BASEMENT IMPACT ASSESSMENT

FOR

PROPOSED BASEMENT WORKS (OFFICE SCHEME)

AT

75 BAYHAM STREET
LONDON
NW1 0AA

FOR

W12 STUDIOS

Project No. P3096-OFF

ISSUE 2.1 – REVISED SCHEME

Michael Alexander Consulting Engineers, Foundation House, 4 Percy Road, London
E–mail mail@maengineers.com
Tel 020 8445 9115

DOCUMENT CONTROL SHEET

	75 Bayham Street, London NW1 0AA	Project No.	P3096-OFF
Prepared By:	Giovanni Sclavi BEng MSc(Hons) GIPENZ		
Reviewed By:	Isaac Hudson MEng MA(Cantab.) CEng MIStructE Director		
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APPENDICES

1.00 INTRODUCTION

1.01 Michael Alexander Consulting Engineers has been appointed to prepare a Basement Impact Assessment Report to support the Planning Application for the proposed new building (including a basement) at 75 Bayham Street, London NW1 0AA.

1.02 This document has been prepared by Giovanni Sclavi BEng MSc(Hons) GIPENZ and reviewed by Isaac Hudson MEng MA (Cantab) CEng MIStructE who is a chartered structural engineer. The document has been reviewed by Seamus Lefroy-Brooks of LBH Wembley, a chartered geologist.

1.03 The existing property is currently occupied by offices to the upper floors and with a warehouse to the rear. The three storey building was built circa 1880.

1.04 The existing property is located within the Camden Town Conservation Area, but is not Listed.

1.05 The site is bounded by Bayham Street to the front (east), 77 Bayham Street and unit 1, 6a Pratt Street to the right (north) and 69, 71 and 73 Bayham Street to the left (south). To the rear of the property (west) the site is bounded by 1 and 2 Pratt Mews.

1.06 The proposed works are for the renovation, re-modelling and extension of the buildings on the site, to create offices varying in height from two to four storeys above ground. The proposed building will have a single storey basement below. This document addresses the specific issues relating to the basement construction, as described in Camden Planning Guidance CPG4 (2015 Revision).

2.00 BASEMENT PROPOSALS

2.01 The architectural proposal for the basement is shown on the following Innes Associates Architecture & Urban Design drawings.

107 02 001	Basement Floor Plan
107 02 00	Ground Floor Plan
107 02 01	Lower First Floor Plan
107 02 02	First Floor Plan
107 02 03	Second Floor Plan
107 02 RF	Roof Plan
107 03 01	Section AA
107 03 02	Section BB
107 03 03	Section CC
107 03 04	Section DD
107 03 05	Section EE
107 03 06	Section FF
107 04 01	East Elevation
107 04 02	West Elevation
107 04 03	South Elevation

2.01a The structural proposal for the new building and basement have been developed by Momentum Structural Engineers and used as basis for our Basement Impact Assessment drawings as shown in Appendix D.

2.02 The details of the existing structure and site boundaries will be subject to detailed exploratory work prior to and during the works on-site.

2.03 The design and construction of the building structure shall be in accordance with current Building Regulations, British Standards, Codes of Practice, Health and Safety requirements and good building practice.

2.04 The details of the existing building are shown on the following Jack Woolley Architects drawings.

1030_01_P1	Location Plan
1030_02_P1	Roof Plan (existing)
1030_03_P1	East Elevation (existing)
1030_04_P1	West Elevation (existing)
1030_05_P1	Section AA (existing)
1030_06_P1	Section BB (existing)
1030_07_P1	Section CC (existing)
1030_08_P1	Section DD (existing)
1030_09_P1	Ground Floor Plan (existing)
1030_10_P1	First Floor Plan (existing)
1030_11_P1	Second Floor Plan (existing)

2.05 The proposed underpinning sequence and temporary propping arrangement are shown on the following Momentum Structural Engineers drawings (attached to Appendix D).

2631_200_5	Basement Level GA
2631_205_0	Basement Level Temporary Propping Plan

3.00 SUBTERRANEAN (GROUND WATER) FLOW

3.01 Stage 1: Screening

The impact of the proposed development on ground water flows is considered here as outlined in Camden Planning Guidance CPG 4 (2015 Revision). The references are to the screening chart Figure 1 in CPG4.

3.01.1 GW Q1a *Is the site located directly above an aquifer?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study (Figure (a)) the site is not above an aquifer.

3.01.2 GW Q1b *Will the proposed basement extend beneath the water table surface?*

No. Near-surface groundwater table was not found at the time of site investigations as stated on LBH Wembley report LBH4318 Ver 2.0. No groundwater is expected within the impermeable London Clay.

3.01.3 GW Q2 *Is the site within 100m of (i) a watercourse, (ii) a well (used or disused) or (iii) a potential spring line?*

With reference to the Camden Geological, Hydrogeological and Hydrological Study (Figures (b), (c) and (d)),

(i) The nearest surface water feature is the Grand Union Canal, located, approximately 420m to the North of the site.

The Hampstead pond chains are located to the North West approximately 2900m from the site.
The nearest 'lost' watercourse is the River Fleet which ran approximately 390m to the east of the site.

(ii) From the British Geological Society 'Geoindex' the nearest water wells are on Pratt Street (approximately 390m to the East of the site) and on Camden Street (approximately 460m to the North of the site).

(iii) The local geology suggests that the site is not located adjacent to a potential spring line.

3.01.4 GW Q3 *Is the site within the catchment of the pond chains of Hampstead Heath?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study, the site is not within the catchment of the pond chains on Hampstead, nor the Golder's Hill Chain.

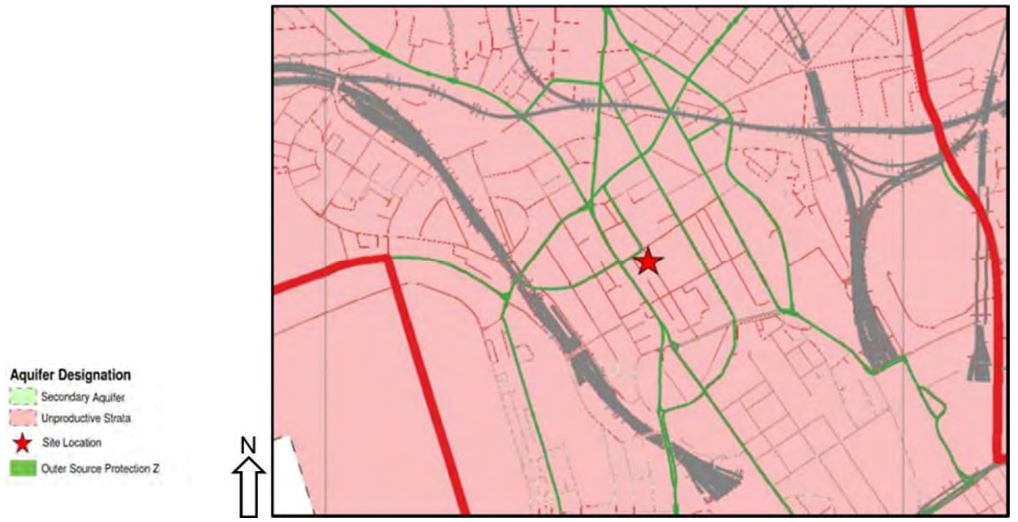


Figure (a)
Aquifer Designation Map
(Extract from Fig 8 of Camden Geological, Hydrogeological and Hydrological Study)

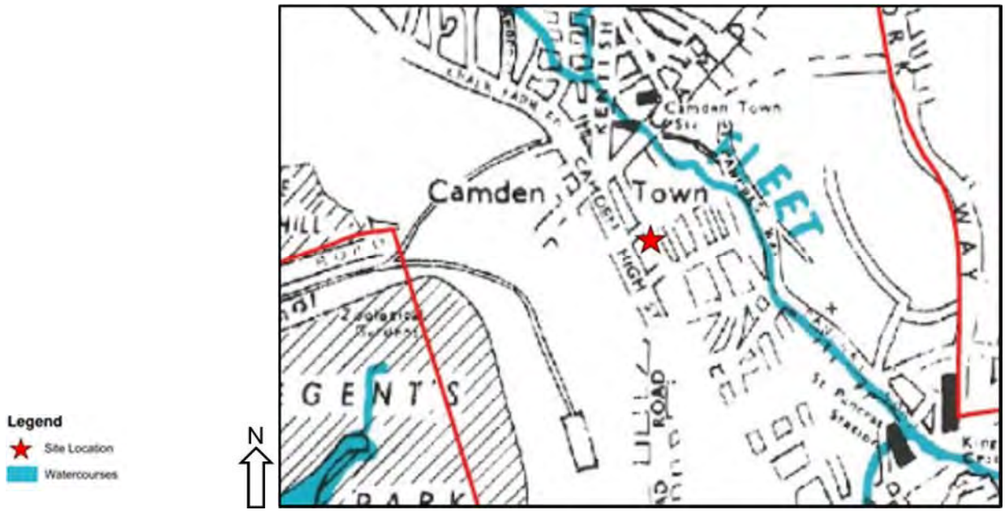


Figure (b)
Watercourses
(Extract from Fig 11 of Camden Geological, Hydrogeological and Hydrological Study -Lost Rivers of London by Barton)

3.01.5 GW Q4 *Will the proposed basement development result in a change in the proportion of hard surface/paved areas?*

No. The site is currently fully occupied by buildings. In the proposed condition this will be generally be the case.

3.01.6 GW Q5 *As part of the site drainage, will more surface water (e.g. rainfall and-runoff) than at present be discharged to the ground (e.g. via soakaways and /or SUDS)?*

No. Currently no surface water from the site is discharged to the ground, and this will also be true after the proposed works.

3.01.7 GW Q6 *Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond (not just the pond chains on Hampstead Heath) or spring line?*

No. The nearest ponds in the Hampstead Chain are not in close proximity to the site, nor is the site located adjacent to a spring line.

3.01.8 On the basis of items 3.01.1 to 3.01.7 above, and in reference to Figure 1 of CPG4, no aspects need to be carried forward to the scoping stage.

3.02 Stage 2: Scoping

3.02.1 No scoping is required as site investigations have been carried out on site by LBH Wembley in October 2015. Refer to their report LBH4318 Ver 2.0 of January 2017.

Figure (c)
Surface Water Features
(Extract from Fig 12 of Camden Geological, Hydrogeological and Hydrological Study)

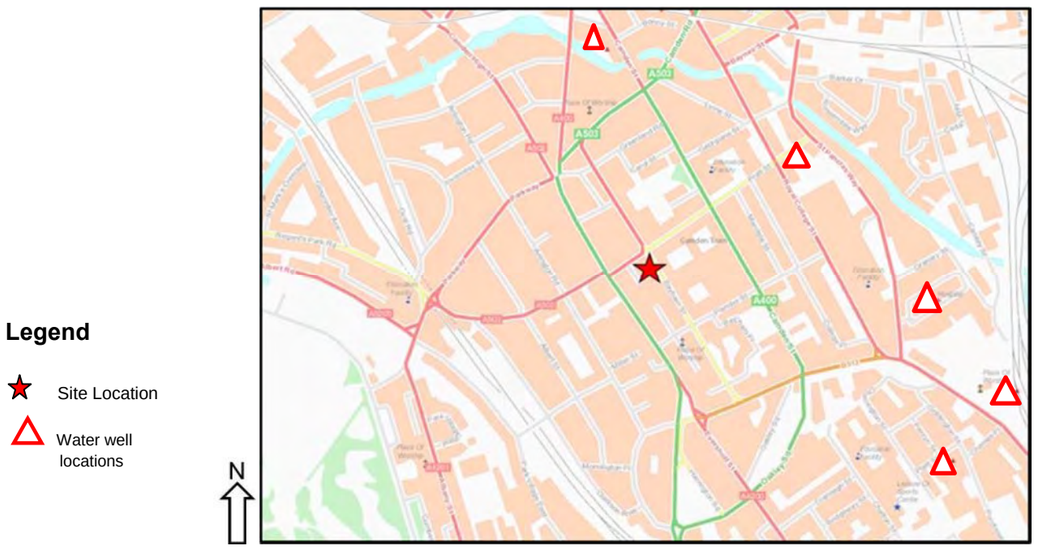


Figure (d)
Waterwells (also showing Infrastructure)
(Extract from British Geological Survey)

3.03 Stage 3: Site Investigation and Study

3.03.1 A site investigation was carried out by LBH Wembley in October 2015 which included trial pits and window sampling. Refer to their report LBH4318 Ver 2.0 of January 2017.

3.03.2 No groundwater was encountered during the investigations.

3.04 Stage 4: Impact Assessment

3.04.1 A hydrogeological assessment has been carried out by a chartered geologist and is included in section 5 of LBH Wembley's report. In summary it notes that no potential subterranean (groundwater) flow impacts associated with the construction of the proposed development have been identified.

3.04.2 It is however possible that perched water could be encountered during the excavation, at the interface of the made ground and the London Clay. Provision for this will need to be reflected in the proposed construction method – refer Appendix E.

4.00 **GROUND STABILITY**

4.01 **Stage 1: Screening**

4.01.1 GS Q1 *Does the existing site include slopes, natural or manmade, greater than 7˚?*

No. The site is generally level, with a slight slope from north to south and east to west. There are no slopes >7 degrees within the site.

4.01.2 GS Q2 *Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7˚?*

No. The basement construction will not change the profile of the ground at the boundaries of the property.

4.01.3 GS Q3 *Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7˚?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study, (refer Figure (f)), the neighbouring areas also have slopes less than 7 degrees.

4.01.4 GS Q4 *Is the site within a wider hillside setting in which the general slope is greater than 7˚?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study, (refer Figure (f)), the closest slopes that are greater than 7 degrees are located approximately 340m to the West.

4.01.5 GS Q5 *Is the London Clay the shallowest strata at the site?*

Yes. With reference to Camden Geological, Hydrogeological and Hydrological Study, the underlying soil stratum is indicated as being the London Clay (Figure (e)).

4.01.6 GS Q6 *Will any trees be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?*

No. There are no trees within the site boundary.

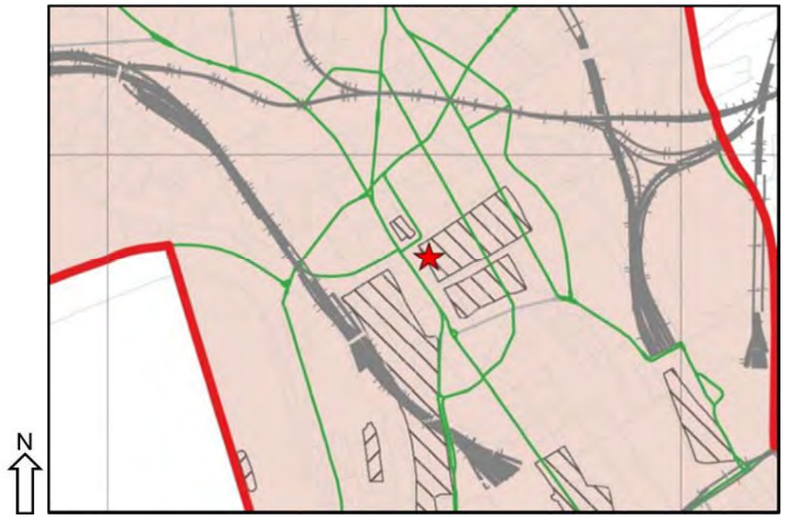


Figure (e)
Geological Map
(Extract from Fig 4 of Camden Geological, Hydrogeological and Hydrological Study)

Figure (f)
Slope Angle Map
(Extract from Fig 16 of Camden Geological, Hydrogeological and Hydrological Study)

4.01.7 GS Q7 *Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?*

The London Clay strata is usually classified as having a high volume change potential and hence can lead to seasonal shrink-swell subsidence where buildings are founded in desiccated soils. We have however no specific evidence of subsidence having been experienced on site or in the immediate surrounding area.

4.01.8 GS Q8 *Is the site within 100m of a water course or a potential spring line?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study (refer Figures (b) and (c)), the site is located 390 metres from the subterranean River Fleet.

4.01.9 GS Q9 *Is the site within an area of previously worked ground?*

Yes. Geological maps show an area of worked ground on the other side of Bayham St. With reference to the Camden Geological, Hydrogeological and Hydrological Study (figure (e)).

4.01.10 GS Q10 *Is the site within an aquifer?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study (Figure (a)) the site is not above an aquifer.

4.01.11 GS Q11 *Is the site within 50m of the Hampstead Heath ponds?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study, the Hampstead pond chains are located to the North West approximately 2900m from the site.

4.01.12 GS Q12 *Is the site within 5m of a highway or pedestrian right of way?*

Yes. The proposed basement will be less than 5m from the public highway.

4.01.13 GS Q13 *Will the proposed basement significantly increase the differential depth of foundations relative to neighboring properties?*

Yes. It appears that no 73 Bayham Street has a lower ground floor approximately 1.4m below street level. With reference to survey drawings, we understand that the Pratt Mews properties do not have basements. It is not clear whether any of the other adjoining properties have basements. However in any event the proposed foundations will be deeper than those of the adjoining properties.

Legend

★ Site Location

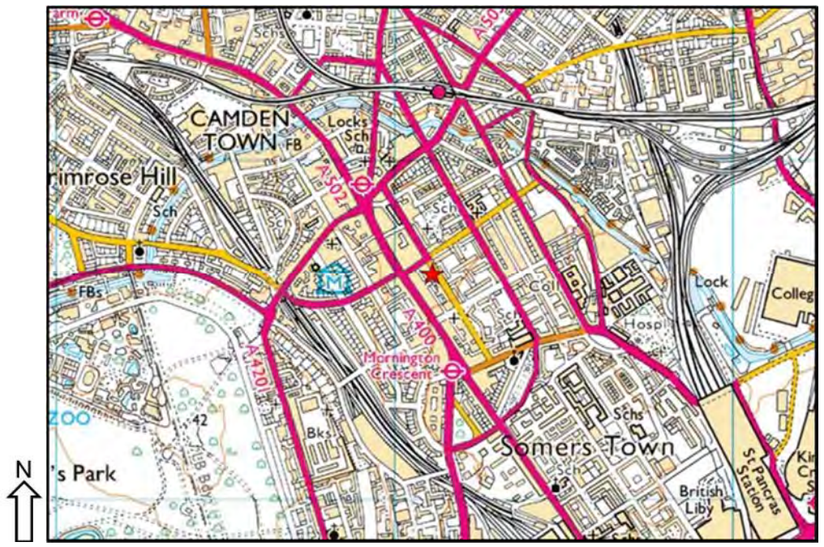


Figure (g)
Topography Map
(Extract from Ordnance Survey Mapping)

Figure (h)
1873 Map

4.01.14 GS Q14 *Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?*

No. With reference to Open Street Map (figure (i)) there are no tunnels located below the site. The nearest tunnel is the Northern Line located approximately 70m to the west of the site. The safeguarded zone for the proposed HS2 railway is approximately 350m to the south west of the site – refer figure (k).

4.01.15 On the basis of items 4.01.01 to 4.01.14 above and in reference to Figure 2 of CPG4, the aspects that should be carried forward to a scoping stage in respect of land stability are:

- The increase in differential foundation depths.
- The basement being within 5m of a pedestrian highway.
- The site being underlain by London Clay.
- The potential for being in an area of worked ground

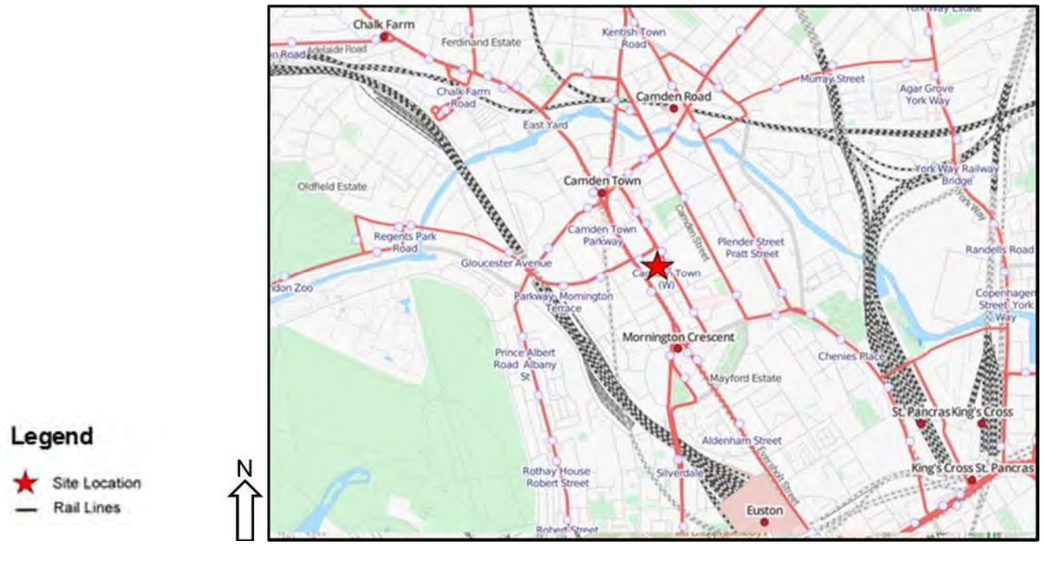


Figure (i)
Map of Underground Infrastructure
(Extract from Open Street Map)

4.02 Stage 2: Scoping

4.02.1 With reference to the Camden Geological, Hydrogeological and Hydrological study Appendix F3, the potential impacts which will need to be considered will include:-

- The risk of potential seasonal shrink-swell subsidence due to the underlying subsoils being London Clay.
- The risk of structural damage to the adjoining properties during and following the basement construction.
- The risk of damage to the road or pavement, or any underground services buried under.
- Whether there are areas of extensive backfill across the site which might lead to ground instability

4.02.2 In response to the above issues: -

- Trial pits were commissioned to the party walls.
- An outline construction method statement was prepared.

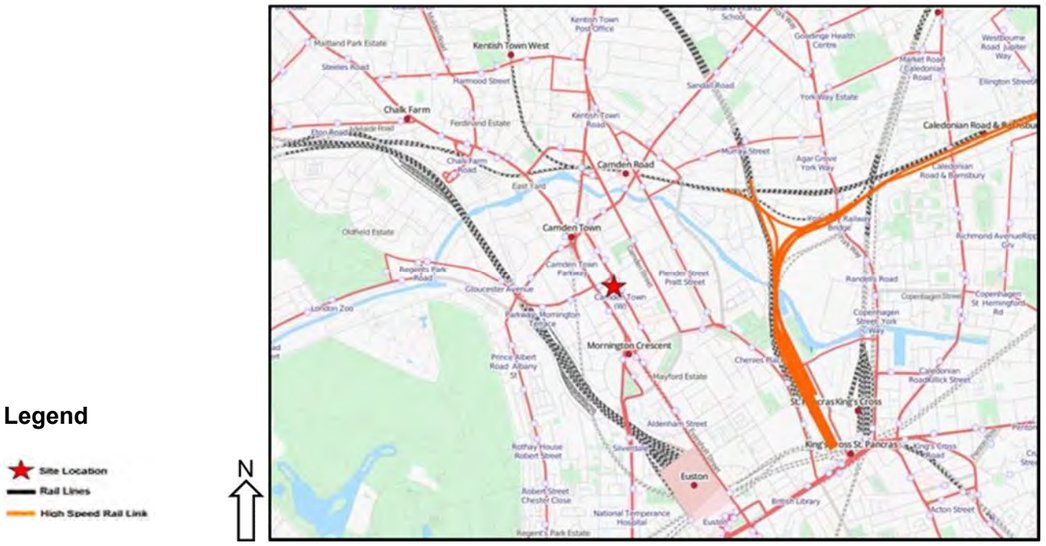


Figure (j)
High Speed Rail Link
(Extract from Open Street Map)

4.03 **Stage 3: Site Investigation and Study**

4.03.1 The LBH Wembley Site Investigation of October is summarised in their report LBH4318 Ver 2.0 dated January 2017. In summary of the findings: -

- A varying thickness of made ground was encountered over London Clay to the full depth of the investigation.
- The made ground was deepest adjacent to the Bayham Street elevation, considered likely to be due to a former basement. Otherwise no significant areas of backfill were encountered
- The clay subsoils were found to have high plasticity.
- Existing foundations were conventional brick spread footings.
- Ground water was not encountered during the investigations

4.04 **Stage 4: Impact Assessment**

4.04.1 The proposed basement is around 4.25m deep and will be excavated through the made ground and then the well understood London Clay stratum. Provided appropriate construction methods are employed there should be no significant impact in terms of ground stability.

4.04.2 The new basement will be constructed by underpinning the existing party walls. This is a well-established method and used successfully on numerous single storey basements within the London Clay.

4.04.3 To the front elevation of the building the existing walls will be also underpinned. A reinforced concrete liner wall will be used in board of the underpinning which will span laterally between adjoining supports. Additional temporary propping will be provided to minimise any local ground movements which might affect services in the pavement. The services in the pavement will be scanned and marked prior to the commencement of the works. Further trial pits to the walls adjacent to the street will be carried out in advance of the works to confirm that these have similar depth and profile to the adjoining walls.

4.04.4 The unloading of the ground due to the basement excavation may cause some heave of the underlying clay subsoils in both short and long term. To a certain extent, heave forces acting on the basement under the building will be counteracted by the weight of the building over. This is considered in more detail in LBH's report within the ground movement assessment, which shows that short term heave movements to the centre of the site will be up to 15mm, with smaller predicted movements for the party walls and beyond.

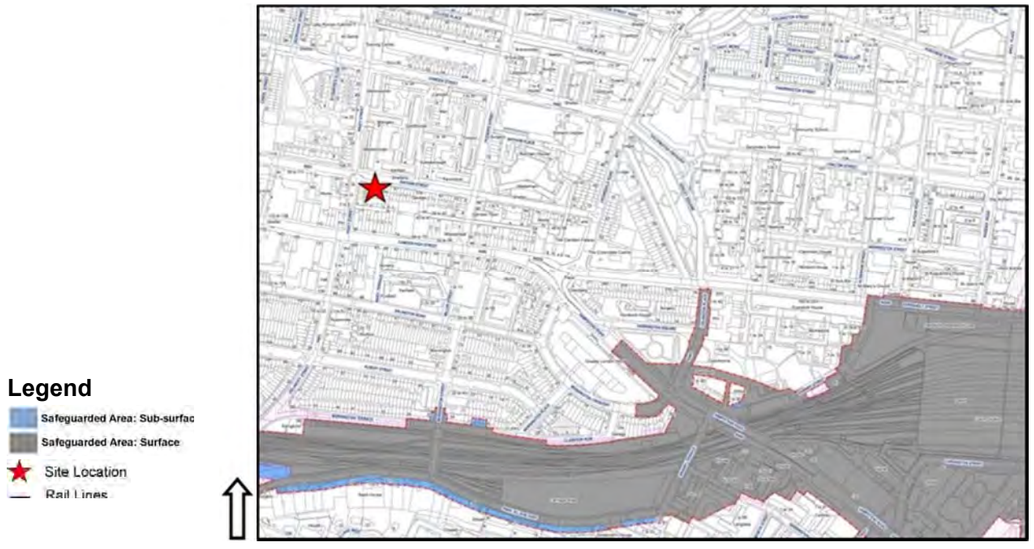


Figure (k)
High Speed Rail Safeguarding Map
(Extract from gov.uk)

To mitigate the effect of heave on the building, the 'hybrid' approach as set out in the LBH report will be adopted:-

- The underpinning will be constructed with an enlarged toe. The heave pressures acting on this toe will be resisted by the weight of the building above.
- The main part of the basement will be constructed with a suspended slab laid on a layer of compressible material to allow the heave to occur.

The suspended slab will span across the building on top of the toes of the underpinning.

4.04.5 The new basement will not suffer from seasonal shrink swell subsidence as the depth of the proposed basement will be below the level of any tree root activity. The nearest trees are within Bayham St, and there is no reason to suggest that the construction of the basement will cause adjoining properties to become more susceptible to subsidence, particularly since the adjoining buildings to Bayham Street have been shown to have deeper foundations due to their part basements.

Ground Movements

4.04.6a Consideration has been given as to the foundation and slab levels of the adjoining properties, as described in clause 4.01.13. Where the floor levels to adjoining properties are not known, this information will be requested through the party wall process prior to commencement of construction.

4.04.6 To assist in determining the impact of the proposals, LBH have carried out a Ground Movement Analysis and Damage Assessment - refer section 7 of their report.

4.04.7 The report notes that it is hard to accurately predict the ground movements associated with basements formed by underpinning. However they suggest that the damage to adjoining properties could be 'Category 1-Very Slight' or worst case 'Category 2 –Slight' as defined by Burland.

4.04.8 In section 7.4.1 of LBH's report, they set out the methods by which ground movements – and hence building damage – will be mitigated. This has been reflected in the structural proposals.

4.04.9 An outline construction method has been developed, which is included in Appendix D. This sets out the measures which will be taken to mitigate the impact of the works, with specific reference to avoiding any adverse impact on the pavement or buried services.

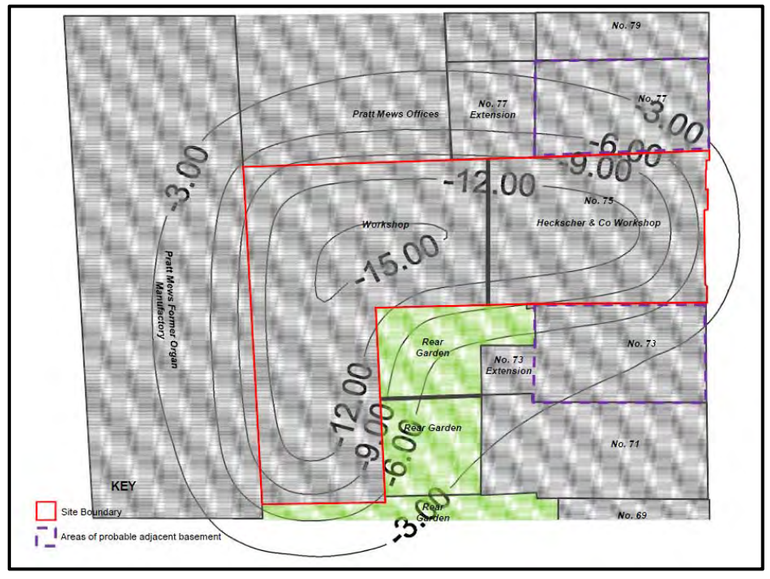


Figure (l)
Short Term Ground Movement Contours
(from LBH's ground movement assessment)

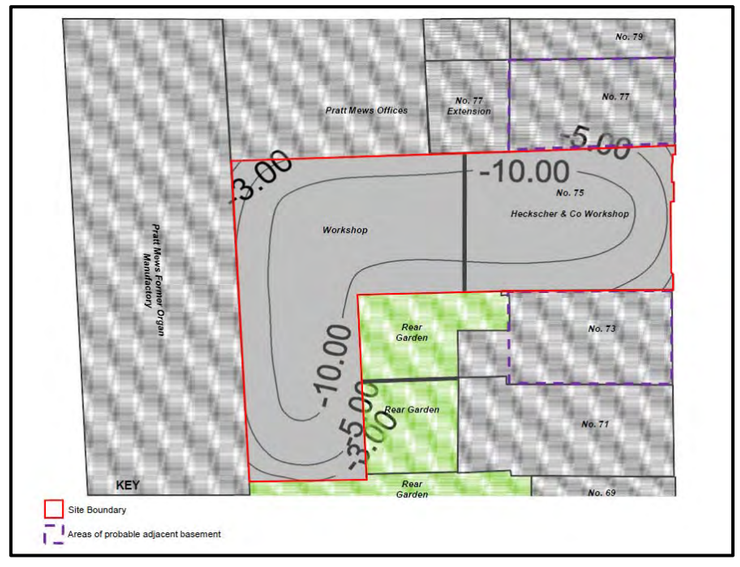


Figure (m)
Long Term Ground Movement Contours
(from LBH's ground movement assessment

Monitoring

4.04.10 Measurement monitoring of the temporary works, Party Walls and adjoining structures will be carried out during the construction period. The precise scope of monitoring will be prepared in conjunction with the advisors to the Adjoining Owners.

4.04.11 The ‘monitoring and contingency plan’ will include trigger values for vertical and horizontal movement and frequency of measurement. There will be an increased frequency of monitoring during the underpinning and excavation works to enable mitigation to be effectively implemented if trigger values are exceeded. If ‘Amber’ trigger values are exceeded then the monitoring frequency will be further increased and a detailed review of construction methods will be carried. If ‘Red’ trigger values are exceeded then all further excavation will be stopped, and the excavation made safe before a revised plan of works can be implemented.

4.04.12 The scope and locations of monitoring is described on Michael Alexander Engineers document ‘P3096 - Monitoring for 75 Bayham Street‘ which will be agreed with the neighbours through the party wall process.

Mitigation Measures

4.04.13 The entire construction philosophy includes several mitigation measures adopted to minimize the risk of damaging the adjoining properties.

4.04.14 The mitigation strategy comprises:

- Maximum 1.2m wide underpins will be installed in the typical sequence 1,4,2,5 and 3 to allow the brick above to ‘bridge’ over the opening. Refer to Momentum Structural Engineers drawing ‘2631_200 Basement Level GA’.
- It is assumed that two levels of underpinning will be required with the introduction one level of temporary propping to each stage. Refer to Momentum Structural Engineers drawing ‘2631_205 Basement Level Temporary Propping Plan’.
- If any unacceptable movement is detected along the party walls during the underpinning procedure the party wall will be isolated from the movement by installing a system of flat jacks in place of immediate dry packing.
- The underpins will be constructed with enlarged toes locally connected by foundation strips to provide the required propping action at the base of the excavation.
- The void left between the foundation strips will allow most of the heave during the construction process minimizing the pressures acting on the toe in temporary and permanent conditions.
- Precise monitoring of the target points will be carried out throughout the entire internal demolition and construction process; additional temporary propping will be installed if the readings will approach the ‘trigger levels’.

5.00 SURFACE FLOW AND FLOODING

5.01 Stage 1: Surface Flow and Flooding Screening

5.01.1 SF Q1 *Is the site within the catchment of the pond chains on Hampstead Heath?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study, the site is not within the catchment of the pond chains on Hampstead, nor the Golder's Hill Chain.

5.01.2 SF Q2 *As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?*

No. On completion of the development, the surface water flow and the over ground structure drainage will be routed by gravity in the same way as the existing condition to the combined sewer in Bayham Street (Refer to Thames Water Asset Search in Appendix B). The underground drainage will instead be collected in to sump pits and then pumped to the combined public sewer.

5.01.2a The new green roof on rear wing of the building, the area now occupied by the warehouse, will attenuate the total rainwater flow reducing the overall peak run-off to the public combined sewer in Bayham Street.

5.01.3 SF Q3 *Will the proposed basement development result in a change in the proportion of hard surface/paved external areas?*

No. There will be no change in the proportion of hard landscaped areas. Refer figures A1 and A2 in Appendix A.

5.01.4 SF Q4 *Will the proposed basement result in changes to the profile of inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?*

No. There will be no change in the areas of hard landscaping.

5.01.5 SF Q5 *Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream water courses?*

No. The surface water quality will not be affected by the development, as in the permanent condition collected surface water will be generally be from roofs, or external hard landscaping as existing.

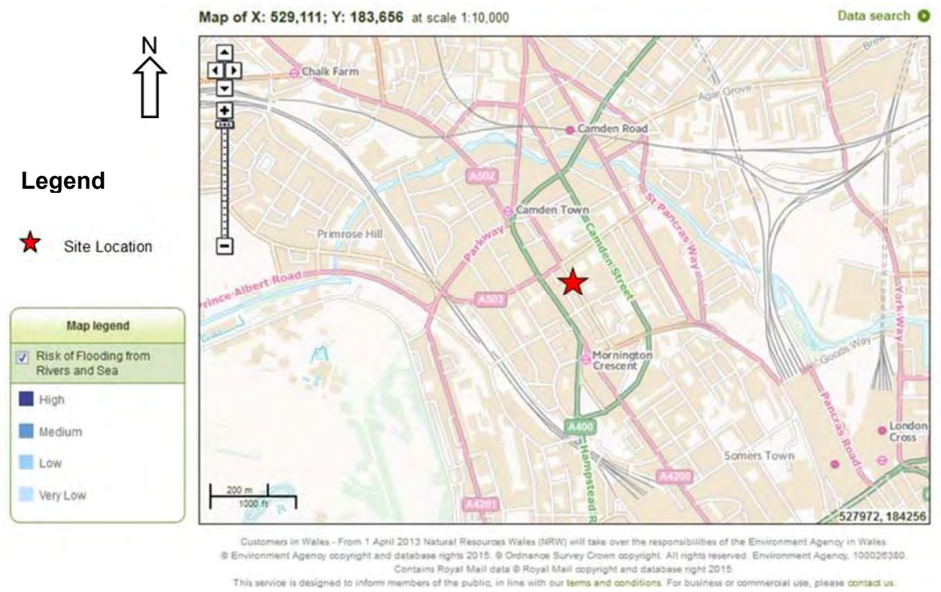


Figure (n)
Areas at Risk of Flooding from Rivers or Sea
(Extract from Environment Agency flood map)

Figure (o)
Areas at Risk of Flooding from Reservoirs
(Extract from Environment Agency flood map)

5.01.6 On the basis of items 5.01.1 to 5.01.5 above and in accordance with the Figure 3 in Camden Planning Guidance CPG 4 (2015 Revision), there are no aspects that should be carried forward to a scoping stage in respect of Surface Flow and Flooding.

5.01.7 SF Q6 *Is the site in an area known to be at risk from surface water flooding, such as South Hampstead, West Hampstead, Gospel Oak and King's Cross, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?*

No. Bayham Street is not one of the streets noted within the Camden Planning Guidance CPG 4 (2015 Revision) as a street "at risk of surface water flooding" (Figure (p)).

A 'Sewer History' enquiry to Thames Water (Appendix A) gave no record of surcharge of sewers having previously affected this particular property.

With reference to the EA Rivers and Sea Flood Maps (Figure (n)), the site is not located within a flood risk zone. The EA Reservoir flood map (Refer figure (o)), shows that the site is not at risk of flooding from reservoirs.

With reference to the EA surface water flooding maps (Figure (q)) the site is at 'low risk' of flooding.

5.01.8 On the basis of the above and in accordance with the Figure 3 in Camden Planning Guidance CPG 4 (2015 Revision), a flood risk assessment in accordance with PPS25 is not required.

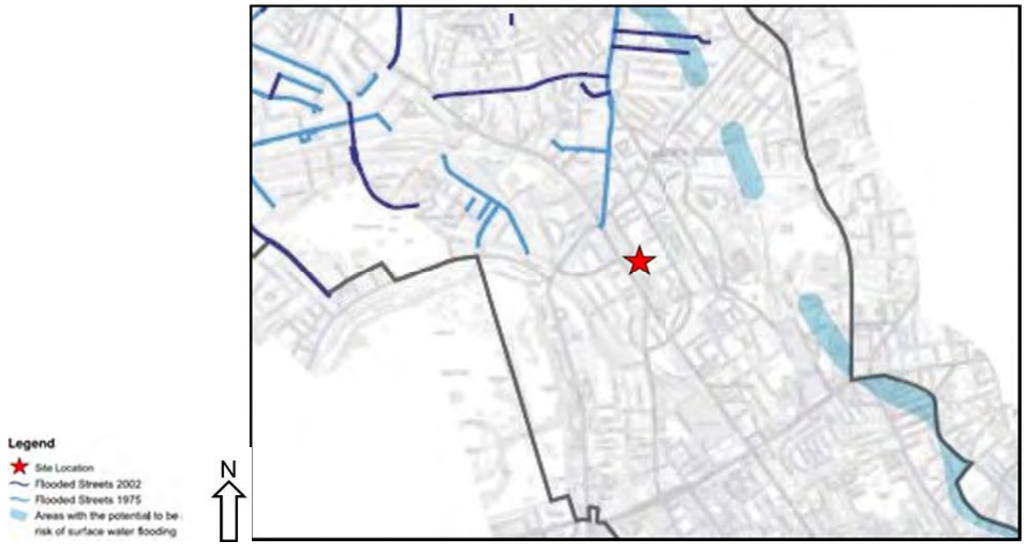


Figure (p)
Flood Map
(Extract from Fig 15 of Camden Geological, Hydrogeological and Hydrological Study)

Figure (q)
Flooding from Surface Water
(Extract from Environment Agency flood map)

APPENDIX A

IMPERMEABLE AREA PLANS

`

KEY

- Impermeable Area (building)
- Impermeable Area (external)
- Soft landscaping

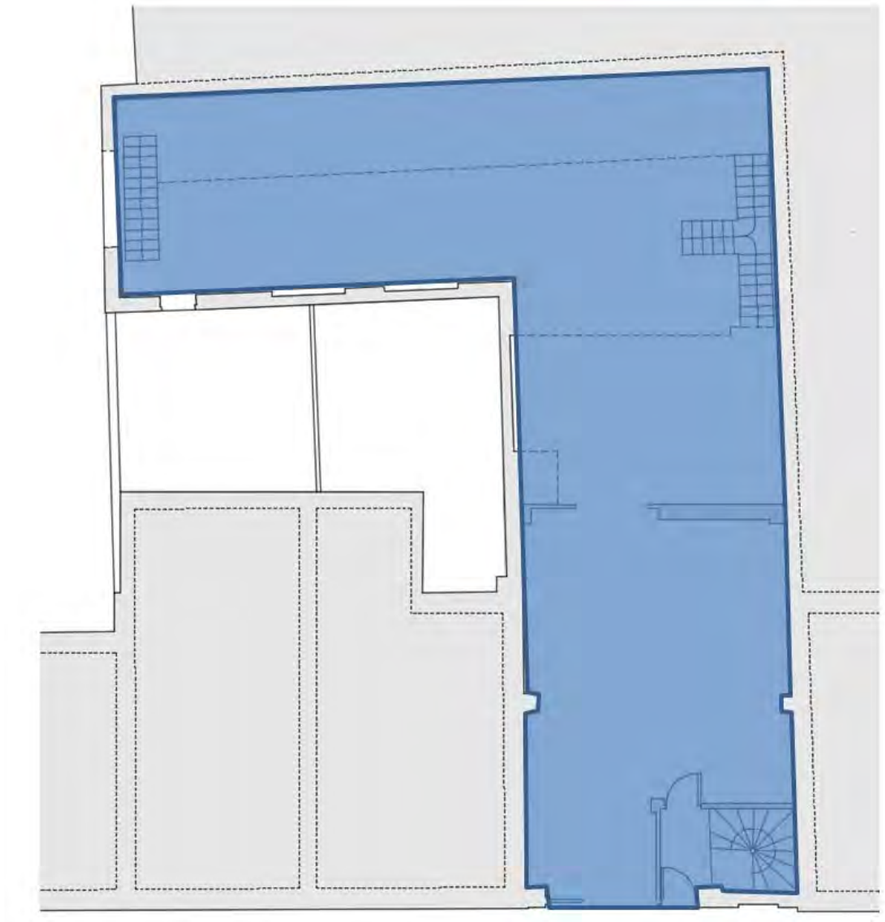


Figure A1 - Existing Impermeable Area Plan

KEY

- Impermeable Area (building)
- Impermeable Area (external)
- Soft landscaping
- Hard landscaping over proposed basement
- Soft landscaping over proposed basement

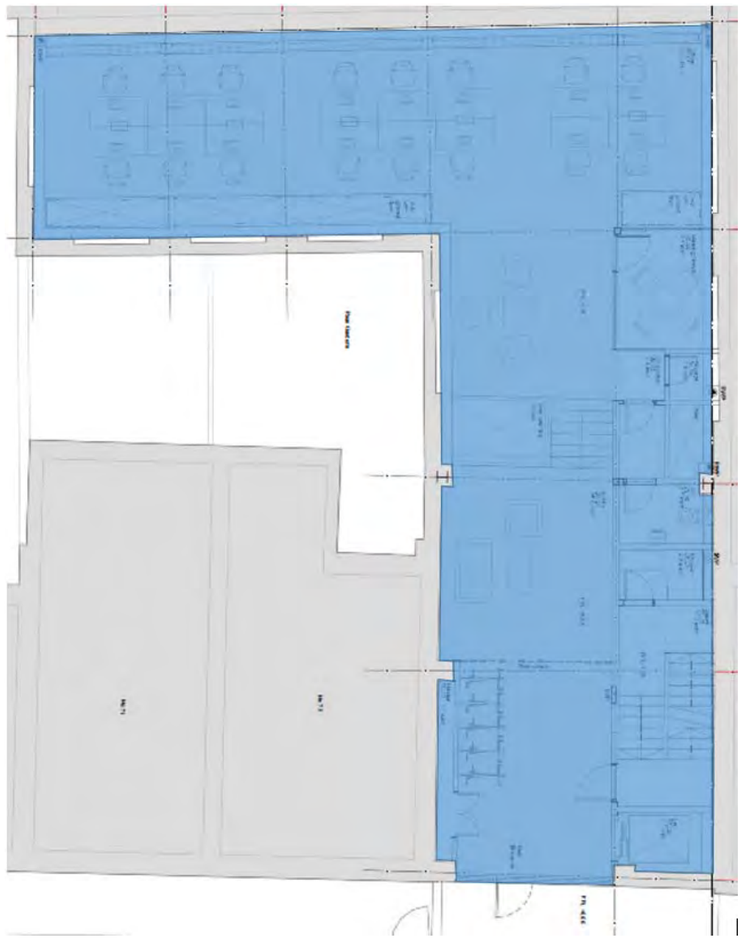


Figure A2 - Proposed Impermeable Area Plan

APPENDIX B

THAMES WATER RECORDS

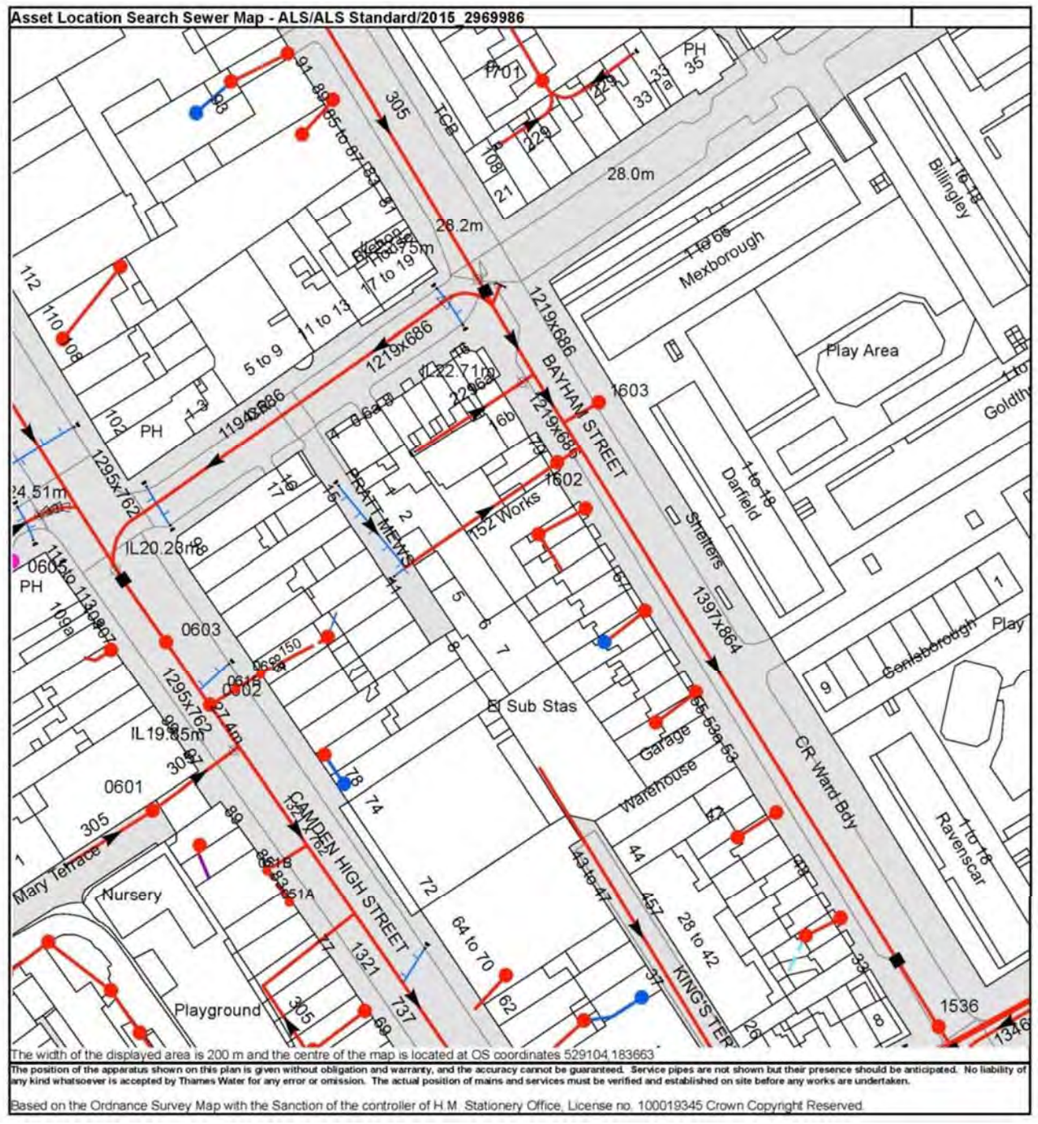


Figure B1 - Extract from Thames Water Asset Search showing a combined sewer

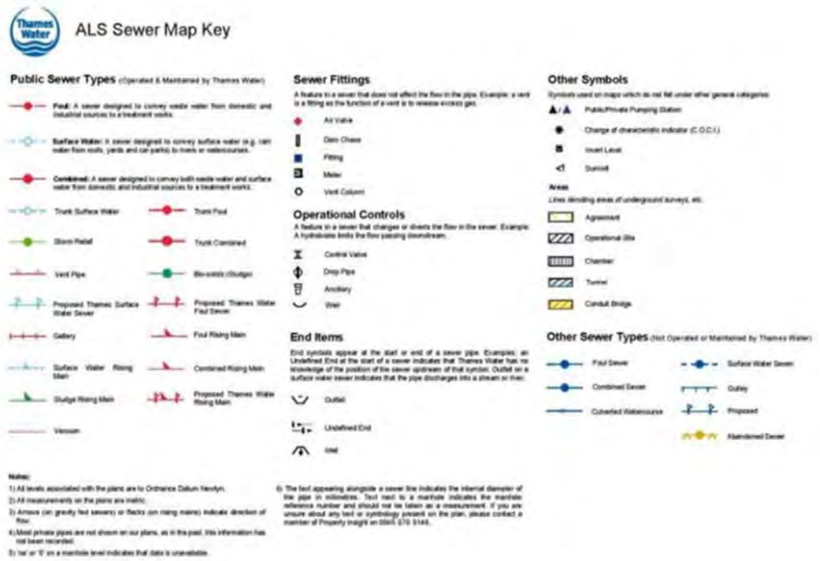


Figure B2 - Key to Thames Water Asset Search

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
16BI	n/a	n/a
16BJ	n/a	n/a
16BC	n/a	n/a
16BD	n/a	n/a
15GH	n/a	n/a
15GI	n/a	n/a
1536	n/a	n/a
06FF	n/a	n/a
16CD	n/a	n/a
16DB	n/a	n/a
16DC	n/a	n/a
1602	n/a	22.3
1603	n/a	n/a
07BH	n/a	n/a
07BI	n/a	n/a
07CC	n/a	n/a
1701	27.65	23.85
07CD	n/a	n/a
15FE	n/a	n/a
05DA	n/a	n/a
15FC	n/a	n/a
05CA	n/a	n/a
051A	n/a	n/a
051B	n/a	n/a
06FA	n/a	n/a
06EB	n/a	n/a
06EC	n/a	n/a
0602	n/a	n/a
061B	n/a	n/a
061A	n/a	n/a
16CB	n/a	n/a
05EG	n/a	n/a
05FI	n/a	n/a
05EF	n/a	n/a
0601	n/a	n/a
06HA	n/a	n/a
0603	n/a	n/a
0605	n/a	n/a
07BE	n/a	n/a
07AF	n/a	n/a
07CB	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Figure B3 - Manhole Invert and Cover Levels

Sewer Flooding
History Enquiry

Michael Alexander Consulting Engineers

Search address supplied	75 Bayham Street London NW1 0AA
Your reference	P3096 75 Bayham Street NW1
Our reference	SFH/SFH Standard/2015_2969985
Received date	**12 February 2015**
Search date	**12 February 2015**

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Sewer Flooding
History Enquiry

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- "At Risk" properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

APPENDIX C

PHOTOGRAPHS

Photograph 1

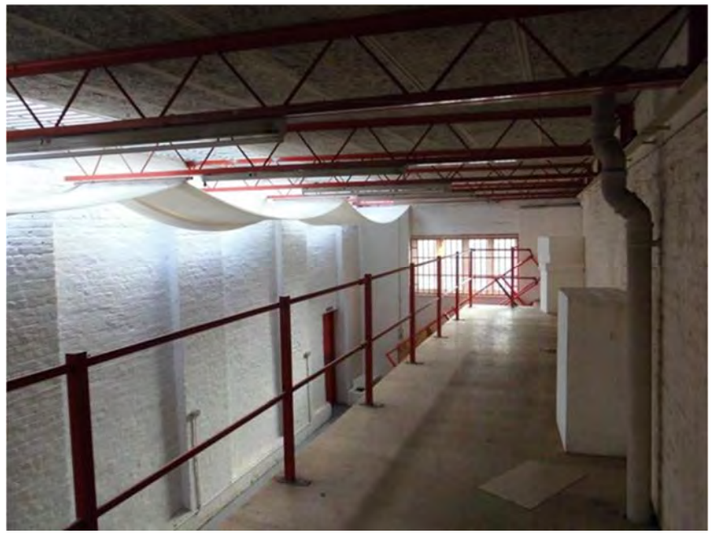
Photograph 2

Photograph 3

Photograph 4

Photograph 5- View of front of the building

Photograph 6 – View of front of the building

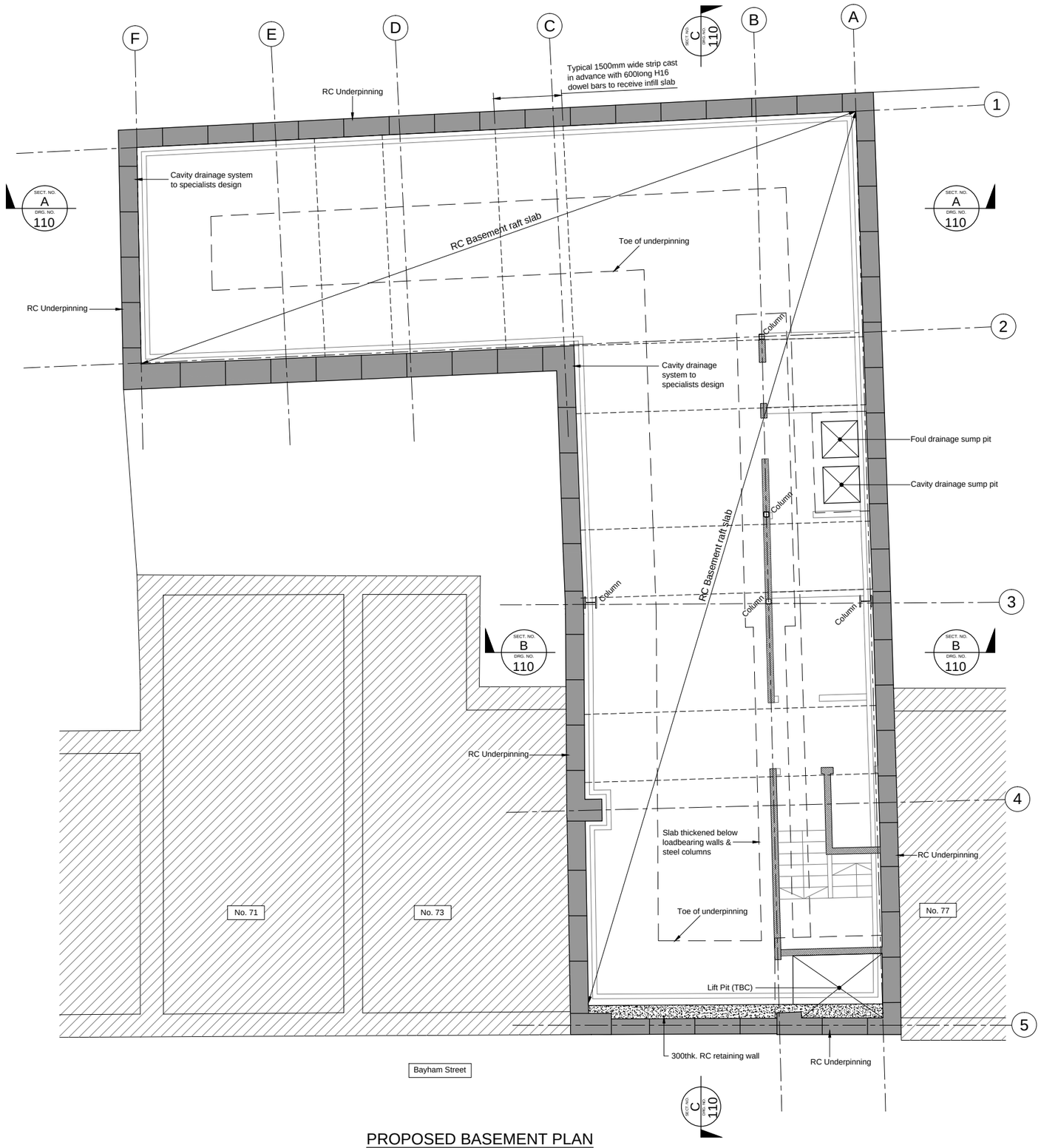


Photograph 7– Internal view of rear 'leg' of building

Photograph 8 – View from front building of lower roofs

APPENDIX D

OUTLINE STRUCTURAL DRAWINGS



PROPOSED BASEMENT PLAN

Scale 1:50

0 100mm WHEN PLOTTED @ 1:1 FOR A1 100 50mm WHEN PLOTTED @ 1:2 FOR A3 200

NOTES

1. This drawing shall be read in conjunction with all relevant Architects & Engineers drawings and specifications.
2. Do not scale any dimensions. All dimensions to be checked on site.

LEGEND

- Underpinning
- Existing walls to be demolished
- New loadbearing walls
- New partition walls

Rev.	Date	Description	By
P4	23.09.2016	ISSUED FOR BIA REPORT	SP
P3	04.03.2016	ISSUED FOR BIA REPORT	RJC
P2	23.10.2015	ISSUED FOR BIA REPORT	SP
P1	13.10.2015	ISSUED FOR BIA REPORT	SP

PRELIMINARY

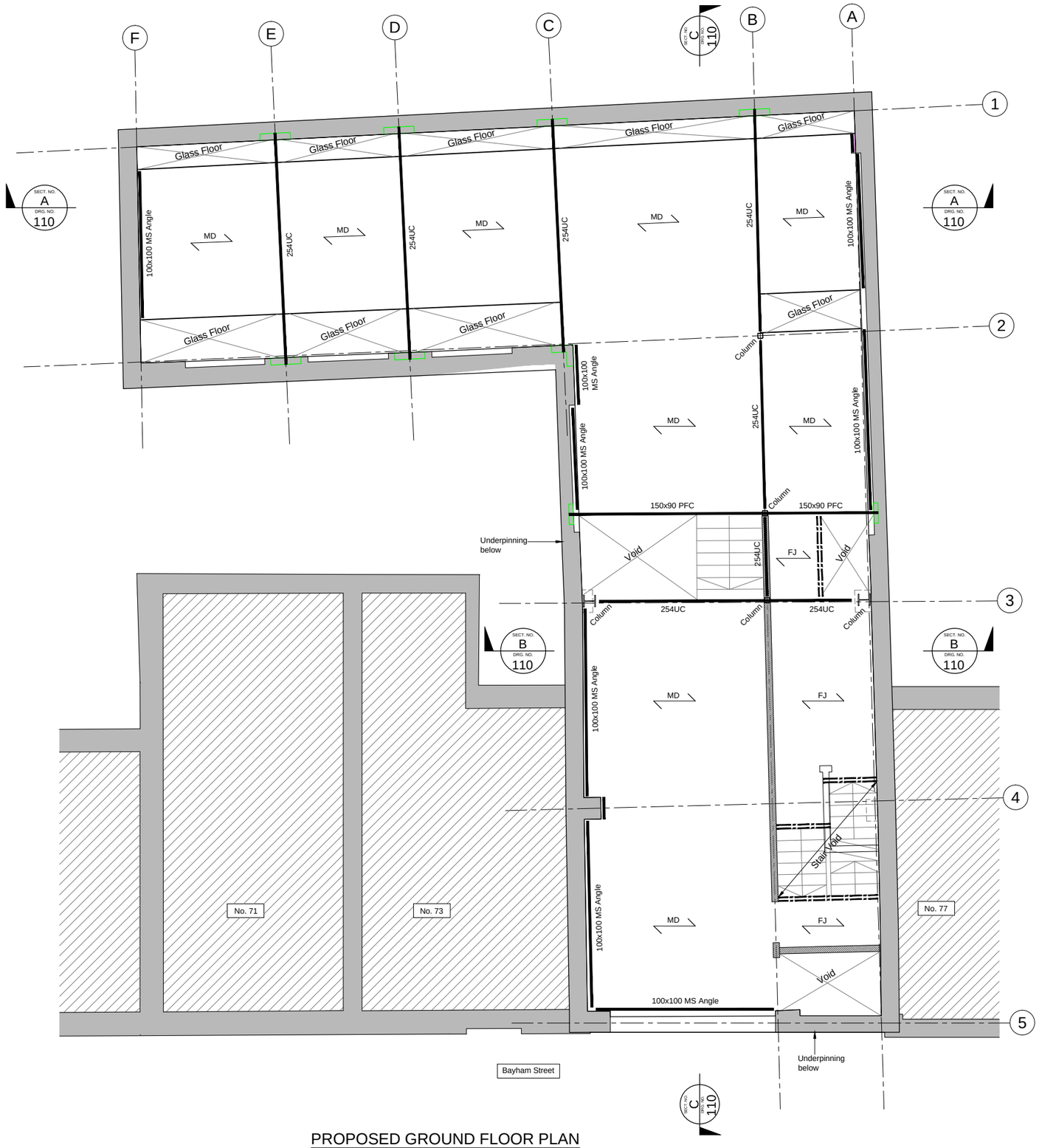
Client: W12 STUDIOS

Project Title: 75 BAYHAM STREET OFFICE SCHEME

Drawing Title: BASEMENT GENERAL ARRANGEMENT

MichaelAlexander
Foundation House
4 Percy Road
London N12 8BU
tel +44 (0)20 8445 9115
email mail@maengineers.com
web www.maengineers.com

Drawn	SP Sept 2015
Checked	IH Sept 2015
Scale	1:50 1:100
Size	A1 A3
Project No.	P3096
Drawing No.	BIA 101
Rev.	P4



PROPOSED GROUND FLOOR PLAN

Scale 1:50

0 100mm WHEN PLOTTED @ 1:1 FOR A1 100 50mm WHEN PLOTTED @ 1:2 FOR A3 200

NOTES

1. This drawing shall be read in conjunction with all relevant Architects & Engineers drawings and specifications.
2. Do not scale any dimensions. All dimensions to be checked on site.

LEGEND

- Existing walls retained
- Existing walls to be demolished
- New loadbearing walls
- New partition walls
- MD — RC Slab on Metal Decking
- FJ — Timber floor joists
- New Steel Beam
- Double timber joist trimmer

Rev.	Date	Description	By
P2	23.09.2016	ISSUED FOR BIA REPORT	SP
P1	13.10.2015	ISSUED FOR BIA REPORT	SP

PRELIMINARY

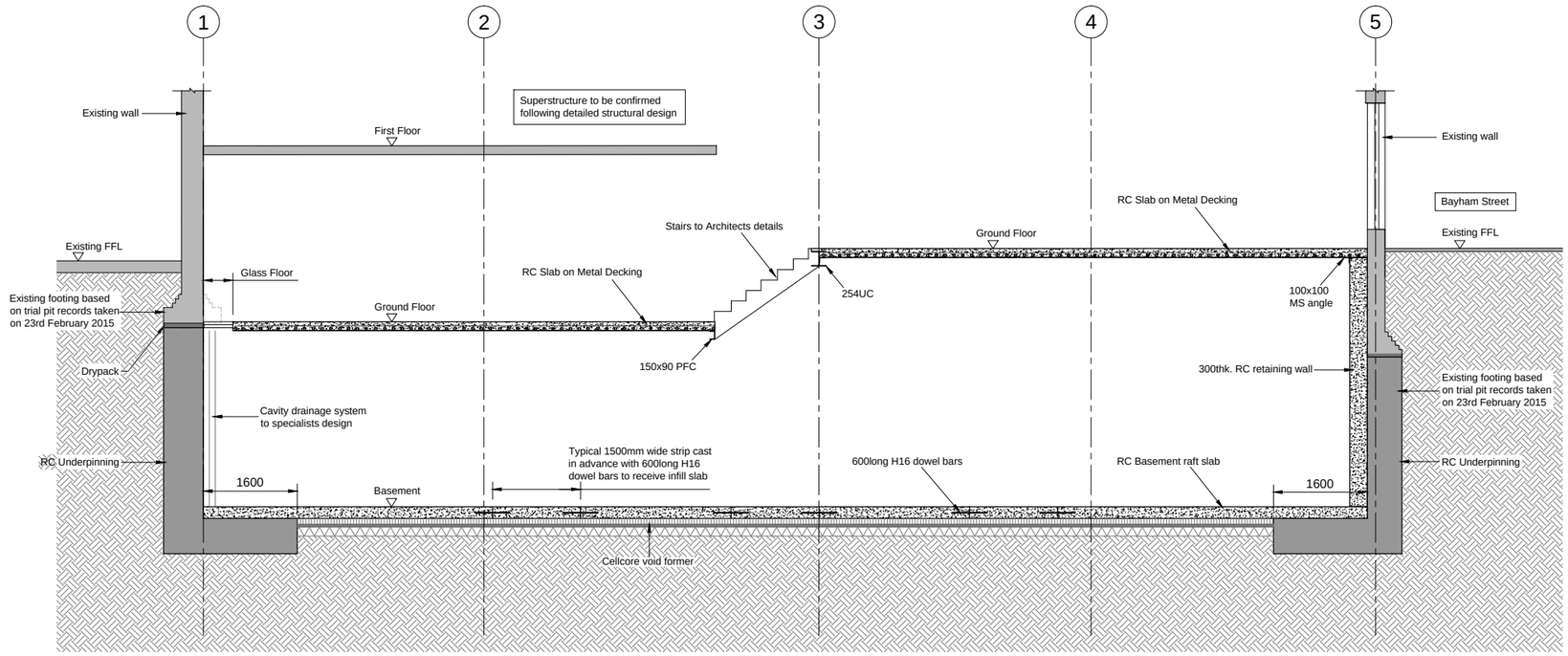
Client: W12 STUDIOS

Project Title: 75 BAYHAM STREET OFFICE SCHEME

Drawing Title: GROUND FLOOR PLAN GENERAL ARRANGEMENT

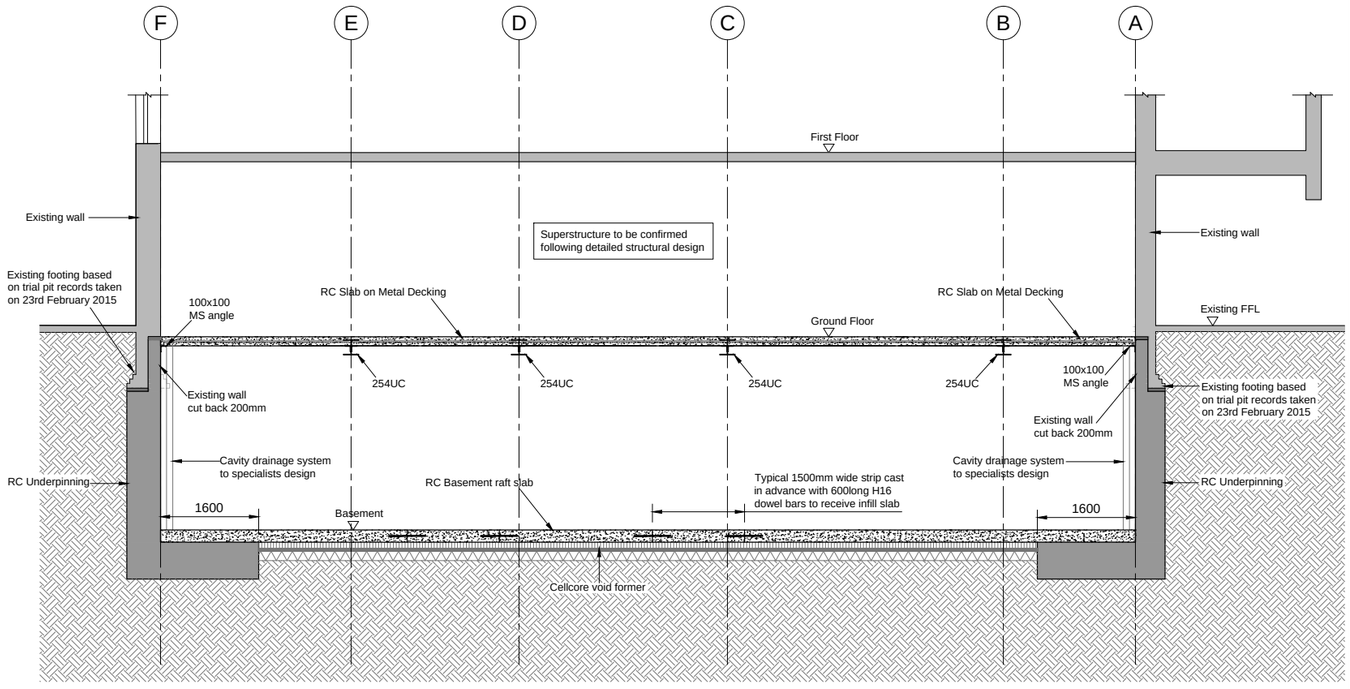
MichaelAlexander
Foundation House
4 Percy Road
London N12 8BU
tel +44 (0)20 8445 9115
email mail@maengineers.com
web www.maengineers.com

Drawn	SP Sept 2015
Checked	IH Sept 2015
Scale	1:50, 1:100
Size	A1, A3
Project No.	P3096
Drawing No.	BIA 102
Rev.	P2



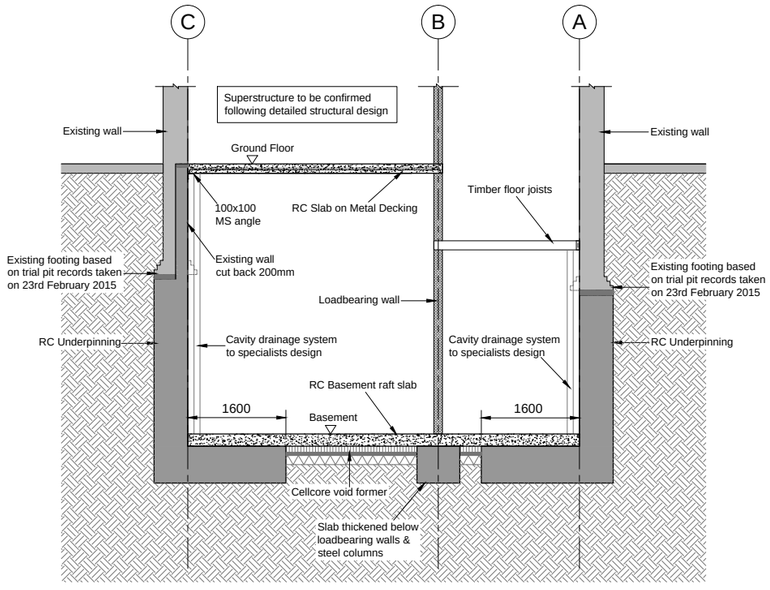
SECTION C-C

Scale 1:50



SECTION A-A

Scale 1:50



SECTION B-B

Scale 1:50

NOTES

1. This drawing shall be read in conjunction with all relevant Architects & Engineers drawings and specifications.
2. Do not scale any dimensions. All dimensions to be checked on site.

Rev.	Date	Description	By
P4	23.09.2016	ISSUED FOR BIA REPORT	SP
P3	07.03.2016	ISSUED FOR BIA REPORT	RJC
P2	23.10.2015	ISSUED FOR BIA REPORT	SP
P1	13.10.2015	ISSUED FOR BIA REPORT	SP

PRELIMINARY

Client: W12 STUDIOS

Project Title: 75 BAYHAM STREET OFFICE SCHEME

Drawing Title: PROPOSED SECTIONS

MichaelAlexander
Foundation House
4 Percy Road
London N12 8BU
tel +44 (0)20 8445 9115
email mail@maengineers.com
web www.maengineers.com

Drawn	SP	Sept 2015
Checked	IH	Sept 2015
Scale	1:50 1:100	Size A1 A3
Project No.	P3096	
Drawing No.	BIA 110	
Rev.	P4	

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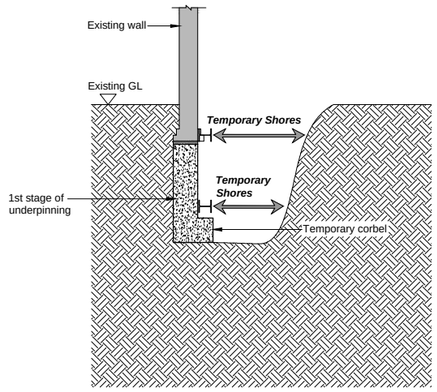
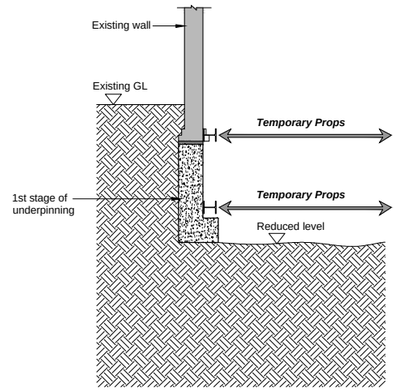


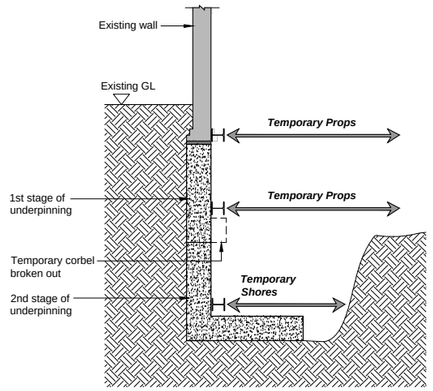
STAGE 1
Scale 1:50

- Excavate & install First stage of underpinning



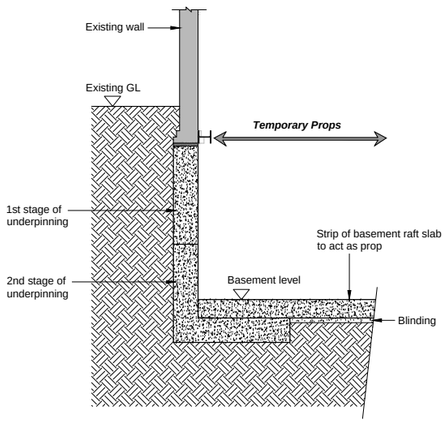
STAGE 2
Scale 1:50

- Excavate to reduced level
- Install upper levels of temporary propping across excavation



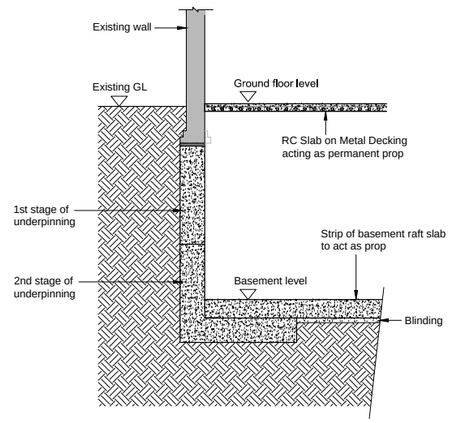
STAGE 3
Scale 1:50

- Excavate & install second stage of underpinning
- Remove temporary corbel
- Install lower level of temporary props



STAGE 4
Scale 1:50

- Excavate to reduced level & blind bearing surface
- Install reinforced strips of basement raft slab
- Remove lower levels of temporary props



STAGE 5
Scale 1:50

- Install Ground floor PC Beam & Block floor
- Remove upper level of temporary props

REMAINING SECTIONS OF THE BASEMENT RAFT SLAB TO BE INSTALLED AT A LATER DATE TO ALLOW FOR HEAVE TO occur BEFORE INSTALLATION

STAGE 6
Scale 1:50

PRELIMINARY CONSTRUCTION SEQUENCE FOR UNDERPINNING

Preliminary sequence to be developed in detail by the contractor following trial excavation.

0 — 100mm WHEN PLOTTED @ 1:1 FOR A1 — 100 — 50mm WHEN PLOTTED @ 1:2 FOR A3 — 200

NOTES

1. This drawing shall be read in conjunction with all relevant Architects & Engineers drawings and specifications.
2. Do not scale any dimensions. All dimensions to be checked on site.

Rev.	Date	Description	By
P3	07.03.2015	ISSUED FOR BIA REPORT	RJC
P2	23.10.2015	ISSUED FOR BIA REPORT	SP
P1	13.10.2015	ISSUED FOR BIA REPORT	SP

PRELIMINARY

Client: W12 STUDIOS

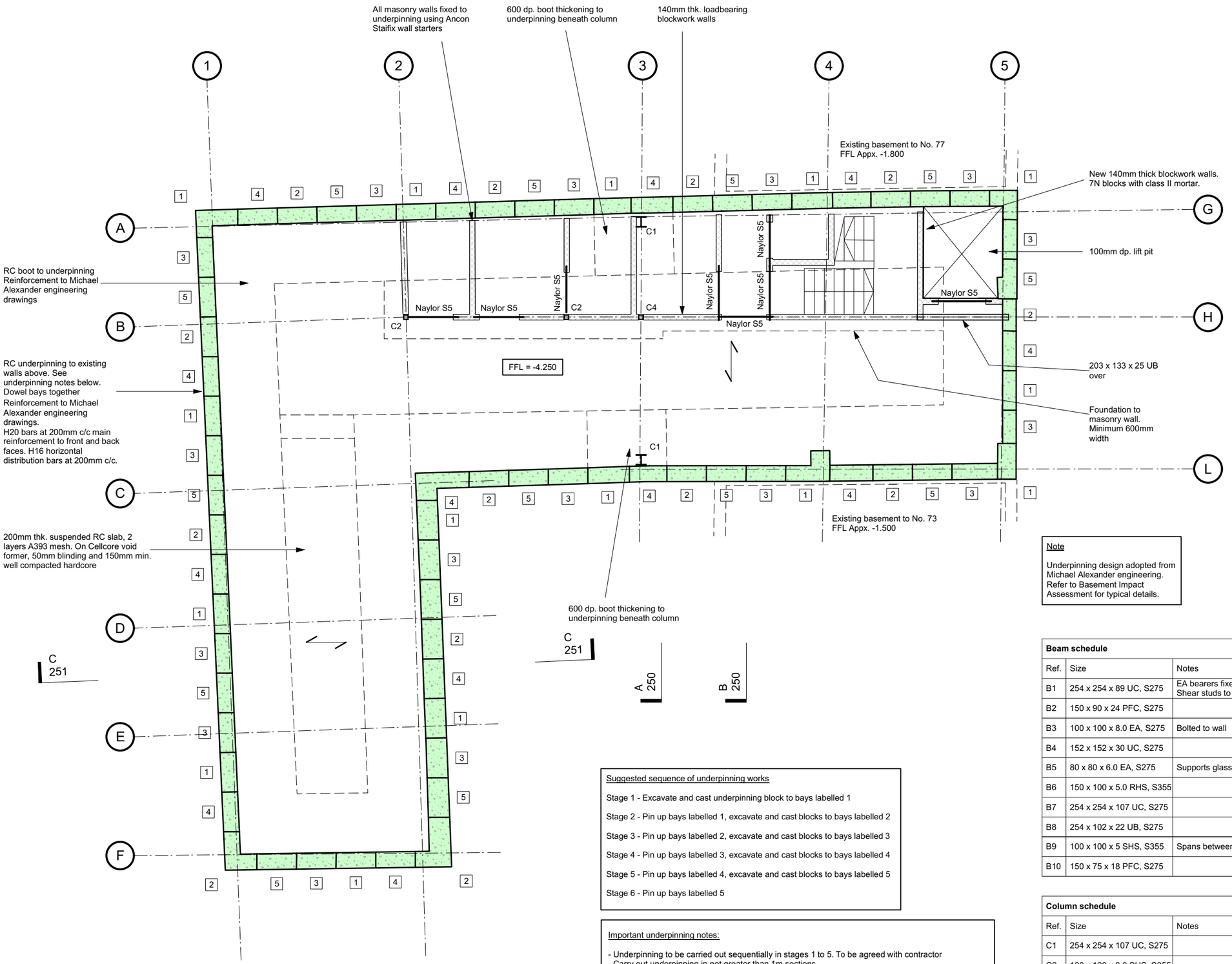
Project Title: 75 BAYHAM STREET OFFICE SCHEME

Drawing Title: UNDERPINNING SEQUENCE

MichaelAlexander
Foundation House
4 Percy Road
London N12 8BU
tel +44 (0)20 8445 9115
email mail@maengineers.com
web www.maengineers.com

Drawn	SP	Sept 2015
Checked	IH	Sept 2015
Scale	1:50 1:100	Size A1 A3
Project No.	P3096	
Drawing No.	BIA 111	
Rev.	P3	

A3



0 1 2 3 4 5m

Scale 1:100

Note

Underpinning design adopted from Michael Alexander engineering. Refer to Basement Impact Assessment for typical details.

Beam schedule

Ref.	Size	Notes
B1	254 x 254 x 89 UC, S275	EA bearers fixed to web. Shear studs to top 1 per trough
B2	150 x 90 x 24 PFC, S275	
B3	100 x 100 x 8.0 EA, S275	Bolted to wall
B4	152 x 152 x 30 UC, S275	
B5	80 x 80 x 6.0 EA, S275	Supports glass floor (by others)
B6	150 x 100 x 5.0 RHS, S355	
B7	254 x 254 x 107 UC, S275	
B8	254 x 102 x 22 UB, S275	
B9	100 x 100 x 5 SHS, S355	Spans between UC beams
B10	150 x 75 x 18 PFC, S275	

Column schedule

Ref.	Size	Notes
C1	254 x 254 x 107 UC, S275	
C2	120 x 120 x 8.0 SHS, S355	
C3	90 x 90 x 5.0 SHS, S355	
C4	120 x 120 x 8.0 SHS, S355	

Suggested sequence of underpinning works

Stage 1 - Excavate and cast underpinning block to bays labelled 1

Stage 2 - Pin up bays labelled 1, excavate and cast blocks to bays labelled 2

Stage 3 - Pin up bays labelled 2, excavate and cast blocks to bays labelled 3

Stage 4 - Pin up bays labelled 3, excavate and cast blocks to bays labelled 4

Stage 5 - Pin up bays labelled 4, excavate and cast blocks to bays labelled 5

Stage 6 - Pin up bays labelled 5

Important underpinning notes:

- Underpinning to be carried out sequentially in stages 1 to 5. To be agreed with contractor
- Carry out underpinning in not greater than 1m sections
- Not more than 25% in length of any existing foundation / structure to be unsupported at any one time.
- Pinning up of previous bay must be carried out prior to excavation of any further bay.
- Allow 24 hours between casting of underpinning block and pinning up.
- Any works on adjacent bays must not be carried out within a 48 hour period.

NOT FOR CONSTRUCTION

Revision	Date of Issue	By
5	29.12.16	HR
4	09.11.16	CC
3	18.10.16	NJB
2	07.10.16	JP
1	02.09.16	JP
0	17.08.16	JP

Issue History

Work Stage - ACE / (RIBA)
TENDER DOCUMENTATION

Issue Status
TENDER DOCUMENTATION

Project Title
Bayham Street
London

Client
W12

Architect
Innes Associates

Drawing Title
Basement Level GA

Scale	Drawn	Checked
1:100	JP	HR

MOMENTUM structural engineers

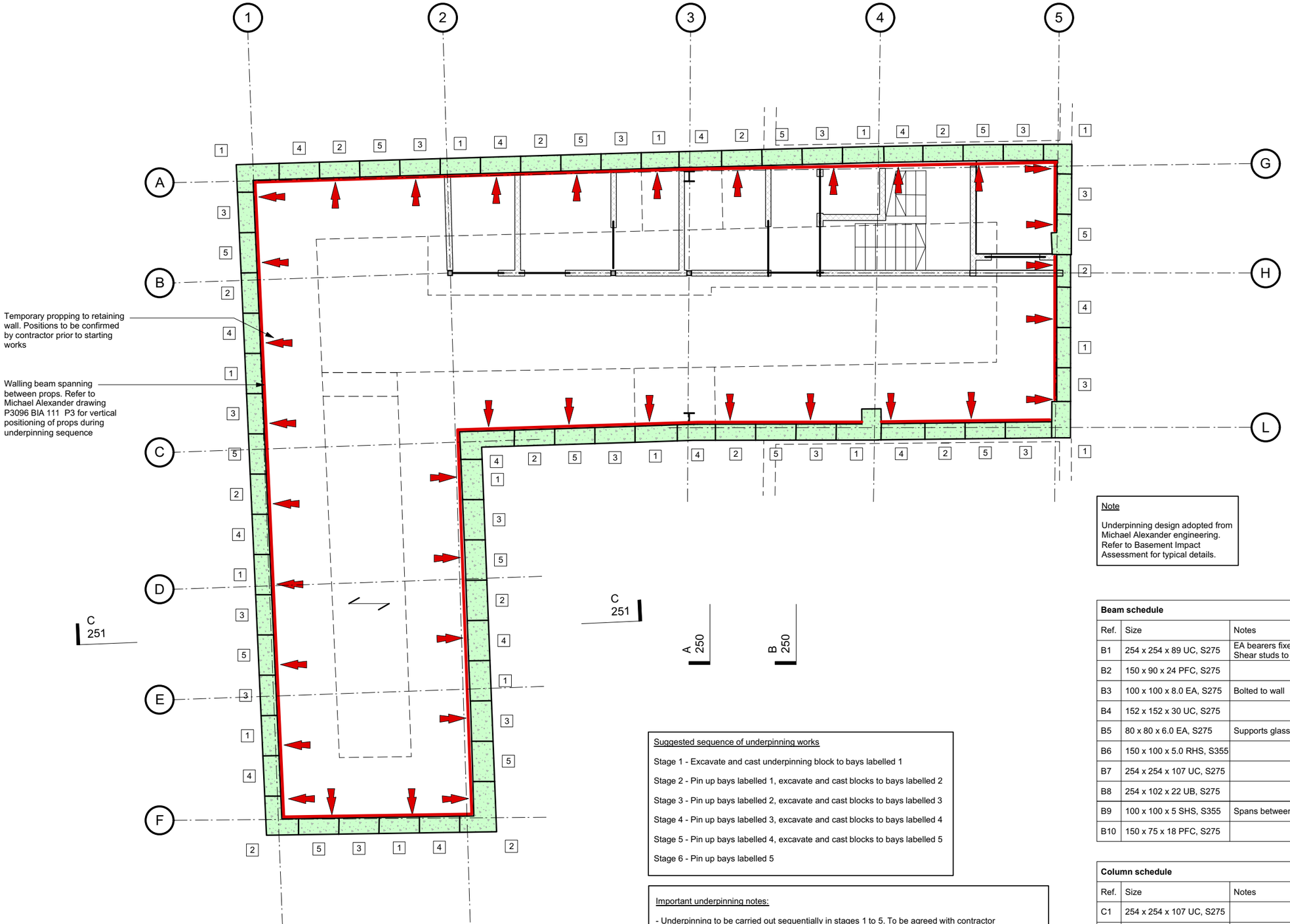
90 Walcot Street
Bath BA1 5BG
01225 444194

103 The Timber Yard
London N1 6ND
020 7739 6939

www.momentumengineering.com

Drawing Reference
2631 200 5

A3



Note

Underpinning design adopted from Michael Alexander engineering. Refer to Basement Impact Assessment for typical details.

Beam schedule

Ref.	Size	Notes
B1	254 x 254 x 89 UC, S275	EA bearers fixed to web. Shear studs to top 1 per trough
B2	150 x 90 x 24 PFC, S275	
B3	100 x 100 x 8.0 EA, S275	Bolted to wall
B4	152 x 152 x 30 UC, S275	
B5	80 x 80 x 6.0 EA, S275	Supports glass floor (by others)
B6	150 x 100 x 5.0 RHS, S355	
B7	254 x 254 x 107 UC, S275	
B8	254 x 102 x 22 UB, S275	
B9	100 x 100 x 5 SHS, S355	Spans between UC beams
B10	150 x 75 x 18 PFC, S275	

Column schedule

Ref.	Size	Notes
C1	254 x 254 x 107 UC, S275	
C2	120 x 120 x 8.0 SHS, S355	
C3	90 x 90 x 5.0 SHS, S355	
C4	120 x 120 x 8.0 SHS, S355	

Suggested sequence of underpinning works

Stage 1 - Excavate and cast underpinning block to bays labelled 1

Stage 2 - Pin up bays labelled 1, excavate and cast blocks to bays labelled 2

Stage 3 - Pin up bays labelled 2, excavate and cast blocks to bays labelled 3

Stage 4 - Pin up bays labelled 3, excavate and cast blocks to bays labelled 4

Stage 5 - Pin up bays labelled 4, excavate and cast blocks to bays labelled 5

Stage 6 - Pin up bays labelled 5

Important underpinning notes:

- Underpinning to be carried out sequentially in stages 1 to 5. To be agreed with contractor
- Carry out underpinning in not greater than 1m sections
- Not more than 25% in length of any existing foundation / structure to be unsupported at any one time.
- Pinning up of previous bay must be carried out prior to excavation of any further bay.
- Allow 24 hours between casting of underpinning block and pinning up.
- Any works on adjacent bays must not be carried out within a 48 hour period.

NOT FOR CONSTRUCTION

Revision	Date of Issue	By
0	16.12.16	HR

Issue History

Work Stage - ACE / (RIBA)
TENDER DOCUMENTATION

Issue Status
TENDER DOCUMENTATION

Project Title
Bayham Street
London

Client
W12

Architect
Innes Associates

Drawing Title
Basement Level
Temporary propping plan

Scale	Drawn	Checked
1:100	JP	HR

MOMENTUM structural engineers

90 Walcot Street
Bath BA1 5BG
01225 444194

103 The Timber Yard
London N1 6ND
020 7739 6939

www.momentumengineering.com

Drawing Reference
2631 205 0

APPENDIX E

CONSTRUCTION METHOD STATEMENT

CONSTRUCTION METHOD STATEMENT

E.01 The following provides an outline Method Statement for the construction of the basement. This will be developed and finalised by the appointed Contractor, once the detailed design is complete. An outline construction programme has been included in Appendix G.

E.02 Prior to works commencing, schedules of condition will be carried out to adjoining properties as part of the party wall process.

E.03 Precise monitoring points will be fixed to the party walls and adjoining buildings, as specified on Michael Alexander Engineers document 'P3096 - Monitoring for 75 Bayham Street', in accordance with the agreed 'Monitoring and Contingency Plan'. Initial 'base' readings will be taken.

E.04 The site and adjoining pavement will be scanned and marked for services prior to the commencement of any excavation works.

E.05 A full depth trial excavation will be carried out by the Contractor prior to the commencement of the main excavation works. This will enable the Contractor to identify whether there is any perched water on the interface between the made ground and London Clay, and to check how readily the subsoil stands un-supported.

Any perched water should be collected in sumps during the excavation works and pumped.

Should the excavation sides be found locally to be unstable or there is unacceptable loss of material from the excavated face, then contingency plans will be developed, likely to include back shuttering behind the underpinning. These proposals will include measures to ensure no voids are left behind the back shuttering.

E.06 The construction will commence with the underpinning works to the existing party walls. This will be carried out to an agreed sequence, to ensure there is at least 2m between any two open pins. A possible approach for the underpinning is shown on drawing P3096/11, which illustrates the propping that will be required during the excavation works. At this stage it is assumed that two levels of underpinning will be required, except for the part of the site adjoining Bayham Street, where the required underpinning depth will be less due to the existing and former basements. However this can be reviewed following the trial excavation.
The proposed underpinning sequence and temporary propping arrangement are shown on the following Momentum Structural Engineers drawings '2631_200 Basement Level GA' and 2631_205 Basement Level Temporary Propping Plan'.

E.07 Lateral props will be installed within the existing buildings close to floor and roof levels prior to demolition of the existing structure. In general these will be installed full width across the building from party wall to party wall, or across corners.

E.08 The warehouse mezzanine floor and roof structure will then be demolished, leaving the restrained party walls in place. The timing of the demolition, excavation and reconstruction works shall be to a continuous programme to minimise the heave of the clay subsoils that might result from the temporary unloading.

E.09 The remaining sections of retaining structure can then be constructed. To the Bayham Street elevation, temporary works will be installed to ensure the stability of the adjoining pavement. Internally the retaining structure will be a reinforced concrete wall cast in sections.

E.09a Preliminary trench excavations will be carried out to cast strip sections of the basement suspended slab to provide propping action to the base of RC underpinning in the temporary case.

E.10 Bulk excavation will then commence. Any minor water inflows to the basement excavation will be collected in sumps and pumped. Temporary horizontal props will be installed as described previously. Permanent propping will be achieved by the ground floor slab. Regular monitoring readings will be taken and compared with 'Red' and 'Amber' trigger levels.

E.11 When bulk excavation is complete to basement level, the bottom surface of the excavation will be immediately blinded.

E.12 The basement suspended slab will then be constructed on top of the concrete underpin toes, to act as a permanent prop to the base of the underpinning. The sections of clay subsoil between these strips will be able to heave since the slab will be laid on layer of compressible material.

E.13 Works can then proceed with the construction of the ground floor slab.

E.14 Following completion of the ground floor slab, which acts as a permanent prop to the excavation, the propping can be removed.

E.15 The superstructure of the new building can then be progressed. As each new floor level is constructed and tied into the party walls, the temporary lateral propping can be removed.

E.16 At a later stage in the construction, once the majority of the heave has occurred, the remaining parts of the basement slab will be cast.

APPENDIX F

PRELIMINARY STRUCTURAL CALCULATIONS

F1.00 INTRODUCTION

F1.01 These preliminary calculations are for planning purposes only. Detailed calculations will be developed in due course in respect of Part A of The Building Regulations

F2.00 BRITISH STANDARDS

F2.01 The following Standards will be applied in the detailed design: -

BS648	Weights of Building Materials
BS5268: Part 2	Structural use of Timber: Permissible Stress design, materials and workmanship
BS5628: Part 1	Structural use of unreinforced masonry
BS5950:Part1	Structural Steelwork-Simple & continuous construction
BS5977:Part1	Lintels: Method for Assessment of Load
BS6399:Part 1	Code of Practice for Dead and Imposed Load
BS6399:Part 3	Code of Practice for Imposed Roof Load
BS8110:Part 1	Structural use of concrete

F3.00 LOADING

F3.01 **New Flat Roof**

Dead Load		
225mm Green Roof	4.25	kN/m²
150mm Concrete Slab on Metal Decking	2.75	kN/m²
Lighting and Services	0.25	kN/m²
Total Dead Load	**7.25**	**kN/m²**
Total Live Load	**0.60**	**kN/m²**

Existing Pitched Roof

Dead Load		
Roof Tiles	0.60	kN/m²
Insulation	0.10	kN/m²
Timber Structure and Boarding	0.35	kN/m²
Lighting and Services	0.15	kN/m²
Total Dead Load	**1.20**	**kN/m²**
Total Live Load	**0.60**	**kN/m²**

New Ground and Lower First Floors

Dead Load		
150mm Concrete Slab on Metal Decking	2.75	kN/m²
Lighting and Services	0.25	kN/m²
Total Dead Load	**3.00**	**kN/m²**
Total Live Load (+1.0 kN/m²)	**2.50**	**kN/m²**

Existing First and Second Floors

Dead Load		
Timber Boards and Finishes	0.20	kN/m²
Timber Joists	0.25	kN/m²
Ceiling and Services	0.35	kN/m²
Total Dead Load	**0.80**	**kN/m²**
Total Live Load (+1.0 kN/m²)	**2.50**	**kN/m²**

Existing 400 thk External walls *(Solid brick wall)*

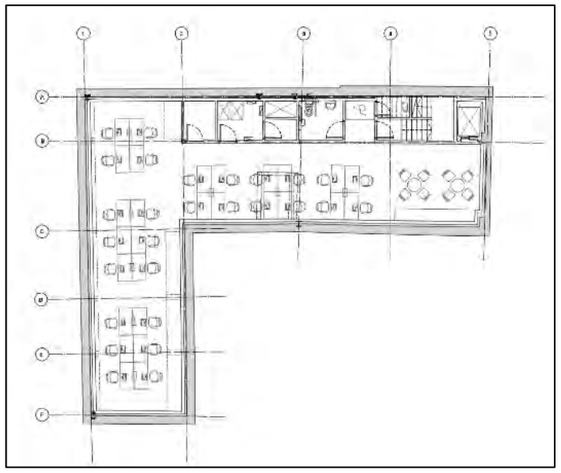
Dead Load		
400mm thk Brick wall	7.60	kN/m²
Finishes	0.10	kN/m²
Total Dead Load on elevation	**7.70**	**kN/m²**

200mm Suspended Slab

Dead Load		
200mm Concrete Slab	4.80	kN/m²
Raised Floor	0.50	kN/m²
Total Dead Load	**5.30**	**kN/m²**
Total Live Load (+1.0 kN/m²)	**2.50**	**kN/m²**

F4.00 PRELIMINARY CALCULATIONS

F4.01 **Calculation of Line Load on Underpinning (loads per linear meter)**



Key plan

Loads from roof and floors in Zone A (grid line 1 to 2): tributary width= 2.45m

Wall Load:

7.70 kN/m^2 x 8.40 m=	64.70 kN/m
Existing Corbel (assumed)=	4.00 kN/m
	68.70 kN/m
Roof= 2.45 m x (7.25 kN/m^2 + 0.60 kN/m^2)=	19.25 kN/m
Floors= 2 x 2.45 m x (3.00 kN/m^2 + 2.50 kN/m^2)=	26.95 kN/m
	46.20 kN/m
Total Load on Underpinning Walls=	114.90 kN/m

Loads from roof and floors in Zone B (grid line 2 to 3): tributary width= 3.30m

Wall Load:

7.70 kN/m^2 x 5.80 m=	44.70 kN/m
Existing Corbel (assumed)=	4.00 kN/m
	48.70 kN/m
Roof= 3.30 m x (7.25 kN/m^2 + 0.60 kN/m^2)=	25.90 kN/m
Floors= 2 x 3.30 m x (3.00 kN/m^2 + 2.50 kN/m^2)=	36.30 kN/m
	62.20 kN/m
Total Load on Underpinning Walls=	110.90 kN/m

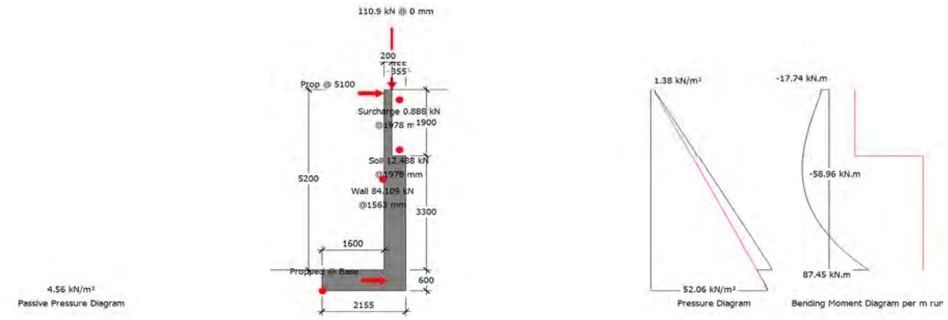
Loads from roof and floors in Zone B (grid line 3 to 5): tributary width= 3.30m

Wall Load:

7.70 kN/m^2 x 11.70 m=	90.10 kN/m
Existing Corbel (assumed)=	4.00 kN/m
	94.10 kN/m
Roof= 3.30 m x (1.20 kN/m^2 + 0.60 kN/m^2)=	6.00 kN/m
Floors= 2 x 3.30 m x (0.80 kN/m^2 + 2.50 kN/m^2)=	21.80 kN/m
Floors= 2 x 3.30 m x (3.00 kN/m^2 + 2.50 kN/m^2)=	36.30 kN/m
	64.10 kN/m
Total Load on Underpinning Walls=	158.20 kN/m

F5.00 TYPICAL UNDERPINNING DESIGN

F5.01



Summary of Design Data

Notes	All dimensions are in mm and all forces are per meter run
Material Densities (kN/m^3)	Back soil 18.50, Front soil 18.00, Concrete 24.00
Concrete grade	fcu 40 N/mm^2, Permissible tensile stress 0.250 N/mm^2
Concrete covers (mm)	Wall inner cover 50 mm, Wall outer cover 50 mm, Base cover 50 mm
Reinforcement design	fy 500 N/mm^2 designed to BS 8110: 1997
Surcharge and Water Table	Surcharge 2.50 kN/m^2, Fully drained

† 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 @ 5.1 m
Vertical Line Load	110.9 kN/m @ X 0 mm and Y 0 mm - Load type Live
† 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 150.00 kN/m^2, @ back 150.00 kN/m^2
Back Soil Friction and Cohesion	ϕ = Atn(Tan(20)/1.2) = 16.87°
Base Friction and Cohesion	δ = Atn(0.75xTan(Atn(Tan(20)/1.2))) = 12.82°
Front Soil Friction and Cohesion	ϕ = Atn(Tan(30)/1.2) = 25.69°

Loading Cases

G_{Soil}- Soil Self Weight, G_{Wall}- Wall & Base Self Weight, Fv_{Heel}- Vertical Loads over Heel,
P_a- Active Earth Pressure, $P_{surcharge}$- Earth pressure from surcharge, P_p- Passive Earth Pressure

Case 1: Geotechnical Design	1.00 G_{Soil}+1.00 G_{Wall}+1.00 Fv_{Heel}+1.00 P_a+1.00 $P_{surcharge}$+1.00 P_p
Case 2: Structural Ultimate Design	1.40 G_{Soil}+1.40 G_{Wall}+1.60 Fv_{Heel}+1.00 P_a+1.00 $P_{surcharge}$+1.00 P_p

Geotechnical Design

Wall Stability - Virtual Back Pressure

Case 1 Overturning/Stabilising	291.079/493.505	0.590	OK

Wall Sliding - Virtual Back Pressure

Fx/($Rx_{Friction}$+ $Rx_{Passive}$)	0.000/(47.199+0.000)	0.000	OK

Soil Pressure

Virtual Back (No uplift)	Max(123.601/150, 68.953/150) kN/m²	0.824	OK
Wall Back (No uplift)	Max(148.138/150, 44.416/150) kN/m²	0.988	OK

Structural Design

Prop Reactions

Maximum Prop Reactions (Ultimate) 144.3 kN @ Base, 31.7 kN @ 5.100 m

Wall Design (Inner Steel)

Critical Section	Critical @ 0 mm from base, Case 2			
Steel Provided (Cover)	Main H16@200 (50 mm)	Dist. H16@200 (66 mm)	1005 mm²	OK
Compression Steel Provided (Cover)	Main H20@200 (50 mm)	Dist. H16@200 (70 mm)	1571 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	497 mm, 1000 mm, 1005 mm², 500 N/mm², 40.0 N/mm²		472 mm	
Mr=fn(above,As',d',x,x/d)	1571 mm², 60 mm, 28 mm, 0.06		206.5 kN.m	
Moment Capacity Check (M/Mr)	M 87.4 kN.m, Mr 206.5 kN.m		0.424	OK
Wall Axail Design (N/Ncap)	N 251.7 kN, Ncap 8880.0 kN		0.028	OK
Wall Slenderness λ	Leff/tk =0.97x5200.0/555.0		9.1	OK
Wall Axail-Mom Design (M/Mr_{Axial})	M 87.4 kN, Mr_{Axail}276.8 kN.m		0.316	OK
Shear Capacity Check	F 114.8 kN, vc 0.411 N/mm², Fvr 204.3 kN		0.56	OK

Wall Design (Outer Steel)

Critical Section	Critical @ 3300 mm from base, Case 2			
Steel Provided (Cover)	Main H20@200 (50 mm)	Dist. H16@200 (70 mm)	1571 mm²	OK
Compression Steel Provided (Cover)	Main H16@200 (50 mm)	Dist. H16@200 (66 mm)	1005 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	140 mm, 1000 mm, 1571 mm², 500 N/mm², 40.0 N/mm²		121 mm	
Mr=fn(above,As',d',x,x/d)	1005 mm², 58 mm, 43 mm, 0.31		82.6 kN.m	
Moment Capacity Check (M/Mr)	M 57.2 kN.m, Mr 82.6 kN.m		0.693	OK
Wall Axail Design (N/Ncap)	N 251.7 kN, Ncap 3200.0 kN		0.079	OK
Wall Slenderness λ	Leff/tk =0.97x5200.0/200.0		25.1	OK
Kmin = (Nuz-N)/(Nuz-Nbal)	Min(1.0, 3555.6 - 251.7)/(3555.6 - 698.2)		1.0	
M_{add}= N.Kmin.h.λ²/2000	251.7x1.0x200.0x25.1²/2000		-11.4kN.m	
(M+Madd)/Mr_{Axial}	M+Madd 68.6 kN, Mr_{Axail}93.8 kN.m		0.731	OK
Shear Capacity Check	F 8.9 kN, vc 0.999 N/mm², Fvr 139.8 kN		0.06	OK

Base Top Steel Design

Steel Provided (Cover)	Main H16@200 (50 mm)	Dist. H16@200 (66 mm)	1005 mm²	OK
Compression Steel Provided (Cover)	Main H16@200 (50 mm)	Dist. H16@200 (66 mm)	1005 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	542 mm, 1000 mm, 1005 mm², 500 N/mm², 40 N/mm²		515 mm	
Mr=fn(above,As',d',x,x/d)	1005 mm², 58 mm, 28 mm, 0.05		225.2 kN.m	
Moment Capacity Check (M/Mr)	M 0.0 kN.m, Mr 225.2 kN.m		0.000	OK
Shear Capacity Check	F 0.0 kN, vc 0.391 N/mm², Fvr 211.8 kN		0.00	OK

Base Bottom Steel Design

Steel Provided (Cover)	Main H16@200 (50 mm)	Dist. H16@200 (66 mm)	1005 mm²	OK
Compression Steel Provided (Cover)	Main H16@200 (50 mm)	Dist. H16@200 (66 mm)	1005 mm²	
Leverarm z=fn(d,b,As,fy,Fcu)	542 mm, 1000 mm, 1005 mm², 500 N/mm², 40 N/mm²		515 mm	
Mr=fn(above,As',d',x,x/d)	1005 mm², 58 mm, 28 mm, 0.05		225.2 kN.m	
Moment Capacity Check (M/Mr)	M 144.7 kN.m, Mr 225.2 kN.m		0.643	OK
Shear Capacity Check	F 190.2 kN, vc 0.391 N/mm², Fvr 211.8 kN		0.90	OK

F6.00 FRONT ELEVATION RETAINING WALL

F6.01 Horizontal load (during construction)

Back soil to be London Clay
Density ρ= 18.5 kN/m³
Internal angle of friction Φ= 20 degrees
ka= (1−sinΦ) / (1+sinΦ)= (1−sin20°) / (1+sin20°)= (1−0.34) / (1+0.34)= 0.66 / 1.34= 0.492

Where: Φ= internal angle of friction & ρ= unit weight of soil

pa_1= $ka \times \rho \times h_1$= 0.49 × 18.5 kN/m³ × 2.00 m = 18.13 kN/m² (at prop level)
pa_2= $ka \times \rho \times h_2$= 0.49 × 18.5 kN/m³ × 5.20 m = 47.15 kN/m² (at the bottom of excavation)

Where: ka= coefficient of active pressure & h= height of retained fill

Total horizontal force on wall due to backfill is:
Fa= 0.5 x pa x h = 0.5 x 47.15 kN/m² x 5.2 m= 122.59 kN

F6.02 Design Check (during construction)

Refer to Clause F5.01

F6.03 Horizontal load (permanent condition)

To the horizontal load calculated above (refer to clause F6.01) a surcharge Q= 20 kN/m² is applied as uniform face load to wall.

Total horizontal force on wall due to backfill is:
Fa= 0.5 x pa x h + Q x h= 0.5 x 47.15 kN/m² x 5.2 m + 20 x 5.2= 226.59 kN

To avoid failure of the existing brickwork wall of its interface with the new underpinning load and internal RC retaining wall will resist the face loading.

F6.04 Sliding Capacity and Overturning Capacity Check (permanent condition)

In permanent conditions sliding and overturning checks are not required as the wall will be propped at top and bottom by ground floor and basement slabs. Where there is a ground floor void the underpinning and retaining wall will be reinforced laterally to enable them to span between points of lateral restraint.

F6.05 Retaining Wall Design

The total bending moment acting on the wall due to the face loads (M*) is:
M*= 0.06415 x pa_2 × h² + Q x h² / 8= 0.06415 × 47.15 x 5.20² + 20 x 5.20² / 8= 149.38 kNm

The moment will be rested by a 300mm RC wall reinforced with T20 @200 c/c

APPENDIX G

OUTLINE CONSTRUCTION PROGRAMME

P3096 75 BAYHAM STREET, LONDON NW1 0AA Rev 1.0 Issued for BIA 07/03/2016

PROGRAMME/ACTION LIST

Week commencing

TASK	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15	Month 16	Month 17	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24
Planning																							
Planning Approval	◆																						
Design																							
Architectural Design	■	■	■																				
Structural Design	■	■	■																				
Contractor appointment				◆																			
Agreement of Detailed Construction Method				■	■																		
Party Wall																							
Party Wall Awards Agreed					◆																		
Structural Works																							
Start on site					◆																		
Enabling works					■																		
Temporary works & demolition of roof and floors						■	■	■															
Underpinning & installation of temporary propping								■	■	■													
Excavation of basement										■	■	■											
Basement slab												■	■										
Commence of steel frame													■										
Ground floor slab														■									
Superstructure														■	■	■	■	■					
Completion																							
Finishes, M&E intallation, etc.																■	■	■	■	■	■	■	

This programme is for information only and subject to detailed consideration by the appointed contractor