

LMB GEOSOLUTIONS LTD

PRELIMINARY RISK ASSESSMENT

HOLLYBANK, MUSWELL HILL

February 2016

DOCUMENT RECORD

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LMB Geosolutions Ltd

Tel: +44 (0) 20 7272 3351

Company No. 8303397
www.lmbgeosolutions.com



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EXECUTIVE SUMMARY

Executive Summary

Site Description		The site is currently vacant and comprises three terraces of brick construction, garages (32no.) and a cottage, arranged over a roughly triangular area.
Proposed Development		The proposed development comprises construction of 6no. new two storey residential dwellings and will also include garden, private patio and car parking areas.
Summary of Previous Site Use & History		Historical mapping and information suggests that site included a cottage in the south western area, with the current garages and cottages constructed c. 1935. Information from the site walkover and a previous assessment indicate that a former underground petrol storage tank and a former WWII air raid shelter are present at the site.
Geology & Aquifer Designations		The data reviewed suggest that the site is located over Made Ground which in turn overlies the London Clay Formation. The London Clay Formation is designated Unproductive Strata.
Hydrology		The nearest named surface water feature is the New River located approximately 1.5km east of the site. An un-named pond is present approximately 350m north east of the site and historically a number of pond features and a stream were present approximately 30m to 50m south of the site. The site is located in an area where neighbouring streets are shown to be at low to high risk from surface water flooding.
Environmental Sensitivity		**Moderate/Low** environmental sensitivity.
Preliminary Risk Ratings	Land Contamination	Overall **Low to Moderate**. Potential on-site and off-site sources of contamination have been identified associated with historical land uses. The development itself and the underlying low permeability London Clay will provide some mitigate of potential risks. However, potential risks have been identified associated with: • Direct contact of contaminants in areas of proposed soft landscaping / rear gardens with future site users. • Bulk ground gases and volatile vapours from potential off-site sources.
	Designation	The potential for the site to be designated as contaminated land (as defined in Part 2A of the Environmental Protection Act) is considered to be Low.
Recommendations		It is recommended that small scale ground investigation works are undertaken to appraise potential risks identified. It is recommended that the scope should be agreed with the local authority prior to commencement. If not already undertaken, it is recommended that potential risks relating to surface water flooding and asbestos within buildings are assessed by an appropriately qualified consultant/personnel.
This summary is not a stand-alone document and should be read in conjunction with the information contained within the report.		

INTRODUCTION

Introduction

AUTHORISATION

LMB Geosolutions Ltd (LMB) was instructed by the Crawford Partnership (Architects) on behalf of Solid Foundations (the Client) in January 2016 to undertake a preliminary risk assessment in relation to the proposed development at Hollybank, Muswell Hill, London N10 3TN (the Site).

PROJECT AND SITE DETAILS

Site Address	Hollybank, Muswell Hill, London N10 3TN. A Site Location Plan is provided as **Figure 1**.
Site Area	Approximately 0.20 hectares
Proposed Development	It is understood that the proposed development involves the construction of 6no. new two storey residential dwellings with the floor level sunken between approximately 800mm and 1300mm below ground level. It is understood that the residential dwellings will also include garden, private patio and car parking areas. A development schematic is included in **Appendix A**.
Development Planning	It is understood that planning permission has been granted for the development which includes a number of conditions, with Condition 9 (a to c inclusive) related to potential land contamination issues.
Previous Reports	LMB have previously produced the following assessment report in relation to the site: • LMB (June 2014). Ground Investigation & Assessment of Possible Below Ground Fuel Tank, Hollybank Garages, Muswell Hill. In addition, the Architects have provided the following report as background information: • GEA (Dec 2013). Desk Study and Basement Impact Assessment Report. Hollybank Cottage and Garages, Muswell Hill, London N10.

BACKGROUND TO CURRENT WORKS

This assessment has been undertaken to support the proposed development and to identify any potential issues and constraints on the development associated with the ground conditions and possible land contamination.

As outlined, the planning permission includes a number of conditions related to potential land contamination issues, as follows:

9. a) No development shall commence until a desktop study shall be carried out which shall include the identification of previous uses, potential contaminants that might be expected, given those uses, and other

relevant information. Using this information, a diagrammatical representation (Conceptual Model) for the site of all potential contaminant sources, pathways and receptors shall be produced.

The desktop study and Conceptual Model shall be submitted to the Local Planning Authority. If the desktop study and Conceptual Model indicate no risk of harm, development shall not commence until approved in writing by the Local Planning Authority.

b) If the desktop study and Conceptual Model indicate any risk of harm, a site investigation shall be designed for the site using information obtained from the desktop study and Conceptual Model. This shall be submitted to, and approved in writing by, the Local Planning Authority prior to that investigation being carried out on site. The investigation must be comprehensive enough to enable: -

- *a risk assessment to be undertaken,*
- *refinement of the Conceptual Model, and*
- *the development of a Method Statement detailing the remediation requirements.*

The risk assessment and refined Conceptual Model shall be submitted, along with the site investigation report, to the Local Planning Authority.

c) If the risk assessment and refined Conceptual Model indicate any risk of harm, a Method Statement detailing the remediation requirements, using the information obtained from the site investigation, and also detailing any post remedial monitoring shall be submitted to, and approved in writing by, the Local Planning Authority prior to that remediation being carried out on site.

Where remediation of contamination on the site is required completion of the remediation detailed in the method statement shall be carried out and a report that provides verification that the required works have been carried out, shall be submitted to, and approved in writing by the Local Planning Authority before the development is occupied.

Reason: To ensure the development can be implemented and occupied with adequate regard for environmental and public safety.

No development shall commence until a preliminary risk assessment report is submitted to and approved in writing by the Council. This report shall comprise: a desktop study which identifies all current and previous uses at the site and surrounding area as well as the potential contaminants associated with those uses; a site reconnaissance; and a conceptual model indicating potential pollutant linkages between sources, pathways and receptors, including those in the surrounding area and those planned at the site; and a qualitative risk assessment of any potentially unacceptable risks arising from the identified pollutant linkages to human health, controlled waters and the wider environment including ecological receptors and building materials. All works must be carried out in compliance with and by a competent person who conforms to CLR 11: Model Procedures for the Management of Land Contamination (Defra 2004) or the current UK requirements for sampling and testing.

Potentially contaminative land uses (past or present) are understood to occur at, or near to, this site. This condition is required to ensure that no unacceptable risks are caused to humans, controlled waters or the wider

INTRODUCTION

environment during and following the development works, in accordance with Policy CC4 of the Core Strategy (2011), and Policies DM H7 and DM H11 of the Development Management Local Plan (2013).

AIMS & OBJECTIVES

This document aims to provide a preliminary risk assessment to support discharge of the Condition 9a of the planning permission.

SCOPE OF WORKS

The Preliminary Environmental Risk Assessment (PRA) report includes the following scope of works:

- Completion of a site reconnaissance survey to make a preliminary assessment of the Site and area immediately surrounding it;
- Informal enquiries with Local Authority and/or review of information on the Local Authority website for records pertaining to the Site;
- Review of historical plans for the area to assess historical land uses on and immediately surrounding the site;
- Assessment of the 'sensitivity' of the Site location as determined by factors such as hydrogeology, proximity of watercourses, neighbouring land use, sensitive local land uses and geology etc;
- Completion of an interpretive report that will include;
    - Details of site conditions;
    - Production of a preliminary conceptual site model;
    - Provision of a Preliminary Risk Assessment outlining potential issues and/or environmental liabilities associated with the proposed development; and
    - Conclusions, recommendations and provision of an executive summary.

LIMITATIONS

LMB has prepared this report solely for the use of the named Client and those parties with whom a warranty agreement and/or assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from LMB and the Client.

LMB accepts no responsibility or liability for:

a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and

b) issue of this document to any third party with whom an agreement has not been executed.

The risk assessment and opinions provided, among other things, take in to consideration currently available guidance and best available techniques relating to acceptable contamination concentrations and

interpretation of these values. No liability can be accepted for the retrospective effects of any future changes or amendments to these value.

SITE CHARACTERISATION

Site Characterisation

SITE LOCATION

The site is located off Muswell Hill (A504), approximately 1km south west of Alexandra Palace railway station.

SITE RECONNAISSANCE

A representative of LMB undertook a site reconnaissance survey on Thursday 4th February 2016 during cool cloudy weather conditions. The reconnaissance survey was completed in external areas only.

A photographic recoded is provided as **Appendix B**.

The site is currently vacant and comprises three terraces of brick construction, lock up garages (32no.) and a cottage, arranged over a roughly triangular area and accessed via driveway from Muswell Hill (see Photos 1 to 4).

It is understood that the garages were primarily utilised for general storage with one garage used for vehicle repair services. Evidence of surface staining was observed outside the former vehicle repair garage (see Photos 4 & 5).

The ground surface primarily comprises tarmac hardstanding of generally poor condition, with areas of soft cover, vegetation and trees located around the periphery of the garages along the boundary between the site and surrounding residential properties (see Photos 6 to 8).

A corrugated metal sheet was observed covering access to a below ground structure that is believed to comprise a former World War II air raid shelter (see Photos 9 and 10). This feature is further discussed in the **previous report findings** section.

The former Underground Fuel Storage Tank (UST) previously investigated by LMB was observed to remain present between the garages present near the southern site boundary (see Photos 11 & 12).

The surrounding area comprises primarily residential housing with residential flats adjacent to the access driveway (see Photos 13 & 14). A parade of shops is present approximately 50m east of the site on Park Road, A1201 (see Photo 16).

ENVIRONMENTAL SETTING

The sites environmental setting as defined by factors such as the local hydrology, geology and hydrogeology has been appraised through reference to publically available information via the British Geological Survey (BGS), Environment Agency (EA) and UK Hydrometric Register and is summarised in the table below:

Published Geology & Aquifer Designations	Reference to published geological mapping (Sheet 256, North London) indicates that the site is located on the London Clay Formation (typically silty clay).

SITE CHARACTERISATION

	Publicly accessible Environment Agency (EA) information indicates that the following geological units and aquifer designations are present at the site: • London Clay Formation (Unproductive Strata).
Local Hydrology	Reference to information on local mapping, the EA website and within the UK Hydrometric Register indicates that the closest named surface water course is the New River located approximately 1.5km east of the site. An un-named pond is present approximately 350m north east of the site. Reference to the GEA report (Dec 2013) indicates that historically a stream was present to the south of Muswell Hill, approximately 50m south of the site. Information relating to the Thames region within the UK Hydrometric Register indicates that the average annual rainfall in the region is 710mm. Publicly accessible information contained on the EA website indicates that the site is not located in an area at risk of flooding from rivers and sea. However, the site is located in an area where neighbouring streets are shown to be at low to high risk from surface water flooding. It should be noted that this factual information does not constitute an assessment of potential flood risk.
Resource Potential & Ecological Quality	**Surface Water**: the New River is included within the relevant River Basins Management Plan (RBMP, Thames) and has been assigned a good ecological quality (chemical quality does not require assessment), neither of which is predicted to change during the latest cycle of RBMP (2015). There are no known surface water abstractions from the New River in the most immediate proximity to the site but it is utilised and is considered to have resource potential.
	Groundwater: The London Clay Formation is not considered to have a resource potential. In addition, the Site is not located within an EA designated Source Protection Zone (SPZ).
Surrounding Land Use	The site is located in an area of primarily residential, recreational and commercial land uses.
Sensitive Land Uses and Local Designations	Reference to information contained on the 'MAGIC' website (administered by Natural England) indicates that the closest designated sensitive land uses relate to local nature reserves located approximately 400m west and 450m south west respectively.

SITE CHARACTERISATION

SUMMARY OF LIKELY GROUND & GROUNDWATER CONDITIONS

Local Ground Conditions

Information presented within the GEA report (Dec 2013) suggests that, in an investigation they completed on another site to the south, the London Clay was confirmed to a depth of 15.0m bgl.

In addition, three borehole records (ref. TQ28NE259, TQ28NE260 & TQ28NE261) located approximately 100m north-north west, 30m north and 100m east south east (along Muswell Hill Road and Priory Road) respectively have been reviewed to provide an indication of local ground conditions.

The borehole records indicate that Made Ground soils extend to between 0.90m and 1.30m bgl. The Made Ground soils are described as, '*grey ash concrete and soil*' and 'firm *orange brown clay with occasional brick fragments*.'

Beneath the Made Ground, soils consistent with the London Clay were recorded in the three borehole records and are typically described as *firm brown and orange brown thinly laminated fissured silty clay',* becoming stiff with depth.

The previous ground investigation works undertaken at the site by LMB (June 2014) comprised progression of 4no. dynamic (windowless) sampler boreholes to 3.00m bgl. Made Ground soils were recorded between approximately 0.85m and 1.00m bgl and generally found to comprise gravelly clay with varying proportions of brick and occasional concrete, ceramic, glass and clinker. An upper horizon of slightly ashy sand with clinker gravel was recorded in two of the boreholes.

The London Clay was described as weathered brown to orange brown and grey, locally slightly sandy soft and firm clay.

Local Groundwater Conditions

No groundwater strikes were recorded on the BGS borehole logs reviewed. However, the GEA report recorded groundwater at depths of between 1.82m and 5.69m below ground level (bgl). It is not clear whether the records relate to a single borehole, groundwater strikes or groundwater monitoring.

In addition, within the previous LMB report (June 2014) perched water was recorded during drilling at approximately 1.00m bgl at the junction of the Made Ground and underlying London Clay.

Summary

The ground and groundwater conditions on site based on the data presented above are summarised in the table below:

Stratum	Summary Description	Anticipated Depth to Groundwater (m bgl)	Anticipated Thickness (m)
Made Ground	Ash, concrete and soil and clay with occasional brick fragments.	1.00. Representative of shallow perched water.	<1.00 – 1.50

London Clay Formation	Typically, an upper weathered horizon of soft to firm clay overlying slightly silty firm to stiff and very stiff clay.	1.50 – 6.00. Not representative of an aquifer unit but of discrete water in micro-fissure and local granular horizons.	c.40.00(1)

(1) Thickness not proven in BGS borehole logs reviewed.

HISTORICAL LAND USE

A review of historical map and aerial photography data has been completed to identify previous land uses on site and within 250m.

The information is summarised in the table below with selected historical maps included in **Appendix C**.

Map	On Site Features	Off Site Features
1850	Open land	Road adjacent north east annotated as Muswell Hill.
1864	Woodland in southern area of site.	Lalla Rook Cottage adjacent to western site boundary. Pond features approximately 10m south, 20m east and 50m south east. Residential building adjacent to east of site entrance and from approximately 50m north east. Stream approximately 50m south.
1894	Buildings present on eastern site boundary.	Pond features approximately 10m south and 20m east no longer visible. 'Smithy' approximately 50m east.
1895	No noticeable change.	'Victoria' public house approximately 60m east.
1913	Lalla Rook Cottage extends into south western area of site.	Residential housing adjacent to southern site boundary and approximately 100m west. Pond and stream to south no longer visible. Tramway approximately 100m north east. Smithy no longer annotated.
1920	No noticeable change	
1935	Lalla Rook Cottage no longer present and residential housing adjacent to western site boundary. Three terraces of buildings present on site with same layout as current buildings	Mass residential development in wider area.
1945-1950	No noticeable change	

SITE CHARACTERISATION

Map	On Site Features	Off Site Features
1951	Southern terrace of garages includes annotation 'Hollybank Cottage.'	Tramway no longer present.
1964 – 1973	No noticeable change.	
1970		
1983 – 1987		
1991		
2006		
2013		

REGULATORY ENQUIRES

Pollution Control

The Pollution Team at London Borough of Haringey (LBI) was contacted on 29th January 2016 with a view to obtaining any pertinent information relating to the site and surrounding area. A response was received on 5th February 2016 and the salient points are provided below with the full response provided in **Appendix D**.

- The officer confirmed that they held no records of ground conditions or pollution incidents at the site.
- The officer indicated that there are no known contamination issues in the surrounding area or sites designated as contaminated land.
- The officer confirmed that the site has not been identified for further inspection under Part IIA of the Environmental Protection Act (1990).
- The officer confirmed that there are no private water supplies registered within 250m of the site.
- The officer identified that the only permitted installation within 200m of the site relates to a dry cleaners following contemporary trade entries within 300m of the site:

PREVIOUS REPORT FINDINGS

LMB Report

As outlined, a previous ground investigation and assessment was completed by LMB (June 2014) which focussed on the potential existence of an Underground Fuel Storage Tank (UST) with the aim of determining the following:

- If the UST is likely to have been used to store fuel.
- Evidence of any fuel leakage from the UST; and
- Any impact on the surrounding soils in the context of the proposed development.

The findings can be summarised as follows:

- Based on the results of the ground investigation and assessment the UST is interpreted to have historically been used for petrol/gasoline fuel storage.
- The UST is estimated to have a volume of approximately 13,000 litres and is currently full (water and residual fuel).
- An enquiry with London Fire Brigade confirmed they held no records of petroleum tanks at the site.

It is possible that there has been historical leakage of fuel from the UST and that there are latent areas of petroleum hydrocarbon contamination in the soils beneath the UST. However, the results of the ground investigation and assessment completed suggest that if present such areas of impact would be very limited.

GEA Reporting

The previous report completed by GEA was a Basement Impact Assessment. However, the assessment did include a desk study and an appraisal of historical land uses and potential sources of contamination that could impact the site.

Based on the assessment completed GEA stated that, '*the site had not had a significantly contaminative history, by virtue of it having been occupied by garages and a house since sometime between 1913 and 1935*.' On this basis it was concluded that there is a '*LOW RISK of contamination at this site*'.

ENVIRONMENTAL & PERMITTING DATA

The table below provides a summary of the environmental and permitting data for the site and surrounding area:

Item	On Site	0 – 250m	Description
Local Authority Pollution Prevention and Control	0	1	This relates to Topshot dry cleaners located approximately 115m south east.
Contemporary Trade Entries	0	7	Active entries include garage services (approx. 1003m E), rubbish removal services (approx. 108m SE) and cleaners (approx. 164m NW).
Pollution Incidents to Controlled Waters	0	0	
Integrated Pollution Prevention & Control	0	0	
Historical & Registered Landfills	0	0	
Registered Waste Transfer Sites	0	0	

SITE CHARACTERISATION

ENVIRONMENTAL SENSITIVITY

Overall, the site setting is considered to be of **moderate/low** environmental sensitivity, for the following reasons:

- The Site is located in a primarily residential, commercial and recreational land use area;
- The Site is underlain by the London Clay which is designated Unproductive Strata;
- The Site is not located within an SPZ and there are no recorded private water supplies within 250m;
- The site is located in an area of low to high risk of flooding from surface water;
- The nearest known surface water feature is an un-named pond located approximately 350m north east of the site; and
- There are no recorded designated sensitive land uses within 250m of the site.

PRELIMINARY CONCEPTUAL SITE MODEL

Preliminary Conceptual Site Model

The information presented in the Site Characterisation section of this report and within the following documents have been used to complete a Preliminary Conceptual Site Model (PCSM) that details the potential contaminant sources, pathways and receptors:

- Environment Agency/DEFRA document; Priority Contaminants for the Assessment of Land (CLR8)[1]
- Department of the Environment Industry Profile (1996). Road vehicle fuelling, service and repair: garages and filling stations.

The PCSM is presented in the table below:

Potential Contaminant Sources	On-site	• Former vehicle repair garage. • Former UST and possible vehicle refuelling. • Possible ACM associated with building fabric including air raid shelter. • Possible historical building demolition (Lalla Rook Cottage).
	Off-site	• Possible infilled pond features to east and south. • Surrounding historical land uses (e.g. smithy, depot & tramway). • Current land uses (e.g. dry cleaners).
Associated Contaminant	On-site	• Heavy metals and inorganic contaminants including Asbestos Containing Materials (ACM) associated with landfilling. • Possible pathogens, solvents, acids, detergents and fuel oil associated with slaughter house. • Organic contaminants (including petroleum hydrocarbons).
	Off-site	• Heavy metals and inorganic contaminants including Asbestos Containing Materials (ACM). • Organic contaminants including hydrocarbons (e.g. petroleum hydrocarbons including PAHs and solvents). • Bulk ground gases & volatile vapours.
Receptors		• Future Site Users; • Neighbouring residents; and • New Buildings.
Pathways to Receptors		• Direct contact, inhalation and ingestion of contaminants within any Made Ground and shallow soils. • Migration of ground gas and volatile vapours via preferential pathways (e.g. localised micro-fissures in the London Clay and granular horizons in London Clay / Made Ground).

[1] This document has been withdrawn but is considered to remain useful in proving technical background for identifying potential sources of contamination and designing ground investigation works.

Preliminary Risk Assessment

INTRODUCTION

This section provides a Preliminary Risk Assessment (PRA) that considers the information provided in the previous sections, including the PCSM.

The PRA and risks ratings assigned in the tables below are based on the qualitative risk assessment matrices presented in CIRIA C552 which are reproduced in **Appendix E**.

POLLUTANT LINKAGE ASSESSMENT

The likelihood of pollutant linkages being present between the potential contaminant sources, pathways and receptors identified in the PCSM are outlined in the table below:

Pathway Linkage	Likelihood of Pollutant Linkage	Consequences	Risk Rating	Reasoning
Future Site Users (Direct exposure pathway)				
Ingestion/Dermal Contact/Inhalation (Site Users).	Low	Medium	Moderate/Low	It is proposed to develop the site for residential housing with associated garden, private patio and car parking areas. There is potential for direct contact with contaminants in garden areas.
Ingestion/Dermal Contact/Inhalation (Maintenance and Construction Workers).	Unlikely	Medium	Low	Maintenance and construction workers will adopt appropriate management procedures to mitigate potential risks.
Future Site Users (Indirect exposure pathway)				
Enclosed space accumulation of ground gas.	Low	Severe	Moderate	The potential sources of ground gas are limited and for potential off-site sources, the low permeability of the clay soils would limit any on-site migration. The former fuel UST is a potential on site source of volatile vapours but the

Pathway Linkage	Likelihood of Pollutant Linkage	Consequences	Risk Rating	Reasoning
				investigation of this area suggest there has been no leakage/impact and the low permeability of the clay soils would limit any on-site migration. If Made Ground soils are present beneath the site and/or extend off-site, then there is potential for ground gas generation. However, the development will result in a level reduction of 0.8m to 1.3m which is likely to result in removal of a large proportion of the Made Ground and any contaminants therein.
Outdoor volatile vapour exposure	Unlikely	Severe	Moderate/Low	Potential exposure is considered very unlikely given the proposed end use.
Ingress into potable water supply pipes	Low	Mild	Low	Potential on site sources of contamination are limited and likely to be removed during development excavation and it is considered unlikely that upgraded water pipe material will be required. However, confirmation with the statutory undertaker is recommended.
Risks to Buildings via accumulation of ground gas and volatile vapours in enclosed spaces and sub-floor voids.	Low	Severe	Moderate	The potential off-site sources of ground gas and on site sources of volatile vapours have been identified. However, the low permeability of the clay soils would limit any on-site migration.
Water Environment				

PRELIMINARY RISK ASSESSMENT

Pathway Linkage	Likelihood of Pollutant Linkage	Consequences	Risk Rating	Reasoning
Contaminant migration on to neighbouring land.	Unlikely	Medium	Low	The site is underlain by low permeability London Clay which is designated Unproductive Strata. It is considered very unlikely that any contaminants beneath the site could impact groundwater, third party land or vice versa.
Contaminant migration from neighbouring land.	Unlikely	Medium	Low	
Contamination of groundwater	Unlikely	Medium	Low	
Contamination of surface water	Unlikely	Medium	Low	It is possible that during any construction phase there could be some limited run-off from stockpiles/earthworks. However, it is considered unlikely that such run-off would be contaminated and there are no surface water features within 1km of the site.
Foundation Piling				
Creation of a pathway between near surface contaminants and the underlying groundwater	Unlikely	Medium	Low	It is possible that a piled foundation solution will be adopted for the development. However, potential contaminants in Made Ground soils beneath the site are likely to be removed during development excavation and given the thickness of London Clay, if residual contamination is present it is unlikely to pose a risk to deeper groundwater units via piling.
Overall Risk Rating			**Low to Moderate**	

DESIGNATION AS CONTAMINATED LAND

Based on the results of the PRA and the information from the LBH Pollution Control, the potential for the site to be designated as contaminated land (as defined in Part 2A of the Environmental Protection Act) is considered to be **Low**.

Conclusions & Recommendations

CONCLUSIONS

Ground & Groundwater Conditions

Based on the available information, the ground conditions beneath the site are thought to comprise Made Ground overlying the London Clay Formation.

The London Clay Formation is designated Unproductive Strata. Perched water was recorded during previous site works at approximately 1.00m bgl at the junction of the Made Ground and underlying London Clay.

Overall, the site setting is considered to be of **moderate/low** environmental sensitivity. However, the site is located in an area of low to high risk of flooding from surface water.

Preliminary Risk Assessment

Based on the information reviewed there are potential on site and off site sources of contamination relating to historical activities (e.g. UST and possible vehicle refuelling and repairs, possible in-filled ponds and dry cleaners etc.).

The proposed development will include reduced floor level of between 0.8m and 1.3m (and based on the available information on ground conditions) that is likely to result in removal of a large proportion of Made Ground soils and any contaminants therein.

However, the development will also include areas of soft landscaping and private gardens where there is potential for direct contact between site users and any remaining residual contamination.

There is potential for sources of ground gas / volatile vapour to pose an ongoing risk to future sites users and the built environment, but the low permeability of the underlying London Clay is likely to provide some mitigation of risks.

Based on the environmental setting, local land use and the presence of a significant thickness of London Clay it is considered unlikely that any existing contaminants beneath the site could impact groundwater, third party land or vice versa.

Based on the preliminary risk assessment completed the overall risks are considered to be **Low to Moderate**. The potential **Moderate** risks identified are associated with:

- Direct contact of contaminants in areas of proposed soft landscaping / rear gardens with future site users.
- Bulk ground gases and volatile vapours from potential off-site sources.

CONCLUSIONS & RECOMMENDATIONS

Designation as Contaminated Land

On the assumption that potential land contamination issues are dealt with as part of the development, the potential for the site to be designated as contaminated land (as defined in Part 2A of the Environmental Protection Act) is considered to be **Low**.

RECOMMENDATIONS

Based on the information presented in this report, it is recommended that small scale ground investigation works are undertaken with a view to providing information including but not limited to the following:

- Levels of contaminants within the soils, particularly in areas of proposed soft landscaping; and
- The potential on-going risks to future site users and buildings from bulk ground gases and volatile vapours.

In addition, it is recommended that the risk mitigation measures outlined in the previous LMB report (ref. LMB.05.06.14_REPPIL_GIHollybank_v1.2) for removal of the former UST are implemented prior to development.

It is recommended that the scope of any ground investigation works is designed in accordance with the specific planning conditions and agreed with LBH prior to commencement.

General

Although beyond the remit of this assessment it, if not already undertaken, it is recommended that an asbestos survey of the garages, cottage and air raid shelter is completed by appropriately qualified personnel prior to removal/demolition.

Flooding

If not already undertaken, it is recommended that potential risks relating to surface water flooding are assessed by an appropriately qualified flood risk and/or drainage consultant.

REFERENCES & GUIDANCE

1. London Borough of Haringey Guidance on Contaminated Land Conditions (CS1)
2. Environment Agency/Defra (2002). Model procedures for the Management of Land Contamination (CLR 11)
3. Environment Agency/Defra (2002). Contaminated Land Statutory Guidance (April 2012)
4. BS 10175 (2011) Investigation of Potentially Contaminated Sites. Code of Practice.
5. BS5930 (2007) Code of Practice for Site Investigations.
6. BS 5667-11:2009. Water quality sampling. Part 11: Guidance on sampling of groundwaters.
7. Department of the Environment Industry Profiles.
8. Environment Agency/Defra (2002). Sampling strategies for contaminated land (CLR4)2
9. Environment Agency/Defra (2002). Priority Contaminants for the Assessment of Land (CLR8)3
10. CIRIA (2007). Assessing risks posed by hazardous ground gases to buildings
11. BS 8485:2007. Code of Practice for the Characterisation and Remediation from Ground Gas in affected Development.
12. NHBC (2007). Guidance on the Evaluation of Development proposals on sites where Methane and Carbon dioxide are present.
13. Landfill Gas Industry Code of Practice (Todeka Ltd, 2012). The Management of Landfill Gas;
14. CL:AIRE / CIEH (2008), Guidance on Comparing Soil Contamination Data with a Critical Concentration, May 2008;
15. CL:AIRE / EIC (2009), The Soil Generic Assessment Criteria for Human Health, December 2009.
16. Environment Agency (2003), Review of fate & transport of selected contaminants in the Environment, Report P5-079-TR1;
17. Environment Agency (2004), Model Procedures for the Management of Land Contamination, September 2004, ISBN: 1844322955;
18. Environment Agency (2008a), Compilation of Data for Priority Organic Pollutants, Report SC050021/SR7, November 2008;
19. Environment Agency (2009a), Human Health Toxicological Assessment of Contaminants in Soil, Report SC050021/SR2, January 2009;
20. Environment Agency (2009b), CLEA Software (Version 1.04) Handbook (and Software), Report SC050021/SR4, January 2009;
21. Environment Agency (2009c), Updated Technical Background to the CLEA Model, Report SC050021/SR3, January 2009;
22. Environment Agency (2009d), A Review of Body Weight and Height Data Used in the CLEA Model, Report SC050021/Final Technical Review 1, January 2009;

[2] This document has been withdrawn but is considered to remain useful in proving technical background for designing ground investigation works.

[3] This document has been withdrawn but is considered to remain useful in proving technical background for designing ground investigation works.

REFERENCES & GUIDANCE

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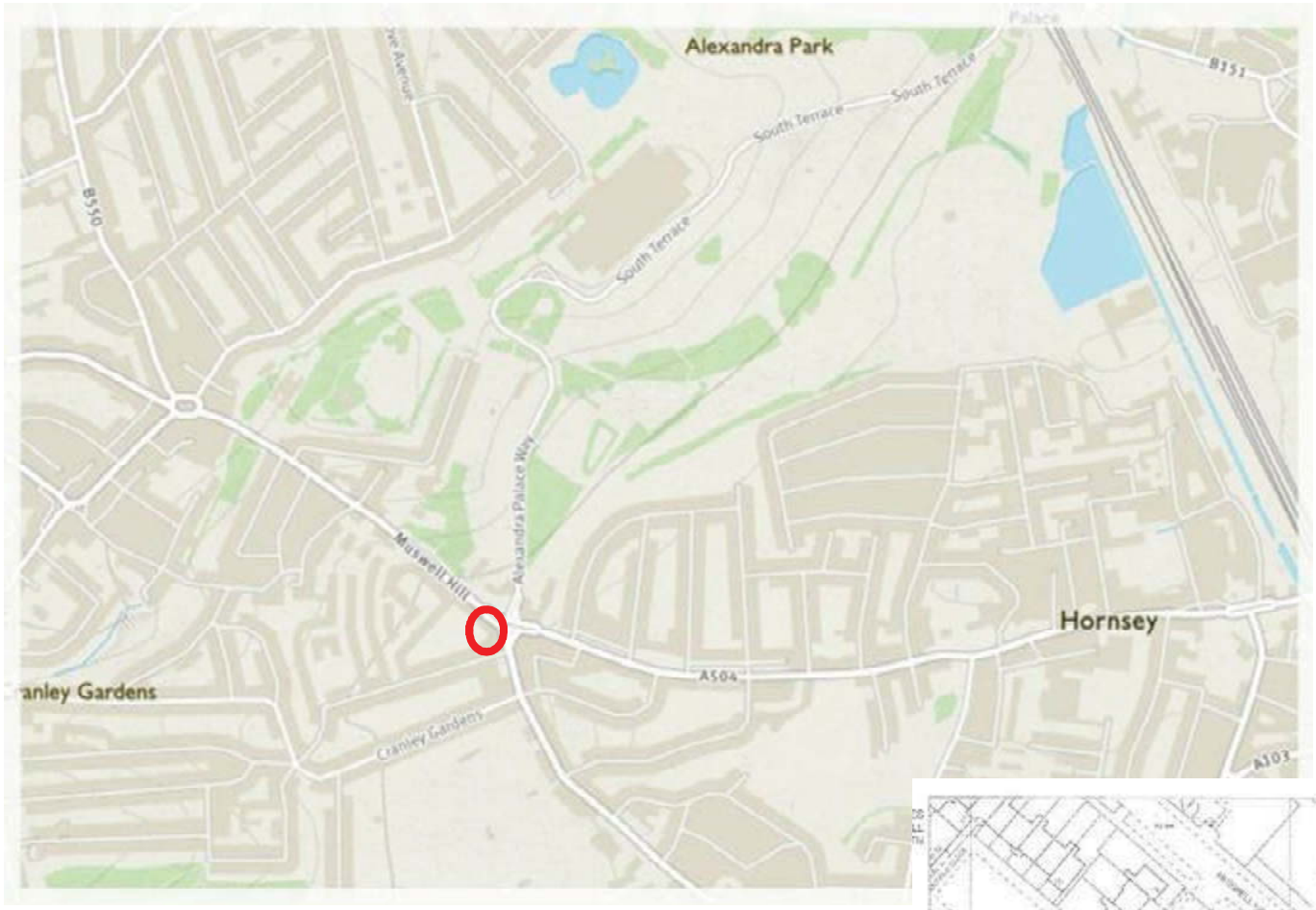
FIGURES





Key:

Approximate Site Location

IMPORTANT – Please Read

This drawing is for illustrative purposes only and is for use only in conjunction with associated reports relating to the project details below. LMB accepts no liability for the mis-interpretation or use of this illustration by any other parties.

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Ground Investigation
Land Contamination
Hydrogeology
Engineering Geology

Site:
Hollybank, Muswell Hill, London N10

Figure Number:
Figure 1

Title: Site Location Plan

Project No:	Created By:	Date:
	PIL	Jan 2016

Client:

APPENDICES

Appendices

APPENDIX A DEVELOPMENT SCHEMATIC



NOTES:

Report all errors and discrepancies promptly to architects before proceeding with the works.
Do not scale drawing. Figured dimensions to be worked to in all cases.
The contractor is responsible for checking dimensions, tolerances and references.
All structural information to be taken from engineers drawings.
All relevant party wall agreements are to be entered into and agreed between owners prior to commencement of works.
All build over agreements with utility companies to be agreed and approved prior to works on site.

Revisions

Site map

SCALE: 1:200 @ A2

PROJECT: HOLLYBANK, N10 3TH
CLIENT: Client's name
DRAWING NO.: 2012/286/000
REV:
STATUS: Planning
DRAWN: JL
CHECKED: AC
DATE: 02.2016

crawford partnership | architecture interior design
RIBA Chartered Practice
1a Muswell Hill, London, N10 3TH
Tel: 020 8444 2070 · Fax: 020 8444 1180
info@crawfordpartnership.co.uk
www.crawfordpartnership.co.uk
Company number 3499361

The Crawford Partnership Ltd. 17 Redston Road, London N8 ,Company number 3499361

APPENDICES

APPENDIX B PHOTOGRAPHIC RECORD



Plate 1 – Terrace of lock up garages nearest to site entrance.



Plate 2 – View south west from driveway with lock up garages in background.

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Photographs
Site Reconnaissance Survey

Project: Hollybank

Photographs.
Plate 1 and 2



Plate 3 – Terrace of garages and cottage on south eastern and southern site boundary.



Plate 4 – Terrace of garages northern site boundary.

LMB Ground Investigation Land Remediation Hydrogeology Engineering Geology	**Photographs** Site Reconnaissance Survey	Project: Hollybank Photographs. Plate 3 and 4



Plate 5 – Service staining outside former vehicle repair garage.



Plate 6 – Area of vegetation between garages on southern site boundary.



Plate 7 – Back of garages with fence line of residential house to north and north west.

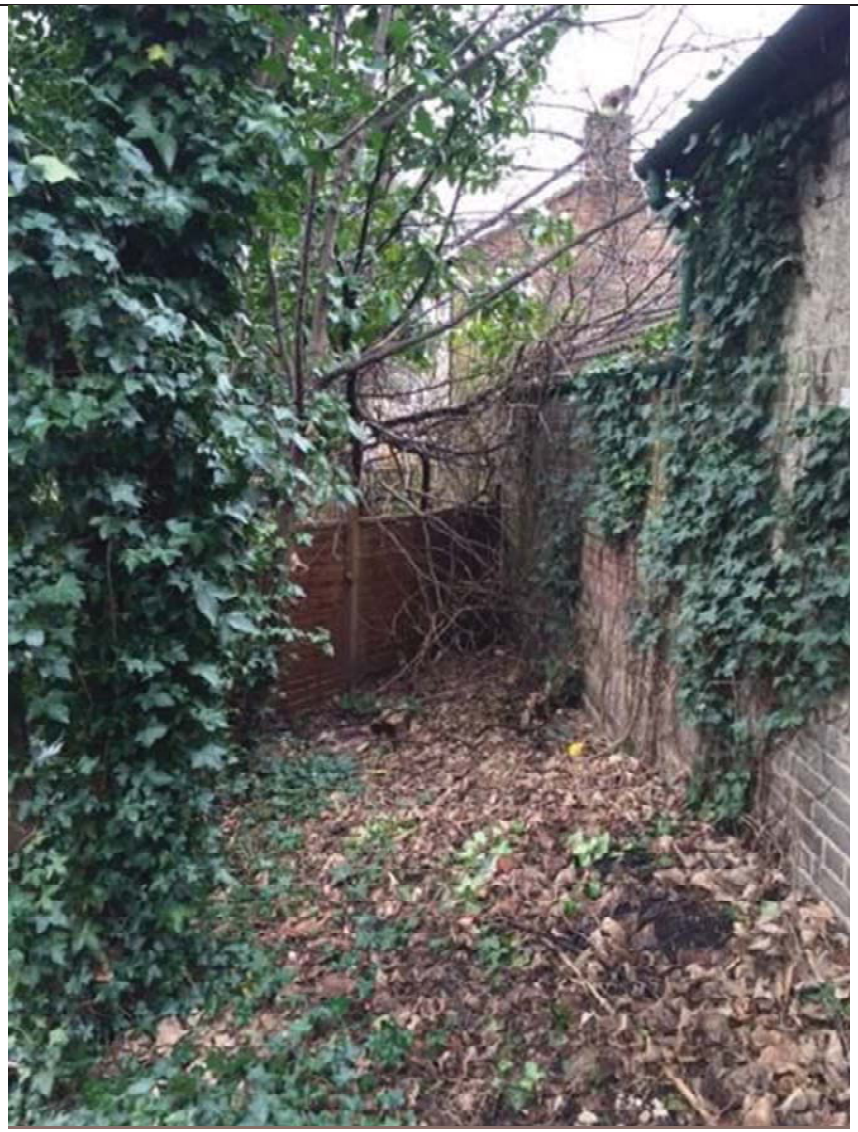

Plate 8 – Rear of garages on southern site boundary.

Photographs
Site Reconnaissance Survey

Project: Hollybank

Photographs.
Plate 7 and 8



Plate 9 – View north east with flats in background.



Plate 10 – Access driveway with residential flats adjacent.

Photographs
Site Reconnaissance Survey

Project: Hollybank

Photographs.
Plate 9 and 10



Plate 11 – Access manhole for UST.

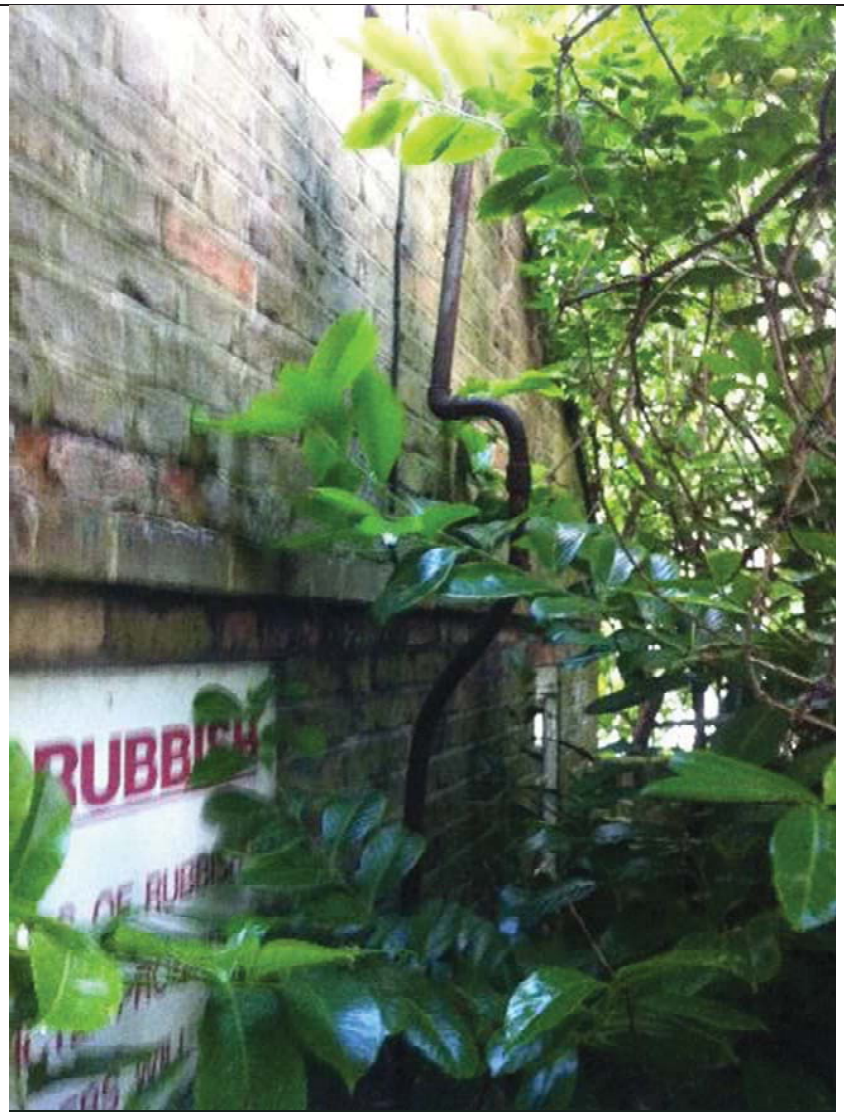

Plate 12 – Possible vent pipe for UST.



Plate 13 – View north east with flats in background.



Plate 14 – Access driveway with residential flats adjacent.

Photographs
Site Reconnaissance Survey

Project: Hollybank

Photographs.
Plate 13 and 14



Plate 15 – View south east down Muswell Hill with site access on right.



Plate 16 – View south east with parade of shops on Park Road.