Chelmer Consultancy Services

Unit 15, East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
Telephone: 01245 400 930 **Fax:** 01245 400 933
Email: info@siteinvestigations.co.uk **Website**: www.siteinvestigations.co.uk

Geo-environmental Interpretative Report

Client:	Wandsworth Sand and Stone Ltd
Site:	13-15 John's Mews London WC1N 2PA
CCS Ref:	GENV/4507
Dated:	September 2014

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1.0 EXECUTIVE SUMMARY

Item	Comments	Risk
Site	**13-15 John's Mews, London WC1N 2PA**	
Ground Conditions	The current work encountered MADE GROUND to a maximum depth of 5.90m below existing ground level. The MADE GROUND was found to be underlain by Weathered London Clay to a maximum depth of 7.50m, which in turn was underlain by the 'fresh' grey London Clay stratum which was not penetrated at the maximum borehole termination depth of 10.00m below existing ground level.	Medium
Swelling/ Shrinking	The Weathered London Clay/London Clay strata encountered beneath the site has been confirmed to possess a 'high' volume change potential in accordance with the National House Building Councils (NHBC) classification system given in Part 4 of their Standards. Therefore, it is possible that precautions against foundation sides and beneath any ground beams will be required in order to accommodate potential seasonal swelling and shrinkage.	Medium
Root Activity	No root activity was noted during the current investigation.	Low
GW	A groundwater 'seepage' was observed within borehole BH1B at a depth of 5.90m below ground level. Standing water was observed within borehole BH1B at a depth of 9.50m below ground level. On the return gas/groundwater monitoring visits to the installation fitted within borehole BH1B on 30th July and 10th August 2014 groundwater was recorded at depths of 3.39m and 3.27m below existing ground level.	Medium
Landborne Gas	The site would be classified as GREEN or 'Characteristic Situation 1' and therefore no land borne gas remedial measures would be required at this site.	Low
Soil Chemical Analysis	Three lead concentrations of 736mg/kg, 503mg/kg and 739mg/kg from BH1A, BH1B and BH1B respectively exceeded the ATRISK Contaminated Land Screening Values (SSVs) of 444mg/kg. However, due to the lack of proposed soft landscaping areas or garden areas, and the removal of near surface soils during the proposed basement development, the risk to future residents is considered to be '**low**'. We would however recommend that standard Health and Safety precautions be taken with regard to ground workers at this site. These should include PPE equipment such as gloves, overalls etc. to prevent dermal contact with the soils. Washing facilities should be made available on-site to reduce extended contact with site soils. During the construction phase, dust suppression measures may be required to minimise potential inhalation of dust by neighbours or ground workers.	Low
WAC Tests	The result of the WAC test indicates that this sample would probably be classified as "Hazardous" material. This is considered to represent the typical MADE GROUND across the site.	High
Piled Foundations	The proposed basement slab is expected to be set approximately 3.50m-4.00m below existing ground level. At this depth the basement slab would be set within MADE GROUND according to the findings from borehole BH1B. Any proposed foundations set within MADE GROUND could experience issues related to differential settlement. This is due to the heterogeneous nature of this material. Also, the allowable bearing pressure will be significantly reduced within the MADE GROUND. It is therefore recommended that the proposed development be supported on piled foundations. Appropriate design parameters have been suggested, together with an indication of design capacity. Settlements of such piles can be expected to be small, typically less than 5-10mm.	Low
Buried Concrete	The results of the chemical analyses indicate that the samples tested would fall into Class DS-2 of the Building Research Establishments (BRE) classification system Special Digest Part 1:2005 "Concrete in aggressive ground".	Low
Collapse of Excavations	From the evidence of the borehole, the excavations may require support against collapse of sides and a contingency for this should be allowed for at this stage.	Medium
Additional Work	No further works are considered necessary with regards to contaminated land.	N/A

2.0 INTRODUCTION & SCOPE OF WORKS

2.1 This report has been prepared by Chelmer Site Investigation Laboratories Limited (CSI) to the instructions of the Architects for the project, FT Architects Ltd.

2.2 The Client for the project was Wandsworth Sand and Stone Limited.

2.3 The site under consideration consisted of a two storey detached building, with a former engineering workshop and garage within the ground floor and offices within the first floor. The footprint of the building covered the whole site, with a concrete hard standing floor present across the ground floor. *Existing Site Plans* have been appended to this report.

2.4 The approximate six-figure grid reference for the site is 530790, 182060.

2.5 It is understood that the proposed development will include the 'Change of use from garage/workshop/offices (Class B1) to residential use (Class C3) to provide 2 dwelling houses, including excavation works to create a new basement floor level, creation of 2 new courtyards, mansard roof extensions and elevational alterations to front and rear'. *Proposed Development Plans* have been appended to this report.

2.6 The Phase I *Non-intrusive* investigation undertaken by CSI ref. DTS/4507 comprised a 'Desk Study' and included a Walkover Survey, an Environmental Disclosure Report and a Historical Map Search.

2.7 The Phase I Desk Top Study identified that the site was occupied by the same two buildings since at least 1877-1878, however the use of the buildings has likely changed over the years. The surrounding area has largely remained the same since 1877-1878, apart from a school constructed adjacent to the site during 1963-1974.

2.8 This Phase II *Intrusive* site investigation has now been commissioned to provide initial information on the sub-soil conditions at the location of the proposed new development together with laboratory testing and reporting, in order to enable future foundations to be designed.

2.9 In addition, a groundwater/gas monitoring survey was also carried out within the standpipe installed in borehole BH1B which was drilled during the current intrusive investigation work, together with a ***preliminary contamination assessment***.

2.10 This report presents the work carried out and discusses the findings.

3.0 FIELDWORK & FINDINGS

3.1 All fieldwork was generally executed in accordance with the recommendations given in British Standard BS 5930:1999+A2:2010, "Code of Practice for Site Investigations". Contamination sampling was undertaken in accordance with BS 10175 : 2011, "Code of Practice for the Investigation of Potentially Contaminated Sites".

3.2 The borehole and trial pit locations are indicated on the appended *Sketch Fieldwork Location Plan*.

3.3 Fieldwork was undertaken on 22nd May, 3rd July and 18th July 2014. The original scope of works involved the drilling of four c.f.a. boreholes (BH1-BH4) and the excavation of four trial pits (TP1-TP4). Due to hitting refusal two trial pits (TP2 & TP3) were not excavated and three additional c.f.a. boreholes were undertaken on 3rd July 2014, however these also encountered refusal so a final borehole was undertaken on 18th July 2014.

C.f.a. Boreholes

3.4 Six c.f.a. boreholes (BH1, BH1A, BH1B & BH2-BH4) were drilled across the site at the positions indicated on the *Sketch Fieldwork Location Plan*. Two additional boreholes were undertaken at the locations of trial pits TP1 & TP2, however, as the geology was the same as within borehole BH1A these were not logged. Boreholes BH1 & BH2-BH4 hit refusal at a depth of 0.90m below existing ground level. Borehole BH1A hit refusal at a depth of 2.00m below existing ground level. Borehole BH1B was advanced to a depth of 10.00m below existing ground level.

3.5 Disturbed samples were taken from all boreholes and within borehole BH1B at regular depth intervals within each stratum and when a change of strata was encountered.

3.6 Standard Penetration Tests (SPTs & CPTs) and Mackintosh Probes provided additional information on the consistency of the material encountered. A *Penetration vs Depth Profile* has been appended to this report.

3.7 Upon completion of borehole BH1B a combined groundwater/gas-monitoring standpipe was installed to a depth of 8.00m below existing ground level.

3.8 Full details of the borehole findings are given on the appended borehole record sheets.

Hand Excavated Trial Pits

3.9 Two internal trial pits (TP1 & TP4) were excavated at the locations indicated on the *Sketch Fieldwork Location Plan.* Trial pits TP2 & TP3 were not excavated.

3.10 Trial pit TP1 was undertaken adjacent to the northern party wall with No. 11. Two sections of trial pit TP1 were logged, section A and section B. Section A found the existing brick wall to be corbelled onto a concrete foundation at a depth of 750mm below existing ground level. The corbels were found to extend out a distance of 225mm from the brick wall. The underside of the concrete foundation was unable to be established due an obstruction and the trial pit was terminated at a depth of 1.25m below existing ground level.

3.11 Within trial pit TP1, section B found the existing brick wall to be corbelled onto a concrete foundation at a depth of 675mm below existing ground level. The corbels were found to extend out a distance of 150mm from the brick wall. The underside of the concrete foundation was unable to be established due an obstruction and the trial pit was terminated at a depth of 1.25m below existing ground level.

3.12 Trial pit TP4 was undertaken adjacent to the southern party wall with No. 17 and the external front wall. Two sections of trial pit TP4 were logged, section A and section B. Section A found the existing brick wall to be corbelled out 150mm from the wall. The underside of the foundation was unable to be established due an obstruction from the mains services and large rubble and section A was terminated at a depth of 1.25m below existing ground level.

3.13 Within trial pit TP4, section B found the existing brick wall to rest onto a concrete foundation at a depth of 200mm below existing ground level. The underside of the concrete foundation was unable to be established due an obstruction from mains services and large rubble and section B was therefore terminated at a depth of 1.00m below existing ground level.

3.14 Full details of the trial pit findings are given on the appended trial pit record sheets.

Landborne Gas Emissions Monitoring

3.15 Following the initial site work, two return gas/groundwater monitoring visits were undertaken to the installation fitted within borehole BH1B on the 30th July and 10th August 2014.

3.16 The barometric pressure was recorded together with the level of Carbon Dioxide, Oxygen and Methane within the borehole. In addition, gas flow measurements were taken and the depth to groundwater recorded.

3.17 Full details of the readings are included on the appended Gas/Groundwater Monitoring Record Sheet.

4.0 GROUND CONDITIONS

4.1 According to information published by the British Geological Survey the underlying geology at this site is shown as being the Lynch Hill Gravel Member, with the Hackney Gravel Member outcropping nearby, overlying the London Clay Formation.

Lynch Hill Gravel Member

4.2 The Lynch Hill Gravel Member is a sand and gravel, with local lenses of silt, clay or peat from the parent material, the Maindenhead Formation. The Lynch Hill Gravel can be described as being coarse to fine subgranualr gravel with coarse to fine brown sand. The Wolstonian age gravel rests unconformably on the bedrock geology and with an average thickness of 7m with a range typically 1-12m. It is geographically limited to the Thames Valley and associated tributaries. The Lynch Hill Gravel Member was previously known as the Lynch Hill Gravel Formation.

Hackney Gravel Member

4.3 This Wolstonian aged sand and gravel typically has locally with lenses of silt, clay or peat. It rests with unconformity on bedrock geology and averages in thickness at about 6m but can be up to 10m thick. This member is geographically limited to the Thames Valley and its associated tributaries.

London Clay

4.4 It is thought that the London Clay Formation was deposited during a period of sea inundation in the area up to 200m in depth. The London Clay can be up to 150m thick beneath south Essex thinning across London to about 90m near Reading. The formation consists of mainly dark blue-grey to brown-grey clay containing variable amounts of fine-grained sand and silt. London Clay generally weathers to an orange-brown colour with pockets of silty fine sand. The formation is particularly susceptible to swelling and shrinking when subjected to moisture content changes and is commonly intensely fissured. In addition, gypsum (selenite) crystals and pyrite nodules are commonly found throughout the formation.

When exposed to the weathering process the upper regions of the London Clay oxidise to brown in colour. It usually contains selenite crystals, often grouped in bands or layers, which are thought to have originated from the decomposition of shell fragments. London Clay contains clay minerals in the form of illite, kaolinite and smectite. The presence of smectite renders the London Clay particularly susceptible to heave caused by alternate wetting and drying near the surface. In addition, weathering and possible slight transportation of semi-frozen material "en-masse" in glacial or peri-glacial regions can occur. This action often completely destroys the structure of the material and can involve a serious loss of strength. As the materials are based on local constituents, the lithology of the deposit is often similar to that of the parent strata.

4.5 Full details of the ground conditions encountered within borehole BH1B can be summarised as follows:

Depth From GFL (m)	Depth To From GFL (m)	Description
0.00	0.075	CONCRETE
0.075	5.90	MADE GROUND
5.90	7.50	Weathered London Clay
7.50	10.00+	London Clay

4.6 It should be noted that the MADE GROUND depth recorded above is that encountered within borehole BH1B during the current work. However, owing to the variable nature and unknown deposition criteria of MADE GROUND it is possible that deeper or more extensive areas of MADE GROUND may exist at this site which have not been revealed by the current work.

4.7 A groundwater 'seepage' was observed within borehole BH1A at a depth of 5.90m below ground level. Standing groundwater was observed within borehole BH1B at a depth of 9.50m below ground level. On the return gas/groundwater monitoring visits to the installation fitted within borehole BH1B on 30th July and 10th August 2014 groundwater was recorded at depths of 3.39m and 3.27m below existing ground level.

4.8 No root activity was noted during the current investigation.

5.0 LABORATORY TESTING

5.1 The following geotechnical and contamination tests have been carried out on samples recovered from borehole BH1B drilled at this site.

5.2 Unless otherwise stated, the geotechnical tests have generally been carried out in accordance with the recommendations given in British Standard 1377:1990, "Methods of Test for Soils for Civil Engineering Purposes".

5.3 The chemical testing was carried out in accordance with standard industry methods in a UKAS approved laboratory which is also currently accredited in accordance with MCERTS for the majority of its testing. Further information regarding this accreditation is available on request together with a full list of test methods if required.

5.4 *Atterberg Limits and Moisture Content Tests*

The Atterberg Limit and moisture contents have been determined for a single sample of Weathered London Clay and two London Clay samples collected and tested from the underlying strata.

Weathered London Clay

The liquid limit (LL) was found to be 80%, the plastic limit (PL) 18%, and the modified plasticity index (PI) 62%. The moisture content of this sample was found to be 33%.

These results indicate that the sample tested would be classified as Clay of 'very high' (CV) plasticity in accordance with the Casagrande Geotechnical classification system.

In addition, the sample would fall into the "high" volume change potential category of the National House Building Council's (NHBC) classification system given in Part 4 of their Standards.

London Clay

The liquid limit (LL) was found to range between 67% and 68%, the plastic limit (PL) between 14% and 16%, and the modified plasticity index (PI) between 51% and 54%. The moisture content of these two samples was found to be 28%.

These results indicate that the samples tested would be classified as Clay of 'high' (CH) plasticity in accordance with the Casagrande Geotechnical classification system.

In addition, the samples would fall into the "high" volume change potential category of the National House Building Council's (NHBC) classification system given in Part 4 of their Standards.

5.5 *pH and Sulphate Tests*

The pH and sulphate content has been determined for two samples recovered at various depths from the borehole drilled at this site.

The pH values were found to vary between 7.9 and 8.1 with the sulphate content, on a 2:1 water:soil extract was found to vary between 0.79 and 0.99 g/l.

5.6 *Chemical Analysis*

Three representative samples of the MADE GROUND encountered across the site were selected and tested for a range of commonly occurring contaminants and indicators of contamination including those given by the Contaminated Land Exposure Assessment (CLEA).

A contamination suite was undertaken on samples from each of the boreholes and window sample locations, which included heavy metals, speciated PolyAromatic Hydrocarbon (PAH) and speciated Total Petroleum Hydrocarbon (TPH).

5.7 *Waste Classification Tests*

A sample collected from borehole BH1B was selected and tested for Waste Acceptance Criteria (WAC) in accordance with BS EN 12457 Part 3.

The sample was selected from the MADE GROUND from borehole BH1B at a depth of 1.5m below existing ground level.

Full details of the results are given on the appended results sheets.

5.8 *Soil Samples*

All soil samples will be kept for a period of 28 days after the date of the invoice for this project unless otherwise notified to Chelmer Site Investigation Laboratories Limited in writing. Should samples be required to be stored for longer than 28 days then a storage charge will be levied.

6.0 DISCUSSION

PROPOSED DEVELOPMENT & SCOPE OF WORKS

6.1 As discussed in Section 2 above, it is understood that the proposed development will include the 'Change of use from garage/workshop/offices (Class B1) to residential use (Class C3) to provide 2 dwelling houses, including excavation works to create a new basement floor level, creation of 2 new courtyards, mansard roof extensions and elevational alterations to front and rear'. *Proposed Development Plans* have been appended to this report.

6.2 The Phase I *Non-intrusive* investigation undertaken by CSI ref. DTS/4507 comprised a 'Desk Study' and included a Walkover Survey, an Environmental Disclosure Report and a Historical Map Search.

6.3 This Phase II *Intrusive* site investigation has now been commissioned to provide initial information on the sub-soil conditions at the location of the proposed new development together with laboratory testing and reporting, in order to enable future foundations to be designed.

6.4 In addition, a groundwater/gas monitoring survey was also carried out within the standpipe installed in borehole BH1B which was drilled during the current intrusive investigation work, together with a ***preliminary contamination assessment***.

6.5 At the time of the current investigation, as no detailed information is available regarding the precise loadings associated with proposed new development, the foundation design discussed below is, by necessity, general in nature.

6.6 This report presents the work carried out and discusses the findings.

FOUNDATION DESIGN

6.7 The current work encountered MADE GROUND to a maximum depth of 5.90m below existing ground level. The MADE GROUND was found to be underlain by Weathered London Clay to a maximum depth of 7.50m, which in turn was underlain by the 'fresh' grey London Clay stratum which was not penetrated at the maximum borehole termination depth of 10.00m below existing ground level.

6.8 A groundwater 'seepage' was observed within borehole BH1A at a depth of 5.90m below ground level. Standing groundwater was observed within borehole BH1B at a depth of 9.50m below ground level. On the return gas/groundwater monitoring visits to the installation fitted within borehole BH1B on 30th July and 10th August 2014 groundwater was recorded at depths of 3.39m and 3.27m below existing ground level.

6.9 No root activity was noted during the current investigation.

6.10 The Weathered London Clay/London Clay strata encountered beneath the site has been confirmed to possess a 'high' volume change potential in accordance with the National House Building Councils (NHBC) classification system given in Part 4 of their Standards.

6.11 Therefore, it is likely that precautions against foundation sides and beneath any ground beams will be required in order to accommodate potential seasonal swelling and shrinkage. Solutions can be deployed in terms of structural design and/or compressible materials, these measures should be assessed by the appointed Structural Engineer.

6.12 It should be noted that should ground conditions differing significantly from those described in our report be encountered during foundation excavation, then Chelmer Site Investigation Laboratories Limited should be contacted immediately and that the below noted allowable bearing pressures or recommended foundation type may need to be altered accordingly.

BASEMENT CONSTRUCTION

6.13 The proposed basement slab is expected to be set approximately 3.50m-4.00m below existing ground level. At this depth the basement slab would be set within MADE GROUND according to the findings from borehole BH1B. Any proposed foundations set within MADE GROUND could experience issues related to differential settlement. This is due to the heterogeneous nature of this material. Also, the allowable bearing pressure will be significantly reduced within the MADE GROUND. It is therefore recommended that the proposed development be supported on piled foundations.

6.14 It is expected that an amount of overburden pressure will be released, which will be partially off-set by the weight of the new structure. A heave analysis using the net reduction of effective bearing pressure should be undertaken during the detailed design stage.

6.15 The construction would also be required to resist pressures arising from the assumed groundwater regime, which is likely to be more onerous than those indicated during the current investigation.

6.16 This means that de-watering may be required during construction; see 'Foundation and Service Excavations' below. The basement must also be designed to accommodate the related uplift pressure.

6.17 Once the basement construction has been completed, there is always a possibility that this will act as a local "sump" for surface groundwater and run-off. Therefore, we would recommend that the basement construction is designed to minimise any ingress of groundwater. Detailed recommendations for the waterproofing system are beyond the scope of this report although it is noted that, as a minimum, it would be prudent for the system to be designed in compliance with the requirements of BS8102:2009.

6.18 It should be noted that should ground conditions differing significantly from those described in our report be encountered during foundation excavation, then Chelmer Site Investigation Laboratories Limited should be contacted immediately and that the recommended foundation type discussed may need to be altered accordingly.

PILED FOUNDATIONS

6.19 Due to the depth of MADE GROUND encountered and its potential for differential settlement, it is recommended that the proposed development be supported on piled foundations.

6.20 At this site the piles could be bored or driven to support foundation loads mainly in adhesion within the cohesive elements of the underlying London Clay Formation. Given the nature of the ground conditions encountered, and the proximity to adjacent residential buildings, a bored pile solution would appear the most appropriate. However, we do not recommend c.f.a. solid auger piles at this site as these would leave piles sides unsupported prior to placing of concrete.

6.21 It is beyond our brief to provide a full and detailed pile design and the advice of a specialist piling contractor should be sought in this respect. All pile design is of course the responsibility of the selected piling contractor, and thus the soil parameters/assumptions listed below are given for guidance purposes only. These soil parameters/assumptions relate to "static design" for vertically loaded single and contiguous bored/C.F.A. piles:-

Made Ground

Bulk unit weight, γ_b –	17kN/m^3
Effective angle of internal friction, φ'	Zero
Undrained shear strength, Su/Cu	Zero

London Clay

Bulk unit weight, γ_b -	20kN/m^3
Undrained shear strength, Su/Cu	Approximately 90-180 kN/m^2 (interpreted from SPT results)
Adhesion Factor, α	Piling contractor's advice, but within the range 0.45 to 0.60
Effective angle of internal friction, φ'	22°
Bearing Capacity Factor, Nc	9

6.22 The following table gives typical working loads for isolated bored piles to 8.00m and 10.00m below existing ground level.

Pile Type	Depth below existing GL (m)	Diameter (m)	Working Load (tonnes)
Bored	8.00	0.30	5-10
Bored	8.00	0.45	10-15
Bored	8.00	0.60	20-25
Bored	10.00	0.30	10-15
Bored	10.00	0.45	20-25
Bored	10.00	0.60	35-40

6.23 Again, it is recommended that the advice of a competent piling contractor be sought as to the most suitable pile type at this site and for confirmation of the order of working load achievable given the ground conditions encountered and the proprietary pile type selected.

6.24 In addition, we have assumed that the top 2 to 3 metres of each pile is 'sleeved' to prevent 'heave' forces developing on the shaft.

6.25 Settlements of such piles can be expected to be small, typically less than 5-10mm.

6.26 Depending on pile spacing, the ultimate capacity of a pile group may be less than the sum of the ultimate capacities for the individual piles.

6.27 With regard to the possible downward migration of contaminants the recommendations given in the Environment Agency Document *"Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination : Guidance on Pollution Prevention"* National Groundwater and Contaminated Land Centre Report NC/99/73, May 2001, or similar updated guidance, should be followed when assessing pile design at this site.

Chelmer Consultancy Services
Unit 15, East Hanningfield Industrial Estate, Old Church Road
East Hanningfield, Essex CM3 8AB
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RETAINING STRUCTURES

6.28 The full design of temporary and permanent retaining structures is beyond the scope of this report. The calculation of permanent lateral pressures against the sides should relate to long-term (effective) stress analysis using critical state soil parameters. However, the following preliminary guidelines are accordingly considered appropriate:

Made Ground

Bulk unit weight, γ_b -	18 kN/m^3
Effective cohesion, c' -	Zero
Effective angle of internal friction, φ' -	25º
Friction at wall/soil interface, δ', -	Zero

London Clay

Active side **(permanent)**	
Bulk unit weight, γ_b -	20 kN/m^3
Effective cohesion, c' -	Zero
Effective angle of internal friction, φ' -	22º
Friction at wall/soil interface, δ', -	½ φ' (zero if high stiffness support system used)
Coefficient of earth pressure at rest, k_0:	1.0 minimum for underpinning
Passive side **(temporary)**	
Bulk unit weight, γ_b -	20 kN/m^3
Effective cohesion, Cu/Su -	130 kN/m^2
Effective angle of internal friction, φ' -	Zero
Adhesion at wall/soil interface, Cu_w -	Zero
Passive side **(permanent)**	
Bulk unit weight, γ_b -	20 kN/m^3
Effective cohesion, c' -	Zero
Effective angle of internal friction, φ' -	22º
Friction at wall/soil interface, δ', -	½ φ'

6.29 For Surcharge loading it is necessary that the analyses take account of all lateral loadings arising from potential vehicle loading and any adjacent existing foundations.

6.30 Soil strengths and loads/actions should be factored in accordance with design code adopted.

FOUNDATION AND SERVICE EXCAVATIONS

6.31 From the evidence of the borehole, the excavations may require support against collapse of sides and a contingency for this should be allowed for at this stage.

6.32 Foundation and service excavations will be within MADE GROUND and normal health and safety considerations need to be met with regard to the contamination test results obtained during the current work.

6.33 A groundwater 'seepage' was observed within borehole BH1A at a depth of 5.90m below ground level. Standing groundwater was observed within borehole BH1B at a depth of 9.50m below ground level. On the return gas/groundwater monitoring visits to the installation fitted within borehole BH1B on 30th July and 10th August 2014 groundwater was recorded at depths of 3.39m and 3.27m below existing ground level.

6.34 Therefore, it is likely that groundwater will be encountered during shallow foundation or service excavations. A suitable dewatering system will need to be employed during the construction of the basement. Advice of a specialist dewatering contractor should be sought to confirm whether well-pointing will be adequate or whether other techniques will be required. It is very important that the base of foundation excavations is kept dry, the foundation base is kept square and that any soft spots are replaced and compacted prior to pouring foundation concrete. The associated Basement Impact Assessment (ref. BIA/4507) provides further guidance on this matter.

6.35 Furthermore, we recommend that where groundwater or surface water flows into foundation excavations, 'blinding' concrete is used at the base of the foundation excavations and that foundation concrete is poured as soon as possible thereafter.

BURIED CONCRETE

6.36 The results of the chemical analyses indicate that the samples tested would fall into Class DS-2 of the Building Research Establishments (BRE) classification system Special Digest Part 1:2005 "Concrete in aggressive ground".

6.37 Owing to the presence of selenite crystals found within the natural Clay material, we would recommend that a minimum of Class DS-2 conditions are adopted for any concrete mix design and that consideration is given to using "sulphate resisting cement" in concrete mix at this site.

PRELIMINARY CONTAMINATION ASSESSMENT

6.38 The National Planning Policy Framework contains the legislative framework for the regulation of Development on a site which "is affected by contamination or land stability issues". This legislation states that decisions should ensure that "the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation" and that "adequate site investigation information, prepared by a competent person, is presented." A Competent Person is defined as "a person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation". Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the "developer and/or landowner." It also states that "all investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175 (2001)."

6.39 For this ***Preliminary Contamination Assessment*** the site has been modelled using the Source-Pathway-Receptor approach to produce a Conceptual Site Model, presented in CSI Report DTS/3832, dated August 2013.

Source (substances or potential contaminants which may cause harm)

Pathway (a linkage route between the source and receptor)

Receptor (something which may be harmed by the source e.g. humans, plant, groundwater etc.)

Sources

6.40 From the historical information obtained during the current investigation, the site appears to have been occupied by the same two buildings since at least 1877-1878.

6.41 The buildings on-site were recently for commercial use by an electrical engineering company, which may indicate the presence of contaminants throughout the site which may pose a risk to future users of the site. However, the risk is considered to be '**low**' due of the presence of hard standing across the site. Additionally, the proposed extension of basements during development will remove any near surface contamination that may be present. Additionally, no off-site sources of contamination were identified Phase I investigation.

6.42 However, although to the risk to future residents was considered to be '**low**', chemical testing of the underlying soils was recommended to assess the risk to construction/ground workers during the development. Gas monitoring was also recommended to assess the risk from ground gas emissions.

Pathways

6.43 The proposed development will comprise the renovation of two commercial units into residential buildings, including the addition of basement levels.

6.44 Any contamination could reach the receptors by a number of routes, including direct contact with the soils via ingestion, inhalation or dermal contact. This is more likely to affect construction workers rather than end users, due to the presence of hard standing across the site and no proposed soft landscaping.

6.45 Gas pathways may be present via preferential pathways, such as service and drainage runs.

Receptors

6.46 From the results of the desk study and the intended end site use the following potential receptors have been identified. The following potential receptors have been identified:

- *Construction workers on the site likely to come into contact with the soils.*
- *Structures.*
- *Neighbours.*
- *Future users of the development, including young children.*

6.47 It should be noted that the CLEA software has limited functionality and contains algorithms, which the EA has publicly expressed its intention to update. As a consequence of this, some of the screening values generated by the CLEA software may not adequately reflect specific site conditions and in some instances are unduly conservative. In addition, it should also be noted that the figures given in the appended table are based on a 6% soil organic matter content.

6.48 The DEFRA/EA model has been developed on the basis of many critical assumptions about possible exposure to soil contamination and the development of conceptual exposure models to describe different land uses as follows:

Residential with plant uptake	Mainly refers to residential gardens in which vegetables are grown.
Residential without plant uptake	Refers to areas which have gardens (e.g. blocks of flats) but without vegetable uptake.
Open Spaces	Areas of open space only – not allocated for any specific usage.
Commercial/Industrial	Commercial/industrial usage where there are open areas which are not hard surfaced.

6.49 The Contaminated Land Exposure Assessment (CLEA) model was originally published in March 2002 as joint DEFRA/EA publications; Contaminated Land Research (CLR) Report CLR 11, with Report CLR7 as a supporting document, providing toxicity data and human tolerable daily intake (TDI) data to be used with this model. This model enabled the derivation of more site-specific values for contaminants present on a site, rather than the use of 'generic' values, which were previously used.

6.50 DEFRA/EA previously published a number of Soil Guideline Values (SGVs) for certain determinands, (common toxic metals), which were generic guideline criteria for assessing the risks to human health from chronic exposure to soil contamination for standard land-use functions. However, these were withdrawn in late 2008 and DEFRA/EA have now issued a new set of guidance documents. With regard to the Chelmer Site Investigations Laboratories Limited standard suite of tests, currently SGV figures have only been issued for Arsenic, Cadmium, Mercury, Nickel, Phenols and Selenium.

6.51 In the absence of currently published SGV values for the remaining contaminants, Messrs. W. S. Atkins have derived ATRISK^{soil} Soil Screening Values (SSVs) based on the new 2009 guidance (SC050021/SR3 (the CLEA Report) and SC050021/SR2 (the TOX report)) for commercial/industrial, residential without homegrown produce, residential with homegrown produce and allotment land uses. These have been based on the default assumptions provided in the CLEA report which it is understand will be used in the development of future Soil Guideline Values by DEFRA and the Environment Agency. Atkins SSVs have been derived in line with the new guidance using CLEA model v1.04. As the inhalation of vapour pathway contributes less than ten percent of total exposure, this is unlikely to significantly affect the combined assessment criterion and the SSV values used are the combined assessment criterion given by CLEA if free product is not observed.

6.52 Neither CLEA or ATRISK currently publish values for Hexavalent Chromium. Therefore, both Total Chromium and Hexavalent Chromium values have been compared against the Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) Generic Assessment Criteria published in 2009 and based on CLEA v1.04 with Total Chromium values based on Chromium III.

6.53 The SGV and SSV levels represent "intervention" levels above which the levels of contamination may pose an unacceptable risk to the health of site-users such that further investigation and/or remediation is required.

6.54 Total Petroleum Hydrocarbons are considered in accordance with the fractions proposed by The Environment Agency, drawing on the TPHCWG methodology. These are contained in Table 4.2 – Petroleum hydrocarbon fractions for use in UK human health risk assessment, based on Equivalent Carbon (EC) number, contained in Science Report P5-080/TR3, *The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils.*

6.55 In the 2011 updates, Atkins released Water Screening Values (WSVs) to assess chronic human health exposure from the inhalation of vapours of contaminants in shallow groundwater or perched water. Only vapour pathways are applicable to the WSVs and therefore no dermal or ingestion pathways are considered. In addition, the WSVs are based on a human health receptor and are not applicable for assessing Controlled Waters receptors.

6.56 Considering the end usage of the site, the chemical results would generally be compared against the ***Residential without Plant Uptake*** criteria.

ASSESSMENT OF RESULTS

Soils

6.57 Three lead concentrations of 736mg/kg, 503mg/kg and 739mg/kg from BH1A, BH1B and BH1B respectively exceeded the ATRISK Contaminated Land Screening Values (SSVs) of 444mg/kg.

6.58 No other constituents within the soil exceed the criteria set out by the ATRISK Contaminated Land Screening Values (SSVs), the CLEA Soil Guideline Values (SGVs) and the LQM/CIEH Generic Assessment Criteria (GAC) for *Residential without plant uptake* criteria.

6.59 Although elevated lead concentrations were identified within the underlying MADE GROUND, due to the lack of proposed soft landscaping areas or garden areas, and the removal of near surface soils during the proposed basement development, the risk to future residents is considered to be '**low**'. No further works are therefore considered necessary with regards to contaminated land.

LANDBORNE GAS EMISSIONS

6.60 During the return gas/groundwater monitoring visit, the maximum concentration of methane was recorded at 0.1%v/v and the maximum carbon dioxide concentration was recorded at 1.1v/v. A maximum flow rate of 0.6l/hr was recorded.

6.61 The full land-borne gas assessment details are appended.

6.62 Due to the concentrations and associated low flow rates identified during the initial two monitoring visits, it was decided to assess whether further visits would be required. This was undertaken using guidance from BS 8576:2013 Annex F to assess the sufficiency of the data.

6.63 From the results obtained to date, the likely risk associated with ground gas is Characteristic Situation 1, taking worst case as:

1.1%v/v x 0.6 l/hr = 0.0066 l/hr (maximum limit is 0.07 l/hr)

- Keeping the flow rate at 0.6 l/hr, the gas concentration would have to increase to 11.7%v/v, 11 times as much as previously recorded, to move into CS 2.

- Keeping the same concentration, worst case recorded 1.1%v/v, the flow would have to increase to 6.4 l/hr, 11 times greater than the worst case identified.

6.64 It should also be noted that the second monitoring visit was undertaken during a period of low pressure and thus the results may represent 'worst case'. The above required large increases in flow rates and gas concentrations that would be required to increase the risk from ground gases are not considered to be feasible. It is therefore considered that further gas monitoring is not required and the site would thus be classified as **GREEN**, or **Characteristic Situation 1.** This should however be agreed with the Local Authority prior to development.

WASTE ACCEPTANCE CRITERIA

6.65 A single EN 14473/02 Waste Acceptance Criteria (WAC) test was undertaken from the MADE GROUND from BH1B at a depth of 1.50m bgl and the certificate pertaining to this has been appended to this report.

6.66 The result of the WAC test indicates that this sample would probably be classified as "Hazardous Waste" material. This is considered to represent the MADE GROUND across the site. Full details of the results are given on the appended results sheets.

6.67 However, it should be noted that Chelmer Site Investigation Laboratories Ltd are not a licensed landfill operator and we therefore strongly recommend that the WAC data should be presented to potential Waste Management Companies in order for them to confirm the waste classification of surplus soils to be removed from this site and to determine its acceptability at appropriate landfill sites for disposal/treatment.

UPDATED CONCEPTUAL MODEL

6.68 The following diagram summaries the potential pollution linkages identified for this site in the form of an updated diagrammatic Conceptual Model.

CIRIA Contaminated Land Risk Assessment Table

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

*Extracted from CIRIA Publication C552 Contaminated Land Risk Assessment

Source	Potential Contaminants	Receptors	Pathways	Associated Hazard (Severity)	Likelihood of occurrence	Potential Risk	Notes
On-site -MADE GROUND -Historic uses	Heavy Metals TPHs PAHs Ground Gases	Sites Users Neighbours	Direct contact, ingestion	Medium	Unlikely	Low	No proposed soft landscaping and removal of underlying soil during basement development reduces exposure to future site residents.
			Inhalation of vapours (acute)	Severe	Unlikely	Moderate/Low	Possible risk present.
			Inhalation of vapours (chronic)	Medium	Unlikely	Low	Possible risk present.
			Ingestion of contaminated water through water main pipework	Medium	Unlikely	Low	No proposed soft landscaping and removal of underlying soil during basement development reduces exposure to future site residents.
		Construction Workers	Direct contact, ingestion	Medium	Low Likelihood	Moderate/Low	Possible risk present.
		Surface Water	Leaching, lateral migration of shallow groundwater	Medium	Unlikely	Low	Low risk due to no nearby surface water.
		Groundwater	Leaching, migration through granular material	Medium	Unlikely	Low	Removal of underlying soil during basement development reduces risk
		Services	Direct contact	Medium	Unlikely	Low	No proposed soft landscaping and removal of underlying soil during basement development reduces exposure to future site residents.

Additional Comments

6.69 Due to the elevated concentrations identified, any excavated material at this site may pose a '**moderate'** hazard to ground workers as far as Health and Safety is concerned. We would therefore recommend that standard Health and Safety precautions be taken with regard to ground workers at this site. These should include PPE equipment such as gloves, overalls etc. to prevent dermal contact with the soils. Washing facilities should be made available on-site to reduce extended contact with site soils. During the construction phase, dust suppression measures may be required to minimise potential inhalation of dust by neighbours or ground workers.

6.70 An Asbestos Management Survey is recommended to be undertaken prior to development at the site.

6.71 As always, the above recommendations are based on a selected number of representative samples and further testing may be required if any other contamination is suspected or encountered during future ground works.

6.72 With regard to the installation of any future water supply pipe work, reference should be made to the Water Regulations Advisory Service (WRAS) information and guidance note, The Selection of Materials for Water Supply Pipes to be Laid in Contaminated Land. It is recommended that the results of the contamination testing undertaken on the site should be provided to the water supplier in order to ensure that any pipe provided complies with their requirements.

Prepared By : Jack Hunter BSc (Hons)
Geo-environmental Engineer

Prepared By : Nicolas Dieu BEng (Hons)
Geotechnical Engineer

END OF REPORT

a) This report has been prepared for the purpose of providing advice to the client pursuant to its appointment of Chelmer Site Investigation Laboratories Limited (CSI) to act as a consultant.
b) Save for the client no duty is undertaken or warranty or representation made to any party in respect of the opinions, advice, recommendations or conclusions herein set out.
c) All work carried out in preparing this report has used, and is based upon, our professional knowledge and understanding of the current relevant English and European Community standards, approved codes of practice, technology and legislation.
d) Changes in the above may cause the opinion, advice, recommendations or conclusions set out in this report to become inappropriate or incorrect. However, in giving its opinions, advice, recommendations and conclusions, CSI has considered pending changes to environmental legislation and regulations of which it is currently aware. Following delivery of this report, we will have no obligation to advise the client of any such changes, or of their repercussions.
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f) The content of this report represents the professional opinion of experienced environmental consultants. CSI does not provide specialist legal advice and the advice of lawyers may be required.
g) In the Summary and Recommendations sections of this report, CSI has set out our key findings and provided a summary and overview of our advice, opinions and recommendations. However, other parts of this report will often indicate the limitations of the information obtained by CSI and therefore any advice, opinions or recommendations set out in the Executive Summary, Summary and Recommendations sections ought not to be relied upon unless they are considered in the context of the whole report.
h) The assessments made in this report are based on the ground conditions as revealed by walkover survey and/or intrusive investigations, together with the results of any field or laboratory testing or chemical analysis undertaken and other relevant data, which may have been obtained including previous site investigations. In any event, ground contamination often exists as small discrete areas of contamination (hot spots) and there can be no certainty that any or all such areas have been located and/or sampled.
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l) Comments on groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. Groundwater conditions may vary due to seasonal or other effects.
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Chelmer Site Investigations
Unit 15 East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
Telephone: 01245 400930 Fax: 01245 400933
Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

Chelmer Site Investigations

Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Weather:** Internal	**Date:** 22.05.14
Site: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Borehole No:** 1	**Boring method:** CFA 100mmØ Secondman	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
G.L.	CONCRETE	0.2					No roots observed.		
0.2	MADE GROUND: medium compact to compact, dark brown, sandy, very silty clay with brick and concrete rubble.	0.7		D					0.5
0.9	Borehole ends at 0.9 m obstruction. (Suspect concrete)Too dense for drill to penetrate.								

Drawn by: TP **Approved by:** ME

Remarks: *Borehole dry and open on completion.*

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

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Unit 15 East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
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Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Weather:** Internal	**Date:** 03.07.14
Site: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Borehole No:** 1A	**Boring method:** CFA 100mm Secondman	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
F.L.	CONCRETE	0.15							
0.15	MADE GROUND: medium compact to compact, dark brown, gravelly silt with numerous pieces of brick.	0.85					No roots observed.		
0.5				D					0.5
	MADE GROUND: medium compact to compact, moist, dark brown, clayey gravelly silt with numerous brick fragments.	1.5		D	M	50(20) 50(10) TDTD			1.0
				D					1.5
2.0	Borehole abandoned at 2.0 m. Obstruction thought to be made ground. Too dense for drill to penetrate.			D	M	50(15) 50(10) TDTD			2.0

Drawn by: MM **Approved by:** ME

Remarks: *Borehole moist and open on completion.*

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

Chelmer Site Investigations
Unit 15 East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
Telephone: 01245 400930 Fax: 01245 400933
Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Weather:** Internal	**Date:** 18.07.14
Site: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Borehole No:** 1B	**Boring method:** GEO 205 150mmØ CFA	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
G.L.	CONCRETE	0.075							
0.075	MADE GROUND: medium compact to compact crushed and whole brick.	0.225		D			No roots observed.		0.5
0.3	MADE GROUND: medium compact to compact, mid brown, gravelly silty coarse sand with numerous brick rubble/fragments.	0.7		D					1.0
1.0	MADE GROUND: medium compact, moist, pungent, black gravelly, very silty clay with occasional brick fragments.	3.4		D	CPT	N = 18			1.5
				D					2.0
				D					2.5
				D	CPT	N = 17			3.0
				D					3.5
				D					4.0
4.4	MADE GROUND: medium compact to compact, dark grey gravelly silty clay with occasional brick fragments.	1.0		D	CPT	N = 35			4.5
				D					5.0
5.4	MADE GROUND: medium compact, mid grey silty clay with occasional brick fragments.	0.5		D					5.5
5.9	Stiff, mid brown, mottled grey silty CLAY with partings of brown and grey silt and fine sand and crystals.	1.6		D	SPT	N = 20		*5.9*	6.0
				D					7.0
7.5	Stiff, mid grey, silty CLAY with partings of grey silt and fine sand and crystals. Becoming stiff from 8.8m.	2.5			SPT	N = 26			7.5
				D					8.0
				D	SPT	N = 40			9.0
								9.5	
10.0	Borehole ends at 10.0m			D					10.0

Drawn by: MM **Approved by:** ME

Remarks: *Groundwater seepage at 5.9m.*
Groundwater standing at 9.5m on completion.
Borehole open on completion.
Standpipe installed to 8.0m.

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

Chelmer Site Investigations
Unit 15 East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
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Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

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Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Weather:** Internal	**Date:** 22.05.14
Site: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Borehole No:** 2	**Boring method:** CFA 100mmØ Secondman	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
G.L.	CONCRETE	0.2					No roots observed.		
0.2	MADE GROUND: medium compact to compact, dark brown, sandy, very silty clay with brick and concrete rubble.	0.7		D					0.5
0.9	Borehole ends at 0.9 m obstruction. (Suspect concrete)Too dense for drill to penetrate.								

Drawn by: TP **Approved by:** ME

Remarks: *Borehole dry and open on completion.*

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

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Telephone: 01245 400930 Fax: 01245 400933
Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

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Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Weather:** Internal	**Date:** 22.05.14
Site: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Borehole No:** 3	**Boring method:** CFA 100mmØ Secondman	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
G.L.	CONCRETE	0.2					No roots observed.		
0.2	MADE GROUND: medium compact to compact, dark brown, sandy, very silty clay with brick and concrete rubble.	0.7		D					0.5
0.9	Borehole ends at 0.9 m obstruction. (Suspect concrete)Too dense for drill to penetrate.								

Drawn by: TP **Approved by:** ME

Remarks: *Borehole dry and open on completion.*

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

Chelmer Site Investigations
Unit 15 East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
Telephone: 01245 400930 Fax: 01245 400933
Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

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Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Weather:** Internal	**Date:** 22.05.14
Site: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Borehole No:** 4	**Boring method:** CFA 100mmØ Secondman	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
G.L.	CONCRETE	0.2					No roots observed.		
0.2	MADE GROUND: medium compact to compact, dark brown, sandy, very silty clay with brick and concrete rubble.	0.7		D					0.5
0.9	Borehole ends at 0.9 m obstruction. (Suspect concrete)Too dense for drill to penetrate.								

Drawn by: TP **Approved by:** ME

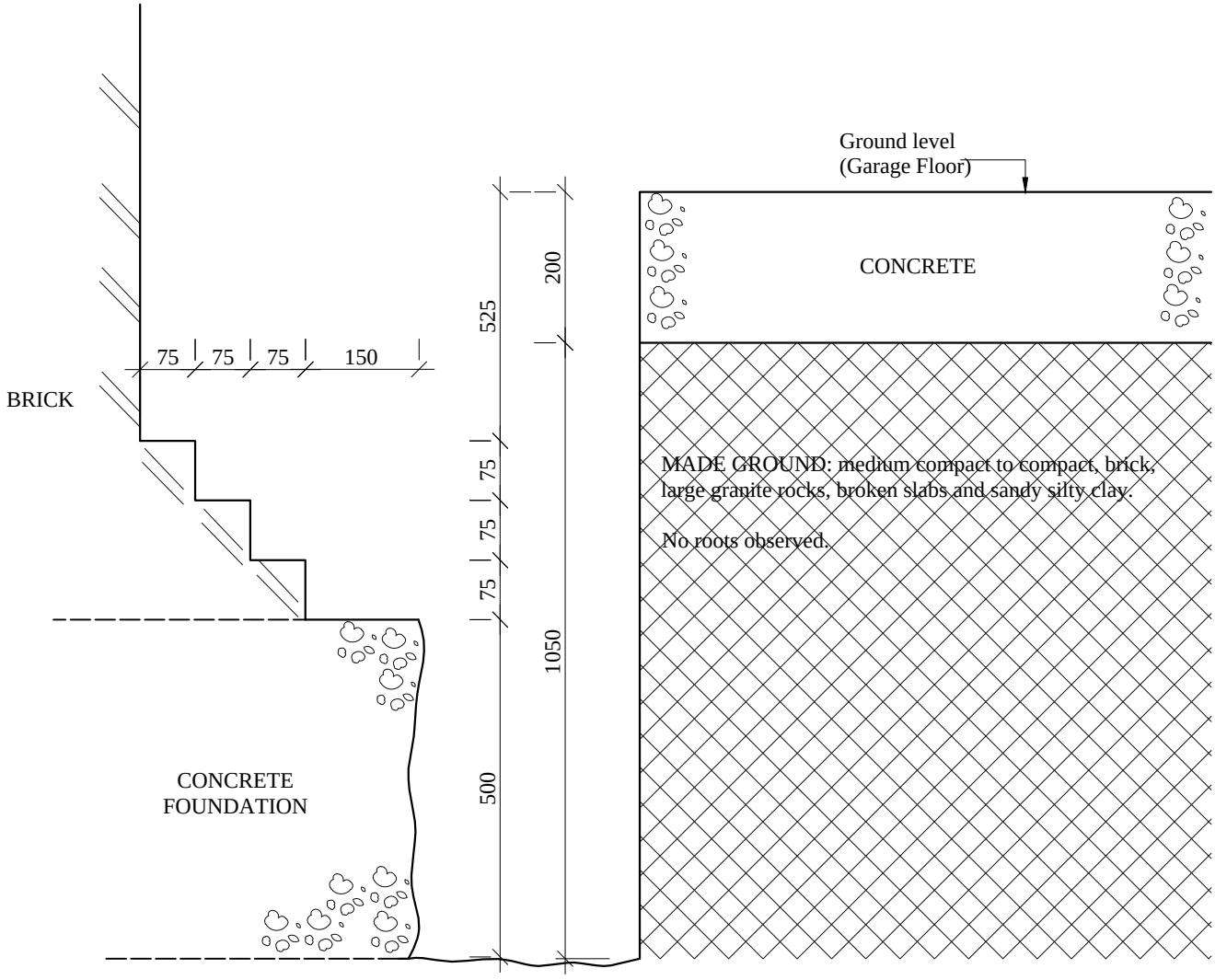
Remarks: *Borehole dry and open on completion.*

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

Chelmer Site Investigations
Unit 15 East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
Telephone: 01245 400930 Fax: 01245 400933
Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 1 of 2	**Date:** 22.05.14
Location: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Trial Pit No:** 1	**Weather:** Internal
Excavation Method: Hand Tools		**Drawn by:** MG	**Checked by:** ME

SECTION A



TP1A ABORTED AT 1250mm
DUE TO LARGE RUBBLE UNABLE TO ESTABLISH U/S FOUNDATION

Remarks:

Key:

D Small disturbed sample	**J** Jar sample
B Bulk disturbed sample	**V** Pilcon Vane (kPa)
U Undisturbed sample (U100)	**M** Mackintosh Probe
N Standard Penetration Test Blow Count	**W** Water Sample

Chelmer Site Investigations
Unit 15 East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
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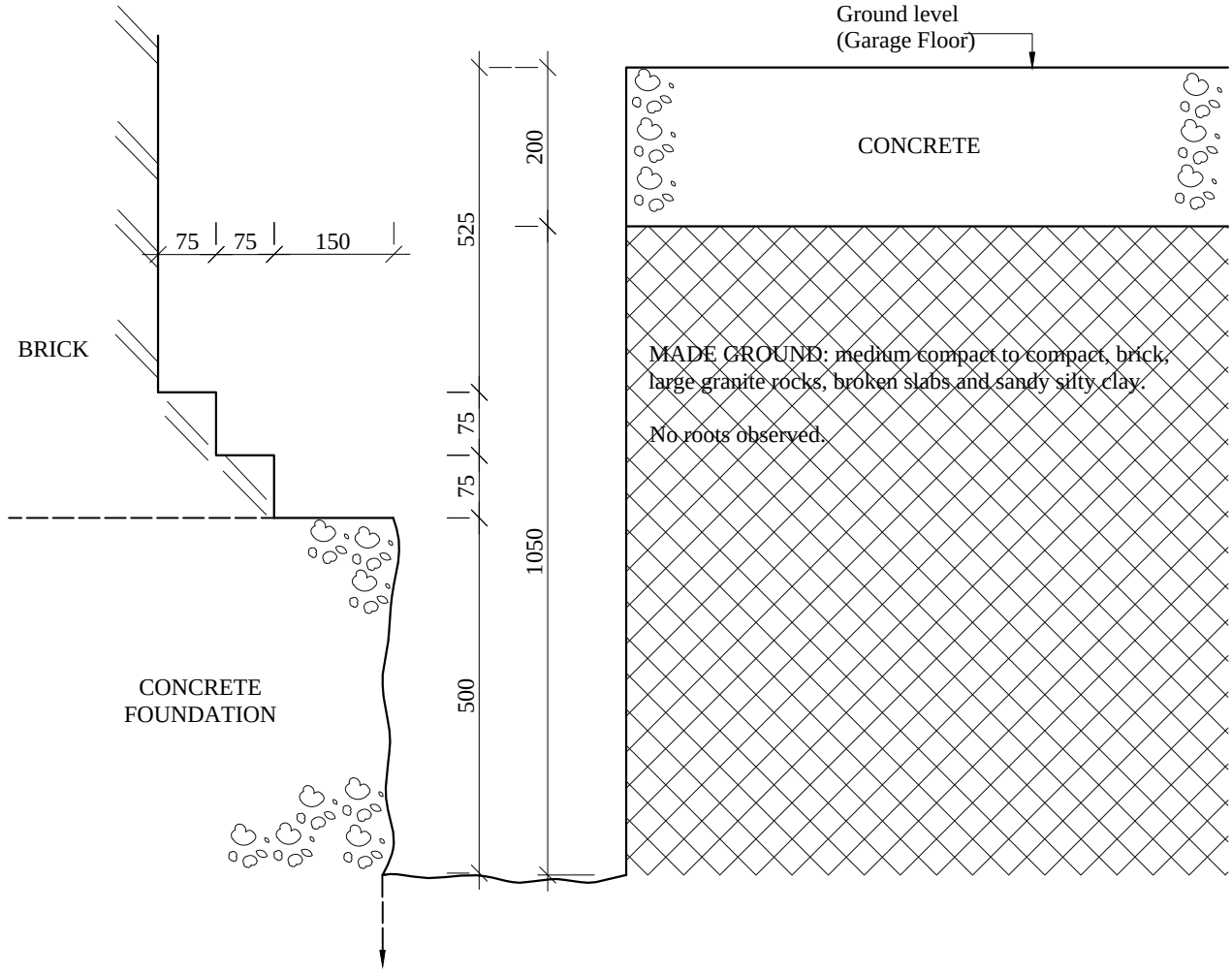
Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 2 of 2	**Date:** 22.05.14
Location: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Trial Pit No:** 1	**Weather:** Internal
Excavation Method: Hand Tools		**Drawn by:** MG	**Checked by:** ME

SECTION B



TP1 SECTION-B ABORTED AT 1250mm
DUE TO LARGE RUBBLE UNABLE TO ESTABLISH U/S FOUNDATION

Remarks:

Key:
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample (U100)
N Standard Penetration Test Blow Count
J Jar sample
V Pilcon Vane (kPa)
M Mackintosh Probe
W Water Sample

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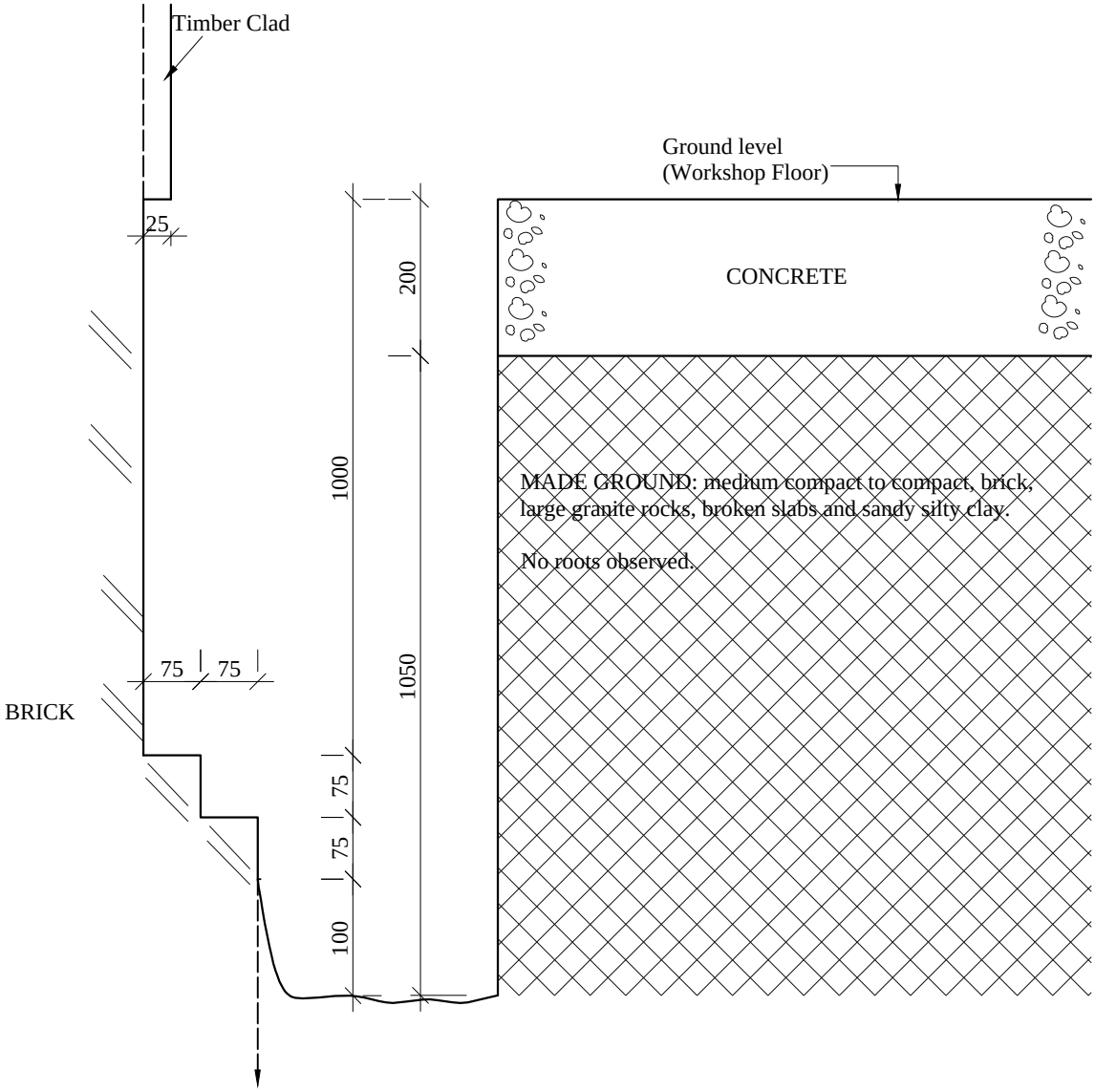
Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 1 of 2	**Date:** 22.05.14
Location: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Trial Pit No:** 4	**Weather:** Internal
Excavation Method: Hand Tools		**Drawn by:** MG	**Checked by:** ME

SECTION A



TP4 SECTION-A ABORTED AT 1250mm
DUE TO MAINS SERVICES AND LARGE RUBBLE UNABLE TO ESTABLISH U/S FOUNDATION

Remarks:

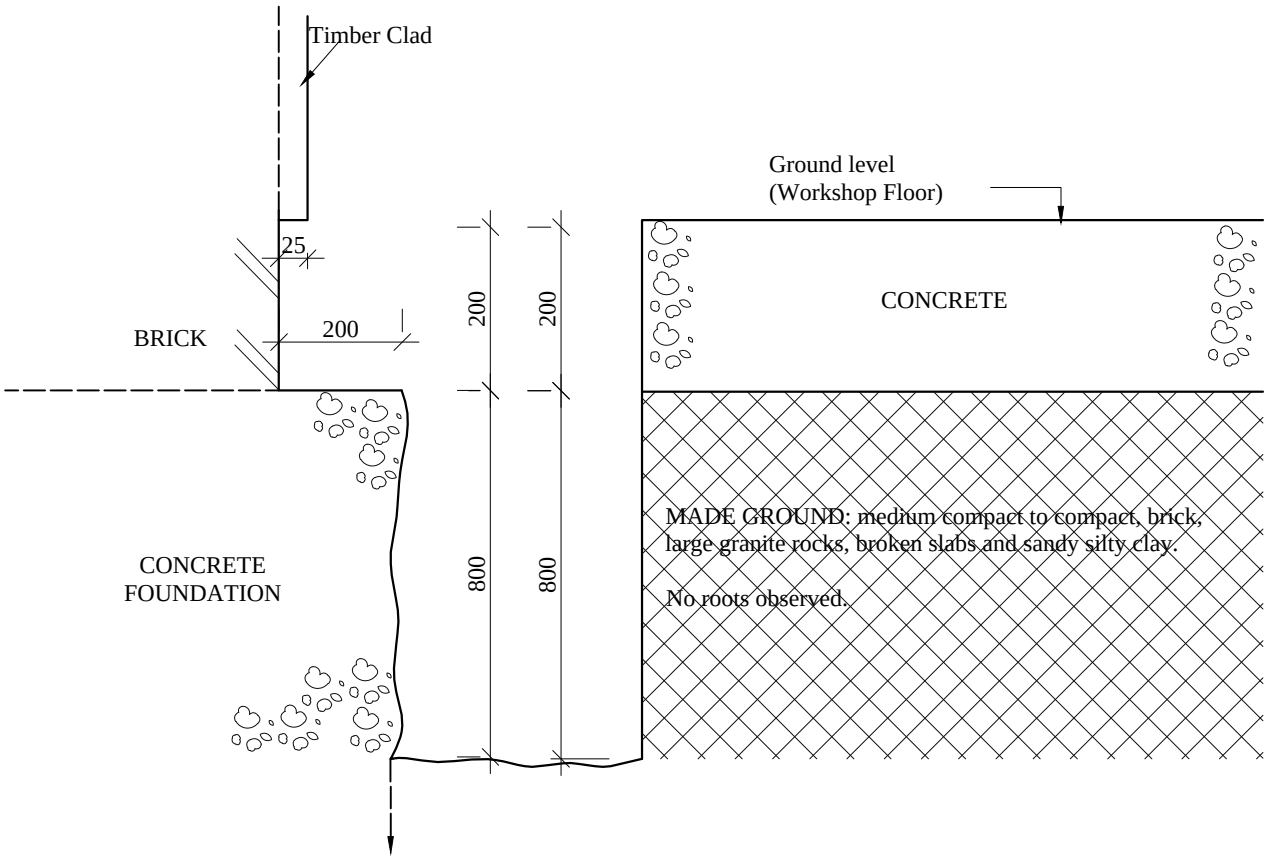
Key:
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample (U100)
N Standard Penetration Test Blow Count
J Jar sample
V Pilcon Vane (kPa)
M Mackintosh Probe
W Water Sample

Chelmer Site Investigations
Unit 15 East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
Telephone: 01245 400930 Fax: 01245 400933
Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

Client: Wandsworth Sand and Stone LTD	**Scale:** N.T.S.	**Sheet No:** 2 of 2	**Date:** 22.05.14
Location: 13-15 Johns Mews, London, WC1N 2PA	**Job No:** 4507	**Trial Pit No:** 4	**Weather:** Internal
Excavation Method: Hand Tools		**Drawn by:** MG	**Checked by:** ME

SECTION B

FRONT WALL ELEVATION



TP4 SECTION-B ABORTED AT 1000mm
DUE TO MAINS SERVICES AND LARGE RUBBLE UNABLE TO ESTABLISH U/S FOUNDATION

Remarks:

Key:
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample (U100)
N Standard Penetration Test Blow Count
J Jar sample
V Pilcon Vane (kPa)
M Mackintosh Probe
W Water Sample

Chelmer Consultancy Services
Unit 15, East Hanningfield Industrial Estate, Old Church Road
East Hanningfield, Essex CM3 8AB
Telephone: 01245 400 930 Fax: 01245 400 933
Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

Landborne Gas Assessment

Site Ref: 4507
Site Name: 13-15 Johns Mews, London, WC1N 2PA

Well	Date	Methane Peak	Methane Steady	Methane GSV	Carbon Dioxide Peak	Carbon Dioxide Steady	Carbon Dioxide GSV	Oxygen	Atmos.	Flow	Response Zone	Depth to Water	CO	H2S
		%v/v	%v/v	l/hr	%v/v	%v/v	l/hr	%v/v	mbar	l/hr	m bgl	m bgl	ppm	ppm
BH1B	30/07/2014	0.1	<0.1	0.0005	0.1	0.1	0.0005	20.5	1015	0.5	1.00-8.00	3.39	0	0
	10/08/2014	0.1	0.1	0.0006	1.1	0.8	0.0066	18.8	997	0.6		3.27	0	0

Notes

NR = Not recorded
Values in Bold exceed the CO_2 Building Regulations threshold (>1.5%)
Values in Red exceed the Buildings Regulations Action Level (CO_2 >5.0% and CH_4 >1.5%)

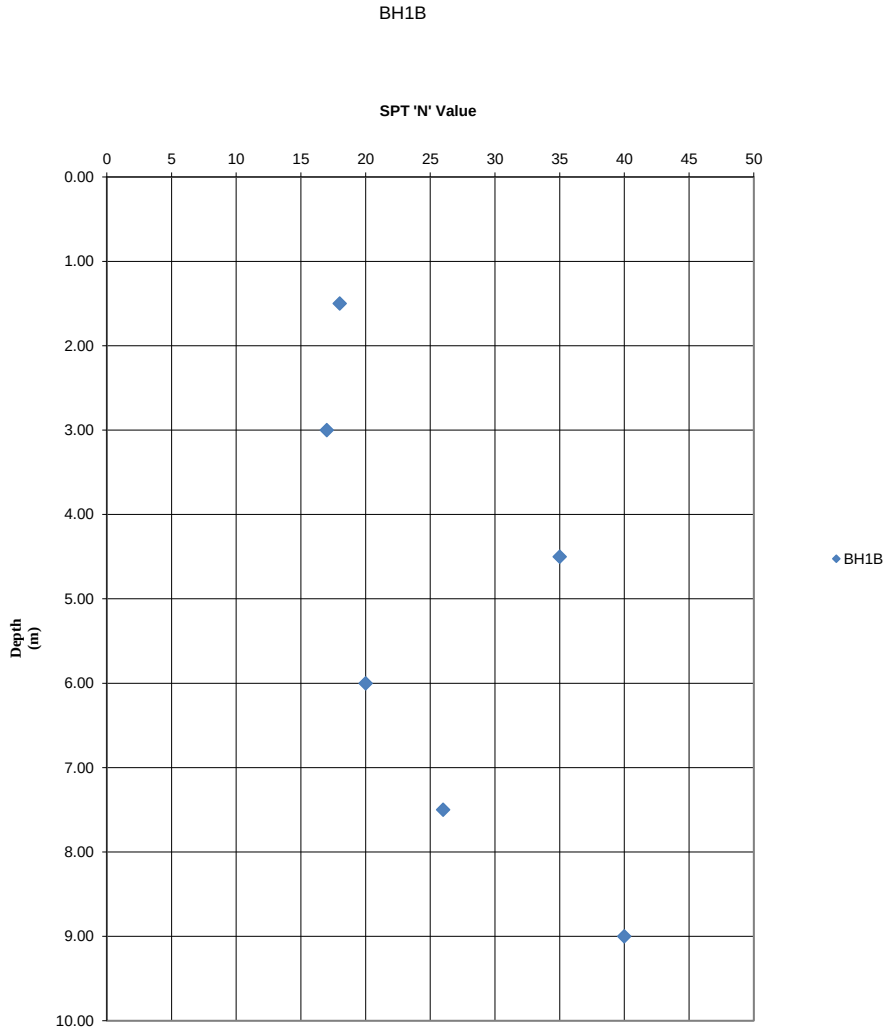
CHELMER SITE INVESTIGATIONS	Penetration Test versus Depth Profile	Unit 15, East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB Tel - (01245 400930) Fax - (01245 400933)

Project Name :	13-15 John's Mews, London WC1N 2PA	Job No. :	GEO 4507
		Date :	September 2014

BH1B

Depth (m)	CPT/SPT 'N' value	Depth (m)	CPT/SPT N' value	Depth (m)	CPT/SPT N' value
1.50	18				
3.00	17				
4.50	35				
6.00	20				
7.50	26				
9.00	40				

NB : 'N' values greater than 50 reported as 50 above



Chelmer Geotechnical Laboratories

Unit 15, East Hanningfield Industrial Estate

Old Church Road, East Hanningfield, Essex CM3 8AB

Telephone: 01245 400 930 **Fax:** 01245 400 933

Email: info@siteinvestigations.co.uk **Website**: www.soillabs.co.uk

Geotechnical Testing

Client : Wandsworth Sand and Stone Ltd

Site Name : 13-15 Johns Mews, London WC1N 2PA

Client Reference : CSI4507

CGL Reference : CGL04289

Date of Completion : 13-Aug

UKAS TESTING
8284

Chelmer Geotechnical Laboratories

Content Summary

This report contains all test results indicated on the attached test instruction/summary (Q17).

CGL Reference :	CGL04289
Client Reference :	CSI4507
For the attention of :	Wandsworth Sand and Stone Ltd
This report comprises of the following :	1 Page of Results
	1 Moisture/Shear Strength Chart
	1 Plasticity Chart

Notes :

General

Please refer to report summary notes for details pertaining to methods undertaken and their subsequent accreditations

Samples were supplied by Chelmer Site Investigations

All tests performed in-house unless otherwise stated

Deviant Samples

Samples were received in suitable containers	Yes
A date and time of sampling was provided	Yes
Arrived damaged and/or denatured	No

Laboratory Testing Results

BS 1377 : 1990

Chelmer Geotechnical Laboratories

Job Number : CGL04289
Client : Wandsworth Sand and Stone Ltd
Client Reference : CSI4507
Site Name : 13-15 Johns Mews, London WC1N 2PA

Date Received : 30/07/2014
Date Testing Started : 08/08/2014
Date Testing Completed : 13/08/2014
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref				Moisture Content (%) [1]	Soil Faction > 0.425mm (%) [2]	Liquid Limit (%) [3]	Plastic Limit (%) [4]	Plasticity Index (%) [5]	Liquidity Index (%) [5]	Modified Plasticity Index (%) [6]	Soil Class [7]	Filter Paper Contact Time (h) [8]	Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	pH Value [11]	Sulphate Content		
BH/TP/WS	Depth	UID	Sample Type														SO_3 [12]	SO_4 [13]	Class [14]
1B	7.0	55860	D	33	<5	80	18	62	0.24	62	CV								
1B	8.0	55862	D	28	<5	68	14	54	0.26	54	CH					7.9	0.82	0.99	DS-2
1B	9.0	55863	D	28	<5	67	16	51	0.22	51	CH								
1B	10.0	55864	D													8.1	0.66	0.79	DS-2

Notes :-

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Site Investigations using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D	Disturbed sample
B	Bulk sample
U	U100 (undisturbed sample)
W	Water sample
ENP	Essentially Non-Plastic
U/S	Underside Foundation

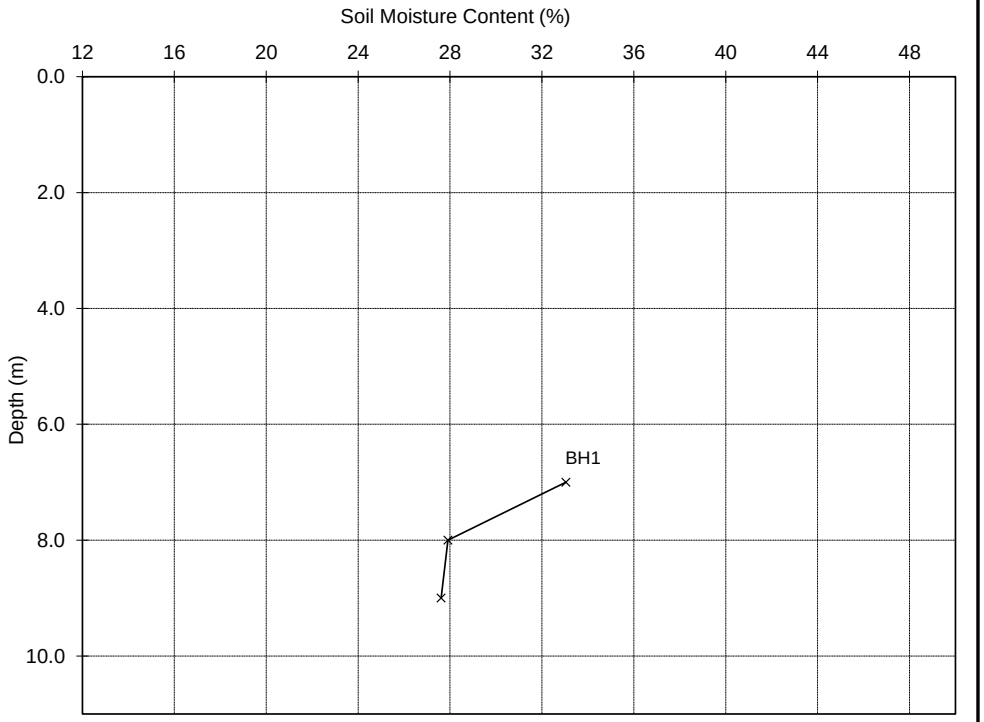
Comments :-

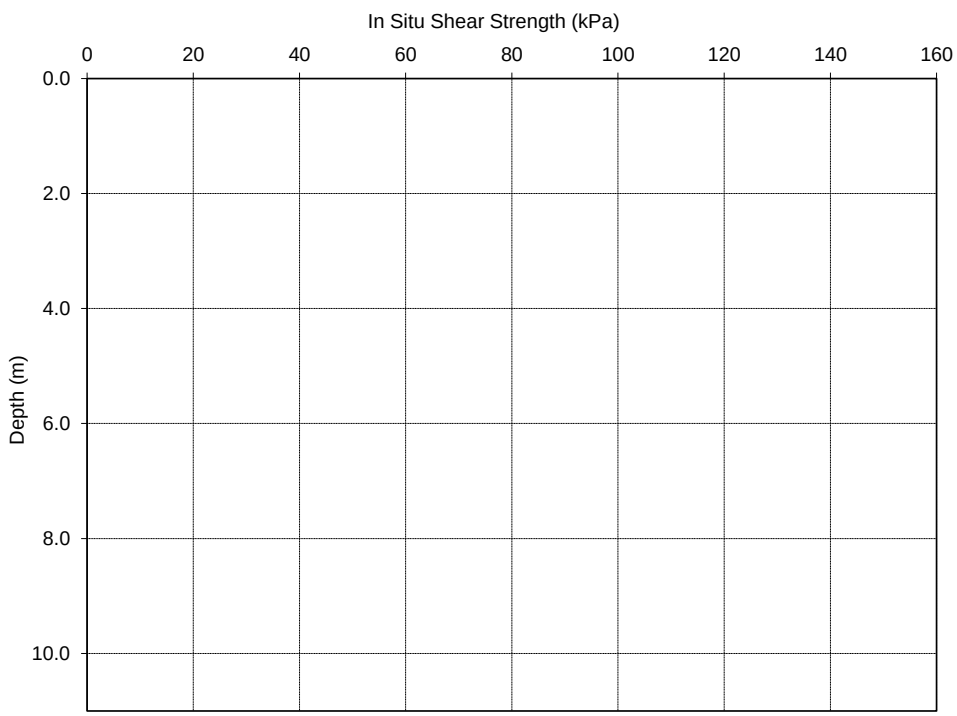
Technician :- MT
Checked By :- ME
Date Checked :- 13-Aug-14

Laboratory Testing Results

Moisture Content/Shear Strength Profile

Job Number :	CGL04289	Date Received :	30/07/2014
Client :	Wandsworth Sand and Stone Ltd	Date Testing Started :	08/08/2014
Client Reference :	CSI4507	Date Testing Completed :	13/08/2014
Site Name :	13-15 Johns Mews, London WC1N 2PA	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB





Notes :-

1. If the Soil Fraction > 0.425mm exceeds 5% the Equivalent Moisture Content of the remainder (calculated in accordance with BS 1377: Part 2 : 1990, cl.3.2.4 note 1) is also plotted and the alternative profile additionally shown as an appropriately coloured broken line.
2. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly over consolidated clays) at shallow depths.

Unless otherwise stated, values of Shear Strength were determined in situ by Chelmer Site Investigations using a Pilcon Hand Vane the calibration of which is limited to a maximum reading of 140 kPa.

Comments :-

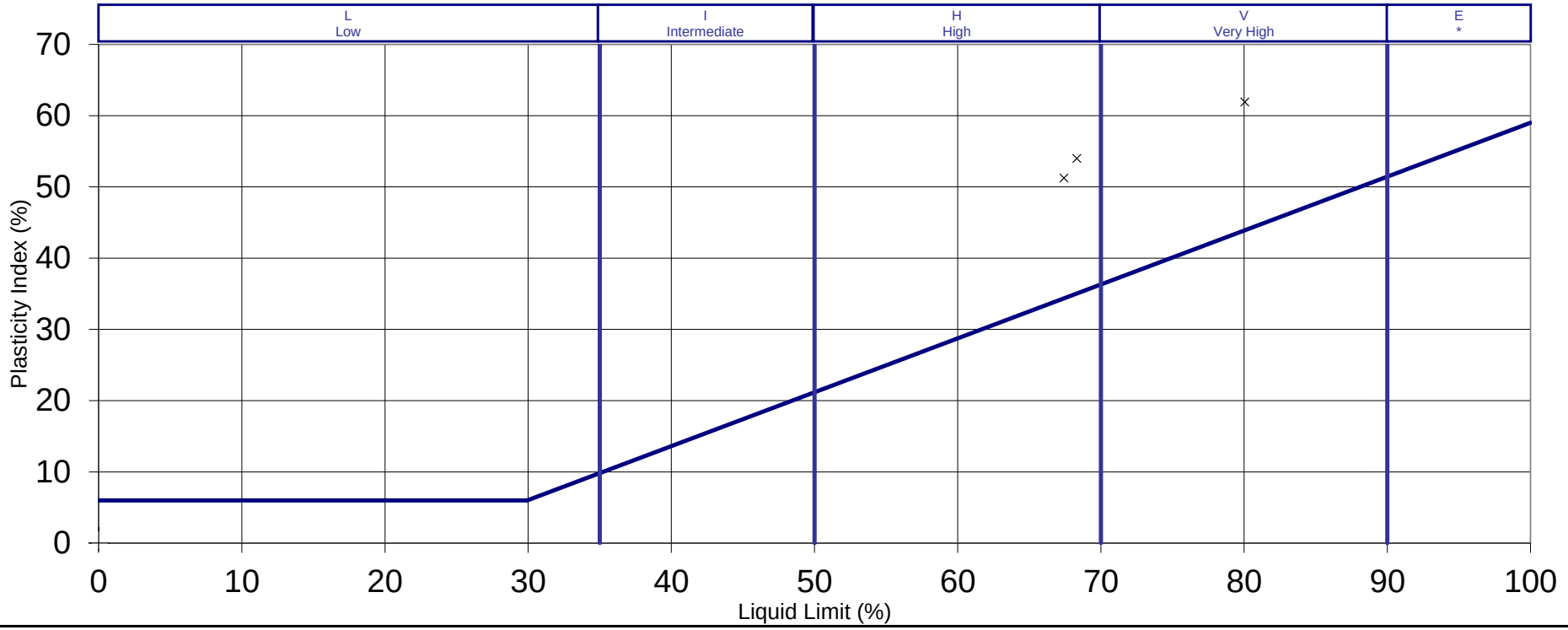
Checked By :- ME Date Checked :- 13-Aug-14

Laboratory Testing Results

Plasticity Chart for the classification of fine soils and the finer part of coarse soils
In Compliance with BS5930 : 1999

Chelmer Geotechnical Laboratories

Job Number :	CGL04289	Date Received :	30/07/2014
Client :	Wandsworth Sand and Stone Ltd	Date Testing Started :	08/08/2014
Client Reference :	CSI4507	Date Testing Completed :	13/08/2014
Site Name :	13-15 Johns Mews, London WC1N 2PA	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB



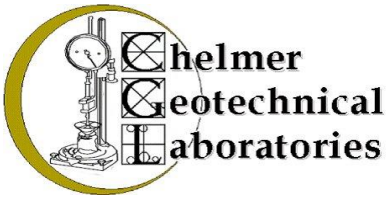
Notes :-

SILT (M-SOIL), M, plots below A-Line
CLAY, C, plots above A-Line }M and C may be combined as FINE SOIL, F.

Key :- BH1

Comments :-

Checked By :- ME Date Checked :- 13-Aug-14



Where our involvement consists exclusively of testing samples, the results and comments (if provided) relate only to the samples tested.

Any samples that are deemed to be subject to deviation will be recorded as such within the test summary.

Nicholls Colton Analytical
7 - 11 Harding Street
Leicester
LE1 4DH

Chelmer Site Investigations
Unit 15
East Hanningfield Industrial Estate
CM3 8AB

Analytical Test Report:	**L14/1556/CSI/001 - Amendment A**

Your Project Reference:	**Johns Mews**	Samples Received on:	01.08.2014
Your Order Number:	CSI4507	Testing Instruction Received:	01.08.2014
Report Issue Number:	1	Sample Tested :	01 to 12.08.2014
Samples Analysed	4 Soils	Report issued:	13.08.2014

Signed

James Gane
Manager - Data Logistics
Nicholls Colton Analytical

Notes:

General

Please refer to Methodologies tab for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report .

Moisture Content was determined in accordance with NCA method statement MS - CL - Sample Prep, oven dried at <30˚C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Stone Content was determined in accordance with NCA method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

With the exception of Sulphate, Sulpur and LoI which are crushed over the 2mm test sieve, concentrations are reported as a percentage mass of the dry soil passing the 10mm BS test sieve. As received samples have been corrected for moisture content but not stone content.

Samples were supplied by customer.

Deviant Samples

Samples were received in suitable containers	**Yes**
A date and time of sampling was provided	**Yes**
Some sample handling times were exceeded prior to analysis of determinants	**Yes**

Where samples do not meet one or more of the above criteria they will be classed as deviant, this means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

WAC Testing

Samples were leached in accordance with BS EN 12457-2: 2002.

Eluate Results are reported as L/S 10. These results have been calculated in accordance with BS EN 12457-2:2002.

Comparative values are taken from the Environment Agency document “Guidance for waste destined for disposal in landfills”, Version 2, June 2006.

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Leicester
LE1 4DH

L14/1556/CSI/001 - Amendment A

Project Reference - Johns Mews

Analytical Test Results - Env Suite 1

NCA Reference			14-26209	14-26210	14-26211
Client Sample Reference			BH1A	BH1B	BH1B
Client Sample Location			BH1A	BH1B	BH1B
Depth (m)			0.50	0.50	1.00
Date of Sampling			30.07.2014	30.07.2014	30.07.2014
Time of Sampling			AM	AM	AM
Sample Matrix			Sand	Sand	Clay
Determinant	**Units**	**Accreditation**			
Arsenic	(mg/kg)	MCERTS	20.0	13.0	19.5
Cadmium	(mg/kg)	MCERTS	0.6	0.4	0.6
Chromium (Total)	(mg/kg)	MCERTS	1.5	4.3	6.2
Copper	(mg/kg)	MCERTS	185	76.7	134
Lead	(mg/kg)	MCERTS	736	503	739
Mercury	(mg/kg)	UKAS	5.2	< 2.5	4.7
Nickel	(mg/kg)	MCERTS	21.1	14.6	22.9
Selenium	(mg/kg)	None	< 8	< 8	< 8
Zinc	(mg/kg)	MCERTS	122	66.8	124
Total Phenols	(mg/kg)	MCERTS	<1.2	<1.3	<1.3
Cyanide (Total)	(mg/kg)	MCERTS	<1.2	<1.3	<1.3
pH	pH Units	MCERTS	8.0	10.7	7.5
Sulphate	(mg/l)	None	1400	610	510
Sulphur	(%)	None	0.19	0.13	0.26
Sulphide	(mg/kg)	None	<4.0	<4.0	34.1
Acenaphthene	(mg/kg)	MCERTS	<0.1	<0.1	<0.1
Acenaphthylene	(mg/kg)	UKAS	<0.1	<0.1	<0.1
Anthracene	(mg/kg)	UKAS	0.1	<0.1	<0.1
Benzo (a) anthracene	(mg/kg)	MCERTS	1.7	<0.1	<0.1
Benzo (a) pyrene	(mg/kg)	MCERTS	1.8	<0.1	<0.1
Benzo (b) fluoranthene	(mg/kg)	MCERTS	2.2	<0.1	<0.1
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	1.2	<0.1	<0.1
Benzo (k) fluoranthene	(mg/kg)	MCERTS	0.6	<0.1	<0.1
Chrysene	(mg/kg)	MCERTS	1.5	<0.1	<0.1
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	0.1	<0.1	<0.1
Fluoranthene	(mg/kg)	MCERTS	3.0	0.1	<0.1
Fluorene	(mg/kg)	MCERTS	<0.1	<0.1	<0.1
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	1.1	<0.1	<0.1
Naphthalene	(mg/kg)	MCERTS	<0.1	<0.1	<0.1
Phenanthrene	(mg/kg)	MCERTS	1.0	0.2	0.3
Pyrene	(mg/kg)	MCERTS	3.0	0.1	<0.1
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	17.7	1.7	1.8

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Leicester
LE1 4DH

L14/1556/CSI/001 - Amendment A

Project Reference - Johns Mews

Analytical Test Results - TPH CWG

NCA Reference			14-26209	14-26210	14-26211
Client Sample Reference			BH1A	BH1B	BH1B
Client Sample Location			BH1A	BH1B	BH1B
Depth (m)			0.50	0.50	1.00
Date of Sampling			30.07.2014	30.07.2014	30.07.2014
Time of Sampling			AM	AM	AM
Sample Matrix			Sand	Sand	Clay
Determinant	**Units**	**Accreditation**			
Aliphatics					
$>C_5$ to C_6	(mg/kg)	None	<0.03	<0.03	0.08
$>C_6$ to C_8	(mg/kg)	None	<0.03	<0.03	0.25
$>C_8$ to C_{10}	(mg/kg)	None	<0.03	<0.03	<0.03
$>C_{10}$ to C_{12}	(mg/kg)	None	<11	<12	<13
$>C_{12}$ to C_{16}	(mg/kg)	None	<11	<12	<13
$>C_{16}$ to C_{21}	(mg/kg)	None	<11	<12	<13
$>C_{21}$ to C_{35}	(mg/kg)	None	42	<12	17
Aromatics					
$>C_5$ to C_7	(mg/kg)	None	<0.03	<0.03	<0.03
$>C_7$ to C_8	(mg/kg)	None	<0.03	<0.03	<0.03
$>C_8$ to C_{10}	(mg/kg)	None	<0.03	<0.03	<0.03
$>C_{10}$ to C_{12}	(mg/kg)	None	<11	<12	<13
$>C_{12}$ to C_{16}	(mg/kg)	None	<11	<12	<13
$>C_{16}$ to C_{21}	(mg/kg)	None	15	<12	<13
$>C_{21}$ to C_{35}	(mg/kg)	None	130	13	31

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Leicester
LE1 4DH

L14/1556/CSI/001 - Amendment A

Project Reference - Johns Mews

Certificate Of Analysis - WAC Suite

NCA Reference	14-26212
Client Sample Reference	BH1B
Sample Description	Dark brown slightly sandy clay.
Depth (m)	1.5
Date of Sampling	30.07.2014
Time of Sampling	AM
Sample Matrix	Clay
Moisture Content (%)	28
Stone content (%)	0

			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
Solid Analysis						
Total Organic Carbon	%	MCERTS	6.4	3.0	5.0	6.0
Loss on Ignition	%	UKAS	11.0	-	-	10.0
BTEX	mg/kg	MCERTS	<0.3	6.00	-	-
PCB's (7 Congeners)	mg/kg	-	0.04	1.00	-	-
Mineral Oil ($>C_{10}$ to C_{40})	mg/kg	-	111	500	-	-
PAH	mg/kg	-	1.9	100	-	-
pH	units	MCERTS	7.6	-	> 6	-
Eluate Analysis						
Arsenic	mg/kg	-	0.07	0.50	2	25
Barium	mg/kg	-	0.26	20	100	300
Cadmium	mg/kg	-	< 0.03	0.04	1	5
Chromium (total)	mg/kg	-	< 0.03	0.5	10	70
Copper	mg/kg	-	< 0.10	2.0	50	100
Mercury	mg/kg	-	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	-	0.40	0.5	10.0	30
Nickel	mg/kg	-	< 0.03	0.4	10.0	40
Lead	mg/kg	-	< 0.10	0.5	10.0	50
Antimony	mg/kg	-	0.81	0.06	0.7	5
Selenium	mg/kg	-	< 0.10	0.1	0.5	7
Zinc	mg/kg	-	< 0.10	4	50	200
Chloride	mg/kg	-	20	800	15000	25000
Fluoride	mg/kg	-	1.0	10	150	500
Sulphate (as SO_4)	mg/kg	-	1293	1000	20000	50000
Phenol Index	mg/kg	-	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	-	80	500	800	1000

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Leicester
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L14/1556/CSI/001 - Amendment A

Project Reference - Johns Mews

Sample Descriptions

NCA Reference	Client Sample Reference	Sample Depth (m)	Description	Moisture Content (%)	Stone Content (%)
14-26209	BH1A	0.50	Dark brown gravelly sand with carbonish material and brick fragments. (Fill)	7.8	57
14-26210	BH1B	0.50	Brown slightly gravelly sand with crushed rock.	15	6.0
14-26211	BH1B	1.00	Dark brown slightly sandy clay.	27	7.9

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Leicester
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L14/1556/CSI/001 - Amendment A

Project Reference - Johns Mews

Analysis Methodologies

Matrix	Determinant	Sample condition for analysis	Test Method used
Soil	Metals	Air Dried	In house method statement - MS - CL - ICP metals
Soil	PAH	Air Dried	In house method statement - MS - CL - PAH
Soil	Phenols	As Received	In house method statement - MS - CL - Phenols (Skalar)
Soil	Cyanide	As Received	In house method statement - MS - CL - Cyanide by Skalar
Soil	pH	As Received	In house method statement - MS - CL - pH (Soil)
Soil	Sulphate	Air Dried	In house method statement - MS - CL - Anions (Aquakem)
Soil	Total Sulphur	Air Dried	In house method statement - MS - CL - BRE
Soil	Sulphide	-	Subcontract Analysis
Soil	CWG	As Received	In house method statement - MS - CL - EPH and VPH

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L14/1556/CSI/001 - Amendment A

Project Reference - Johns Mews

WAC Analysis Methodologies

Matrix	Determinant	Sample condition for analysis	Test Method used
Soil	TOC	Air Dried	In house method statement - MS - CL - TOC
Soil	LoI	Air Dried	BS 1377, Part 3, 1990
Soil	BTEX	As Received	In house method statement - MS - CL - VOC and BTEX
Soil	PCB	As Received	In house method statement - MS - CL - PCB
Soil	Mineral Oil	As Received	In house method statement - MS - CL - TPH
Soil	PAH	Air Dried	In house method statement - MS - CL - PAH
Soil	pH	Air Dried	In house method statement - MS - CL - pH (Soil)
Eluate	Metals	Leached	In house method statement - MS - CL - Water Metals
Eluate	Anions	Leached	In house method statement - MS - CL - Anions (Aquakem)
Eluate	Phenol Index	Leached	In house method statement - MS - CL - Phenols (Skalar)
Eluate	DOC	Leached	In house method statement - MS - CL - DOC

Chelmer Consultancy Services
Unit 15, East Hanningfield Industrial Estate, Old Church Road
East Hanningfield, Essex CM3 8AB
Telephone: 01245 400 930 Fax: 01245 400 933
Email: info@siteinvestigations.co.uk Website:
www.siteinvestigations.co.uk

Contamination Test Results on Soil Samples

Location: 13-15 Johns Mews	Date : September 2014	Job No. : 4507	Sheet 1 of 1

Borehole No.	Units	BH1A	BH1B	BH1B	ATRISK Contaminated Land Screening Values (SSV) derived using CLEA v1.04 for 6% SOM			
Sample No.		14-26209	14-26210	14-26211				
Depth (m)		0.50	0.50	1.00				
Material Type		MADE GROUND	MADE GROUND	MADE GROUND	Residential with plant uptake	Residential without plant uptake	Allotments	Commercial/ Industrial
Aromatic Hydrocarbons (mg/kg)	>C5-C7	<0.03	<0.03	<0.03	0.06	0.07	0.07	7.37
	>C7-C8	<0.03	<0.03	<0.03	14.9	15.2	106	1780
	>C8-C10	<0.03	<0.03	<0.03	23.7	24.1	53.2	2700
	>C10-C12	<11	<12	<13	132	147	71.3	36800
	>C12-C16	<11	<12	<13	452	700	132	38000
	>C16-C21	15	<12	<13	804	1330	288	28400
	>C21-C35	130	13	21	1220	1330	1550	28400
Aliphatic Hydrocarbons (mg/kg)	>C5-C6	<0.03	<0.03	0.08	26.1	26.1	4250	>1000000
	>C6-C8	<0.03	<0.03	0.25	87.8	87.9	13900	>100000
	>C8-C10	<0.03	<0.03	<0.03	14.5	14.5	1780	86700
	>C10-C12	<11	<12	<13	87.7	87.8	7460	94600
	>C12-C16	<11	<12	<13	4010	4050	13300	95300
	>C16-C21	<11	<12	<13	88200	88900	281000	>1000000
	>C21-C35	42	<12	17	88200	88900	281000	>1000000
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	2130	4770	612	106000
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	-	-	-	-
Anthracene	mg/kg	0.1	<0.1	<0.1	18300	24000	10400	545000
Benz(a)anthracene	mg/kg	1.7	<0.1	<0.1	18	18.2	76.8	218
Benzo(a)pyrene	mg/kg	1.8	<0.1	<0.1	2.43	2.46	10.3	22.3
Benzo(b)fluoranthene	mg/kg	2.2	<0.1	<0.1	24.1	24.4	93	223
Benzo(ghi)perylene	mg/kg	1.2	<0.1	<0.1	248	249	1630	2250
Benzo(k)fluoranthene	mg/kg	0.6	<0.1	<0.1	244	246	1100	2240
Chrysene	mg/kg	1.5	<0.1	<0.1	2280	2330	6350	22000
Dibenz(ah)anthracene	mg/kg	0.1	<0.1	<0.1	2.4	2.42	12.3	22.4
Fluoranthene	mg/kg	30	<0.1	<0.1	2160	3210	924	72700
Fluorene	mg/kg	<0.1	<0.1	<0.1	1930	3100	725	72100
Indeno(123-cd)pyrene	mg/kg	1.1	<0.1	<0.1	23.9	24.3	84.9	222
Naphthalene	mg/kg	<0.1	<0.1	<0.1	8.71	9.22	23.4	22700
Phenanthrene	mg/kg	1.0	0.2	0.3	-	-	-	-
Pyrene	mg/kg	3.0	0.1	<0.1	1550	2400	620	54500
TOTAL PAH	mg/kg	17.70	1.70	1.80				
Cyanide (Total)	mg/kg	<1.2	<1.3	<1.3	34	34	34	34
pH	unit	8.0	10.7	7.5	-	-	-	-
Copper (Total)	mg/kg	185	77	134	4020	8370	1110	109000
Lead (Total)	mg/kg	736	503	739	322	444	160	6830
Zinc (Total)	mg/kg	122	67	124	17200	46800	3990	917000
					LQM/CIEH Generic Assessment Criteria			
Chromium (Total)	mg/kg	1.5	4.3	6.2	3000	3000	34600	30400
					CLEA Soil Guideline Values (SGV)			
Arsenic (Total)	mg/kg	20.0	13.0	19.5	32	32	43	640
Cadmium (Total)	mg/kg	0.6	0.4	0.6	10	10	1.8	230
Mercury (Total)	mg/kg	5.2	<2.5	4.7	170	170	80	3600
Nickel (Total)	mg/kg	21.1	14.6	22.9	130	130	230	1800
Phenols (Total)	mg/kg	<1.2	<1.3	<1.3	420	420	280	3200
Selenium (Total)	mg/kg	<8	<8	<8	350	350	120	13000
Sulphate	(mg/l)	1400	610	510	-	-	-	-
Sulphur	(%)	0.19	0.13	0.26	-	-	-	-
Sulphide	(mg/kg)	<4.0	<4.0	34.1	-	-	-	-

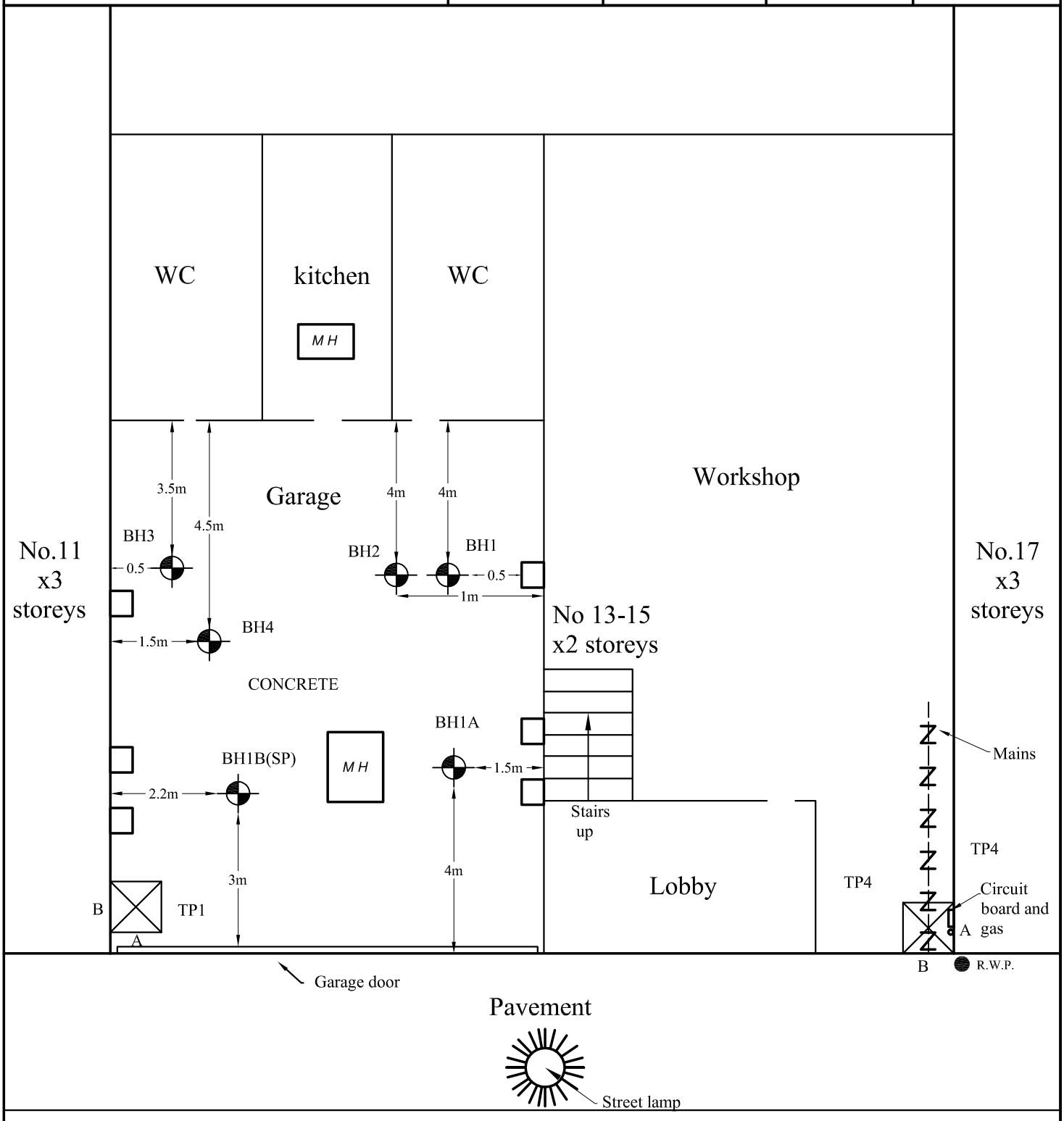
Key

PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
- Not determined

Result exceeds ATRISK screening value
Result exceeds EQS/CIEH generic assessment criteria
Result exceeds CLEA Soil Guideline Value (SGV)

Chelmer Site Investigations
Unit 15 East Hanningfield Industrial Estate
Old Church Road, East Hanningfield, Essex CM3 8AB
Telephone: 01245 400930 Fax: 01245 400933
Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

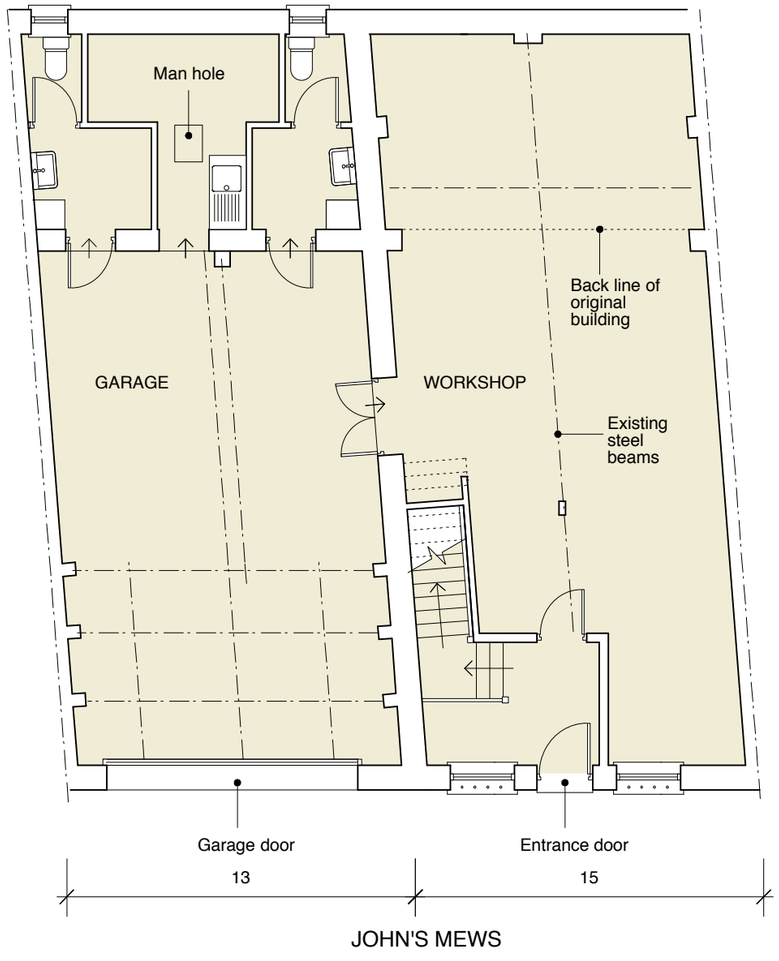
Client:	Wandsworth Sand and Stone LTD	**Scale:**	N.T.S.	**Sheet:**	1 of 1	**Date:**	22.05.07/03.07.14/18.07.14
Location:	13-15 Johns Mews, London, WC1N 2PA	**Job No:**	4507	**Weather:**	Internal	**Drawn by:** MM	**Checked by:** ME



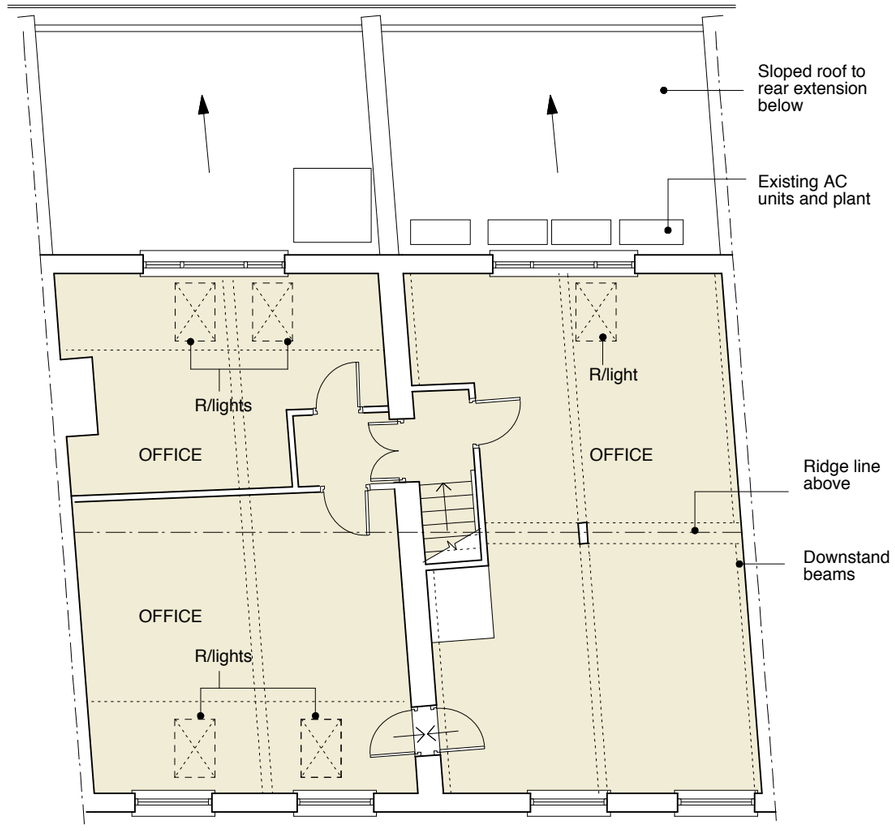
Notes: *Two additional boreholes undertaken in area of TP1 and original TP2 location but not logged as similar depth and strata to BH1A. TP2 and TP3 not excavated.*

Key:

Tree/Shrub | Borehole | Trial Pit | G Gully | Tree Stump | Rain Water/ Soil Pipe | MH Manhole



EXISTING GROUND FLOOR PLAN



EXISTING FIRST FLOOR PLAN

SCALE
0 (metres) 5

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES VERIFIED WITH THE ARCHITECT.

CLIENT

MR AND MRS CLARKE

JOB TITLE

13/15 JOHN'S MEWS LONDON WC1N 2PA

DRAWING TITLE

EXISTING GROUND AND 1ST FLOORS

SCALE **1:100@A3**

DATE **26.07.13**

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www.ftarchitects.co.uk

DRAWING No. **200_32_01**

REVISION

EXISTING ROOF PLAN

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES VERIFIED WITH THE ARCHITECT.

SCALE

0 (metres) 5

CLIENT

MR AND MRS CLARKE

JOB TITLE

13/15 JOHN'S MEWS LONDON WC1N 2PA

DRAWING TITLE

EXISTING ROOF PLAN

SCALE **1:100@A3**

DATE **26.07.13**

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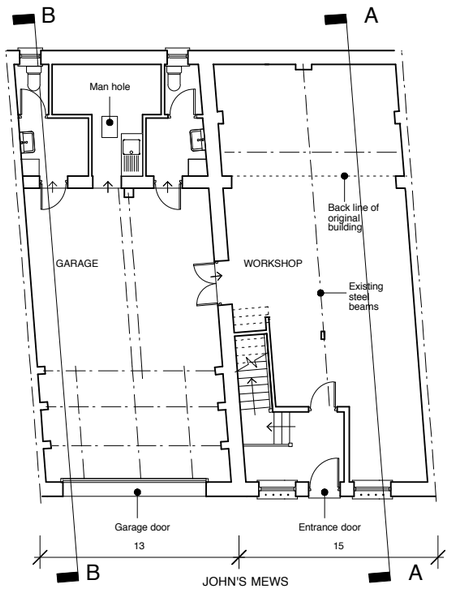
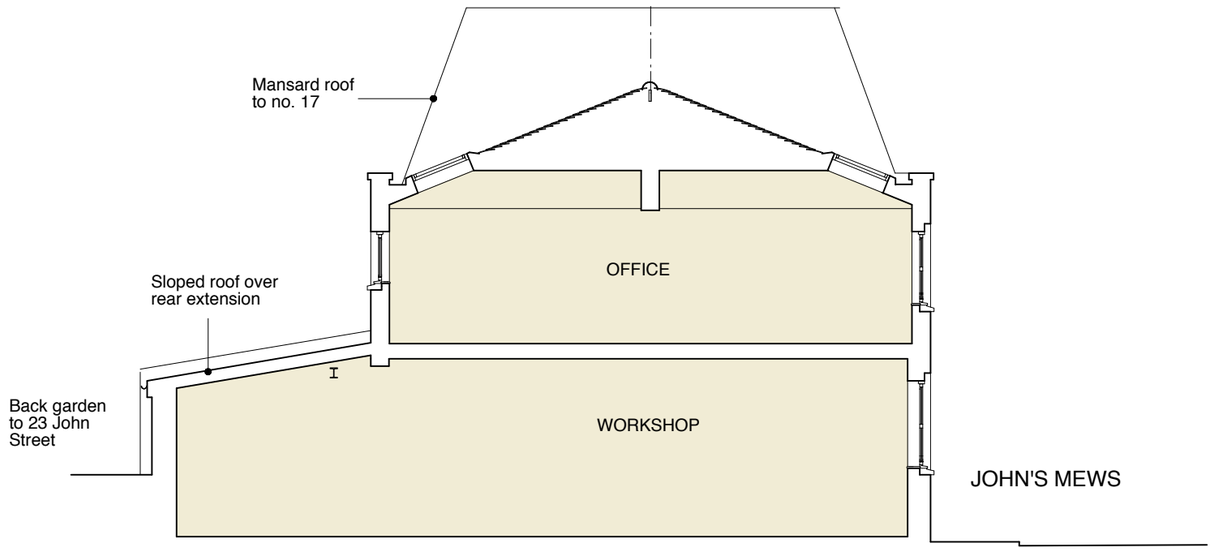
DRAWING No. **200_32_02**

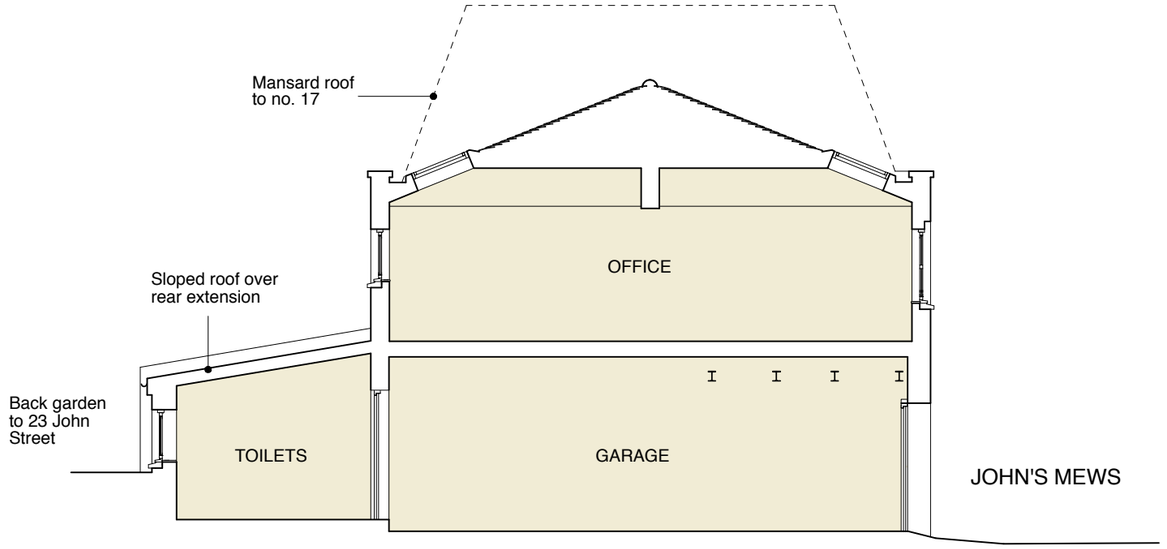
REVISION



REFERENCE PLAN



EXISTING SECTION AA THROUGH 15 JOHNS MEWS



EXISTING SECTION BB THROUGH 13 JOHNS MEWS

SCALE
0 (metres) 5

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES VERIFIED WITH THE ARCHITECT.

CLIENT

MR AND MRS CLARKE

JOB TITLE

13/15 JOHN'S MEWS LONDON WC1N 2PA

DRAWING TITLE

EXISTING SECTIONS

SCALE **1:100@A3**

DATE **26.07.13**

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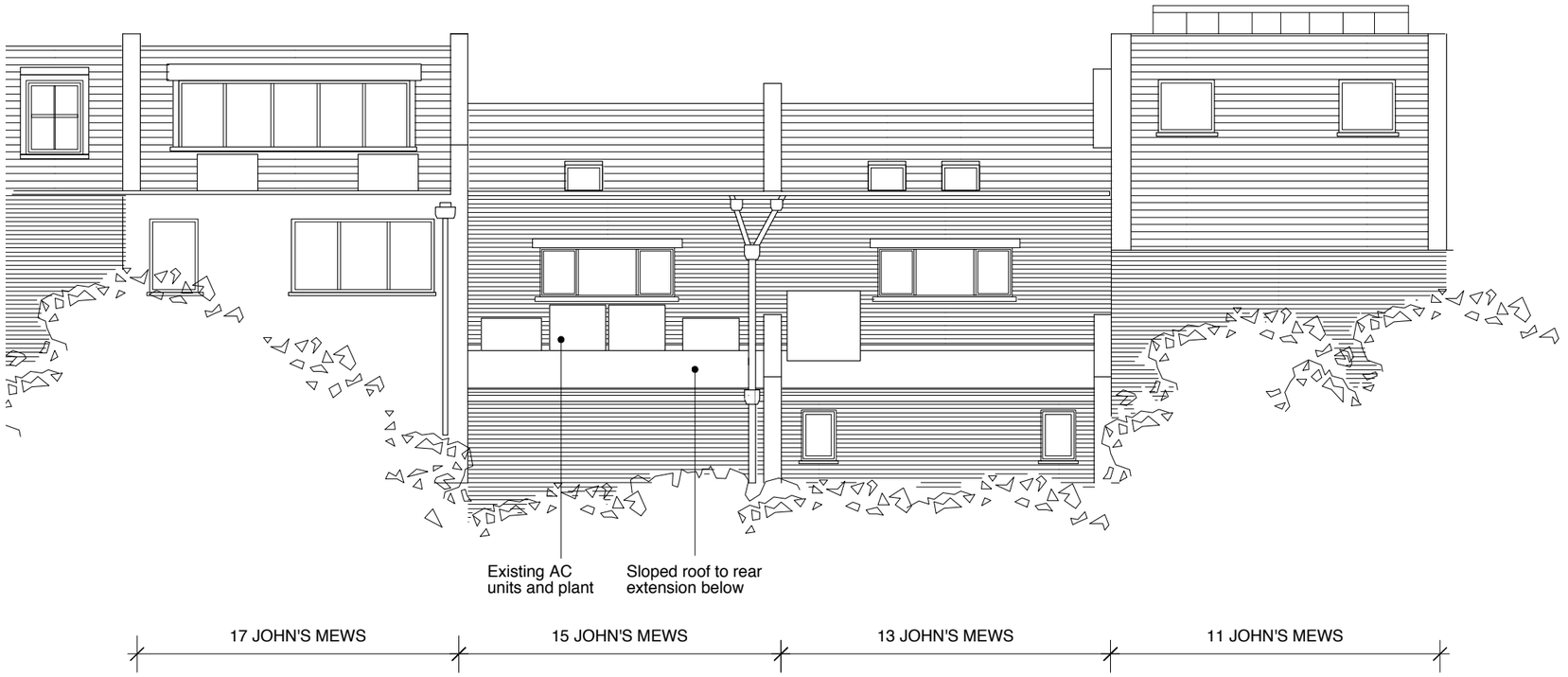
DRAWING No. **200_32_03**

REVISION



EXISTING REAR ELEVATION

EXISTING FRONT ELEVATION

SCALE
0 (metres) 5

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES VERIFIED WITH THE ARCHITECT.

CLIENT
MR AND MRS CLARKE

JOB TITLE
13/15 JOHN'S MEWS LONDON WC1N 2PA

DRAWING TITLE
EXISTING ELEVATIONS

SCALE
1:100@A3

DATE
26.07.13

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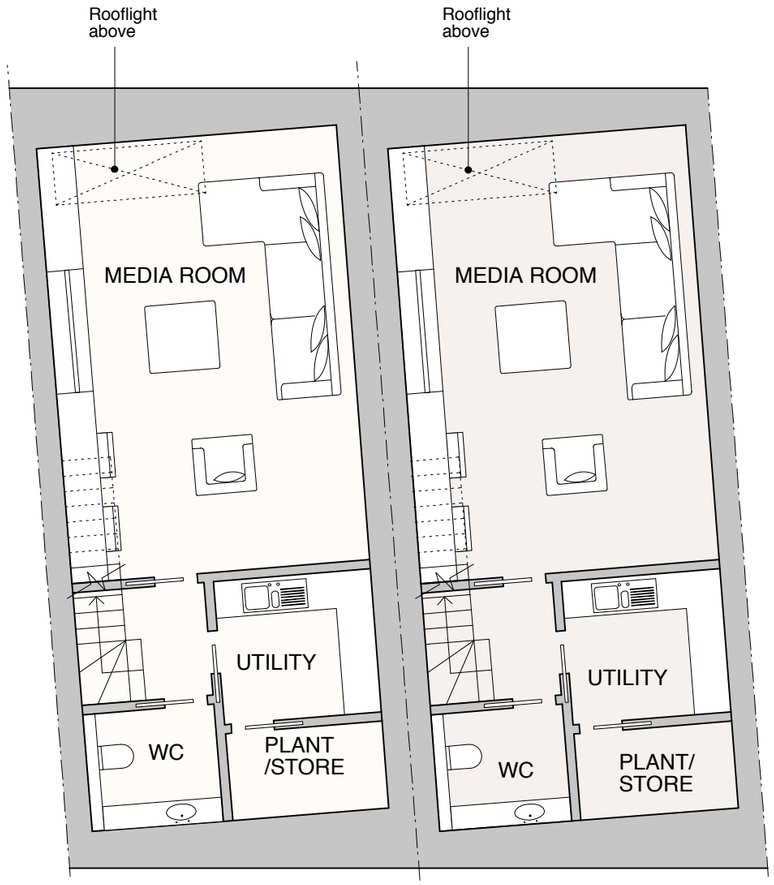
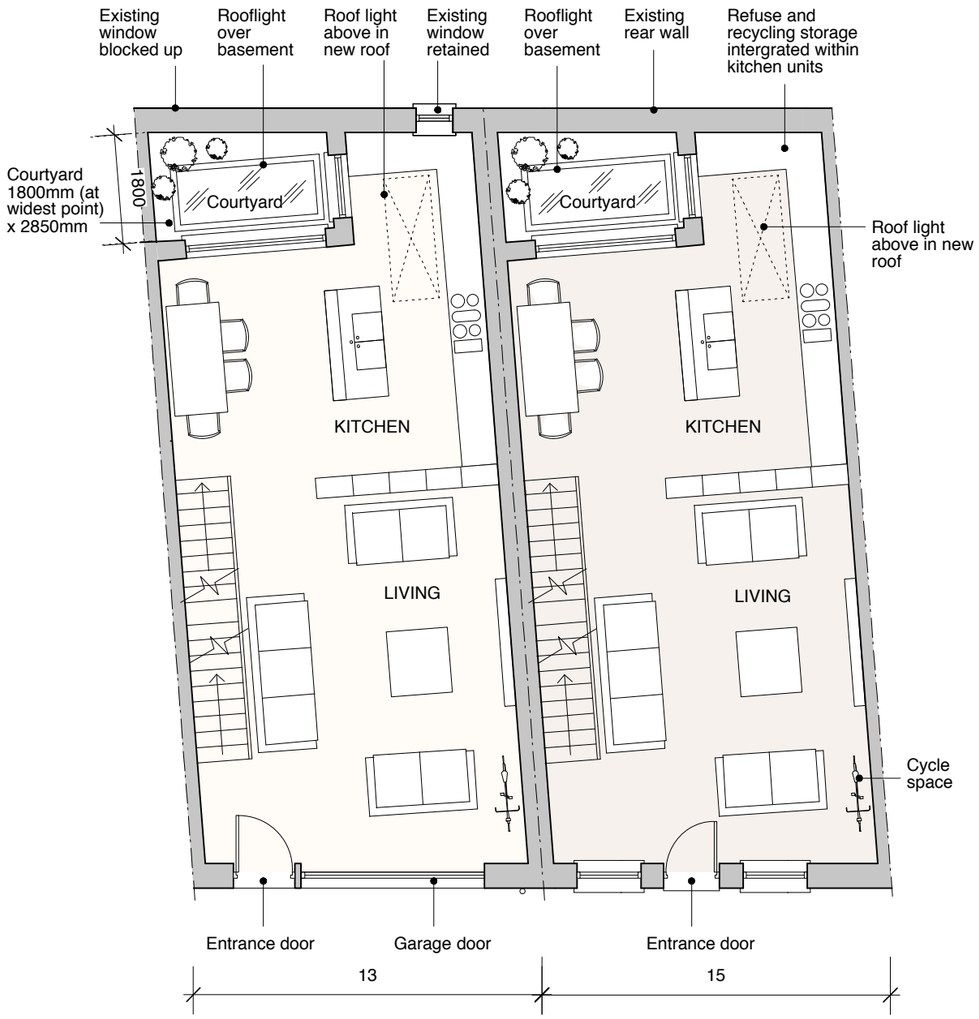
DRAWING No.
200_32_04

REVISION



New basement excavated across 13 & 15 John's Mews

BASEMENT PLAN



GROUND FLOOR PLAN

REFERENCE

Single, family house - no. 13 John's Mews

Single, family house - no. 15 John's Mews

This application is a variation on the proposed development granted consent in 2013 (ref 2013/4967/P)

SCALE

0 (metres) 5

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES VERIFIED WITH THE ARCHITECT.

SKETCH

CLIENT

WANDSWORTH SAND + STONE LTD.

JOB TITLE

13/15 JOHN'S MEWS LONDON WC1N 2PA

DRAWING TITLE

PROPOSED BASEMENT + GROUND FLOOR PLANS

SCALE **1:100@A3**

DATE **04.14**

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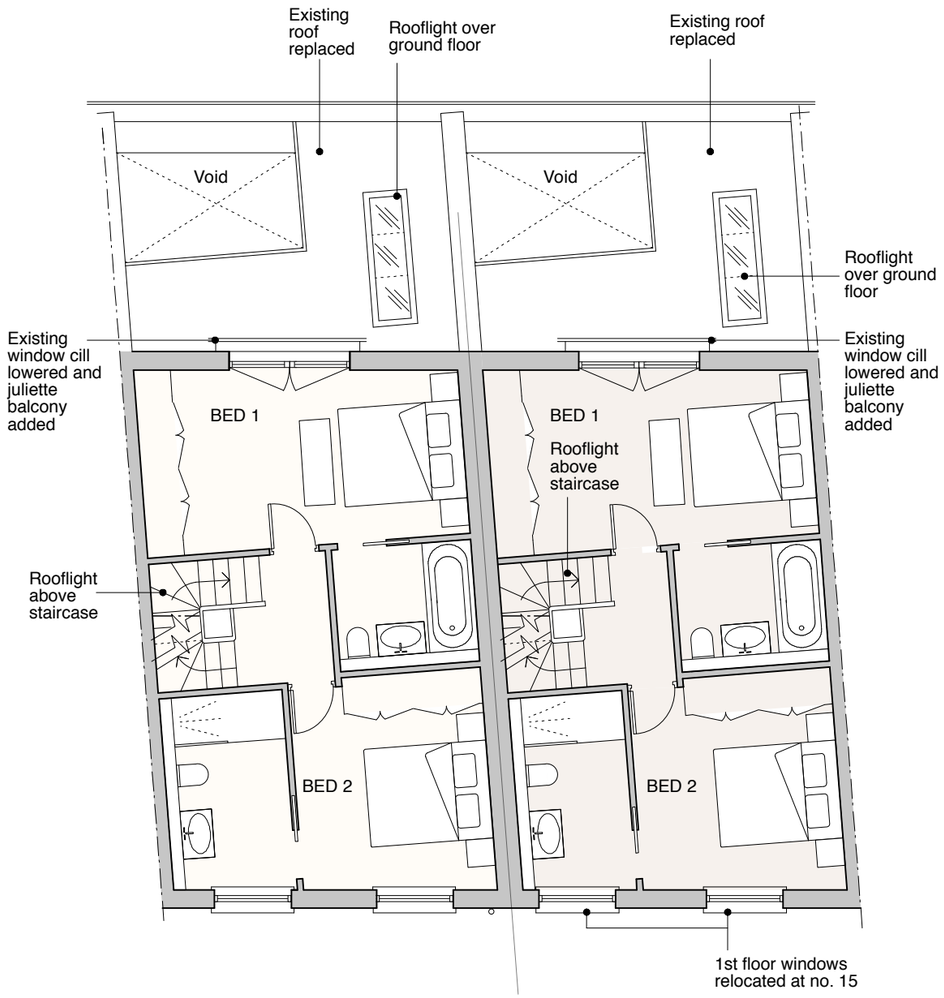
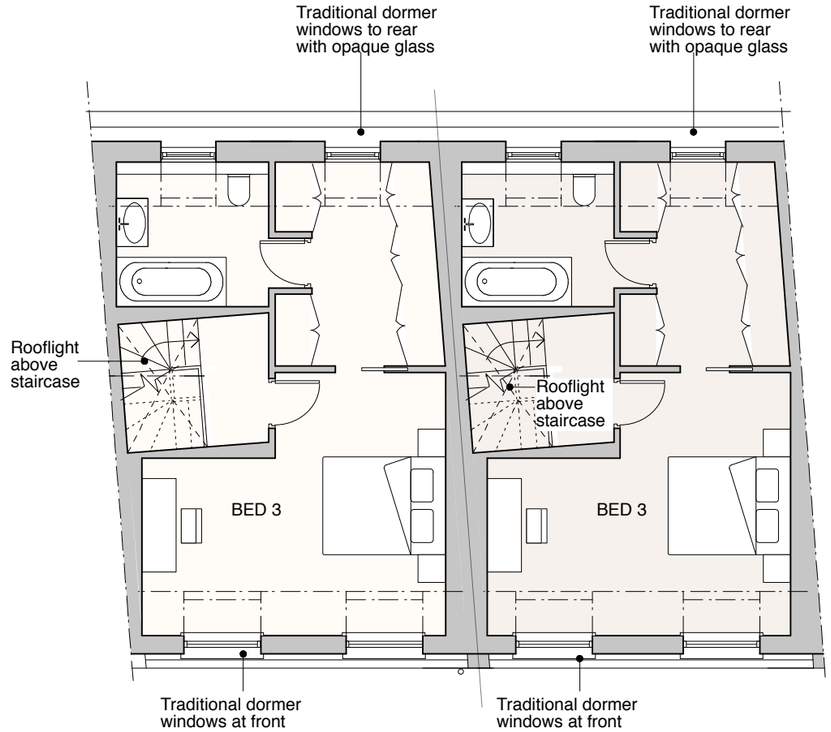
DRAWING No. **200_32_101**

REVISION



FIRST FLOOR PLAN



SECOND FLOOR PLAN

REFERENCE

Single, family house - no. 13 John's Mews

Single, family house - no. 15 John's Mews

This application is a variation on the proposed development granted consent in 2013 (ref 2013/4967/P)

GENERAL NOTES

Upper floors are unchanged from approved scheme

Surface and foul drainage to be connected into existing combined sewer

SCALE

0 (metres) 5

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES VERIFIED WITH THE ARCHITECT.

SKETCH

CLIENT

WANDSWORTH SAND + STONE LTD.

JOB TITLE

13/15 JOHN'S MEWS LONDON WC1N 2PA

DRAWING TITLE

PROPOSED FIRST + SECOND FLOOR PLANS

SCALE	DATE
1:100@A3	**04.14**

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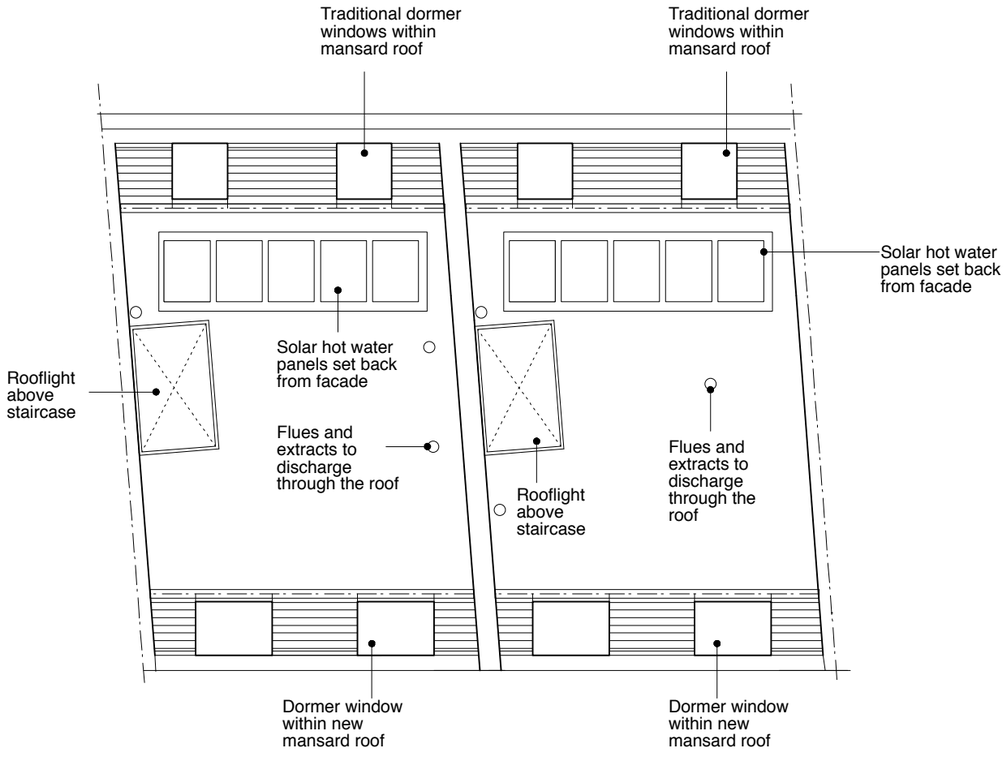
DRAWING No.	REVISION
200_32_102	



PROPOSED ROOF PLAN

GENERAL NOTES

This application is a variation on the proposed development granted consent in 2013 (ref 2013/4967/P)

Upper floors are unchanged from approved scheme

Surface and foul drainage to be connected into existing combined sewer

	Existing Gross Internal Area	
	sqm	sq ft
Basement No.13		
Basement No.15		
Ground Floor No.13	62.9	677.2
Ground Floor No.15	62.9	677.2
First Floor No.13	44.8	481.8
First Floor No.15	44.8	481.8
Second Floor No.13		
Second Floor No.15		
TOTAL	215.4	2318

	Proposed Gross Internal Area	
	sqm	sq ft
Basement No.13	56.3	606.4
Basement No.15	56.3	606.4
Ground Floor No.13	56.5	608.4
Ground Floor No.15	56.5	608.4
First Floor No.13	44.8	481.8
First Floor No.15	44.8	481.8
Second Floor No.13	37.1	399.2
Second Floor No.15	37.1	399.2
TOTAL	389.4	4191.6

SCALE

0 (metres) 5

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES VERIFIED WITH THE ARCHITECT.

NOTE: Surface and foul drainage to be connected into existing combined sewer

SKETCH

CLIENT

WANDSWORTH SAND + STONE LTD.

JOB TITLE

13/15 JOHN'S MEWS LONDON WC1N 2PA

DRAWING TITLE

PROPOSED ROOF PLAN

SCALE **1:100@A3**

DATE **04.14**

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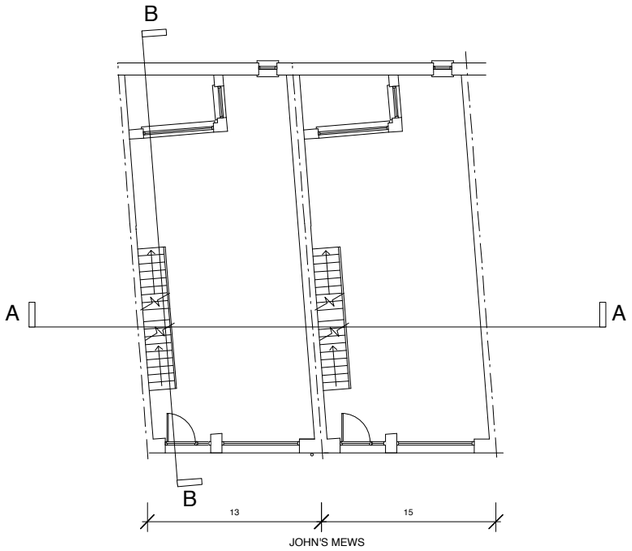
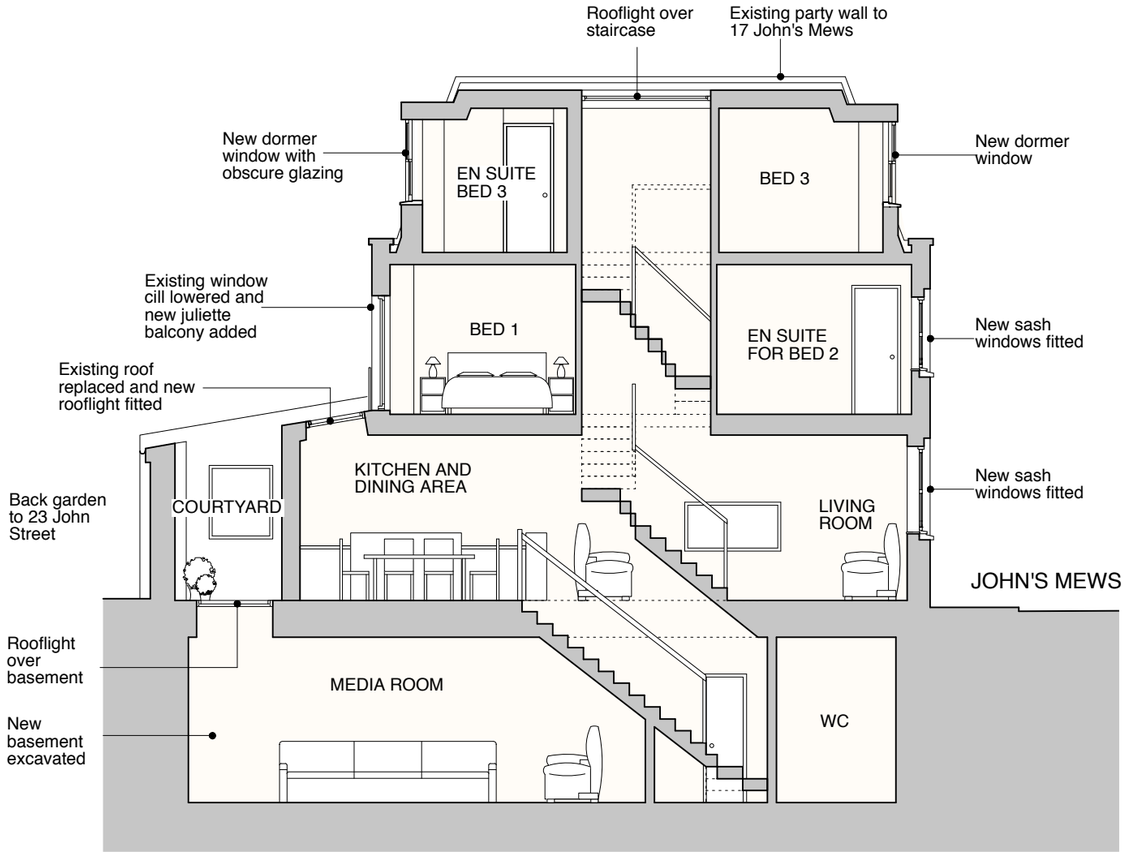
DRAWING No. **200_32_103**

REVISION



REFERENCE PLAN

PROPOSED SECTION A-A



PROPOSED SECTION B-B

SCALE
0 (metres) 5

This application is a variation on the proposed development granted consent in 2013 (ref 2013/4967/P)

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

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SKETCH

CLIENT
WANDSWORTH SAND + STONE LTD.

JOB TITLE
13/15 JOHN'S MEWS LONDON WC1N 2PA

DRAWING TITLE
PROPOSED SECTIONS

SCALE
1:100@A3

DATE
04.14

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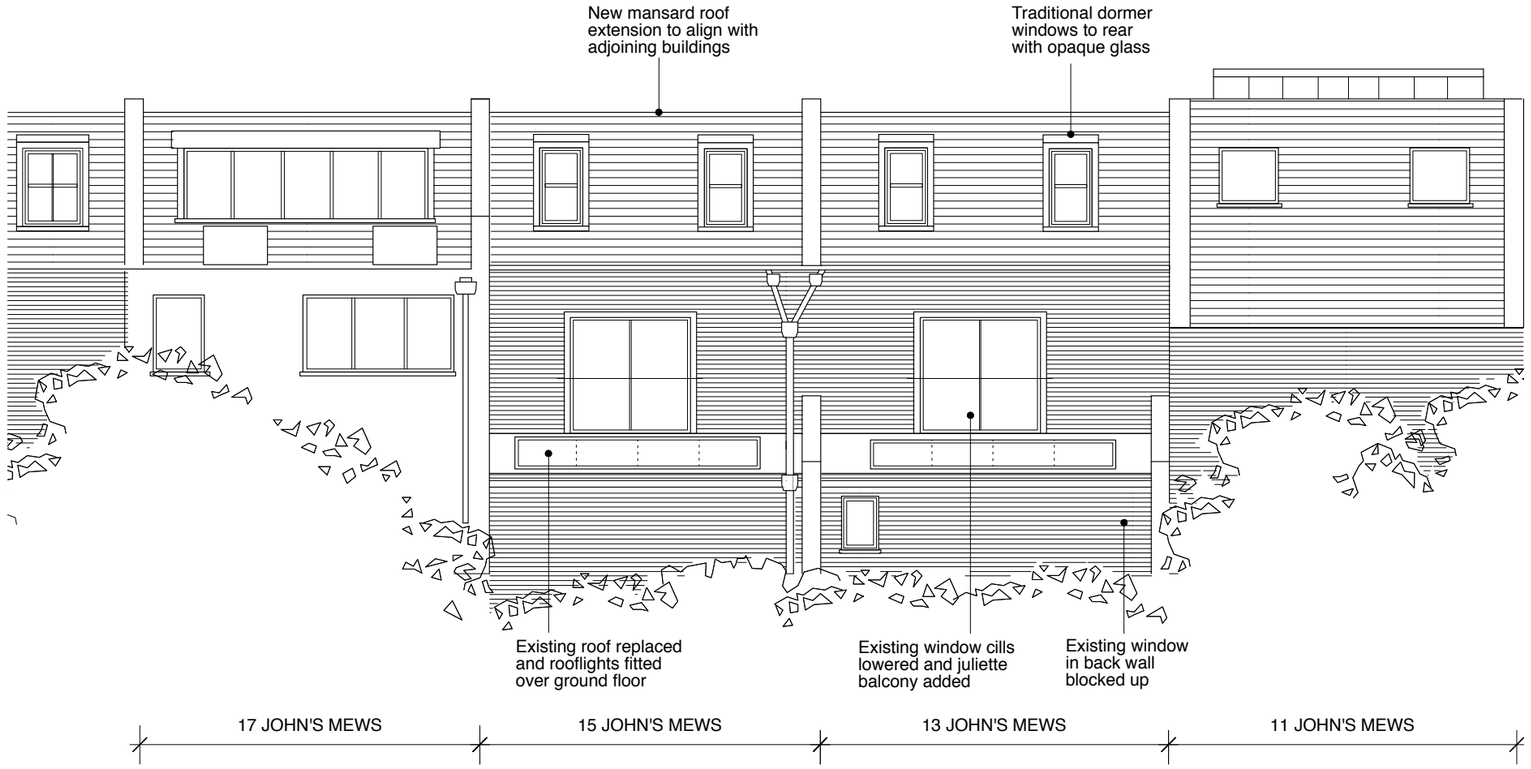
DRAWING No.
200_32_104

REVISION



PROPOSED REAR ELEVATION

PROPOSED FRONT ELEVATION

This application is a variation on the proposed development granted consent in 2013 (ref 2013/4967/P)

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES VERIFIED WITH THE ARCHITECT.

SKETCH

CLIENT

WANDSWORTH SAND + STONE LTD.

JOB TITLE

13/15 JOHN'S MEWS LONDON WC1N 2PA

DRAWING TITLE

PROPOSED ELEVATIONS

SCALE **1:100@A3**

DATE **26.07.13**

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DRAWING No. **200_32_105**

REVISION

SCALE

0 (metres) 5