Basement Impact Assessment

at
12 Platt's Lane, London NW3 7NR

for
Orly Weinberger

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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Commission

Soils Limited was commissioned by Orly Weinberger to undertake a Basement Impact Assessment on land at 12 Platt's Lane, London NW3 7NR. The scope of the investigation was outlined in the Soils Limited quotation reference Q17659/NJL/1, dated 25th May 2016.

This document comprises the Basement Impact Assessment and incorporates the results, discussion and conclusions.

Standards

The site works, soil descriptions and geotechnical laboratory testing was undertaken in accordance with the following standards:

- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design
- BS EN ISO 14688-1:2002+A1:2013 - Geotechnical investigation and testing - Identification and description
- BS EN ISO 14688-2:2004+A1:2013 - Geotechnical investigation and testing - Principles for a classification

The geotechnical laboratory testing was performed by GEO Site & Testing Services Ltd (GSTL) in accordance with the methods given in BS 1377:1990 Parts 1 to 8 and their UKAS accredited test methods.

For the preparation of this report, the relevant BS code of practice was adopted for the geotechnical laboratory testing technical specifications, in the absence of the relevant Eurocode specifications (ref: ISO TS 17892).

The chemical analyses were undertaken by QTS Environmental Limited in accordance with their UKAS and MCERTS accredited test methods or their documented in-house testing procedures. This investigation did not comprise an environmental audit of the site or its environs.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sample borehole implies the specific technique used to produce a trial hole.

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Section 1 Introduction

1.1 Objective of Investigation

Soils Limited was commissioned by Orly Weinberger to undertake a Basement Impact Assessment (BIA). The objective of this investigation was to establish the impact and risk of the proposed basement at 12 Platt’s Lane, London NW3 7NR.

The report provides details on the ground and groundwater conditions onsite and presents calculations to determine the potential impact of the proposed development on neighbouring properties. In addition, the report provides a qualitative risk assessment of the potential impacts the proposed development might have on groundwater levels, surface water flows and flooding.

It is recognised that any Basement Impact Assessment is a live document and that further detailed assessments will be ongoing, if appropriate, as the design and construction progresses.

1.2 Limitations and Disclaimers

Soils Limited was commissioned by Orly Weinberger to undertake a Basement Impact Assessment to supply a risk based impact assessment with regard to hydrology, hydrogeology and land stability.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Section 2 Site Context

2.1 Location

The site was located at 12 Platt's Lane, London NW3 7NR. The approximate O.S Land Ranger Grid Reference was TQ 25245 85963.

The site location plan is given in Figure 1.

2.2 Site Details

The site comprised a semi-detached three storeys residential building. To the front of the building there was hard landscaping, represented by the access driveway, and a flowerbed with a couple of mature and immature trees. Soft landscaping was present to the rear of the building, where hedges and mature trees were found. Two trees were also observed to the front of the building. The site was provided with a surface drainage system connected to the public sewer, as reported in drawing 1610-EX01 Rev.00, dated 1st December 2016 and reported in Appendix F.

The site was located on a gentle slope such that the houses were slightly terraced into and out of the slope.

The site was bordered by 10 Platt's Lane to the south-west, by 14 Platt's Lane to the north-east, by Platt's Lane from the south-west to the north-east and from the south-east to the north-west by St. Luke's Church and by the tennis pitches of the West Heath Lawn Tennis Club.

Following to the site walkover, it was understood that the adjoining property at 10 Platt's Lane comprised a semi-basement, resulting from the terracing, used as a garage. No details were provided by the Client about the depth to the basement foundations and the basement area. As a consequence, it was conservatively assumed that the construction of the proposed basement to 12 Platts Lane, will induce a relevant increase in the differential depth of the foundations.

No information was available with regards to the detached property at 14 Platt's Lane. Also in this case, the worst case scenario considering the building to be founded on shallow foundations was assumed.

2.3 Proposed Development

The proposed redevelopment is to comprise the construction of a basement with light wells localised to the front and to the north-east flank of the building. The proposed basement is to be used for a kitchen, living room, playroom, gym, yoga room, shower and plant room. In order to satisfy the requirements of LBC reported in CPG4, Section 5.11, the basement drainage system related to the presence of the bathroom must be provided with positively pumping devices (PPDs) and anti-flood valves will be fitted to contrast the risk of flooding.

The lightwells are proposed over already paved areas, as reported on drawings provided by the Client and appended to the report, except for the presence of a small flowerbed and a driveway in brick setts. The increase in paved area, therefore, can be considered as negligible over the site. Considering also the presence of a drainage system, no changes are expected in the flows towards neighbouring properties and infiltrating the ground.

The top of the proposed basement slab would be about 3.00m below the external ground level, therefore the proposed excavations for the basement slab construction were anticipated to a depth of approximately 3.40 – 3.60m below existing ground level. A maximum depth of 3.60m bgl was therefore conservatively considered in the report for the development of the calculations.

No tree cutting was considered as a consequence of the development. The Client provided a Tree Survey Report, where two elderberry trees were proposed for removal due to their poor conditions and incompatibility of being "retained as living trees in the context of the current land use". One cherry tree, furthermore, was proposed for cutting because already dead. The Tree Survey Report was reported in Appendix J

In compiling this report reliance was placed on drawings no. C8415/1 and C8415/2, dated May 2016 and prepared by Laser Surveyors, and on the architectural drawings no. 1610-PA01 Rev.1 to 1610-PA04 Rev.1, dated 24th May 2016 and prepared by XUL Architecture. All the drawings were provided by the Client. Any change or deviation from the scheme outlined in the drawing could invalidate the recommendations presented within this report. Soils Limited must be notified about any such changes.
The proposed development layout and drainage scheme as provided by the client are included in Appendix D and Appendix F.

2.4 Topography

The site was generally flat and level. The site was located within a hillside setting, presenting a downward sloping from the north/north-east to the south/south-west lower than 7° (12%) in the area of interest.

2.5 Published Geological Data

The 1:50,000 BGS map showed the site to be located directly on bedrock of the Claygate Member with no overlying superficial geology recorded. The soils of the London Clay Formation and of the Bagshot Formation were also noted as constituting the bedrock at very short distance from the site.

2.5.1 Bagshot Formation

The Bagshot Formation is composed of mainly pale yellow-brown to pale grey or white, locally orange or crimson, fine- to coarse-grained sand that is frequently micaceous and locally clayey, with sparse glauconite and sparse seams of gravel. The sands are commonly cross-bedded but some are laminated. Thin beds and lenses of laminated pale grey to white sandy or silty clay or clay ('pipe-clay') occur sporadically, becoming thicker towards the top of the formation. A thick clay bed is included at the top, while a basal bed of gravelly coarse-grained sand is observed. Fossil fauna of mostly marine molluscs and indistinct plant is occasionally observed. The most of organic material has been destroyed by oxidation or dissolution. In places the lower part of the Bagshot Formation includes an interval of bioturbated sandy clay, silt and fine-grained sand overlying a unit of fine- to coarse-grained sand.

2.5.2 Claygate Member

The Claygate Member comprises dark grey clays with sand laminae, passing up into thin alternations of clays, silts and fine-grained sand, with beds of bioturbated silt. Ferruginous concretions and septarian nodules occur in places. The presence of fossils is also recorded within the Claygate Member.

2.5.3 London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The upper boundary member of the London Clay Formation is known as the Claygate Member and marks the transition between the deep water, predominantly clay environment and succeeding shallow-water, sand environment of the Bagshot Formation.

The lower boundary is generally marked by a thin bed of well-rounded flint gravel and/or a glauconitic horizon. The formation overlies the Harwich Formation or where the Harwich Formation is absent the Lambeth Group.

In the north London area, the upper part of the London Clay has been disturbed by periglacial processes and may contain pockets of sand and gravel.

2.6 Unpublished Geology

Published information on four boreholes was available in a radius of about 300m from the site. Soils described as Made Ground were described in the majority of the boreholes, generally observed from ground level to depths ranging from 0.60m to 1.40m bgl. The Made Ground typically comprised firm friable brown to dark brown to black to grey mottled sandy gravelly CLAY with occasional brick, ash, concrete, rubble, clinker and coal fragments.

Soils from weathered strata of the London Clay Formation were observed from below the Made ground to depths ranging from 5.50m to 7.50m bgl in three out of the four boreholes available. The soils of the Weathered London Clay Formation comprised firm becoming stiff to very stiff and fissured brown to brown orange to brown grey mottled CLAY with occasional selenite crystals and orange brown stained fissures.

Soils identified as belonging to the Claygate Member were observed in one out of the three boreholes from directly below the Made Ground to a depth of about 5.80m bgl and typically comprised firm becoming stiff grey mottled and brown to light grey brown sandy clayey SILT.

The London Clay Formation was observed in all of the four boreholes at depths ranging from 5.50m to 7.50m bgl to the full depths of the investigation and typically comprised stiff to very stiff and closely fissured dark grey to dark brown silty CLAY with occasional light brown to brown fine sand and silt partings and rare fine gypsum.

2.6.1 Groundwater

Groundwater was generally not reported in the unpublished data. Where observed, it was found at depths ranging from 1.20 m to 2.30 m bgl. This is likely to be a 'perched' water table within the Claygate Member with the groundwater collected on top of the London Clay. The regional water table in this location is around 20 m below sea level (Environment Agency, 2016). It must be pointed out that the groundwater levels from unpublished geology may describe conditions that differ from the results of the site investigation.

2.7 Hydrology

The nearest surface water feature was the Golders Hill Chain of ponds recorded ~750m to the north-east of the site.

The site was recorded at an elevation of approximately 95 m AOD, and the ponds of the Golders Hill Chain were at approximately 102 m AOD.

2.8 Hydrogeology

The Environment Agency has produced an aquifer designation system consistent with the requirements of the Water Framework Directive. The designations have been set for superficial and bedrock geology and are based on the importance of aquifers for potable water supply and their role in supporting water bodies and wetland ecosystems.

Information presented by the Environment Agency classifies the Claygate Member bedrock as a Secondary 'A' aquifer and the London Clay Formation bedrock as unproductive strata, as also reported within the Guidance for subterranean Development, Table 2.

Any water infiltrating the London Clay Formation will generally tend to flow vertically downwards at a very slow rate. Due to the predominantly cohesive nature of the soils, the groundwater flow rate is anticipated to be very slow. Published permeability data for the London Clay Formation indicates the horizontal permeability to generally range between 10^{-10} m/s and 10^{-8} m/s (~5 mm/year to ~5 mm/day), with an even lower vertical permeability.

Vertical permeability within the Claygate is slow in view of the presence of layers of clay, but horizontal permeability is likely to be one or two orders of magnitude higher, e.g. up to 0.5 m/day, especially if sandy lenses will be encountered.

2.9 Flood Risk

The National Flood Information Service shows the site to be located within an area at very low risk of flooding from rivers or the sea. The area fell also outside the maximum extent of flooding from reservoirs and the risk can be considered as negligible to very low. A very low risk of flooding from surface water was also identified.

According to the Environmental Agency, the site did not fall within a Groundwater Source Protection Zone. The site does not lie within a flood risk zone from rivers or the sea or in a flood warning area.

The site falls outside from the Critical Drainage areas of the London Burough of Camden, but, as reported in the LBC Strategic Flood Risk Assessment, Platt's Lane was highlighted as a street suffering flooding from surface water in 2002.

The maps related to the mentioned flood risk assessment are presented in Figure 12 to Figure 20.

2.10 Underground Infrastructure

There is no known information with regards to buried infrastructure in close proximity to the site, as reported in Figure 21.

There are no reported Network Rail or London Underground Limited assets within the site's vicinity.

Section 3 Screening

3.1 Introduction

Soils Limited has adopted a screening process to meet the requirements of the London Borough of Camden (LBC), Camden Planning Guidance for Basements and Lightwells CPG4 to identify potential risks to the ground, groundwater/surface water, land stability, adjacent properties and infrastructure. The assessment is undertaken in the form of tabulated questions, setting out relevant considerations for conditions in the borough. Where simple answers may be provided without further analysis, these are provided.

A number of screening tools are included in the Arup document (Ref: Camden geological, hydrogeological and hydrological study, Guidance for Subterranean Development, Issue01/November 2010), which includes a series of questions within a screening flowchart for three categories; surface water flow, groundwater flow and land stability. Responses to the questions are tabulated below.

3.2 Subterranean (Groundwater) Screening Assessment

The response to the Subterranean (Groundwater) Screening Assessment is given in Table 3.1.

Table 3.1 – Subterranean (Groundwater) Screening

Question	Response	Action Required
1a. Is the site located directly above an aquifer?	Yes Secondary 'A' Aquifer	The soils of the Claygate Member were observed as mainly cohesive and, therefore, the seepage of groundwater was assumed to be relatively low. Pumps must be used in the temporary conditions to ensure a safe and comfortable development. In the permanent condition, the basement must be provided with appropriate sumps and pumps. No dewatering of the surrounding areas was considered to avoid the development of settlements eventually affecting the neighbouring structures.

Question	**Response**	**Action Required**
1b. Will the proposed basement extend beneath the water table surface?	Yes	Groundwater monitoring to be completed as part of the design process to confirm the level of the water table. The basement design would take into account the potential of water ingress over the lifetime of the structure and would include appropriate water proofing design and the design of appropriate sumps and pumps.
2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	No The closest used water features belong to the Golders Hill Chain of ponds, located at about 750m to the north-east of the site. The closest disused watercourse was the river Westbourne, as described by Barton (1965) and Talling (2011). The river was approximately located 300m to the south/south-east.	None
3. Is the site within the catchment of the pond chains of Hampstead Heath?	No The Hampstead Heath ponds chain was located about 1000m to the east of the site.	None
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No No significant changes in the ratio between paved and unpaved areas due to the presence of lightwells.	None: the change in ratio due to the presence of lightwell is negligible. Front lightwell and rear patio are in previously paved areas. Rear garden still existing. The increase is less than 1% of the permeable areas.
5. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	No No significant change in the ratio between paved and unpaved areas. Surface drainage system linked to public sewer.	None

Question	Response	Action Required
6. 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 or spring line?	No No ponds or spring lines in the close proximities of the site.	None

3.3 Stability Screening Assessment

The response to the Stability Screening Assessment is given in Table 3.2.

Table 3.2 – Stability Screening

Question	Response	Action Required
1. Does the existing site include slopes, natural or manmade, greater than 7°?	No No significant slopes were identified on site.	None
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°?	No The information provided by the Client did not report a re-profiling of the landscape.	None
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	No No significant slopes identified within the area of interest.	None
4. Is the site within a wider hillside setting in which the general slope is greater than 7°?	No The site falls within a wider hillside setting. No slopes greater than 7% were identified within the area of interest.	None
5. Is the London Clay the shallowest strata at the site?	No Soils of the Claygate Member were found underlying the Made Ground.	None

Question	**Response**	**Action Required**
6. 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 No tree to be felled as part of the development. The Tree Survey Report proposed the removal of two live elderberry trees and of one dead cherry tree as potentially involved with the works.	None Trees will not be cut as part of the development. The eventual cut of trees, as suggested within the Tree Survey Report, will not change the status quo and induce variations in the moisture content of the soils. The cherry tree was found dead and the area of influence of the two elderberry trees, considered as moderately water demanding trees and with a radius of influence of 0.75 times the mature height of trees, not affecting the foundations.
7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	No The absence of existing underpinning provides the evidence of the absence of a history of shrinkage/swelling. Atterberg Limits Tests identified the soils of the Claygate Member as having a medium volume change potential. No relevant change in soil moisture content expected due to eventual tree cutting (not dependent on the development).	None Precautions to be taken for soils with medium volume change potential as per NHBC Chapter 4.2 and BRE digest 240. No significant variations in moisture content expected from potential tree cutting because the development will take place immediately out of the zone of influence of the trees (Figure 22)
8. Is the site within 100 m of a watercourse or potential spring line?	No The closest used water features belong to the Golders Hill Chain of ponds, located at about 750m to the north-east of the site. The closest disused watercourse was the river Westbourne, as described by Barton (1965) and Talling (2011). The river was approximately located 300m to the south/south-east.	None

Question	Response	Action Required
9. Is the site within an area of previously worked ground?	No The site was characterised by the presence of Made Ground, but no evidence of pre-existing pits, cuttings, etc.	None
10. Is the site within an aquifer?	Yes Secondary 'A' Aquifer	The soils of the Claygate Member were observed as mainly cohesive and, therefore, the seepage of groundwater was assumed to be relatively low. Pumps must be used in the temporary conditions to ensure a safe and comfortable development. In the permanent condition, the basement must be provided with appropriate sumps and pumps. No dewatering of the surrounding areas was considered to avoid the development of settlements eventually affecting the neighbouring structures.
11. Is the site within 50 m of the Hampstead Heath ponds?	No The Hampstead Heath ponds chain was located about 1000 m to the east of the site.	None
12. Is the site within 5 m of a highway or pedestrian right of way?	No 12 Platt's Lane was located at more than 5m due to the presence of the front driveway.	None
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Yes No information was available regarding to the basement at the adjoining property at 10 Platt's Lane.	Basement Impact Assessment to be carried out to take into account the worst case scenario, represented by the absence of the neighbouring basement and of a relevant increase in the foundations differential depths.
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No No Network Rail or London Underground tunnels expected.	None

3.4 Surface Flow and Flooding Screening Assessment

The response to the Surface Flow and Flood Screening Assessment is given in Table 3.3.

Table 3.3 – Surface Flow and Flooding Screening

Question	Response	Action Required
1. Is the site within the catchment of the pond chains of Hampstead Heath?	No The Hampstead Heath ponds chain was located about 1000m to the east of the site.	None
2. 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 The negligible change in the ratio between paved an unpaved areas and the presence of a surface drainage system connected to the public sewer imply that no relevant changes will take place.	None
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No No significant changes in the ratio between paved and unpaved areas due to the presence of lightwells.	None: the change in ratio due to the presence of lightwell is null to negligible. Front lightwell and rear patio are in previously paved areas. Rear garden still existing.
4. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	No No relevant changes will be applied to the ratio between paved and unpaved areas and an appropriate drainage system will be provided.	None
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No No effects on the quality of surface water are expected because of the proposed development.	None
6. Is the site in an area known to be at risk from surface water flooding?	Yes The NFIS identified a very low risk of flooding from surface water. SFRA reports Platt's Lane at very low risk from surface flooding (<1 event in 1000 years) and at low flood hazard (<0.75). One single event recorded in 2002 according to SFRA. The site does not fall within a CDA.	The construction of the basement does not increase the risk of surface water flooding and permeable areas will be preserved on site. Considering the very low risk identified, it is recommended to provide mitigation measures in agreement with SFRA, Section 6.5.

3.5 Summary

Based on the screening exercise, further stages of the basement impact assessment are required. A summary of the basement impact assessment requirements has been provided in Table 3.4, Table 3.5 and Table 3.6.

Table 3.4 – Subterranean (Groundwater Flow)

Item	Description
1a	The soils of the Claygate Member were observed as mainly cohesive and, therefore, the seepage of groundwater was assumed to be relatively low. Pumps must be used in the temporary conditions to ensure a safe and comfortable development. In the permanent condition, the basement must be provided with appropriate sumps and pumps. No dewatering of the surrounding areas was considered to avoid the development of settlements eventually affecting the neighbouring structures.
1b	Groundwater monitoring to be completed as part of the design process to confirm the range of levels of the water table. The basement design would take into account the potential of water ingress over the lifetime of the structure and would include appropriate water proofing design and the design of appropriate sumps and pumps..

Table 3.5 – Ground Movement (Land stability)

Item	Description
10	The soils of the Claygate Member were observed as mainly cohesive and, therefore, the seepage of groundwater was assumed to be relatively low. Pumps must be used in the temporary conditions to ensure a safe and comfortable development. In the permanent condition, the basement must be provided with appropriate sumps and pumps. No dewatering of the surrounding areas was considered to avoid the development of settlements eventually affecting the neighbouring structures.
13	The present BIA was carried out to take into account the worst case scenario, represented by the absence of the neighbouring basement and of a relevant increase in the foundations differential depths.

Table 3.6 – Surface Flow and Flooding

Item	Description
6	The construction of the basement does not increase the risk of surface water flooding and permeable areas will be preserved on site. Considering the very low risk identified, it is recommended to provide mitigation measures in agreement with SFRA, Section 6.5.

Section 4 Intrusive Investigation

4.1 Ground Conditions

On the 17th June 2016, three windowless sampler boreholes (WS1, WS2, WS3) were attempted on site, at locations selected by Soils Limited, where access could be gained and no live services were identified, adjacent to the footprint of the proposed redevelopment. The depth investigated ranged from 5.00m (WS3) to 5.80m bgl (WS1 and WS2).

Dynamic probing (DP1 and DP2) was undertaken prior and adjacent to the respective boreholes (WS1 and WS2) using a Super Heavy Dynamic Probe (DPSH) to depths ranging from 3.00m and 10.00m bgl.

Standpipe monitoring wells were installed in all of the three boreholes to a depth of 5.0 metres bgl (below ground level) to allow long-term groundwater levels monitoring. Groundwater readings were then carried out on three occasions, as agreed with the Client.

On 10th August 2016, three trial pits for foundation exposure tests were dug at locations selected by the Client and modified on site due to site constraints. After the tests, the trial pits were then backfilled with arisings.

The borehole locations are outlined in Figure 3.

Table 4.1 outlines the depths of each trial-hole.

Table 4.1 – Investigatory Depths of Trial-holes

Trial-hole (WS)	Final Depth (m bgl)	Trial-hole (WS)	Final Depth (m bgl)
WS1	5.80	DP2	3.00
WS2	5.80	FE1	1.00
WS3	5.00	FE2	0.65
DP1	10.00	FE3	0.90

Ground conditions encountered are presented below; detailed information including logs are presented in Appendix A:

Made Ground (MG)
Claygate Member (CLGB)

Table 4.2 summarises the ground conditions encountered.

Table 4.2 – Ground Conditions

Stratum	Epoch	Depth Range (m bgl)		Thickness (m)	Description
		Top	Bottom		
MG	Recent	GL	0.30 – 1.40	1.00	Pavement and fine to coarse concrete and brick over soft yellow brown to grey/brown slightly clayey gravelly SAND to silty CLAY to soft light brown to light brown mottled light grey slightly sandy slightly gravelly to slightly sandy gravelly CLAY to soft greyish brown to dark grey slightly sandy SILT to CLAY.
CLGB	Palaeogene	0.30 – 1.40	5.00[1] – 6.00[1]	Not proven[2]	Soft to firm to stiff light brown mottled light grey and orange to brown mottled light grey and orange to grey to greyish brown CLAY to slightly sandy slightly silty to sandy CLAY.

Note: [1] Final depth of trial hole. [2] Base of strata not encountered.

4.1.1 Made Ground

Made Ground was encountered in five out of the six trial holes from ground level to depths ranging from 0.30m to 1.40 m bgl and comprised pavement and fine to coarse concrete and brick over soft yellow brown to grey/brown slightly clayey gravelly SAND to silty CLAY to soft light brown to light brown mottled light grey slightly sandy slightly gravelly to slightly sandy gravelly CLAY to soft greyish brown to dark grey slightly sandy SILT to CLAY. Sand was fine to medium. Gravel was fine to medium sub-angular brick and concrete with occasional to rare fine clinker fragments. Rare to occasional fine ash fragments.

4.1.2 Claygate Member

Soils described as Claygate Member were found in all of the six trial holes directly beneath the Made Ground and comprised soft to firm to stiff light brown mottled light grey and orange to brown mottled light grey and orange to grey to greyish brown CLAY to slightly sandy slightly silty to sandy CLAY with occasional to frequent lenses and pockets of silty fine sand. Sand was fine. Soft consistency was noted in particular in the area of borehole WS3.

4.1.3 Roots

Fine roots and rootlets were encountered in three out of the six trial holes to depths ranging from 1.00m (WS1) to 4.00m bgl (WS3). The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot by plot basis prior to the construction of foundations. Supplied site surveys may not include substantial shrubs or bushes and is also unlikely to have data or any trees, bushes or shrubs removed prior to or following the site survey.

Where trees are mentioned in the text this means existing trees, substantial bushes or shrubs, recently removed trees (approximately 20 years to full recovery on cohesive soils) and those planned as part of the site landscaping).

4.1.4 Groundwater

Groundwater equilibrium conditions may only be conclusively established if a series of observations are made via groundwater monitoring wells. Groundwater monitoring wells were installed into all of the three windowless sampler borehole to 5.0 m bgl.

Groundwater was recorded during the site investigation at depths ranging from 3.00m (WS3) to 4.90m bgl (WS1). The intrusive investigation was carried out in June (2015), when groundwater levels should be lowering towards their annual minimum (i.e. lowest) elevation which typically occurs around September.

Further groundwater monitoring was conducted within the 3No. standpipes installed on site following completion of site works and has been presented in Table 4.3. Not all the wells were accessible during the site visits because of the ongoing site works, causing some of the locations to be covered with spoil or damaged by others.

Table 4.3 - Groundwater Monitoring

Trial Hole	Depth to Water (m bgl)		
	17/06/2016	15/07/2016	10/08/2016
WS1	4.90	2.20	2.95
WS2	4.00	- [1]	- [2]
WS3	3.00	1.30	- [1]

Note: [1] Well not accessible. [2] Well damaged.

Groundwater was observed at shallow depth, rising from its lowest elevation recorded at 4.90m bgl during the intrusive investigation to 1.30m bgl in July 2016. That behaviour was considered a consequence of the permeability of the soils of the Claygate Member, characterised by very low vertical values, but potentially also by higher horizontal permeability due to the presence of sandy layers. The potential for the presence of perched water must also be considered, as reported by the Environmental Agency on the Management of the London Basin Chalk Aquifer (2016).

4.2 Foundation Exposures

Foundations exposures were carried out in FE1, FE2 and FE3. Different locations were initially selected by the Client, but slight relocations were needed due to site constraints. The final locations were agreed with the Client.

Trial pits FE1 and FE2 were dug to the front of the building, indicatively under the bay windows, while FE3 was dug to the north-east flank of the building. The trial holes locations were reported in Figure 3.

No proper foundation was observed within trial pit FE1. According to information provided by the Client, in the area of the trial pit a ramp down into a garage was previously located.

In trial pits FE2 and FE3 brickworks were observed to depths ranging from 0.28m and 0.57m bgl and overlaying mass concrete blocks, potentially identifying previous trench fills or local underpins.

The full foundations sketched for FE2 and FE3 are presented in Appendix A.1.

Section 5 Discussion of Geotechnical In-Situ and Laboratory Testing

5.1 Dynamic Probe Tests

Dynamic probing (DPSH) was undertaken at two locations (DP1 and DP2) adjacent and prior to the drilling of the respective windowless sampler boreholes to depths ranging from 3.00m (DP2) to 10.00m bgl (DP1). The results were converted to equivalent SPT “N” values based on dynamic energy using commercial computer software (Geostru). The results were then interpreted based on the classifications outlined in Appendix B.1, Table B.1.1 to Table B.1.3.

The Claygate Member recorded equivalent SPT “N” values between 3 and 24. The cohesive soils of the Claygate Member were classified as very low to high strength with inferred undrained cohesive strength of 15kPa to 120kPa.

A full interpretation of the DPSH tests are outlined in Appendix B.2, Table B.2.1.

5.2 Atterberg Limit Tests

Atterberg Limit tests were performed on six sample from the Claygate Member. The results were classified in accordance with BRE Digest 240 and NHBC Standards Chapter 4.2.

The soils of the Claygate Member were classified as medium volume change potential in accordance with both BRE Digest 240 and NHBC Standards Chapter 4.2.

A full interpretation of the Atterberg Limit tests is outlined in Table B.2.2, Appendix B.2 and the laboratory report in Appendix B.3.

5.3 Sulphate and pH Tests

Three samples were taken from the Claygate Member (WS1:2.30m bgl; WS2:1.70m bgl; WS3:3.00m bgl) for water soluble sulphate (2:1) and pH testing in accordance with Building Research Establishment Special Digest 1, 2005, ‘Concrete in Aggressive Ground’.

The tests recorded water soluble sulphate between 11mg/l and 23mg/l with pH values of 7.5 to 8.0.

The significance of the sulphate and pH Test results are discussed in Section 6.2 and the laboratory report in Appendix B.3.

Section 6 Foundation Design

6.1 Allowable Bearing Values

Assuming a strip foundation, 5.00m x 0.75m in plan, the recommended allowable bearing pressure for the Claygate Member at basement formation level is 95kPa. The evaluation of the expected settlements was reported in detail in Section 7.

6.2 Subsurface Concrete

Sulphate concentration measured in 2:1 water/soil extracts fell into Class **DS-1** of the BRE Special Digest 1 2005, *'Concrete in Aggressive Ground'.* Table C2 of the Digest indicated ACEC (Aggressive Chemical Environment for Concrete) site classifications of **AC-1**. The pH of the soils tested ranged between 7.5 and 8.0. The classification given was determined using the mobile groundwater case, as groundwater was encountered. The laboratory results are presented in Appendix B.3.

Concrete to be placed in contact with soil or groundwater must be designed in accordance with the recommendations of Building Research Establishment Special Digest 1 2005, *'Concrete in Aggressive Ground'* taking into account any possible exposure of potentially pyrite bearing natural ground and the pH of the soils.

Section 7 Basement Impact Assessment – Land/Slope Stability

7.1 Introduction

This section provides calculations to determine ground movements that may result from the construction of the additional basement level and to assess how these may affect adjacent structures.

Movements are likely to occur through the following mechanisms:

7.1.1 Heave Movements

The excavation will unload the Claygate Member and the London Clay Formation and will cause a degree of heave, and/or settlement after construction.

7.1.2 Underpin Settlement

Construction of underpins can lead to settlement. With good workmanship, this would be expected to be limited to 5mm of settlement per underpin 'lift'. Settlement may potentially also occur where foundation loads are transferred to deeper, previously unload, soils.

Underpinning settlement only affects shared foundations, such as foundations to party walls. Where foundations are not shared, or the properties linked, workmanship will not affect the adjoining structure.

7.2 Ground Movement arising from Basement Excavation

The soils at formation level will be subject to stress relief during excavation, as up to about 3.60m of overburden is to be removed under the house, the rear garden and the lightwells. This is likely to give rise to a degree of heave over the short term and potential heave or settlement over the longer term as structural loads are reapplied.

A ground movement assessment has been undertaken using OASYS Limited PDISP (Pressure induced DISPlacement analysis) analysis software. PDISP assumes that the ground behaves as an elastic material under loading, with movements calculated based on the applied loads and the soil stiffness (E_u and E') for each stratum input by the user. PDISP assumes perfectly flexible loaded areas and as such tends to overestimate movements in the centre of loaded areas and underestimate movements around the perimeters. Notwithstanding this, the structure has not been modelled as an evenly loaded flexible raft and loads from underpins around the perimeter have been accounted for and modelled in the analysis. The calculated movements are therefore, not considered to be underestimated.

The proposed development gives rise to a net unloading of the underlying strata both during construction and over the long term. The excavation will unload the soils under the house by approximately 61kPa, assuming that the ground conditions encountered during the site investigation are laterally continuous across the extent of the proposed new basement. These values assume a typical bulk unit weight of 16.6kN/m^3 and a saturated unit weight of 18.4kN/m^3 for the soils above the foundation level formation. The combined effects of both the immediate undrained unloading and the long-term drained recovery of pore pressures have been analysed.

Considering the results of the site investigation, an interpretation was carried out using commercial software Geostru. The stiffness parameters reported in Table 7.1 were adopted for the soils involved in the analyses.

Table 7.1 – Soil Parameters

Stratum	Depth to Top of Stratum (m bgl)	Young's Modulus (MPa)	Poisson's Ratio
Made Ground	0.00	5.04	0.30
Claygate Member	3.60	12.49	0.30
	6.40	16.96	0.30

One critical section was identified in the neighbouring property at 10 Platt's Lane and one in the detached property at 14 Platt's Lane.

The critical section at 10 Platt's Lane was identified at a distance of about 10.90m from the outer face of the underpinning and, as already stated, it was conservatively assumed that no basement was present under the adjoining building.

The building at 14 Platt's Lane, as already discussed, was detached from the proposed development. Three different scenarios were considered because of the varying distance from the proposed development.

Scenario SC1, approximately to the front third of the building with reference to Platt's Lane, was about 1.80m distant from the proposed development and the corresponding width of the building was about 5.70m.

Scenario SC2, to the middle third of the building, was about 3.15m distant from the proposed development and the corresponding width of the building was about 4.50m.

Scenario SC3, to the rear third of the building, was about 3.90m distant from the proposed development and the corresponding width of the building was about 3.80m.

The mentioned scenarios were reported in Figure 4 and the input/output files from PDISP were reported in Appendix H.

7.2.1 Short Term Heave

Calculated short term heave was divided by a factor equal to three, as suggested by Simons and Menzies (2000) in order to take into account the increase in stiffness along a path of unloading and reloading. In order to evaluate the calculation of settlements across the area and along the distance between the outer face of the underpinning and the critical sections considered, the purpose was achieved by increasing the Young's Moduli by a factor equal to three. Poisson's Ratio was considered equal to 0.50 for cohesive soils under undrained conditions.

For the building at 10 Platt's Lane, minimum short term heave is predicted to be of the order of -4.00mm, occurring towards the rear patio and the front lightwell. Negative values indicate an upwards movement. The movement decreases towards the underpins located along the boundary lengths of the basement. Heave was noted to occur within these areas up to a maximum of -1.20mm due to the net increase of surcharged load. The movement decreases with negligible movement at 3m from the boundary underpins and towards the front of the property. A contour plot showing the variation of long term movements across the entire basement footprint is presented in Figure 5.

Minimum short term heave under the footprint of the detached building at 14 Platt's Lane is predicted to be of the order of -0.50mm, occurring under the wall facing the proposed development. The movement decreases towards the opposite side of the building to a minimum of -0.20mm

7.2.2 Long Term Ground Movement

Long term movements depend on the almost contemporary development of the increase of heave (negative settlements) in the long term due to the reduction in stiffness of the soils and the development of (positive) settlements due to the construction of the basement and the application of the loads from the upper structure to greater depths. Those movements develop contemporary and cannot be distinguished, but an evaluation of the long term heave, as developing alone, was also reported for completeness on the graph in Figure 6. It must be pointed out that long term heave and other long term movements develop contemporary and on the same time scale because of the methods adopted for the excavation and construction sequences used in the construction of basements under existing buildings.

In the case of the building at 10 Platt's Lane, maximum long term ground movements, therefore, are obtained by adding the long term heave to the settlements induced by the application of the construction loads and are of the order of -16.00mm, occurring in the rear patio and the front lightwell. The movement decreases to an average of 1.60mm around the party wall and negligible movement at 5.0m from the excavation. A maximum settlement of about 2.00mm was noted at the underpins face along the property boundaries. A contour plot showing the variation of long term movements across the entire basement footprint is presented in Figure 6.

Maximum long term ground movements under the footprint of the building at 14 Platt's Lane were recorded to be less than 0.50mm under the wall facing the proposed development and decreased to a maximum of about 0.20mm at the opposite side of the building.

7.2.3 Settlement Due To Workmanship

The heave/settlement assessment undertaken within PDISP assumes perfect workmanship in the underpin construction and does not allow for settlement of the dry pack between existing footings and the new concrete. With good construction practice, these would be expected to not exceed 5.00mm (assuming 5.00mm per underpin lift). This value will be applied to the overall ground movement and corresponding impact assessment to give a worst case damage category for the adjacent party wall properties.

7.3 Ground Movement Due To Underpin Wall Deflection

The retained height of the underpin wall is to be a maximum of some 3.60m beneath the ground floor, assuming 440mm thick concrete underpins, and taking no account of a liner wall for long-term movements, deflections of the underpins would be expected to be less than 5mm. The calculations were carried out using the commercial software Wallap for the property at 10 Platt's Lane. It is assumed that underpins are propped in the temporary condition in order to prevent lateral movement. Over the long-term, temporary props will be eliminated and the underpins will act as a cantilever wall, propped by just the basement floor slab.

Limited information was available from the literature with regards to the propagation of movements at a distance from the excavation and the wall stem, especially with regards to horizontal movements. An estimation was then done considering the information provided by CIRIA C580 in Section 2.5.2, Figure 2.8, and the wall assumed as a cantilevered secant pile wall. Horizontal movements were estimated to be less than 0.042% of wall height, corresponding to a horizontal movement of less than 1.51mm, for SC1, less than 0.022% of wall height (0.80mm) for SC2, and less than 0.018% of the height (<0.65mm) for SC3.

Section 8 Damage Category Assessment

8.1 Introduction

These ground movements were considered for assessing the expected potential damage category that the construction of a new basement was expected to induce to the neighbouring properties. The assessment was carried out considering the method described in CIRIA Special Publication 200 (Burland et al., 2001) and CIRIA C580 (Gaba et al., 2003), based upon the method proposed by Burland et al. (2001) and taking into account the works by Burland and Wroth (1974) and Boscardin and Cording (1989).

The general categories of damage entity were summarised in Table 6.1.

Table 8.1 – Classification Of Visible Damage To Walls

Category	Description
0 (Negligible)	Negligible – hairline cracks
1 (Very slight)	Fine cracks that can easily be treated during normal decoration (crack width <1mm)
2 (Slight)	Cracks easily filled, redecoration probably required. Some repointing may be required externally (crack width <5mm)
3 (Moderate)	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced (crack width 5 to 15mm or a number of cracks > 3mm).
4 (Severe)	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows (crack width 15mm to 25mm but also depends on number of cracks).
5 (Very severe)	This requires a major repair involving partial or complete re-building (crack width usually >25mm but depends on number of cracks).

The London Borough of Camden, Camden Planning Guidance, Basements and Lightwells (CPG4), July 2015 indicates that the design and construction methodology should aim to restrict the damage category to neighbouring properties to not higher than Category 2 damage (slight damage), as it will only imply the risk of aesthetic damages to the buildings.

However, the Council considers that neighbouring residential properties are particularly sensitive to damage, where relatively minor internal damage to a person's home can incur cost and considerable inconvenience to repair and redecorate. The Council therefore will expect BIAs to provide mitigation measures where any risk of damage is identified of Burland category 1 (very slight) or higher. Following inclusion of mitigation measures into the proposed scheme the changes in attributes are to be re-evaluated and new net consequences determined.

8.2 Summary of Ground Movements and Evaluation of Relative Deflection

The analysis of the ground movements reported in Section 7 allowed to estimate the relative vertical and horizontal deflections for the considered buildings and scenarios, corresponding to an expected Damage Category of 1 (Very slight) for the property at 10 Platt's Lane and to an expected Damage Category of 0 (Negligible) for all the scenarios regarding the property at 14 Platt's Lane according to the classification by Burland (2001). The results were summarised in Table 8.2.

Table 8.2 - Expected Damage Category

Critical Section	Horizontal Movement (mm)	Vertical Deflection (mm)	Horizontal Strain ε_h (%)	Deflection Ratio Δ/L (%)	Damage Category
10 Platt's Lane	<5.00	<4.50	0.046	0.041	1 (Very slight)
14 Platt's Ln (SC1)	<1.51	<0.10	0.026	0.002	0 (Negligible)
14 Platt's Ln (SC2)	<0.80	<0.10	0.018	0.002	0 (Negligible)
14 Platt's Ln (SC3)	<0.65	<0.10	0.017	0.003	0 (Negligible)

The results for the section at 10 Platt's Lane, as already explained, consider the effects of good workmanship to increase the potential damage. No workmanship error was considered for the section at 14 Platt's Lane, as that building does not share foundations with the proposed development. It must be pointed out that generally the evaluation of vertical and horizontal movements is over-conservative and this induces the evaluation of expected damage categories indicating a higher risk than the real one.

8.3 Mitigation Measures

In order to allow the minimisation of the effects, as required within CPG4, Section 3.30, mitigation measures were proposed to reduce the movements induced by the proposed development on the structure at 10 Platt's Lane to a Damage Category of 0 (Negligible) if possible.

It is recommended to carry out the excavation and construction during the dry period of the year, when the groundwater will be at a greater depth from the ground level. In order to carry out enhanced analyses, it was still assumed a worst credible case of groundwater at 1.30m bgl, but a moderately conservative condition assuming a depth of 2.00m bgl. The mentioned condition was considered compatible with the groundwater observations reported in Section 4.1.4.

The excavation phase must be carried out in small bays, in order to guarantee that it will interest the foundation soil mass on a local basis. No contiguous bays or bays on the opposite side of the building must be excavated contemporarily or at short distance before the completion of the erection of the wall and the finalisation of a correctly working resisting structure. The digging of soil from each bay and under the existing foundations must be done considering small advancements and not to excavate to the formation level in a unique solution, with the result of the total elimination of the passive resistance of the soils. The preservation of the passive resistance, furthermore, must be guaranteed until the props, temporary or permanent, will be put in place. The excavation under the existing foundation must be carried out by maintaining a 45º slope towards the centre of the site to guarantee an adequate support and the needed passive resistance.

Based upon the above assumption, the calculation of the effects induced by the excavation and erection of the underpinning was carried out again using Wallap with reference to the building at 10 Platt's Lane. The enhanced horizontal deflection reduced to 2.00mm. No further calculations were done with regards to vertical movements. The expected Damage Category was then reassessed as 0 (Negligible) and the results reported in Table 8.2.

Table 8.3 - Expected Damage Category - Reassessment

Critical Section	Horizontal Movement (mm)	Vertical Deflection (mm)	Horizontal Strain ε_h (%)	Deflection Ratio Δ/L (%)	Damage Category
10 Platt's Lane	<2.00	<4.50	0.018	0.041	0 (Negligible)
14 Platt's Ln (SC1)	<1.51	<0.10	0.026	0.002	0 (Negligible)
14 Platt's Ln (SC2)	<0.80	<0.10	0.018	0.002	0 (Negligible)
14 Platt's Ln (SC3)	<0.65	<0.10	0.017	0.003	0 (Negligible)

The input/output files from the software used in the assessment were reported in Appendix H and Appendix I.

The use of a good construction control and of a continuous ground monitoring could improve the performances of the structures, with a further minimisation of the construction effects (Ball et al., 2014).

8.4 Cumulative Effects

The walkover identified the presence of a basement under the building at 10 Platt's Lane, but no information was made available with regards to the area occupied and the foundation depth. Therefore, the quantitative calculations considered the worst case scenario and the presence of the basement was ignored to take into account the maximum differential depth between the foundations of the adjoining buildings.

The presence of the basement, however, cannot be excluded for the development of qualitative evaluations regarding to the construction of a new basement adjoining an existing one, as mentioned in CPG4, clause 3.31, and GSD, clauses 168 to 174 and Figure 23.

The proposed development was to take place within the soils of the Claygate Member and it did not exclude the possibility for the groundwater to flow around and below the basement.

The construction of a further basement, therefore, will increase the length of the flow path and the potential for the increase of the upstream groundwater level exists. This effect can increase the potential ingress of water within the basement, increasing the risk already considered in Section 3.2. The design of the sump and pumping system, therefore, must be carried out considering a higher total volume and flow than the one obtainable for the construction of an isolated basement. Also, the choice of pump type must be carried out considering the risk of a long lasting use and the potential for electric black-outs during flooding events. A malfunctioning of the pumping device must be also taken into account. In order to reduce the risk of malfunctioning, an adequate maintenance programme must be prepared and it is strongly recommended to consider an appropriate system redundancy.

Section 9 Conclusions and Recommendations

9.1 General Considerations

The findings of this report are informed by site investigation data and information regarding construction methods, sequence, loading and allowable bearing capacity provided by the client. The analysis is undertaken on the assumption of high quality workmanship.

The analysis is based on site investigation data, particularly within the Claygate Member of the London Clay Formation and regarding to the groundwater depths. Soils Limited must be notified if different conditions are observed during the construction phase.

The formation level of the basement will be constructed within the Claygate Member, below the minimum groundwater level encountered during the ground investigation in one out of the three boreholes.

The observations carried out at the time of the intrusive investigation showed that the proposed foundation level would be positioned below the groundwater. The basement design would take into account the potential of water ingress over the lifetime of the structure and would include appropriate water proofing design as also the presence of appropriate water sumps. The basement must also be protected against the risk of flooding from sewers by applying positive pumping devices, as requested by CPG4, clause 5.11.

The proposed development will consider a negligible change in the proportion between paved and unpaved areas due to the construction lightwells. The lightwell to the front will be constructed over a small flowerbed and a portion of the access driveway in brick setts. The increase in paved area was therefore less than 1% of the permeable areas of the site, as reported on the drawings by XUL Architecture in Appendix F. The net effect on surface water flow or flooding can be, as a consequence, considered as negligible.

As the formation level of the basement will be below the level of seepage recorded on site, groundwater control measures may be required to keep isolated underpin excavations dry prior to concrete placement.

9.2 On the Expected Damage Category

The construction of the basement will generate ground movements due to a variety of causes including; heave, settlement, underpin construction and underpin wall deflection during and after excavation. Calculations indicate that these could give rise to a damage category within 'Category 0' (Negligible) for the adjacent properties. The above assumes a good standard of workmanship, the construction to be carried out in dry periods and the limiting of horizontal deflection of the underpins during construction.

It is recommended that all party wall foundations are propped prior to excavation commencing below them. The underpins should also be propped at regular intervals as construction progresses and that the passive resistance of the soils be retained prior to the application of the props. This is required to control horizontal deflection and prevent rotation and sliding of underpins prior to the basement and ground floor slab being cast.

A robust propping sequence must be adopted by the contractor responsible for the works in order to limit movements due to the surcharge imposed behind underpins by the adjacent structure.

The method for the development of all temporary and permanent works, including design and erection, depends on the particular technology and procedure adopted by the contractor, which will be fully responsible for them and for the respect of the information reported in the BIA. The contractor must apply all the care and professionality to ensure the respect of the deflections and damage categories estimated within the report.

It is recommended that an appropriate monitoring regime be adopted to manage risk and potential damage to the neighbouring structures with a further minimisation of the construction effects as construction progresses onsite (Ball et al., 2014). The definition of the monitoring regime must ensure that the works will be undertaken to respect the method statement prepared by the Structural Engineer and provided by the Client, in order to ensure a safe and considerate development and the integrity of the neighbouring properties. Soils Limited was not appointed for the design of ground movements monitoring, but if requested considers this to be done via the installation of inclinometers to the upslope of the underpinning and/or via topographic survey.

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Appendix E Construction Method Statement by Richard Tant Associates

Appendix F Documents by XUL Architects

Appendix G Documents by Aleck Associates

Appendix H PDISP Input/Output

Appendix I Wallap Input/Output

Appendix J Tree Survey Report

Appendix K Programme of Works

Appendix L Non-Technical Summary of the BIA

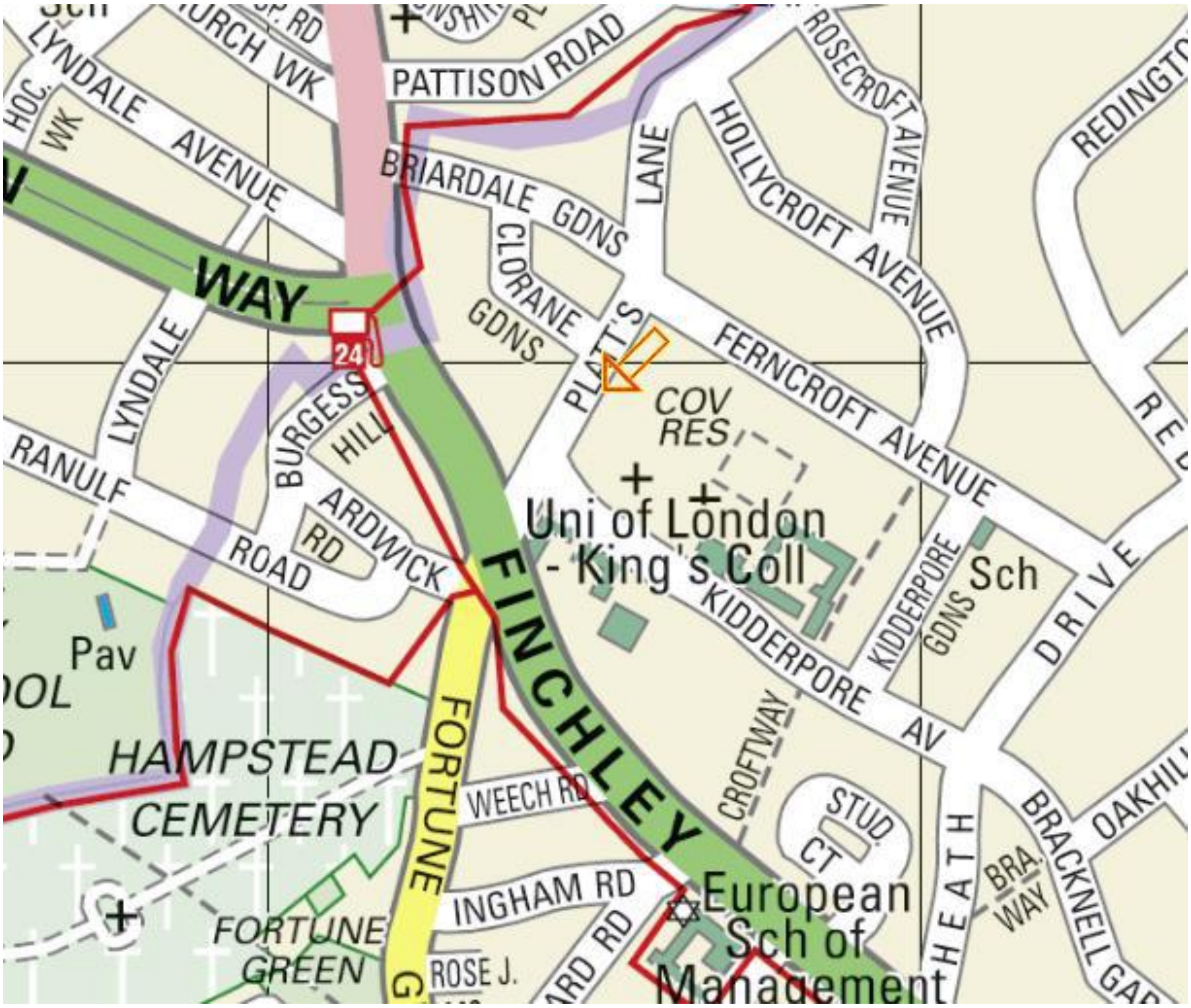

Figure 1 – Site Location Map

Job Number	**Project**
15655	12 Platt's Lane, London NW3 7NR
Client	**Date**
Orly Weinberger	December 2016

Figure 2 – Aerial Photograph

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Client
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Figure 3 – Boreholes Location

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Figure 4 – Scenarios

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Figure 5 – Undrained Heave

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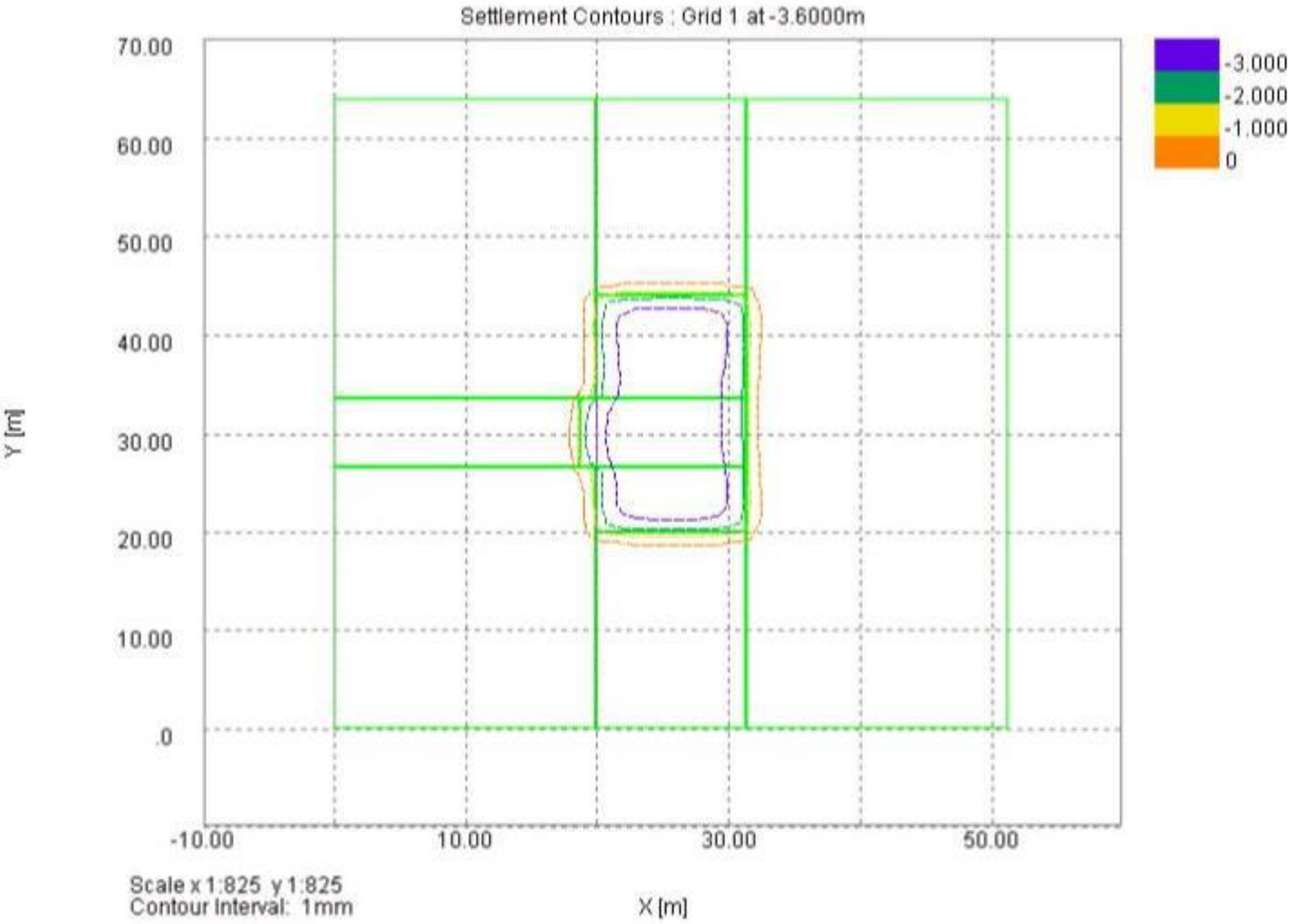

Figure 6 – Drained Movements

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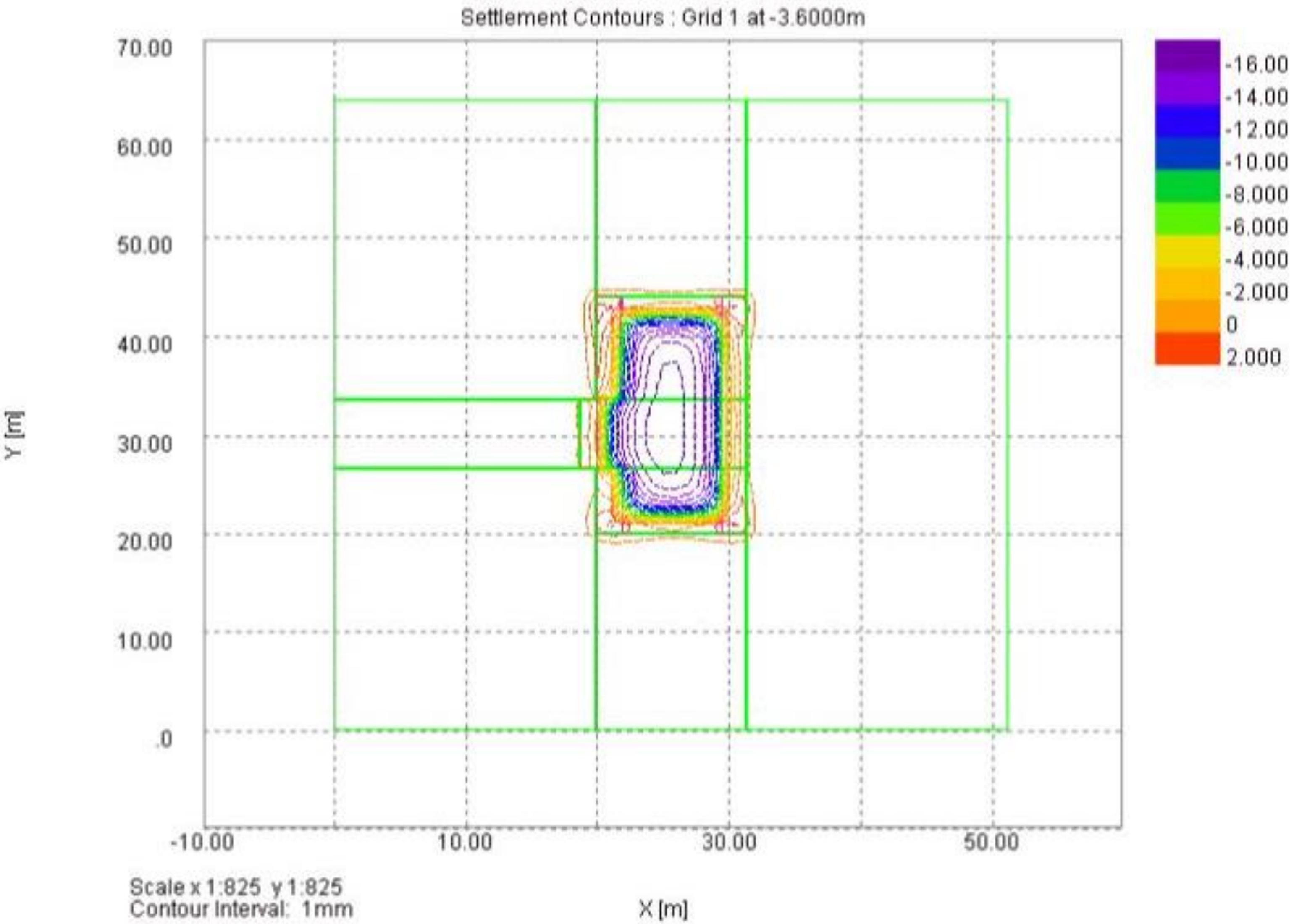

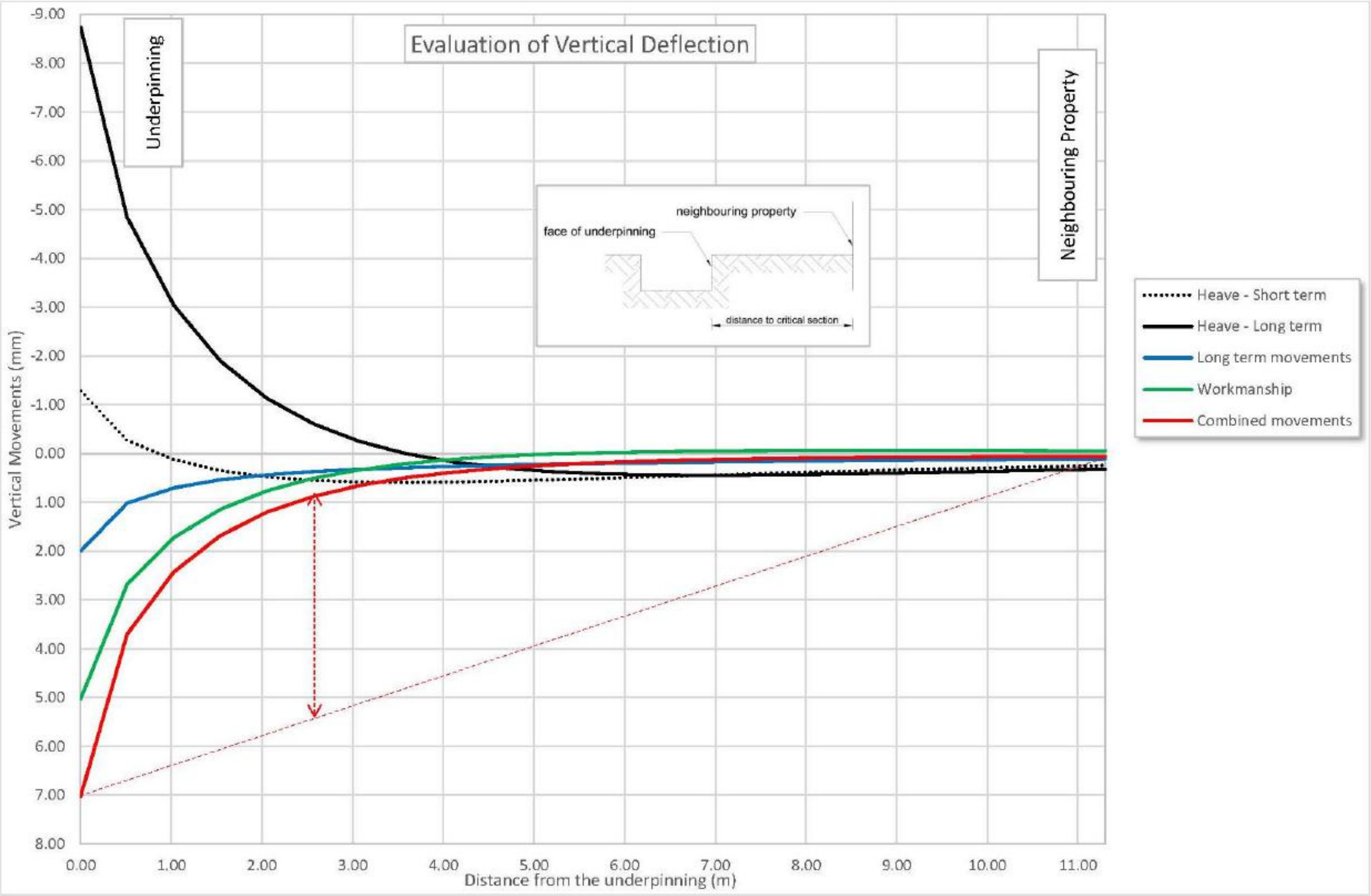

Figure 7 – Deflection at 10 Platt's Lane

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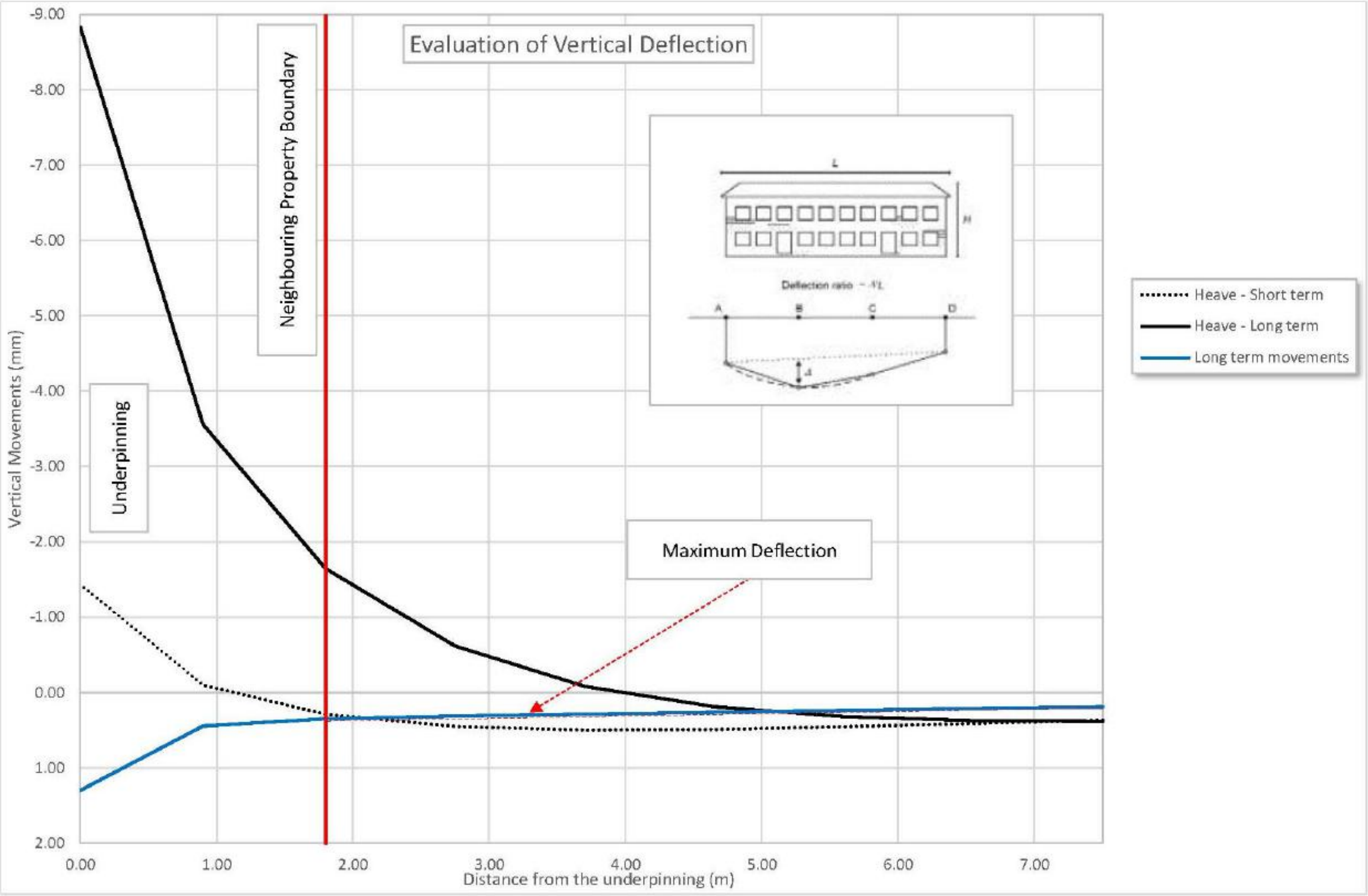

Figure 8 – Deflection at 14 Platt's Lane – SC1

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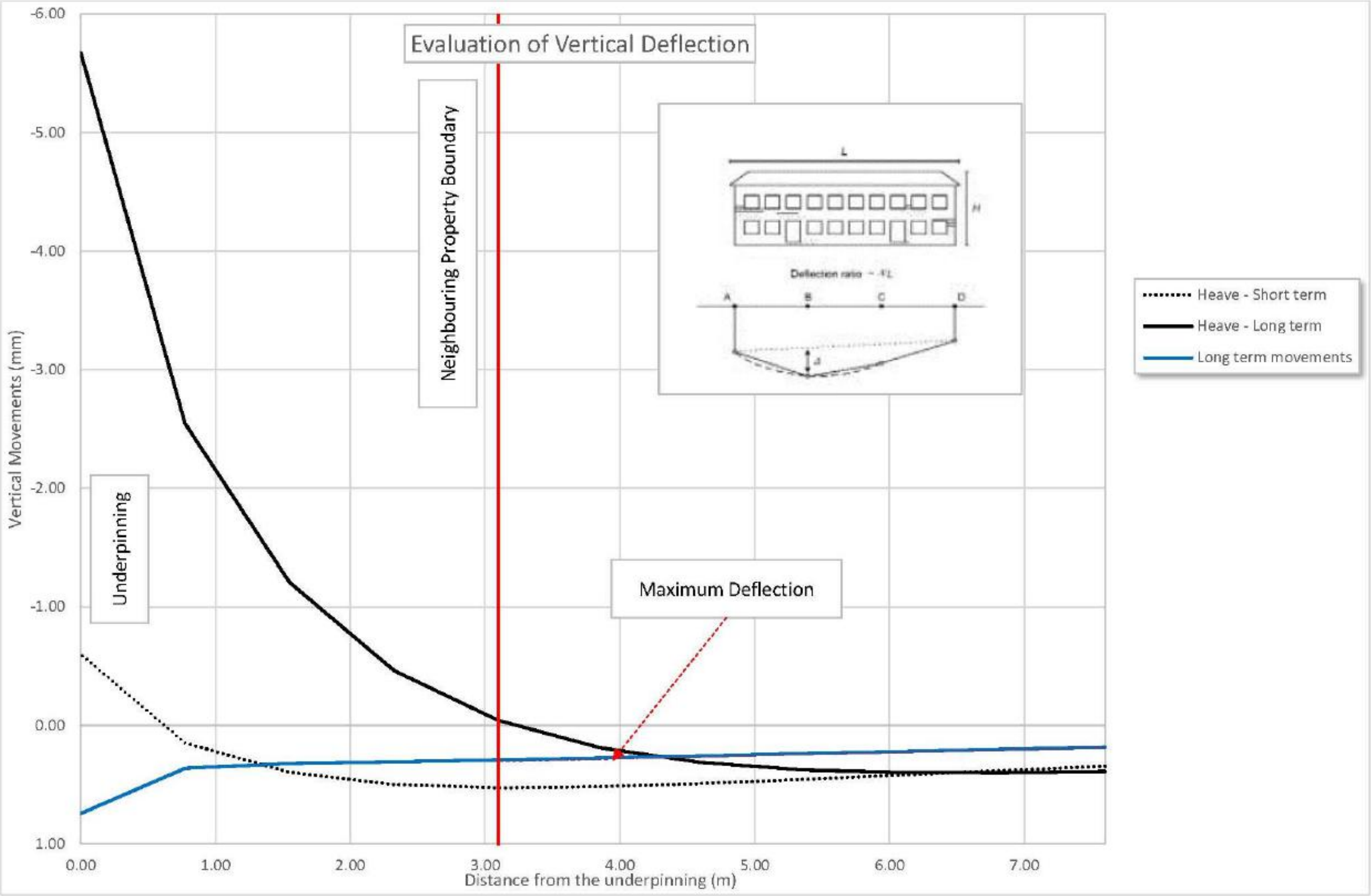

Figure 9 – Deflection at 14 Platt's Lane – SC2

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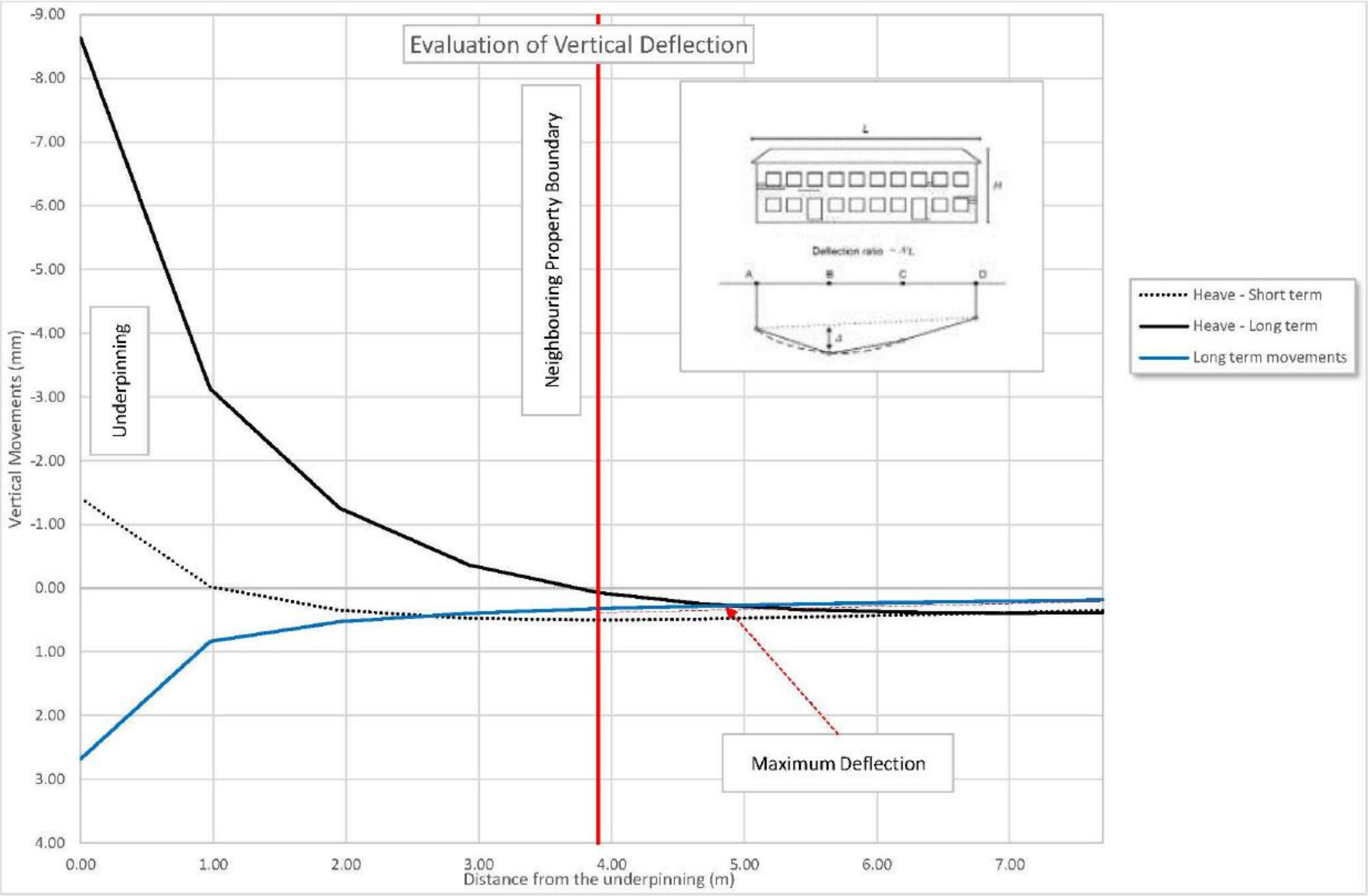

Figure 10 – Deflection at 14 Platt's Lane – SC3

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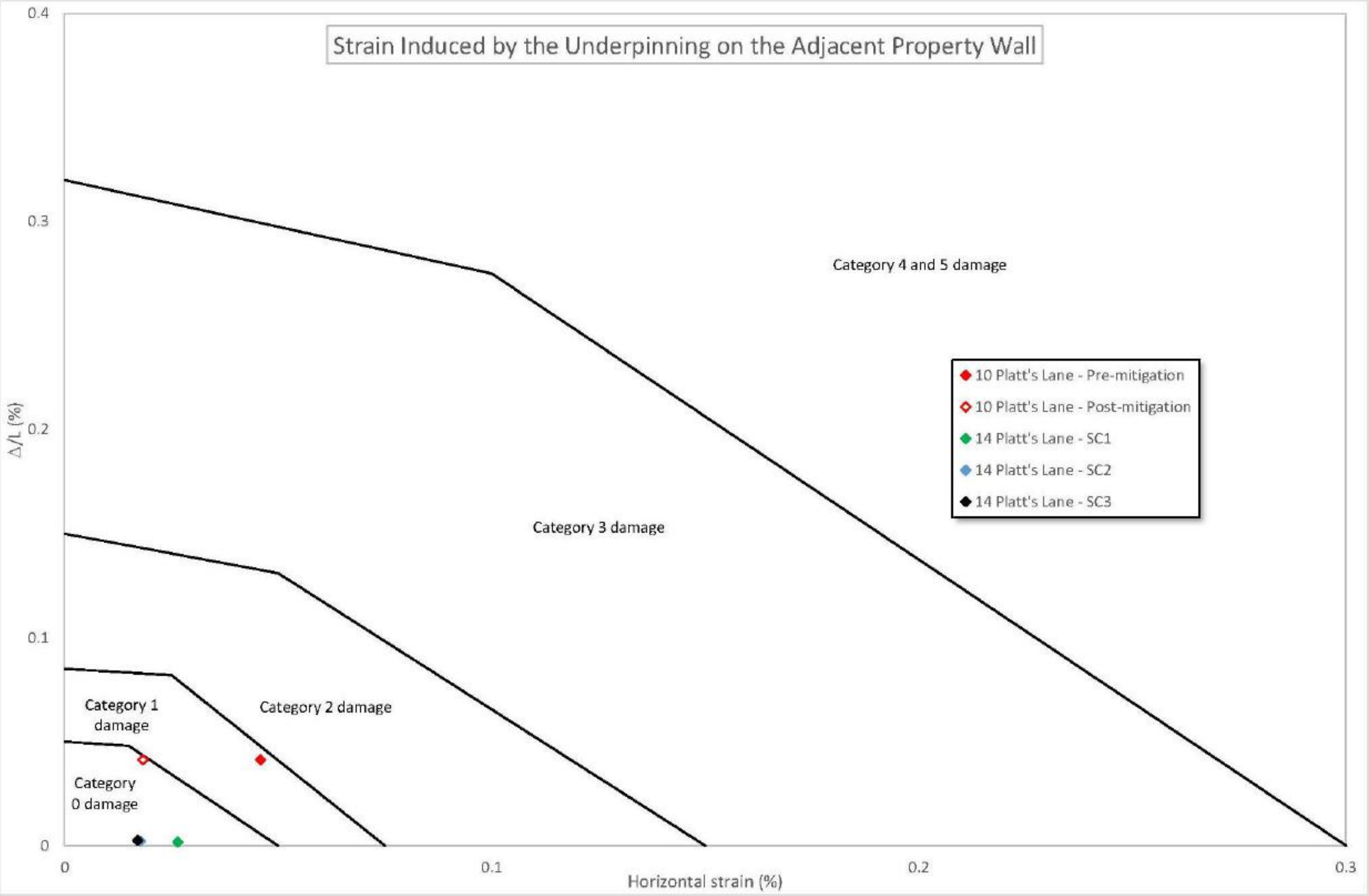

Figure 11 – Damage Category

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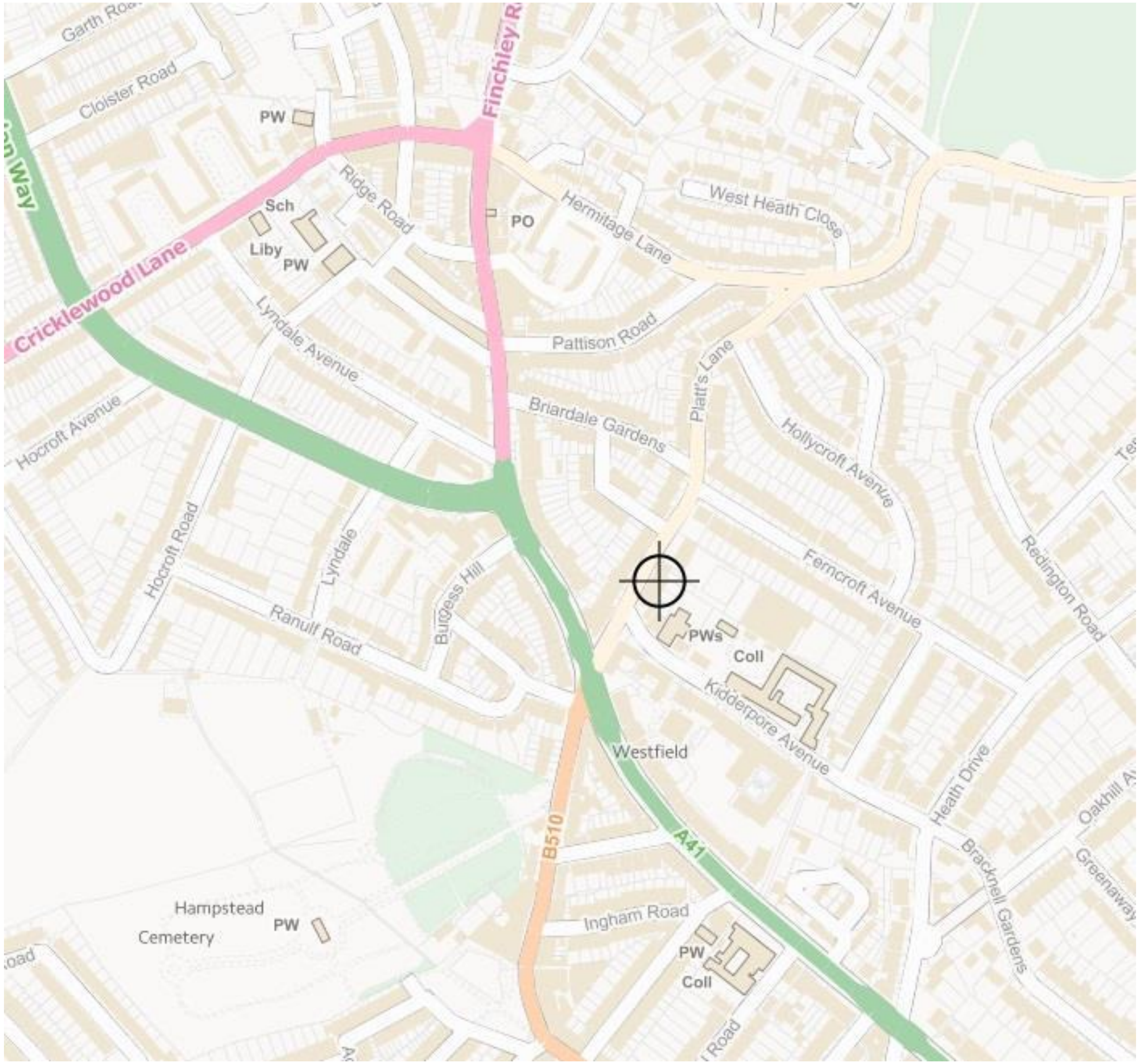

Figure 12 – NFIS, Flooding from Rivers and the Sea

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December 2016

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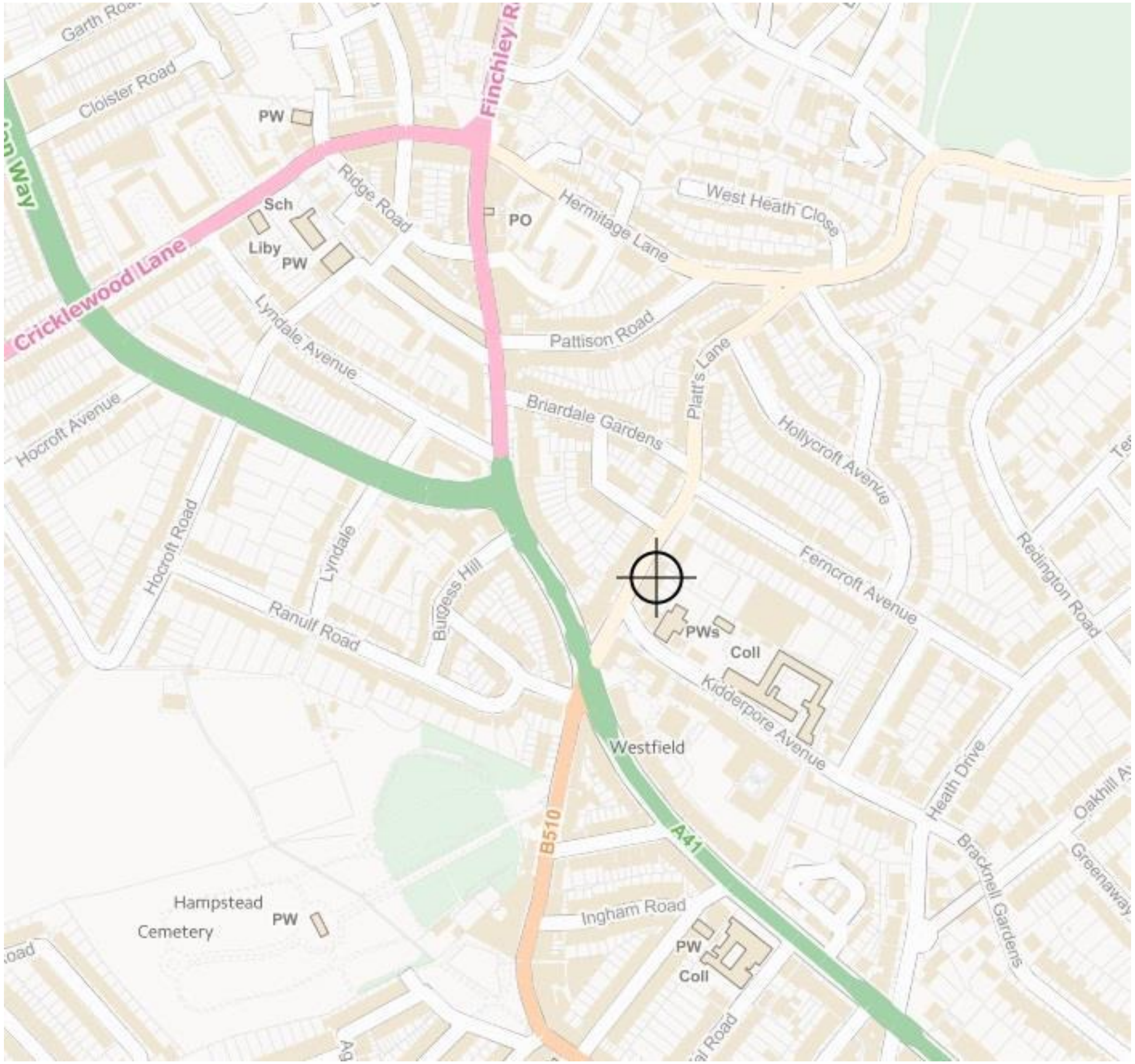

Figure 13 – NFIS, Flooding from Reservoirs

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December 2016

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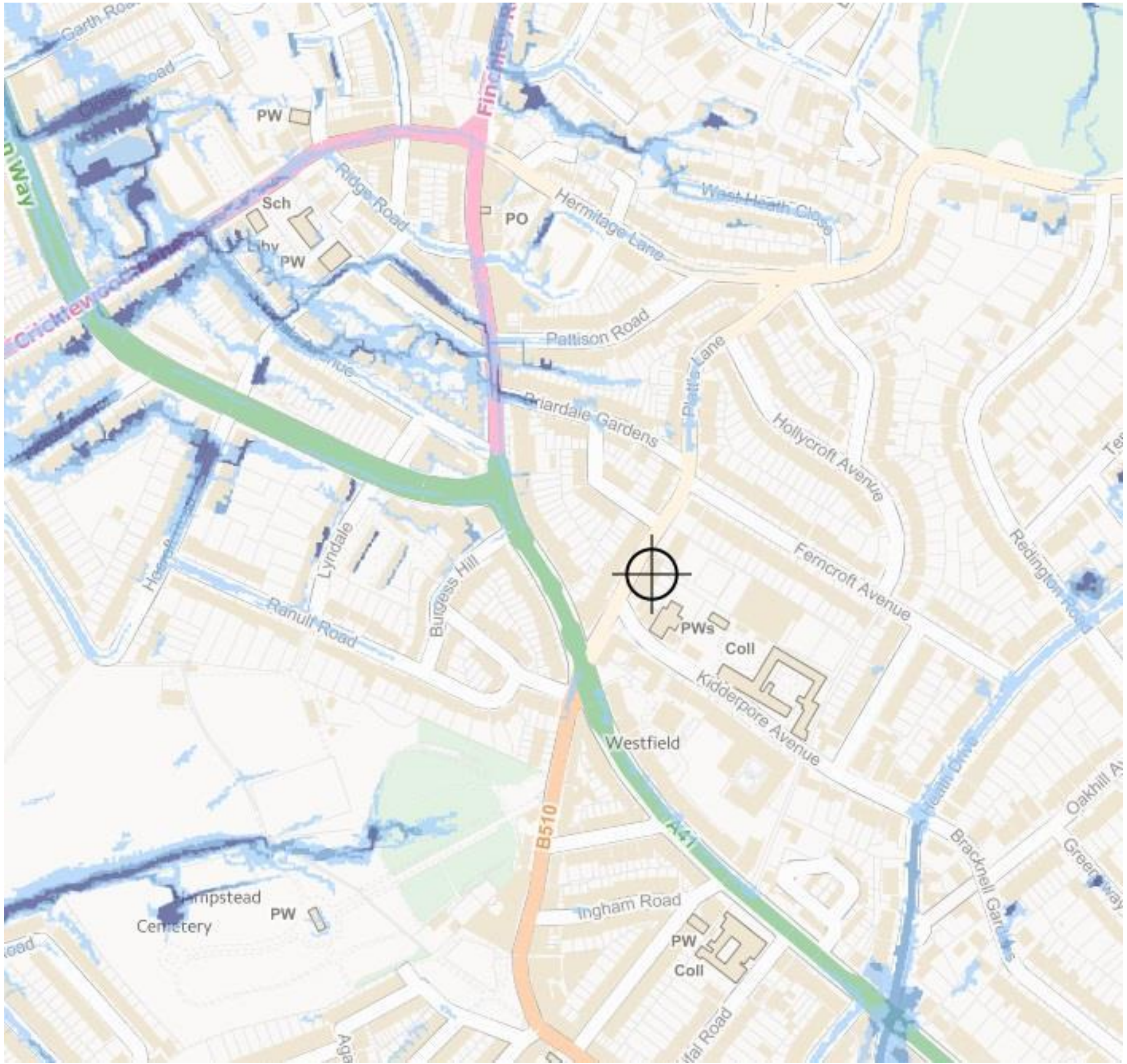

Figure 14 – NFIS, Flooding from Surface Water

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Figure 15 – EA, Groundwater Protection Zones

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Figure 16 – EA, Flooding from Rivers and the Sea

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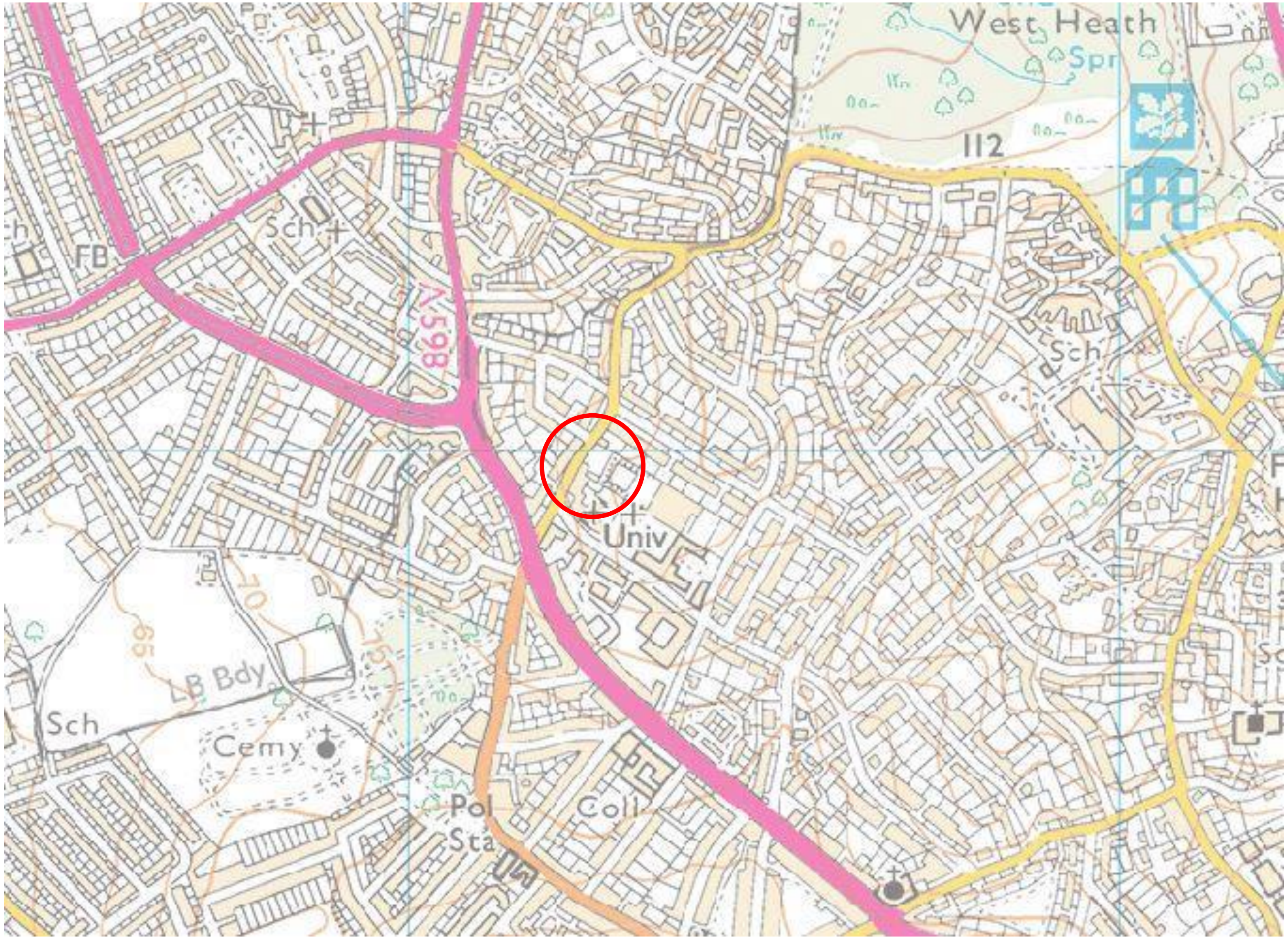

Figure 17 – EA, Flood Warning Areas

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Orly Weinberger

Date
December 2016

Job Number
15655

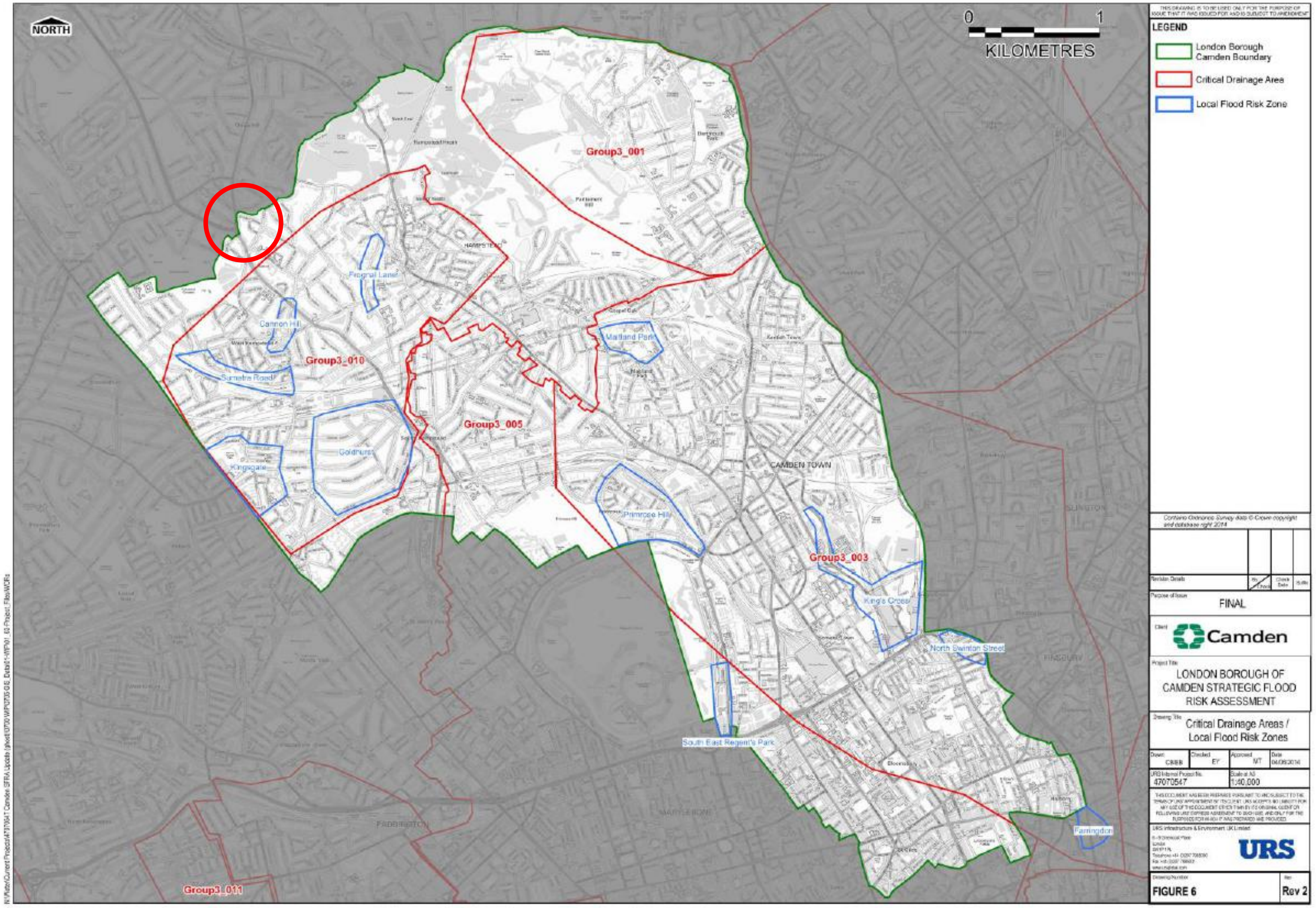


Figure 18 – SFRA, Critical Drainage Areas

Project
12 Platt's Lane, London NW3 7NR

Client
Orly Weinberger

Date
December 2016

Job Number
15655

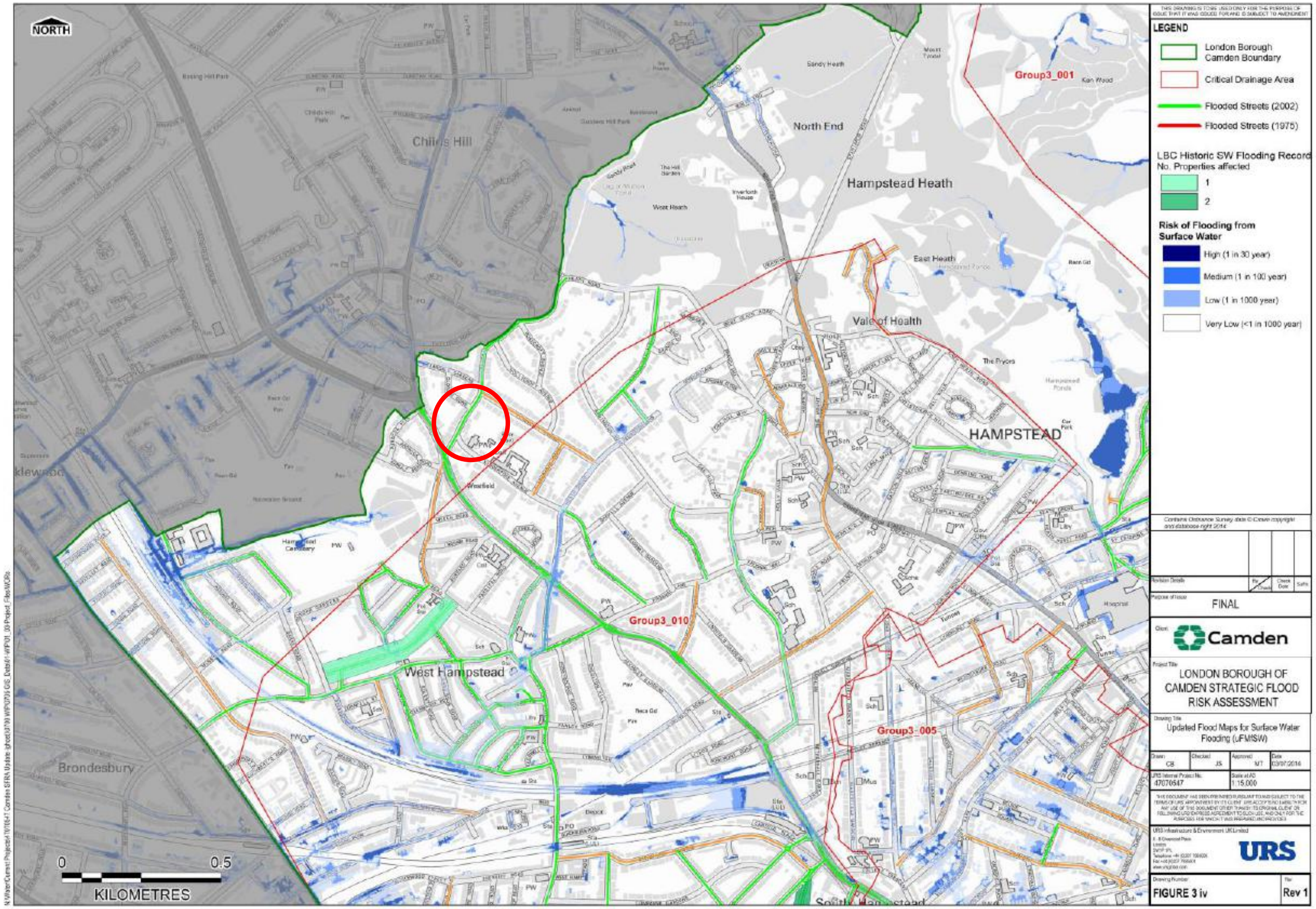


Figure 19 – SFRA, Flooding from Surface Water

Project
12 Platt's Lane, London NW3 7NR

Client
Orly Weinberger

Date
December 2016

Job Number
15655

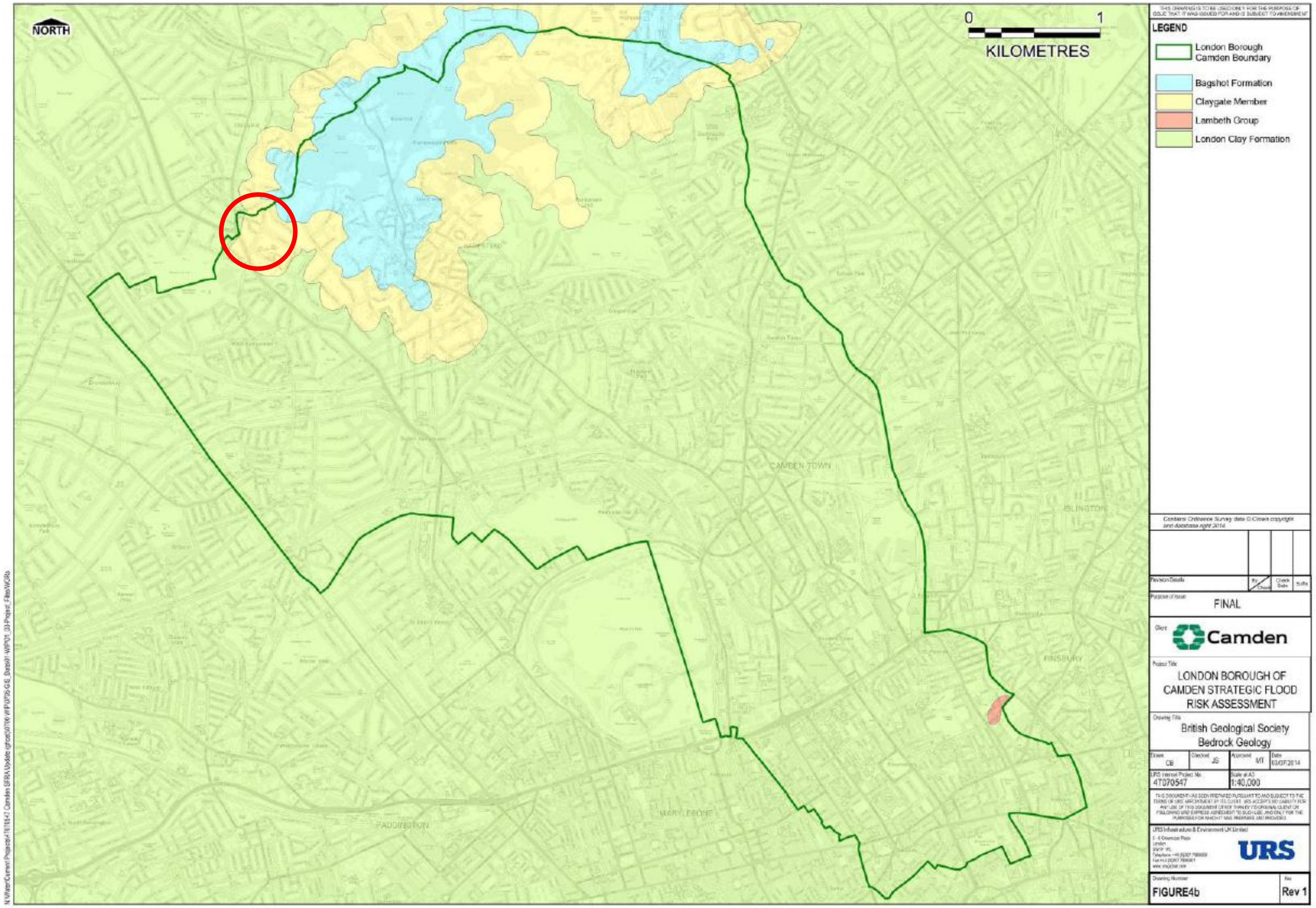


Figure 20 – SFRA, Claygate Member Localisation

Project
12 Platt's Lane, London NW3 7NR

Client
Orly Weinberger

Date
December 2016

Job Number
15655

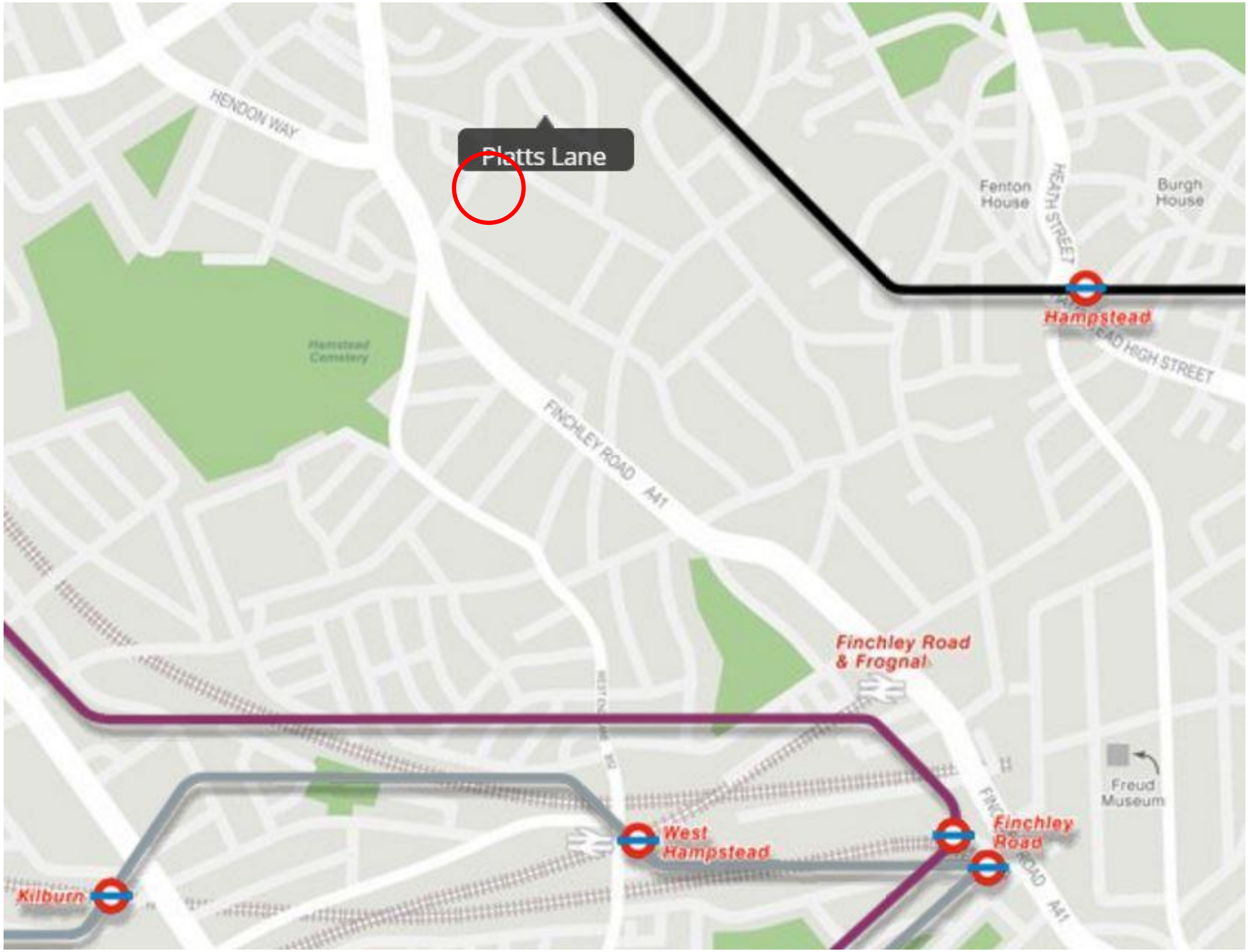


Figure 21 – Underground

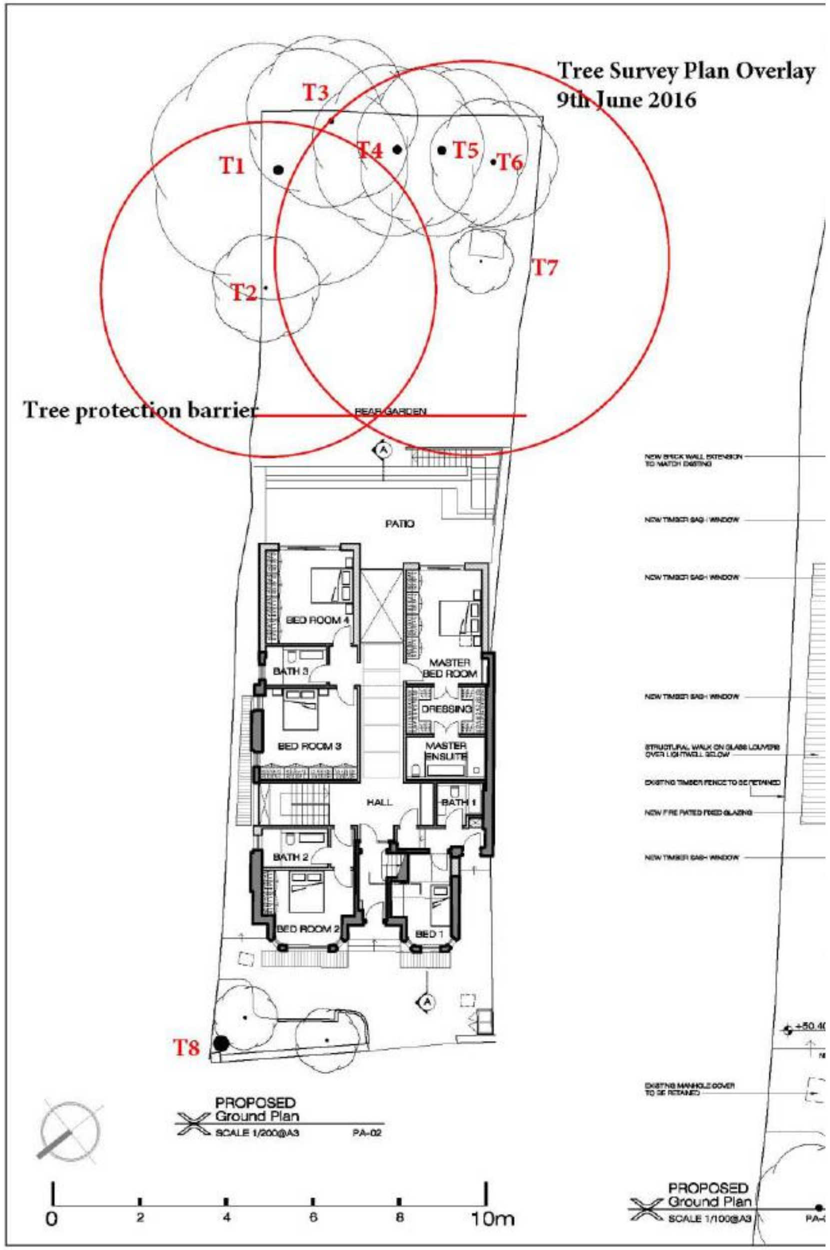
Project
12 Platt's Lane, London NW3 7NR

Client
Orly Weinberger

Date
December 2016

Job Number
15655

Figure 22 – Influence of Tree Roots



Project
12 Platt's Lane, London NW3 7NR

Client
Orly Weinberger

Date
December 2016

Job Number
15655

Appendix A Field Work

Appendix A.1 Engineers Logs

Borehole Log

Borehole No.
WS1
Sheet 1 of 1

Project Name: 12 Platt's Lane	Project No. 15655	Co-ords: -	Hole Type WS
Location: Finchley London NW3 7NR		Level:	Scale 1:50
Client: Orly Weinberger		Dates: 17/06/2016 - 17/06/2016	Logged By OK

Samples and In Situ Testing Depth (m)	Type	Results
0.30	J+D	
0.50	J+D	
1.00	J+D	
1.30	D	
1.80	D	
2.30	D	
2.80	D	
3.30	D	
3.80	D	
4.30	D	
4.70	D	
5.30	D	
5.80	D	

Water Strikes: ▼ 4.90

Depth (m)	Level (m)	Stratum Description
0.30		Fine to coarse concrete and brick GRAVEL. MADE GROUND D SAMPLE
0.50		Soft light brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium sub-angular brick and concrete. Occasional fine clinker fragments. Rare fine roots. MADE GROUND D SAMPLE
1.00		Soft light brown mottled light grey slightly sandy slightly gravelly CLAY. Sand is fine. Gravel is fine to medium sub-angular flint brick and concrete. Occasional fine clinker fragments. Rare fine roots. MADE GROUND D SAMPLE
1.40		Soft light brown mottled light grey slightly sandy slightly gravelly CLAY. Sand is fine. Gravel is fine to medium sub-angular flint brick and concrete. Rare fine clinker fragments. Occasional ash. MADE GROUND
2.00		Firm light brown mottled light grey and orange CLAY with occasional lenses and pockets of silty fine sand.
3.00		Soft light brown mottled light grey and orange CLAY with frequent lenses and pockets of silty fine sand.
4.00		Firm brown mottled grey and orange CLAY with occasional lenses and pockets of silty fine sand.
4.90		Firm brown mottled grey and orange CLAY with frequent lenses and pockets of silty fine sand.
6.00		Stiff grey CLAY with frequent lenses of silty fine sand becoming soft at 5.50.

End of borehole at 6.00 m

Remarks
Fine roots observed to 1.00m bgl. Groundwater strike at 4.90m bgl.

Borehole Log

Project Name: 12 Platt's Lane	Project No. 15655	Co-ords: -	Borehole No. **WS2** Sheet 1 of 1 Hole Type WS
Location: Finchley London NW3 7NR		Level:	Scale 1:50
Client: Orly Weinberger		Dates: 17/06/2016 - 17/06/2016	Logged By OK

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	J+D		0.20			Light brown mottled light grey and orange slightly sandy clayey SILT. Sand is fine. Occasional pockets of soft silty clay. Rare decomposed material. Occasional fine roots and rootlets. D SAMPLE
		0.50	J+D		0.50			
		1.00	D		1.00			Firm light brown mottled light grey and orange sandy CLAY. Sand is fine. A single sub-angular medium flint gravel. Occasional decomposed material. Occasional fine roots and rootlets. D SAMPLE
		1.30	D					
		1.70	D					Stiff light brown mottled light grey and orange CLAY with occasional lenses of silty fine sand. Occasional fine roots and rootlets. D SAMPLE
					2.00			
		2.30	D					Stiff light brown mottled light grey and orange CLAY with occasional lenses of silty fine sand. A pocket of clayey silty fine sand at 1.70 to 1.80. Occasional fine to medium roots and rootlets.
		2.80	D					Firm brown mottled light grey and orange CLAY with frequent lenses and pockets of silty fine sand becoming stiff at 3.0. Rare fine roots to 3.0.
		3.30	D					
		3.80	D					
	▼				4.00			Stiff brown mottled orange CLAY with frequent lenses and pockets of silty fine sand.
		4.30	D					
					4.70			Stiff grey CLAY with frequent lenses and pockets of silty fine sand becoming soft at 5.0.
		4.80	D					
		5.30	D					
		5.80	D					
					6.00			End of borehole at 6.00 m

Remarks
Fine to medium roots and rootlets observed to 2.00m bgl. Fine roots and rootlets observed to 3.00m bgl. Groundwater strike at 4.00m bgl.

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Borehole Log

Borehole No.	**WS3**
	Sheet 1 of 1
Project Name:	12 Platt's Lane
Project No.	15655
Co-ords:	-
Hole Type	WS
Location:	Finchley London NW3 7NR
Level:	
Scale	1:50
Client:	Orly Weinberger
Dates:	17/06/2016 - 17/06/2016
Logged By	OK

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D		0.20			Dark grey slightly sandy SILT. Sand is fine. Very rare fine brick fragments. Rare fine ash fragments. Frequent fine roots and rootlets. D SAMPLE
		0.50	D		0.50			Soft greyish brown slightly sandy CLAY. Sand is fine. Rare fine to medium brick fragments. Occasional fine ash fragments. Occasional fine roots and rootlets. MADE GROUND D SAMPLE
		1.00	D		1.00			Soft orange mottled light grey slightly sandy slightly silty CLAY. Sand is fine. A single medium sub-angular flint gravel. Occasional rootlets.
		1.50	D		1.50			Soft orangish brown mottled light grey slightly sandy slightly silty CLAY. Sand is fine. D SAMPLE
		2.00	D		2.00			Soft orange brown mottled light grey and orange CLAY with occasional lenses of silty fine sand. D SAMPLE
		2.50	D		2.50			Soft light brown mottled light grey CLAY with frequent lenses and pockets of silty fine sand. D SAMPLE
	▼	3.00	D		3.00			Soft light brown mottled light grey CLAY with frequent lenses and pockets of silty fine sand. D SAMPLE
		3.50	D		3.50			Soft brown mottled grey CLAY with occasional lenses of silty fine sand. D SAMPLE
		4.00	D		4.00			Soft brown mottled grey CLAY with occasional lenses of silty fine sand. Rare rootlets. D SAMPLE
		4.50	D		4.50			Firm brown CLAY with occasional lenses of silty fine sand. D SAMPLE
		5.00	D		5.00			Firm greyish brown slightly silty sandy CLAY. Sand is fine. D SAMPLE
								End of borehole at 5.00 m

Remarks

Fine roots observed to 0.50m bgl. Rootlets observed to 4.00m bgl. Groundwater strike at 3.00m bgl.

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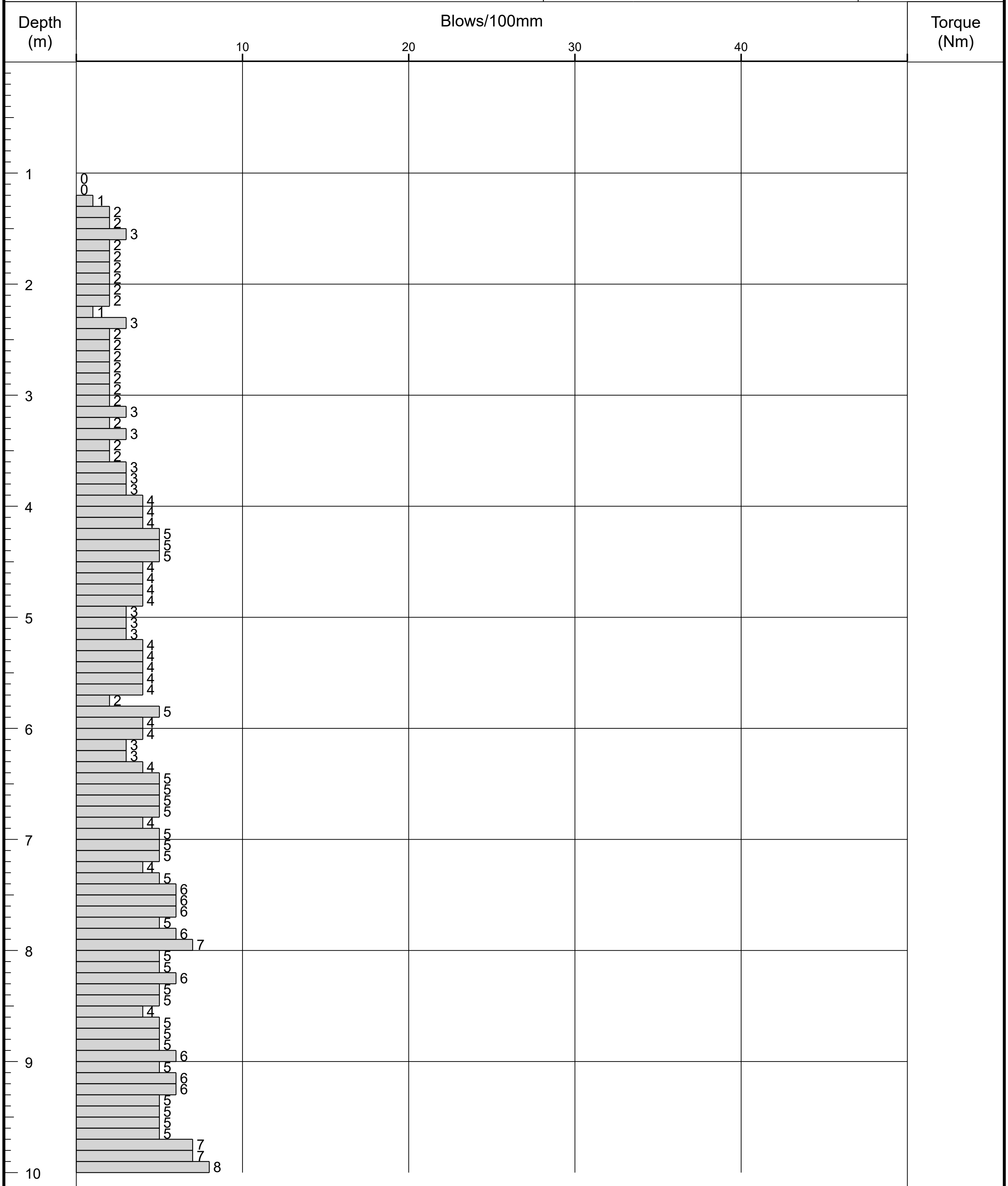
Probe Log

			Borehole No. **DP1** Sheet 1 of 1
Project Name: 12 Platt's Lane	Project No. 15655	Co-ords: -	Hole Type DP
Location: Finchley London NW3 7NR		Level:	Scale 1:50
Client: Orly Weinberger		Dates: 17/06/2016 - 17/06/2016	Logged By



Remarks	Fall Height	Cone Base Diameter		AGS
	Hammer Wt	Final Depth	9.90	
	Probe Type	Log Scale	1:50	

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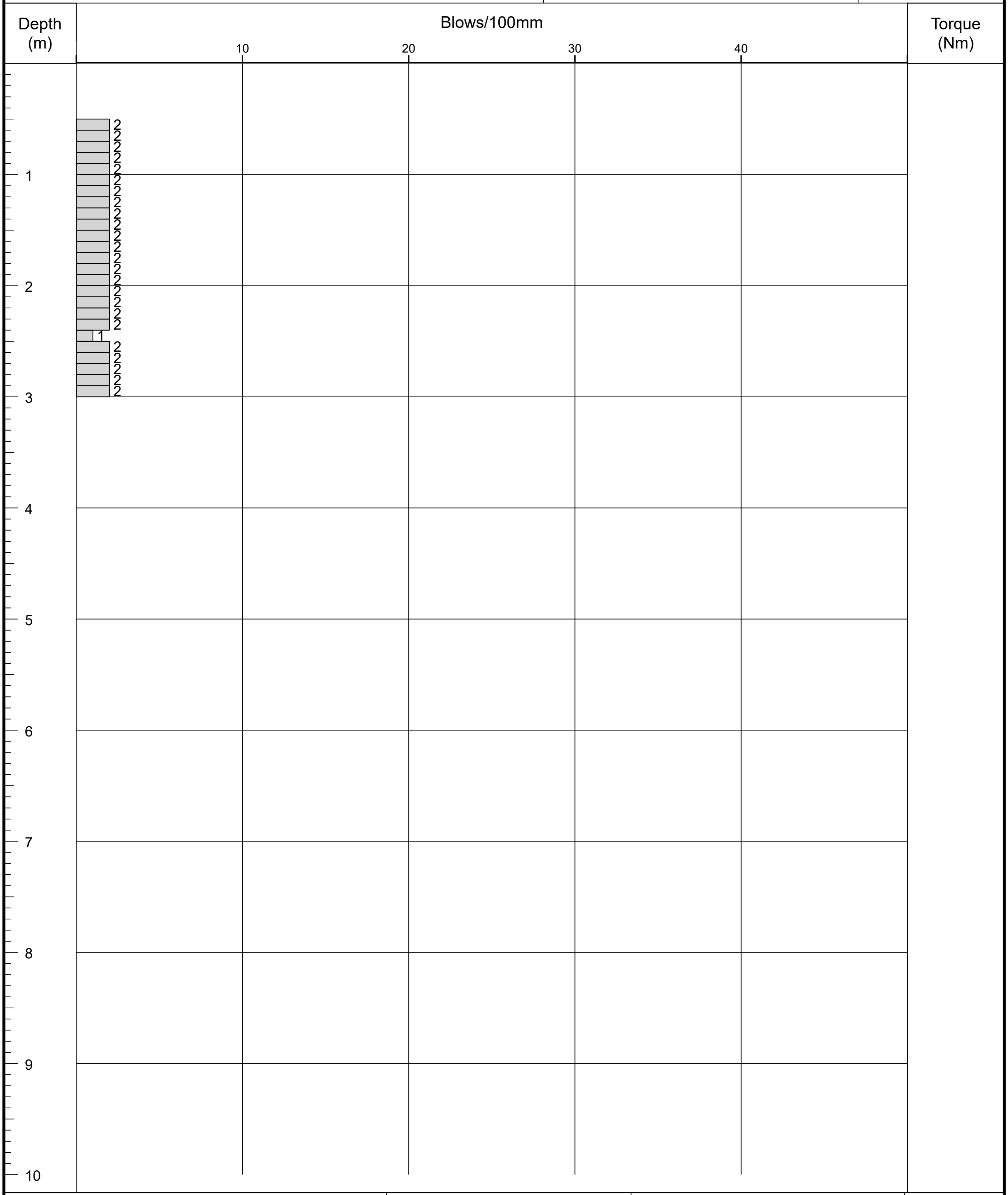
Probe Log

Project Name: 12 Platt's Lane	Project No. 15655	Co-ords: -	Borehole No. **DP2** Sheet 1 of 1
Location: Finchley London NW3 7NR		Level:	Hole Type DP
Client: Orly Weinberger		Dates: 17/06/2016 - 17/06/2016	Scale 1:50
			Logged By

Depth (m)	Blows/100mm	Torque (Nm)



Remarks	Fall Height	Cone Base Diameter
	Hammer Wt	Final Depth 2.90
	Probe Type	Log Scale 1:50

Soils Limited
Newton House, Cross Road, Tadworth KT20 5SR
Tel: 01737 814221 Email: admin@soilslimited.co.uk

Trial Pit Log

Trial Pit No. **FE1**
Sheet 1 of 1

Project Name: 12 Platt's Lane
Project No.: 15655
Method:
Plant:
Support:
Hole Type: TP
Location: Finchley London NW3 7NR
Scale: 1:25
Client: Orly Weinberger
Trial Pit Length: m
Trial Pit Width: m
Logged By
Dates: 10/08/2016
Level:
Co-ords:

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.55		▩	Grey/brown slightly clayey gravelly SAND with frequent fine to medium to coarse brick and concrete fragments. Fine to medium sub-angular to sub-rounded gravel. MADE GROUND
				1.00		▨	Soft orange/brown CLAY.
							End of Pit at 1.00m

General Remarks:

Groundwater Remarks:

Sample Type
D: Disturbed
B: Bulk
J: Jar
W: Water

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Tel: 01737 814221 Email: admin@soilslimited.co.uk

Trial Pit Log

Trial Pit No.
FE2
Sheet 1 of 1

Project Name: 12 Platt's Lane	Project No.: 15655	Method: Plant: Support:	Hole Type TP
Location: Finchley London NW3 7NR			Scale 1:25
Client: Orly Weinberger	Trial Pit Length: m	Trial Pit Width: m	Logged By
Dates: 10/08/2016	Level:	Co-ords:	

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.15		░	Pavement and concrete
				0.65		▩	Soft yellow brown slightly silty CLAY with occasional gravel and occasional brick and concrete fragments. Fine to medium sub-angular to sub-rounded gravel.
							End of Pit at 0.65m

1
2
3
4
5

General Remarks:

Groundwater Remarks:

Sample Type
D: Disturbed
B: Bulk
J: Jar
W: Water

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Tel: 01737 814221 Email: admin@soilslimited.co.uk

Trial Pit Log

Trial Pit No.
FE3
Sheet 1 of 1

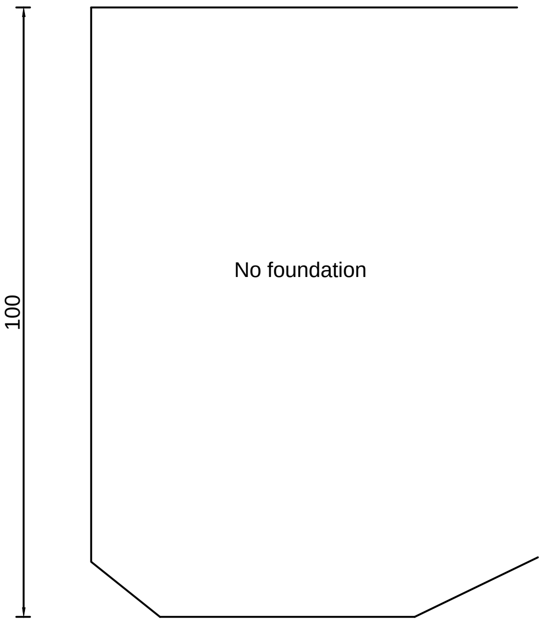
Project Name: 12 Platt's Lane
Project No.: 15655
Location: Finchley London NW3 7NR
Client: Orly Weinberger
Dates: 10/08/2016
Level:
Co-ords:
Method:
Plant:
Support:
Trial Pit Length: m
Trial Pit Width: m
Hole Type: TP
Scale: 1:25
Logged By

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30		▩	Grey/brown slightly clayey gravelly SAND with frequent fine to medium to coarse brick and concrete fragments. Fine to medium sub-angular to sub-rounded gravel. MADE GROUND
				0.90		▤	Soft orange/brown CLAY.
							End of Pit at 0.90m

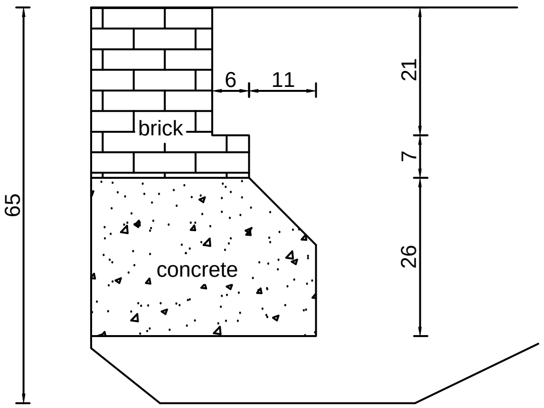
General Remarks:

Groundwater Remarks:

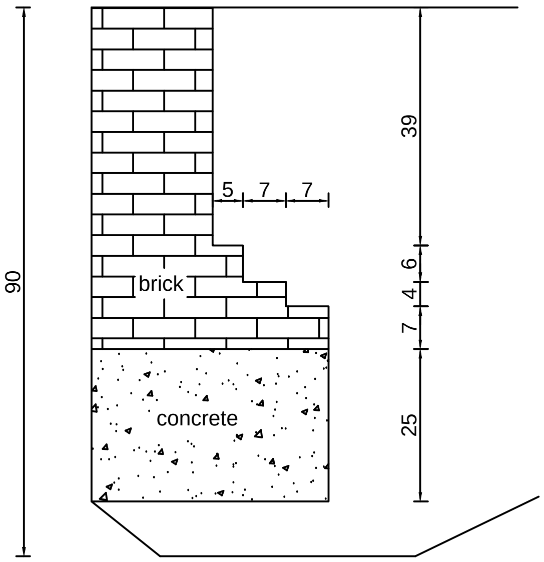
Sample Type
D: Disturbed
B: Bulk
J: Jar
W: Water


100
No foundation

FE1


65
6
11
brick
concrete
21
7
26

FE2


90
5
7
7
brick
concrete
39
6
4
7
25

FE3

Appendix B Geotechnical In-Situ and Laboratory Testing

Appendix B.1 Classification

Classification based on SPT "N" values:

The inferred undrained strength of the cohesive soils was based on the SPT "N" blow counts, derived from the relationship suggested by Stroud (1974) and classified using Table B.1.1. (Ref: Stroud, M. A. 1974, "The Standard Penetration Test – its application and interpretation", Proc. ICE Conf. on Penetration Testing in the UK, Birmingham. Thomas Telford, London.).

Table B.1.1 SPT "N" Blow Count Cohesive Classification

Classification	Undrained Cohesive Strength C_u (kPa)
Extremely low	<10
Very low	10 – 20
Low	20 – 40
Medium	40 – 75
High	75 – 150
Very high	150 – 300
Extremely high	> 300

Note: (Ref: BS EN ISO 14688-2:2004+A1:2013 Clause 5.3.)

The relative density of granular soils was classified based of the relationship given in Table B.1.2.

The *UK National Annex to Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing, NA 3.7 SPT test, BS EN 1997-2:2007, Annex F* states "Relative density descriptions on borehole records should also be based on uncorrected SPT N values, unless significantly disturbed, using the density classification in BS 5930:2015, Table 7.

Table B.1.2 SPT "N" Blow Count Granular Classification

Classification	SPT "N" blow count (blows/300mm)
Very loose	0 to 4
Loose	4 to 10
Medium dense	10 to 30
Dense	30 to 50
Very dense	Greater than 50

Note: (Ref: The Standard Penetration Test (SPT): Methods and Use, CIRIA Report 143, 1995)

Chalk samples recovered are disturbed by the sampling process. Therefore, it is difficult to assess an accurate chalk grade for in accordance with CIRIA C574 'Engineering in Chalk'. In the absence of a standardised correlation between SPT "N" values and chalk grade for the most recent chalk classification (CIRIA C574) a broad indication of the in-situ chalk grade can be assessed using a paper by T.R.M. Wakeling from a site in Mundford, Norfolk, which compares SPT "N" values to the old Spink & Norbury chalk classification. From the Spink & Norbury classification it is possible to infer a basic CIRIA Grade (structureless or structured), as outlined in Table B.1.3.

Table B.1.3 Interpretation of SPT "N" Blow Counts in Chalk

SPT "N" Value Range	Spink & Norbury Grade	Inferred CIRIA Grade
<8	VI	Structureless (Dm)
8 – 15	V	Structureless (Dc)
15 – 20	IV	Structured chalk (C5 – A1)
20 - 25	III	Structured chalk (C5 – A1)
25 - 35	II	Structured chalk (C5 – A1)
>35	I	Structured chalk (C5 – A1)

Appendix B.2 Interpretation

Table B.2.1 Interpretation of DPSH Blow Counts

DP	Strata	Equivalent SPT N Blow Counts	Inferred Cohesive Strength/Granular Density
DP1	CLGB[1] 1.40 – 10.00 Clay	3 – 24	Very low to high (C_u = 15 – 120kPa)
DP2	CLGB 0.50 – 3.00 Clay	3 – 6	Very low to low (C_u = 15 – 30kPa)

Note: [1] Ground conditions inferred past the base of windowless sampler boreholes.

Table B.2.2 Interpretation of Atterberg Limit Tests

Stratum	Moisture Content (%)	Plasticity Index (%)	Passing 425µm Sieve (%)	Modified Plasticity Index (%)	Soil Classification	Volume Change Potential	
						BRE	NHBC
CLGB	32 – 37	27 – 39	92 – 100	27 - 39	CH	Medium	Medium

Note: BRE Volume Change Potential refers to BRE Digest 240 (based on Atterberg results)
NHBC Volume Change Potential refers to NHBC Standards Chapter 4.2
Soils Classification based on British Soil Classification System
The most common use of the term clay is to describe a soil that contains enough clay-sized material or clay minerals to exhibit cohesive properties. The fraction of clay-sized material required varies, but can be as low as 15%. Unless stated otherwise, this is the sense used in Digest 240. The term can be used to denote the clay minerals. These are specific, naturally occurring chemical compounds, predominately silicates. The term is often used as a particle size descriptor. Soil particles that have a nominal diameter of less than 2 µm are normally considered to be of clay size, but they are not necessarily clay minerals. Some clay minerals are larger than 2 µm and some particles, 'rock flour' for example, can be finer than 2 µm but are not clay minerals.
(The Atterberg Limit Tests were undertaken in accordance with BS 1377:Part 2:1990 Clauses 3.2, 4.3 and 5)

Appendix B.3 Geotechnical In-Situ and Laboratory Results

UKAS TESTING
2788

Laboratory Report

GSTL
GEO Site & Testing Services Ltd

Contract Number: 31571

Client's Reference: **15655**

Report Date: **06-07-2016**

Client **Soils Limited**
Newton House
Cross Road
Tadworth
Surrey
KT20 5SR

Contract Title: **12 Platt's Lane, London NW3 7NR**
For the attention of: **Dante Valerio Tedesco**

Date Received: **06-07-2016**
Date Commenced: **06-07-2016**
Date Completed: **06-07-2016**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	6
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	6
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - Emma Sharp (Office Manager)
Jon Tatam (Administrative/Quality Assistant) - Paul Evans (Quality/Technical Manager) - Vaughan Edwards (Managing Director)

Client ref: 15655

Location: 12 Platt's Lane, London NW3 7NR

Contract Number: 31571-

Hole Number	Sample Number	Type	Depth (m)	Description of Sample*
WS1	1	D	1.80	Brown gravelly sandy fine to medium silty CLAY.
WS1	2	D	2.80	Brown sandy soft silty CLAY.
WS2	1	D	2.30	Brown sandy soft silty CLAY.
WS2	2	D	3.80	Brown sandy soft to firm silty CLAY.
WS3	1	D	2.00	Brown sandy soft silty CLAY.
WS3	2	D	3.50	Brown sandy soft silty CLAY.

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

GSTL
GEO SITE & TESTING SERVICES LTD

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
Date: 6.7.16

UKAS
TESTING
2788

Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

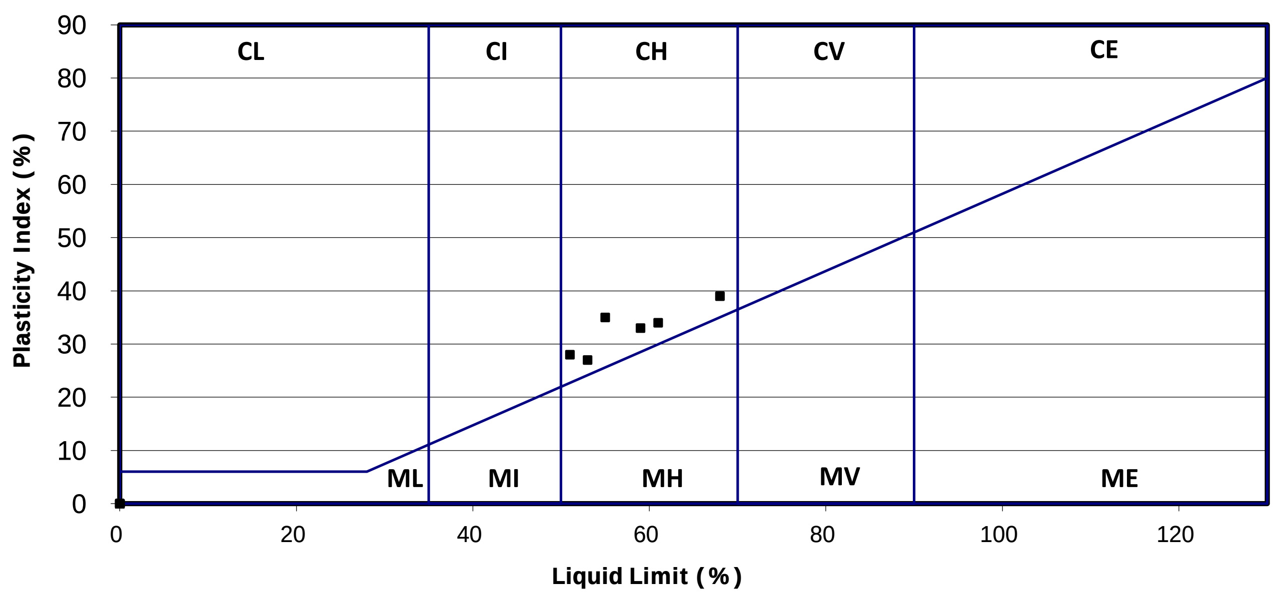
Client ref: **15655**
Location: **12 Platt's Lane, London NW3 7NR**
Contract Number: **31571-**

Hole / Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3 / 4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
WS1 / 1	D	1.80	32	61	27	34	92	CH High Plasticity
WS1 / 2	D	2.80	37	55	20	35	100	CH High Plasticity
WS2 / 1	D	2.30	32	51	23	28	100	CH High Plasticity
WS2 / 2	D	3.80	34	68	29	39	100	CH High Plasticity
WS3 / 1	D	2.00	33	59	26	33	100	CH High Plasticity
WS3 / 2	D	3.50	33	53	26	27	100	CH High Plasticity

Symbols: **NP : Non Plastic** **# : Liquid Limit and Plastic Limit Wet Sieved**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

BS 5930:1999+A2:2010



GSTL
GEO SITE & TESTING SERVICES LTD

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
Date: 6.7.16

UKAS
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2788

Dante Valerio Tedesco
Soils Ltd
Thomas Telford House - Unit 11
Sun Valley Business Park
Winnall Close
Winchester
SO23 0LB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 16-46060

Site Reference:	12 Platt's Lane, London NW3 7NR
Project / Job Ref:	15655
Order No:	None Supplied
Sample Receipt Date:	29/06/2016
Sample Scheduled Date:	29/06/2016
Report Issue Number:	1
Reporting Date:	05/07/2016

Authorised by:

Russell Jarvis
Associate Director of Client Services
On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Associate Director of Laboratory
On behalf of QTS Environmental Ltd

Soil Analysis Certificate						
QTS Environmental Report No: 16-46060	**Date Sampled**	17/06/16	17/06/16	17/06/16		
Soils Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: 12 Platt's Lane, London NW3 7NR	**TP / BH No**	WS1	WS2	WS3		
Project / Job Ref: 15655	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	2.30	1.70	3.00		
Reporting Date: 05/07/2016	**QTSE Sample No**	214425	214426	214427		

Determinand	**Unit**	**RL**	**Accreditation**					
pH	pH Units	N/a	**MCERTS**	8.0	7.5	7.5		
Total Sulphate as SO_4	mg/kg	< 200	NONE	< 200	548	< 200		
Total Sulphate as SO_4	%	< 0.02	NONE	< 0.02	0.05	< 0.02		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	23	11	13		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.02	0.01	0.01		
Total Sulphur	%	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Ammonium as NH_4	mg/kg	< 0.5	NONE	5.9	7.7	6.2		
Ammonium as NH_4	mg/l	< 0.05	NONE	0.59	0.77	0.62		
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**	7	5	9		
W/S Chloride (2:1)	mg/l	< 0.5	**MCERTS**	3.5	2.5	4.7		
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**	5	< 3	< 3		
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**	2.6	< 1.5	< 1.5		
W/S Magnesium	mg/l	< 0.1	NONE	1.5	0.8	1.5		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis $^{(S)}$

Soil Analysis Certificate - Sample Descriptions

QTS Environmental Report No: 16-46060
Soils Ltd
Site Reference: 12 Platt's Lane, London NW3 7NR
Project / Job Ref: 15655
Order No: None Supplied
Reporting Date: 05/07/2016

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 214425	WS1	None Supplied	2.30	18.6	Light brown sandy clay
$ 214426	WS2	None Supplied	1.70	19.8	Light brown sandy clay
$ 214427	WS3	None Supplied	3.00	19.8	Light brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample $^{I/S}$
Unsuitable Sample $^{U/S}$

$ samples exceeded recommended holding times

Soil Analysis Certificate - Methodology & Miscellaneous Information

QTS Environmental Report No: 16-46060
Soils Ltd
Site Reference: 12 Platt's Lane, London NW3 7NR
Project / Job Ref: 15655
Order No: None Supplied
Reporting Date: 05/07/2016

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D **Dried**
AR **As Received**

Appendix C References

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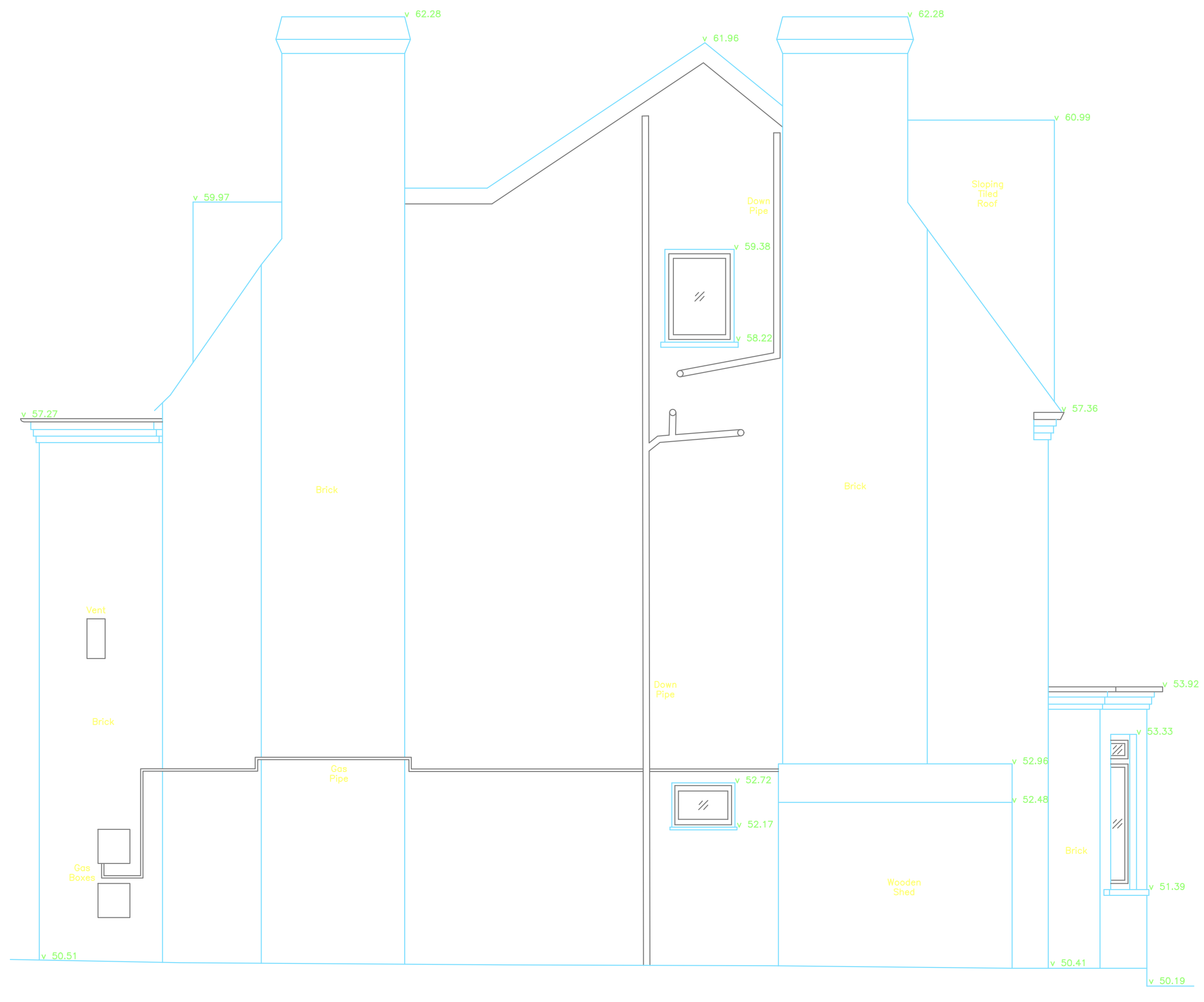
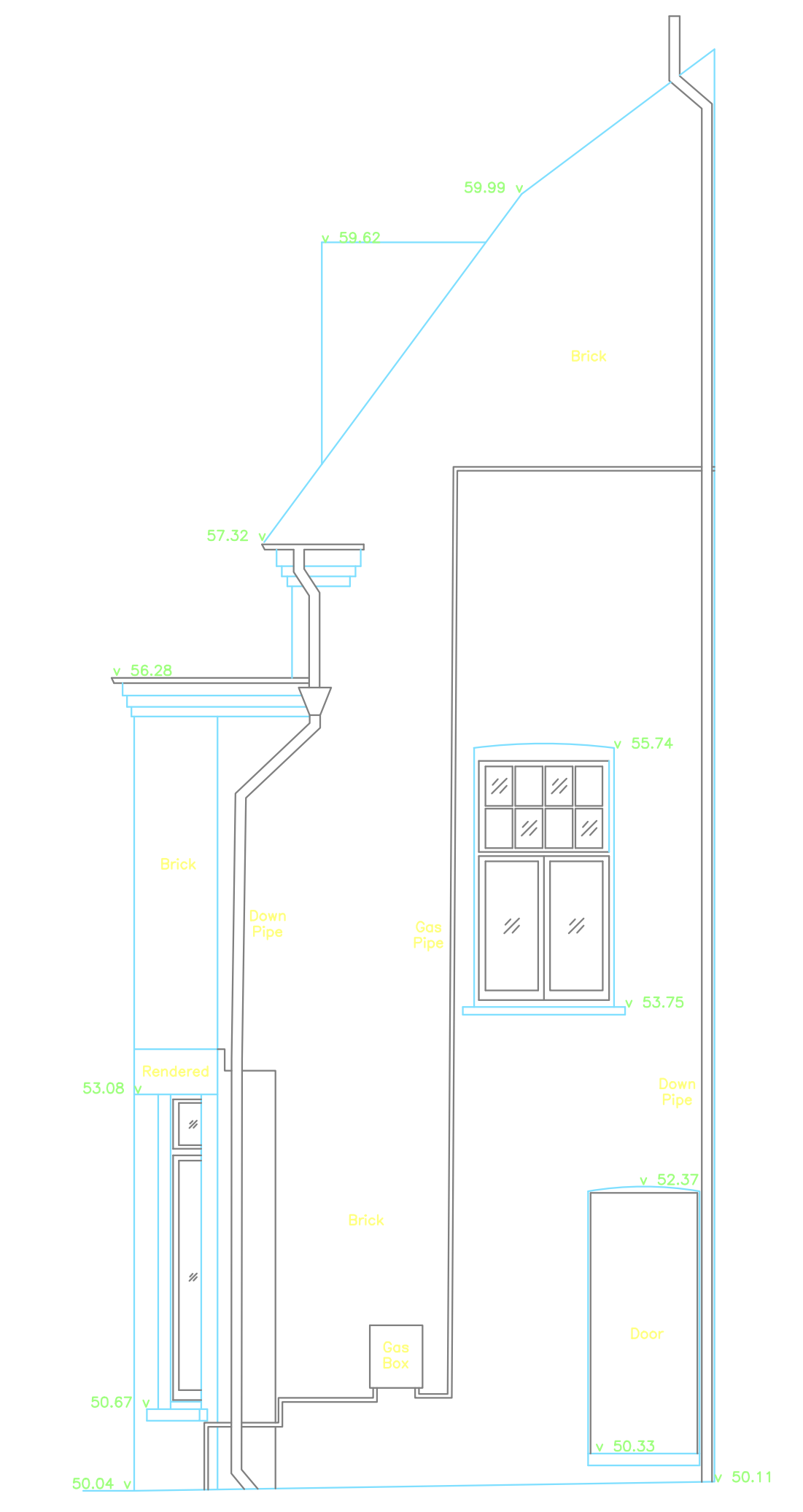
Appendix D Information Provided by the Client

Elevation 1
Datum 45.00m



Elevation 2
Datum 45.00m

Elevation 3
Datum 45.00m



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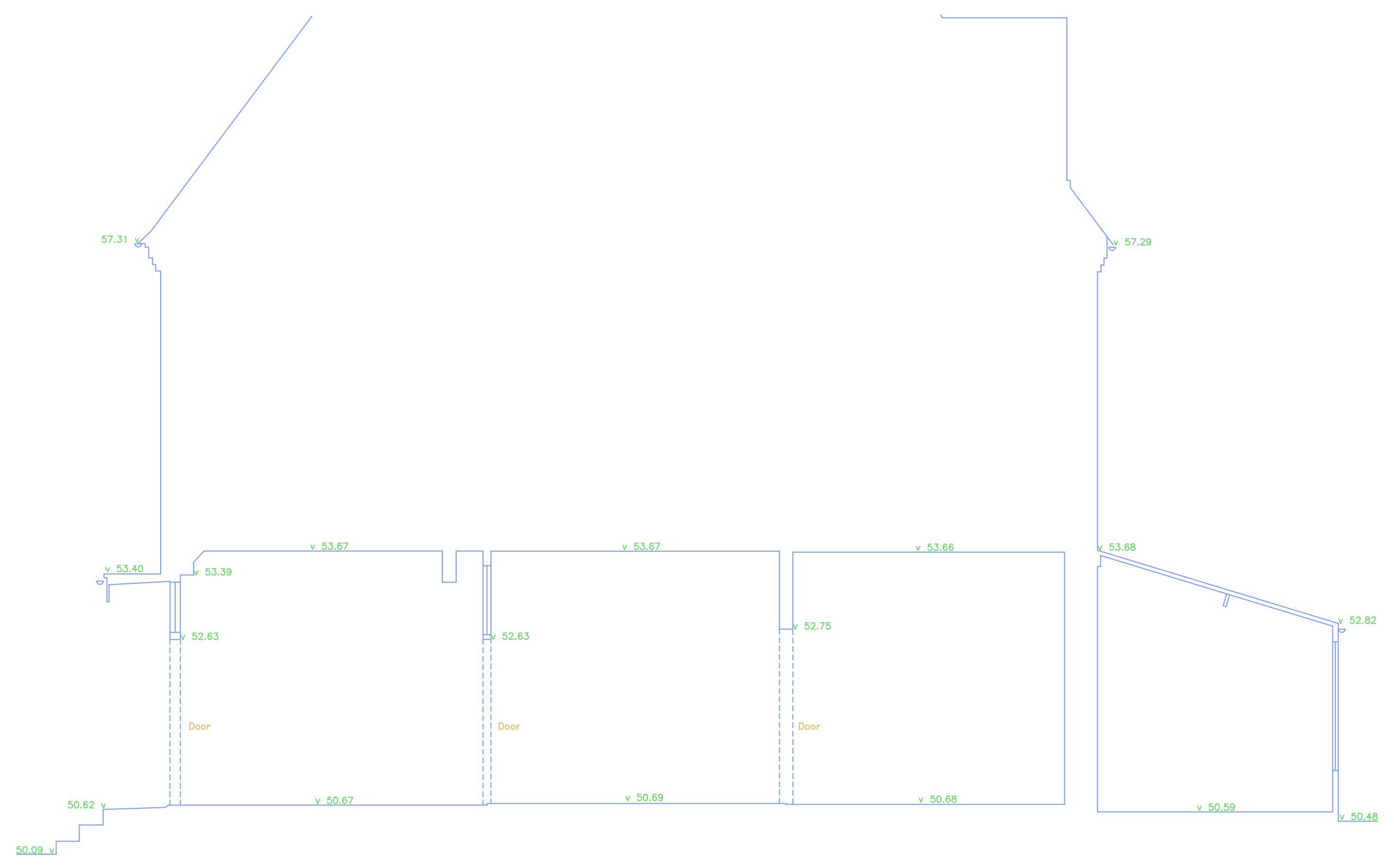
Datum 45.00m



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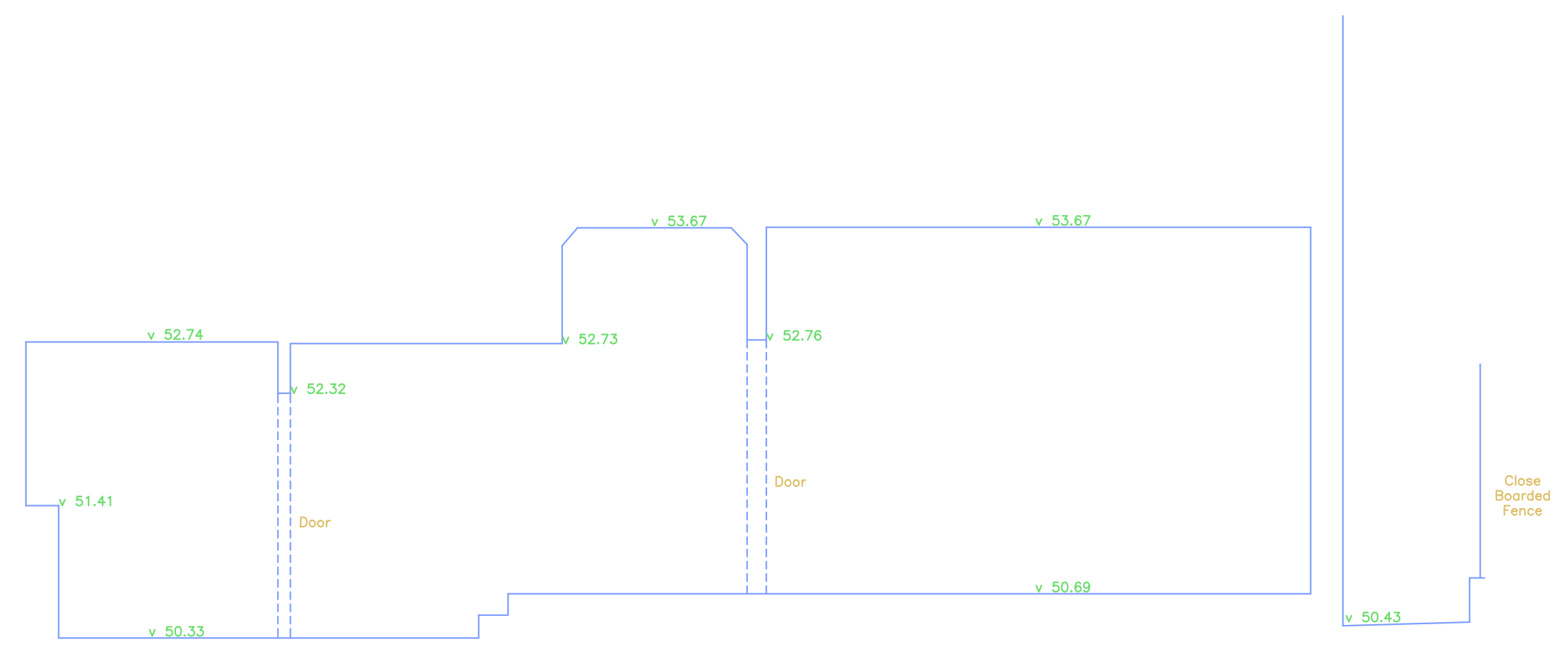
Datum 45.00m



Section 2
Datum 45.00m

LASER SURVEYS

LAND AND BUILDING SURVEYS, UNDERGROUND SERVICES LOCATION, CCTV DRAINAGE SURVEYS.

Established 1975. Member of The Survey Association.

OPEN SPACE, UPPER INTERFIELDS, MALVERN. WR14 1UT
TEL 01886 833173 FAX 01886 833485 email: worcester@lasersurveys.com

142-144 HILLVIEW AVENUE, HORNCHURCH, ESSEX. RM11 2DL
TEL 01708 438408 FAX 01708 438405 email: london@lasersurveys.com

DATUM NOTES

GRID IS BASED ON ARBITRARY COORDINATES BUT IS ORIENTATED APPROXIMATELY NORTH.

LEVELS ARE RELATED TO :– ARBITRARY DATUM.
BENCH MARK USED IS LOCATED AT :–
CONTROL STATION No.1

VALUE GIVEN AS 50.00m (ARBITRARY DATUM)

SURVEY CONTROL STATIONS SHOWN △

ABBREVIATIONS (where applicable)

AV	Air Valve	MK	Marker
BK	Brick	MS	Milestone
BL	Bollard	MT	Meter
BS	Bus Stop	MY	Mercury
BT	British Telecom	OH	Overhead
C/B	Close Boarded	PAV	Paving
CL	Cover Level	PB	Post Box
CLK	Chainlink	PE	Pipe
CO	Column	PM	Parking Meter
Conc	Concrete	P/R	Post and Rail
CP	Catch Pit	PT	Post
CPS	Concrete Paving Slabs	P/W	Post and Wire
CTV	Cable Television	RE	Rodding Eye
DC	Drainage Channel	RET	Retaining
DP	Down Pipe	RS	Road Sign
EP	Electricity Pole	RSJ	Rolled Steel Joist
ER	Earthing Rod	SC	Stop Cock
FB	Flower Bed	SK	Soakaway
FE	Fence	SPT	Septic Tank
FH	Fire Hydrant	ST	Silt Trap
FL	Floor Level	SV	Stop Valve
FP	Flag Pole	SVC	Security Video Camera
GP	Gate Post	TCB	Telephone Call Box
GV	Gas Valve	THL	Threshold Level
GY,G	Gully	TL	Traffic Light
HT	Height	TK	Tank
IC	Inspection Cover	TP	Telegraph Pole
IL	Invert Level	UG	Underground
IN	Interceptor	UTF	Unable to trace Further
I/R	Iron Railings	UTL	Unable To Lift
JB	Junction Box	VP	Vent Pipe
KO	Kerb Outlet	WL	Water Level
LB	Litter Bin	WM	Water Meter
LP	Lamp Post	WO	Wash Out
MH	Manhole Cover		
Ar	Arch Height		
B	Beam Height		
C	Ceiling Height		
D	Door Height		
H	Head Height		
S	Sill Height		
Sp	Spring height		

NOTES

* Drainage pipe sizes (where shown) have been gauged from the surface for safety reasons and should be regarded as approximate only.
* Tree species (where shown) should be treated with caution and expert identification is advised.
* Although this is a digital survey the accuracy and amount of detail shown is only commensurate with the graphical scale of mapping as specified. Care should be exercised when working to larger scales.
* Visible features in the vicinity of the boundaries as shown above, may not represent the extent of legally conveyed ownership.
* Whilst every effort has been made to achieve accuracy on this plan, CRUCIAL clearance dimensions, levels and invert levels should be checked prior to design and construction.
* Kerb levels have been taken in the bottom of the channel.

SHEET LAYOUT
NOT TO SCALE

12 PLATTS LANE,
HAMPSTEAD,
LONDON.
NW3 7NR

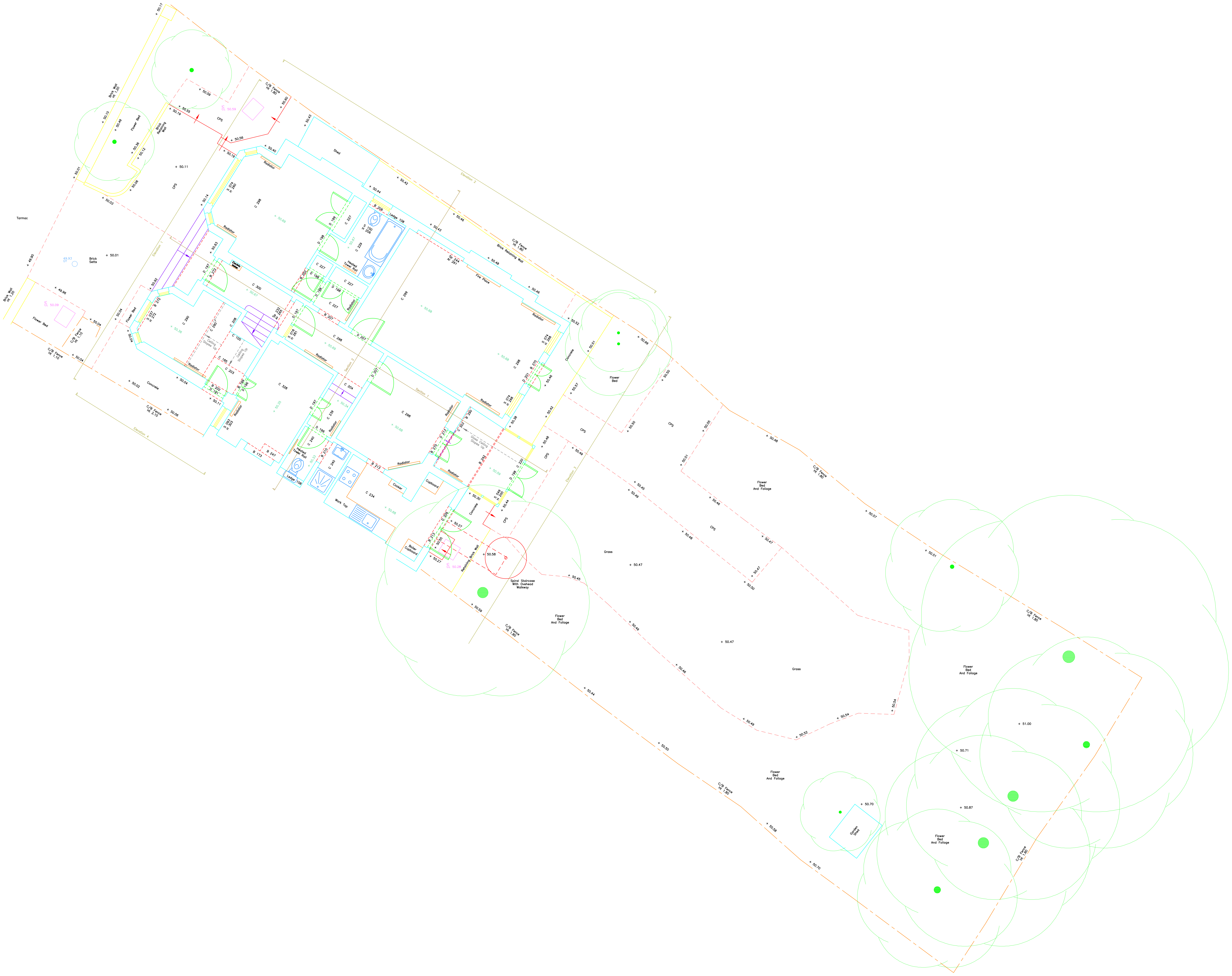
ELEVATIONS

SURVEYED FOR
XUL ARCHITECTS
33 BELSIZE LANE
LONDON
NW3 5AS

SURVEYOR DAVID BUSH
DATE MAY 2016

NO	DATE	REVISION

DRAWING NO	C 8415/1	REV	0
DRAWING TITLE	ELEVATIONS		
SCALE	1 : 50 (A0)		
SEE ALSO DWG NOS			
SHEET	2 OF 2		
REF NO	G 8415		



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CONTROL STATION No.1

VALUE GIVEN AS 50.00m (ARBITRARY DATUM)

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ABBREVIATIONS (where applicable)

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BS	Bus Stop	MY	Mercury
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CPS	Concrete Paving Slabs	P/W	Post and Wire
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D	Door Height
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SHEET LAYOUT
NOT TO SCALE

12 PLATTS LANE,
HAMPSTEAD,
LONDON.
NW3 7NR

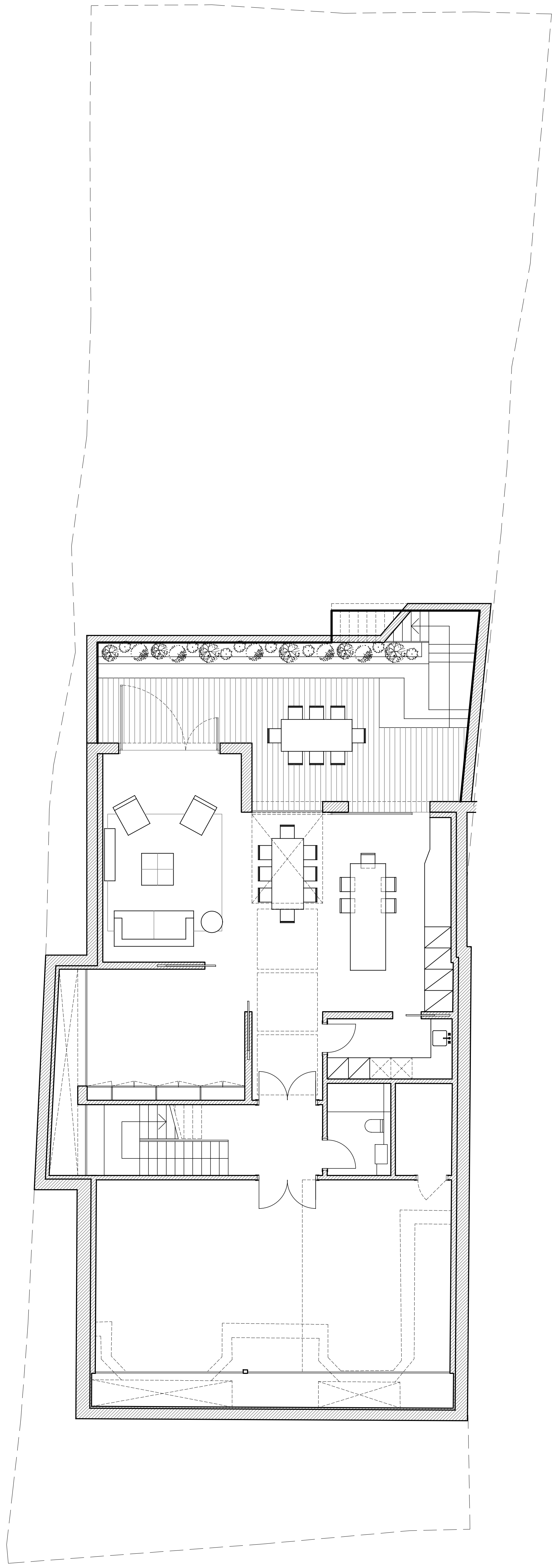
TOPOGRAPHICAL AND BUILDING SURVEY

SURVEYED FOR
XUL ARCHITECTS
33 BELSIZE LANE
LONDON
NW3 5AS

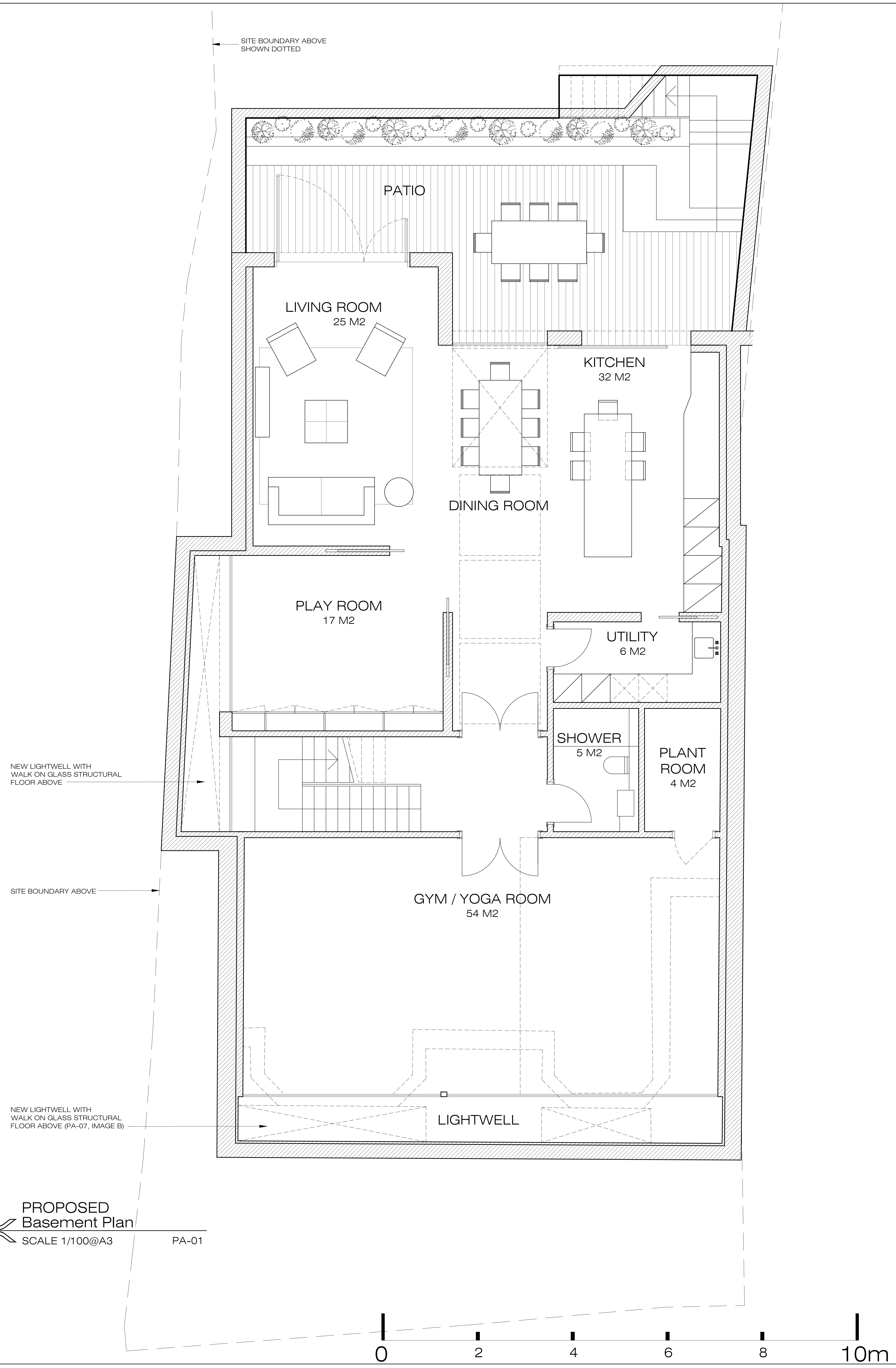
SURVEYOR DAVID BUSH
DATE MAY 2016

NO	DATE	REVISION

DRAWING NO	C 8415/1	REV	0
DRAWING TITLE	TOPO - FLOOR PLANS		
SCALE	1 : 50 (A0)		
SEE ALSO DWG NOS			
SHEET	1 OF 2		
REF NO	G 8415		



PROPOSED
Basement Plan
SCALE 1/200@A3 PA-01



PROPOSED
Basement Plan
SCALE 1/100@A3 PA-01

XUL ARCHITECTURE

Ground Floor Office
33 Belsize Lane
London NW3 5AS

Office: +44 (0) 207 431 9014
s.sandler@xularchitecture.co.uk
www.xularchitecture.co.uk

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ADDITIONAL NOTES:

REVISIONS

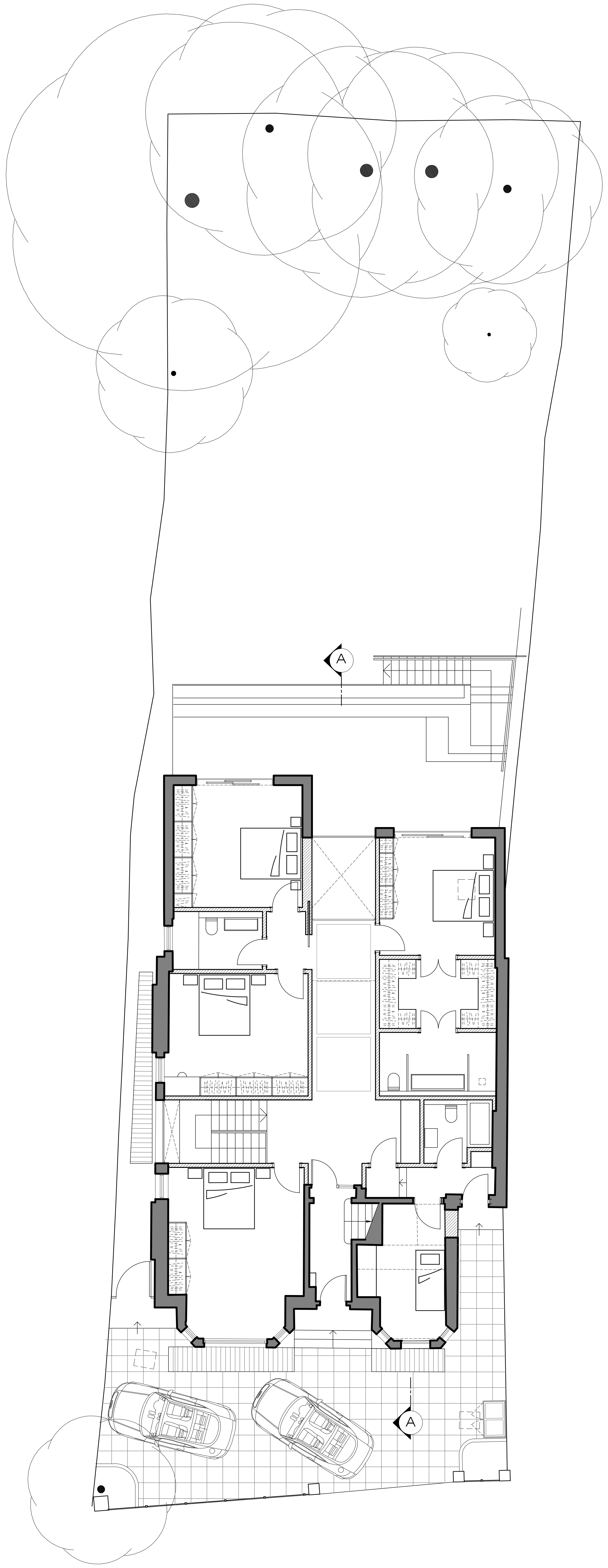
No	Date	Description Issue For	issue By
00	25/05/16	INFORMATION	JH
01	26/05/16	INFORMATION	JH
02	27/05/16	INFORMATION	JH
03	01/06/16	INFORMATION	JH
04	03/06/16	PLANNING	JH
05	18/07/16	PLANNING	AMG
06	25/07/16	PLANNING	AMG

Client
PRIVATE CLIENT

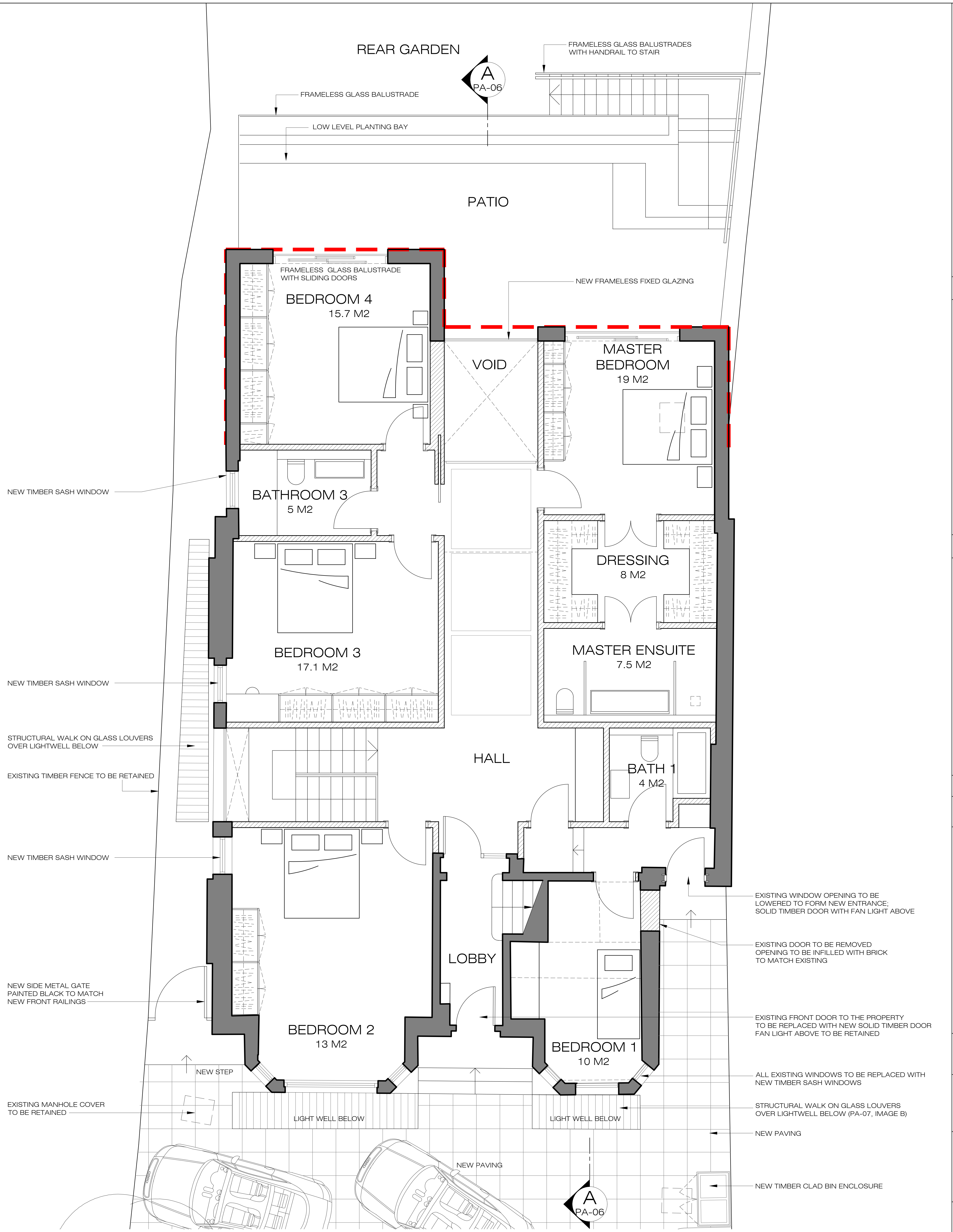
Project
12 Platt's Lane
NW3 7NR

Title
PROPOSED
Basement Plan

Scale	Dwg. No.	Rev.
1/100@A3	PA-01	06
Date 25/05/16		
Drawn JH	Project Number 1610	
Checked CC		



PROPOSED
Ground Plan
SCALE 1/200@A3 PA-02



PROPOSED
Ground Plan
SCALE 1/100@A3 PA-02

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ADDITIONAL NOTES:

REVISIONS

No	Date	Description Issue For	issue By
00	25/05/16	INFORMATION	JH
01	26/05/16	INFORMATION	JH
02	27/05/16	INFORMATION	JH
03	01/06/16	INFORMATION	JH
04	03/06/16	PLANNING	JH
05	28/06/16	PLANNING	AM
06	18/07/16	PLANNING	AMG
07	25/07/16	PLANNING	AMG

Client
PRIVATE CLIENT

Project
12 Platt's Lane
NW3 7NR

Title
PROPOSED
Ground Floor Plan

Scale
1/100@A3

Dwg. No.
PA-02

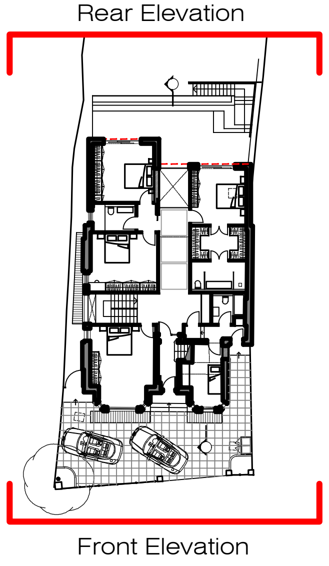
Rev.
07

Date
25/06/16

Drawn
AM

Project Number
1610

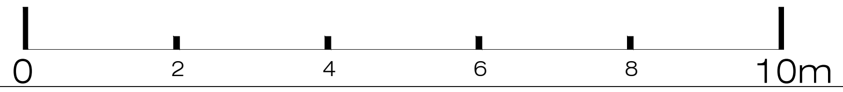
Checked
CC



Key Plan
SCALE 1:500@A3

PROPOSED
Front Elevation
SCALE 1/100@A3 PA-03

PROPOSED
Rear Elevation
SCALE 1/100@A3 PA-03



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ADDITIONAL NOTES:

REVISIONS

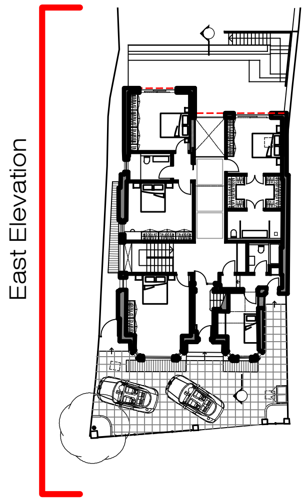
No	Date	Description Issue For	issue By
00	25/05/16	INFORMATION	JH
01	26/05/16	INFORMATION	JH
02	03/06/16	PLANNING	JH
03	18/07/16	PLANNING	AMG
04	20/07/16	PLANNING	AMG

Client
PRIVATE CLIENT

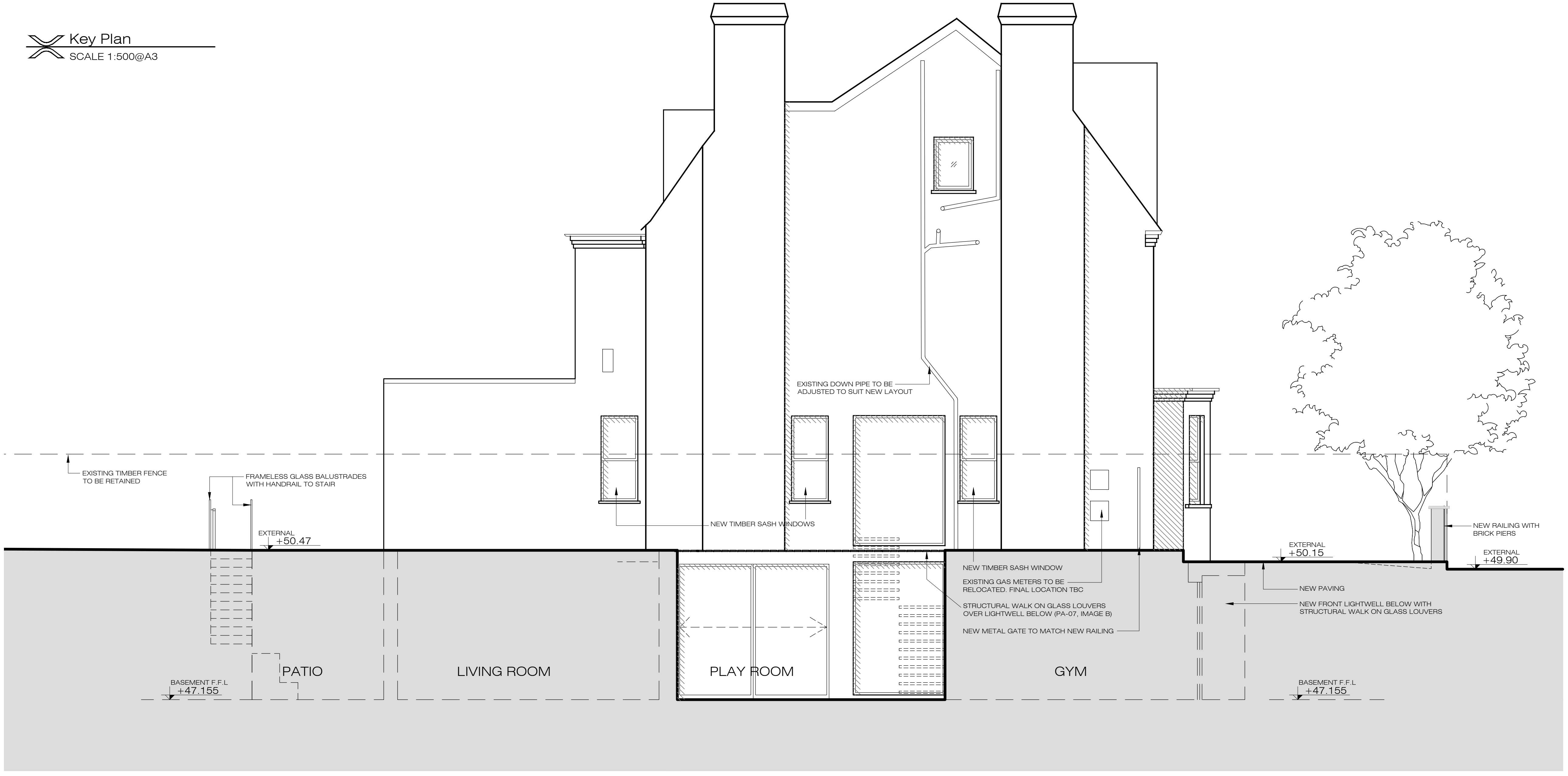
Project
12 Platt's Lane
NW3 7NR

Title
PROPOSED
Front and Rear Elevations

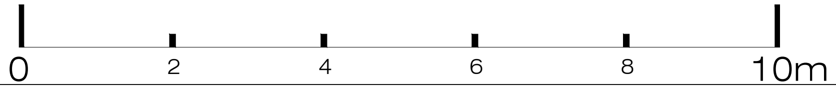
Scale 1/100@A3	Dwg. No. PA-03	Rev. 04
Date 18/07/16		
Drawn JH	Project Number 1610	
Checked CC		



Key Plan
SCALE 1:500@A3



PROPOSED
Flank Elevation (East)
SCALE 1/100@A3 PA-04



XUL ARCHITECTURE

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www.xularchitecture.co.uk

PLEASE NOTE:

1. ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE FABRICATION.
2. CONTRACTOR TO REFER TO ENGINEER'S DRAWINGS BEFORE PROCEEDING WITH WORKS.
3. ALL DRAWINGS AND DESIGNS ARE COVERED BY DESIGN RIGHT (INTELECTUAL PROPERTY), AND MAY NOT BE DISTRIBUTED, COPIED OR ISSUE WITHOUT WRITTEN PERMISSION OF XUL ARCHITECTURE.
4. ALL DESIGN CONCEPTS ARE THE SOLE PROPERTY OF XUL ARCHITECTURE AND NO ADAPTATIONS, REPRODUCTIONS OR COPIES MAY BE MADE WITHOUT WRITTEN PERMISSION OF XUL ARCHITECTURE.
5. THESE DRAWINGS ARE SUBJECT TO ANY VARIATION REQUIRED OR RECOMMENDATION BY ANY STATUTORY AUTHORITY, OR FOR THE BETTER CARRYING OUT OF THE WORKS.
6. SAMPLES TO BE PROVIDED BY CONTRACTOR FOR XUL ARCHITECTURE APPROVAL.
7. ALL FINISHES TO XUL ARCHITECTURE SATISFACTION.
8. ALL DRAWINGS TO BE APPROVED BY XUL ARCHITECTURE BEFORE CONSTRUCTION.

ADDITIONAL NOTES:

REVISIONS

No	Date	Description Issue For	issue By
00	25/05/16	INFORMATION	JH
01	26/05/16	INFORMATION	JH
02	03/06/16	PLANNING	JH
03	28/06/16	PLANNING	AM
04	18/07/16	PLANNING	AMG

Client
PRIVATE CLIENT

Project
12 Platt's Lane
NW3 7NR

Title
PROPOSED
Flank Elevation (East)

Scale
1/100@A3

Dwg. No.
PA-04

Rev.
04

Date
18/07/16

Drawn
AM

Project Number
1610

Checked
CC

Appendix E Construction Method Statement by Richard Tant Associates

Richard Tant Associates
Consulting Civil & Structural Engineers

15/8/2016

RT/SMS/4387

12 Platt's Lane

Structural Methodology Report

Brief

This document is the structural methodology report carried out for the purposes of the planning application for the proposals at no. 12 Platt's Lane. It should be noted that this report outlines and suggests the assumed construction at this stage. It should also be noted that, as is standard for works of this type, the main contractor will be fully responsible for the design and erection of all temporary works.

The purpose of the report, with the Basement Impact Assessment prepared by Soils Ltd, is to demonstrate that a subterranean development can be constructed on the particular site having regard to the sites existing structural conditions and geology.

The Basement Impact Assessment prepared by Soils Ltd references to the stages set out in the CPG4 Basement & Lightwells planning document.

Richard Tant Associates

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

Description of Proposed Basement and Internal Works

12 Platt's Lane is a semi-detached red brick, three storey Victorian house comprising timber floors and load bearing masonry walls. There are no signs of significant differential movement and the property appears to be in sound structural condition.

The proposal is to form a new single storey basement structure generally below the existing building with an excavation of approximately 3.7m below the existing ground level. At the rear a basement patio is proposed with light wells to the front and side. A number of the internal load bearing ground floor walls is also due to be removed and a steel frame will be introduced integrated with the proposed basement and light wells.

Basement Works

A geotechnical report including a flood risk assessment has been carried out by Soils Ltd; the bore holes confirm up to 1.4m of made ground overlying London Clay. Water inflow was recorded in window sample 3 at a depth of 3m and then later monitoring results of the standpipe recorded a water level of 1.2m below ground level. We note the Soils Ltd report highlights that groundwater inflow is likely to be very slow. Based on this geotechnical information the new basement construction is to comprise reinforced concrete underpinned retaining walls with an internal cavity drain system. This will be described in more detail throughout this report. Please refer to our drawings 4387-SM01, SM02, SM03 and SM04.

Internal Works

The proposal is to remove a number of internal ground floor load bearing walls; steel frames will be provided integrated with the proposed basement construction and temporary works to support the first floor walls and ground floor perimeter walls over the light wells. For further details of these internal works and the basement works with the temporary works please refer to our drawings 4387-SM01, SM02, SM03 and SM04.

12 Platt's Lane

Supporting the Proposed Loads

The vertical and horizontal loads will be supported via reinforced concrete retaining walls or reinforced concrete underpinning with the vertical loads from the internal floors and ground floor walls being supported via the new steel frames in turn supported via new internal pad foundations and proposed basement walls. Refer to calculation sheets for justification: 4387-P1 et seq.

Structural Integrity of Surrounding Structures and Utilities

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

Slope Instability

The proposal is to construct the walls in stages that will be temporarily propped until the final base is constructed and cured. No battering back is proposed. We therefore confirm slope instability will not be initiated due to these works. Please refer to the proposed drawings, 4387-SM01, SM02, SM03 and SM04.

Impact on Drainage and Surface Water

We do not expect there to be any existing public drainage within the area of influence of the proposed basement works. With regards to surface water the basement is mainly below existing hard standing. Refer to the surface flow assessment in the Soils Ltd. basement impact assessment.

Geological & Hydrological Concerns

The application is informed and supplemented by the hydrological section of the geotechnical report and flood risk assessment carried out by Soils Ltd and identified in their basement impact assessment.

Structural Stability of the Existing Buildings

The proposed basement is to be constructed between reinforced underpinning generally under the existing building's external walls except at the back of the patio and around the light wells where new reinforced concrete retaining walls are proposed. The reinforced concrete underpinned walls and reinforced concrete walls will be designed to retain soil and water pressures. Refer to calculation sheets for justification. These works are not expected to create any significant differential settlement or have a detrimental effect on the structural stability of the existing building or neighbouring buildings. For the permanent design a ground movement analysis will be carried out to confirm expected movement.

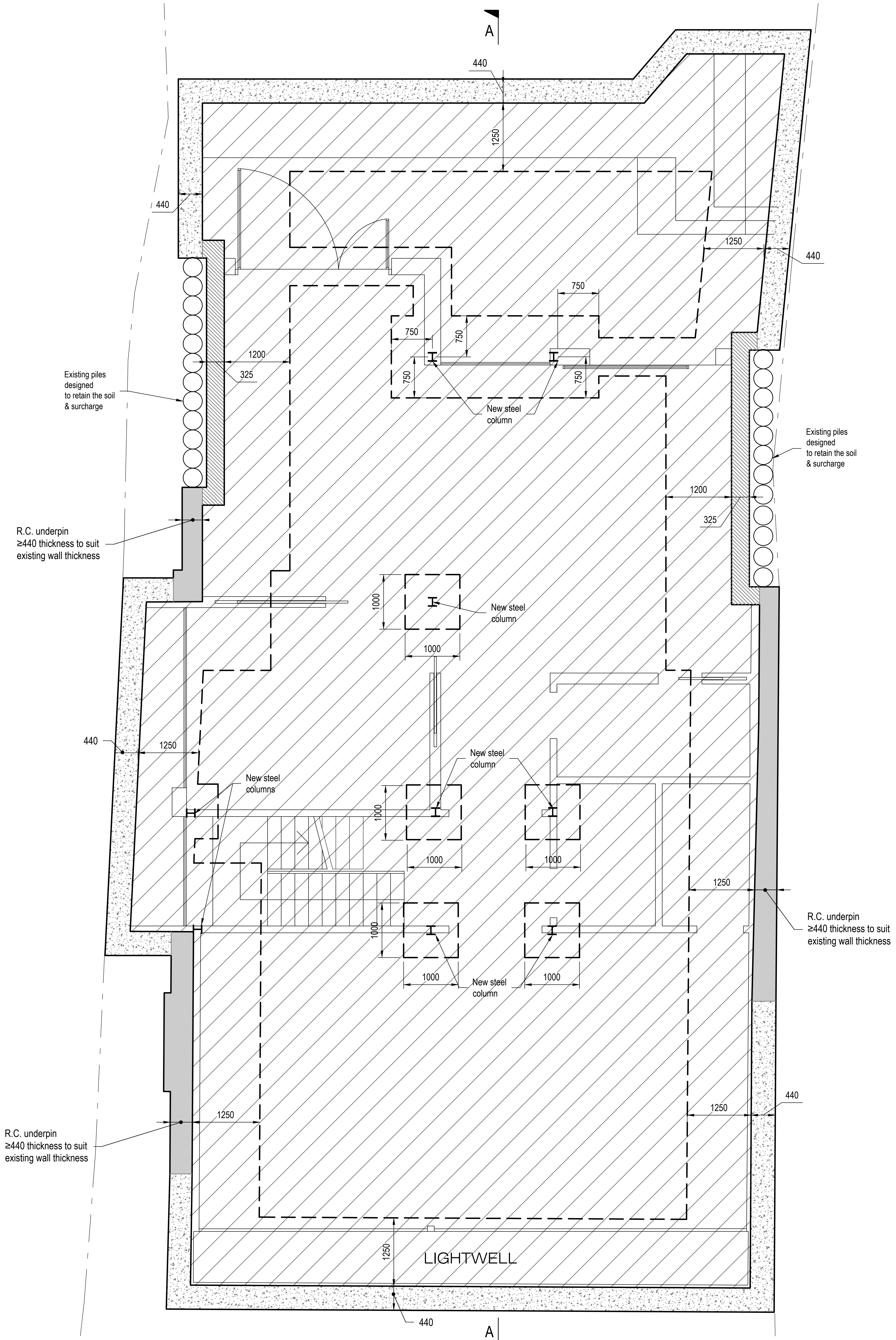
Impact on Trees

There are a number of trees near the proposed basement. Wassells, an Arboricultural consultancy, are involved and confirm the proposed trees will not be adversely effected by these works.

Temporary Works

Please refer to the proposed drawings, 4387-SM01, SM02, SM03 and SM04 for details of the temporary works. When the contractor is appointed he will be fully responsible for the temporary works including the design and erection.

This report has been produced for the sole use of Camden Council and for their use only and should not be relied upon by any third party. No responsibility is undertaken to any third party without the prior written consent of Richard Tant Associates.
Richard Tant BEng(Hons) CEng MIStructE for Richard Tant Associates.



Legend:

▨ - R.C underpinning, wall thickness to be ≥440 to suit width wall above constructed in hit and miss manner.

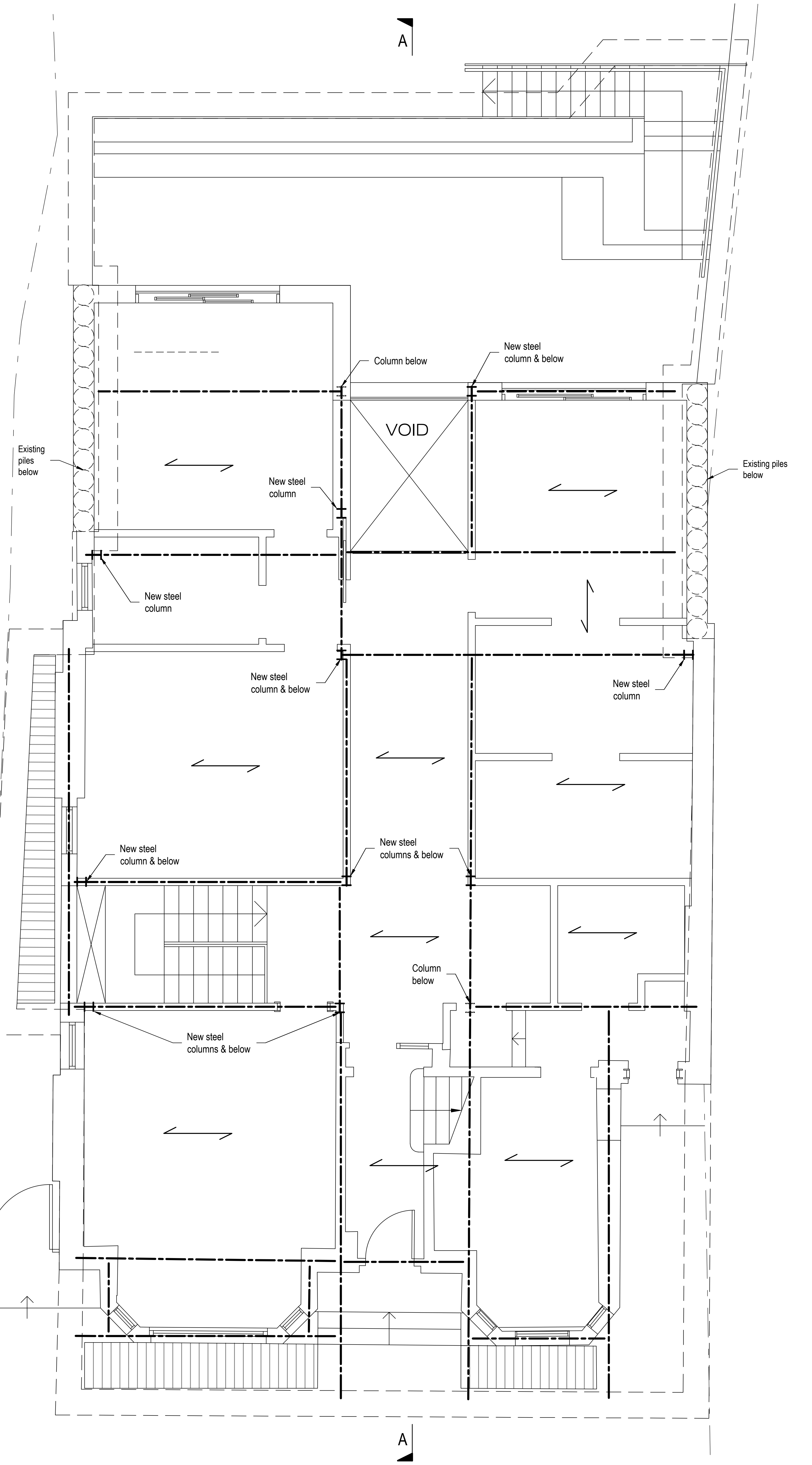
▨ - 600deep x 440 thk. R.C wall & 440 thk. R.C underpinning constructed in hit and miss manner.

▨ - R.C. slab / footing .

▨ - 325 thk. R.C. lining wall.

Proposed Basement

Scale 1 : 50



: New steel beam, below.

Proposed Ground Floor

(Structure below)

Scale 1 : 50

Suggested structural proposal to be confirmed after full structural inspection. Not suitable for tender or construction.

Notes.

REV.	AMENDMENTS	BY	DATE	CHECKED
-	-	-	-	-

PROJECT
Platts Lane 12

TITLE
Indicative Basement & Ground Floor, Structure Below

ARCHITECTS
XUL Architects

DRAWING No.
4387-SM01

DATE	10.8.2016
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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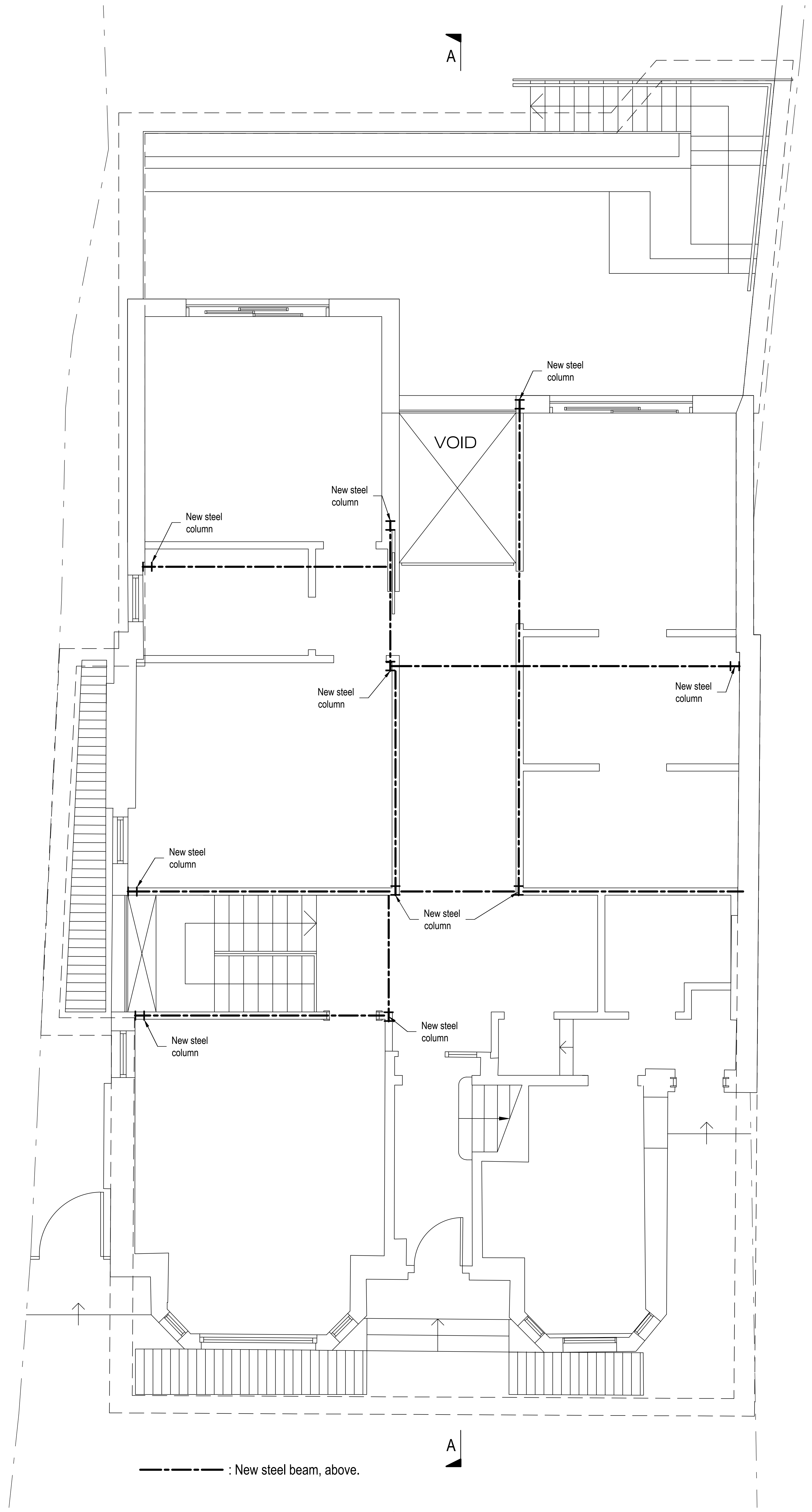
Consulting Civil & Structural Engineers
54 LISSON STREET LONDON NW1 5DF
TEL: 020 7724 1002 FAX: 020 7224 8883
info@richardtantassociates.com



Proposed Ground Floor

(Structure above)

Scale 1 : 50

Suggested structural proposal to be
confirmed after full structural inspection.
Not suitable for tender or construction.

Notes.

REV.	AMENDMENTS	BY	DATE	CHECKED
-	-	-	-	-

PROJECT

Platts Lane 12

TITLE

Indicative Ground Floor
Structure Above

ARCHITECTS

XUL Architects

DRAWING No.

4387-SM02

DATE	10.8.2016
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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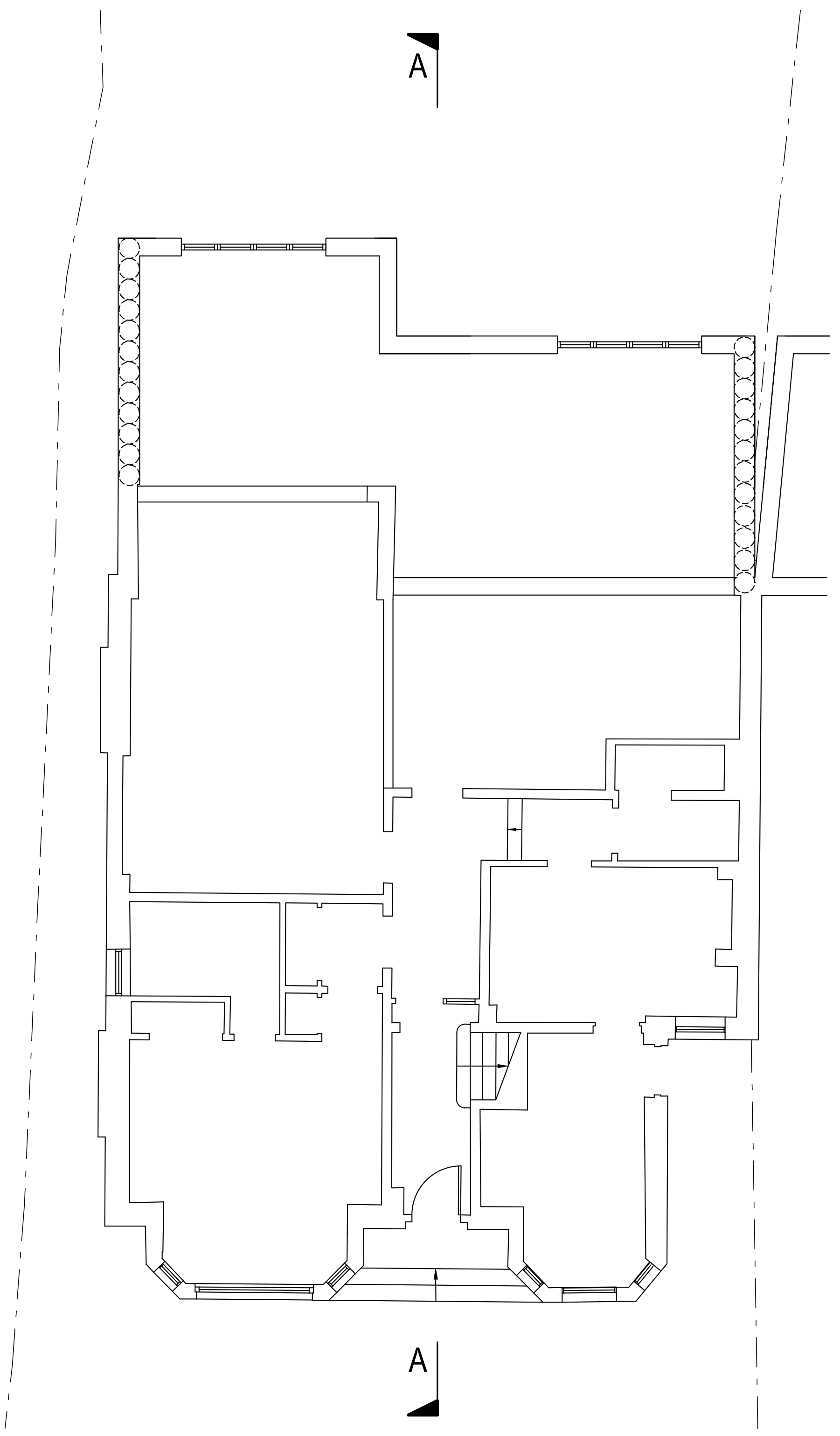
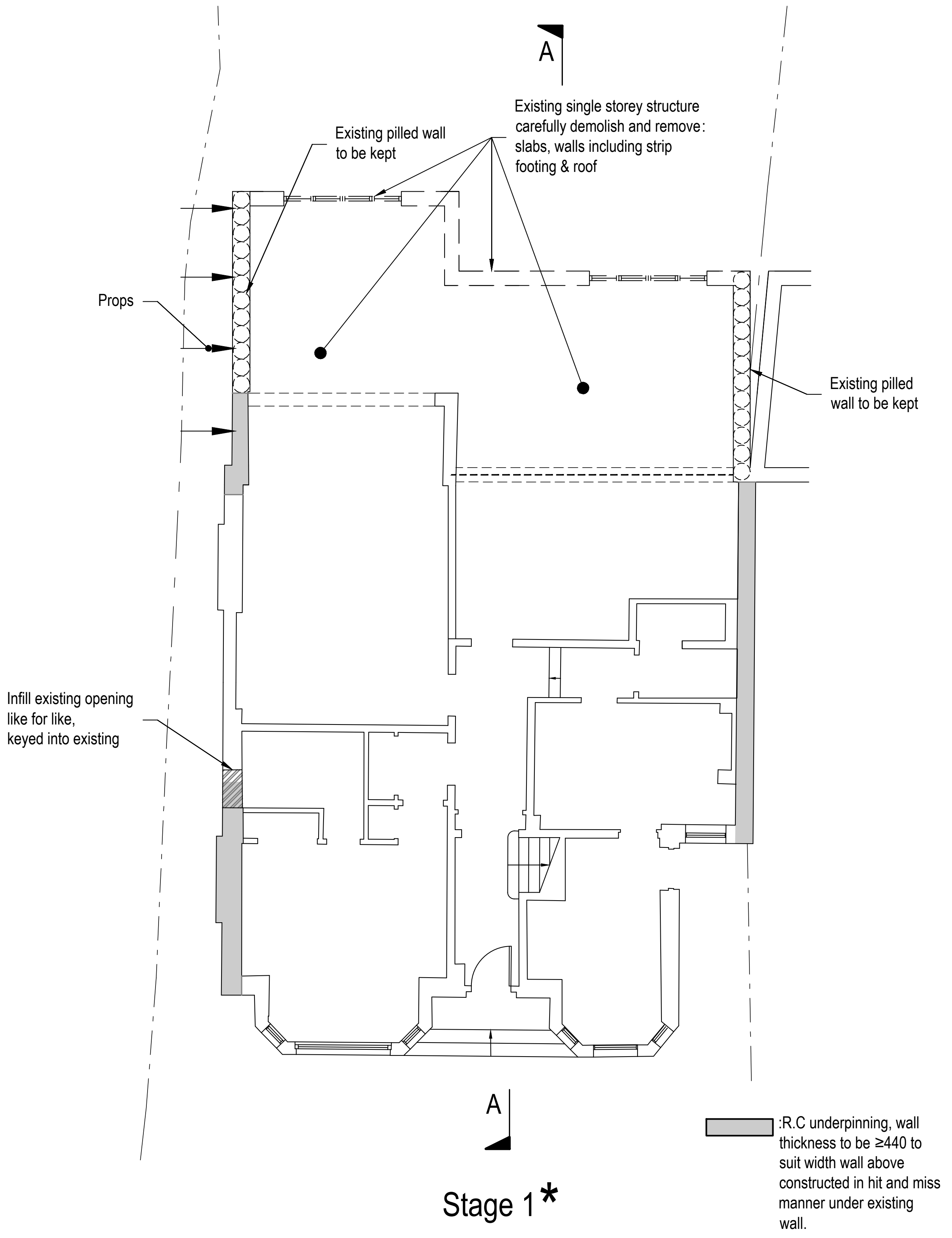
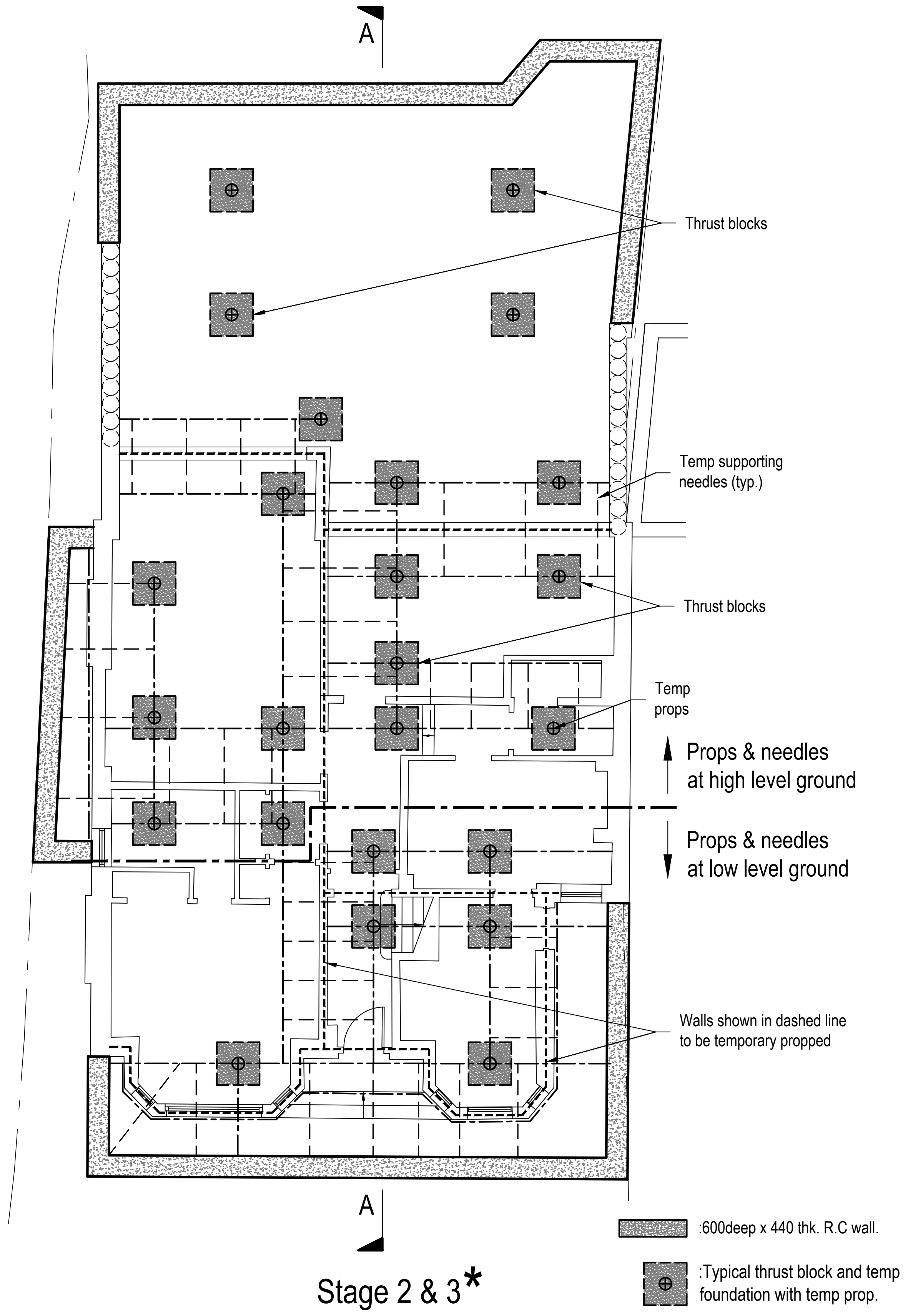
info@richardtantassociates.com



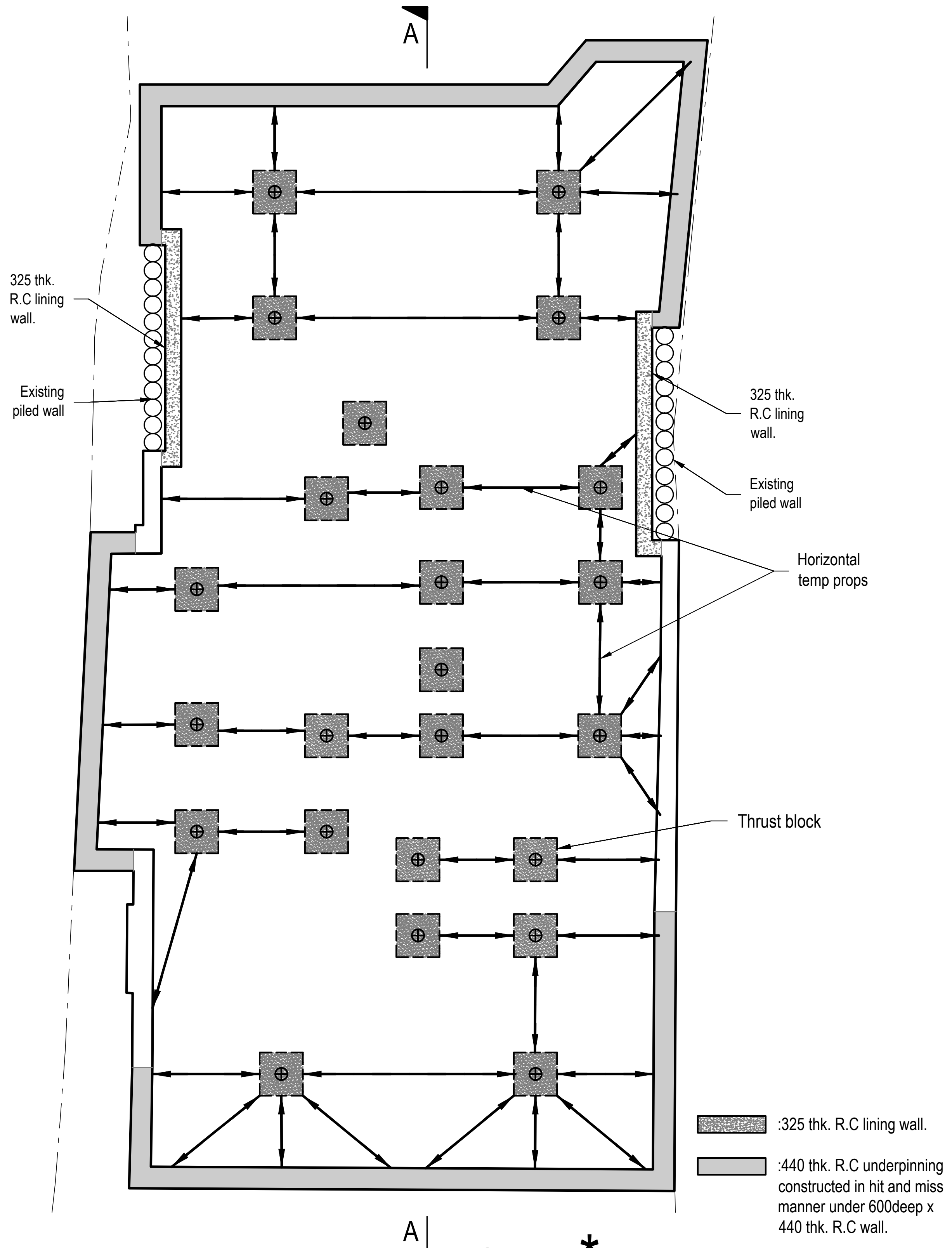
Existing Ground



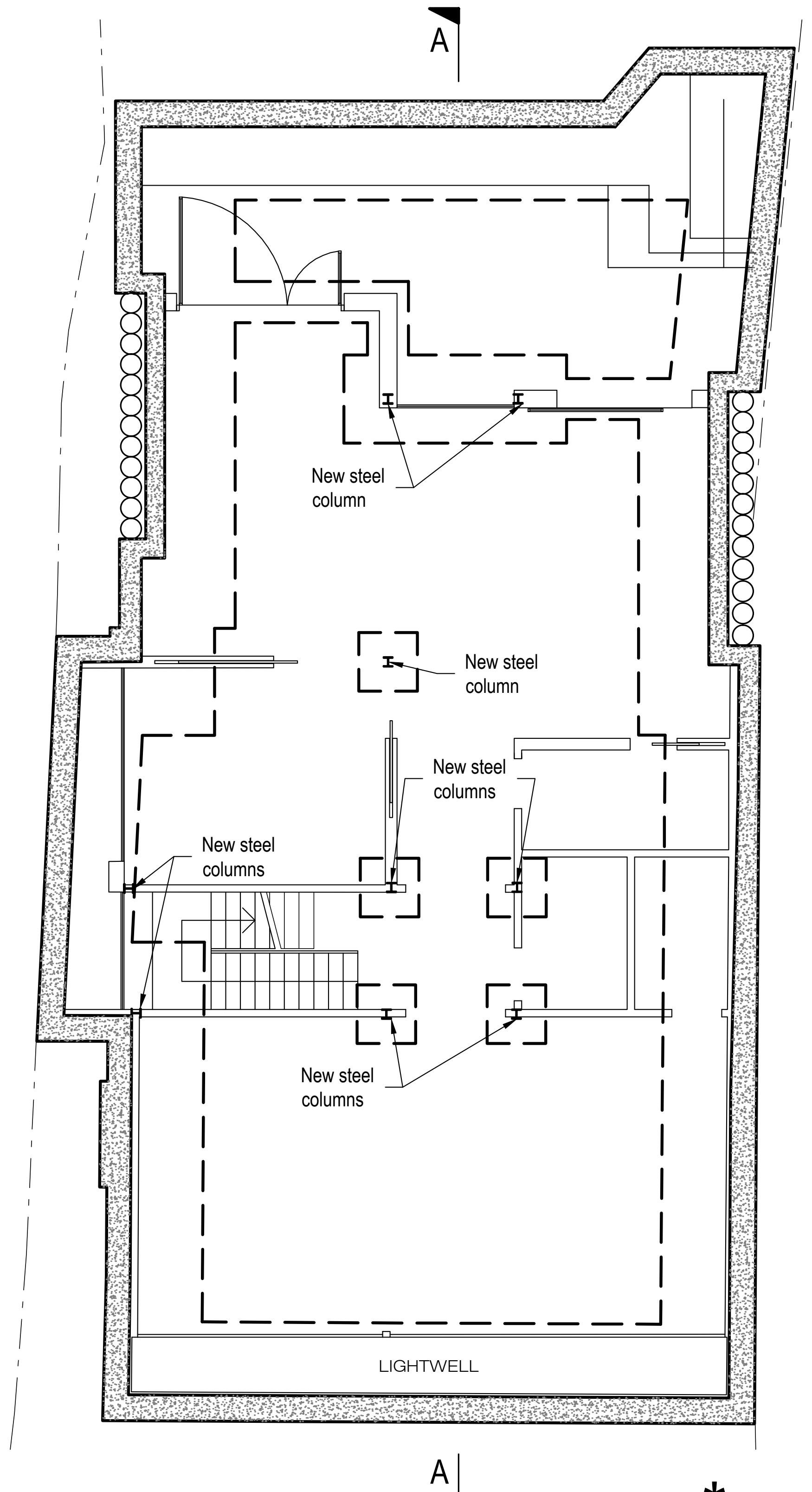
Stage 1*



Stage 2 & 3*



Stage 4*



Stage 5 & 6*

* :

Stage 1:

- Disconnect, make safe and remove any underground services.
- Existing single storey structure (as shown) carefully demolish and remove: slabs, walls including footing but excluding piled wall.
- Fit horizontal props with walling beams to flank wall.
- R.C. underpinning hit & miss as shown & back fill.

Stage 2:

- Install thrust blocks and temp foundation with temp props.
- Fit horizontal props.

Stage 3:

- Cast 440wide x 600deep R.C. wall.
- Install additional thrust blocks and walling beams.

Stage 4:

- R.C. underpinning hit & miss to formation level under 600deep x 440 thk. R.C wall. and back fill.
- Excavate & fit horizontal props with walling beams.
- Cast 325 thk. lining R.C. wall.

Stage 5:

- Cast Basement R.C. slab and pad footings.

Stage 6:

- Install new beams, columns & joists. Make amendments to upper floors.
- Cut down thrust blocks.
- After concrete has cured remove temporary props.
- Install finishes: insulation, waterproofing etc. - refer to Architects details.

Notes.

Suggested Method of Works

This suggested method is a suggestion only and the contractor may submit alternative proposals. The method of works and all temporary works including design and erection are to be the full responsibility of the main contractor.

REV.	AMENDMENTS	BY	DATE	CHECKED
-	-	-	-	-

PROJECT
Platts Lane 12

TITLE
Suggested Method of Works 1

ARCHITECTS
XUL Architects

DRAWING No.
4387-SM03

DATE	10.8.2016
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

TANT
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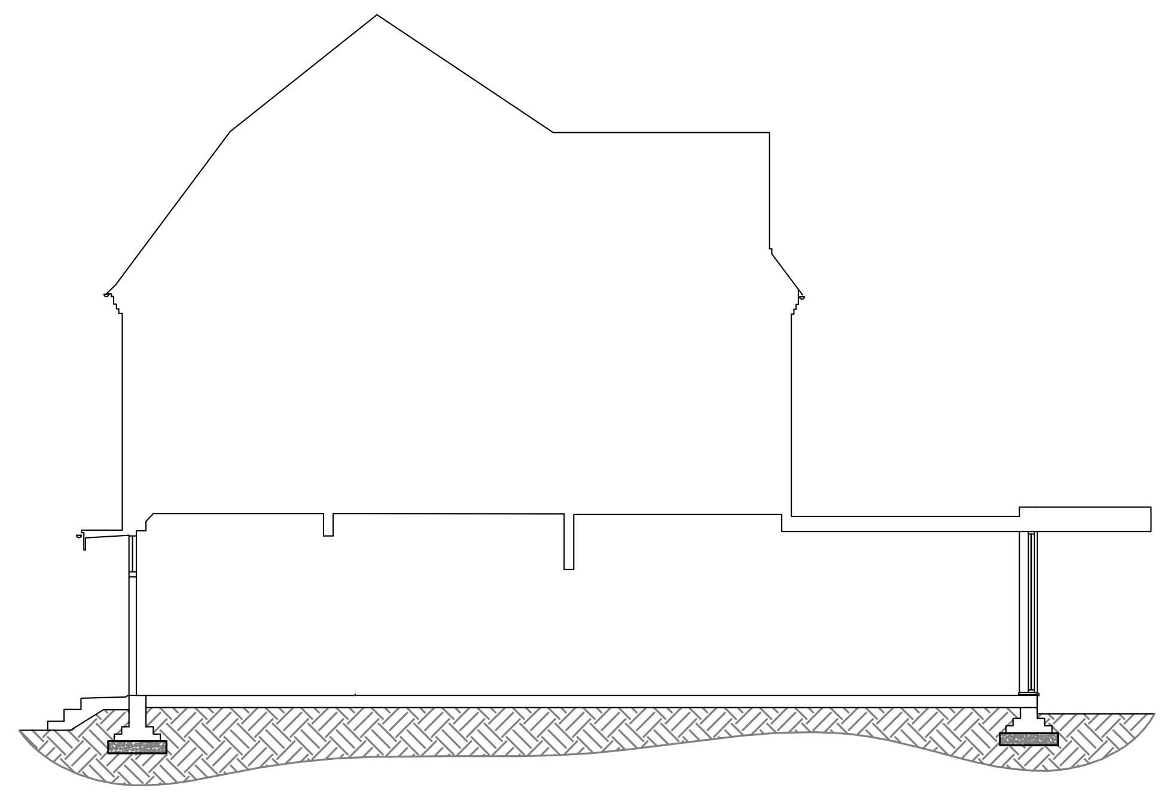
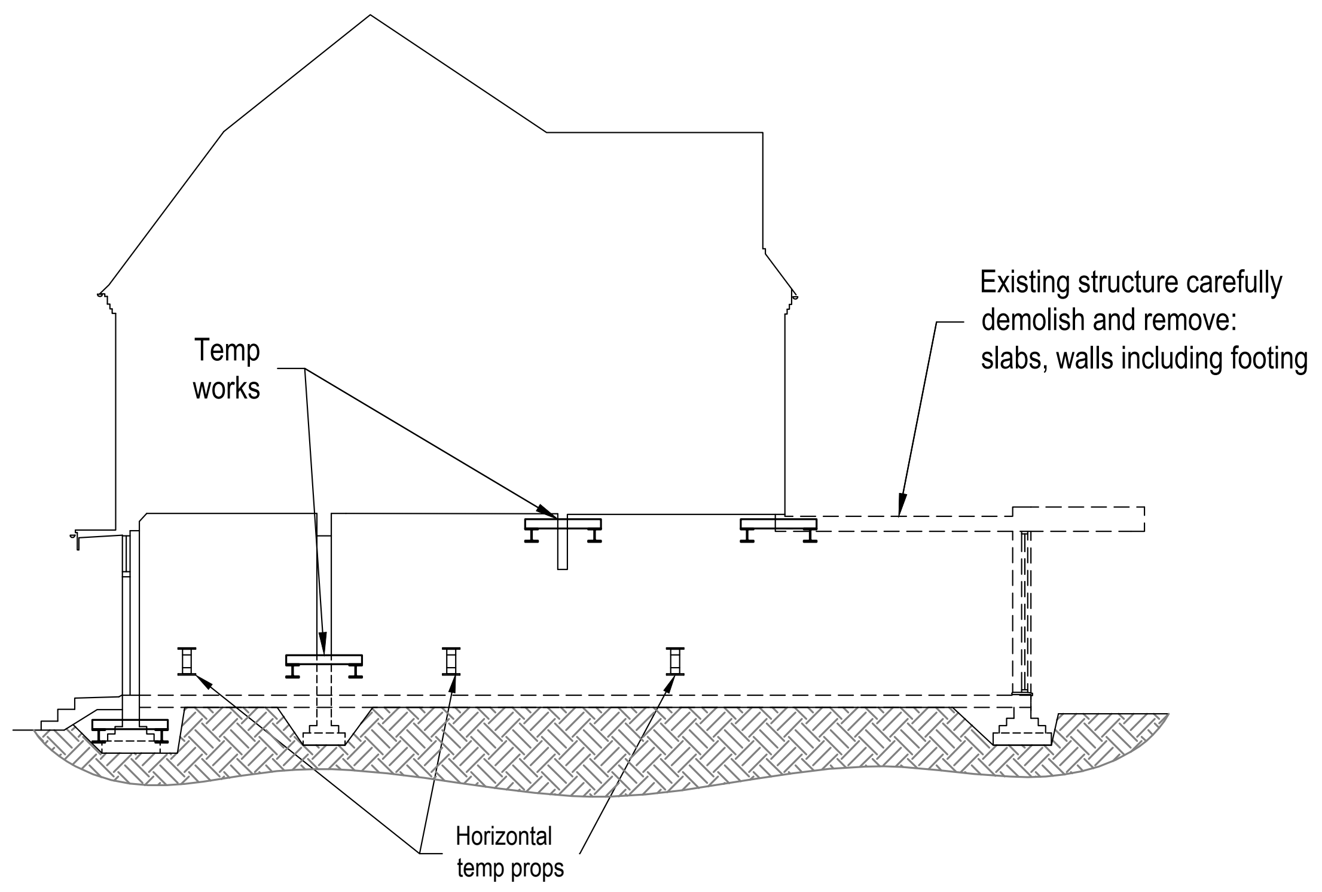
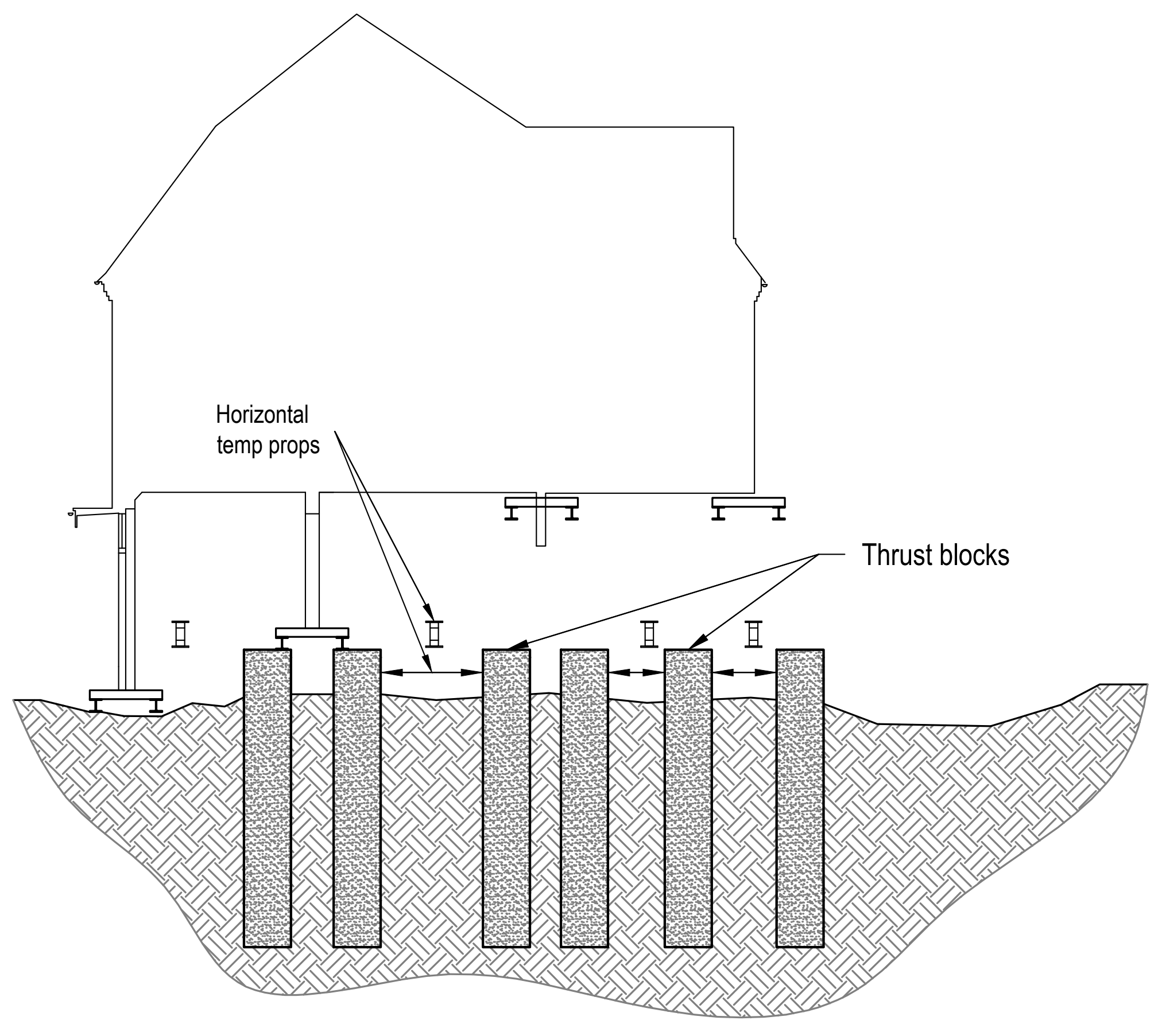


Existing Section A - A



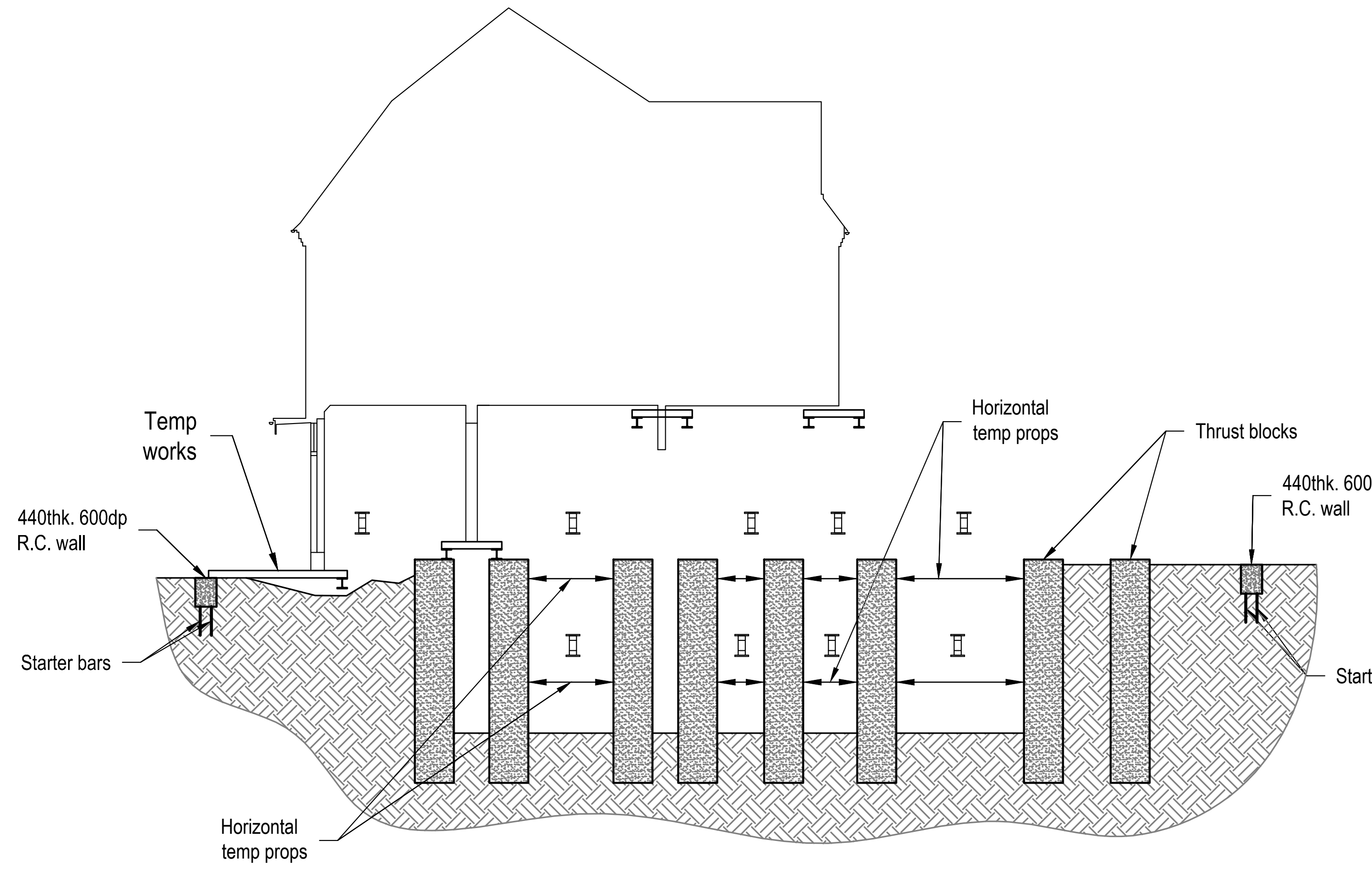
Stage 1:

- Disconnect, make safe and remove any underground services.
- Existing single storey structure (as shown) carefully demolish and remove: slabs, walls including footing but excluding piled wall.
- Fit horizontal props with walling beams to flank wall.
- R.C. underpinning hit & miss as shown & back fill - refer to drg. 4387-SM03.



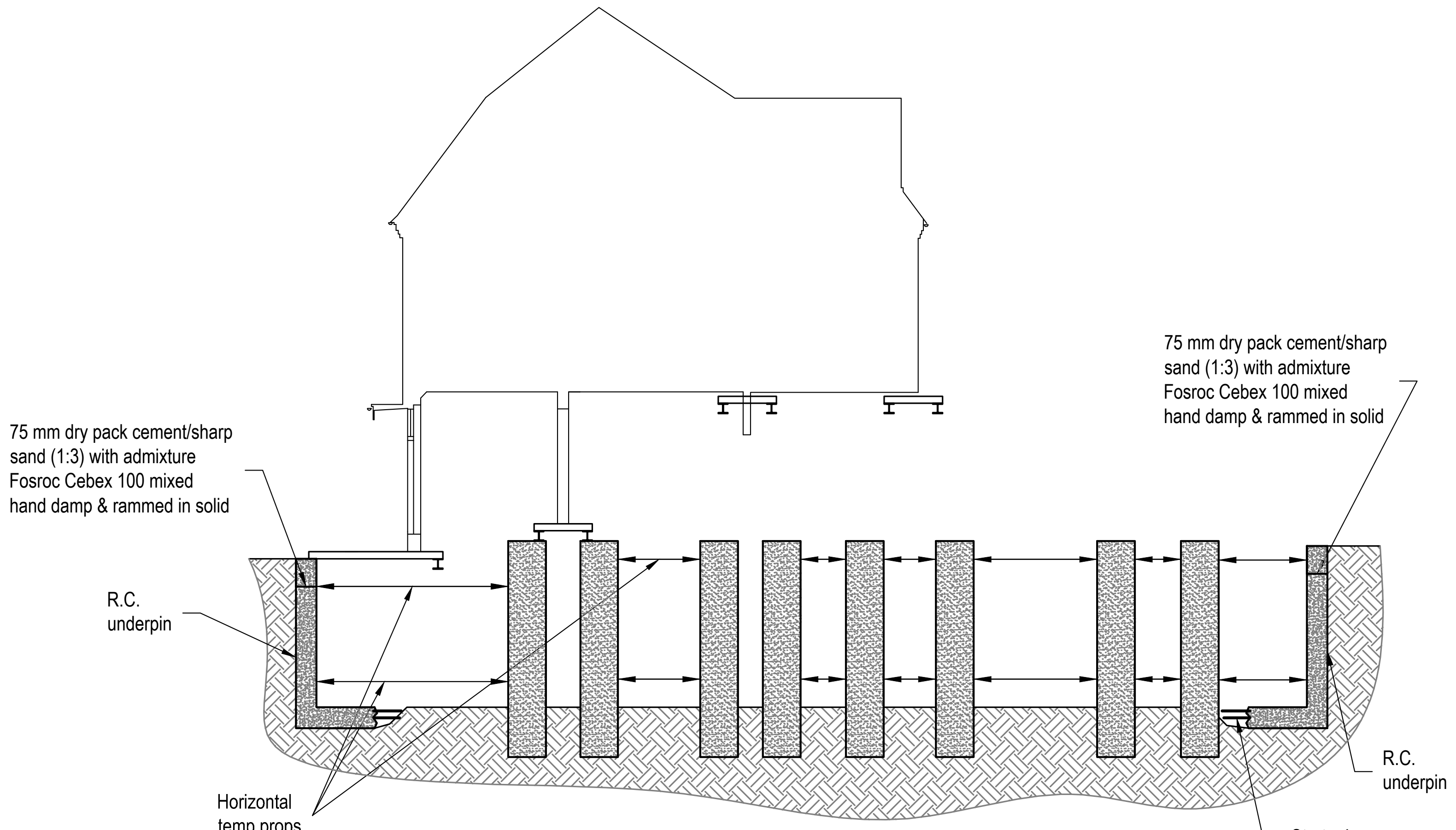
Stage 2:

- Install thrust blocks and temp foundation with temp props.
- Fit horizontal props.



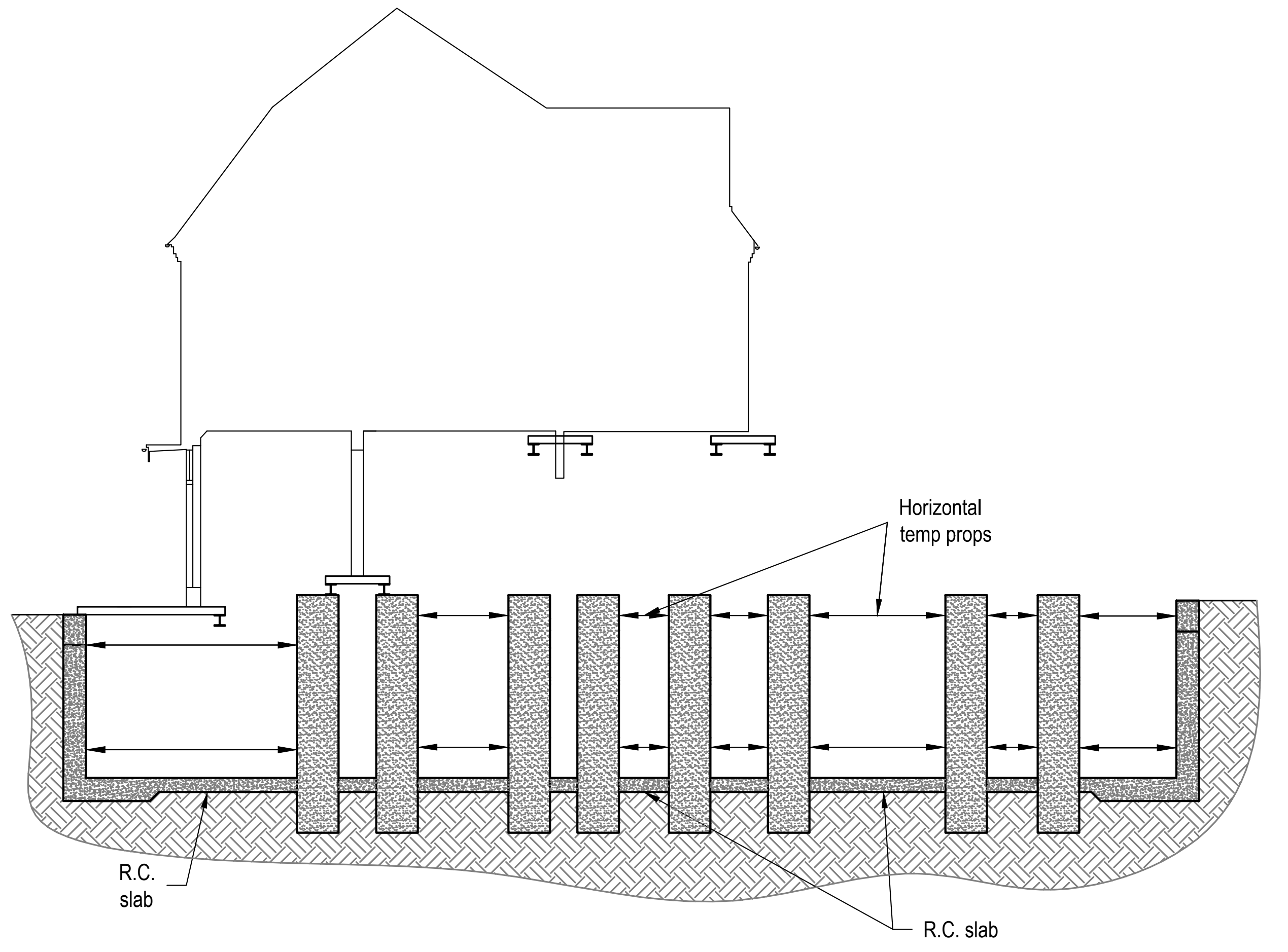
Stage 3:

- Cast 440wide x 600deep R.C. wall.
- Install additional thrust blocks and walling beams.



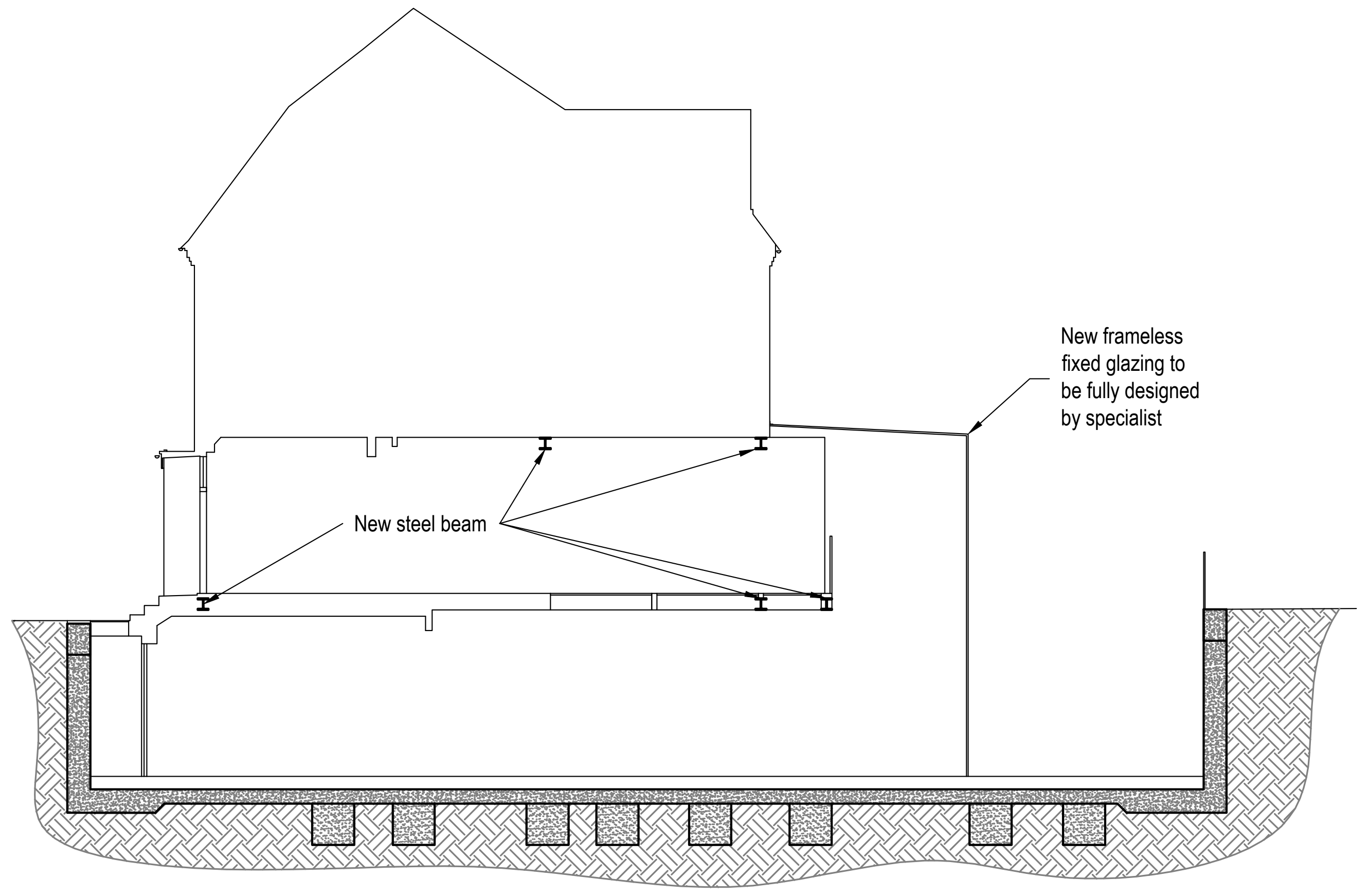
Stage 4:

- R.C. underpinning hit & miss to formation level under 600deep x 440 thk. R.C wall. and back fill.
- Excavate & fit horizontal props with walling beams.
- Cast 325 thk. lining R.C. wall.



Stage 5:

- Cast Basement R.C. slab and pad footings.



Stage 6:

- Install new beams, columns & joists. Make amendments to upper floors.
- Cut down thrust blocks.
- After concrete has cured remove temporary props.
- Install finishes: insulation, waterproofing etc. - refer to Architects details.

Notes.

Suggested Method of Works

This suggested method is a suggestion only and the contractor may submit alternative proposals. The method of works and all temporary works including design and erection are to be the full responsibility of the main contractor.

REV.	AMENDMENTS	BY	DATE	CHECKED
-	-	-	-	-

PROJECT
Platts Lane 12

TITLE
Suggested Method of Works 2

ARCHITECTS
XUL Architects

DRAWING No.
4387-SM04

DATE	10.8.2016
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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Job No.	Sheet No.	Rev.
4387	P1	

Member/Location

Job Title: 12 PLATT'S LANE

Drg. Ref. RETAINING WALL CALCS

Made by RT Date AUG 2016 Chd.

RETAINING / UNDER PIN DESIGN

BEARING PRESSURE CHK

ATTRACTS 6.5m OF 215 WALL, 3.5m OF 327 WALL, 3.7m R.C. WALL
2.5m BASEMENT SLAB, 2.5m GROUND, 1ST, 2ND & ROOF :

∴ DEAD LOAD : kN/m

6.5 × 5 = 33
3.5 × 7.5 = 27
3.7 × 0.44 × 24.5 = 40
2.5 × 0.25 × 24.5 = 16
(2.5 × 0.6)3 = 4.5
2.5 × 1.6 = 4

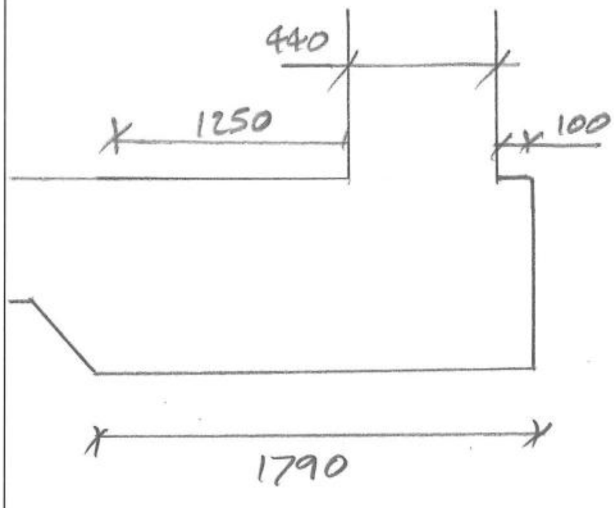
124 kN/m

LIVE LOAD : kN/m²

2.5 × 2.5 = 7
2.5 × 2.5 × 3 = 19
2.5 × 0.75 = 2

28 kN/m

TOTAL = 152 kN/m (CHAR)

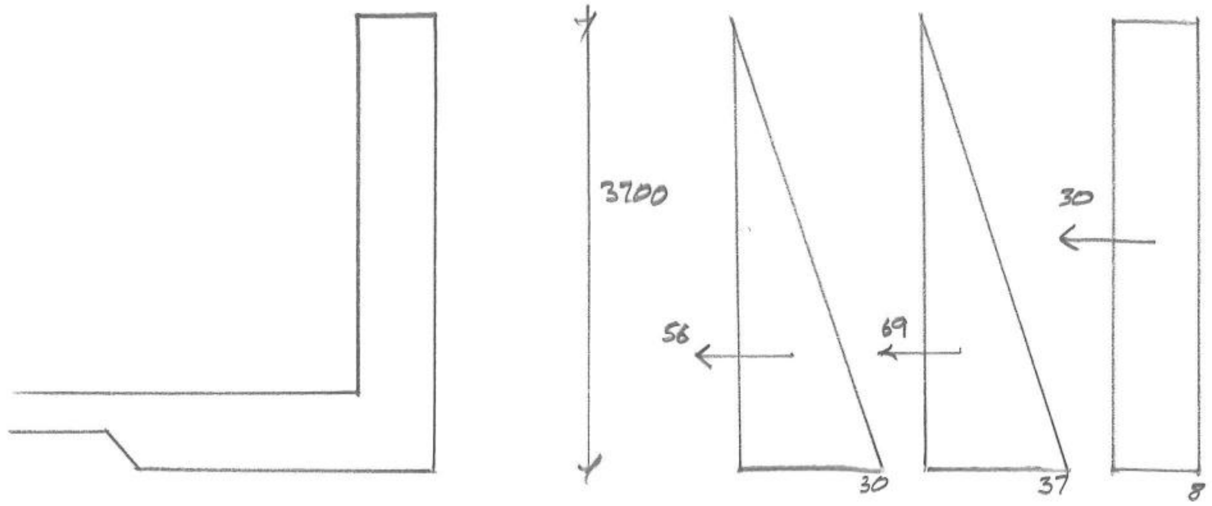


$\sigma = 152\,kN / 1790 = 85\,kN/m^2$

SAFE BEARING CAP = 95 kN/m² (REFER TO SOILS OTD REPORT)

∴ BEARING STRESS OK. ✓

Job No. 4387
Sheet No. P2
Rev.
Member/Location
Job Title 12 PLATT'S LANE
Drg. Ref. RETAINING WALL CALCS
Made by RT Date AUG 2016 Chd.



$K_o = 0.8$
ACTIVE/REST

SOIL = $3.7 \times 10 \times 0.8 = 30$ kN/m²
WATER = $3.7 \times 10 = 37$ kN/m²
SURCHARGE = $10 \times 0.8 = 8$ kN/m²

∴ MAX CANT B.M. = $(56+69)\,1.24 + 30 \times 1.9 = 212$ kNm/m (CHAR)
$\times 1.5 = 319$ kNm/m ULT

$K = 319 / 1000 . 390^2 . 40 = 0.05$

$A_s = 319 / 0.95 \times 460 \times 0.93 . 390 = 2013$ mm²/m B25-150 3270 mm²/m

$SPAN/d = 3700/390 = 9.5$ M.F. REQ = 1.36 $f_s = 189$

$M/bd^2 = 2.1$ M.F. = 1.35

∴ REQ M.F. = 1.06

∴ $0.25 = \frac{100 A_s'}{bd}$ ∴ $A_s' = 975$ B16-150 (1340 mm²/m)

∴ PROVIDE B25-150
TENSION FACE
&
B16 – 150 COMP. FACE

Appendix F Documents by XUL Architects