Basement Impact Assessment

of the proposed development at

46 Holmdale Road
London
NW6 1BL

for

Alex Wills & Artemis Doupa

LBH4507 Ver 1.1

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LBH WEMBLEY

ENGINEERING

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Foreword-Guidance Notes

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VALIDITY

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THIRD PARTY INFORMATION

The report may present an opinion based upon information received from third parties. However, no liability can be accepted for any inaccuracies or omissions in that information.

1. Introduction

1.1 Background

It is proposed to extend and deepen the existing partial basement present at this three storey terraced Victorian property to provide further habitable space.

It is also proposed to construct a single storey infill extension to the rear of the building.

1.2 Brief

LBH WEMBLEY have been appointed by Alex Wills and Artemis Doupa to complete a Basement Impact Assessment (BIA) for submission to London Borough of Camden in order to satisfy the specific requirements of the 2017 Camden Planning Policy and Supplementary Planning Guidance CPG4 on Basements and Lightwells, and associated Camden geological, hydrogeological and hydrological study 2010 (referred to as the 'Arup' report).

1.3 Planning Policy

The 2017 Camden Local Plan Policy A5 Basements reads as follows:

> *"The Council will only permit basement development where it is demonstrated to its satisfaction that the proposal would not cause harm to:*
>
> *a) neighbouring properties;*
> *b) the structural, ground, or water conditions of the area;*
> *c) the character and amenity of the area;*
> *d) the architectural character of the building; and*
> *e) the significance of heritage assets.*
>
> *In determining proposals for basements and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability in the form of a Basement Impact Assessment and where appropriate, a Basement Construction Plan.*
>
> *The siting, location, scale and design of basements must have minimal impact on, and be subordinate to, the host building and property. Basement development should:*
>
> *f) not comprise of more than one storey;*
> *g) not be built under an existing basement;*
> *h) not exceed 50% of each garden within the property;*
> *i) be less than 1.5 times the footprint of the host building in area;*
> *j) extend into the garden no further than 50% of the depth of the host building measured from the principal rear elevation;*
> *k) not extend into or underneath the garden further than 50% of the depth of the garden;*
> *l) be set back from neighbouring property boundaries where it extends beyond the footprint of the host building; and*
> *m) avoid the loss of garden space or trees of townscape or amenity value.*
>
> *Exceptions to f. to k. above may be made on large comprehensively planned sites.*

The Council will require applicants to demonstrate that proposals for basements:

n. do not harm neighbouring properties, including requiring the provision of a Basement Impact Assessment which shows that the scheme poses a risk of damage to neighbouring properties no higher than Burland Scale 1 'very slight';
o. avoid adversely affecting drainage and run-off or causing other damage to the water environment;
p. avoid cumulative impacts;
q. do not harm the amenity of neighbours;
r. provide satisfactory landscaping, including adequate soil depth;
s. do not harm the appearance or setting of the property or the established character of the surrounding area;
t. protect important archaeological remains; and
u. do not prejudice the ability of the garden to support trees where they are part of the character of the area.

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding.

We will generally require a Construction Management Plan for basement developments.

Given the complex nature of basement development, the Council encourages developers to offer security for expenses for basement development to adjoining neighbours."

The following policies in the Local Plan are also relevant to basement development and will be taken into account when assessing basement schemes:

- "Policy A2 Open space";
- "Policy A3 Biodiversity";
- "Policy D1 Design";
- "Policy D2 Heritage"; and
- "Policy CC3 Water and flooding".

In addition to the Local Plan Policy Camden publishes Camden Planning Guidance on Basements and Lightwells. These CPG documents do not carry the same weight as the main Camden Development Plan documents (including the above Policy A5) but they are important supporting documents.

It is noted that the current CPG4 Planning Guidance on Basements and Lightwells (2015) has not yet been updated to reflect the Local Plan and refers primarily to the now withdrawn Planning Policy DP27 on Basements and Lightwells.

1.4 Report Structure

The report commences with a desk study and characterisation of the site, before progressing to BIA screening and scoping assessments, whereby consideration is given to identifying the potential hydrogeological, hydrological and stability impacts to be associated with the proposed development. Following this the findings of an intrusive ground investigation are reported and a ground model is developed, followed by a discussion of the geotechnical issues.

Finally, an Impact Assessment is presented, including an assessment of the ground movements associated with the proposed works, along with consideration of the potential damage to the host building and neighbouring structures.

1.5 Documents Consulted

The following documents have been consulted during the preparation of this document:

1. Camden Local Plan – Adoption Version, 2017
2. Camden Planning Guidance 4 (CPG 4), Basements and Lightwells, 2015
3. Camden Development Policies DP27 – Basements and Lightwells, 2010
4. London Borough of Camden Geological, Hydrogeological and Hydrological Study (CHGGS), by Ove Arup & Partners Limited, dated 18th November 2010, Issue 0
5. Structural Trial Pit Records by Richard Tant Associates, Job No. 4435, dated 5th January 2018

2. The Site

2017 Map

2.1 Site Location

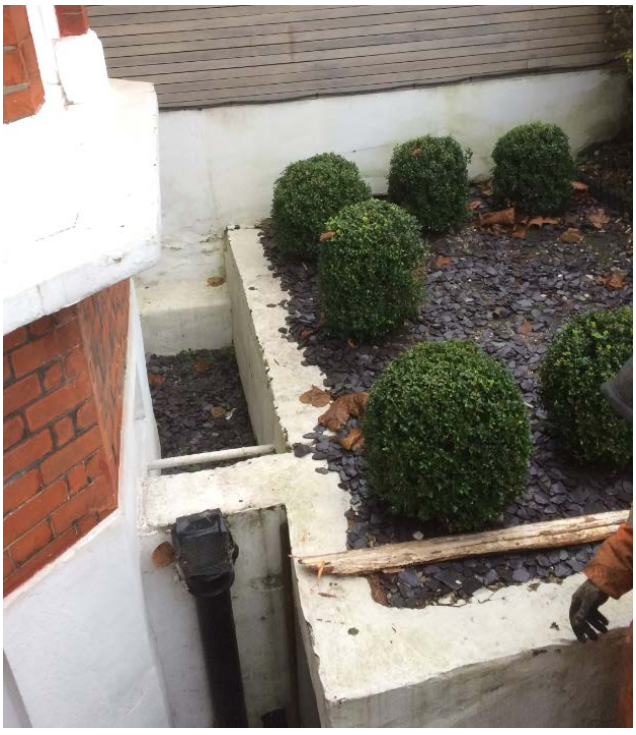
The site is situated on the western side of Holmdale Road, approximately 60m south of the junction with Mill Lane.

The site may be located approximately by postcode NW6 1BL or by National Grid Reference 525210, 185180.

2.2 Topographical Setting

The site lies on the lower southwestern slopes of Hampstead Heath on land that that falls gently to the south.

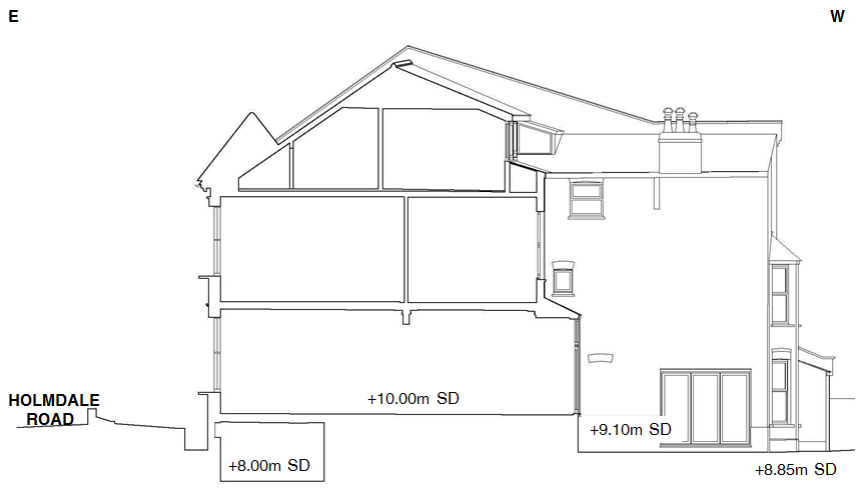
Street level at the front of the site appears to be situated at approximately +58m OD.



Patio in the front garden area

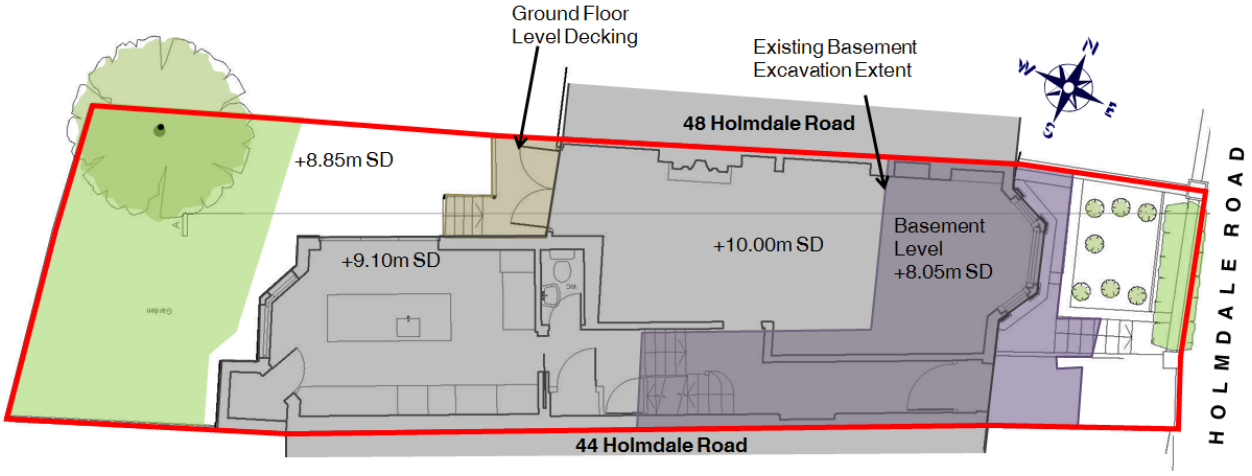
2.3 Site Description

The site is currently occupied by a Victorian, three storey terraced house with a partial basement beneath the front of the dwelling. A topographical survey undertaken by CSL Surveys (Ref: 22116RB F0, dated October 2016) has quoted figures in Site Datum (SD), with a reference datum of 10.00m and indicates that the existing ground floor level is raised by approximately 0.5m with respect to Holmdale Road. The existing basement is set at 8.03m SD; approximately 2m below the existing ground floor level.



Cross section showing the existing levels

Mature plum tree in rear garden



Plan showing existing layout

At the front of the property there is a narrow lightwell beyond which a raised planted area reaches to the rear of the pavement. The ground beneath this area is indicated to include a coal storage bunker and may include further cellars. However, for the purposes of drainage assessment it is assumed that the slate chipped patio area is permeable.

The ground floor of the property is at a split level, such that the front of the house is set at approximately +10.0m SD, whilst the rear kitchen area is set at a lower level of approximately +9.1m SD. The rear garden steps down again to around +8.3m SD.

The rear garden comprises a paved area and a lawn; a mature plum tree is present in the northwest corner of the garden. A small decking is present at ground level (+10.0m OD) at the rear of the lounge with steps down to the rear garden patio.

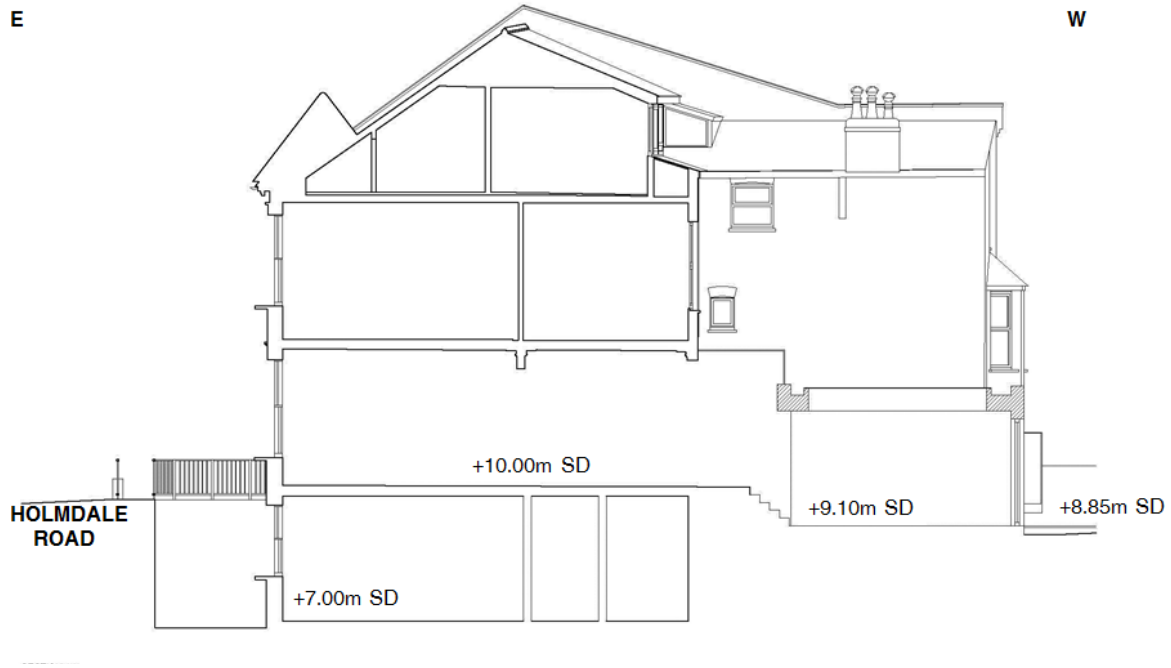
The site is adjoined to the north and south by terraced properties at No 48 and No 44 Holmdale Road.

2.4 Proposed Development

It is proposed to deepen the existing basement by approximately 1.1m and to extend this laterally beneath more of the existing house footprint, as well as extending and deepening the front lightwell.

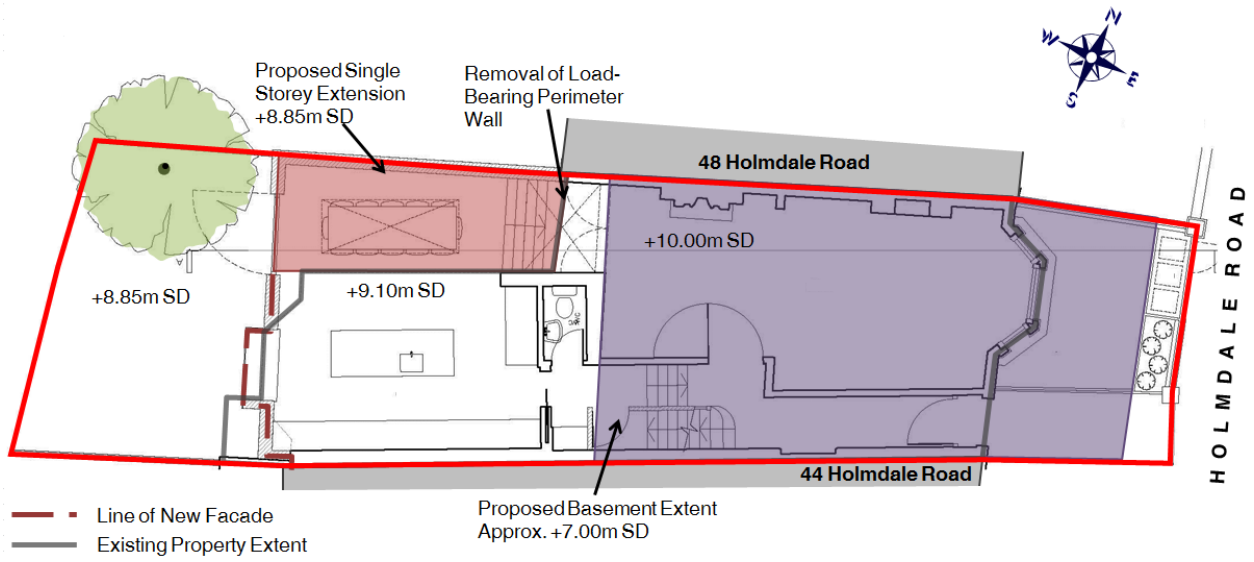
A single storey infill extension is also proposed to the rear of the property.

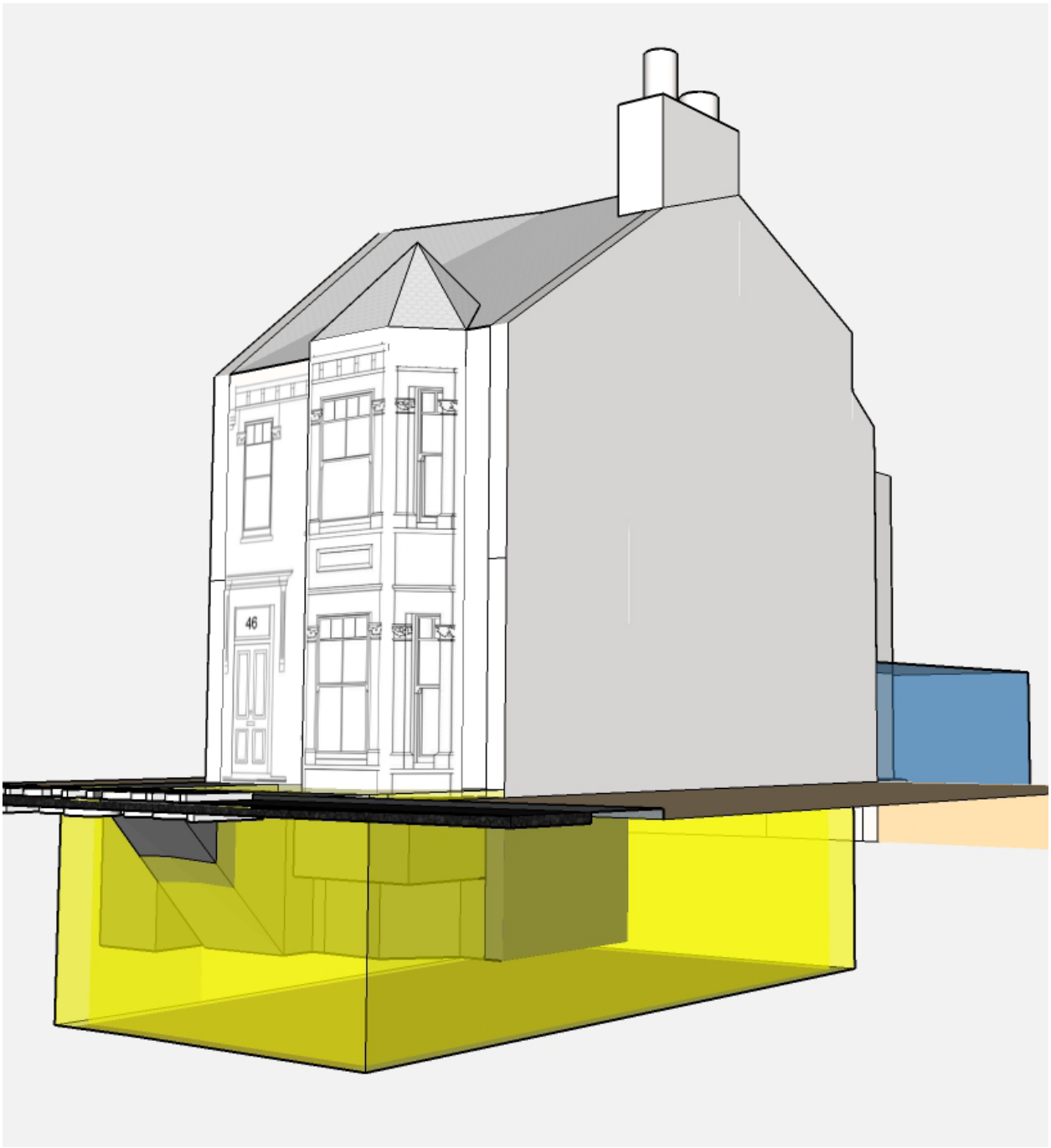
Alterations are proposed to the internal load bearing walls at the rear of the building, adjacent to the upper ground floor level patio and the ground floor façade at the rear of the kitchen, which will involve the demolition of the existing kitchen store room.



Above: Cross section showing the proposed levels

Below: plan showing the proposed layout

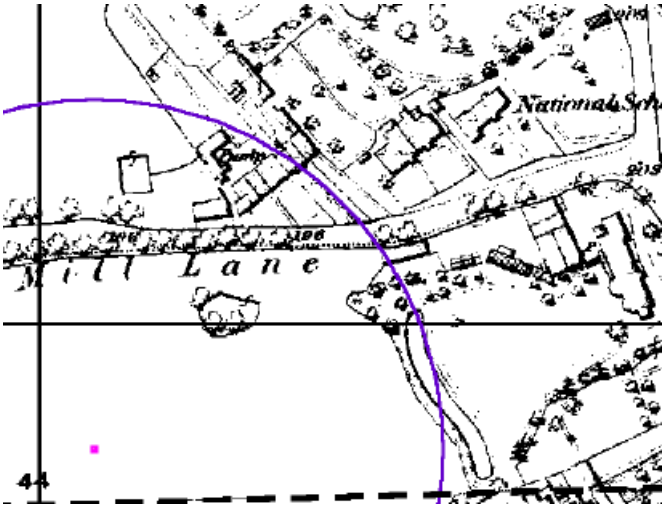




3D illustration showing the proposed development of 46 Holmdale Road

3. Desk Study

3.1 Site History

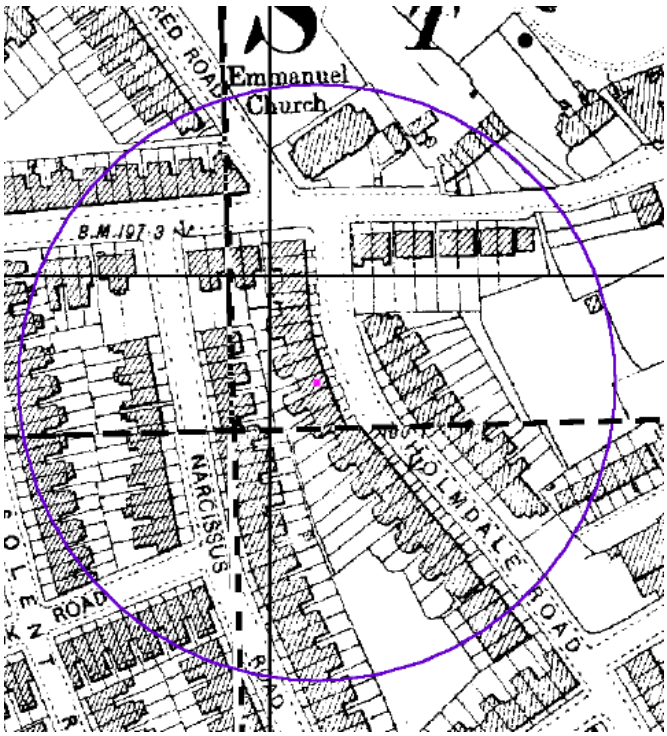


Extract from 1871-1879 maps

Although the nearby Mill Lane and the Midland Railway, located approximately 400m south of the site, had been established previously, the site remained open fields until the development of Holmdale Road during the late 19th Century. A pond was recorded around 50m northeast of the site prior to development.

Residential development had spread along Holmdale Road, as well as the surrounding area, by the turn of the century and remained relatively unchanged through to present day.

Many of the dwellings on Holmdale Road suffered blast damage from wartime bombing during World War II; Nos 33-39 Holmdale Road were reported to have suffered total destruction and as a result a four storey apartment block has since been constructed on the plot in the mid-20th Century.



Extract from 1896 map

3.2 Geological Information

British Geological Survey (BGS) records indicate that the site is directly underlain by the London Clay Formation.

3.3 Hydrogeological / Hydrological Information

A tributary of the River Westbourne is shown to flow in a south / southwest direction, approximately 220m east of the site.

The London Clay Formation may be considered virtually impermeable; hence no significant groundwater flow is expected to occur beneath the site.

The EA maps indicate that parts of Holmdale Road are at a risk from surface water flooding; however the site itself is designated as very low risk. Holmdale Road is, however, reported to have flooded in both 1975 and 2002.

4. Screening & Scoping Assessments

The Screening & Scoping Assessments have been undertaken with reference to Appendices E and F of the CGHSS, which is a process for determining whether or not a BIA is usually required.

4.1 Screening Assessment

The Screening Assessment consists of a series of checklists that identifies any matters of concern relating to the following:

- Subterranean (groundwater) flow
- Surface flow and flooding
- Slope stability

4.1.1 Screening Checklist for Subterranean (Groundwater) Flow

Question	Response	Justification
Is the site is located directly above an aquifer?	**No**	The Environment Agency (EA) maps indicate that the site is not directly underlain by an aquifer.
Will the proposed basement extend beneath the water table surface?	**No**	No groundwater is present beneath the site.
Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	**No**	The nearest watercourse is a tributary of the River Westbourne, roughly 220m to the east of the site.
Is the site within the catchment of the pond chains on Hampstead Heath?	**No**	The site is not within catchment of the Hampstead Heath Ponds.
Will the proposed development result in a change in the area of hard-surfaced/paved areas?	**Yes**	The front slate-chipped patio will be removed to facilitate the construction of the front lightwell.
Will more surface water (e.g. rainfall and run-off) than at present will be discharged to the ground (e.g. via soakaways and/or SUDS)?	**No**	There is not expected to be any change to affect the current discharge.
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?	**No**	No pond is present near the site.

4.1.2 Screening Checklist for Surface Flow and Flooding

Question	Response	Justification
Is the site within the catchment area of the pond chains on Hampstead Heath?	**No**	The site is not within catchment of the Hampstead Heath Ponds.
As part of the site drainage, will surface water flows (e.g. rainfall and run-off) be materially changed from the existing route?	**No**	Surface water flows will be disposed of by the existing means.
Will the proposed basement development result in a change in the proportion of hard-surfaced/paved areas?	**Yes**	The front slate-chipped patio will be removed to facilitate the construction of the front lightwell.
Will the proposed basement 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**	Surface water flows will be disposed of by the existing means.
Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	**No**	
Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding for example because the proposed basement is below the static water level of a nearby surface water feature?	**Yes**	Environment Agency (EA) maps indicate that the site is at a very low risk of surface water flooding. However, Holmdale Road is reported to have flooded in 1975 and 2002.

4.1.3 Screening Checklist for Stability

Question	Response	Justification
Does the existing site include slopes, natural or manmade, greater than 7 degrees?	**No**	There are no slopes greater than 7 degrees within the site.
Does the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees?	**No**	No re-profiling is planned at the site.
Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees?	**No**	
Is the site within a wider hillside setting in which the general slope is greater than 7 degrees?	**No**	The general slope of the wider hillside is less than 7 degrees.

Is London Clay the shallowest strata at the site?	**Yes**	The site is directly underlain by the London Clay.
Will trees be felled as part of the proposed development and/or are works proposed within tree protection zones where trees are to be retained?	**No**	The proposed basement is not within the protection zone of a mature plum tree to be retained in the rear garden.
Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	**No**	No evidence of seasonal shrink-swell subsidence has been recorded in the area.
Is the site within 100m of a watercourse of a potential spring line?	**No**	The nearest watercourse is a tributary of the River Westbourne, approximately 220m east of the site.
Is the site within an area of previously worked ground?	**No**	The site is not underlain by worked ground, as shown on Fig. 4 of the CGHHS.
Is the site within an aquifer?	**No**	The Environment Agency (EA) maps indicate that the site is not underlain by an aquifer.
Will the proposed basement extend beneath the water table such that dewatering may be required during construction?	**No**	No groundwater is present beneath the site.
Is the site within 50m of the Hampstead Heath ponds?	**No**	The site is not within catchment of the Hampstead Heath Ponds.
Is the site within 5m of a highway or pedestrian right of way?	**Yes**	The proposed lightwell is situated around 1m from the pedestrian right of way.
Will the proposed basement significantly increase the differential depth of foundations relative to the neighbouring properties?	**Yes**	It is envisaged the proposed excavations will extend up to 1m below the existing basements at 44 and 48 Holmdale Road.
Is the site over (or within the exclusion zone of) tunnels, e.g. railway lines?	**No**	The site is not within any exclusion zones or over tunnels.

4.2 Scoping Assessment

Where the checklist is answered with a “yes” or “unknown” to any of the questions posed in the flowcharts, these matters are carried forward to the scoping stage of the BIA process.

The scoping produces a statement which defines further the matters of concern identified in the screening stage. This defining should be in terms of ground processes, in order that a site specific BIA can be designed and executed (Section 6.3 of the CGHHS).

4.2.1 Scoping for Subterranean (Groundwater) Flow

- **The proposed development will result in a change in the area of hard-surfaced/paved areas**

The guidance advises that a change in the proportion of hard surfaced or paced areas of a property will affect the way in which rainfall and surface water are transmitted away from a property.

4.2.2 Scoping for Surface Flow and Flooding

- **The proposed basement development will result in a change in the proportion of hard-surfaced/paved areas**

The guidance advises that a change in the proportion of hard surfaced or paved areas of a property will affect the way in which rainfall and surface water are transmitted away from a property.

- **The site is in an area known to be at risk from surface water flooding, or at risk from flooding for example because the proposed basement is below the static water level of nearby surface water feature**

The guidance advises that a Flood Risk Assessment may be required.

4.2.3 Scoping for Stability

- **London Clay is the shallowest strata at the site**

The guidance advises that of the at-surface strata present in the London Borough of Camden, the London Clay is the most prone to seasonal shrink-swell (subsidence and heave).

- **The site is within 5m of a highway or pedestrian right of way**

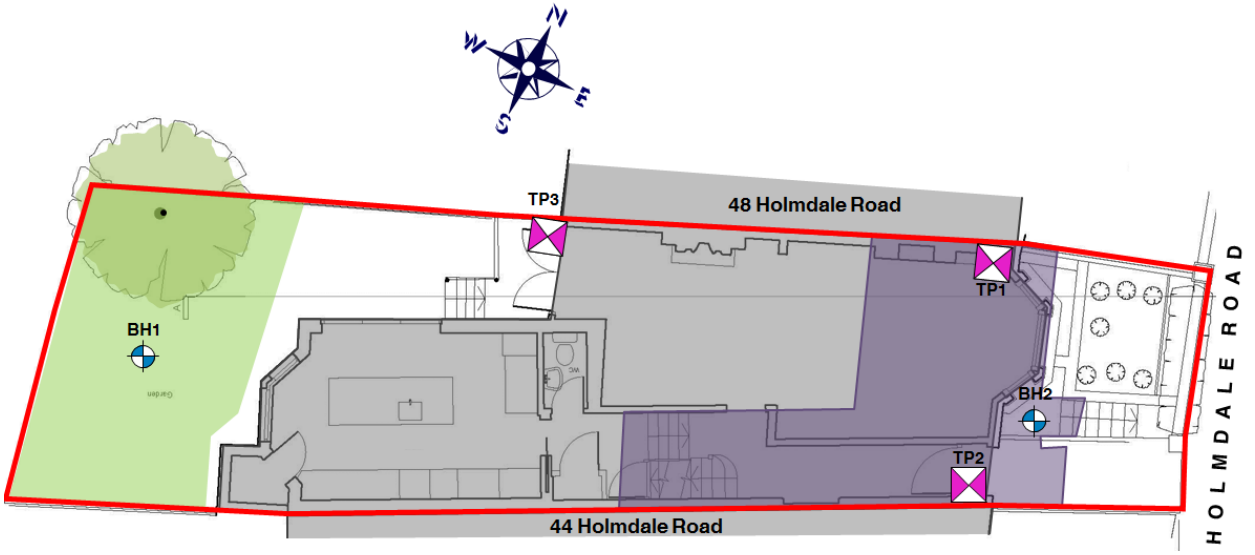
The guidance advises that excavation for a basement may result in damage to the road, pathway or any underground services buried in trenches beneath the road or pathway.

- **The proposed basement may significantly increase the differential depth of foundations relative to the neighbouring properties**

The guidance advises that excavation for a basement may result in structural damage to neighbouring properties if there is a significant differential depth between adjacent foundations.

5. Stage 3 – Site Investigation

An investigation comprising two small diameter percussive boreholes was carried out in December 2017, in order to assess the ground conditions and recover samples for geotechnical and chemical laboratory testing. In addition, three trial pits were constructed to expose the configuration of the existing foundations.



The site plan above indicates the approximate position of the exploratory boreholes and trial pits, while the associated records and laboratory test results are appended. The Site Datum (SD) levels shown on these records have been interpolated from a topographical survey provided.

5.1 Ground Conditions

The investigation indicates that, beneath a limited thickness of made ground, the site is directly underlain by the London Clay Formation.

5.1.1 Made Ground

The made ground beneath the rear garden extends to approximately 0.7m depth and appears to comprise topsoil overlying a pale brown silty sandy clay fill with occasional brick and stones.

Concrete over 350mm sand and gravel fill is present in the front lightwell.

5.1.2 London Clay Formation

The London Clay generally comprises firm, becoming firm to stiff, orange-brown mottled grey silty clay with scattered selenite crystals.

The results of the plasticity index testing confirm that these soils are of high plasticity.

5.1.3 Groundwater

No groundwater was encountered during the investigation and no shallow groundwater table is considered to be present at this site.

6. Discussion of Geotechnical Issues

6.1 Basement Proposals

It is proposed to deepen (by approximately 1.1m) and laterally extend the existing basement in order to create habitable basement space beneath the front half of the dwelling, as well as extending and deepening the front lightwell.

6.2 The proposed basement floor level will be at approximately +7.0m SD.Stability of Neighbouring Structures

6.2.1 No 44 Holmdale Road

No 44 Holmdale Road is understood to have a partial basement, set at around +8.0m SD, mirroring that at No 46.

It is therefore envisaged that the party wall to No 44 Holmdale Road will generally need underpinning by up to 1m, albeit a section to the rear will need underpinning by approximately 3m.

6.2.2 No 48 Holmdale Road

No 48 Holmdale Road is understood to have constructed a basement extension around the turn of the century and and trial pit records indicate that the party wall to No 48 Holmdale Road have been underpinned by 650mm.

It is therefore envisaged that the party wall to No 48 Holmdale Road will generally need deepening by up to 0.5m.

6.2.3 Pedestrian Right of Way / Holmdale Road

It is proposed to laterally extend the front lightwell to around 1m from the pavement along Holmdale Road; hence consideration could be given to the use of some form of temporary sheeting and propping.

6.3 Basement Construction

It is proposed to construct the perimeter wall to the new basement extensions by conventional underpinning.

6.3.1 New Foundations

The basement excavation will by-pass the made ground and extend down into the London Clay Formation.

The structural loads applied by the basement extension will be accommodated by the perimeter walls. In the absence of any expectation of substantial groundwater inflows into the excavation, conventional underpinning using the ‘hit and miss’ excavation method may be adopted.

Outside the zone of influence of any trees, the new underpinning should be placed in suitably firm London Clay expected at the depth of the proposed basement, and may be designed to apply an assessed net allowable bearing pressure of 120kN/m^2.

The 'hit and miss' method may also be used to construct the front lightwell, however, if a greater degree of temporary stability is required then consideration could be given to the use of some form of temporary sheeting and propping.

6.3.2 Basement Heave

Following excavation, it is envisaged that there will be a mismatch between the weight of the soil that is removed and the weight of the new structure that is to replace this; hence post-construction heave movements may be expected.

Theoretically, long term heave movements of less than 10mm will occur beneath the centre of the basement excavation, reducing to around 5mm outside the new basement.

It is suggested that the basement should be designed as a reinforced rigid box structure to respond uniformly to any residual net unloading. Consideration may also be given to thickening the basement slab in an effort to balance the weight of the soil that is to be removed and the weight of the new structure.

6.3.3 Waterproofing

Groundwater was not encountered within the envisaged depth of the basement excavation. Nevertheless, there is potential for water to collect around the basement structure in the long term unless perimeter and under floor drainage is assured. Hence, it is recommended that the basement should be fully waterproofed and designed to withstand hydrostatic pressures in accordance with Guidance provided in BS8102:2009, Code of Practice for the Protection of Below-Ground Structures against Water from the Ground. An assumed groundwater level at 1m depth below external ground level would be prudent for the purposes of assessing hydrostatic pressures in order to allow for the possibility of surface water flooding due to a water main burst or similar.

6.3.4 Retaining Walls

The following parameters may be considered in the design of the retaining walls:

Stratum	Bulk Density	Effective Cohesion	Effective Friction Angle
	(kg/m^3)	(c' - kN/m^2)	(ϕ'- degrees)
Made Ground	1800	Zero	25
6.4 London Clay Formation	**1900**	**Zero**	

20Single Storey Ground Floor Extension

It is proposed to construct a ground floor extension adjacent to the existing kitchen, on the rear garden patio at +57.6m OD.

Outside the influence of trees, new foundations placed in firm London Clay Formation may be designed to apply an assessed net allowable bearing pressure of $80kN/m^2$.

The foundations to the rear of this extension will, however, be constructed within the zone of influence of the existing mature Wild Plum tree, to be retained, in the rear garden; hence the NHBC guidance for building near trees in high shrinkable soils should be followed.

Plum trees are identified by the NHBC guidance to be of moderate water demand and given the approximate distance from the tree to the proposed ground floor extension, it is suggested that foundations should be taken to approximately 2m depth together with suspended flooring and appropriate use of compressible material.

A construction joint should be provided between the main building and the extension.

6.5 Foundation Concrete

The results of chemical analyses carried out on selected samples of the soils encountered indicate soluble sulphate concentrations falling within Class DS-3 as defined by BRE Special Digest 1 (2005). The recommendations of that guidance for Class DS-3 sulphate conditions should therefore be followed, assuming an Aggressive Chemical Environment for Concrete (ACEC) site classification of AC-2s for static groundwater.

6.6 Waste Disposal

All material to be disposed of off-site should be properly recorded, including the retention of any waste tickets, details of excavated soil export destination and the waste classification. The results have suggested that the made ground may be classified as Non-Hazardous for waste purposes.

The London Clay may also be classed as Non-Hazardous for waste disposal purposes and WAC analysis confirms that provided that the clay can be adequately separated from any made ground, it may be possible to dispose of the natural soils to a tip licenced to accept Inert material.

7. Impact Assessment

The screening and scoping stages have identified potential effects of the development on those attributes or features of the geological, hydrogeological and hydrological environment. This stage is concerned with evaluating the direct and indirect implications of each of these potential impacts.

7.1 Potential Hydrogeological Impacts

7.1.1 Proportion of Hard Surfaced Area

The proposals include the removal of the slate-chipped patio in the front garden to facilitate the construction of the front lightwell. This area, approximately 6m^2, is expected to be underlain by made ground of unknown permeability to the depth of the existing lightwell and is not expected to drastically affect the way water is transmitted from the property.

7.1.2 Surface Water Discharge

7.2 Potential Hydrological Impacts

7.2.1 Proportion of Hard Surfaced Area

As discussed in **Section 7.1.1** it is not expected that the way water is transmitted from the property will be drastically affected.

7.2.2 Surface Water Flooding

Holmdale Road is within Local Flood Risk Zone (LFRZ) 3_010 as defined in Figure 3.1 of the Camden Surface Water Management Plan (2011) and has also experienced flooding in 1975 and 2002. In accordance with the Camden Local Plan, a Flood Risk Assessment has been prepared – by LBH WEMBLEY (Ref: LBH4507 FRA Ver. 1.0) – in order to demonstrate that the proposed scheme will result in a minimal impact on surface water drainage conditions.

7.3 Potential Stability Impacts

7.3.1 London Clay / Shrink-Swell

The potential impacts associated with the basement construction are expected to obviate concerns regarding seasonal movements within the London Clay Formation

The construction of the foundations for the single storey ground floor extension will also negate any concerns regarding seasonal movements within the London Clay Formation.

7.3.2 Pedestrian Right of Way

The proposed lightwell lies around 1m from the pedestrian right of way and the theoretical 45° zone of support to the pedestrian right of way is expected to be comprised by the construction.

In order to preserve the integrity of the pedestrian right of way and highway, temporary sheeting should to be used to construct the side of the lightwell adjacent to the pedestrian right of way.

7.3.3 Differential Depth of Foundations

The party walls to No 44 and No 48 Holmdale Road are to be underpinned.

7.4 Ground Movement to Neighbouring Structures

The key factor to consider when undertaking a ground movement assessment for the development is that the design of the new basement will need to preserve the stability of the adjacent building, both during excavation and construction and in the permanent situation.

7.4.1 Structures Assessed for Ground Movement

7.4.1.1 44 Holmdale Road

The adjoining property at No 44 Holmdale Road is a three storey terraced dwelling with a partial basement and front lightwell present south of the site which was constructed around the same time as 46 Holmdale Road.

The partial basement appears to be set at an approximate elevation similar to the existing basement at 46 Holmdale Road. Hence underpinning is envisaged to be required for the party wall with this property and may be required to a depth of up to 3m, where the proposed basement extension does not neighbour the partial basement at No 44.

7.4.1.2 48 Holmdale Road

The adjoining property at No 48 Holmdale Road is a three storey terraced dwelling with a basement and front lightwell to the north of the site and was constructed around the same time as 44 Holmdale Road.

It is understood that a basement extension was constructed around the turn of the century, and that as part of the extension works the party wall with 46 Holmdale Road has been underpinned to a depth of 0.65m below the existing basement. Hence it is envisaged the existing foundations may require deepening by approximately 0.35m.

7.4.2 Modelled Ground Conditions

Excavation of the proposed basement will result in unloading of the clay leading to theoretical heave movement of the underlying soil in both the short and long term, depending upon the reapplication of loading.

Therefore, an analysis of the vertical movements has been carried out for a modelled situation, based on a soil model devised from the results of the ground investigation, together with published information on the London Clay Formation

The relation between the undrained shear strength (C_u) and depth (z) from the top of the London Clay Formation is therefore assumed to be $C_u = 50 + 8z$.

.The soil layers of this model are detailed in the table below.

Analysis Layer:	Upper Boundary (+m OD)	Thickness (m)	Average C_u (kN/m^2)	Soil Stiffness (kN/m^2)	
				E_u	E'
London Clay Formation	55.00	1	58	26100	14500
London Clay Formation	54.00	2	66	29700	16500
London Clay Formation	52.00	2	82	36900	20500
London Clay Formation	50.00	5	98	44100	24500
London Clay Formation	45.00	5	138	62100	34500
London Clay Formation	40.00	5	178	80100	44500
London Clay Formation	35.00	5	218	98100	54500
London Clay Formation	30.00	5	258	116100	64500
Assumed Rigid Boundary	25.00				

The Undrained Modulus of Elasticity (Eu) has been based upon an empirical relationship of Eu = 450 x Cu, and the Drained Modulus of Elasticity (E') has been based upon an empirical relationship of 250 x Cu.

Poisson's Ratios of 0.5 and 0.2 have been used for short term (undrained) and long term (drained) conditions respectively.

Based on the above parameters and loading / unloading and ignoring any benefit gained from the loading of previous buildings on site, the potential vertical displacements and the post construction movements have been analysed.

The analysis uses classic modified Boussinesq elastic theory, assuming a fully flexible foundation applying a uniform loading/unloading to a semi-infinite elastic half-space, using the above parameters for stratified homogeneity and with the introduction of an assumed rigid boundary at approximately 30m depth (+25.00m OD).

The programme calculates the theoretical Boussinesq elastic stress increase/decrease due to the applied net loadings / unloadings (over the given loaded / unloaded areas) at the mid-level of each stratum.

Short-term and long-term displacements are then calculated at each calculation point for each stratum, using the given values of Stiffness Moduli and Poisson's Ratio of the whole area of the site on a 0.5m calculation grid.

7.4.3 Short Term Movements

There are two components of short term movements that might potentially interact to affect the neighbouring structures. These are settlements associated with theoretical elastic heave movements from excavation of the basement and the underpinning process.

7.4.3.1 Underpinning

It is not possible to rigorously model the party wall settlements arising from conventional underpinning. However, experience indicates that the potential movements are very much dependent on workmanship.

It is suggested that given dry conditions and good workmanship, the amount of vertical movement of the walls can be expected to be approximately 5mm per stage of underpinning.

A single stage of underpinning is expected to take place at either of the two party walls; hence, 5mm of vertical settlement may arguably be expected at these walls.

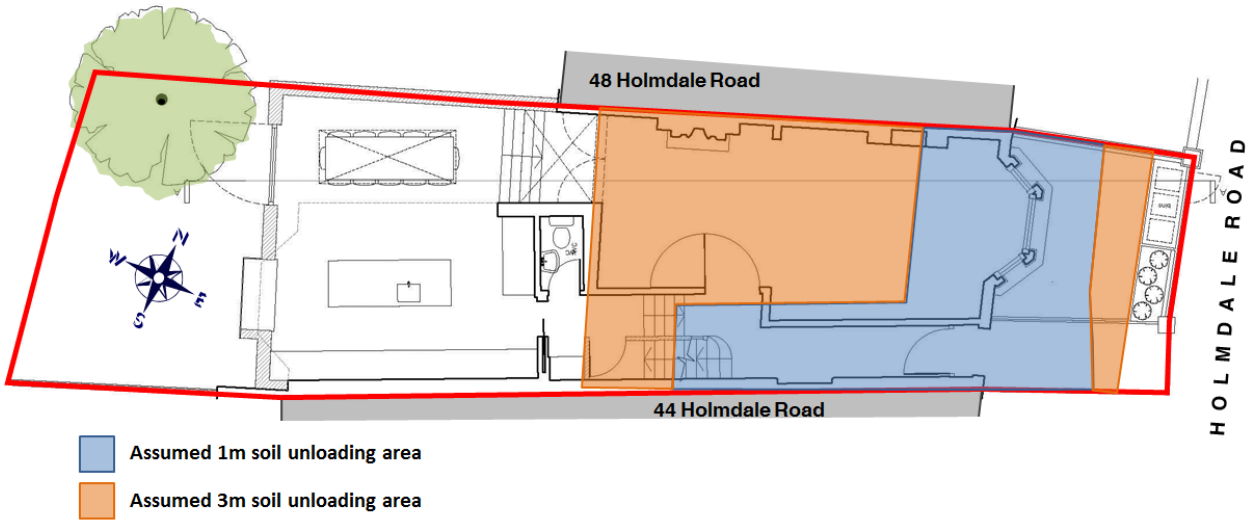
The subsequent ground horizontal movements that may occur due to yielding of the underpinned wall during the basement excavation may also be estimated. As a first approximation, the magnitude of the horizontal movement is assumed to be equal to the vertical movement at the underpinned wall; hence the horizontal movement expected at the party walls is also predicted to be 5mm.

7.4.3.2 Excavation

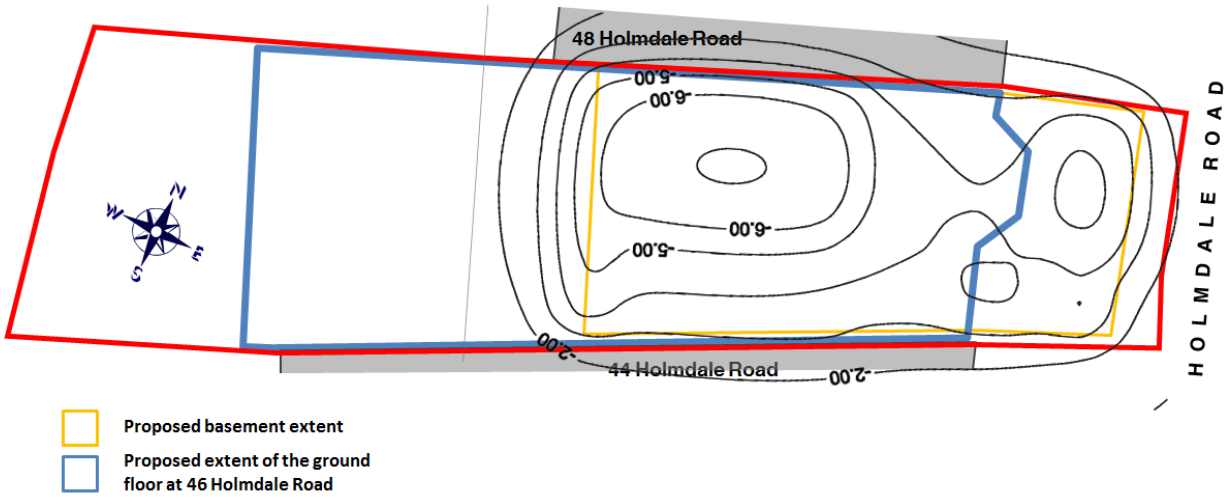
It is envisaged the basement excavation will generally extend to approximately 1m beneath the existing cellar area and up to approximately 3m where the basement area will be extended.

As a result, the potential effect of the basement excavation has been considered by applying a net unloading of up to -20kN/m^3 due to soil loading to be removed within the existing basement and up to -60 kN/m^3 where the basement is proposed to be extended.

This is illustrated on the plan as follows.



The potential effect of this soil excavation may lead to up to approximately 7mm of heave beneath the proposed deepened basement area reducing to roughly 4mm beneath both of the party walls with Nos. 48 and 44 Holmdale Road.

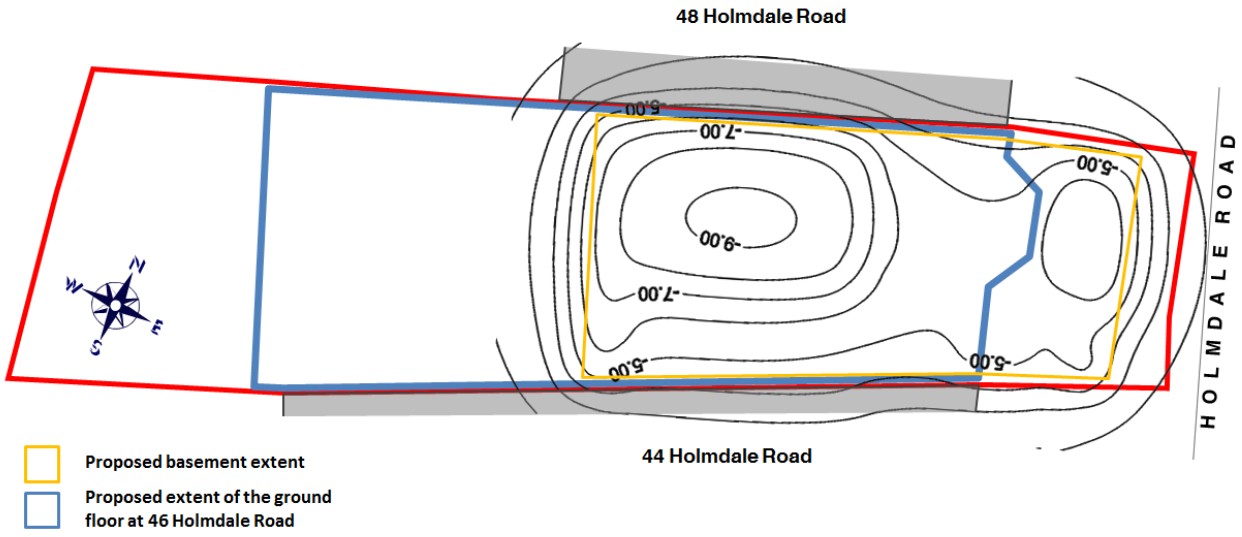


Plan showing theoretical approximate short term heave (mm) due to excavation

7.4.4 Post Construction Movements

In the areas where the basement is proposed to be extended or deepened there will be a mismatch between the weight of soil that is to be removed and the weight of the new structure that is to replace it. In this situation a component of long term heave that could proceed for decades is inevitable.

The results of heave analysis, as presented on the plan below, suggest that the scale of this long term heave ground movement will amount up to approximately 10mm in the area of deepest excavation.



Plan showing theoretical approximate post construction heave (mm) due to excavation

However, in practice, the construction of the ground floor extension and the new basement structure will result in an increase in loading of the soil in those areas which may serve to somewhat counteract the predicted heave movement. The structural loads are not modelled in the prediction in order to consider the worst case scenario

7.4.5 Impacts

7.4.5.1 Impact on 44 Holmdale Road

The vertical settlement due to underpinning and heave due to excavation described in the previous section are expected to potentially counteract each other to result in expected negligible net vertical movement affecting this party wall. Slight heave movement is predicted at the party wall where no underpinning is envisaged but these are not expected to be significant (<5mm).

Hence the potential damage to the building has thus been assessed as Category 0 (negligible) to Category 1 (very slight).

7.4.5.2 Impact on 48 Holmdale Road

Similarly, due to the envisaged deepening of the wall and the excavation heave it may be expected negligible net vertical movements are to affect the party wall with 48 Holmdale Road.

Heave movement at the rear party wall and in general the rear section of this building, predicted to be up to 5mm is also expected to be counteracted by the settlement due to the weight of the proposed ground floor extension.

Hence potential Category 0 (negligible) to Category 1 (very slight) damage is predicted to this building.

7.4.6 Mitigation of Ground Movements

In line with DP27, Camden will ensure that harm is not caused to neighbouring properties by basement development. Camden Local Plan (June 2017) states that the BIA must demonstrate that the basement scheme has a risk of damage to the neighbouring properties no higher than Burland Scale 1 (very slight).

It is predicted that negligible to very slight damage Category 0 to 1 may be expected on the basis that the expected slight wall settlements associated with underpinning will be largely counteracted by heave movements in the rear extension area.

Given the possibility of up to Category 1 damage to neighbouring structures, precautionary mitigation measures have been adopted as part of the proposed scheme in order to limit the potential adverse effects. The basement has therefore been designed as a monolithic reinforced box, together with temporary propping.

It should also be noted that the above predictions are based upon good workmanship and robust propping of the excavations.

Appendix

EXPLORATORY LOGS

STRUCTURAL TRIAL PIT RECORDS

GEOTECHNICAL TESTING RESULTS

CHEMICAL LABORATORY RESULTS

HAZWASTE ONLINE CLASSIFICATION REPORT

DRAWINGS

PROJECT: 46 Holmdale Road
CLIENT: Alex Wills & Artemis Doupa
Project No LBH4507

BOREHOLE BH1

BORING METHOD: Small Diameter Percussive
Date: 20/12/2017

GROUND WATER: No Groundwater Observed

REMARKS: Inspection pit excavated to 1.1m depth

G.L +8.85m SD Approx.

Samples No	Samples Type	Depth m	Tests	Legend	Depth m	Description
1	D	0.20			0.30	MADE GROUND (topsoil)
					0.75	MADE GROUND (pale orange-brown / grey-brown slightly sandy clay with occasional stones and brick fragments)
2	D	1.00				Firm orange-brown / grey mottled silty CLAY
	SPT	1.30	7			
	SPT	2.30	8			
3	D	2.50-2.70				…small sand parting around 2.6m depth and occasional selenite below
	SPT	3.30	11		3.5	
						Firm to stiff blueish grey / brown silty CLAY with occasional claystones
	SPT	4.30	12			
4	D	4.50-4.70			4.70	
						Stiff fissured blueish / grey-brown sandy slightly silty CLAY

U=Undisturbed
B= Bulk
D=Disturbed
W=Water

PROJECT: 46 Holmdale Road	Project No	**BOREHOLE BH1**
CLIENT: Alex Wills & Artemis Doupa	LBH4507	

BORING METHOD:	Small Diameter Percussive	Date: 20/12/2017
GROUND WATER:	No Groundwater Observed	
REMARKS:	Inspection pit excavated to 1.1m depth	

G.L +8.85m SD Approx.

Samples No	Samples Type	Depth m	Tests	Legend	Depth m	Description
	SPT	5.30	22		5.70	
	SPT	6.30	31		6.45	Very stiff blueish grey-brown slightly silty CLAY

U=Undisturbed
B= Bulk
D=Disturbed
W=Water

PROJECT: 46 Holmdale Road	Project No	**BOREHOLE BH2**
CLIENT: Alex Wills & Artemis Doupa	LBH4507	

BORING METHOD:	Small Diameter Percussive	Date: 20/12/2017
GROUND WATER:	No Groundwater Observed	
REMARKS:	Inspection pit excavated into the natural soils	

G.L +8.00m SD Approx.

Samples No	Samples Type	Depth m	Tests	Legend	Depth m	Description
					0.05	MADE GROUND (concrete)
					0.40	MADE GROUND (dirty brown sand and gravel)
					1.20	Firm grey / brown mottled silty CLAY …occasional sand partings from around 0.7m depth
					1.25	Sand parting
1	D	1.70-1.90			2.20	Firm grey / brown mottled silty CLAY with occasional claystones
					3.00	Firm to stiff grey / brown mottled sandy slightly silty CLAY

Sheet 1 of 1

U=Undisturbed
B= Bulk
D=Disturbed
W=Water

LBH WEMBLEY ENGINEERING

PROJECT: 46 Holmdale Road

CLIENT: Alex Wills & Artemis Doupa

Project No LBH4507

SPT RESULTS

Borehole No	Depth at Start of Test (m)	Spoon or Cone	Blow for each successive 75mm penetration						Water Level (m)	Is Hole Blowing?	N Value
BH1	1.00	S	1	1	1	2	2	2	DRY	-	7
	2.00	S	1	1	2	1	2	3	DRY	-	8
	3.00	S	1	1	3	2	3	3	DRY	-	11
	4.00	S	1	1	2	3	3	4	DRY	-	12
	5.00	S	2	4	4	6	6	6	DRY	-	22
	6.00	S	6	6	7	7	8	9	DRY	-	31

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Job No.	Sheet No.	Rev.
4435		

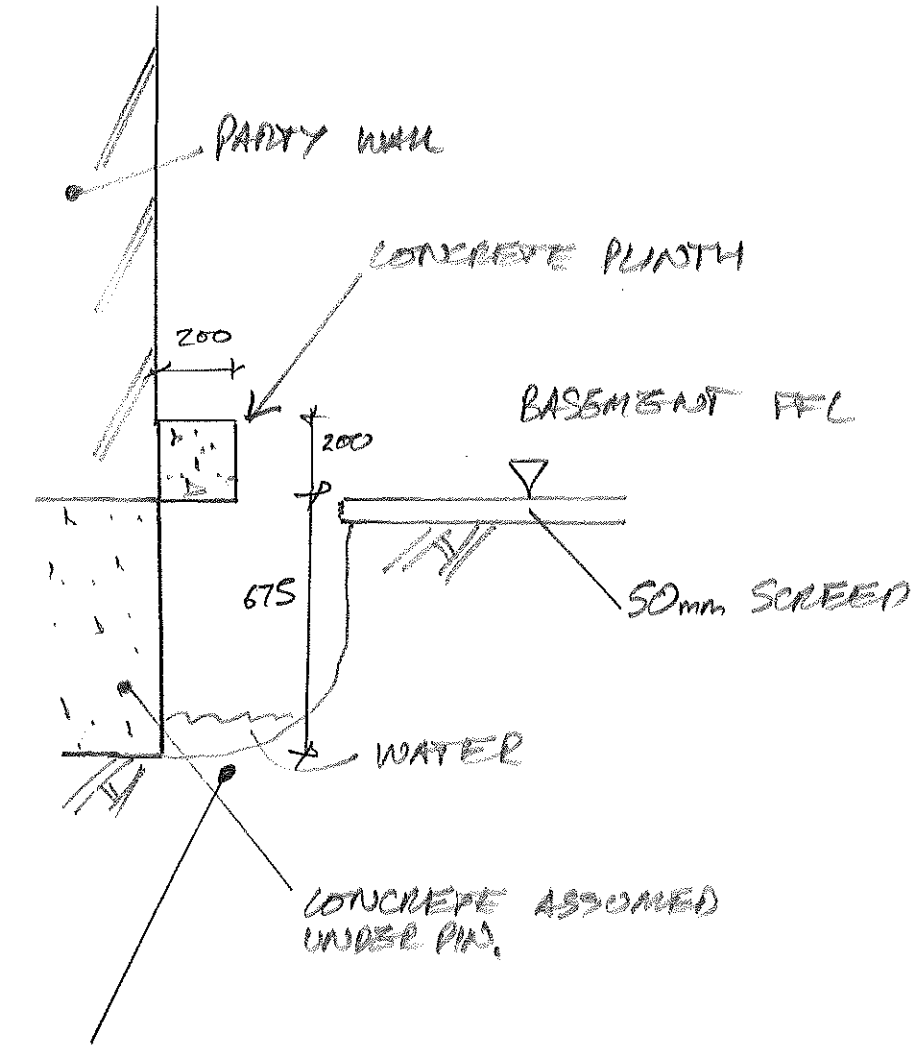
Member/Location

Job Title: 46 HOLMDALE ROAD

Drg. Ref.

Made by RT Date 5.1.18 Chd.

SITE 19.12.17



T.H. 1

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Job No.	Sheet No.	Rev.
4435		

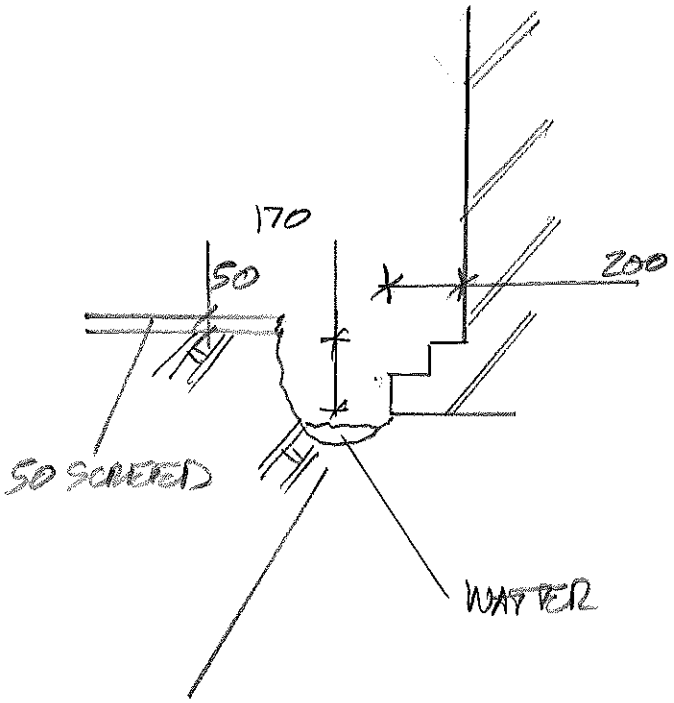
Member/Location

Job Title: 96 WORMWOOD ROAD

Drg. Ref.

Made by RT Date 5.1.18 Chd.

SITE 19.12.17



CLAY x 120 kN/m² SBC.

T.H. 2

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Job No.	Sheet No.	Rev.
4435		

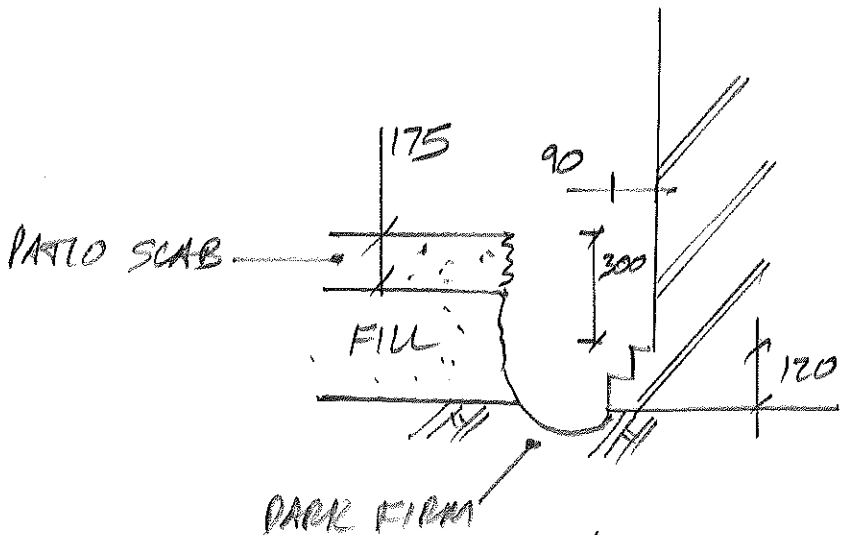
Member/Location

Job Title: 96 WOODBRIDGE ROAD

Drg. Ref.

Made by [illegible] Date 5.1.18 Chd.

SITE 19.12.17



DRY.

T.H.3

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Telephone:- 01327 860947/860060 Fax:- 01327 860430 Email: groundtech@listersgeotechnics.co.uk

PROJECT INFORMATION		SAMPLE INFORMATION		
Site Location:-	46 Holmdale Road Hampstead Heath London NW6 1BL	**Laboratory Tests Undertaken:-**		
		TEST TYPE	**TEST METHOD**	**TESTED**
		Natural Water Contents (WC%)	(BS 1377:Part 2:1990 Clause 3.2)	✓
		Liquid Limits (%)	(BS 1377:Part 2:1990 Clause 4.3)	✓
		Plastic Limits (%)	(BS 1377:Part 2:1990 Clause 5.3)	✓
		Plasticity Index (%)	(BS 1377:Part 2:1990 Clause 5.4)	✓
		Linear Shrinkage (%)	(BS 1377:Part 2:1990 Clause 6.5)	
		PSD - Wet Sieving	(BS 1377:Part 2:1990 Clause 9.2)	
Client Reference:-	-	Engineering Sample Descriptions	(BS 5930 : Section 6)	
		Passing 425/63 (μm)	-	
		Hydrometer	(BS 1377:Part 2:1990 Clause 9.5)	
Date Samples Received:-	5th January 2018	Loss on Ignition (%)	-	
Date Testing Completed:-	8th January 2018	Soil Suctions (kPa)	BRE Digest IP 4/93, 1993	
		Bulk Density (Mg/m^3)	(BS 1377:Part 2:1990 Clause 7.2)	
		Strength Tests	(BS 1377:Part 7:1990 Clause 8 & 9)	
		Soluble Sulphate Content (SO_4g/l)	(BS 1377:Part 3:1990 Clause 5.3)	✓
		pH value	(BS 1377:Part 3:1990 Clause 9.4)	✓
		California Bearing Ratios (CBR)	(BS 1377:Part 4:1990 Clause 7)	
		Compaction Tests	(BS 1377:Part 4:1990 Clauses 3.0-3.6)	

The results relate only to the samples tested

Laboratory testing in accord with BS EN ISO/IEC 17025-2000 and Quality Management in accord with ISO 9001

Signed on behalf of GroundTech Laboratories:- _____ **Technical Signatory**

Quality Assured to ISO 9001

GEOTECHNICAL LABORATORY TEST RESULTS

Report No: 18.01.001

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone: 01327 860947/860060 Fax: 01327 860430 Email: groundtech@listersgeotechnics.co.uk

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	WC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	WC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 1	D	2.50																					6.0	1.67
	D	4.50	PI/63	29	71	25	46	100	46	CV	98	0.41	27	0.09										
BH 2	D	1.70	PI/63	35	76	27	49	100	49	CV	97	0.46	29	0.16									6.5	0.10

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Reference
18.01.001

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
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Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

LBH Wembley Geotechnical & Environmental
Unit 12
Little Balmer
Buckingham Industrial Park
Buckingham
MK18 1TF

Attention: Tom Jones

CERTIFICATE OF ANALYSIS

Date:	10 January 2018
Customer:	H_LBHWGE_BUK
Sample Delivery Group (SDG):	171222-3
Your Reference:	LBH4507
Location:	46 Holmdale Road
Report No:	439595

We received 2 samples on Friday December 22, 2017 and 2 of these samples were scheduled for analysis which was completed on Wednesday January 10, 2018. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
16807568	BH1		0.20 - 0.20	20/12/2017
16807572	BH1		1.00 - 1.00	20/12/2017

Maximum Sample/Coolbox Temperature (°C) :

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

11.2

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			16807568				16807572				
Customer Sample Reference			BH1				BH1				
AGS Reference											
Depth (m)			0.20 - 0.20				1.00 - 1.00				
Container			250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)		250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)		
Sample Type			S	S	S		S	S	S		
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 1					X				
Anions by Kone (soil)	All	NDPs: 0 Tests: 1	X								
Anions by Kone (w)	All	NDPs: 0 Tests: 1						X			
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 1		X							
Boron Water Soluble	All	NDPs: 0 Tests: 1	X								
CEN Readings	All	NDPs: 0 Tests: 1						X			
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1	X								
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1						X			
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 1						X			
Easily Liberated Sulphide	All	NDPs: 0 Tests: 1	X								
EPH	All	NDPs: 0 Tests: 1	X								
EPH by FID	All	NDPs: 0 Tests: 1	X								
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 1	X								
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 1	X								
Fluoride	All	NDPs: 0 Tests: 1						X			

Validated

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
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SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			16807568				16807572				
Customer Sample Reference			BH1				BH1				
AGS Reference											
Depth (m)			0.20 - 0.20				1.00 - 1.00				
Container			250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)		250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)		
Sample Type			S	S	S		S	S	S		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2			X				X		
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 1	X								
Loss on Ignition in soils	All	NDPs: 0 Tests: 1				X					
Mercury Dissolved	All	NDPs: 0 Tests: 1						X			
Metals in solid samples by OES	All	NDPs: 0 Tests: 1	X								
Mineral Oil	All	NDPs: 0 Tests: 1				X					
PAH by GCMS	All	NDPs: 0 Tests: 2	X			X					
PCBs by GCMS	All	NDPs: 0 Tests: 1				X					
pH	All	NDPs: 0 Tests: 2	X			X					
Phenols by HPLC (S)	All	NDPs: 0 Tests: 1	X								
Phenols by HPLC (W)	All	NDPs: 0 Tests: 1						X			
Sample description	All	NDPs: 0 Tests: 2	X			X					
Total Dissolved Solids	All	NDPs: 0 Tests: 1						X			
Total Organic Carbon	All	NDPs: 0 Tests: 2	X			X					
Total Sulphate	All	NDPs: 0 Tests: 1	X								

Validated

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Results Legend

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)				16807568			16807572	
Customer Sample Reference				BH1			BH1	
AGS Reference								
Depth (m)				0.20 - 0.20			1.00 - 1.00	
Container				250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)	250g Amber Jar (ALE210)	400g Tub (ALE214)	60g VOC (ALE215)
Sample Type				S	S	S	S	S	S
TPH CWG GC (S)	All	NDPs: 0 Tests: 1		X					

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
16807568	BH1	0.20 - 0.20	Dark Brown	Sandy Clay Loam	Crushed Brick	Stones
16807572	BH1	1.00 - 1.00	Light Brown	Silty Clay	None	Stones

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH1
			Depth (m)	0.20 - 0.20	1.00 - 1.00
			Sample Type	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	20/12/2017	20/12/2017
			Sample Time	.	.
			Date Received	22/12/2017	22/12/2017
			SDG Ref	171222-3	171222-3
			Lab Sample No.(s)	16807568	16807572
			AGS Reference		
Moisture Content Ratio (% of as received sample)	%	PM024		16	25
Loss on ignition	<0.7 %	TM018			8.12 M
Mineral oil >C10-C40	<1 mg/kg	TM061			8.95
EPH (C5-C40)	<35 mg/kg	TM061		117	
Mineral Oil Surrogate % recovery**	%	TM061			72.8
EPH Range >C10 - C40	<35 mg/kg	TM061		117 M	
Phenol	<0.01 mg/kg	TM062 (S)		<0.01 M	
Cresols	<0.01 mg/kg	TM062 (S)		<0.01 M	
Xylenols	<0.015 mg/kg	TM062 (S)		<0.015 M	
2,3,5-Trimethylphenol	<0.01 mg/kg	TM062 (S)		<0.01 M	
2-Isopropylphenol	<0.015 mg/kg	TM062 (S)		<0.015 M	
Phenols, Total Detected 5 speciated	<0.06 mg/kg	TM062 (S)		<0.06 M	
Organic Carbon, Total	<0.2 %	TM132		2.63 M	0.491 M
Soil Organic Matter (SOM)	<0.35 %	TM132		4.53 #	
pH	1 pH Units	TM133		7.63 M	7.75 M
Chromium, Hexavalent	<0.6 mg/kg	TM151		<0.6 #	
Cyanide, Total	<1 mg/kg	TM153		<1 M	
Cyanide, Free	<1 mg/kg	TM153		<1 M	
Thiocyanate	<1 mg/kg	TM153		<1 M	
PCB congener 28	<3 µg/kg	TM168			<3 M
PCB congener 52	<3 µg/kg	TM168			<3 M
PCB congener 101	<3 µg/kg	TM168			<3 M
PCB congener 118	<3 µg/kg	TM168			<3 M
PCB congener 138	<3 µg/kg	TM168			<3 M
PCB congener 153	<3 µg/kg	TM168			<3 M
PCB congener 180	<3 µg/kg	TM168			<3 M
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168			<21
Sulphide, Easily liberated	<15 mg/kg	TM180		<15 ♦ M	
Arsenic	<0.6 mg/kg	TM181		18.9 M	
Boron	<0.7 mg/kg	TM181		10.9 #	
Cadmium	<0.02 mg/kg	TM181		0.252 M	
Chromium	<0.9 mg/kg	TM181		36.4 M	
Copper	<1.4 mg/kg	TM181		64.3 M	

Validated

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH1				
			Depth (m)	0.20 - 0.20	1.00 - 1.00				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	20/12/2017	20/12/2017				
			Sample Time	-	-				
			Date Received	22/12/2017	22/12/2017				
			SDG Ref	171222-3	171222-3				
			Lab Sample No.(s)	16807568	16807572				
			AGS Reference						
Lead	<0.7 mg/kg	TM181		721 M					
Mercury	<0.14 mg/kg	TM181		0.75 M					
Nickel	<0.2 mg/kg	TM181		26.5 M					
Selenium	<1 mg/kg	TM181		<1 #					
Zinc	<1.9 mg/kg	TM181		271 M					
ANC @ pH 4	<0.03 mol/kg	TM182			0.0847				
ANC @ pH 6	<0.03 mol/kg	TM182			0.0325				
Total Sulphur (ASB)	<0.0016 %	TM221		0.00591					
Boron, water soluble	<1 mg/kg	TM222		1.23 M					
Water Soluble Sulphate as SO4 2:1 Extract	<0.004 g/l	TM243		0.0327 M					

Validated

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

GRO by GC-FID (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Customer Sample Ref.	BH1
Depth (m)	1.00 - 1.00
Sample Type	Soil/Solid (S)
Date Sampled	20/12/2017
Sample Time	.
Date Received	22/12/2017
SDG Ref	171222-3
Lab Sample No.(s)	16807572
AGS Reference	

Component	LOD/Units	Method	
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5 #
Benzene	<10 µg/kg	TM089	<10 M
Toluene	<2 µg/kg	TM089	<2 M
Ethylbenzene	<3 µg/kg	TM089	<3 M
m,p-Xylene	<6 µg/kg	TM089	<6 M
o-Xylene	<3 µg/kg	TM089	<3 M
sum of detected mpo xylene by GC	<9 µg/kg	TM089	<9
sum of detected BTEX by GC	<24 µg/kg	TM089	<24

Validated

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH1				
			Depth (m)	0.20 - 0.20	1.00 - 1.00				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	20/12/2017	20/12/2017				
			Sample Time	.	.				
			Date Received	22/12/2017	22/12/2017				
			SDG Ref	171222-3	171222-3				
			Lab Sample No.(s)	16807568	16807572				
			AGS Reference						
Naphthalene-d8 % recovery**	%	TM218		94.6					
Acenaphthene-d10 % recovery**	%	TM218		91.6					
Phenanthrene-d10 % recovery**	%	TM218		87.8					
Chrysene-d12 % recovery**	%	TM218		94.6					
Perylene-d12 % recovery**	%	TM218		98.9					
Naphthalene	<9 µg/kg	TM218		25.4 M					
Acenaphthylene	<12 µg/kg	TM218		22.3 M					
Acenaphthene	<8 µg/kg	TM218		<8 M					
Fluorene	<10 µg/kg	TM218		<10 M					
Phenanthrene	<15 µg/kg	TM218		137 M					
Anthracene	<16 µg/kg	TM218		29.3 M					
Fluoranthene	<17 µg/kg	TM218		270 M					
Pyrene	<15 µg/kg	TM218		232 M					
Benz(a)anthracene	<14 µg/kg	TM218		194 M					
Chrysene	<10 µg/kg	TM218		206 M					
Benzo(b)fluoranthene	<15 µg/kg	TM218		405 M					
Benzo(k)fluoranthene	<14 µg/kg	TM218		141 M					
Benzo(a)pyrene	<15 µg/kg	TM218		251 M					
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		213 M					
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		58.4 M					
Benzo(g,h,i)perylene	<24 µg/kg	TM218		283 M					
PAH, Total Detected USEPA 16	<118 µg/kg	TM218		2470					
PAH total 17 (inclusive of Coronene)	<10 mg/kg	TM218			<10				

Validated

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

TPH CWG (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH1
			Depth (m)	0.20 - 0.20
			Sample Type	Soil/Solid (S)
			Date Sampled	20/12/2017
			Sample Time	.
			Date Received	22/12/2017
			SDG Ref	171222-3
			Lab Sample No.(s)	16807568
			AGS Reference	
GRO Surrogate % recovery**	%	TM089		76
GRO TOT (Moisture Corrected)	<44 µg/kg	TM089		<44 M
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		<5 #
Benzene	<10 µg/kg	TM089		<10 M
Toluene	<2 µg/kg	TM089		<2 M
Ethylbenzene	<3 µg/kg	TM089		<3 M
m,p-Xylene	<6 µg/kg	TM089		<6 M
o-Xylene	<3 µg/kg	TM089		<3 M
sum of detected mpo xylene by GC	<9 µg/kg	TM089		<9
sum of detected BTEX by GC	<24 µg/kg	TM089		<24
Aliphatics >C5-C6	<10 µg/kg	TM089		<10
Aliphatics >C6-C8	<10 µg/kg	TM089		<10
Aliphatics >C8-C10	<10 µg/kg	TM089		<10
Aliphatics >C10-C12	<10 µg/kg	TM089		<10
Aliphatics >C12-C16	<100 µg/kg	TM173		<100
Aliphatics >C16-C21	<100 µg/kg	TM173		848
Aliphatics >C21-C35	<100 µg/kg	TM173		13700
Aliphatics >C35-C44	<100 µg/kg	TM173		5620
Total Aliphatics >C12-C44	<100 µg/kg	TM173		20200
Aromatics >EC5-EC7	<10 µg/kg	TM089		<10
Aromatics >EC7-EC8	<10 µg/kg	TM089		<10
Aromatics >EC8-EC10	<10 µg/kg	TM089		<10
Aromatics >EC10-EC12	<10 µg/kg	TM089		<10
Aromatics >EC12-EC16	<100 µg/kg	TM173		342
Aromatics >EC16-EC21	<100 µg/kg	TM173		2190
Aromatics >EC21-EC35	<100 µg/kg	TM173		20200
Aromatics >EC35-EC44	<100 µg/kg	TM173		9680
Aromatics >EC40-EC44	<100 µg/kg	TM173		3040
Total Aromatics >EC12-EC44	<100 µg/kg	TM173		32400
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173		52600
GRO >C5-C10	<10 µg/kg	TM089		<10

Validated

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Asbestos Identification - Solid Samples

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	BH1 0.20 - 0.20 SOLID 20/12/2017 00:00:00 27/12/2017 15:32:37 171222-3 16807568 TM048	03/01/2018	Renata Bozhkov	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

Validated

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	46 Holmdale Road
Mass Sample taken (kg)	0.120	**Natural Moisture Content (%)**	33.3
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	75
Particle Size <4mm	>95%		

Case	
SDG	171222-3
Lab Sample Number(s)	16807572
Sampled Date	20-Dec-2017
Customer Sample Ref.	BH1
Depth (m)	1.00 - 1.00

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.491	3	5	6
Loss on Ignition (%)	8.12	-	-	10
Sum of BTEX (mg/kg)	<0.024	6	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	8.95	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.75	-	>6	-
ANC to pH 6 (mol/kg)	0.0325	-	-	-
ANC to pH 4 (mol/kg)	0.0847	-	-	-

Eluate Analysis	**C_2** Conc^n in 10:1 eluate (mg/l)		**A_2** 10:1 conc^n leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00357	<0.0002	0.0357	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00109	<0.0003	0.0109	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.0005	<0.0005	<0.005	<0.005	0.5	10	30
Nickel	0.000412	<0.0004	0.00412	<0.004	0.4	10	40
Lead	0.000327	<0.0002	0.00327	<0.002	0.5	10	50
Antimony	<0.0001	<0.0001	<0.001	<0.001	0.06	0.7	5
Selenium	0.00054	<0.0005	0.0054	<0.005	0.1	0.5	7
Zinc	0.00118	<0.001	0.0118	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	0.612	<0.5	6.12	<5	10	150	500
Sulphate (soluble)	22.6	<2	226	<20	1000	20000	50000
Total Dissolved Solids	83.5	<5	835	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	29-Dec-2017
pH (pH Units)	8.59
Conductivity (µS/cm)	103.00
Temperature (°C)	20.10
Volume Leachant (Litres)	0.870

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
10/01/2018 13:14:25

13:14:14 10/01/2018

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Table of Results - Appendix

Method No	Reference	Description
PM001		Preparation of Samples for Metals Analysis
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)'	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM182	CEN/TC 292 - WI 292046-chacterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM218	Determination of PAH by GCMS Microwave extraction	The determination of PAH in soil samples by microwave extraction and GC-MS
TM221	Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd	Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer
TM243		Mixed Anions In Soils By Kone
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

CERTIFICATE OF ANALYSIS

SDG:	171222-3	**Client Reference:**	LBH4507	**Report Number:**	439595
Location:	46 Holmdale Road	**Order Number:**	LBH4507	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	16807568	16807572
Customer Sample Ref.	BH1	BH1
AGS Ref.		
Depth	0.20 - 0.20	1.00 - 1.00
Type	Soil/Solid (S)	Soil/Solid (S)
ANC at pH4 and ANC at pH 6		02-Jan-2018
Anions by Kone (soil)	04-Jan-2018	
Anions by Kone (w)		04-Jan-2018
Asbestos ID in Solid Samples	03-Jan-2018	
Boron Water Soluble	03-Jan-2018	
CEN 10:1 Leachate (1 Stage)		29-Dec-2017
CEN Readings		30-Dec-2017
Cyanide Comp/Free/Total/Thiocyanate	03-Jan-2018	
Dissolved Metals by ICP-MS		08-Jan-2018
Dissolved Organic/Inorganic Carbon		30-Dec-2017
Easily Liberated Sulphide	05-Jan-2018	
EPH	03-Jan-2018	
EPH by FID	03-Jan-2018	
EPH CWG (Aliphatic) GC (S)	29-Dec-2017	
EPH CWG (Aromatic) GC (S)	29-Dec-2017	
Fluoride		02-Jan-2018
GRO by GC-FID (S)	03-Jan-2018	03-Jan-2018
Hexavalent Chromium (s)	03-Jan-2018	
Loss on Ignition in soils		03-Jan-2018
Mercury Dissolved		09-Jan-2018
Metals in solid samples by OES	10-Jan-2018	
Mineral Oil		03-Jan-2018
PAH by GCMS	02-Jan-2018	03-Jan-2018
PCBs by GCMS		03-Jan-2018
pH	02-Jan-2018	02-Jan-2018
Phenols by HPLC (S)	02-Jan-2018	
Phenols by HPLC (W)		03-Jan-2018
Sample description	27-Dec-2017	27-Dec-2017
Total Dissolved Solids		02-Jan-2018
Total Organic Carbon	03-Jan-2018	03-Jan-2018
Total Sulphate	04-Jan-2018	
TPH CWG GC (S)	03-Jan-2018	

Appendix General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Holding time exceeded before sample received**
5	**Samples exceeded holding time before presevation was performed**
§	**Sampled on date not provided**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to sampled on date**
&	**Sample Holding Time exceeded - Late arrival of instructions.**

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Waste Classification Report

654PX-B6VH7-6X3QU

Job name

LBH4507

Description/Comments

Project

LBH4507

Site

46 Holmdale Road

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Jessica Hand
Date:
16/01/2018 10:10:11 UTC
Telephone:
07715944050

Company:
LBH WEMBLEY
Unit 12 Little Balmer
Buckingham Industrial Park
Buckingham
MK18 1TF

Report

Created by: Jessica Hand
Created date: 16/01/2018 10:10 UTC

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	BH1	0.20-0.20	Non Hazardous		2

Classification of sample: BH1

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH1
Sample Depth:
0.20-0.20 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		18.9 mg/kg	1.32	24.954 mg/kg	0.0025 %		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		10.9 mg/kg	3.22	35.097 mg/kg	0.00351 %		
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.252 mg/kg	1.142	0.288 mg/kg	0.0000288 %		
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		36.4 mg/kg	1.462	53.201 mg/kg	0.00532 %		
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<**LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		64.3 mg/kg	1.126	72.395 mg/kg	0.00724 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	721 mg/kg	1.56	1124.627 mg/kg	0.0721 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.75 mg/kg	1.353	1.015 mg/kg	0.000102 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		26.5 mg/kg	2.976	78.871 mg/kg	0.00789 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1 mg/kg	2.554	2.554 mg/kg	0.000255 %		
11	zinc { zinc chromate }	024-007-00-3				271 mg/kg	2.774	751.794 mg/kg	0.0752 %		
12	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
13	benzene	601-020-00-8	200-753-7	71-43-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**
14	toluene	601-021-00-3	203-625-9	108-88-3		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		ethylbenzene				<0.003	mg/kg		<0.003	mg/kg	<0.0000003 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
16		xylene				<0.006	mg/kg		<0.006	mg/kg	<0.0000006 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
		006-007-00-5											
18		pH				7.63	pH		7.63	pH	7.63 pH		
				PH									
19		naphthalene				0.0254	mg/kg		0.0254	mg/kg	0.00000254 %		
		601-052-00-2	202-049-5	91-20-3									
20		acenaphthylene				0.0223	mg/kg		0.0223	mg/kg	0.00000223 %		
			205-917-1	208-96-8									
21		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
22		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
23		phenanthrene				0.137	mg/kg		0.137	mg/kg	0.0000137 %		
			201-581-5	85-01-8									
24		anthracene				0.0293	mg/kg		0.0293	mg/kg	0.00000293 %		
			204-371-1	120-12-7									
25		fluoranthene				0.27	mg/kg		0.27	mg/kg	0.000027 %		
			205-912-4	206-44-0									
26		pyrene				0.232	mg/kg		0.232	mg/kg	0.0000232 %		
			204-927-3	129-00-0									
27		benzo[a]anthracene				0.194	mg/kg		0.194	mg/kg	0.0000194 %		
		601-033-00-9	200-280-6	56-55-3									
28		chrysene				0.206	mg/kg		0.206	mg/kg	0.0000206 %		
		601-048-00-0	205-923-4	218-01-9									
29		benzo[b]fluoranthene				0.405	mg/kg		0.405	mg/kg	0.0000405 %		
		601-034-00-4	205-911-9	205-99-2									
30		benzo[k]fluoranthene				0.141	mg/kg		0.141	mg/kg	0.0000141 %		
		601-036-00-5	205-916-6	207-08-9									
31		benzo[a]pyrene; benzo[def]chrysene				0.251	mg/kg		0.251	mg/kg	0.0000251 %		
		601-032-00-3	200-028-5	50-32-8									
32		indeno[123-cd]pyrene				0.213	mg/kg		0.213	mg/kg	0.0000213 %		
			205-893-2	193-39-5									
33		dibenz[a,h]anthracene				0.0584	mg/kg		0.0584	mg/kg	0.00000584 %		
		601-041-00-2	200-181-8	53-70-3									
34		benzo[ghi]perylene				0.283	mg/kg		0.283	mg/kg	0.0000283 %		
			205-883-8	191-24-2									
35		phenol				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		604-001-00-2	203-632-7	108-95-2									
										Total:	0.175 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

- **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17/07/2015
Risk Phrases: R61 , R60 , R50/53 , R43 , R42 , R38 , R37 , R36 , R22 , R20
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

- **dicopper oxide; copper (I) oxide** (EC Number: 215-270-7, CAS Number: 1317-39-1)

CLP index number: 029-002-00-X
Description/Comments: M-factor for long-term aquatic hazard not included as per paragraph (5), ATP9
Data source: Regulation (EU) 2016/1179 of 19 July 2016 (ATP9)
Additional Risk Phrases: N R50/53 >= 0.25 %, N R50/53
Additional Hazard Statement(s): None.
Reason for additional Hazards Statement(s)/Risk Phrase(s):
10/10/2016 - N R50/53 >= 0.25 % risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases
10/10/2016 - N R50/53 risk phrase sourced from: WM3 v1 still uses ecotoxic risk phrases

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Risk Phrases: None.
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03/06/2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
Additional Risk Phrases: None.
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s)/Risk Phrase(s):
14/12/2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

- **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25/05/2015
Risk Phrases: None.
Hazard Statements: None.

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17/07/2015
Risk Phrases: R38 , R37 , R36 , R27 , R26 , R22
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17/07/2015
Risk Phrases: N R51/53 , N R50/53 , R38 , R37 , R36
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06/08/2015
Risk Phrases: N R50/53
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06/08/2015
Risk Phrases: N R50/53 , R43 , R40 , R38 , R37 , R36 , R22
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17/07/2015
Risk Phrases: N R50/53 , R43 , R38 , R37 , R36
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21/08/2015
Risk Phrases: N R50/53 , Xn R22
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21/08/2015
Risk Phrases: N R50/53 , Xi R36/37/38
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06/08/2015
Risk Phrases: R40
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23/07/2015
Risk Phrases: N R50/53
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

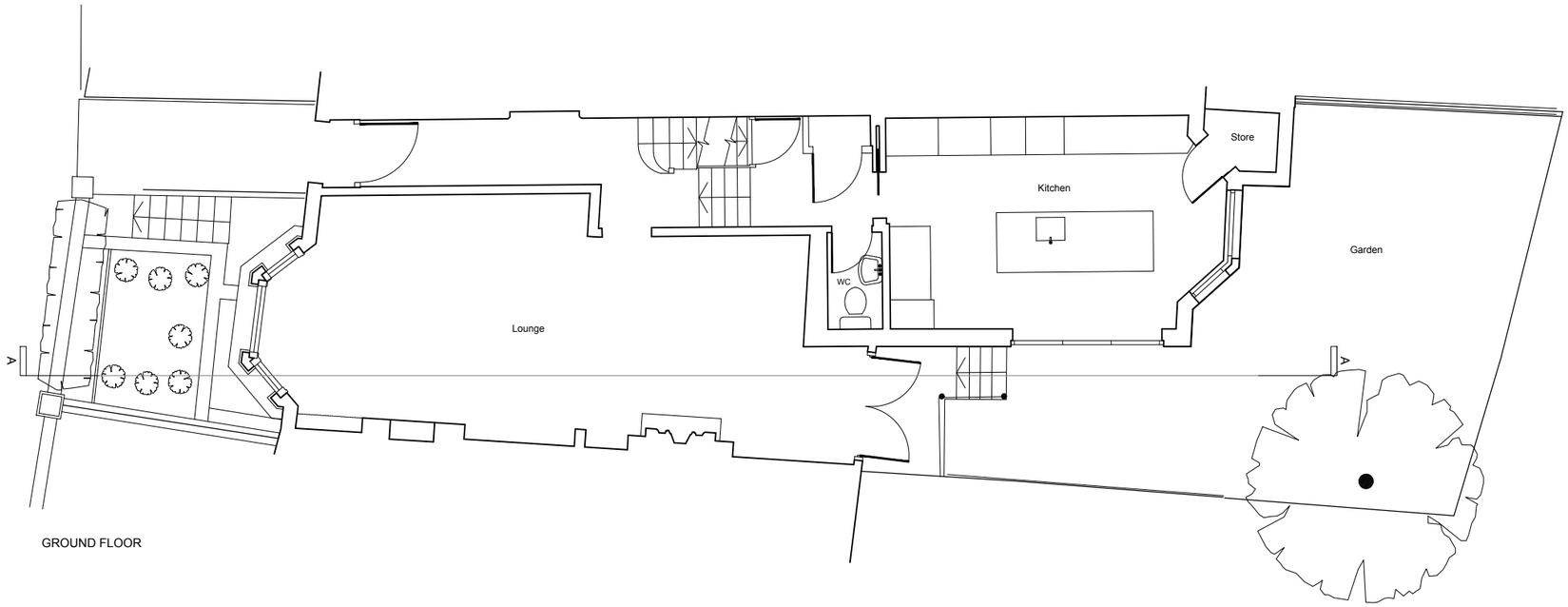
Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide] (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition, May 2015
HazWasteOnline Classification Engine Version: 2018.11.3477.7113 (11 Jan 2018)
HazWasteOnline Database: 2018.11.3477.7113 (11 Jan 2018)

This classification utilises the following guidance and legislation:
WM3 - Waste Classification - May 2015
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

BASEMENT



GROUND FLOOR

date	rev	revisions
-	-	-

north point

scale bar

0 1 2 3 4 5m

notes

architects

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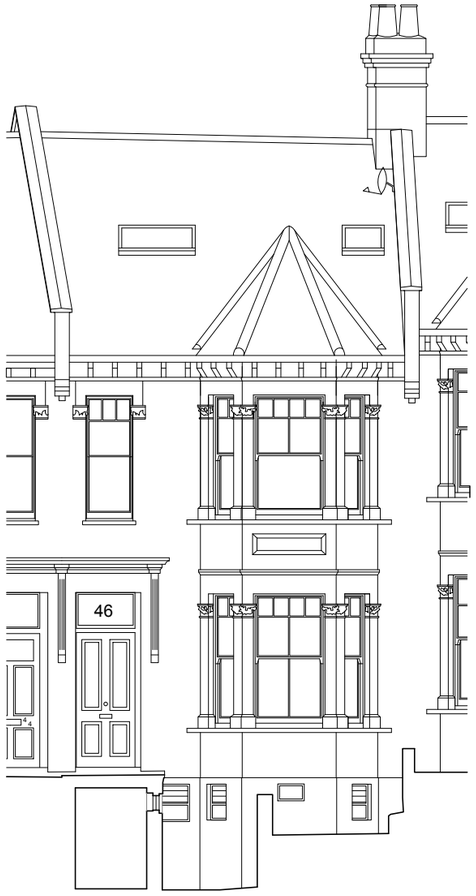
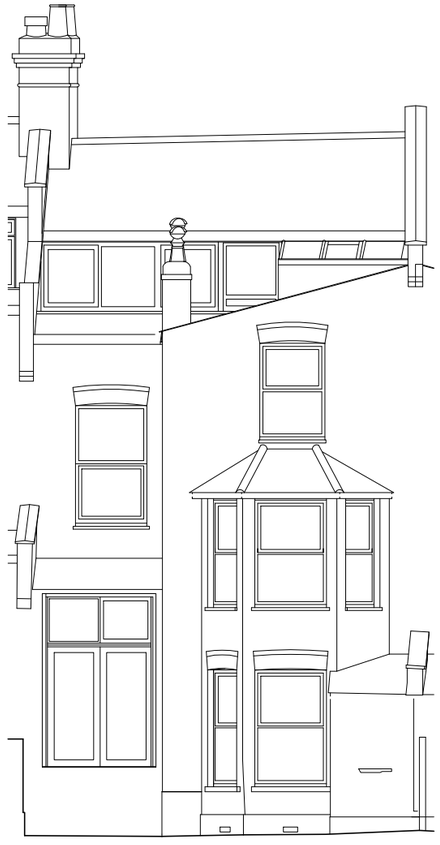
drawing title
Existing Basement & Ground Floor Plan

project
46 Holmdale Road

client
Alex Wills & Artemis Doupa

drawing no.	revision
EX100	-
scale @ A1	scale @ A3
-	1:100
project no.	drawn | date
1720	JH | OCT 17





date	rev	revisions
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scale bar

0 1 2 3 4 5m

notes

architects

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drawing title
Existing Front & Rear Elevations

project
46 Holmdale Road

client
Alex Wills & Artemis Doupa

drawing no.	revision
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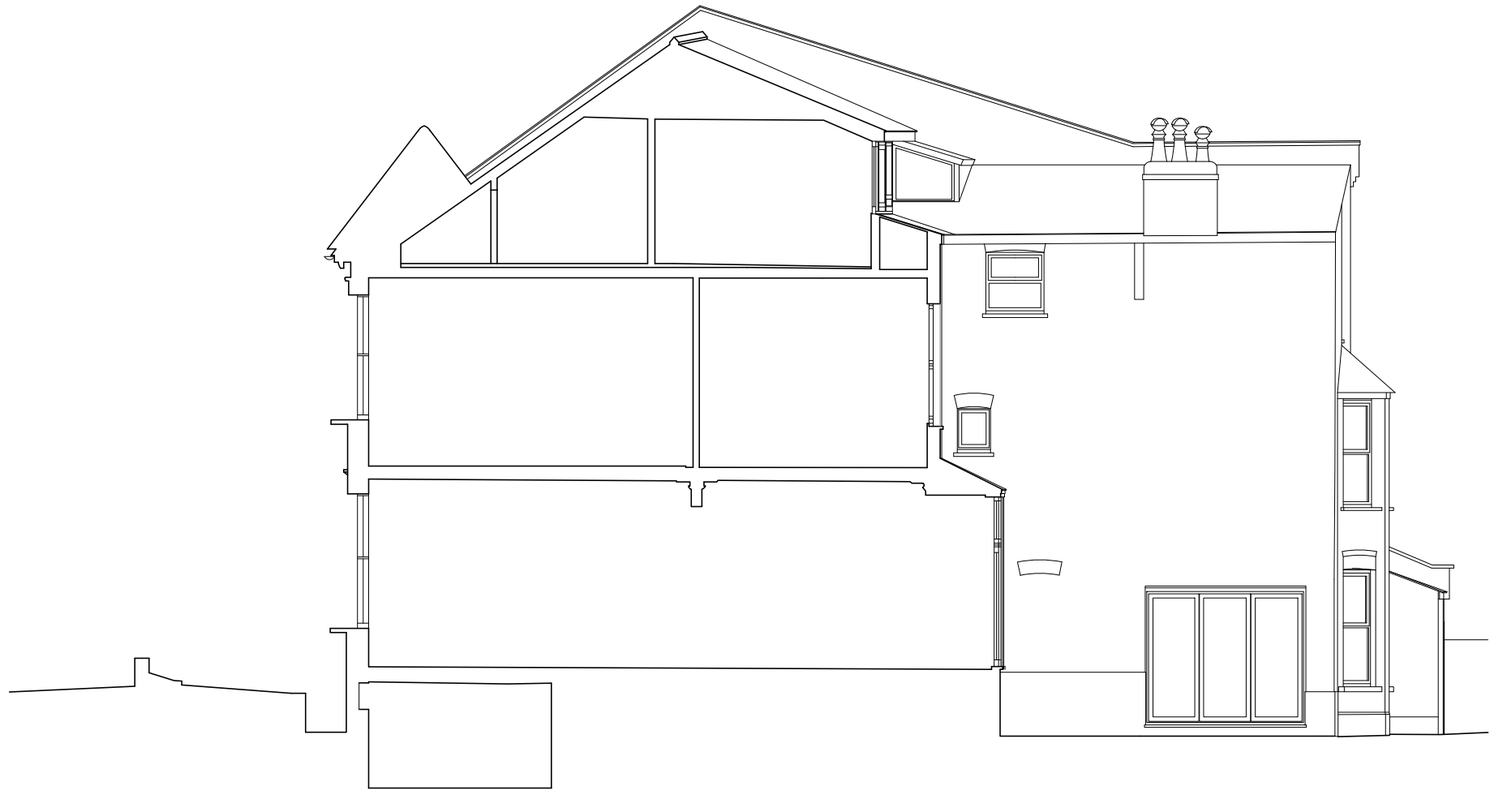
-	1:100
project no.	drawn | date
1720	JH | OCT 17



SECTION AA

date	rev	revisions
-	-	-

scale bar

0 1 2 3 4 5m

notes

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drawing title
Existing Section AA

project
46 Holmdale Road

client
Alex Wills & Artemis Doupa

drawing no.	revision
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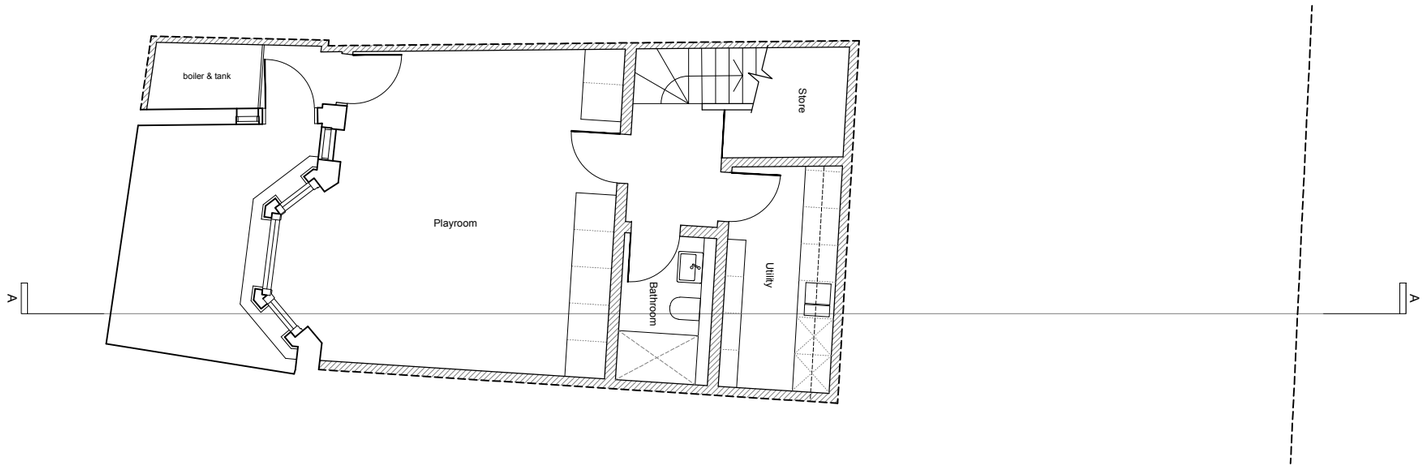
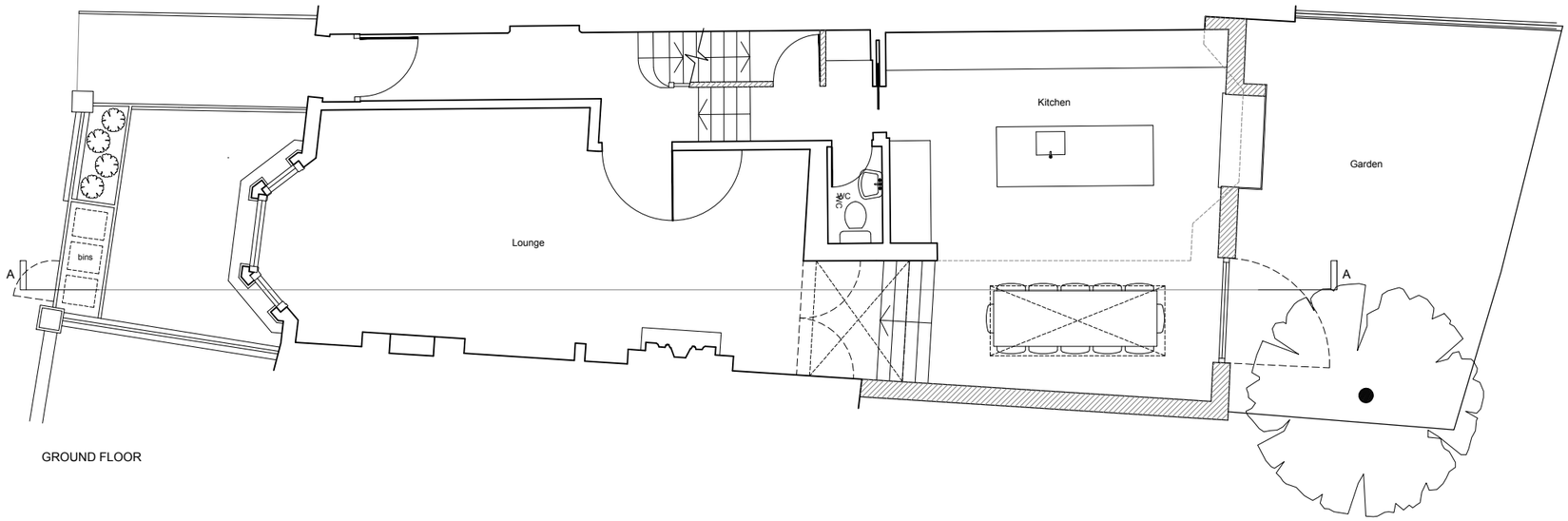
scale @ A1	scale @ A3
-	1:100
project no.	drawn | date
1720	JH | OCT 17



BASEMENT



GROUND FLOOR

date	rev	revisions
-	-	-

north point

scale bar

0 1 2 3 4 5m

notes

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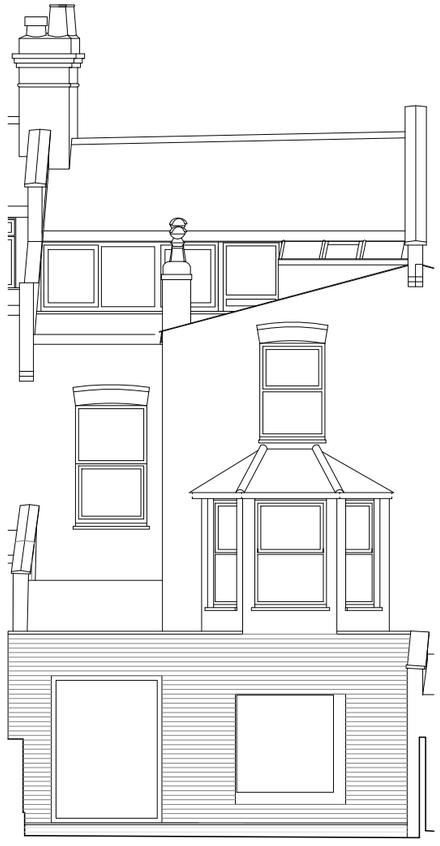
drawing title
Proposed Basement & Ground Floor Plan

project
46 Holmdale Road

client
Alex Wills & Artemis Doupa

drawing no.	revision
A100	-
scale @ A1	scale @ A3
-	1:100
project no.	drawn | date
1720	JH | OCT 17

FRONT ELEVATION



REAR ELEVATION

date	rev	revisions
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scale bar

0 1 2 3 4 5m

notes

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drawing title
Proposed Front & Rear Elevation

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drawing no.	revision
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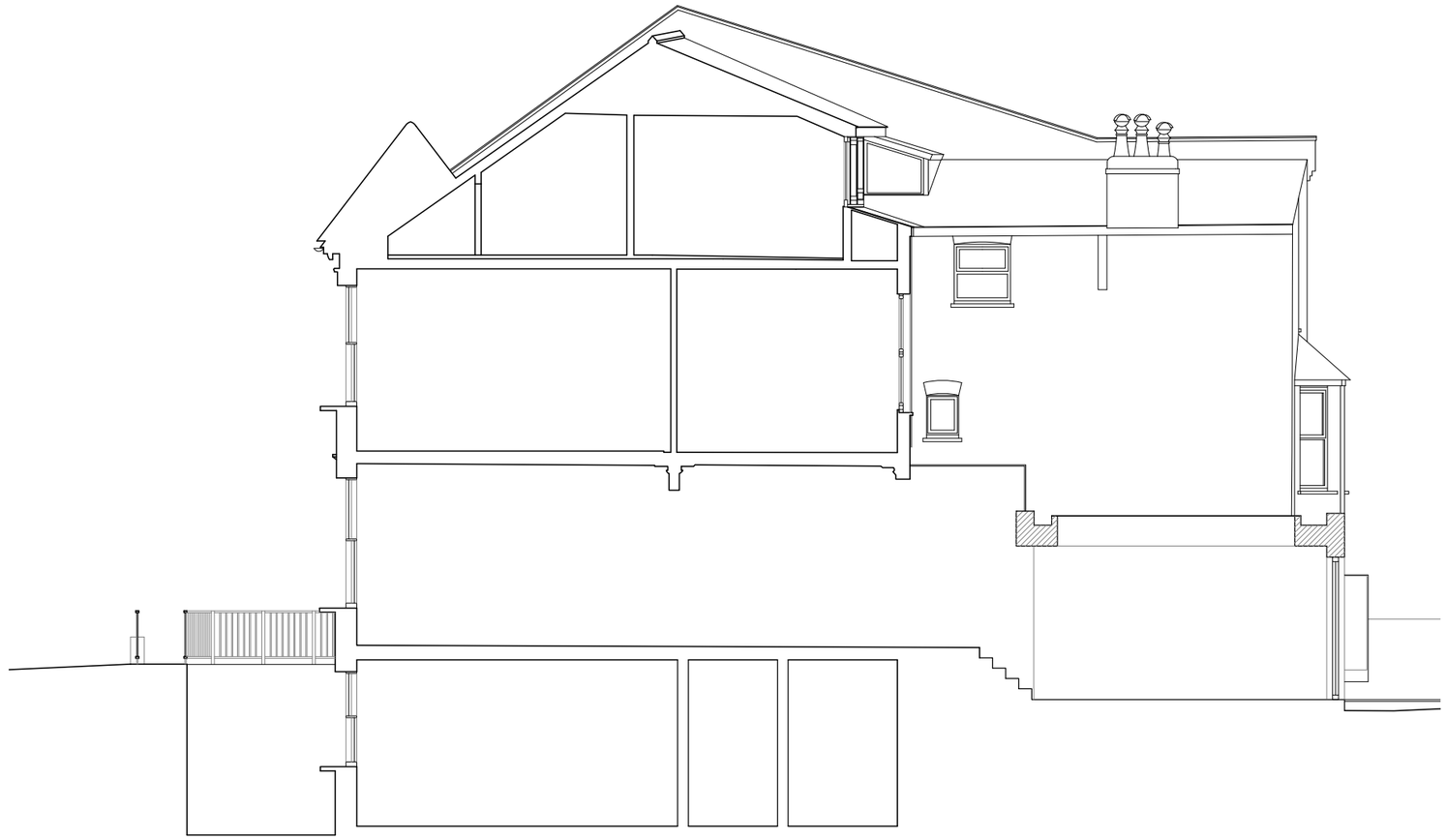
project no.	drawn | date
1720	JH | OCT 17



SECTION AA

date	rev	revisions
-	-	-

scale bar

0 1 2 3 4 5m

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A160	-
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-	1:100
project no.	drawn | date
1720	JH | OCT 17