Wensley Gardens Emsworth Hampshire	Project 31 Longwood Ave				Job no.	
	Calcs for STEEL A				Start page no./Revision 1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date

STEEL BEAM ANALYSIS & DESIGN (BS5950)

In accordance with BS5950-1:2000 incorporating Corrigendum No.1

TEDDS calculation version 3.0.04

Support conditions

Support A	Vertically restrained
	Rotationally free
Support B	Vertically restrained
	Rotationally free

Analysis results

Maximum moment	$M_{max} = 12.4 \text{ kNm}$	$M_{min} = 0 \text{ kNm}$
Maximum shear	$V_{max} = 9.4 \text{ kN}$	$V_{min} = -9.4 \text{ kN}$
Deflection	$\delta_{max} = 4 \text{ mm}$	$\delta_{min} = 0 \text{ mm}$
Maximum reaction at support A	$R_{A_{max}} = 9.4 \text{ kN}$	$R_{A_{min}} = 9.4 \text{ kN}$
Unfactored dead load reaction at support A	$R_{A_{Dead}} = 3 \text{ kN}$	
Unfactored imposed load reaction at support A	$R_{A_{Imposed}} = 3.2 \text{ kN}$	
Maximum reaction at support B	$R_{B_{max}} = 9.4 \text{ kN}$	$R_{B_{min}} = 9.4 \text{ kN}$
Unfactored dead load reaction at support B	$R_{B_{Dead}} = 3 \text{ kN}$	
Unfactored imposed load reaction at support B	$R_{B_{Imposed}} = 3.2 \text{ kN}$	

Section details

Section type	UKB 203x102x23 (Corus Advance)	Steel grade	S275
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Classification of cross sections - Section 3.5

Tensile strain coefficient	$\varepsilon = 1.00$	Section classification	Plastic
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Shear capacity - Section 4.2.3

Design shear force	$F_v = 9.4 \text{ kN}$	Design shear resistance	$P_v = 181.1 \text{ kN}$
PASS - Design shear resistance exceeds design shear force			

Moment capacity - Section 4.2.5

Design bending moment	$M = 12.4 \text{ kNm}$	Moment capacity low shear	$M_c = 64.4 \text{ kNm}$
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Buckling resistance moment - Section 4.3.6.4

Buckling resistance moment	$M_b = 21.5 \text{ kNm}$	$M_b / m_{LT} = 23.7 \text{ kNm}$
PASS - Buckling resistance moment exceeds design bending moment		

Check vertical deflection - Section 2.5.2

Consider deflection due to dead and imposed loads

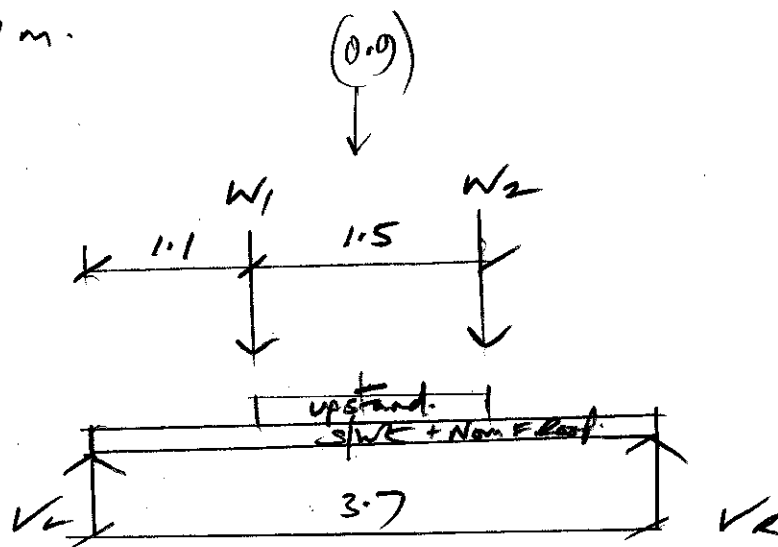
Limiting deflection	$\delta_{lim} = 12.7 \text{ mm}$	Maximum deflection	$\delta = 3.98 \text{ mm}$
PASS - Maximum deflection does not exceed deflection limit			

Project Title: 31 LONGWOOD AVE		Project No: 1031		
Calcs. by: PJD	Prelim./Final	Checked by:	Category of Check:	Sht.
Date: Jan '14		Date:		

STEEL (C)

(x (A) SIMILAR)

L = 3.7 m.



$W_1 \rightarrow$ 3 kN
3.2 WL

$W_2 \rightarrow$ 3 kN
3.2 WL

UPSTAND 0.3 x 0.5

0.15

S/W 0.3

0.3

Nom FR 0.2 x 0.8
0.75

0.16

0.15

0.46 0.15

Tedds $\rightarrow$

203 x 102 x 23 UB

 Tedds P J Davies Associates Ltd 4 Wensley Gardens Emsworth Hampshire	Project				Job no.	
	31 Longwood Ave					
	Calcs for				Start page no./Revision	
	STEEL C				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date

STEEL BEAM ANALYSIS & DESIGN (BS5950)

In accordance with BS5950-1:2000 incorporating Corrigendum No.1

TEDDS calculation version 3.0.04

Support conditions

Support A	Vertically restrained
	Rotationally free
Support B	Vertically restrained
	Rotationally free

Analysis results

Maximum moment	$M_{max} = 13.3 \text{ kNm}$	$M_{min} = 0 \text{ kNm}$
Maximum shear	$V_{max} = 11.8 \text{ kN}$	$V_{min} = -11.8 \text{ kN}$
Deflection	$\delta_{max} = 3 \text{ mm}$	$\delta_{min} = 0 \text{ mm}$
Maximum reaction at support A	$R_{A_{max}} = 11.8 \text{ kN}$	$R_{A_{min}} = 11.8 \text{ kN}$
Unfactored dead load reaction at support A	$R_{A_{Dead}} = 4 \text{ kN}$	
Unfactored imposed load reaction at support A	$R_{A_{Imposed}} = 3.9 \text{ kN}$	
Maximum reaction at support B	$R_{B_{max}} = 11.8 \text{ kN}$	$R_{B_{min}} = 11.8 \text{ kN}$
Unfactored dead load reaction at support B	$R_{B_{Dead}} = 4 \text{ kN}$	
Unfactored imposed load reaction at support B	$R_{B_{Imposed}} = 3.9 \text{ kN}$	

Section details

Section type	UB 203x102x23 (BS4-1)	Steel grade	S275
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Classification of cross sections - Section 3.5

Tensile strain coefficient	$\epsilon = 1.00$	Section classification	Plastic
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Shear capacity - Section 4.2.3

Design shear force	$F_v = 11.8 \text{ kN}$	Design shear resistance	$P_v = 181.1 \text{ kN}$
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PASS - Design shear resistance exceeds design shear force

Moment capacity - Section 4.2.5

Design bending moment	$M = 13.3 \text{ kNm}$	Moment capacity low shear	$M_c = 64.4 \text{ kNm}$
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Buckling resistance moment - Section 4.3.6.4

Buckling resistance moment	$M_b = 22.1 \text{ kNm}$	$M_b / m_{LT} = 23.6 \text{ kNm}$
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PASS - Buckling resistance moment exceeds design bending moment

Check vertical deflection - Section 2.5.2

Consider deflection due to dead and imposed loads

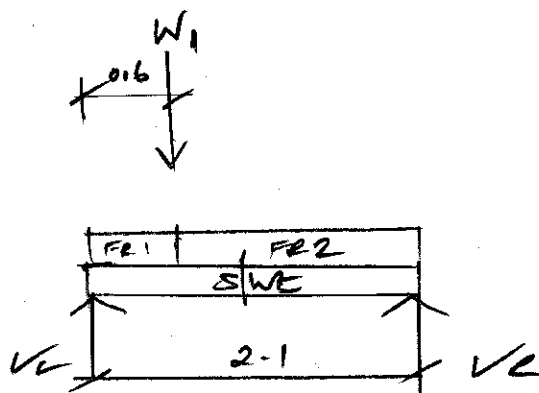
Limiting deflection	$\delta_{lim} = 10.278 \text{ mm}$	Maximum deflection	$\delta = 3.002 \text{ mm}$
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PASS - Maximum deflection does not exceed deflection limit

Project Title: 31 LONGWOOD AVE		Project No: 1031	
Calcs. by: MD	Prelim./Final	Checked by: =	Category of Check: Sht.
Date: Jan '14	—	Date: =	—

STEEL (E)

$L = 2.1 \text{ m.}$



$W_1 \rightarrow$ STEEL (C)

4.0 kN
3.9 kN

FR 1 $3.7/2 \times 0.8$
0.75

1.48

1.39

FR 2 $1.1/2 \times 0.8$
0.75

0.44

0.41

SWE 0.3

TILDS $\rightarrow$

178 x 102 x 19 UB.

 Tedds P J Davies Associates Ltd 4 Wensley Gardens Emsworth Hampshire	Project				Job no.	
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	STEEL E				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date

STEEL BEAM ANALYSIS & DESIGN (BS5950)

In accordance with BS5950-1:2000 incorporating Corrigendum No.1

TEDDS calculation version 3.0.04

Support conditions

Support A	Vertically restrained
	Rotationally free
Support B	Vertically restrained
	Rotationally free

Analysis results

Maximum moment	$M_{max} = 6.2 \text{ kNm}$	$M_{min} = 0 \text{ kNm}$
Maximum shear	$V_{max} = 11.8 \text{ kN}$	$V_{min} = -5.4 \text{ kN}$
Deflection	$\delta_{max} = 0.6 \text{ mm}$	$\delta_{min} = 0 \text{ mm}$
Maximum reaction at support A	$R_{A_{max}} = 11.8 \text{ kN}$	$R_{A_{min}} = 11.8 \text{ kN}$
Unfactored dead load reaction at support A	$R_{A_{Dead}} = 4.2 \text{ kN}$	
Unfactored imposed load reaction at support A	$R_{A_{Imposed}} = 3.7 \text{ kN}$	
Maximum reaction at support B	$R_{B_{max}} = 5.4 \text{ kN}$	$R_{B_{min}} = 5.4 \text{ kN}$
Unfactored dead load reaction at support B	$R_{B_{Dead}} = 2 \text{ kN}$	
Unfactored imposed load reaction at support B	$R_{B_{Imposed}} = 1.6 \text{ kN}$	

Section details

Section type	UB 178x102x19 (BS4-1)	Steel grade	S275
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Classification of cross sections - Section 3.5

Tensile strain coefficient	$\epsilon = 1.00$	Section classification	Plastic
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Shear capacity - Section 4.2.3

Design shear force	$F_v = 11.8 \text{ kN}$	Design shear resistance	$P_v = 140.8 \text{ kN}$
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PASS - Design shear resistance exceeds design shear force

Moment capacity - Section 4.2.5

Design bending moment	$M = 6.2 \text{ kNm}$	Moment capacity low shear	$M_c = 47.1 \text{ kNm}$
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Buckling resistance moment - Section 4.3.6.4

Buckling resistance moment	$M_b = 26 \text{ kNm}$	$M_b / m_{LT} = 33.4 \text{ kNm}$
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PASS - Buckling resistance moment exceeds design bending moment

Check vertical deflection - Section 2.5.2

Consider deflection due to dead and imposed loads

Limiting deflection	$\delta_{lim} = 5.83 \text{ mm}$	Maximum deflection	$\delta = 0.563 \text{ mm}$
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PASS - Maximum deflection does not exceed deflection limit