# 46 Avenue Road, London NW8 6HS
# Structural Method Statement for Proposed Redevelopment (Incorporating Construction Methodology)
# Rev F

Project No. 1147

**Date** **9th March 2017**

**edge structures ltd**
Phoenix Yard
69 Kings Cross Road
London
WC1X 9LL

Tel: 0207 239 4950
Fax: 0207 239 4951

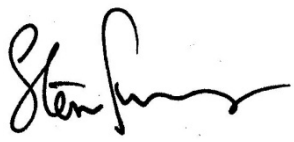
e-mail: info@edgestructures.com

## CONTENTS



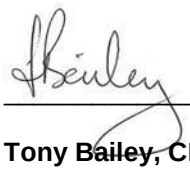
| Rev | Date | Purpose/Status | Document Ref. |
|---|---|---|---|
| draft | 05/11/2010 | For discussion | |
| Draft inc construction method | 24/11/2010 | For discussion | |
| A | 25/11/2010 | Pre-planning | |
| B | 01/12/2011 | Pre-planning | |
| C | 03/04/2014 | Revised for pool removal & re-submission | |
| D | 07/07/2014 | Revised for single basement | |
| E | 01/03/2017 | Revised for latest Planning application | |
| F | 09/03/17 | Revised to show traditional underpinning | |

Originally prepared by: **Peter Oates CEng MICE Associate**
Revisions C, D and E prepared by:



**Steve Parsons, BSc PhD CEng MICE MIStructE**

Checked / Approved by:



**Tony Bailey, CEng MICE Director**

## 1. Terms of Reference

We have been commissioned by Brightwood Ltd to prepare a report setting out the proposed construction methodology for the proposed alterations and extensions to this building. The report is intended to be submitted to the London Borough of Camden in support of a planning application. With reference to the criteria set out in Camden's Core Strategy Policy CS14 and policy DP27 – basements and light-wells, this document provide factual information to demonstrate that the scheme maintains the structural stability of the building and neighbouring properties.

This report also addresses the issues of the access requirements for construction which might be employed in the development. The design has been developed to a level of detail whereby the key technical and methodological issues have been identified and addressed in principle. Structural designs and the methodology will be subject to a degree of further refinement.

This report is produced solely for the use of Brightwood Limited in connection with this planning application and not for any other purpose or for any other party. It shall not be used, in whole or in part, by any third parties without the express written permission of Edge Structures Ltd.

## 2. Description of Existing Building and Boundary Wall Conditions

46 Avenue Road is a four storey house comprising part basement, ground, first and second floors *(see fig 1)*. In front of the building is a hard standing area for vehicles with a basement car lift. The basement comprises staff accommodation, a gym, hydraulic lift room, water tank room, two electrical intake rooms and access to the car lift. There is an array of external air conditioning units and mechanical plant on the roof.

From British History online records: The southern part of Avenue Road existed by 1824 as far as Avenue Close and the northern part of Avenue Road was built by 1829. (*Ref 1, 2)*
From the London Borough of Camden Planning records: Full planning permission was granted for the following proposals to No 46 Avenue Road (dates of decisions given)

*31-12-1934 Erect a garage addition to the premises.*

*25-11-1964 Erection of dwelling comprising basement, ground floor and two floors over.*

*16-12-2002 Alterations and extensions to a single family dwelling house comprising: a part single, part two storey rear extension, a wrought iron glazed awning, the infilling of an existing side external terrace, the extension and remodelling of a single storey side extension, including excavation to form a light-well and basement staff accommodation area, entrance portico, domed skylight, roof access hatch, a detached summer house and pool in the rear garden.*

From the above we assume that an original dwelling was demolished and the existing house built circa 1965 with the extensions and alterations including swimming pool and summer house built circa 2003. The pool was constructed but then demolished and removed in its entirety in 2013. Some records (including the survey and publicly available aerial photographs) still show the pool.

A site inspection has shown that the basement lift motor room walls and soffit to the basement to ground floor staircase is of in-situ concrete construction. The construction of the ground floor, upper floors and foundations is unknown. Whilst a full disclosure of records held by Camden Building will confirm the foundations, the age and type of the property suggest that the building is supported on ground bearing strip footings.

On the south side there is a narrow alley way between No 46 and No 44 *(see fig 2).* A cross lattice wooden fence separates the properties.

The north wall to No 46 forms the boundary with No 48. Towards the rear of No 46 there is a light-well to the basement staff accommodation *(see fig 3).*

## 3. Description of Adjacent Buildings

No 44 Avenue Road to the south of No 46 is arranged over three stories above ground with the upper level of mansard form. It is not known if there is a basement but this is highly probable.

No 48 Avenue Road to the north of No 46 is arranged over three stories above ground with the upper level of mansard form. Planning permission (ref. 2012/3861/P) was granted in September 2013 for '*The excavation of basement beneath front garden and double basement beneath rear garden, erection of 2–story side extension at lower ground and ground floor level and rear extension at ground floor level all in connection with existing dwelling house'.* An application by Planning Sense on behalf of the owner for a Certificate of existing lawful use /development was made in June 2016.

## 4. Description of Proposed Works

The completed proposed works are shown on drawings 1147/99 to 102 incl, 201 and 203 which are included in appendix B.

The works involve the retention of the front elevation to the existing property, demolition of the house behind and new accommodation being provided at basement level and a 3 storey house being rebuilt at the front.

Over the footprint of the original house a single storey basement with two new basement light-wells at the front. The underside of the proposed basement floor is approximately 3.7m below ground level. To the rear of the house a single storey basement with services void under to accommodate a swimming pool, changing room facilities, pool plant equipment with access to the existing house is to be constructed. The existing summer house is to be rebuilt.

The underside of the proposed lower basement floor at the rear is approximately 7.3m below ground level. Construction of 6m basements to domestic properties in London is now occurring on a regular basis.

A detailed site investigation and desk top study have been undertaken. The site investigation includes boreholes and trial pits for soil sampling and testing and provides the parameters used in preliminary geotechnical evaluation.

A Basement Impact Assessment and a Ground Movement Assessment report Rev 05 dated 2 July 2014 for the single basement extension have been prepared by RKD geotechnical engineers. The assessment method follows Burland et al. (1977) / BRE Report 251 Damage Categories. The main conclusions from RKD's report are:

*The combined green field ground movements accumulating after basement excavation have been derived and then traced and plotted. These are all settlements outside of the basement excavation area. The maximum derived settlement at any location was approximately 8.1 mm and the maximum derived settlement beneath any structure occurred at the nearest corner of number 44 Avenue road and was 3.4 mm.*

*The adjacent structure of number 48 Avenue Road, to West side of the existing property of number 46 Avenue Road, is sufficiently far away that the Damage category in this case will be (0) or ' negligible' in response to the new basement works.*

*The adjacent structure of number 44 Avenue Road, to East side of the existing property of number 46 Avenue Road, falls into the Damage category(1) or 'Very Slight' in response to the new basement works.*

This information will also inform the detailed geotechnical analysis that will be necessary for each stage of the basement construction.

Due to the depth of construction for the new basement areas, party wall notices etc involving adjoining owners will be required. Monitoring of surrounding ground and building movements will also be necessary and the requirements and limits on movement are likely to be incorporated into party wall awards. The works have been designed to minimise ground movements. The adjacent properties are considered to be sufficiently far away from these works for the damage resulting from any ground movements to be negligible or very slight.

It is anticipated that the wall to the deeper single storey basement at the rear is likely to be formed with (approximately) 600 mm diameter secant hard/soft bored piles and the basement at the front with (approximately) 450 diameter secant hard/soft bored piles. In the area of the existing basement the existing walls will be underpinned using a traditional approach as the increase in depth is only 400mm. Reinforced concrete floors at basement and ground level will create an enclosed box. The walls will need to be propped at ground level.

The basement will need to be designed to resist water pressures to CP102:1973. The lower basement slab will need to be held down with tension piles to resist water uplift and an under slab system provided to deal with clay heave pressures.

All of the aforementioned will need to be considered as part of a detailed geotechnical analysis to determine predicted ground movements and to provide design loads for the walls and floors.

The architect proposes the basement to be designed as Type C drained protection to BS8102:1990.

The volume of soil material to be excavated to the rear basement alone is of the order of 4000m3 (without bulking): about 6,800 to 8000 tonnes.

The types of underpinning to the existing house foundations depend on the nature of the existing foundations and the support required at various stages of the construction programme. Our current design assumes traditional underpinning to the front and north (No 48) elevations only. The actual underpinning system(s) implemented may vary from this as they would be influenced by the preferences of the specialist ground works contractor. These will however need to be reviewed by the Chartered Structural Engineer appointed for the project.

## 5. Access Requirements and Outline Construction Methodology

The sequencing of work to form the basements under the house, together with any temporary works to the house to provide access and the excavation of the rear basement requires special and detailed consideration. To this end we have considered the construction methodology in some detail.

These proposals would naturally be subject to some development through the involvement of a specialist groundworks contractor. The contractor's method statement will need to be agreed with the Chartered Structural Engineer appointed for the project and their geotechnical specialist.

The contractor to be employed for the works will need to have relevant experience for this type of project.

The proposed construction sequence can be summarised as follows.

1. Underpin the existing front and north elevations. Locally remove the ground floor slab behind the front elevation.
2. Install temporary steel support frame to horizontally restrain the front elevation including steel frame over new opening in the front elevation. Create opening and temporary ramp to provide main access route for materials and construction traffic to rear. Demolish the existing building including removal of the remaining ground floor slab whilst retaining the front elevation. Reuse selected demolition material to part fill the existing basement for the piling mat.

3. The ground level behind the front elevation adjacent to the access opening is to be reduced by 1m and ramps formed at either side to permit a piling rig to pass through into the rear garden. The headroom clearance that this will provide is adequate for a Klemm KR 709 drilling rig.
4. Construct secant piles for deep basement within the garden and to the front for the shallower basement. Piles that support the lower basement slabs and internal columns are to be blind bored at this stage. The capping beams to the bored piles are to be installed.
5. The basement is excavated leaving a ramp to permit arisings to be brought up to the surface at the front of the property. Props are installed across the excavation to support the piled walls.
6. The basement RC slab is poured.
7. The concrete basement box is constructed from the bottom upwards.
8. The concrete ground slab is constructed over both the rear basement and the new area of basement at the front of the house.
9. The upper levels of the new house comprising composite lightweight concrete on metal decking supported on a steel frame constructed. The stability of the steel frame provided by vertical cross-bracing. The existing front elevation tied into the new steel frame and finally the temporary support frame removed.

The volume of spoil to be removed is considerable however there is a sizable area to the front of the house and within the boundary of the site. To minimise disruption to road traffic this area may be used for vehicles carting away spoil. If this is to be the case then retaining walls along the front of the house can be designed for the resulting surcharge loading. To reduce traffic congestion it may be necessary to restrict the carting away of spoil to times after the morning rush hour and before the evening rush hour.

During all of the above construction period a monitoring system will need to be in place to check surrounding ground, existing house and adjacent building movements.

## 6. Conclusions and Recommendations

6.1 Whilst these works are considerable for a domestic property it is possible to carry them out in manner that complies with the policy DP27 criteria regarding structural stability of the building and neighbouring properties;

6.2 Access for construction equipment, delivery of materials and removal of excavated soil is a major challenge and will require considerable logistical planning by the appointed contractor.

6.3 Piling rig access and spoil removal may be undertaken through an opening formed in the existing front elevation.

6.4 A temporary support frame will be required to ensure stability of the retained front elevation.

6.5 Construction of the basements has been demonstrated to be technically feasible and practicable however this will require expertise both in design and construction.

6.6 In excess of 4,000 $m^3$ of soil will need to be removed from site and site management controls will need to be devised and implemented.

6.7 The works can be designed and constructed in such a way that ground movements and associated impacts on neighbouring buildings can be minimised. A detailed geotechnical analysis to predict ground movements has been carried out. The adjacent structure of number 48 Avenue Road, to West side of the existing property of number 46 Avenue Road, is sufficiently far away that the Damage Category (following Burland method of assessment) will be (0) or ‘negligible’ in response to the new basement works. The adjacent structure of number 44 Avenue Road, to East side of the existing property of number 46 Avenue Road, falls into the Damage category(1) or ‘Very Slight’ in response to the new basement works.

6.8 Monitoring of the surrounding ground and building movements will be required during the construction phase.

## 7. References

1) 'Hampstead: St. John's Wood', A History of the County of Middlesex: Volume 9: Hampstead, Paddington (1989), pp. 60-63.
2) Greenwood's Map of London 1827
3) Going Underground Basement Project News, Ischebeck Titan

## Appendix A Photographs


Fig 1 – Number 46 Front elevation

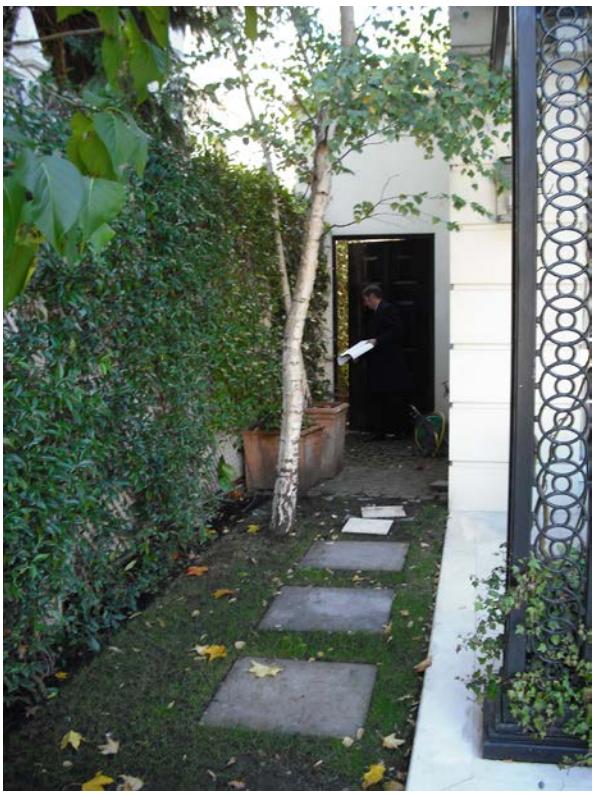


Fig 2 – Rear boundary wall to Number 44

Fig 3 – Rear boundary wall to Number 48

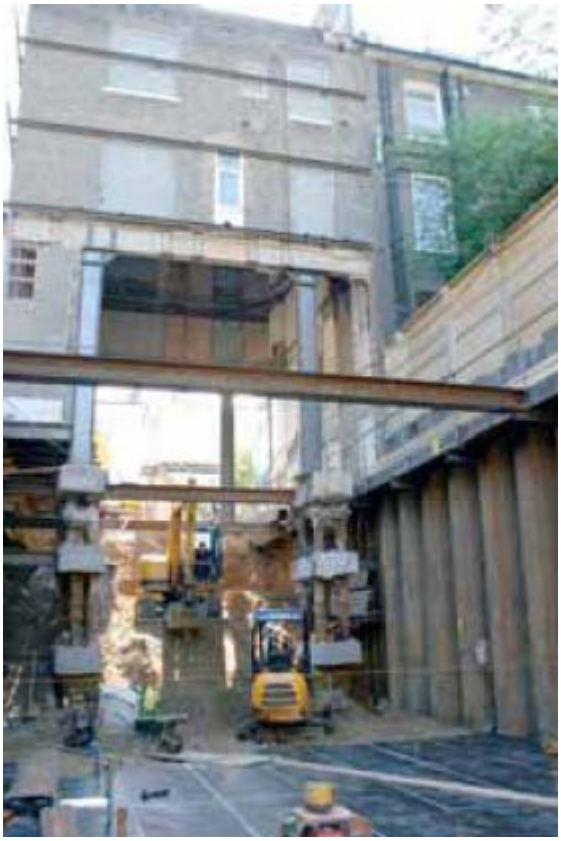
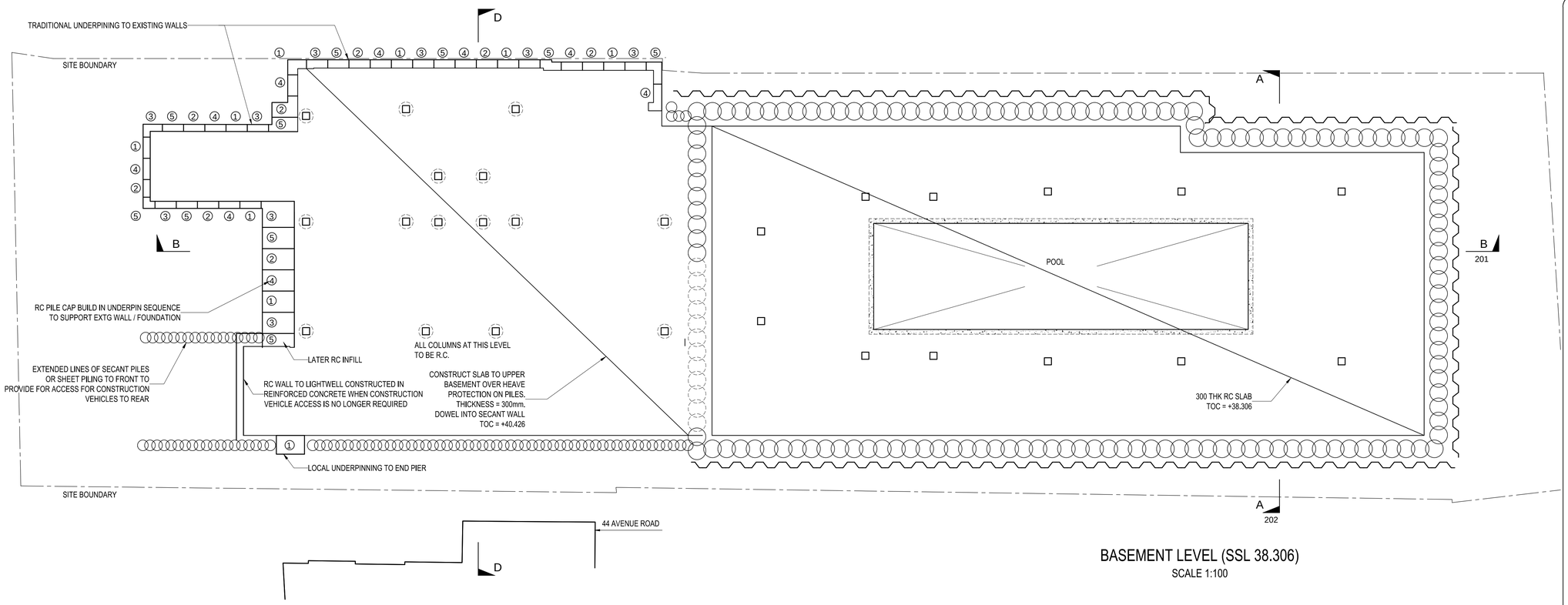


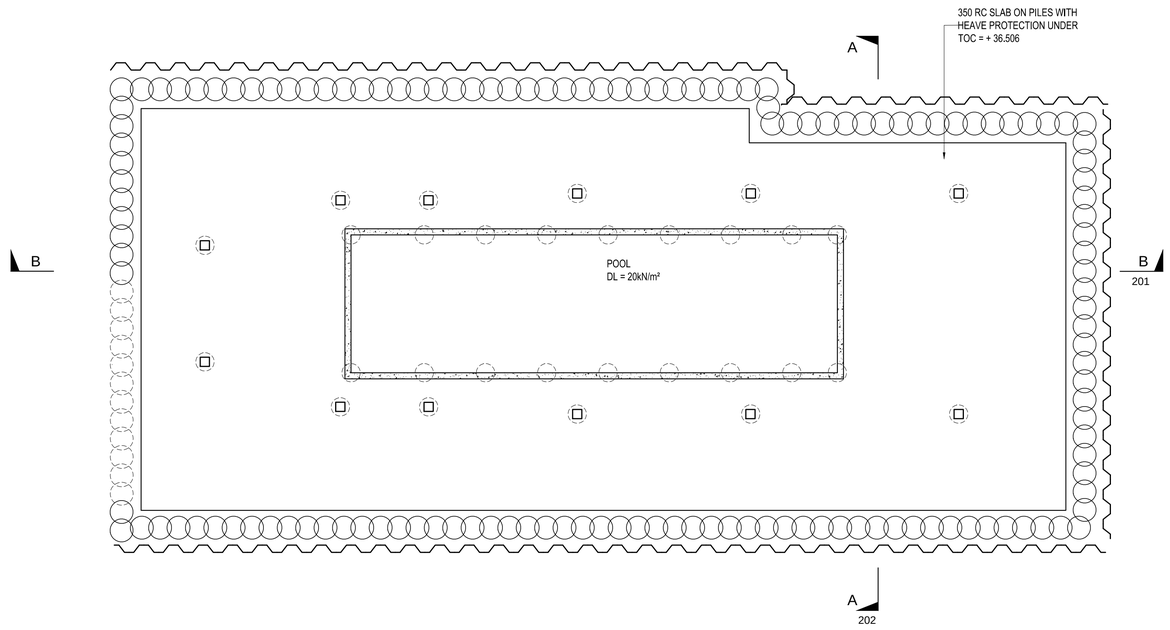
Fig 4 – Example of Temporary works for construction access to build a 6m basement where little access existed before– London (Ref 3 Ischebeck Titan)

Fig 5 – Example of Temporary works for construction access to build a 6m basement where little access existed before– London (Ref 3 Ischebeck Titan)

## Appendix B Proposed Structural Drawings




BASEMENT LEVEL (SSL 38.306)
SCALE 1:100




SERVICE VOID LEVEL SSL 36.506
SCALE 1:100

NOTES:

DRAWING TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS AND SERVICES ENGINEERS' DRAWINGS, AND ALL OTHER RELEVANT INFORMATION.

ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF EDGE STRUCTURES LTD.

DO NOT SCALE FROM THE DRAWING, USE FIGURED DIMENSIONS ONLY.

THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK OR PREPARING ANY SHOP DRAWINGS.
WORK AND MATERIALS TO BE IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS AND BRITISH STANDARDS.



THIS DRAWING IS BASED ON INFORMATION PROVIDED BY
BB PARTNERSHIP ARCHITECTS.

p:\1147 46 avenue road, nw8\5.02 drawings & issue sheets\edge\working drawings

| REV | DESCRIPTION | DR | CH | APP | DATE |
|---|---|---|---|---|---|
| P3 | REVISED UNDERPIN | DF | TB | TB | 08.03.17 |
| P2 | REVISED SCHEME | DF | SP | TB | 03.03.17 |
| P1 | FIRST ISSUE: PRELIMINARY | SP | | | 29.05.14 |

| DRAWN BY | CHECKED BY | APPROVED BY | DATE |
|---|---|---|---|
| SP | | | MAY 2014 |

SCALES @ A1 1:100, 1:50
SCALES @ A3 1:100

ISSUING OFFICE LONDON

FILE 99-203 Single Basement (AOD).dwg

RESTRICTIONS
PRELIMINARY

PROJECT
46 AVENUE ROAD
LONDON NW8
REFURB & BASEMENT WORKS:

TITLE
STRUCTURAL PROPOSALS
BASEMENT

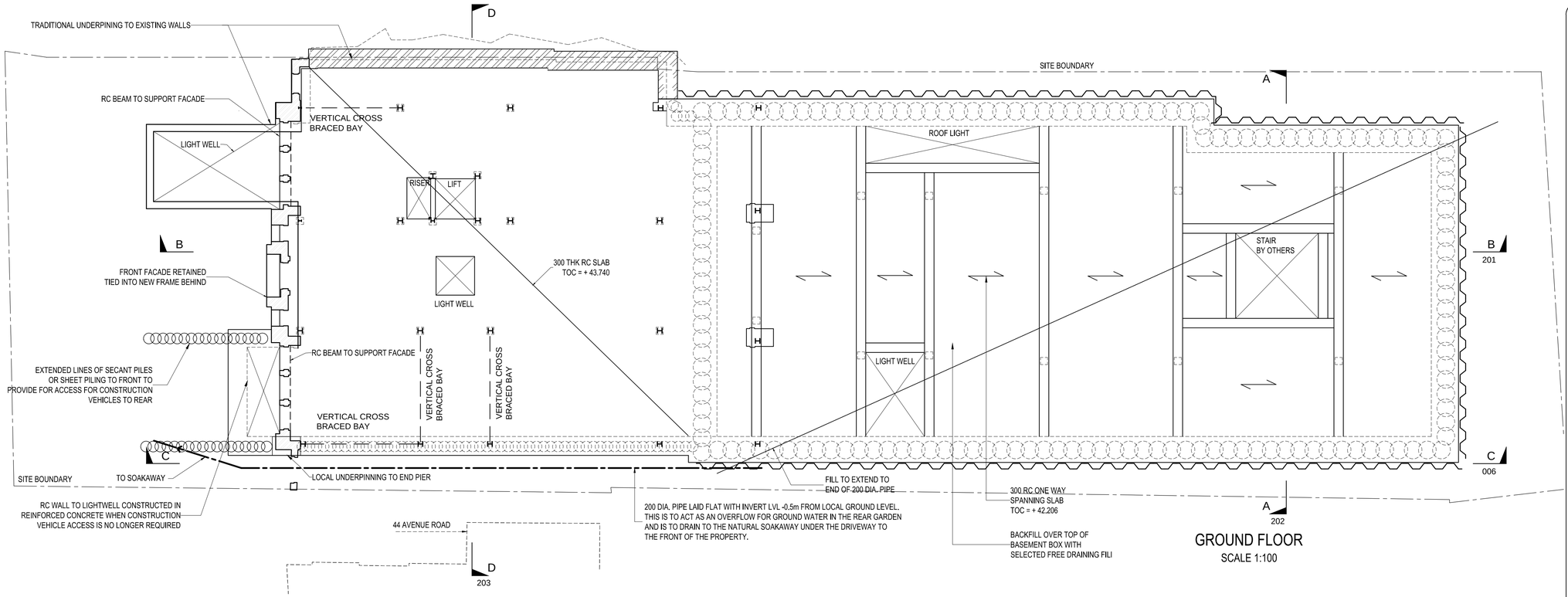
edge structures

edge structures ltd
London ● Leeds

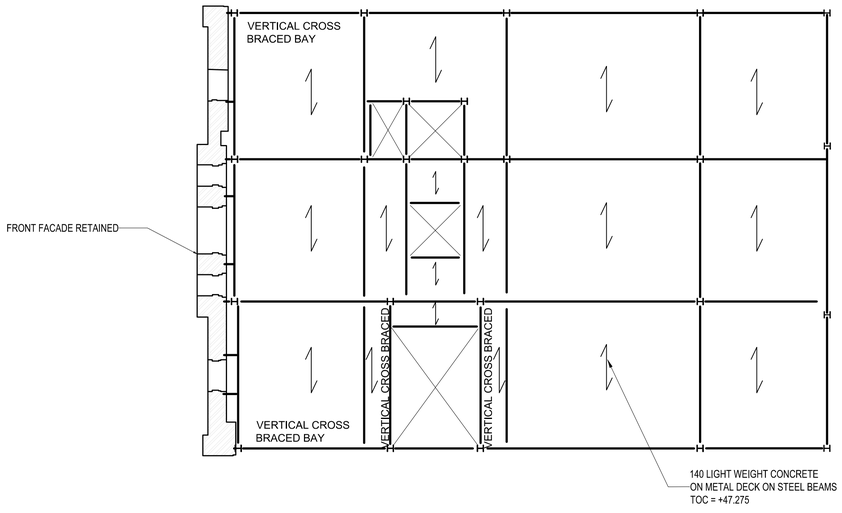
Phoenix Yard
69 Kings Cross Road
LONDON WC1X 9LL

t: 020 7239 4950
f: 020 7239 4951
e: info@edgestructures.com

| JOB NUMBER | DRAWING NUMBER | REVISION |
|---|---|---|
| 1147 | 099 | P3 |




GROUND FLOOR
SCALE 1:100




FIRST FLOOR
SCALE 1:100

NOTES:

DRAWING TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS AND SERVICES ENGINEERS' DRAWINGS, AND ALL OTHER RELEVANT INFORMATION.

ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF EDGE STRUCTURES LTD.

DO NOT SCALE FROM THE DRAWING, USE FIGURED DIMENSIONS ONLY.

THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK OR PREPARING ANY SHOP DRAWINGS.
WORK AND MATERIALS TO BE IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS AND BRITISH STANDARDS.



THIS DRAWING IS BASED ON INFORMATION PROVIDED BY BB PARTNERSHIP ARCHITECTS.

p:\1147 46 avenue road, nw8\5.0Z drawings & issue sheets\edge\working drawings

| REV | DESCRIPTION | DR | CH | APP | DATE |
|---|---|---|---|---|---|
| P3 | REVISED SCHEME | DF | TB | TB | 08.03.17 |
| P2 | REVISED SCHEME | DF | SP | TB | 03.03.17 |
| P1 | FIRST ISSUE: PRELIMINARY | SP | | | 29.05.14 |

| DRAWN BY | CHECKED BY | APPROVED BY | DATE |
|---|---|---|---|
| SP | | | MAY 2014 |

SCALES @ A1 1:100
SCALES @ A3 1:200

ISSUING OFFICE LONDON

FILE 99-203 Single Basement (AOD).dwg

RESTRICTIONS

PRELIMINARY

PROJECT

46 AVENUE ROAD
LONDON NW8
REFURB & BASEMENT WORKS:

TITLE

STRUCTURAL PROPOSALS
GROUND FLOOR

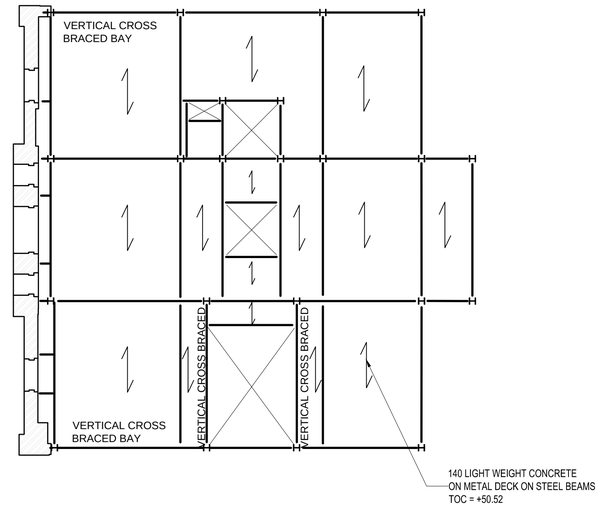
edge structures

edge structures ltd
London ● Leeds

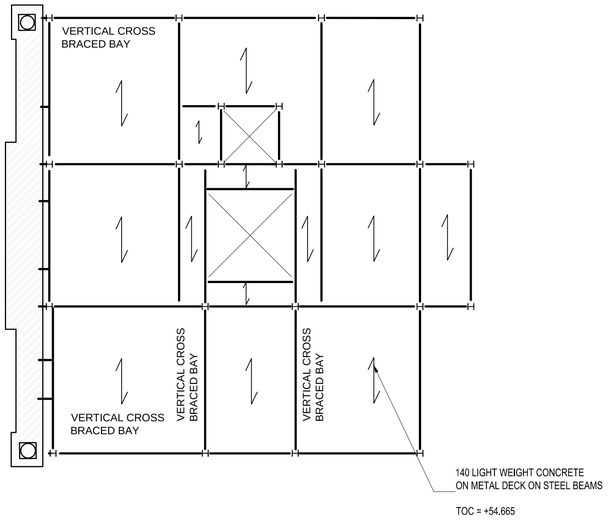
Phoenix Yard
69 Kings Cross Road
LONDON WC1X 9LL

t: 020 7239 4950
f: 020 7239 4951
e: info@edgestructures.com

| JOB NUMBER | DRAWING NUMBER | REVISION |
|---|---|---|
| 1147 | 100 | P3 |




SECOND FLOOR
SCALE 1:100




ROOF
SCALE 1:100

NOTES:

DRAWING TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS AND SERVICES ENGINEERS' DRAWINGS, AND ALL OTHER RELEVANT INFORMATION.

ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF EDGE STRUCTURES LTD.

DO NOT SCALE FROM THE DRAWING, USE FIGURED DIMENSIONS ONLY.

THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK OR PREPARING ANY SHOP DRAWINGS.
WORK AND MATERIALS TO BE IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS AND BRITISH STANDARDS.



THIS DRAWING IS BASED ON INFORMATION PROVIDED BY BB PARTNERSHIP ARCHITECTS.

p:\1147 46 avenue road, nw8\5.0Z drawings & issues sheets\edge\working drawings

| REV | DESCRIPTION | | | | |
|---|---|---|---|---|---|
| P2 | REVISED SCHEME | DF | TB | TB | 08.03.17 |
| P1 | FIRST ISSUE: PRELIMINARY | DF | SP | TB | 03.03.17 |

| DRAWN BY | CHECKED BY | APPROVED BY | DATE |
|---|---|---|---|
| SP | | | MAY 2014 |

SCALES @ A1 1:100
SCALES @ A3 1:200

ISSUING OFFICE LONDON

FILE 99-203 Single Basement (AOD).dwg

RESTRICTIONS
PRELIMINARY

PROJECT
46 AVENUE ROAD
LONDON NW8
REFURB & BASEMENT WORKS:

TITLE
STRUCTURAL PROPOSALS
SECOND FLOOR

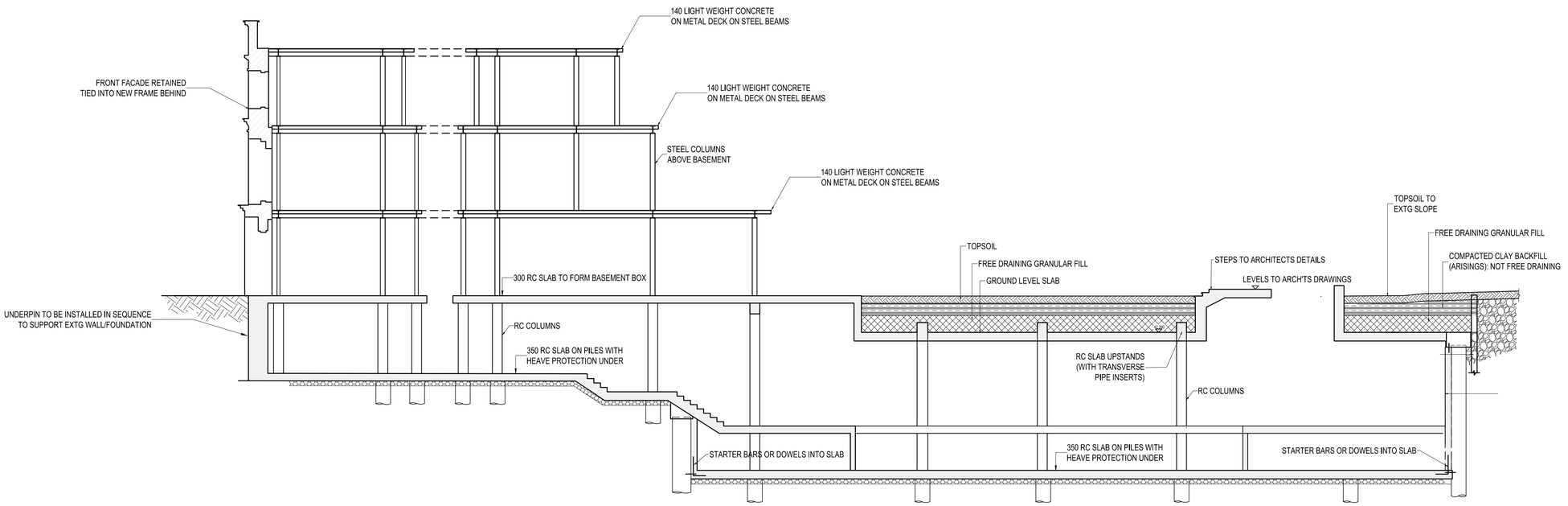
edge structures

edge structures ltd
London ● Leeds

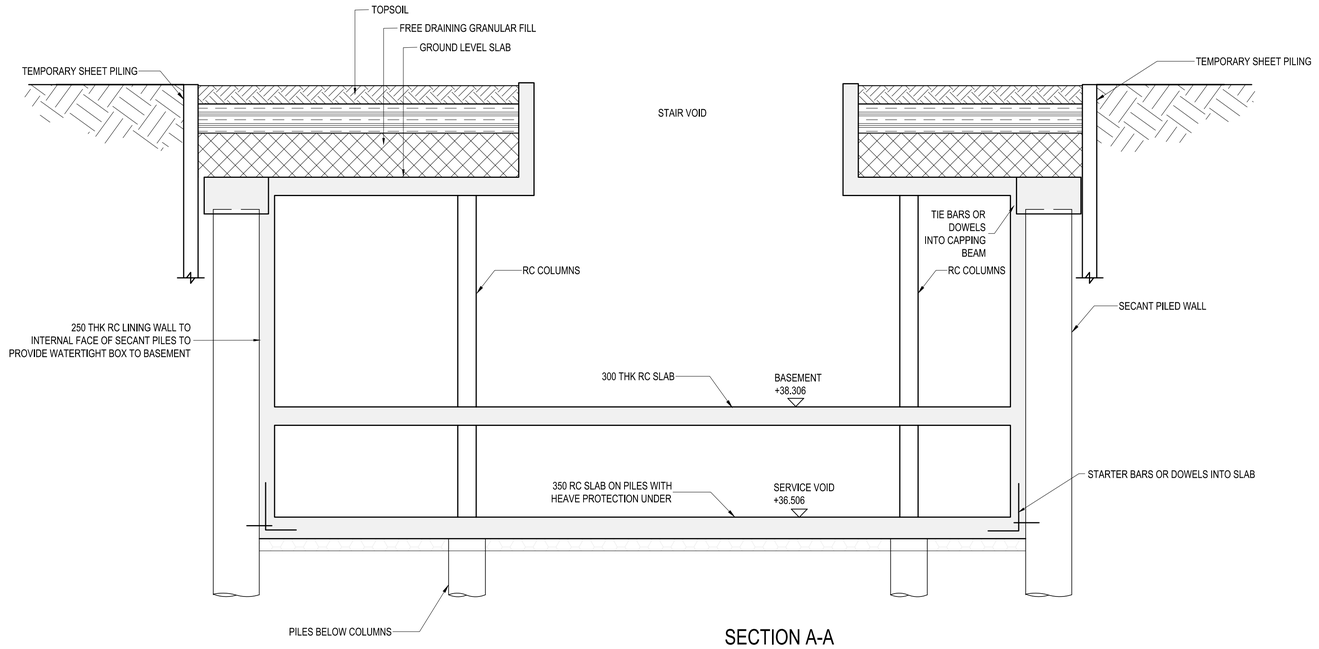
Phoenix Yard
69 Kings Cross Road
LONDON WC1X 9LL

t: 020 7239 4950
f: 020 7239 4951
e: info@edgestructures.com

| JOB NUMBER | DRAWING NUMBER | REVISION |
|---|---|---|
| 1147 | 102 | P2 |




SECTION B-B
SCALE 1:100




SECTION A-A
SCALE 1:50

NOTES:

DRAWING TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS AND SERVICES ENGINEERS' DRAWINGS, AND ALL OTHER RELEVANT INFORMATION.

ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF EDGE STRUCTURES LTD.

DO NOT SCALE FROM THE DRAWING, USE FIGURED DIMENSIONS ONLY.

THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK OR PREPARING ANY SHOP DRAWINGS.
WORK AND MATERIALS TO BE IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS AND BRITISH STANDARDS.



THIS DRAWING IS BASED ON INFORMATION PROVIDED BY
BB PARTNERSHIP ARCHITECTS.



| REV | DESCRIPTION | DR | CH | APP | DATE |
|---|---|---|---|---|---|
| P3 | REVISED SCHEME | DF | TB | TB | 08.03.17 |
| P2 | REVISED SCHEME | DF | SP | TB | 03.03.17 |
| P1 | FIRST ISSUE: PRELIMINARY | SP | | | 29.05.14 |

| DRAWN BY | CHECKED BY | APPROVED BY | DATE |
|---|---|---|---|
| SP | | | MAY 2014 |

SCALES @ A1 1:100
SCALES @ A3 1:200

ISSUING OFFICE LONDON

FILE 99-203 Single Basement (AOD).dwg

RESTRICTIONS
PRELIMINARY

PROJECT
46 AVENUE ROAD
LONDON NW8
REFURB & BASEMENT WORKS:

TITLE
STRUCTURAL PROPOSALS
SECTIONS A AND B

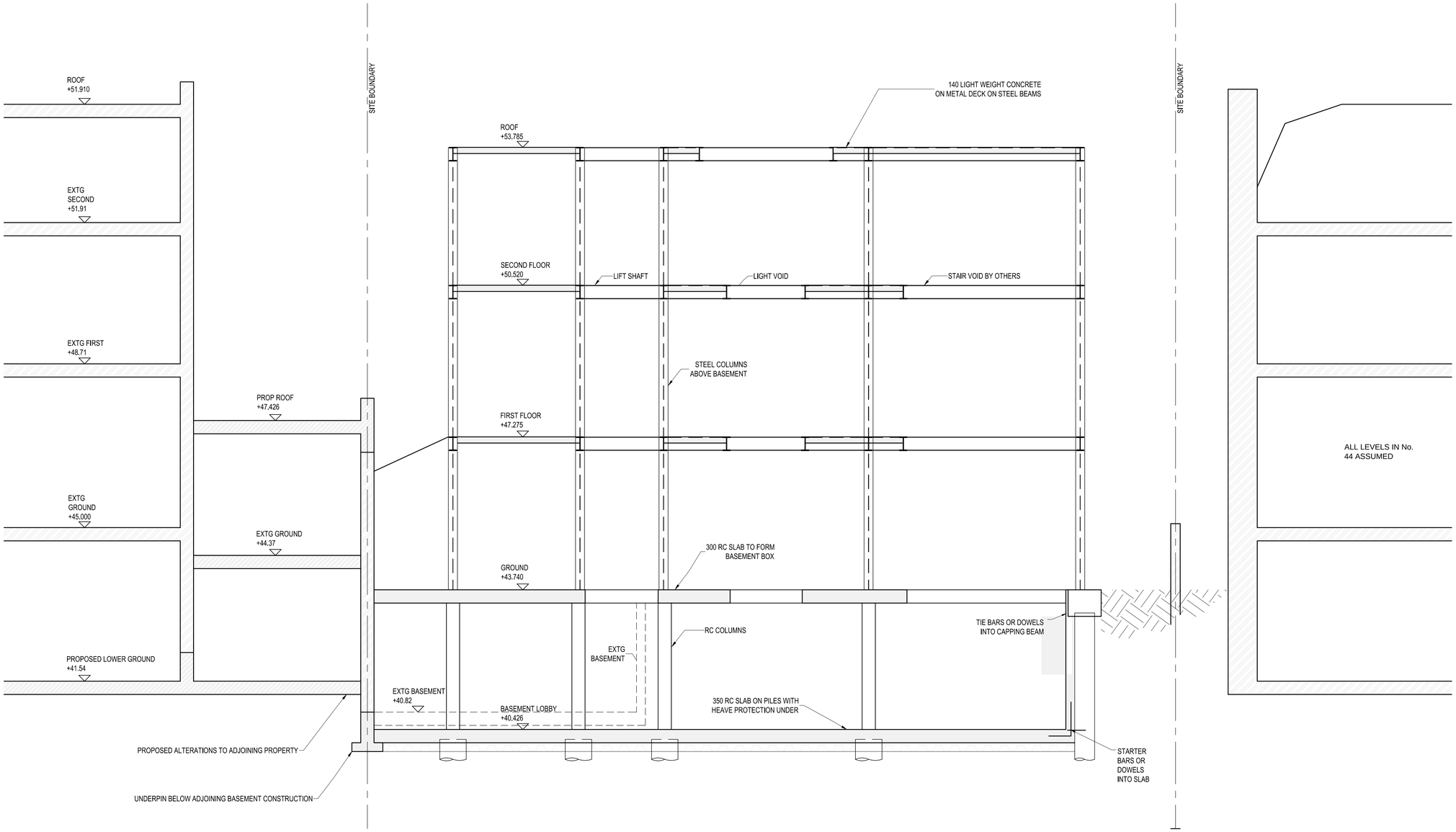
edge structures

edge structures ltd
London ● Leeds

Phoenix Yard
69 Kings Cross Road
LONDON WC1X 9LL

t: 020 7239 4950
f: 020 7239 4951
e: info@edgestructures.com

| JOB NUMBER | DRAWING NUMBER | REVISION |
|---|---|---|
| 1147 | 201 | P3 |




EXISTING ADJOINING STRUCTURE

PROPOSED ADJOINING STRUCTURE

HEAVE PROTECTION

## SECTION D-D
SCALE 1:50

NOTES:

DRAWING TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS AND SERVICES ENGINEERS' DRAWINGS, AND ALL OTHER RELEVANT INFORMATION.

ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF EDGE STRUCTURES LTD.

DO NOT SCALE FROM THE DRAWING, USE FIGURED DIMENSIONS ONLY.

THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK OR PREPARING ANY SHOP DRAWINGS.
WORK AND MATERIALS TO BE IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS AND BRITISH STANDARDS.



THIS DRAWING IS BASED ON INFORMATION PROVIDED BY BB PARTNERSHIP ARCHITECTS.

p:\1147 46 avenue road, nw8\5.02 drawings & issue sheets\edge\working drawings

| REV | DESCRIPTION | DR | CH | APP | DATE |
|---|---|---|---|---|---|
| P1 | FIRST ISSUE: PRELIMINARY | DF | TB | TB | 08.03.2017 |

| DRAWN BY | CHECKED BY | APPROVED BY | DATE |
|---|---|---|---|
| DF | | | MARCH 2017 |

SCALES @ A1 1:50
SCALES @ A3 1:100

ISSUING OFFICE LONDON

FILE 99-203 Single Basement (AOD).dwg

RESTRICTIONS
PRELIMINARY

PROJECT
46 AVENUE ROAD
LONDON NW8
REFURB & BASEMENT WORKS:

TITLE
STRUCTURAL PROPOSALS
SECTIONS 2 OF 2

edge structures

edge structures ltd
London ● Leeds
Phoenix Yard
69 Kings Cross Road
LONDON WC1X 9LL
t: 020 7239 4950
f: 020 7239 4951
e: info@edgestructures.com

| JOB NUMBER | DRAWING NUMBER | REVISION |
|---|---|---|
| 1147 | 203 | P1 |