



City of
Stoke-on-Trent

Place, Growth & Prosperity

Civic Centre
Glebe Street
Stoke-on-Trent
ST4 1HH

Phil Cresswell
Director

to Private Sector Housing Team
for the attention of Terry Williams
date 13 November 2019

MEMO

28 Linden Place, Blurton

The Engineering and Commissioning Team have been asked to provide structural advice and calculations for the work associated with the proposed extension and internal alterations to the above property.

Plans of the property showing the proposed extension and alterations have been provided by the Housing Team.

The calculations and details provided with this report should be sufficient for submission to Building Control.

The property is a traditionally built two-storey semi-detached property constructed circa 1935. It has brick cavity walls, a clay tiled, hipped roof with timber rafters and purlins and timber floors to the front ground floor rooms and first floor. The floor in the kitchen is of solid construction.

Proposed Alteration

The proposed internal structural alterations involve the following:

- 1 The removal of the wall between the kitchen and the toilet.
Provide a new 152 x 89 x 16 UB steel beam to support the floor over.

Temporary Work:
Provide and install 2 no type 1 Acrow props with a 150x75 SW spreader beam both sides of the wall to support the floor joists. Do not remove until the new beam has been installed and the mortar has set.
- 2 Forming a new window opening in the rear wall
Provide a new Stressline lintel type SL50 XHD

Temporary Work:
Provide and install a type 1 Acrow Prop with a Strongboy fitting to support the brickwork above the window and a single Acrow prop to support the end of the new steel beam. Do not remove until the new lintel has been installed and the mortar has set.
- 3 Raising the height of the side doorway, requiring a new lintel.
Provide a new Stressline lintel type SL50

Temporary Work:
Provide and install a type 1 Acrow Prop with a Strongboy fitting to support the wall over. Do not remove until the new lintel has been installed and the mortar has set.

Methodology for Propping

1. Before any work is started, check for the position of any services in and around the walls to be removed and either isolate or remove them. Also check that the construction is as assumed on the drawings and in the calculations, including orientation of roof trusses.
2. The temporary propping stated above is suggestion only, the contractor may change the design to suit his working method at his responsibility.
3. Prior to commencement of works confirm construction is as assumed.
4. Provide the temporary support before demolition works start until the lintel is in place. Ensure beam is packed tightly to underside of wall and/or floor joists above. Ensure props are sited on solid floor or fed through suspended floor until solid ground is reached. It is important that this is done in accordance with all relevant and current documentation including 'BRE Good Building Guide 15' and 'BRE Good Repair Guide 25'.
5. The temporary propping is required to support the wall over. Ensure the props are tight against the underside of the brickwork and floor joists.
6. Any proprietary products used are to be installed to manufacturers instructions.

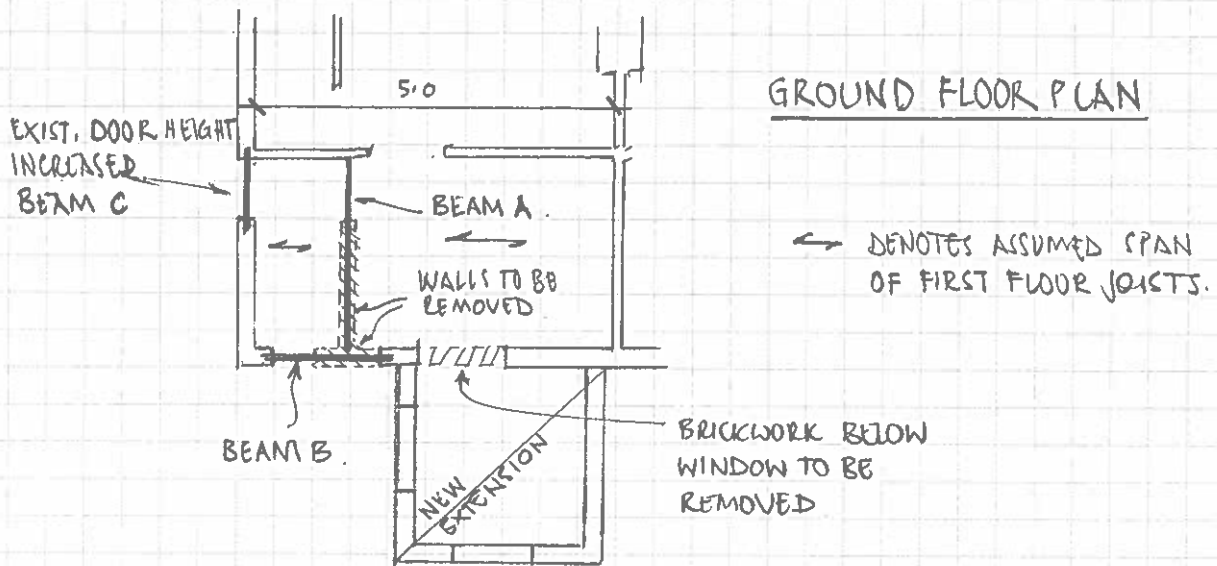
Please contact me on telephone 01782 232115 if you need any further information or advice.

Daniel Rossiter
Principal Structural Engineer



City of
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Project 28 LINDEN PLACE - BLURTON.		Proj No S2019437	
Section DISABLED ADAPPTIONS.		Sheet No 001	
Calculations DR	Date NOV 19.	Checked DW	Date Nov 19
Approved		Date	



BEAM A. - Span 3.0 m. (scaled from Arch's dwg.).

Loading.

$$\text{Dead load} @ 0.5 \text{ kN/m}^2 = 0.5 \times \frac{5.0}{2} \times 3.0 = 3.8 \text{ kN.}$$

$$\text{Partition} @ 0.25 \text{ kN/m}^2 = 0.25 \times \frac{5.0}{2} \times 3.0 = 1.9 \text{ kN.}$$

$$\text{Imposed load} @ 1.5 \text{ kN/m}^2 = 1.5 \times \frac{5.0}{2} \times 3.0 = 11.25 \text{ kN.}$$

$$\text{Total service load} = 16.95 \text{ kN.}$$

$$\text{Total ult. load} = 1.4(3.8 + 1.9) + 1.6 \times 11.25 = 26.0 \text{ kN.}$$

$$M_u = \frac{26 \times 3.0}{8} = 9.75 \text{ kNm.}$$

Blue book,

$$\text{Try } 152 \times 89 \times 16 \text{ UB } M_b = 17.2 \text{ kNm}$$

Deflection,

$$\delta_i = \frac{5 \times 11.25 \times 3.0^3 \times 10^{12}}{384 \times 205 \times 834 \times 10^7} = 2.3 \text{ mm.}$$

$$\text{Allowable} = 8.3 \text{ mm.}$$

\therefore Use 152 x 89 x 16 UB.

Bearings.

a) End of beam on brickwork.

$$\text{Reaction} = 8.5 \text{ kN service, } 13.0 \text{ kN ultimate.}$$



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$$\text{Applied stress below beam} = \frac{13.0 \times 10^3}{89 \times 100} = 1.46 \text{ N/mm}^2$$

consider wall to be constructed with common brick in a class 3 mortar,

$$\therefore \text{Allowable stress} = \frac{5.0 \times 1.5}{3.5} = 2.14 \text{ N/mm}^2$$

\therefore Beam does not require a concrete padstone.

Adopt a full mortar bed below beam seating.

Temporary Works.

Check joists over wall. If joists are continuous provide a single set of props & spreader to the kitchen side. If joists overlap over wall then provide props & spreaders in both the kitchen and the toilet.

$$\text{Safe load of type 1 Acrow prop} = 17 \text{ kN}$$

$$\therefore \text{No of props reqd (assumed one side required only)} \\ = \frac{16.95}{17} = 1$$

Provide 2 No Type 1 Props with 150x75 SW spreader on kitchen side. Unless floor joists are overlapping then provide 2 No sets of props and spreaders.



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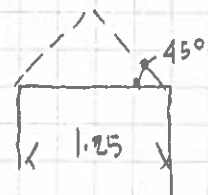
Project 28 UNDEN PLACE		Proj No SZ019h37	
Section DISABLED ADAPATIONS		Sheet No C03	
Calculations DR	Date NOV 19	Checked DW	Date NOV 19
Approved		Date	

Beam B

Span 1.25 m.

loading.

WAM over @ $4.2 \text{ kN/m}^2 =$



$$\text{Service load} = \frac{4.2 \times 1.25^2}{4} = 1.64 \text{ kN.}$$

$$\text{Ultimate load} = 1.64 \times 1.4 = 2.3 \text{ kN.}$$

Point load from Beam A = 8.5 kN service & 13.0 kN ultimate.

$$\therefore \text{Moment (Service)} = \frac{1.64 \times 1.25}{6} + \frac{8.5 \times 1.25}{4} = 3.0 \text{ kNm.}$$

$$\text{Ultimate,} = \frac{2.3 \times 1.25}{6} + \frac{13.0 \times 1.25}{4} = 4.5 \text{ kNm.}$$

Use Stressline Link SL50 X HD 150

$$\text{SWL} \approx 50 \text{ kN (10.2 kN applied)}$$

$$\text{RM} = 11.1 \text{ kNm (3.0 kNm applied)}$$

Temporary Works.

Provide 1 No Acrow to support Beam A SWL = 17 kN Applied 8.5 kN.

and 1 No Acrow with a strongboy fitting to support the brickwork.

$$\text{SWL} = 3.3 \text{ kN Applied 1.64 kN.}$$

Beam C

Span 900 mm

$$\text{loading WAM over, } \frac{4.2 \times 0.9^2}{4} = 0.85 \text{ kN}$$

$$\text{Floor @ } 2.0 \text{ kN/m}^2 = \frac{2.0 \times 1.0 \times 0.9}{2} = 0.9 \text{ kN}$$

$$\text{total } 1.8 \text{ kN}$$

Use Stressline Link SL50, SWL = 15 kN.

Temporary Works.

Provide 1 No Acrow with a strongboy fitting.

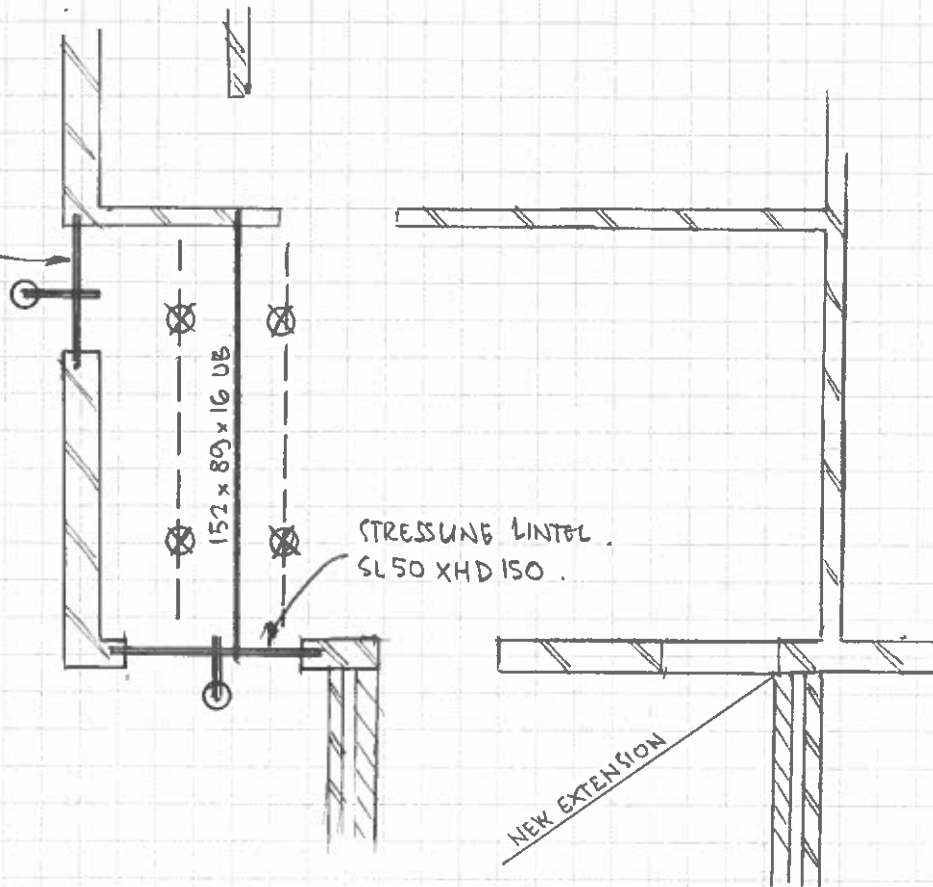
$$\text{SWL} = 3.3 \text{ kN. Applied 1.8 kN.}$$



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Project				Proj No	
28 LINDEN PLACE.				S2019 h 37	
Section				Sheet No	
DISABLED ADAPPTIONS				SKETCH 01.	
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DR	NOV 19.	DLW	Nov 19		

STRESS LINE
LINTEL SL50



GROUND FLOOR PLAN.



ACROW PROP WITH STRONGBOY
FITTING TO SUPPORT
EXTERNAL AND INTERNAL
LEAVES.



2 N° ACROW PROPS WITH
150x75 SW TIMBER
SPREADER BEAM.