12716 - 55 ORNAN ROAD

LONDON, NW3 4QD

BASEMENT IMPACT ASSESSMENT

ENGINEERING METHOD STATEMENT

April 2015

Project Ref: 12716

Unit 5, Quayside, Sir William Morris Way, Fulham SW6 2UZ
Registered in England Number 06533911

REVISION HISTORY

Rev	Purpose	Date	Issued By	Approved
Rev 0	Initial report	12/01/15	JC	BC

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CONTENTS

APPENDICES

Unit 5, Quayside, Sir William Morris Way, Fulham SW6 2UZ
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INTRODUCTION

Green Structural Engineering has been involved in over 80+ successful basement designs in a number of London Boroughs on behalf of private clients, developers and contractors.

The basement projects previously undertaken successfully have been of a similar size to that proposed in this application and quite often on a much larger scale and complexity.

Green Structural engineering also undertakes the temporary works design and sequencing for a number of contractors who operate in LBC, RBKC, LBHF and Westminster.

This experience has positioned GSE at the forefront of basement design and indeed temporary works design for basement construction. This experience has led to an in-depth understanding and appreciation of the design parameters that should be considered for all basement construction projects.

GSE holds £2million in professional indemnity insurance and is a member of the ACE.

SCOPE OF REPORT

This report deals with the structural aspects of the proposed basement construction to 55 Ornan Road and is to be read in conjunction with the following reports:

- GabrielGeo Consulting 'Basement Impact Assessment', reference 15406/R1 dated March 2015.
- Herts & Essex Site Investigations factual geotechnical report, Ref MRS/12571, dated 12 February 2015 (included in appendices, but also in GabrielGeo BIA report.

The above reports cover the groundwater, surface water and slope stability required under CPG4 while this report deal with the structural aspects and the engineering implications of issues raised in the above BIA report.

This report is produced for submission to the London Borough of Camden as part of a planning application for works to 55 Ornan Road and should not be used for any other purposes, e.g. construction or Party Wall Awards.

SCOPE OF WORKS

A new basement is to be created under the footprint of the existing ground floor to 55 Ornan Road with lightwells to the front and rear. The new basement is to be used as living space with the lightwells providing natural light and ventilation.

Investigation works on site to confirm the existing arrangement of the ground floor and the detailed design of the new permanent structure to basement and ground floor will be carried out as part of the detailed design process and are not included within this BIA report.

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Registered in England Number 06533911

DESCRIPTION OF EXISTING SITE

The existing properties along this section of Ornan Road were constructed in the early 1960s in the gardens of the houses to Belsize Avenue.

The topography of the site is classified as flat (slope less than 7deg) with a fall of approximately 2.5deg towards the south. This is confirmed by figure 16 of the Arup report which does not indicate any significant slope in the area.

All utilities and services are located within the adjacent street.

The property is located between the Midland Railway tunnels on the mainline out of St Pancras. Correspondence and record drawings provided by Network Rail indicate that the tunnels are 20m away and will not be affected by the proposed basement.

The property is not listed and is not in a conservation area.

DESCRIPTION OF 55 ORNAN ROAD AND ADJOINING PROPERTIES

The property is part of a terrace, Nos53-59, of post war buildings and is of typical construction with timber floors and roof supported off masonry walls.

The property is in a sound condition structurally. The adjoining properties are of similar construction and look to be in sound condition from an external non – intrusive visual examination.

No55 shares party walls with No53 and No57, the buildings on either side.

The party wall with No53 is part of the original construction and has been extended downwards circa 2010 when a basement was constructed under No 53 by Basement Force. Record drawings of the structural details have been obtained and are included in the appendices.

On the No57 side the original party wall extended only up to first floor level, but has been subsequently raised with the construction of first floor extensions by both Nos55 and 57.

The depth of the foundations to the buildings has not been confirmed but will be similar and found approximately 1m below ground level.

GEOLOGY AND HYDROLOGY CONDITIONS

The British Geological Survey website indicates the underlying ground condition to be London Clay. This has been confirmed by the site investigation carried out which has confirmed the ground conditions to comprise of firm to stiff orange brown clay immediately below the disturbed material found at the surface.

A copy of the site specific boreholes carried by Herts & Essex Site Investigations is included in the Appendices to this report.

The GabrielGeo BIA report covers the groundwater, surface water and slope stability issues more fully but the engineering related issues are summarised below.

Subterranean (Groundwater) Flow

The site Investigation reported no groundwater, but sand layers are always possible in London Clay which could give rise to some seepage. Any water ingress which does occur due to variation in the ground strata will be relatively minor and will be controlled by forming local sumps and pumping without adversely affecting adjacent properties.

An uplift pressure of 38kPa is to be allowed for in the basement slab design.

To allow for potential burst water mains the retaining wall design will include ground water pressure to 1m below ground level.

Surface water

There are no surface water features within 250m of the site, apart from a culvert 93m to the east.

The southern section of Ornan Road flooded in 2001 but not in the earlier 1975 major flood events.

The Environment Agency gives the risk of surface flooding to be 'very low'.

As always there is a risk of sewer flooding which is dealt with by incorporating non-return valves into the drainage connection.

Slope and Ground Stability

Overall slope stability is not an issue as the slope is less than 7 degrees.

Damage category assessment is category 0

To limit the potential settlement an allowable bearing pressure of 100kPa will be adopted in the design.

STRUCTURAL CALCULATIONS

GSE have carried out an outline structural design for the new basement to confirm the feasibility and buildability of the scheme.

The new retaining walls are designed as cantilever walls to reduce the amount of propping required during construction.

On the party wall line the retaining wall sections only require a bottom prop to maintain stability against sliding as the weight of the wall above resists the overturning.

The lightwell retaining walls will require temporary propping at high level and low low level. At high level this will provided during construction by Multiprops propped off the central berm and in the permanent condition by a reinforced concrete ring beam cast on top of the retaining wall sections to tie them together.

See calculation sheets in Appendix B for the retaining wall calculations prepared as part of this report.

Intrusive opening up works to confirm the existing structural arrangement, the detailed design of the new basement will be undertaken at the start of works, once the house is unoccupied, to confirm that the existing structural arrangement are as allowed for in the outline design.

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These operations will be carried out as part of the normal design process once planning has been obtained and will be submitted for checking by Building Control or an Approved Inspector.

The detailed design of the basement structure will allow for the proximity of the existing foundations to the neighboring buildings.

STRUCTURAL DRAWINGS

The following structural drawings for the proposed basement are included in Appendix C:

12716	/GA01	General arrangement plan of the proposed basement indicating the proposed construction method using a 'hit and miss' sequence.
	/S01	Typical section details through the party wall and external wall.

CONSTRUCTION METHOD AND TEMPORARY WORKS REQUIREMENTS

GSE have undertaken an outline temporary works design to confirm the feasibility of the proposed basement construction as indicated on drawing GA/01 included in the appendices.

As normal on projects of this type, where basements are constructed under an existing property, the method used will be an underpinning approach, with the individual underpins constructed in sections no wider than 1000 mm, sequenced such that no adjacent underpins are constructed within a 48 hour period.

This method of construction mitigates the potential ground movement and so minimises any effects of settlement on the adjacent structures.

CONSTRUCTION SEQUENCE OF THE NEW BASEMENT

1. Excavation will commence from the front of the property.

   Note: trial pits to be excavated to confirm existing foundation details.

2. The existing ground floor will be broken out locally and removed from site.

3. Batter back and reduce dig the front area and blind with an oversite concrete.

4. A conveyor belt will be set up through the front room of the existing ground to convey the spoil from the excavation to the skip placed on the road for disposal. The conveying will be done using a method that does not impair the safety of pedestrians.

5. Underpin existing front wall working from the No53 side (existing basement).

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Note: local needle and propping to wall may be required due to openings and will comprise 152UC needles and Multiprops based on temporary footings.

6. Construct front retaining wall and prop off berm behind.

7. Carry out a general site reduced dig.

8. Working backwards and towards No57 install under internal walls and reinforced concrete wall Ls to external walls which retain the soil behind, all in maximum 1m long bays in underpinning sequence.

   Note: Reinforced concrete retaining walls will be formed as follows:

   - ~ Excavate locally and shore excavation as required, installing sacrificial back board to external face. Excavated face to be propped off central berm behind.
   - ~ Fix reinforcement to base and cast.
   - ~ Fix reinforcement to wall and cast.
   - ~ Dry pack between top of underpin and existing foundation
   - ~ Reprop wall off berm.

9. Where new columns are required to support structure above, needle and prop wall over, cast new base and install column ground floor steelwork.

10. Continue working towards No57 installing underpins and retaining wall sections as work progresses.

11. Commence construction of reinforced concrete retaining wall section to party wall in maximum 1m long bays in underpinning sequence. Prop off central berm.

12. As excavation progresses, any existing foundations discovered will be broken out and removed from site to make way for the new basement construction.

13. Both high and low level propping will be required to the lightwell underpins.

    Initially this will comprise propping off the central berm with Multiprops at high level and RMD Slimshores (or similar designed by appointed Temporary Works Engineer) at low level. The high level props can be removed once the permanent reinforced concrete ring beam is cast to tie the top of the retaining wall sections together.

    At low level the propping is to remain in place until the basement slab is cast. This will be done in strips working from No53 by locally excavating the berm and casting the new slab. This will provide the bottom support to the new retaining walls

14. Once the installation of the new slab has progress to approximately half wall reprop the retaining wall section along the party wall with No57 off the new slab. This allows the remaining berm to be excavated and the slab cast.

15. As the slab sections are cast the new underslab drainage will need to be installed in sections, falling towards the new sumps located in the front lightwell.

16. After the new basement slab has cured, a drained – cavity layer will be laid to the slab and walls.

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17. A layer of insulation will be placed on top of the drained – cavity layer on the slab, and in front of the drained – cavity layer on the walls.

18. Finally a layer of screed will be laid to form the finished basement floor.

POTENTIAL IMPACT ON 55 ORNAN ROAD AND ADJOINING PROPERTIES

The construction of the new basement to 55 Ornan Road will affect No57 with which it shares a party wall and to a lesser degree No53 (existing basement) which is within the zone of influence of the excavation. The zone of influence of the excavations will extend some distance but as set out in the GabrielGeo BIA report but the impact will be negligible. The damage assessment for the party wall with No57 is within category 0 and therefore the impact will be minimal provided a suitably experience constrictor is appointed and a designed temporary works methodology is developed and followed on site.

The critical stage of the works in relation to the effect on the neighbouring properties will be during construction of the basement. The major risk of movement during this stage of the works can be reduced and controlled by the appointment of a contractor with previous experience of basement construction that follows the agreed method of working incorporating all necessary temporary works.

The contractor will be required to produce traffic management, detailed method statements and provide detailed temporary works proposals for approval prior to the start of any works.

The temporary works, in accordance with the outline temporary works intent, as described above, will maintain the stability of the new basement during the construction and prevent rotation or slipping of the retaining walls during this stage of the works.

One of the major sources of movement in basement construction is differential settlement of the new foundations when bearing onto different geological strata. The site investigations carried out reveals that the underlying ground strata comprises London Clay to depth, and any movement of the existing walls during the works will be governed by any settlement which occurs during the construction of the proposed underpinning.

The new RC retaining wall will be designed as free-standing cantilevered walled, ignoring propping from ground floor level.

From the analysis of the damage assessment due to the proposed basement being category 0 the impact of any settlement on the existing properties will be minimal and is likely to be accommodated within the elasticity of the superstructure. In our experience on similar projects, we have been involved in over 100 basement projects across London including several in The London Borough of Camden, the movement may at most lead to some slight distortion and hairline cracking, but this can be dealt with by local redecoration.

The proximity of the proposed basement to the neighbouring properties means that Party Wall Agreements will be required and the Schedule of Conditions undertaken in this process will allow any inherent defects in the existing structures to be assessed and accommodated in the detailed design stage.

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The design and construction methodology, as described above, deals with the potential risks and ensures that the excavation and construction of the proposed basement will not affect the structural integrity of the property and adjoining properties.

REDUCTION OF NOISE, DUST AND VIBRATION IMPACT ON NEIGHBOURING OCCUPIERS

The main environmental impacts are noise, vibration and dust. Contractors will always be expected to have considered noise and dust impacts related to their operations and to use Best Practicable Means (BPM) to minimise them, e.g. adjust working times, consider use of quieter methods.

The appointed contractor will be a member of the Considerate Contactors scheme.

The appointed contractor will comply with the following standards and practices.

- British Standard BS 5228 (noise and vibration control on construction and open sites).
- BS 6472:2008 (guide to evaluation of human exposure to vibration in buildings).
- Mayor's guidance on 'The control of dust and emissions during construction and demolition'.
- Principles set out within Section 61 of the Control of Pollution Act 1974.

Liaison with neighbors likely to be affected by works is an essential element of BPM and will be undertaken. The contractors will be expected to respond to complaints and resolve where practicable.

Impact on neighbors from vehicle movement will be addressed in the attached traffic management plan.

As residents are likely to be disturbed by noise, the permitted times of operation, including ancillary activities such as deliveries, will be restricted to standard hours:

- 8am – 6.00pm (Monday to Friday);
- 8am - 1pm (Saturday);
- No working is permitted on Sundays, bank holidays or other national holidays.

The appointed contractors will employ quiet working methods and noise generating equipment where practicable. Plant and activities to be employed should be reviewed to ensure that they are the quietest available for the required purpose e.g. 'super silenced' compressors. Work and sound reducing equipment should be regularly maintained to minimise noise emissions.

The contractors will make use of acoustic barriers or enclosures where there is likely to be significant disturbance to residents (subject to safety considerations).

The contractor's management team will employ the following actions to minimise the impact of noise, dust and vibration on the neighbours;

- All site operatives should be briefed and trained in the correct use of equipment and BPM measures in order to minimise noise impacts.
- Site surveys should take place to identify potential problems and facilitate work scheduling, the need for noise control measures, working hours and minimal delay and noise / dust impacts.
- Effective arrangements for the timely communication of site specific noise control measures to site teams should be in place.

To reduce air pollution the appointed contractors will be expected to employ the methods listed below.

- Ensuring that fumes and/or dust do not escape from the site to affect members of the public and the surrounding environment;
- Burning of materials on site is not permitted under any circumstances;
- Dusty activity should be undertaken away from sensitive receptors, with wind direction taken into consideration;
- The site should be regularly inspected for spillages of cement and other powders which should be removed to prevent off-site deposition;
- Dusty material and activities should be dampened down in dry weather. The use of groundwater should be investigated and water should be reused wherever possible.
- Rubber chutes should be used and drop heights minimised;
- Off-site fabrication, or cutting to size, shall be employed to avoid cutting materials on site whenever possible; and
- Careful consideration should be given to the location and temperature control of tar and asphalt burners.

POTENTIAL IMPACT ON EXISTING AND SURROUNDING UTILITIES, INFRASTRUCTURE AND MAN – MADE CAVITIES

Any local services on the property's land will be maintained during construction and rerouted if necessary. The exact location of these services will not be known until the works commence. However the impact will be negligible as these services will be maintained. If it is necessary to relocate or divert any utilities, the Contractor and Design Team will be under a statutory obligation to notify the utility owner prior to any works. This will be so that they can assess the impact of the works and grant or refuse their approval.

The method of constructing the front retaining wall, along with the presence of the front garden area means that services in the street should not be affected by these works.

POTENTIAL IMPACT ON DRAINAGE, SEWAGE, SURFACE AND GROUND WATER LEVELS AND FLOWS INCLUDING SUDS

All existing drainage and sewage connections will be maintained throughout the construction works so there will be no impact on these existing systems.

The proposed development will not alter the current state of the property, which will remain as part of a single family residence; therefore there will be no significant increased discharge into the existing drainage and sewage systems.

Surface water will not be greatly altered as the proposed works will be carried out in London Clay, which itself is a highly impermeable material, and the proposed lightwell extensions are within generally within existing hardstandings resulting in negligible change to the property's 'hard surfaces'.

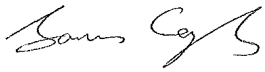
The geotechnical investigations and research carried out confirm that the new formation will be into London Clay and ground water is not expected to be an issue.

POTENTIAL IMPACT ON EXISTING AND PROPOSED TREES

No existing trees will be felled during the construction of the proposed works and no trees are affected by the proposed works nor are any trees protected by Tree Preservation Orders in the vicinity of the proposed works that will be damaged by the construction works.

With the above considerations, the impact on existing and proposed trees is low.

Prepared By:



James Cogley

BEng (Structural)

Approved by:

Brian Cochrane

BEng, CEng, MIStructE

Green Structural Engineering Ltd

April 2015

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APPENDICES

The following appendices are included with this report:

Appendix A	-	GSE Structural drawings for proposed basement
Appendix B	-	GSE Calculation sheets for design of basement retaining walls
Appendix C	-	GSE Underpinning Specification
Appendix D	-	Site Investigation Report
Appendix E	-	Network Rail Record Information
Appendix F	-	No523 Record Drawings

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APPENDIX A

GSE STRUCTURAL DRAWINGS FOR PROPOSED BASEMENT

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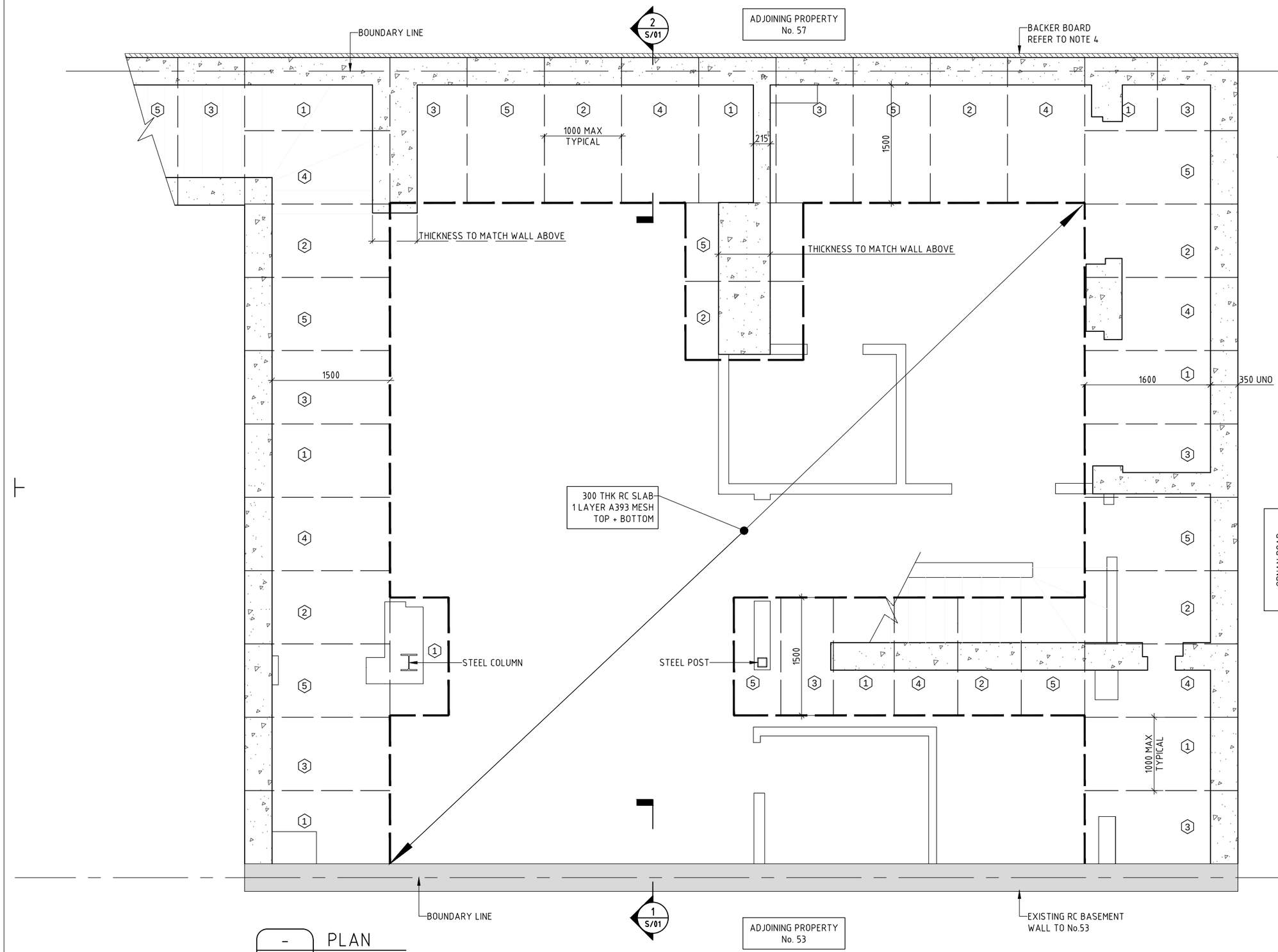
ALL DIMENSIONS IN mm UNLESS OTHERWISE NOTED
ALL DIMENSIONS AND LEVELS TO BE CONFIRMED BY ARCHITECT
SETTING OUT TO BE CONFIRMED ON SITE



KEY

- EXISTING WALL
- NEW LOAD BEARING BRICKWORK
- NEW LOAD BEARING BLOCKWORK
- NEW LOAD BEARING CONCRETE WALL
- NEW LOAD BEARING STUD PARTITION
- NEW NON LOAD-BEARING STUD WALL

NOTES:

1. UNDERPINS WILL NOT BE STABLE WHILST UNDER CONSTRUCTION. CONTRACTOR MUST PROVIDE ADEQUATE LATERAL SUPPORT TO ALL PINS UNTIL BASEMENT SLAB HAS BEEN CAST.
2. BELOW GROUND WATERPROOFING AND DRAINAGE BY OTHERS.
3. CATNIC STRONGHOLD SWC STAINLESS STEEL WALL STARTER KITS POSITIONED AT JUNCTIONS OF EXISTING MASONRY WALL AND NEW MASONRY. INSTALL IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION WITH TIES FULLY EMBEDDED IN MORTAR JOINTS.
4. NON COMPRESSIBLE WATER RESISTANT CEMENTITIOUS BOARD LINER TO BACK OF ALL UNDERPIN SUPPORTING Pparty WALLS.

\- -- PLAN
SCALE 1:50

THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SITE DIMENSIONS BEFORE COMMENCING ANY WORK

12716

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REV	DATE	DESCRIPTION
P1	14/04/15	INITIAL ISSUE

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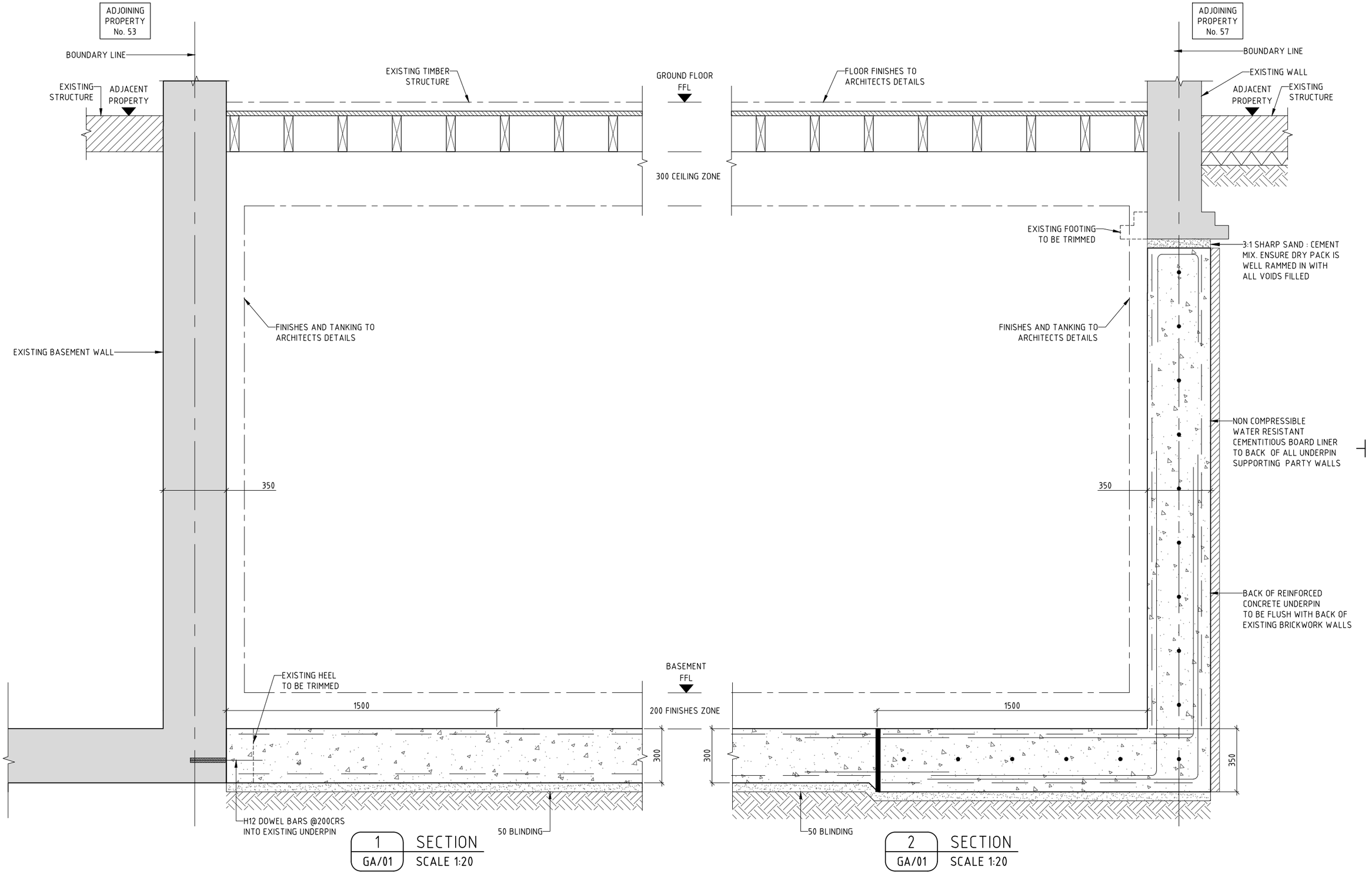
BASEMENT LAYOUT

DRAWN	CHECKED	DATE	PAPER SIZE	SCALE
IZ	BC	14/04/2015	A3	AS SHOWN

GA/01 **P1**

ALL DIMENSIONS IN mm UNLESS OTHERWISE NOTED
ALL DIMENSIONS AND LEVELS TO BE CONFIRMED BY ARCHITECT
SETTING OUT TO BE CONFIRMED ON SITE



1 GA/01 SECTION SCALE 1:20

2 GA/01 SECTION SCALE 1:20

DO NOT SCALE FROM THIS DRAWING
THIS DRAWING IS SUBJECT TO COPYRIGHT

THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SITE DIMENSIONS BEFORE COMMENCING ANY WORK

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SECTIONS THROUGH UNDERPINS

DRAWN	CHECKED	DATE	PAPER SIZE	SCALE
IZ	BC	14/04/2015	A3	AS SHOWN

S/01 **P1**

APPENDIX B

GSE CALCULATIONS FOR DESIGN OF BASEMENT RETAINING WALLS

Unit 5, Quayside, Sir William Morris Way, Fulham SW6 2UZ
Registered in England Number 06533911

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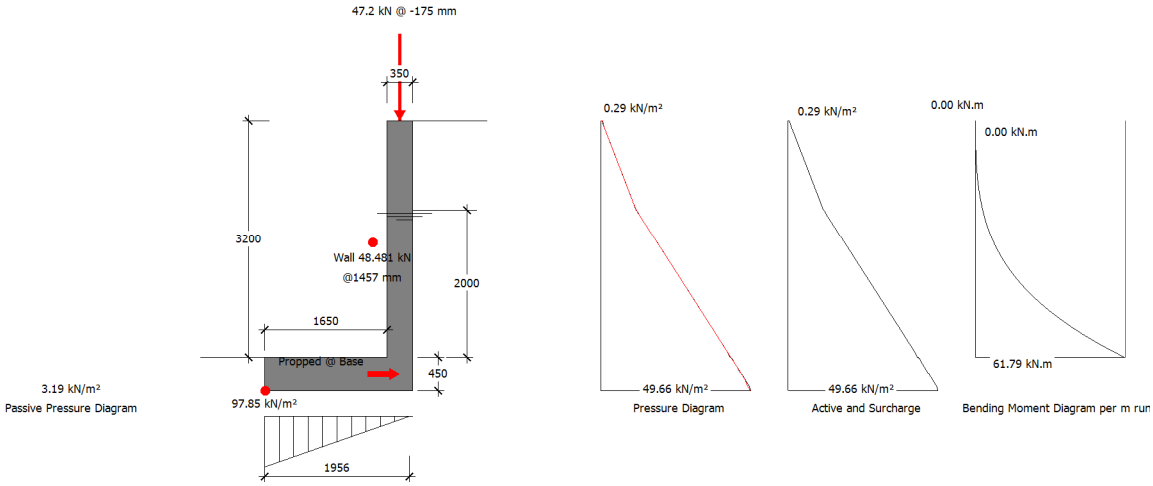
25642

Job Ref	**: 55 ORNAN RD - PARTY WALL**
Sheet	**: 12716 /10010**
Made by	**:**
Date	**: 14 April 2015 / Ver. 2014.08**
Checked	**:**
Approved	**:**

MasterKey : Retaining Wall Design to BS 8002 and BS 8110 : 1997
Basic RC Retaining Wall
Reinforced Concrete Retaining Wall with Reinforced Base



Summary of Design Data

Notes	All dimensions are in mm and all forces are per metre run
Material Densities (kN/m³)	Back Soil - Dry 19.00, Saturated 21.40, Submerged 11.40
	Front Soil - Dry 18.00, Saturated 20.80, Submerged 10.80, Concrete 24.00
Special Assumptions (virtual back)	Useδ =0 @ virtual back
Concrete grade	fcu 35 N/mm², Permissible tensile stress 0.250 N/mm²
Concrete covers (mm)	Wall inner cover 50 mm, Wall outer cover 30 mm, Base cover 50 mm
Reinforcement design	fy 500 N/mm² designed to BS 8110: 1997
Surcharge and Water Table	Surcharge 10.00 kN/m², Water table level 2000 mm

† The Engineer must satisfy him/herself to the reinforcement detailing requirements of the relevant codes of practice

Additional Loads

Wall Propped at Base Level	Therefore no sliding check is required
Vertical Line Load	47.2 kN/m @ X -175 mm and Y 0 mm - Load type Dead
† Dimensions	Ties, line loads and partial loads are measured from the inner top edge of the wall

Soil Properties

Soil bearing pressure	Allowable pressure @ front 100.00 kN/m², @ back 100.00 kN/m²
Back Soil Friction and Cohesion	ϕ_b = Atn(Tan(23)/1.2) = 19.48°, c = 5/1.5 = 3.333 kN/m²
Base Friction and Cohesion	δ = Atn(0.75xTan(Atn(Tan(30)/1.2))) = 19.84°
Front Soil Friction and Cohesion	ϕ = Atn(Tan(30)/1.2) = 25.69°

Loading Cases

G_{Wall}- Wall & Base Self Weight, P_a- Active Earth Pressure, $P_{surcharge}$- Earth pressure from surcharge, P_p- Passive Earth Pressure

Case 1: Geotechnical Design	1.00 G_{Wall}+1.00 P_a+1.00 $P_{surcharge}$+1.00 P_p
Case 2: Structural Ultimate Design	1.40 G_{Wall}+1.00 P_a+1.00 $P_{surcharge}$+1.00 P_p

Geotechnical Design

Wall Stability - Virtual Back Pressure

Case 1 Overturning/Stabilising	94.421/156.796	0.602	OK

Wall Sliding - Virtual Back Pressure

Fx/($Rx_{Friction}$+ $Rx_{Passive}$)	0.000/(34.526+0.138)	0.000	OK
Prop Reaction Case 2 (Service)	82.9 kN @ Base		

Soil Pressure

Virtual Back	97.846/100 kN/m², Length under pressure 1.956 m	0.978	OK

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Job Ref : **55 ORNAN RD - PARTY WALL**
Sheet : **12716 /10011**
Made by :
Date : **14 April 2015 / Ver. 2014.08**
Checked :
Approved :

Wall Back	97.572/100 kN/m², Length under pressure 1.961 m	0.976	OK

Structural Design

Prop Reaction

Maximum Prop Reaction (Ultimate)	82.8 kN @ Base

Wall Design (Inner Steel)

Critical Section	Critical @ 0 mm from base, Case 2		
Steel Provided (Cover)	Main H9@125 (50 mm) Dist. H8@100 (59 mm)	509 mm²	OK
Compression Steel Provided (Cover)	Main H7@300 (30 mm) Dist. H7@300 (37 mm)	128 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	296 mm, 1000 mm, 509 mm², 500 N/mm², 35.0 N/mm²	281 mm	
Mr=fn(above,As',d',x,x/d)	128 mm², 34 mm, 16 mm, 0.05	62.1 kN.m	
Moment Capacity Check (M/Mr)	M 61.8 kN.m, Mr 62.1 kN.m	0.994	OK
Shear Capacity Check	F 61.9 kN, vc 0.424 N/mm², Fvr 125.4 kN	0.49	OK

Base Top Steel Design

Steel Provided (Cover)	Main H9@100 (50 mm) Dist. H9@100 (59 mm)	636 mm²	OK
Compression Steel Provided (Cover)	Main H9@100 (50 mm) Dist. H9@100 (59 mm)	636 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	396 mm, 1000 mm, 636 mm², 500 N/mm², 35 N/mm²	376 mm	
Mr=fn(above,As',d',x,x/d)	636 mm², 55 mm, 20 mm, 0.05	104.0 kN.m	
Moment Capacity Check (M/Mr)	M 0.0 kN.m, Mr 104.0 kN.m	0.000	OK
Shear Capacity Check	F 0.0 kN, vc 0.386 N/mm², Fvr 152.5 kN	0.00	OK

Base Bottom Steel Design

Steel Provided (Cover)	Main H9@100 (50 mm) Dist. H9@100 (59 mm)	636 mm²	OK
Compression Steel Provided (Cover)	Main H9@100 (50 mm) Dist. H9@100 (59 mm)	636 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	396 mm, 1000 mm, 636 mm², 500 N/mm², 35 N/mm²	376 mm	
Mr=fn(above,As',d',x,x/d)	636 mm², 55 mm, 20 mm, 0.05	104.0 kN.m	
Moment Capacity Check (M/Mr)	M 78.6 kN.m, Mr 104.0 kN.m	0.756	OK
Shear Capacity Check	F 89.3 kN, vc 0.386 N/mm², Fvr 152.5 kN	0.59	OK

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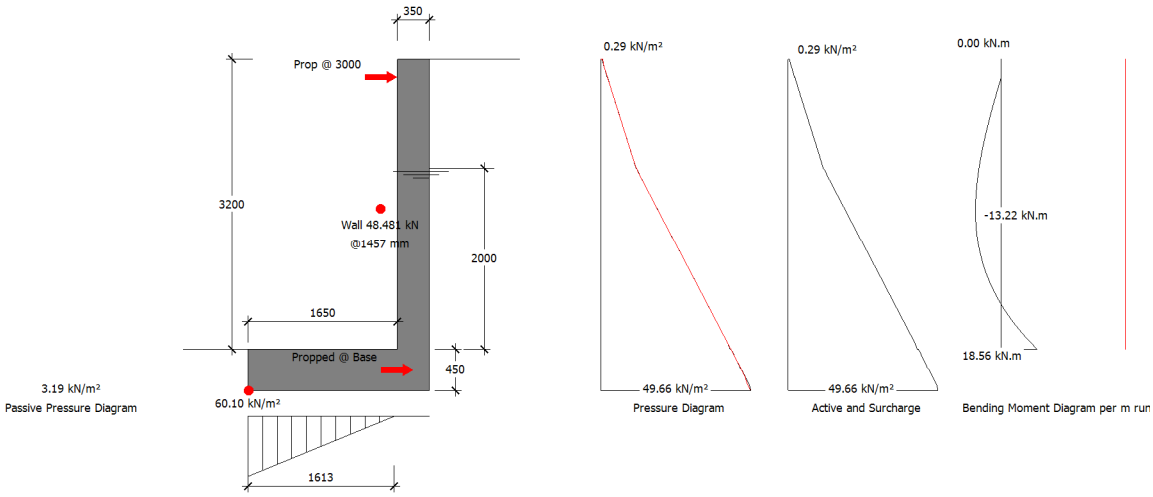
25642

Job Ref : 55 ORNAN RD - FRONT WALL
Sheet : 12716 /10014
Made by :
Date : 14 April 2015 / Ver. 2014.08
Checked :
Approved :

MasterKey : Retaining Wall Design to BS 8002 and BS 8110 : 1997
Basic RC Retaining Wall
Reinforced Concrete Retaining Wall with Reinforced Base



Summary of Design Data

Notes	All dimensions are in mm and all forces are per metre run
Material Densities (kN/m³)	Back Soil - Dry 19.00, Saturated 21.40, Submerged 11.40
	Front Soil - Dry 18.00, Saturated 20.80, Submerged 10.80, Concrete 24.00
Special Assumptions (virtual back)	Useδ =0 @ virtual back
Concrete grade	fcu 35 N/mm², Permissible tensile stress 0.250 N/mm²
Concrete covers (mm)	Wall inner cover 50 mm, Wall outer cover 30 mm, Base cover 50 mm
Reinforcement design	fy 500 N/mm² designed to BS 8110: 1997
Surcharge and Water Table	Surcharge 10.00 kN/m², Water table level 2000 mm

† The Engineer must satisfy him/herself to the reinforcement detailing requirements of the relevant codes of practice

Additional Loads

Wall Propped at Base Level	Therefore no sliding check is required
Additional Wall Prop	Prop @ 3.0 m
† Dimensions	All props are measured from the top of the base
	Ties, line loads and partial loads are measured from the inner top edge of the wall

Soil Properties

Soil bearing pressure	Allowable pressure @ front 100.00 kN/m², @ back 100.00 kN/m²
Back Soil Friction and Cohesion	ϕ_b = Atn(Tan(23)/1.2) = 19.48°, c = 5/1.5 = 3.333 kN/m²
Base Friction and Cohesion	δ = Atn(0.75xTan(Atn(Tan(30)/1.2))) = 19.84°
Front Soil Friction and Cohesion	ϕ = Atn(Tan(30)/1.2) = 25.69°

Loading Cases

G_{Wall}- Wall & Base Self Weight, P_a- Active Earth Pressure, $P_{surcharge}$- Earth pressure from surcharge, P_p- Passive Earth Pressure

Case 1: Geotechnical Design	1.00 G_{Wall}+1.00 P_a+1.00 $P_{surcharge}$+1.00 P_p
Case 2: Structural Ultimate Design	1.40 G_{Wall}+1.00 P_a+1.00 $P_{surcharge}$+1.00 P_p

Geotechnical Design

Wall Stability - Virtual Back Pressure

Case 1 Overturning/Stabilising	94.421/120.492	0.784	OK

Wall Sliding - Virtual Back Pressure

Fx/($Rx_{Friction}$+ $Rx_{Passive}$)	0.000/(17.494+0.138)	0.000	OK
Prop Reactions Case 2 (Service)	68.5 kN @ Base, 14.4 kN @ 3.450 m		

Green Structural Engineering Ltd 25642
Unit 5, Quayside Lodge
William Morris Way, Fulham, SW6 2UZ
Tel: (0203) 4053120
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Job Ref : 55 ORNAN RD - FRONT WALL
Sheet : 12716 /10015
Made by :
Date : 14 April 2015 / Ver. 2014.08
Checked :
Approved :

Soil Pressure

Virtual Back	60.101/100 kN/m², Length under pressure 1.613 m	0.601	OK
Wall Back	59.972/100 kN/m², Length under pressure 1.617 m	0.600	OK

Structural Design

Prop Reactions

Maximum Prop Reactions (Ultimate)	68.4 kN @ Base, 14.4 kN @ 3.000 m		

Wall Design (Inner Steel)

Critical Section	Critical @ 0 mm from base, Case 2		
Steel Provided (Cover)	Main H10@150 (50 mm) Dist. H10@150 (60 mm)	524 mm²	OK
Compression Steel Provided (Cover)	Main H10@150 (30 mm) Dist. H10@150 (40 mm)	524 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	295 mm, 1000 mm, 524 mm², 500 N/mm², 35.0 N/mm²	280 mm	
Mr=fn(above,As',d',x,x/d)	524 mm², 35 mm, 16 mm, 0.06	63.8 kN.m	
Moment Capacity Check (M/Mr)	M 18.6 kN.m, Mr 63.8 kN.m	0.291	OK
Shear Capacity Check	F 47.5 kN, vc 0.429 N/mm², Fvr 126.5 kN	0.38	OK

Wall Design (Outer Steel)

Critical Section	Critical @ 1558 mm from base, Case 2		
Steel Provided (Cover)	Main H10@150 (30 mm) Dist. H10@150 (40 mm)	524 mm²	OK
Compression Steel Provided (Cover)	Main H10@150 (50 mm) Dist. H10@150 (60 mm)	524 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	315 mm, 1000 mm, 524 mm², 500 N/mm², 35.0 N/mm²	299 mm	
Mr=fn(above,As',d',x,x/d)	524 mm², 55 mm, 16 mm, 0.05	68.2 kN.m	
Moment Capacity Check (M/Mr)	M 13.2 kN.m, Mr 68.2 kN.m	0.194	OK
Shear Capacity Check	F 0.4 kN, vc 0.413 N/mm², Fvr 130.0 kN	0.00	OK

Base Top Steel Design

Steel Provided (Cover)	Main H10@125 (50 mm) Dist. H10@125 (60 mm)	628 mm²	OK
Compression Steel Provided (Cover)	Main H10@125 (50 mm) Dist. H10@125 (60 mm)	628 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	395 mm, 1000 mm, 628 mm², 500 N/mm², 35 N/mm²	375 mm	
Mr=fn(above,As',d',x,x/d)	628 mm², 55 mm, 20 mm, 0.05	102.6 kN.m	
Moment Capacity Check (M/Mr)	M 0.0 kN.m, Mr 102.6 kN.m	0.000	OK
Shear Capacity Check	F 0.0 kN, vc 0.384 N/mm², Fvr 151.8 kN	0.00	OK

Base Bottom Steel Design

Steel Provided (Cover)	Main H10@125 (50 mm) Dist. H10@125 (60 mm)	628 mm²	OK
Compression Steel Provided (Cover)	Main H10@125 (50 mm) Dist. H10@125 (60 mm)	628 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	395 mm, 1000 mm, 628 mm², 500 N/mm², 35 N/mm²	375 mm	
Mr=fn(above,As',d',x,x/d)	628 mm², 55 mm, 20 mm, 0.05	102.6 kN.m	
Moment Capacity Check (M/Mr)	M 38.0 kN.m, Mr 102.6 kN.m	0.370	OK
Shear Capacity Check	F 36.9 kN, vc 0.384 N/mm², Fvr 151.8 kN	0.24	OK

APPENDIX C

GSE UNDERPINNING SPECIFICATION

Unit 5, Quayside, Sir William Morris Way, Fulham SW6 2UZ
Registered in England Number 06533911

GREEN STRUCTURAL ENGINEERING

Specification: **Underpinning**

Project: **55 Ornan Road NW3 4QD - BIA**

Date of issue: **April 2015**

Prepared by: **J. Cogley**

Revision: **-**

GENERAL UNDERPINNING SPECIFICATION

1. The walls to the perimeter of the new basement shall be underpinned in reinforced concrete. The underpins shall withstand the vertical loads from the walls and horizontal loads from the earth.
2. Underpinning bases shall be excavated in short sections not exceeding 1000mm in width.
3. The sequence of the underpinning shall be such that any given underpin will be completed, dry-packed and a minimum period of 48 hours lapsed before an adjacent excavation commenced to form another underpin.
4. In the event that the existing foundations to the wall are found to be unstable, sacrificial steel jacks shall be installed underneath the foundation to prop the bottom few courses of bricks. These steel jacks shall be left in place and shall be incorporated into the concrete stem.
5. In the event that the ground is unstable, lateral propping shall be provided as required to the rear of the excavation and to the sides of the excavated working trench. The front and side faces of the excavation shall be propped using trench sheeting or plywood, timber boards and acrow props as appropriate. Sacrificial back – shutters shall be used to the rear face of the excavation (i.e. underneath the wall) if required. Cementitious grout will be poured behind the back – shutters to fill up the voids behind the back – shutters.
6. Excavation for an underpin section shall be dug in a day, and the concrete to the base shall be poured by the end of the same day.
7. The concrete to the stem of the underpin shall be poured the following day. This shall be poured up to within 50 – 75mm of the underside of the existing wall foundations.
8. On the following day, the gap between the concrete and the underside of the existing foundation shall be drypacked with C35 concrete using 5 – 10mm coarse aggregate and “Combex 100” expanding admixture by Fosroc UK Ltd in accordance with their instructions.
9. Once the drypack has gained sufficient strength, any protrusions of the footings into our site shall be carefully trimmed back using hand tools to avoid causing any damage to the foundation. The protrusions shall be trimmed back to be flush in-line with the face of the wall above.
10. A minimum of 48 hours shall be allowed before adjacent sections are excavated to form a new underpin.
11. Adjacent underpins shall be connected using T12 dowel bars 600mm long, 300mm embedment each side, at 300mm vertical centres.
12. Concrete cover to reinforcement shall be 35mm for cast against shutter or the top surface of the basement slab, 50mm for cast against blinding and 75mm for cast against earth.
13. Grade of concrete shall be C35 with minimum cement content 300kg/m^3, maximum free water to cement ratio 0.60, slump 100mm.

APPENDIX D

SITE INVESTIGATION REPORT

Unit 5, Quayside, Sir William Morris Way, Fulham SW6 2UZ
Registered in England Number 06533911

HERTS & ESSEX SITE INVESTIGATIONS

The Old Post Office, Wellpond Green, Standon,
Ware, Herts, SG11 1NJ

Telephone : Ware (01920) 822233
Fax: Ware (01920) 822200

12th February 2015

Our Ref : MRS/12571

Neale & Norden Consultants
17 Dartmouth Park Avenue
London
NW5 1LJ

For the attention of N. Norden Esq,:.

Dear Sir,

Re: 55 Ornan Road, London NW3 4QD : Site Investigation

1.0 Introduction

1.01 In accordance with your instructions, we visited the above site during February 2015 .

1.02 The purpose of our visit was to carry out an investigation into the subsoil conditions with a view to foundation design.

1.03 The comments and opinions expressed are based purely on the conditions encountered and the subsequent laboratory testing.

1.04 Therefore, it is possible that some special conditions prevailing on site have not been encountered or taken into account.

1.05 All ground water recordings or their absence relate to short term observations and do not allow for fluctuations due to seasonal or other effects.

2.0 Description of Site

2.01 The site is situated at 55 Ornan Road, London NW3 .

2.02 At the time of our visit the site was generally flat.

3.0 Fieldwork

3.01 Two boreholes were sunk to a maximum depth of 5.00m by means of a window sampler drilling rig.

3.02 The location of the works is indicated on the site plan forming appendix one.

3.03 The various strata and details encountered were noted and are recorded on the borehole logs forming appendix two.

3.04 Insitu strength tests were carried out in the boreholes, the results of which can be seen on the aforementioned logs.

3.05 A full range of samples were recovered as noted and retained for subsequent laboratory testing.

3.06 The location, type and height of any trees should be taken from a survey for later use with NHBC Chapter 4.20, if required.

4.0 Laboratory Testing

4.01 All samples were tested in accordance with BS:1377:1990 Methods of Test for Soils for Civil Engineering purposes.

4.02 Selected samples were tested to determine their atterberg limits, triaxial strength, soluble sulphate content and pH value.

4.03 The results of all laboratory testing are summarised in appendix three.

5.0 Conclusions and Recommendations

5.01 By inspection of the borehole logs it can be seen that the subsoil consists of a Paving Slab or Topsoil over Sandy Claybound Brick FILL to between 0.50 - 0.75m where a Firm Becoming Stiffer With Depth Orange Brown CLAY is encountered and present to the base of the excavations.

5.02 No water was encountered upon excavation of the boreholes as described on the borehole logs, however a standpipes installed at 5m in borehole one.

5.03 No significant roots were encountered in the boreholes beyond 0.60m.

5.04 Laboratory testing proved the clays to be of high to very high plasticity (PI=38 - 48%) which indicates a high susceptibility to movement associated with moisture content change.

5.05 Triaxial testing proved the CLAYS to have cohesion values between 46 - 121 Kn/m² these values are generally seen to increase with depth.

5.06 Therefore when considering the information available we are of the opinion that a the basement can take the form of a reinforced raft with walls designed to take the pressure of the retained soil. The sandy granular material will need to be battered back to stop caving or alternatively a piled solution may be more appropriate if no room is available.

5.07 Further investigation may be required in order to locate existing foundations within the area of the site which may restrict any future works.

5.08 As the site contains less than 0.50g/L of soluble sulphate it can be categorised as a class 1 site in accordance with BRE Digest, and as such any concrete in contact with the subsoil needs no special precautions.

We hope that this is satisfactory, however if you should require any further information, please do not hesitate to contact us.

Yours faithfully,

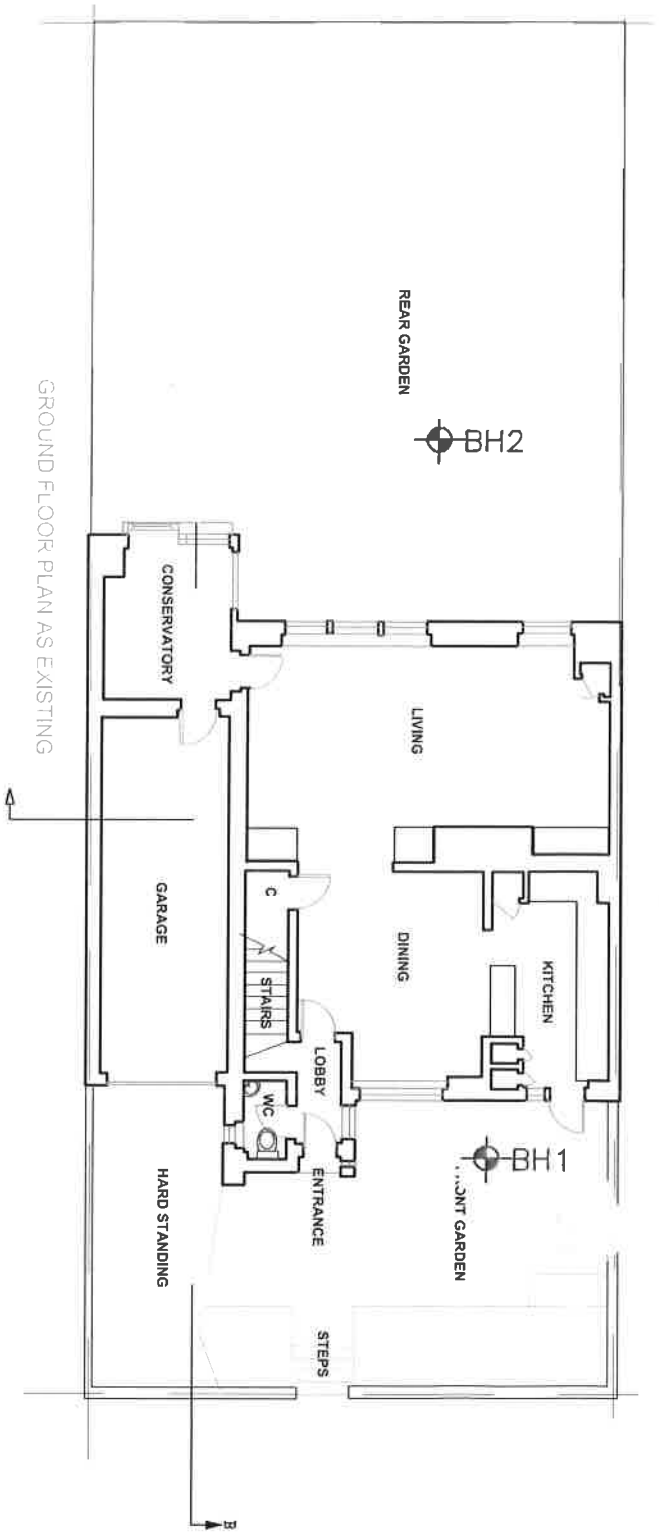
M. R. Smith M.Sc
Principal Engineer

HERTS & ESSEX SITE INVESTIGATIONS
The Old Post Office, Wellpond Green, Standon, Ware, Herts SG11 1NJ
Telephone: Ware (01920) 822233
Fax: Ware (01920) 822200

Appendix No.	1
Sheet No.	1
Job No.	12571
Date	Feb 2015

55 Ornan Road, London NW3 4QD

Site Plan



Not to Scale

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Telephone: Ware (01920) 822233
Fax: Ware (01920) 822200

Appendix No. 2
Sheet No. 1
Job No. 12571
Date Feb 2015

55 Ornan Road, London NW3 4QD

Borehole One

Description of Strata	Depth	Reduced Level	Legend	Thickness (m)	Water Level	Samples No.	Samples Type	Samples Depth (m)	S.P.T N-Value or Vane Strength	Casing Depth (m)
Paving Slab Over Sandy Clay FILL	0.50			0.50	DRY	1	U	0.00		
Firm Becomming Stiff Orange Brown CLAY				4.50		2	U	1.00		1.00
						3	U	2.00		
						4	U	3.00		
						5	U	4.00		
	5.00					6	U	5.00		
Borehole Complete At 5.00m Standpipe Installed at 5.00m										

Remarks:

Scale 1:50

Key : U–Undisturbed Sample (100mm diameter) B –Bulk Sample ▽ –Water Struck D –Disturbed Sample ▽ –Water Standing W–Water Sample P–Piston Sample N–S.P.T. N–Value V–Vane Strength (kN/m²)

HERTS & ESSEX SITE INVESTIGATIONS

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Appendix No. 2
Sheet No. 2
Job No. 12571
Date Feb 2015

55 Ornan Road, London NW3 4QD

Borehole Two

Description of Strata	Depth	Reduced Level	Legend	Thickness (m)	Water Level	Samples No.	Samples Type	Samples Depth (m)	S.P.T N-Value or Vane Strength	Casing Depth (m)
Topsoil	0.25			0.25	DRY	1	U	0.00		
Sandy Claybound Brick FILL	0.75			0.50						
Firm Becomming Stiff Orange Brown CLAY						2	U	1.00		1.00
						3	U	2.00		
				4.25		4	U	3.00		
						5	U	4.00		
	5.00					6	U	5.00		
Borehole Complete At 5.00m										

Remarks:

Scale 1:50

Key : U–Undisturbed Sample (100mm diameter) B –Bulk Sample ▽ –Water Struck D –Disturbed Sample ▽ –Water Standing W–Water Sample P–Piston Sample N–S.P.T. N–Value V–Vane Strength (kN/m²)

HERTS & ESSEX SITE INVESTIGATIONS

Warren House, Bells Hill, Bishop's Stortford, Herts. CM23 2NN
Telephone: Bishops Stortford (01279) 506725
Fax: Bishops Stortford (01279) 506724

Appendix No. 3
Sheet No. 1
Job No. 12571
Date Feb 2015

LOCATION 55 Ornan Road, London NW3

LIQUID AND PLASTIC LIMIT TEST RESULTS

Borehole	Depth (m)	Sample	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Group Symbol	Desiccation Profile	Percentage Retained 425 Micron Sieve (%)
1	1.00	U	33	71	25	46	CV		0
1	3.00	U	32	72	25	47	CV		3
2	2.00	U	27	55	17	38	CH		0
2	5.00	U	34	73	25	48	CV		0

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Appendix No. 3
Sheet No. 2
Job No. 12571
Date Feb 2015

LOCATION 55 Ornan Road, London NW3

UNDRAINED COMPRESSION TEST RESULTS

Borehole	Depth (m)	Sample	Natural Moisture Content (%)	Bulk Density (Mg/m^3)	Lateral Pressure (kN/m^2)	Deviator Stress (kN/m^2)	Apparent Cohesion (kN/m^2)	Angle of Shearing Resistance	Remarks
1	1.00	U	33	1.96	20	114	57		
1	2.00	U	32	1.98	40	136	68		
1	3.00	U	32	1.99	60	130	65		
1	4.00	U	35	2.00	80	142	71		
1	5.00	U	32	2.03	100	242	121		
2	1.00	U	32	1.96	20	92	46		
2	2.00	U	27	1.98	40	160	80		
2	3.00	U	31	1.99	60	128	64		
2	4.00	U	36	2.00	80	136	68		
2	5.00	U	34	2.00	100	182	91		

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Fax: Bishops Stortford (01279) 506724

Appendix No. 3
Sheet No. 3
Job No. 12571
Date Feb 2015

LOCATION 55 Ornan Road, London NW3

SULPHATE ANALYSIS TEST RESULTS

Window Sampler	Depth (m)	Sample	Concentrations of Soluble Sulphate			Classification	pH
			Soil		Groundwater		
			Total SO_4 (%)	SO_4 in 2:1 water:soil (g/l)			
1	1.00	U		0.08			7.05
1	3.00	U		0.05			7.22
2	2.00	U		0.11			7.31

APPENDIX E

NETWORK RAIL RECORD INFORMATION

Unit 5, Quayside, Sir William Morris Way, Fulham SW6 2UZ
Registered in England Number 06533911

From: Brunt Tim <Tim.Brunt@networkrail.co.uk>
To: nordenroy <nordenroy@aol.com>
CC: Mohammad Jakeer <Jakeer.Mohammad@networkrail.co.uk>
Subject: EM3444 - LONDON, 55 ORNAN ROAD, NW3 4QD - Basement Development
Date: Wed, 1 Apr 2015 13:10

Nick,

Based on the information provided your works appear to be:-

Construction of a basement 3m deep under no 55 Ornan Road. With 1.5m light wells to front and rear elevations.

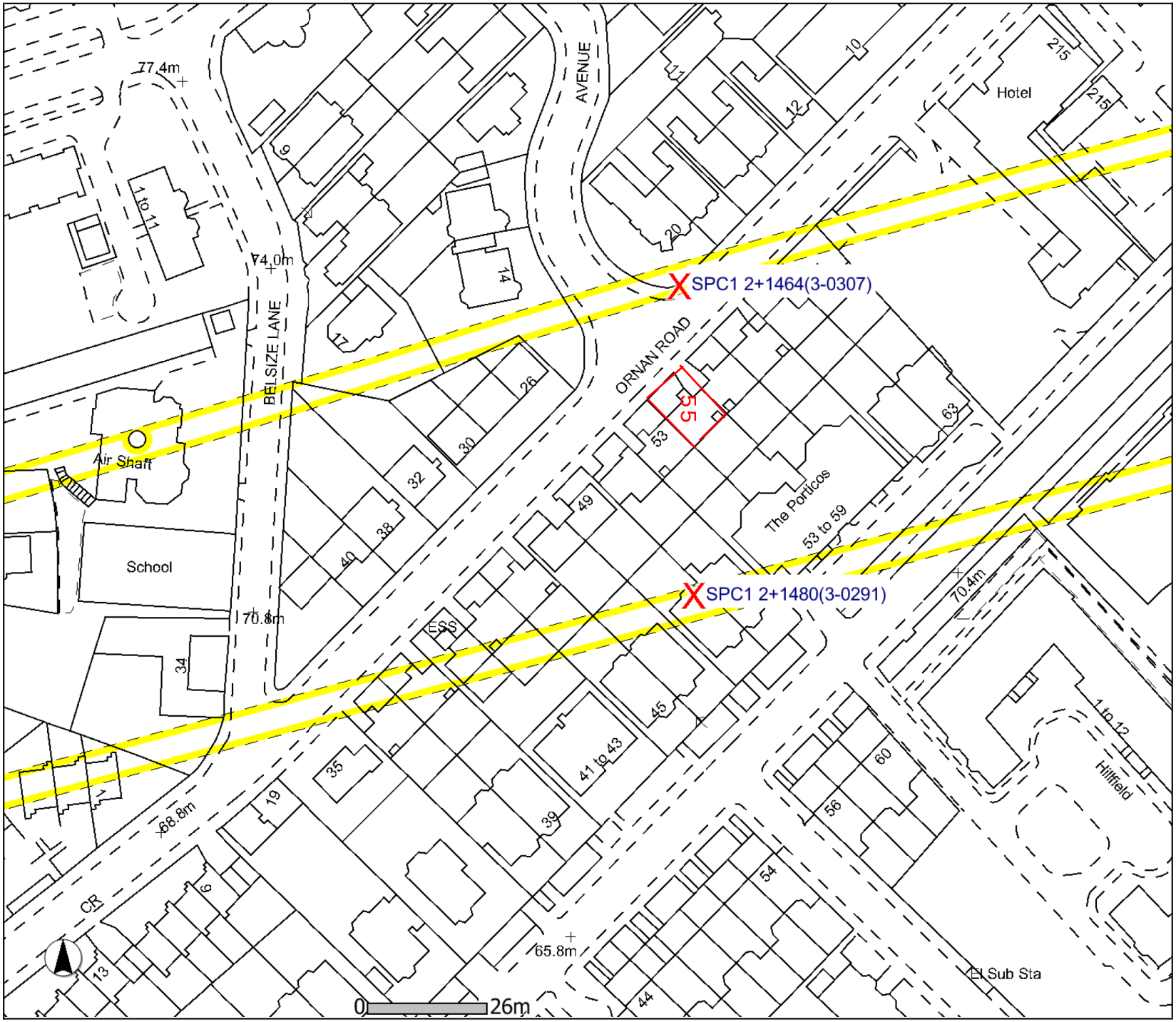
You have not explained how this will be constructed in detail but underpinning will be used.

Based on the property being a distance of circa 20m from either tunnel we do not believe the works will affect our assets.

If I have misconstrued any of your information please let me know. Also should your excavation size increase you should provide us with further details and we will reconsider your plans.

Regards,

Tim Brunt
Senior Asset Protection Engineer | Asset Protection | EM - LNE Route | Network Rail
Desk 11 - Floor 2 | East Midlands Control Centre | Bateman Street | Derby | DE23 8JQ
' 07799 336798 | 01332 442490 | 085 52490
* tim.brunt@networkrail.co.uk



LONDON, 55 ORNAN RD, NW3 4QD

SPC1 2.1480

Plot Scale	1:1250
Plot Date	12/3/2015

Network Rail

Centre of Map Window (E,N): 527079 , 185139

Output Created from the GI Portal – A4 Landscape

APPENDIX F

No53 RECORD DRAWINGS

Unit 5, Quayside, Sir William Morris Way, Fulham SW6 2UZ
Registered in England Number 06533911

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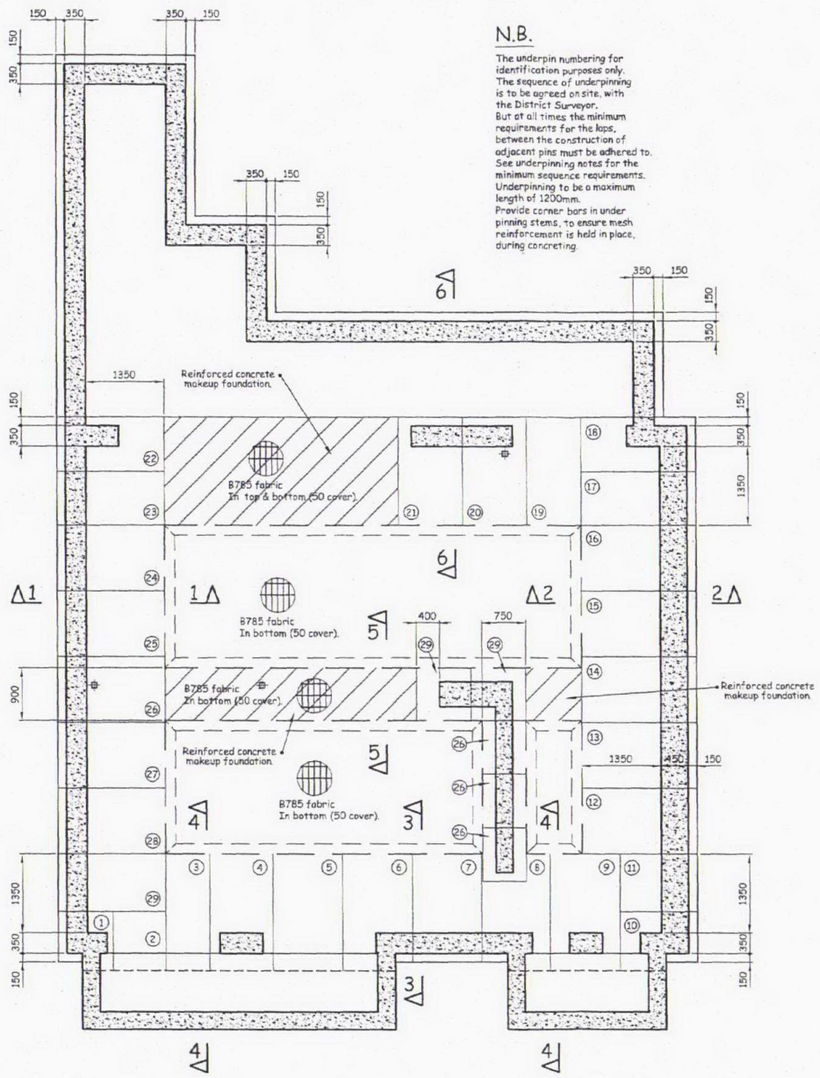

Proposed Underpinning Plan.

Scale 1:50 (at A1)

Underpinning Notes

U1. All reinforced concrete cast on the ground shall be placed on 50mm. of concrete blinding in a nominal 1:8 mix unless otherwise noted.

U2. Foundations have been designed to impose a net bearing pressure of 100kN/m. on London Clay and 125kN/m. on Sand and Gravel, at depths shown. The bearing strata shall be approved by the Local Authority's Building Inspector, before laying blinding, or casting foundations. Any additional excavation shall be replaced with a nominal 1:8 mix concrete. But in the event of extensive additional excavation being required, the Engineer must be informed immediately and fresh instructions obtained.

U3. Concrete mix for foundations shall be a G35 mix with a minimum Ordinary Portland content of 300kg/m. and a maximum water/cement ratio of 0.60. Concrete shall be left for at least 48 hours before dry packing.

U4. Concrete cover to the reinforcement shall be as detailed on the drawings but never less than 35mm.

U5. The minimum depth of the underpinning, (measured from the undersid of the existing footing, to the underside of the new), shall be 500mm. and shall be formed on a strata, capable of sustaining a permisable net ground pressure of 100kN/m. on London Clay and 125kN/m. on sand and gravel.

U6. The underside of the existing wall or foundation shall be trimmed and cleaned of all mud and debris, before dry packing. The dry pack shall be a1:3 mix and well rammed in horizontal layers, not exceeding 75mm thick. Dry packing shall be left. 24 hours before works are commenced on adjacent underpins.

U7. The central area of excavation shall not be carried out until the perimeter underpinning has been completed.

U8. Backfilling behind retaining walls shall be a 1:20 mix, using Ordinary Portland Cement.

Notes

1. This drawing remains the copyright of Vincent and Rymill and is not to be copied, altered or changed without permision.
2. All dimensions are in millimetres unless otherwise noted.
3. Do not scale off this drawing.
4. All temporary works shall be the responsibility of the main contractor. But should advice be given, by the Engineer. No responsibility will be accepted, unless the advice is confirmed in writing, by the Contractor, prior to the works being carried out.
5. The Contractor shall be responsible for the stability of the existing structure and earthworks on the site, as well as the adjoining sites. The Contractor must take all necessary precautions to safeguard this.
   Adequate shoring shall be installed during the works, to ensure the stability of the structure. Such shoring is to be adequately founded.
6. Any deviation from the details shown, must be notified to the Engineer, by the Contractor, in writing, before being carried out.
7. The Local Authority's Building Inspector and the Engineer are to be informed, by the Contractor, in writing, at least 48 hours prior to the works starting, on site. Their agreement must be, obtained, before work, can commence.
8. All concrete to be a minimum grade of C35.

Rev	Details	Date

BASEMENT FORCE.co.uk
The Basement Specialists
Weylands Resource Park, Molsey Road, Walton on Thames, Surrey KT12 3PB.
Telephone 020 7924 1434
info@basementforce.co.uk

V&R VINCENT & RYMILL
Consulting Civil & Structural Engineers
Lakeside Country Club, Frimley Green, Camberley, Surrey GU16 6PT
Tel: (01252) 834242 Fax: (01252) 838889
Email address: frimley@vincentrymill.co.uk
The Old Registry Office, 20 Amersham Hill, High Wycombe, Bucks HP13 6NZ.
Tel: (01494) 474447 Fax: (01494) 471714
Email address: wycombe@vincentrymill.co.uk

Job
53 Ornan Road,
Belsize Park, London
for Mr. A. Cregan

Title
New Basement
Structural Details
Sheet 1 of 2

Scale at A1	Date	Job No	Drg No	Rev
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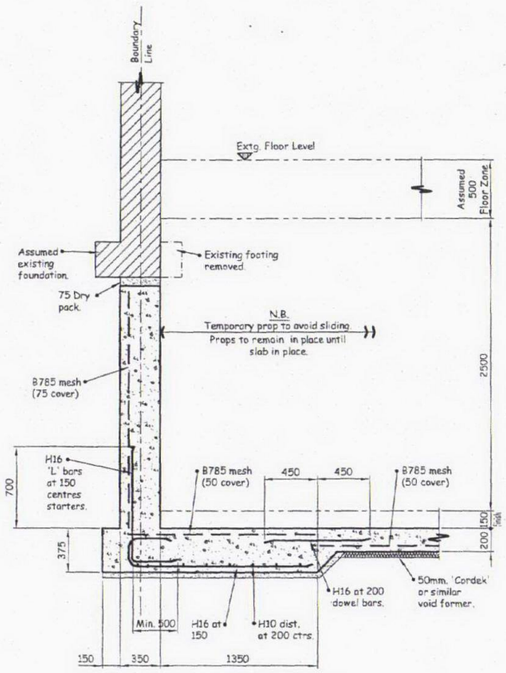
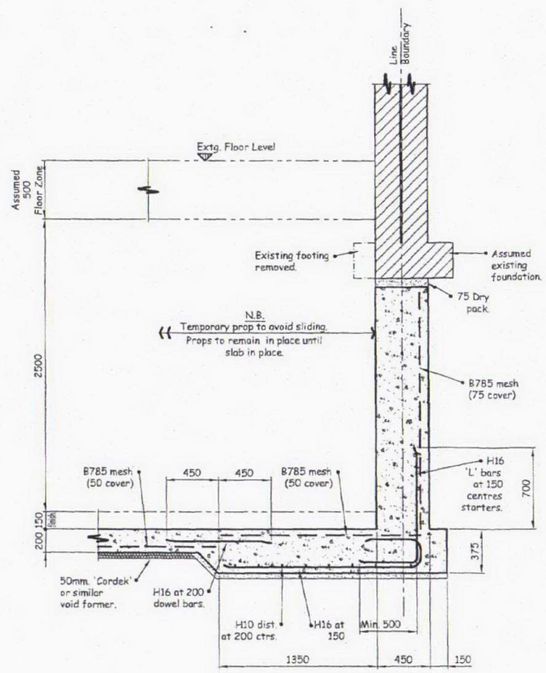


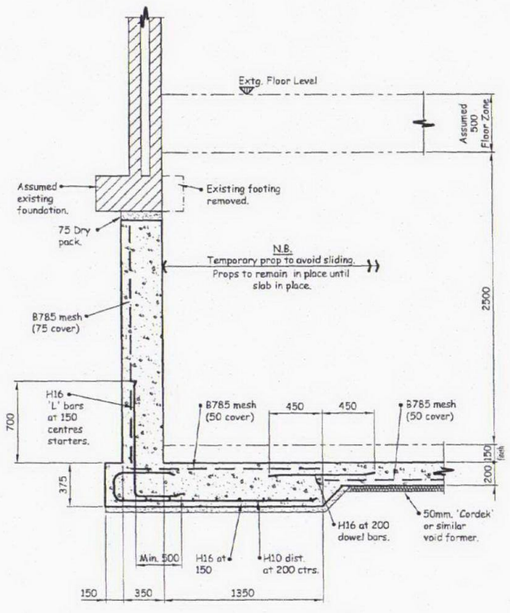
Section 1 - 1

(Scale 1:25)



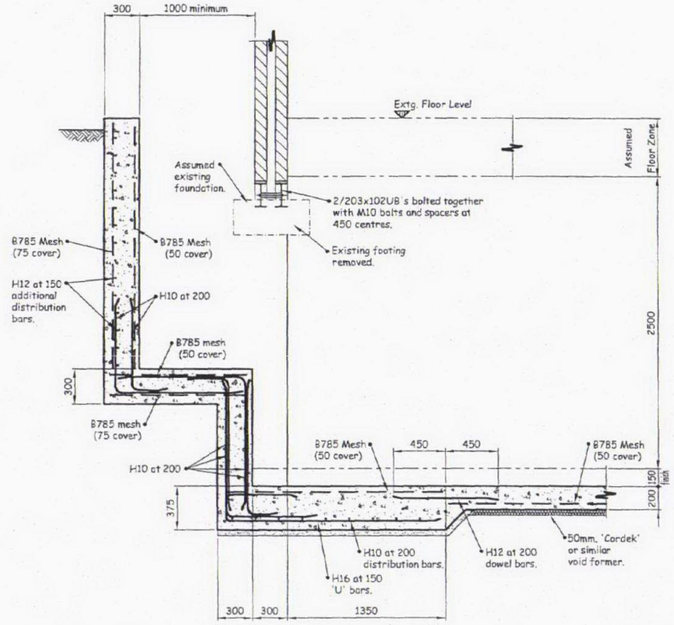
Section 2 - 2

(Scale 1:25)



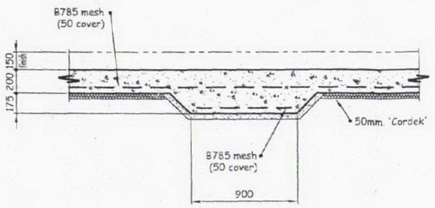
Section 3 - 3

(Scale 1:25)



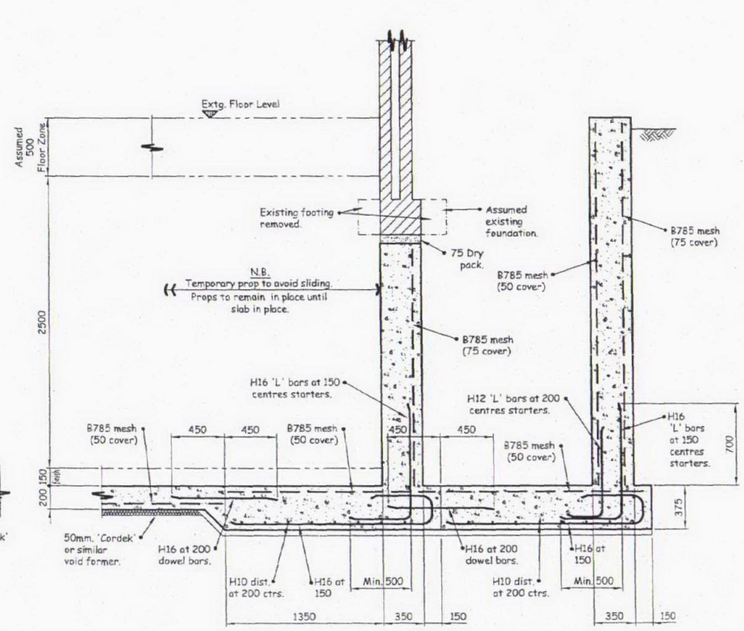
Section 4 - 4 - Lightwell Detail.

(Scale 1:25)



Section 5 - 5

(Scale 1:25)



Section 6 - 6

(Scale 1:25)

Notes

1. All notes on drawing 10K01/01 apply to this drawing.

RECEIVED 26 OCT 2010

Rev	Details	Date

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Job

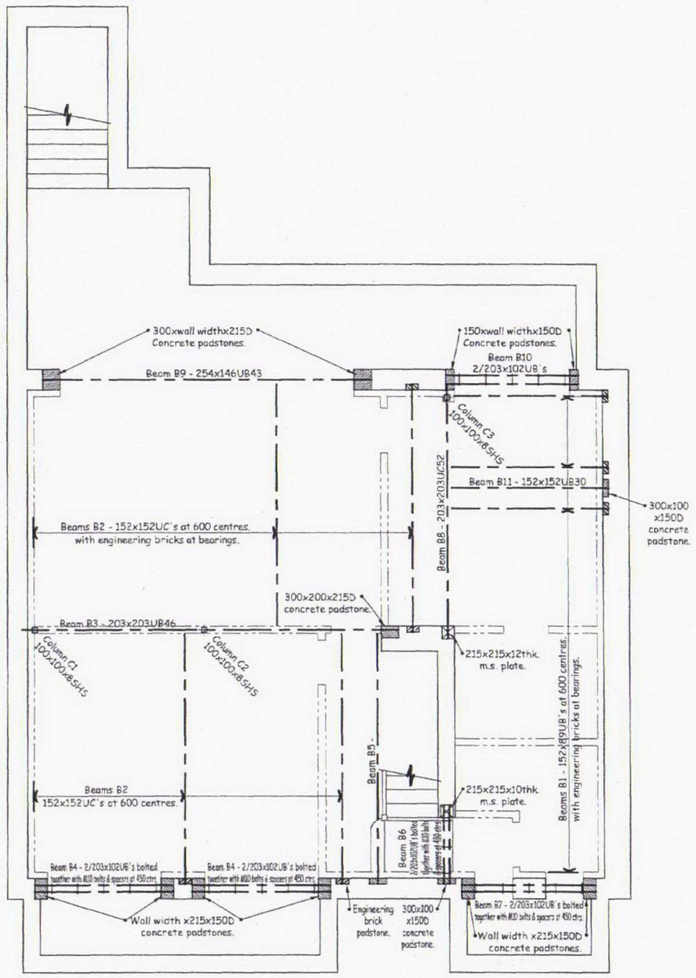
53 Ornan Road,
Belsize Park, London
for Mr. A. Cregan

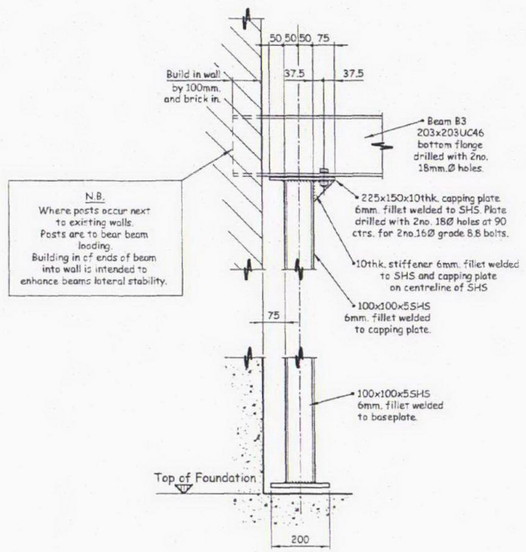
Title

New Basement
Structural Details
Sheet 2 of 3

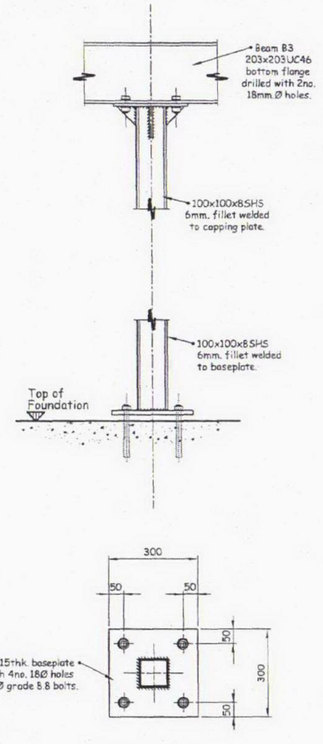
Scale at A1	Date	Job No	Drg No	Rev
1:25	Oct. 2010	10K01	02	

1:50 1.0m 0 1.0m 2.0m 3.0m 4.0m 5.0m 6.0m 7.0m 8.0m 9.0m 1:50





Columns C1 (C3 similar)
Baseplate and Capping Plate.
Scale 1:10



Column C2
Baseplate and Capping Plate.
Scale 1:10

Notes

1. This drawing remains the copyright of Vincent and Rymill and is not to be copied, altered or changed without permision.
2. All dimensions are in millimetres unless otherwise noted.
3. Do not scale off this drawing.
4. Fire protection to all structural members, shall achieve, not less than 1 hour standard.
5. All new structural timber shall be, Grade SC4, (or C24). To B.S. 4978, unless otherwise note. The timber, including cut ends, notches etc. will also, be treated, with an approved timber preservative.
6. All structural steelwork, shall be mild steel and painted with 2 coates of red oxide, each coat, to have a dry film thickness of not less than 50 microns. One coat to be applied at the fabrication works and one coat on site, after erection. Steelwork to be encased in concrete, shall be UNPAINTED.
7. All beam to beam connections shall be double angle cleated using 90x90x12RSA's. All cleats to be drilled with 22Ø holes, for 20Ø grade 8.8 black bolts. All unless noted otherwise.
8. The concrete mix for padstones shall be 1:4 mix.
9. Brickwork shall be constructed, using bricks, with a minimum crushing strength, of 27.5N/mm. Blockwork shall be constructed, using blocks, with a minimum crushing strength of 3.5N/mm. All unless noted otherwise. All masonry shall be laid in Class (iii) mortar.

Rev	Details	Date

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Job
53 Ornan Road,
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for Mr. A. Cregan

Title
New Basement
Structural Details
Sheet 3 of 3

Scale at A1	Date	Job No	Drg No	Rev
1:100 1:50 1:10	Oct. 2010	10K01	03	