16th January 2019

Your ref:
Our ref: J17275D/AT/01

GEA

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Mary Claxton
The Morton Partnership Ltd
Old Timber Yard House
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Dear Mary

Re: STEPHENSON HOUSE, 75 HAMPSTEAD ROAD, LONDON, NW1 2PL

Further to your instruction of 5th November 2018, on behalf of Lazari Investments Ltd, we have now completed the additional investigation of the eastern part of the above site and this letter report comprises our report on our findings.

It is understood that the proposed development comprises demolition of the existing building down to ground floor level, and the subsequent construction of a new mixed use reinforced concrete framed building. The existing basement structure, ground floor slab and foundations are to be retained and the new building will be up to eight storeys in height.

The site has previously been the subject of the following reports, all completed by GEA;

- Desk Study (report reference J17139 Issue 2, dated 12 July 2017);
- Site Investigation (report reference J17275 Issue 2, dated 31 January 2018);
- Additional Site Investigation Letter Report (report reference J17275A/AT/01, dated 29 March 2018); and,
- Settlement Analysis Letter Report (report reference J17275C/AT/01, dated 22 June 2018).

The findings of the above reports have been referred to where appropriate and this report should be read in conjunction with the other reports and does not supersede any recommendations or conclusions made within the previous reports unless otherwise stated. The recommendations and conclusions made within this report are specific to the area in the east of the site that could not previously be investigated.

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted and the number of locations where the ground was sampled. No liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

Summary of Previous Desk Study Findings

The site history was researched by reference to internet sources and historical Ordnance Survey (OS) maps obtained from the Envirocheck database.

The site was first developed with terraced housing during the late 18th Century. Greenwood's map of London, dated 1830, shows that part of the site had been redeveloped with a brewery. By the time of the next map studied, dated 1870, the building on the corner of Charles Street (now Drummond Street) and Highgate Road had been converted into a public house, whilst the brewery is still shown to be present in the central part of the site and all of the existing road network and many of the existing surrounding buildings had been constructed. By 1896, the site had been redeveloped with new commercial buildings. Goad insurance plans indicate uses to have included showrooms for furniture, carpets and bedding, varnishers ('Japanner'), warehouses and offices, while the site is no longer listed as a brewery. An insurance plan dated 1927 also shows a 'sunken petrol tank' to be present towards the rear of No 15 William Street, approximately 5 m to the north of the site, which is present on plans dated 1930 and 1939, but not on plans after 1957.

By the time of the 1953 map, the majority of the buildings on the site had been demolished and replaced, including the Public House and remaining residential buildings in the northeast of the site. Part of the site is also labelled as a Ruin and this coupled with the extensive post-war redevelopment could indicate that the site was damaged during World War II. The adjacent and nearby sites to the west are labelled as a timber yard, a printing works and a furniture Works.

Stephenson House is first labelled on the site on the map dated 1969. Goad insurance plans show Stephenson House, including the basement car park, to have comprised office space for its entire history, with tenants including Barclays Bank. In addition, plans dated during the 1960s show a number of vehicle repair garages present adjacent to the site to the west and north. The maps available show the site and surrounding area to have since remained essentially unchanged, although it is understood that the public house on the corner of Drummond Street and Hampstead Road was demolished and the area incorporated into Stephenson House in 2007.

Reference to archive building plans indicate the building to be supported by mass concrete spread foundations extending to a depth of about 3.00 m below basement level, where they bear within the London Clay. Archived calculations indicate the foundations to have been designed to support a load of 3 tonnes per square foot, which equates to about 285 kN/m^2.

The search has revealed that there are no landfills, waste management, transfer, treatment or disposal sites within 950 m of the site. Additionally, there have been no pollution incidents to controlled waters within 350 m of the site and there are no areas of potentially infilled land within 300 m of the site.

The Geological Survey map of the area (Sheet 256) indicates that the site is underlain by the Lynch Hill Gravel over the London Clay Formation.

The Lynch Hill Gravel is classified as a Secondary 'A' Aquifer, which refers to strata that contain permeable layers capable of supporting water supply at a local level and in some cases may form an important source of base flow for local rivers, as defined by the Environment Agency (EA). The underlying London Clay is classified as a Non-Aquifer and Unproductive Stratum, which refers to a soil or rock with low permeability that has a negligible effect on local water supply or river base flow.

Summary of Findings of Previous Investigation

The previous investigation generally confirmed the expected ground conditions in that, beneath a variable thickness of made ground, Lynch Hill Gravel was encountered overlying the London Clay Formation. The made ground generally comprised brown clayey sand with variable amounts of gravel, brick and concrete fragments and extended to depths of between 0.50 m and 1.60 m. The

Lynch Hill Gravel was encountered in the southern parts of the site and generally comprised dense orange-brown fine to coarse sand and fine to coarse sub-angular to sub-rounded gravel, and extended to depths of between 1.90 m and 2.30 m, with the thickness of the gravel appearing to increase southwards. The London Clay comprised an initial horizon of medium becoming high strength soft becoming firm and stiff fissured brown clay, extending to depths of 8.00 m and 8.90 m, whereupon very stiff high and locally very high strength fissured grey clay was encountered. This extended to the full depth investigated, of 20.00 m. Groundwater was encountered in most of the boreholes and trial pits at depths of between 0.60 m and 0.80 m. However, where the London Clay was found to be present immediately below the floor slab, groundwater was not generally encountered. The results of the chemical analyses did not identify contamination within the soil samples tested.

Contaminated groundwater was encountered during a trial pit excavation in the north of the site, where it was noted to be flowing through a joint in the concrete retaining wall. Analysis of a sample of this water indicated elevated TPH, total PAH, including naphthalene, arsenic and monohydric phenols. Speciation testing of TPH compounds has indicated the contamination to probably be diesel or light heating oil and reference to archive Goad insurance plans indicates the presence of a buried tank on the adjacent site at basement level in this area, which is the most likely source of the contamination.

ADDITIONAL EXPLORATORY WORK

In order to provide an indication of the configuration of the foundations in the area of concern for this additional investigation, 27 small diameter core holes and 54 drill holes were advanced to depths of up to 1.20 m to confirm the extent of the foundations. Where foundations were not encountered immediately below the floor slab, window sampler boreholes were advanced to depths of between 1.30 m and 2.50 m to confirm that the foundations had not simply been locally deepened. Positions were initially located at the centre points between each column with further positions being added to determine the dimensions of foundations where present down to a margin of error of about 200 mm.

In addition, three cores were advanced through the foundations to determine their make-up and window sampler boreholes were advanced through the core holes to determine the bearing stratum for the foundations.

Two additional boreholes were advanced in the car park along the northern boundary wall to further investigate the groundwater contamination previously encountered in this area.

During the course of the works an asbestos survey was carried out, the results of which indicated parts of the site to have an unacceptable level of risk with respect to encountering asbestos fibres during our proposed works. As a result, these areas of the site could not be investigated during this phase of investigations and it is proposed to return to investigate these areas once the asbestos has been removed.

A selection of the samples recovered from the boreholes was submitted to an analytical laboratory for a programme of contamination testing.

All of the above work was carried out under the supervision of a geotechnical engineer from GEA.

The additional borehole records are appended, together with a site plan indicating the exploratory positions and a foundations plan detailing the dimensions and layout of the foundations as determined through the ground investigation. The boreholes have been labelled sequentially between BH101 and BH107 to differentiate them from those carried out as part of the previous investigation.

Sampling Strategy

The additional investigation locations were positioned on site by an engineer from GEA to provide reasonable coverage of the area of the investigation, in accessible areas, whilst avoiding known buried services.

A total of three sample of the made ground have been tested for the presence of contamination. The analytical suite of testing was selected to identify hydrocarbon contamination resulting from the former use of the site and a range of typical industrial contaminants for the purposes of general coverage. For this investigation the analytical suite for the soil included a range of metals, speciation of total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH), total cyanide and monohydric phenols. In addition, all three of the samples were tested for the presence of asbestos.

It was proposed to take an additional sample of the formerly identified contaminated groundwater for subsequent testing to confirm the findings of the previous investigation. However, the standpipe was found to contain insufficient water to allow a sample to be taken.

The contamination analyses were carried out at an MCERTs accredited laboratory with the majority of the testing suite accredited to MCERTS standards. A summary of the MCERTs accreditation and test methods are included with the attached results and further details are available upon request.

GROUND CONDITIONS

The additional investigation has generally confirmed the ground conditions encountered during the previous investigation in that, beneath a variable thickness of made ground, the Lynch Hill Gravel was encountered and was underlain by the London Clay Formation. The made ground was found to be immediately underlain by the London Clay in parts of the site.

Made Ground

The made ground was only encountered in Borehole Nos 101 and 102. In Borehole No 101 the made ground comprised brown slightly sandy clay with occasional gravel and brick fragments extending to a depth of 0.70 m. In Borehole No 102 pale brown sand and gravel with rare brick fragments was encountered and extended to a depth of 0.60 m.

Apart from the presence of fragments of extraneous material noted above, no visual or olfactory evidence of contamination was observed within the soil during the fieldwork. Three samples of the made ground have, however, been analysed for a range of contaminants as a precautionary measure and the results are detailed within the Soil Contamination section below.

Lynch Hill Gravel

The Lynch Hill Gravel was encountered in Borehole Nos 102, 104 and 105 and generally comprised orange-brown fine to coarse sand with fine to medium sub-angular to sub-rounded gravel and extended to a depth of 1.70 m in Borehole No 102, and to the full depths of Borehole Nos 104 and 105, of 1.40 m and 1.80 m respectively.

No evidence of contamination was noted within this stratum.

London Clay

The London Clay generally comprised stiff fissured grey clay which extended to the full depths of Borehole Nos 101, 102 and 103 of 1.30 m, 2.20 m and 2.50 m.

The London Clay was not encountered in Borehole Nos 104 and 105, where the boreholes refused in the overlying Lynch Hill Gravel.

No evidence of contamination was noted within this stratum.

Groundwater

Groundwater was not encountered during the investigation.

Soil Contamination

The table below sets out the values measured within the three samples analysed; all concentrations are in mg/kg unless otherwise stated.

Determinant	BH101 0.50 m	BH102 0.50 m	BH103 0.40 m	Generic Screening Value
pH	8.8	8.2	9.2	-
Arsenic	9.5	11	14	640
Cadmium	<0.2	<0.2	<0.2	410
Chromium	13	39	12	30400
Lead	58	28	11	2330
Mercury	<0.3	<0.3	<0.3	3600
Selenium	2.0	<1.0	<1.0	13000
Copper	13	39	12	71700
Nickel	15	38	13	1350
Zinc	36	77	25	665000
Total Cyanide	<1	<1	<1	12000
Total Phenols	<1.0	<1.0	<1.0	3200
Total PAH	<0.80	<0.80	<0.80	600
Sulphide	<1.0	2.3	<1.0	50
Benzo(a)pyrene	<0.05	<0.05	<0.05	42
Naphthalene	<0.05	<0.05	<0.05	200
TPH	<10	28	<10	1000
Total Organic Carbon %	<0.1	0.3	<0.1	10

Note: Figure in bold indicates concentration in excess of risk-based soil guideline values, as discussed in Part 2 of this report

Generic Quantitative Risk Assessment

The use of a risk-based approach has been adopted to provide an initial screening of the test results to assess the need for subsequent site-specific risk assessments. Contaminants of concern are those that have a value in excess of a generic human health risk based guideline value which is either the CLEA[1] Soil Guideline Value where available, a Generic Screening Value calculated using the CLEA UK Version 1.06[2] software assuming a commercial end use, or based on the DEFRA Category 4 screening values[3]. The key generic assumptions for this end use are as follows:

[1] *Updated Technical Background to the CLEA Model (Science Report SC050021/SR3) Jan 2009* and Soil Guideline Value reports for specific contaminants; all DEFRA and Environment Agency.

[2] Contaminated Land Exposure Assessment (CLEA) Software Version 1.06 Environment Agency 2009

[3] CL:AIRE (2013) *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination* Final Project Report SP1010 and DEFRA (2014) *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination* Policy Companion Document SP1010

- that groundwater is not a critical risk receptor;
- that the critical receptor for human health will be a working female aged 16 to 65 years old;
- that the exposure duration will be 49 years;
- that the critical exposure pathways will be direct soil and indoor dust ingestion, skin contact with soils and dust, and inhalation of dust and vapours; and
- that the building type equates to a three-storey office.

It is considered that these assumptions are acceptable for this generic assessment of this site as the ground floor and basement level will not be for residential use and the site is to be entirely occupied by the proposed building with no areas of soft landscaping proposed. The tables of generic screening values derived by GEA and an explanation of how each value has been derived are included in the Appendix.

Where contaminant concentrations are measured at concentrations below the generic screening value it is considered that they pose an acceptable level of risk and thus further consideration of these contaminant concentrations is not required. However, where concentrations are measured in excess of these generic screening values there is considered to be a potential that they could pose an unacceptable risk and thus further action will be required which could include;

- additional testing to zone the extent of the contaminated material and thus reduce the uncertainty with regard to its potential risk;
- site specific risk assessment to refine the assessment criteria and allow an assessment to be made as to whether the concentration present would pose an unacceptable risk at this site; or
- soil remediation or risk management to mitigate the risk posed by the contaminant to a degree that it poses an acceptable risk.

The results of the chemical analyses have indicated the samples tested to be free from elevated concentrations of the contaminants tested for with respect to the relevant screening values.

The significance of these results is considered further in Part 2 of the report.

Foundation Configuration

The foundations comprise a series of concrete strip foundations beneath the columns in the west of the site, which was the main focus of the investigation. The columns were arranged in rows trending north to south and the concrete strip foundations were found to generally run along the same orientation. The foundations beneath the columns along Survey Line No 9 (shown on enclosed drawing) were found to comprise concrete pad foundations at the base of each column. All of the foundations encountered were immediately overlain by the concrete floor slab.

The table below details the type and dimensions of each of the foundations encountered and the enclosed site plan details the configuration of the foundations with dimensions and offsets from columns included.

Foundation Reference	Foundation Type	Dimensions in Plan (m)	Area (m^2)
F1	Concrete Strip	1.80 x 23.50	42.30
F2	Concrete Strip	1.80 x 36.00	64.80
F3	Concrete Strip	2.80 x 7.00	19.60

Foundation Reference	Foundation Type	Dimensions in Plan (m)	Area (m^2)
F4	Concrete Strip	2.80 x 7.00	19.60
F5	Concrete Strip	2.85 x 40.50	115.43
F6	Concrete Pad	2.00 x 2.50	5.00
F7	Concrete Pad	2.50 x 1.75	4.38
F8	Concrete Pad	3.25 x 6.10	19.83
F9	Concrete Pad	3.25 x 3.45	11.21
F10	Concrete Pad	3.25 x 3.45	11.21

It is proposed to update the previous settlement analysis in view of the results of the additional investigation and this will be completed in due coarse to ensure that settlements will remain within tolerable limits and that the ultimate bearing capacity of the bearing stratum will not be exceeded.

Contamination Risk Assessment

The desk study has revealed the site to have had a potentially contaminative historical use as it has been developed with a brewery and bounded by garages and a timber yard prior to the construction of the existing building. However, the results of contamination testing carried out on three samples of the shallow soils have indicated the soils to be free from elevated concentrations. In addition, contamination testing on eight samples of the made ground during the previous phase of the investigation did not indicated elevated concentrations of a range of common contaminants within these samples either. As a result a requirement for remedial measures is not generally envisaged.

Contaminated groundwater was encountered during the previous phase of investigation. A sample of the water was taken and submitted for a suite of testing and was found to contain elevated TPH, total PAH, including naphthalene, arsenic and monohydric phenols. Speciation testing of TPH compounds has indicated the contamination to probably be diesel or light heating oil and reference to archive Goad insurance plans indicates the presence of a buried tank on the adjacent site at basement level in this area, which is the most likely source of the contamination. It was proposed to test an additional sample of the groundwater to confirm these findings, however, the standpipe was found to contain insufficient water and groundwater was not encountered elsewhere.

An additional two boreholes carried out in this area of the site found no evidence of contamination which indicates that the previously observed inflow of contaminated groundwater through a join in the concrete was likely a relatively isolated occurrence; although without excavating along the full length of the wall it is not possible to state this with certainty. The presence of the London Clay in this area appears to have prevented the migration of the contamination.

During the proposed construction, it is possible that the excavation of the London Clay against the retaining wall may result in further inflows of contaminated water. If this is the case, consideration will need to be given to the removal of the contaminated water and any affected soil and measures should be taken to further waterproof the retaining wall to prevent the ingress of contamination from an external source entering the site, which would essentially result in a continuation of the existing condition and should not, therefore, negatively impact any surrounding sites.

The groundwater contamination will pose a risk to site workers in this area during the ground works. These risks are further assessed below.

Site Workers

Site workers should be made aware of the contamination and a programme of working should be identified to protect workers handling any soil. The method of site working should be in accordance

with guidelines set out by HSE and CIRIA[4] and the requirements of the Local Authority Environmental Health Officer.

Waste Disposal

Under the European Waste Directive, waste is classified as being either Hazardous or Non-Hazardous and landfills receiving waste are classified as accepting hazardous or non-hazardous wastes or the non-hazardous sub-category of inert waste in accordance with the Waste Directive. Waste classification is a staged process and this investigation represents the preliminary sampling exercise of that process. Once the extent and location of the waste that is to be removed has been defined, further sampling and testing may be necessary. The results from this ground investigation should be used to help define the sampling plan for such further testing, which could include WAC leaching tests where the totals analysis indicates the soil to be a hazardous waste or inert waste from a contaminated site. It should however be noted that the Environment Agency guidance WM3[5] states that landfill WAC analysis, specifically leaching test results, must not be used for waste classification purposes.

Any spoil arising from excavations or landscaping works, which is not to be re-used in accordance with the CL:AIRE[6] guidance, will need to be disposed of to a licensed tip. Waste going to landfill is subject to landfill tax at either the standard rate of £88.95 per tonne (about £160 per m^3) or at the lower rate of £2.80 per tonne (roughly £5 per m^3). However, the classifications for tax purposes and disposal purposes differ and currently all made ground and topsoil is taxable at the 'standard' rate and only naturally occurring soil and stones, which are accurately described as such in terms of the 2011 Order, would qualify for the 'lower rate' of landfill tax.

Based upon on the technical guidance provided by the Environment Agency it is considered likely that the soils encountered during this ground investigation, as represented by the nine chemical analyses carried out, would be generally classified as follows;

Soil Type	Waste Classification (Waste Code)	WAC Testing Required Prior to Landfill Disposal?	Comments
Made ground	Non-hazardous (17 05 04)	No	
Lynch Hill Gravel and London Clay	Inert (17 05 04)	Should not be required but confirm with receiving landfill	

Under the requirements of the European Waste Directive all waste needs to be pre-treated prior to disposal. The pre-treatment process must be physical, thermal, chemical or biological, including sorting. It must change the characteristics of the waste in order to reduce its volume, hazardous nature, facilitate handling or enhance recovery. The waste producer can carry out the treatment but they will need to provide documentation to prove that this has been carried out. Alternatively, the treatment can be carried out by an approved contractor. The Environment Agency has issued a position paper[7] which states that in certain circumstances, segregation at source may be considered as pre-treatment and thus excavated material may not have to be treated prior to landfilling if the soils can be segregated onsite prior to excavation by sufficiently characterising the soils in-situ prior to excavation.

The above opinion with regard to the classification of the excavated soils is provided for guidance only and should be confirmed by the receiving landfill once the soils to be discarded have been identified.

4 CIRIA (1996) *A guide for safe working on contaminated sites* - Report 132, Construction Industry Research and Information Association

5 Environment Agency 2015. *Guidance on the classification and assessment of waste.* Technical Guidance WM3 First Edition

6 CL:AIRE March 2011. *The Definition of Waste: Development Industry Code of Practice* Version 2

7 Environment Agency 23 Oct 2007 *Regulatory Position Statement Treating non-hazardous waste for landfill - Enforcing the new requirement*

The local waste regulation department of the Environment Agency (EA) should be contacted to obtain details of tips that are licensed to accept the soil represented by the test results. The tips will be able to provide costs for disposing of this material but may require further testing.

Yours sincerely
GEOTECHNICAL AND ENVIRONMENTAL ASSOCIATES

Alex Taylor

Encs

GEA	Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	**Site** Stephenson House, 75 Hampstead Road, London NW1 2PL	**Number** **BH101**
Excavation Method Drive-in Window Sampler	**Dimensions**	**Ground Level (mOD)**	**Client** Lazari Properties 2 Limited	**Job Number** J17275
	Location	**Dates** 11/12/2018	**Engineer** The Morton Partnership	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35)	Concrete Floor Slab		
					0.35			
0.50	D1				(0.35)	Made Ground (brown slightly sandy clay with occasional brick fragments and gravel)		
					0.70			
					(0.60)	Stiff fissured grey CLAY		
					1.30			
						Terminated at 1.30m		

Remarks
Borehole terminated due to stiffness of clay.
Groundwater not encountered.

Scale (approx)	**Logged By**
1:50	AT

Figure No.
J17275.BH101

GEA Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Stephenson House, 75 Hampstead Road, London NW1 2PL	Number **BH102**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler			Lazari Properties 2 Limited	J17275
	Location	**Dates** 11/12/2018	**Engineer** The Morton Partnership	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.42)	Concrete Floor Slab		
					0.42			
0.50	D1				(0.18)	Made Ground (pale brown sand and gravel with rare brick fragments)		
					0.60			
					(1.10)	Orange-brown fine to coarse SAND with abundant fine to coarse sub-angular to rounded		
					1.70			
					(0.40)	Stiff brown CLAY		
					2.10			
					2.20	Stiff fissured grey CLAY		
						Terminated at 2.20m		

Remarks
Borehole terminated due to stiffness of clay.
Groundwater not encountered.

Scale (approx)	Logged By
1:50	AT

Figure No.
J17275.BH101

GEA Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Stephenson House, 75 Hampstead Road, London NW1 2PL	Number **BH103**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler			Lazari Properties 2 Limited	J17275
	Location	**Dates** 11/12/2018	**Engineer** The Morton Partnership	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35)	Concrete Floor Slab		
0.40	D1				0.35	Concrete Foundation		
					(1.65)			
					2.00	Stiff fissured grey CLAY		
					(0.50)			
					2.50	Terminated at 2.50m		

Remarks
Borehole terminated due to stiffness of clay.
Groundwater not encountered.

Scale (approx)	Logged By
1:50	AT

Figure No.
J17275.BH101

GEA Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Stephenson House, 75 Hampstead Road, London NW1 2PL	Number **BH104**
Excavation Method Drive-in Window Sampler **Dimensions** **Location**	**Ground Level (mOD)** **Dates** 11/12/2018	**Client** Lazari Properties 2 Limited **Engineer** The Morton Partnership	**Job Number** J17275 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30) 0.30	Concrete Floor Slab		
					(1.10)	Orange-brown fine to coarse SAND with fine to medium sub-angular to sub-rounded gravel		
					1.40	Terminated at 1.40m		

Remarks
Borehole terminated due to the density of the sand and gravel.
Groundwater not encountered.

Scale (approx)	Logged By
1:50	AT

Figure No.
J17275.BH101

GEA Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Stephenson House, 75 Hampstead Road, London NW1 2PL	Number **BH105**
Excavation Method Drive-in Window Sampler **Dimensions** **Location**	**Ground Level (mOD)** **Dates** 11/12/2018	**Client** Lazari Properties 2 Limited **Engineer** The Morton Partnership	**Job Number** J17275 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35)	Concrete Floor Slab		
					0.35	Concrete Foundation		
					(1.40)			
					1.75			
					1.80	Orange-brown sandy fine to coarse angular GRAVEL		
						Terminated at 1.80m		

Remarks
Borehole terminated due to density of the sand and gravel.
Groundwater not encountered.

Scale (approx)	Logged By
1:50	AT

Figure No.
J17275.BH101

GEA Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Stephenson House, 75 Hampstead Road, London NW1 2PL	Number **BH106**
Excavation Method Drive-in Window Sampler **Dimensions** **Location**	**Ground Level (mOD)** **Dates** 11/12/2018	**Client** Lazari Properties 2 Limited **Engineer** The Morton Partnership	**Job Number** J17275 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35) 0.35	Concrete Floor Slab		
0.50	D1				(1.25)	Stiff fissured brown silty CLAY with fine slelnite crystals, bluish grey veins and pockets of orange-brown fine sand		
					1.60	Terminated at 1.60m		

Remarks
Borehole terminated due to stiffness of clay.
Groundwater not encountered.

Scale (approx)	Logged By
1:50	AT

Figure No.
J17275.BH101

GEA Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Stephenson House, 75 Hampstead Road, London NW1 2PL	Number **BH107**
Excavation Method Drive-in Window Sampler **Dimensions** **Location**	**Ground Level (mOD)** **Dates** 11/12/2018	**Client** Lazari Properties 2 Limited **Engineer** The Morton Partnership	**Job Number** J17275 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35) 0.35	Concrete Floor Slab		
0.50	D1				(1.05) 1.40	Stiff fissured brown silty CLAY with fine slelnite crystals, bluish grey veins and pockets of orange-brown fine sand		
						Terminated at 1.40m		

Remarks
Borehole terminated due to stiffness of clay.
Groundwater not encountered.

Scale (approx)	Logged By
1:50	AT

Figure No.
J17275.BH101

GEA

www.gea-ltd.co.uk

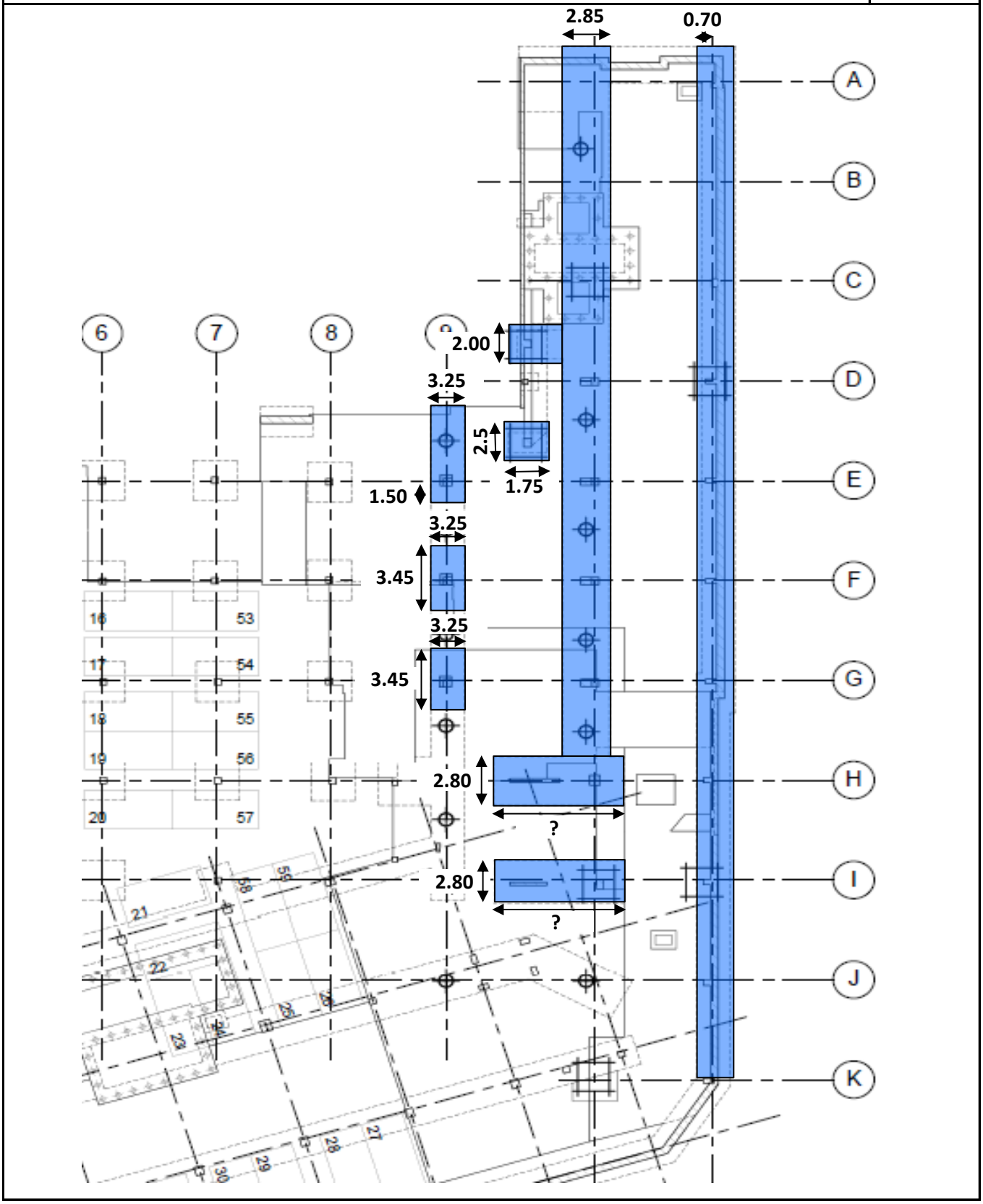
Herts | 01727 824666 Notts | 01509 674888

Existing Foundation Plan

Site	Stephenson House, 75 Hampstead Road, London NW1 2PL
Client	Lazari Properties 2 Limited
Engineer	The Morton Partnership

Job Number J17275

Sheet 1 / 1



Alex Taylor
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Widbury Hill
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Analytical Report Number : 18-22871

Project / Site name:	Stephenson House, Hampstead Road, London	**Samples received on:**	18/12/2018
Your job number:	J17275	**Samples instructed on:**	18/12/2018
Your order number:	J17275	**Analysis completed by:**	28/12/2018
Report Issue Number:	1	**Report issued on:**	28/12/2018
Samples Analysed:	3 soil samples		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 18-22871

Project / Site name: Stephenson House, Hampstead Road, London
Your Order No: J17275

Lab Sample Number				1118178	1118179	1118180		
Sample Reference				BH101	BH102	BH103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.50	0.50	0.40		
Date Sampled				11/12/2018	11/12/2018	11/12/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	6.6	19	9.5		
Total mass of sample received	kg	0.001	NONE	1.4	1.4	1.2		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.8	8.2	9.2		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Total Sulphate as SO_4	mg/kg	50	MCERTS	210	890	1300		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.025	0.26	0.15		
Sulphide	mg/kg	1	MCERTS	< 1.0	2.3	< 1.0		
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	7.1	22	12		
Total Organic Carbon (TOC)	%	0.1	MCERTS	< 0.1	0.3	< 0.1		
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80		

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Lab Sample Number				1118178	1118179	1118180		
Sample Reference				BH101	BH102	BH103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.50	0.50	0.40		
Date Sampled				11/12/2018	11/12/2018	11/12/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.5	11	14		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	39	12		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	71	96	82		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	58	28	11		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	38	13		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2.0	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	36	77	25		

Petroleum Hydrocarbons

TPH C10 - C40	mg/kg	10	MCERTS	< 10	28	< 10		
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	2.2	< 1.0		
TPH (C21 - C35)	mg/kg	1	MCERTS	5.1	21	< 1.0		

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1118178	BH101	None Supplied	0.50	Brown sand with gravel.
1118179	BH102	None Supplied	0.50	Brown clay with gravel.
1118180	BH103	None Supplied	0.40	Light brown sand with gravel.

The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 18-22871

Project / Site name: Stephenson House, Hampstead Road, London

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests. 2:1 extraction.	L082-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

GEA
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Generic Risk-Based Soil Screening Values

Site	Stephenson House, 75 Hampstead Road, London NW1 2PL	**Job Number** J17275D
Client	Lazari Properties 2 Limited	**Sheet** 1 / 1
Engineer	The Morton Partnership	

Proposed End Use Commercial

Soil pH 8

Soil Organic Matter content % 1.0

Contaminant	Screening Value mg/kg	Data Source
Metals		
Arsenic	640	C4SL
Cadmium	410	C4SL
Chromium (III)	30400	LQM/CIEH
Chromium (VI)	49	C4SL
Copper	71,700	LQM/CIEH
Lead	2330	C4SL
Elemental Mercury	170	SGV
Inorganic Mercury	3600	SGV
Nickel	1350	LQM/CIEH
Selenium	13000	SGV
Zinc	665,000	LQM/CIEH
Hydrocarbons		
Benzene	27	C4SL
Toluene	870	SGV
Ethyl Benzene	48000	SGV
Xylene	475	SGV
Aliphatic C5-C6	3400	LQM/CIEH
Aliphatic C6-C8	8300	LQM/CIEH
Aliphatic C8-C10	2100	LQM/CIEH
Aliphatic C10-C12	10000	LQM/CIEH
Aliphatic C12-C16	61000	LQM/CIEH
Aliphatic C16-C35	1,600,000	LQM/CIEH
Aromatic C6-C7	See Benzene	LQM/CIEH
Aromatic C7-C8	See Toluene	LQM/CIEH
Aromatic C8-C10	3700	LQM/CIEH
Aromatic C10-C12	17000	LQM/CIEH
Aromatic C12-C16	36000	LQM/CIEH
Aromatic C16-C21	28000	LQM/CIEH
Aromatic C21-C35	28000	LQM/CIEH
PRO (C_5 –C_{10})	18397	Calc
DRO (C_{12} –C_{28})	1,725,000	Calc
Lube Oil (C_{28} –C_{44})	1,628,000	Calc
TPH	**1000**	Trigger for speciated testing

Contaminant	Screening Value mg/kg	Data Source
Anions		
Soluble Sulphate	500 mg/l	Structures
Sulphide	50	Structures
Chloride	400	Structures
Others		
Organic Carbon (%)	10	Methanogenic potential
Total Cyanide	12000	WRAS
Total Mono Phenols	3200	SGV
PAH		
Naphthalene	200.00	C4SL exp & LQM/CIEH
Acenaphthylene	84,000	LQM/CIEH
Acenaphthene	85,000	LQM/CIEH
Fluorene	64,000	LQM/CIEH
Phenanthrene	22,000	LQM/CIEH
Anthracene	530,000	LQM/CIEH
Fluoranthene	23,000	LQM/CIEH
Pyrene	54,000	LQM/CIEH
Benzo(a) Anthracene	90.0	C4SL exp & LQM/CIEH
Chrysene	140	C4SL exp & LQM/CIEH
Benzo(b) Fluoranthene	100.0	C4SL exp & LQM/CIEH
Benzo(k) Fluoranthene	140.0	C4SL exp & LQM/CIEH
Benzo(a) pyrene	42.00	C4SL
Indeno(1 2 3 cd) Pyrene	60.0	C4SL exp & LQM/CIEH
Dibenzo(a h) Anthracene	13.00	C4SL exp & LQM/CIEH
Benzo (g h i) Perylene	650	C4SL exp & LQM/CIEH
Screening value for PAH	**600.0**	B(a)P / 0.15
Chlorinated Solvents		
1,1,1 trichloroethane (TCA)	552	LQM/CIEH
tetrachloroethane (PCA)	150	LQM/CIEH
tetrachloroethene (PCE)	63.1	LQM/CIEH
trichloroethene (TCE)	6.42	LQM/CIEH
1,2-dichloroethane (DCA)	0.71	LQM/CIEH
vinyl chloride (Chloroethene)	0.0587	LQM/CIEH
tetrachloromethane (Carbon tetra	3	LQM/CIEH
trichloromethane (Chloroform)	79.4	LQM/CIEH

Notes

Concentrations measured below the above values may be considered to represent 'uncontaminated conditions' which pose 'LOW' risk to human health. Concentrations measured in excess of these values indicate a potential risk which require further, site specific risk assessment.

SGV - Soil Guideline Value, derived from the CLEA model and published by Environment Agency 2009

LQM/CIEH - Generic Assessment Criteria for Human Health Risk Assessment 2nd edition (2009)derived using CLEA 1.04 model 2009

C4SL - Defra Category 4 Screening value based on Low Level of Toxicological Risk

C4SL exp & LQM/CIEH calculated using C4SL revisions to exposure assessment but LQM/CIEH health criteria values

Calc - sum of nearest available carbon range specified including BTEX for PRO fraction

B(a)P / 0.15 - GEA experience indicates that Benzo(a) pyrene (one of the most common and most carcinogenic of the PAHs) rarely exceeds 15% of the total PAH concentration, hence this Total PAH threshold is regarded as being conservative

GEA

www.gea-ltd.co.uk

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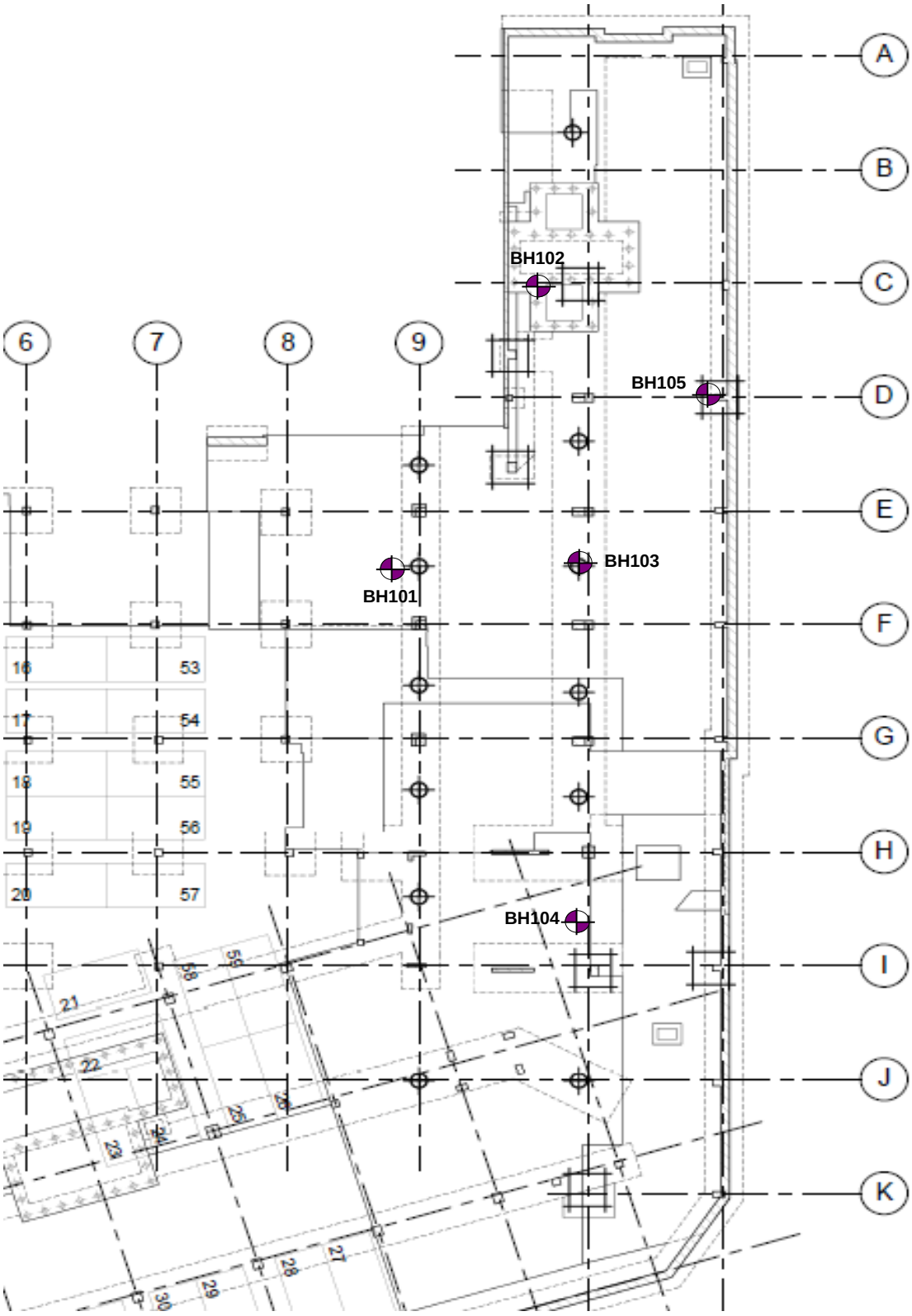
Site Plan

Site	Stephenson House, 75 Hampstead Road, London NW1 2PL
Client	Lazari Properties 2 Limited
Engineer	The Morton Partnership

Job Number J17275

Sheet 1 / 1



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Site Plan

Site	Stephenson House, 75 Hampstead Road, London NW1 2PL
Client	Lazari Properties 2 Limited
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Job Number J17275

Sheet 2 / 2

Approximate Scale in metres

0 5 10 15