133 Arlington Road, NW1 7ET

Structural Methodology Report

Brief

This document is the structural methodology report carried out for the purposes of the planning application for the proposals at no. 133 Arlington Road. It should be noted that this report outlines and suggests the assumed construction at this stage. It should also be noted that, as is standard for works of this type, the main contractor will be fully responsible for the design and erection of all temporary works.
The purpose of the report, with the Basement Impact Assessment prepared by LBH Wembley Engineering, is to demonstrate that a subterranean development can be safely constructed on the particular site having regard to the sites existing structural conditions and geology.
The Basement Impact Assessment prepared by LBH Wembley Engineering references the stages set out in the CPG4 Basement & Lightwells planning document.

Richard Tant Associates

Richard Tant Associates are consulting Civil and Structural Engineers comprising a number of chartered engineers. We have experience in post basement construction and have successfully carried out a number of basements in the Borough Camden from the Basement Impact Assessment stage through to construction on site.

Description of Proposed Basement and Internal Works

133 Arlington Road is a mid terraced brick, Victorian, four storey house comprising timber floors and load bearing masonry walls. The lower ground floor is approximately 1.9m below external pavement level under the main house. A historic single storey lower ground floor extension at the rear is approximately 1.3m high than the main lower ground floor level with the rear garden level being approximately 0.6m above the front pavement level.
There are no signs of significant differential movement and the property appears to be in sound structural condition.

Under the main house the proposed works comprise lowering the main lower ground floor slab level approximately 400mm.

Under the rear section of the house the proposal is to lower the slab level approximately 1.9m with a small extension into the garden.

The proposed internal works comprise partial removal of the ground floor spine wall and an external wall with a rear extension.

Please refer to the drawings prepared by the Architect DeDraft: A001, 02, 03, 04, 100, 200, 201 and the existing survey drawings.

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Basement with Ground Floor Extension
The proposal is to underpin under the main house with 350mm thick reinforced concrete retaining walls to a depth of approximately 1m below current lower ground floor level. At the rear of the property the proposal is to underpin with a 350mm thick reinforced concrete retaining wall to a depth of approximately 2.5m below current rear lower ground floor level. There is a small extension into the garden that will result in a new 400mm thick retaining wall retaining approximately 3.4m.

A geotechnical and hydrological report has been carried out by LBH Wembley Engineering and includes an assessment of flood risk; the bore holes show 1m of made ground at the garden level underlain by firm London Clay. At existing lower ground level of the main house 800mm of made ground was found underlain by firm clay. No water seepages were encountered.
Based on this geotechnical information, the new basement construction is to comprise reinforced concrete underpinned retaining walls with an internal cavity drain system. This will be described in more detail throughout this report.

Trial holes have been completed and inspected, the information is shown on drawing SM01.

Please refer to our drawings 4588-SM01, SM02, SM03, SM04, SM05, SM06, SM07, SM08 and SM09 for the suggested sequence showing temporary and permanent works.

Structural Stability of the Existing buildings
The proposed basement is to be constructed between reinforced concrete underpinned party walls and reinforced retaining walls. The reinforced concrete underpinned party walls and retaining walls will be designed to retain the ground pressures and possible accidental water pressures and distribute the vertical load down. Refer to calculation sheets for justification of the retaining walls: 4588-P1 et seq. Refer to the damage assessment section of the LBH Wembley Engineering report confirming these works are not expected to create any significant differential settlement or have a detrimental effect on the structural stability of the existing building or neighbouring buildings. Due to the expected damage category 1 being very slight, mitigation measures have been taken. A monolithic reinforced concrete box tied into the retaining wall structure has been adopted rather than having an independent retaining wall structure and independent lower ground floor slab structure. Also propping is described until the basement slab has been fully completed and cured to create a stiffer and more robust support structure.

Supporting the Proposed Loads
The vertical loads from the proposed basement will be supported via reinforced concrete underpinning or retaining walls into strip footings. The loads from the internal floors will be supported via the new steel frame in turn supported via the new pad and strip footings. Refer to the calculation sheets for justification of the retaining walls: 4588-P1 et seq.

Structural Integrity of Surrounding Structures and Utilities
We do not expect there to be any public utilities, tunnels or infrastructure within the area of influence of the proposed basement works apart from the existing foundations mentioned above and therefore we do not expect any impact regarding the structural integrity to these items.

Slope Instability

The proposal is to construct the walls in stages that will be temporarily propped until the final base is constructed and cured. No battering back is proposed. We refer to the LBH Wembley Engineering Basement Impact Assessment where the risk of slope instability is addressed and discharged.

Impact on Drainage and Surface Water

We do not expect there to be any existing public drainage within the area of influence of the proposed basement works. With regards to surface water the basement is mainly below existing hard standing. Refer to the Surface Flow Assessment and Flood Risk Assessment in the LBH Wembley Engineering report.

Geological & Hydrological Concerns

The application is informed and supplemented by the hydrological section of the geotechnical report and flood risk assessment carried out by LBH Wembley Engineering and identified in their Basement Impact Assessment report.

Impact on Trees

There is a tree at the rear of the property, Duramen Consulting, an Arboricultural consultancy are involved and have prepared a protection plan for this tree. We can confirm the depth of the proposed footing are such that they will not be detrimentally affected by the tree.

Temporary Works

Please refer to the proposed drawings: 4588-SM01, 02, 03, 04, 05, 06, 07, 08 and 09 enclosed, for details of the temporary works. When the contractor is appointed he will be fully responsible for the temporary works including the design and erection.

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Job No.	Sheet No.	Rev.
4588	P1	

Member/Location

Job Title: 133 ARLINGTON ROAD

Drg. Ref. RETAINING WALL CALCS

Made by RT Date JAN 2018 Chd.

RETAINING / UNDERPIN DESIGN

CASE 1 : UNDERPIN THE MAIN HOUSE 1m DEEP

CASE 2 : UNDERPIN THE REAR LOWER GROUND FLOOR 2.4m DEEP

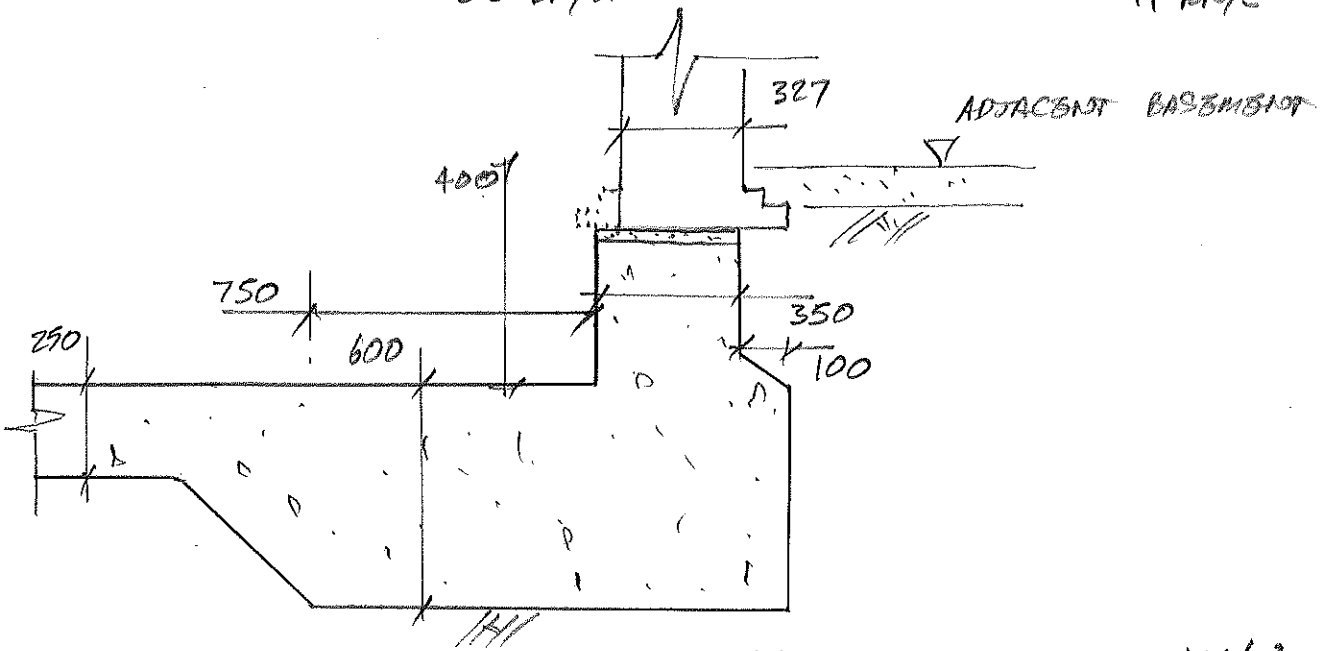
CASE 3 : NEW GARDEN R.C. WALL 3.4m DEEP

CASE 1

ASSUMES 7m OF 215 PARTY WALL + 5m OF 327 PARTY WALL + 1m OF R.C. 350W WALL + 2m OF GROUND, 1ST, 2ND + 2m OF ROOF!

∴ DEAD LOAD kN/m (CHAR) LIVE LOAD kN/m (CHAR)

7 × 5	=	35	2 × 1.5 × 3	=	9
5 × 7.5	=	37.5	0.75 × 2	=	1.5
1 × 0.35 × 24	=	8.4			11 kN/m
2 × 0.6 × 3	=	3.6			
1.6 × 2	=	3.2			
		88 kN/m			



$\sigma = 99/1.2 = 83 kN/m^2$

FROM LBH SBC = 120 kN/m²

∴ BEARING STRESS O.K. ✓

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Job No.	Sheet No.	Rev.
4598	P2	

Member/Location

Job Title: 133 ARLINGTON ROAD

Drg. Ref. RETAINING WALL CALCS

Made by DT Date JAN 2018 Chd.

CASE 2

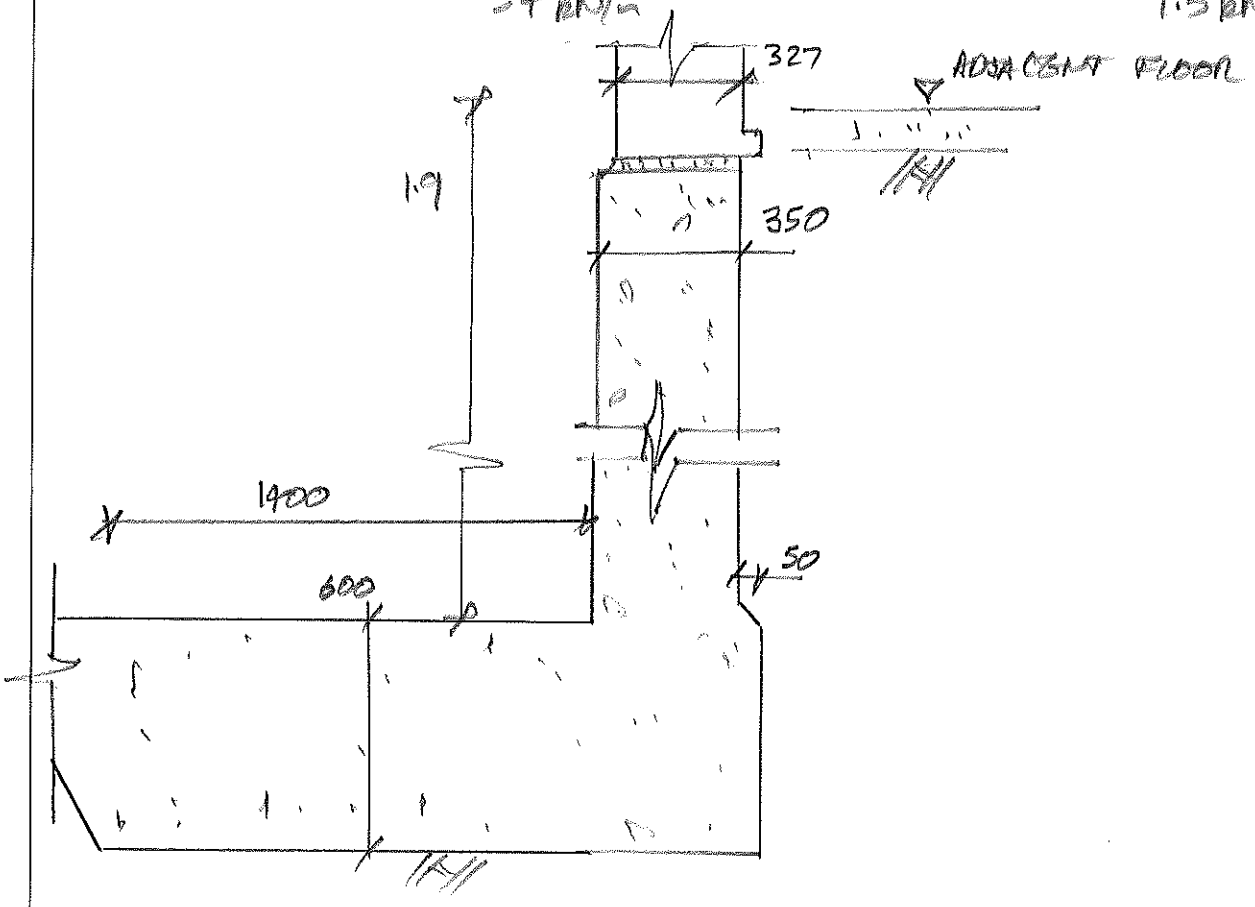
ATTRACTS 2m OF 215 PARTY WALL + 2.5m OF 327 PARTY WALL + 2.4m OF 350 R.C. WALL + 2m OF ROOF !

∴ DEAD LOAD		kN/m (LINEAR)
2×5	=	10
2.5×7.5	=	19
2.4×0.35×24	=	21
2×1.6	=	5.2
		54 kN/m

LIVE LOAD kN/m (LINEAR)

2×0.75 = 1.5

1.5 kN/m



$\sigma = 56/1.8 = 31\ kN/m^2$ FROM LBH SBC = 120 kN/m²

∴ BEARING STRESS O.K. ✓

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Job No.	Sheet No.	Rev.
4588	P3	

Member/Location

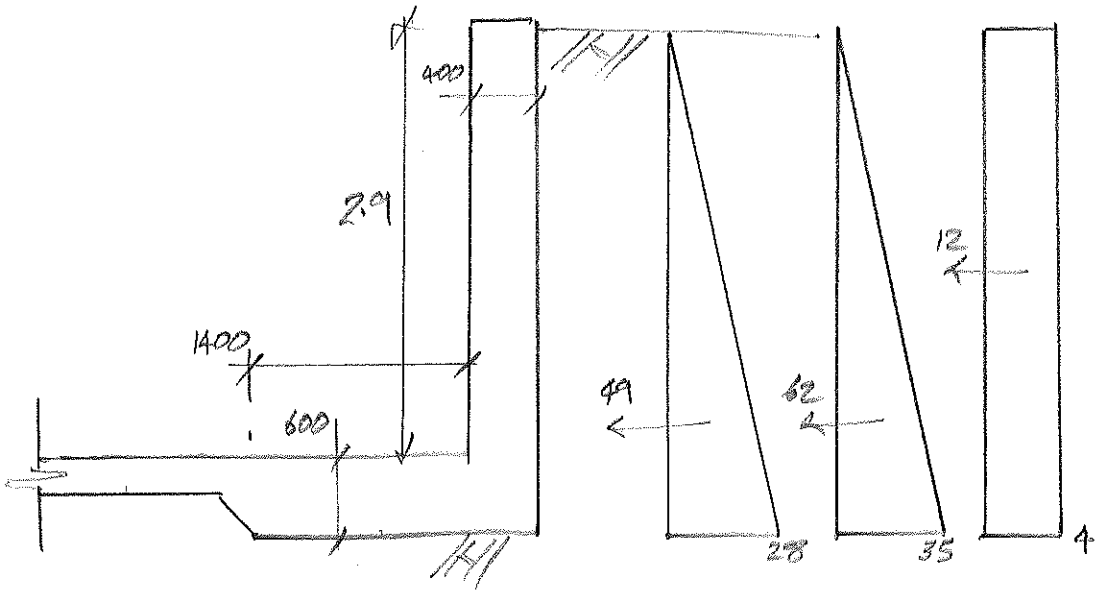
Job Title: 133 ALLINGTON ROAD

Drg. Ref. RETAINING WALL CALCS

Made by RT Date JAN 2018 Chd.

CASE 3

BY INSPECTION BEARING STRESS O.K. CHK RETAINING CAPACITY.



$K_o = 0.8$

SOIL : $3.5 \times 10 \times 0.8 = 28\ kN/m^2$
WATER : $3.5 \times 10 = 35\ kN/m^2$
SURCH : $5 \times 0.8 = 4\ kN/m^2$

$\therefore$ MAX B.M. $= (49+62)1.2 + 12 \times 1.75 = 155\ kNm/m$ CHAR

$\times 1.5 = 155\ kNm/m$ ULT

$K = 155 \times 10^6 / 1000 . 350^2 . 40 = 0.03$

$A_s = 155 \times 10^6 / 095 . 460 . 094 . 350 = 1078\ mm^2/m$

SPAN/d = 9.1 COMP. M.F = 1.17 (B20 - 150) TENS M.F = 1.8 (B20 - 150)

$\therefore 7 \times 1.17 \times 1.8 = 14$

ACTUAL = $9.1 < 14$ $\therefore$ DEFLECTION O.K.

PROVIDE B20 - 150 BOTH FACES ✓