DESK STUDY & GROUND INVESTIGATION REPORT

Twickenham Riverside
Twickenham
TW1 3SD

Client: London Borough of Richmond

Engineer: Price & Myers

J17205

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GEA

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Report prepared by			
	Jack Deaney BSc FGS Geotechnical Engineer		
Report checked and approved for issue by			
	Steve Branch BSc MSc CGeol FGS FRGS Managing Director		

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This report has been issued by the GEA office indicated below. Any enquiries regarding the report should be directed to the office indicated or to Steve Branch in our Herts office.

☑	Hertfordshire	tel 01727 824666	mail@gea-ltd.co.uk
☐	Nottinghamshire	tel 01509 674888	midlands@gea-ltd.co.uk

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This report is intended as a Ground Investigation Report (GIR) as defined in BS EN1997-2, unless specifically noted otherwise. The report is not a Geotechnical Design Report (GDR) as defined in EN1997-2 and recommendations made within this report are for guidance only.

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EXECUTIVE SUMMARY

This executive summary contains an overview of the key findings and conclusions. No reliance should be placed on any part of the executive summary until the whole of the report has been read. Other sections of the report may contain information that puts into context the findings that are summarised in the executive summary.

BRIEF

This report describes the findings of a site investigation carried out by Geotechnical and Environmental Associates Limited (GEA) on the instructions of Price and Myers, on behalf of London Borough of Richmond. It is understood that it is proposed to demolish and remove all existing building and structures to redevelop a site which boundary includes 1A, 1B King Street and 2/4 Water Lane, the remaining former swimming pool buildings at the corner of Water Lane and The Embankment and the river-facing parcel of land on the Embankment in front of Diamond Jubilee Gardens with a mixed use development. The development proposals comprise of seasonal units at lower ground floor level, flexible commercial and office space at ground floor level and residential apartments at first, second and third floors. A new public square and the areas of the public realm will also be developed. This will involve the construction of a lower ground floor car park with vehicular access from The Embankment and cycle storage, reconfiguration of street parking in the roads immediately adjacent to the Site, amended pedestrian access with associated landscaping to the South of Diamond Jubilee Gardens and amendment of service vehicle access to the service road at the rear of Diamond Jubilee Gardens The purpose of the investigation has been to research the history of the site with respect to possible contaminative uses, to determine the ground conditions and hydrogeology, to assess the extent of any contamination and to provide information to assist with the design of the proposed foundations.

SITE HISTORY

The earliest map studied, dated 1880, shows the site to have been occupied by a public house and a garden. The surrounding road network is shown largely in its existing configuration, whilst the surrounding area appeared to have been mainly residential with associated gardens. Richmond House and associated gardens neighboured the west of the site. Insurance plans dated 1907 show that another building to the west of the site was the Council Town Hall and associated urban depot. The surrounding area developed into a more commercially dominated area through to 1914, when it is mainly shown in its existing condition. A motor works had been built 200 m northwest and 200 m northeast of the site and a tank was present 200 m to the east of the site. By 1934, the existing neighbouring terraced buildings fronting onto King Street had been built, whilst Richmond House had been replaced by the existing swimming pool building. On site, the configuration of the pub and carpark had changed slightly. The site and surrounding area remained largely unchanged until some time before 1972, when the existing car park and an early version of the existing terraced buildings had been constructed on site, although they remained as a pub. The tank to the east of the site is last shown on the 1960 map, after which it is assumed to have been removed. The site remained unchanged until 1991, when it is shown in its existing condition and has since remained unchanged.

GROUND CONDITIONS

The made ground typically comprised dark brown silty slightly sandy gravelly clay with fragments of brick, slate, concrete, tarmac, ash and coal that extended to depths of between 0.6 m and 1.7 m (6.4 m OD and 5.3 m OD). In Borehole No WS1, a hydrocarbon odour was noted at approximately 0.6 m depth. The Kempton Park Gravel typically comprised a medium dense becoming dense greyish light brown slightly gravelly fine to coarse grained subrounded to subangular sand to depths of 4.9 m and 5.8 m (2.1 m OD and 1.8 m OD). During drilling of Borehole Nos WS1 and 2, a hydrocarbon odour was present at depths of 3.7 m (3.3 m OD) and 4.5 m (2.5 m OD). The London Clay comprised firm becoming stiff, medium strength becoming very high strength fissured dark grey silty clay with occasional partings of fine sand and selenite crystals to the full depth investigated, of 25.0 m (-18.0 m OD).

Groundwater was encountered during drilling as fast inflows from within the Kempton Park Gravel at depths of 5.3 m and 4.5 m (2.45 m OD and 2.5 m OD) in Borehole Nos 1 and 2 respectively. A slow inflow was also encountered at 4.5 m (2.5 m OD) within Borehole No WS4. Groundwater has been monitored at depths of between 4.12 m and 4.96 m (2.66 m OD and 3.01 m OD).

RECOMMENDATIONS

Formation level of the proposed 4.0 m deep lower ground floor should be within the medium dense sand and gravel of the Kempton Park Gravel. The groundwater monitoring to date suggests groundwater will not be encountered within the excavation, such that contiguous bored piled walls should be suitable to form the new retaining walls. Contamination testing has revealed no elevated levels of contaminants within the soil samples tested, although raised levels of TPH and PAH were encountered within the natural soils at 3.7 m and 4.7 m. Groundwater samples recovered from each of the standpipes revealed soluble PAH and TPH contamination toward the south of the site. The source of the contamination may be able to be removed as part of the proposed basement scheme but it is more likely that additional testing will be required to identify and locate the source of the contamination. Once the source is identified a full remediation strategy and validating testing can be completed.

Part 1: INVESTIGATION REPORT

This section of the report details the objectives of the investigation, the work that has been carried out to meet these objectives and the results of the investigation. Interpretation of the findings is presented in Part 2.

1.0 INTRODUCTION

Geotechnical and Environmental Associates Limited (GEA) has been commissioned by Price and Myers, on behalf of London Borough of Richmond, to carry out a desk study and ground investigation at Twickenham Riverside, Twickenham, TW1 3SD.

1.1 Proposed Development

It is understood that it is proposed to demolish and remove all existing building and structures to redevelop a site which boundary includes 1A, 1B King Street and 2/4 Water Lane, the remaining former swimming pool buildings at the corner of Water Lane and The Embankment and the river-facing parcel of land on the Embankment in front of Diamond Jubilee Gardens with a mixed use development. The development proposals comprise of seasonal units at lower ground floor level, flexible commercial and office space at ground floor level and residential apartments at first, second and third floors. A new public square and the areas of the public realm will also be developed. This will involve the construction of a lower ground floor car park with vehicular access from The Embankment and cycle storage, reconfiguration of street parking in the roads immediately adjacent to the Site, amended pedestrian access with associated landscaping to the South of Diamond Jubilee Gardens and amendment of service vehicle access to the service road at the rear of Diamond Jubilee Gardens

This report is specific to the proposed development and the advice herein should be reviewed once the development proposals are finalised.

1.2 Purpose of Work

The principal technical objectives of the work carried out were as follows:

- to check the history of the site with respect to previous contaminative uses;
- to provide information on the risk of Unexploded Ordnance (UXO);
- to determine the ground conditions and their engineering properties;
- to provide advice with respect to the design of the basement and foundations;
- to provide an indication of the degree of soil contamination present; and
- to assess the risk that any such contamination may pose to the proposed development, its users or the wider environment.

1.3 Scope of Work

At the time that the scope of investigation was determined, the site was understood to only comprise a rectangular area bordered by Water Lane to the east and The Embankment to the south. In order to meet the above objectives with respect to this part of the site only, a desk study was carried out, followed by a ground investigation. The desk study review comprised:

- a review of historical Ordnance Survey (OS) maps and environmental searches sourced from the Envirocheck database;
- a review of readily available geology maps;
- a walkover survey of the site carried out in conjunction with the fieldwork; and
- commissioning of 1st Line Defence to undertake a preliminary UXO risk assessment.

In the light of the desk study an intrusive ground investigation was carried out within the eastern part of the site only which comprised, in summary, the following activities:

- two cable percussion boreholes, each advanced to a depth of 25.0 m;
- three boreholes advanced to depths of 4.0 m and 5.0 m by a Terrier rig;
- standard penetration tests (SPTs) carried out at regular intervals within the boreholes to provide quantitative data on the strength of the soils;
- installation into the boreholes of three combined ground gas and groundwater monitoring standpipes, to depths of 5.0 m and 6.0 m;
- testing of selected soil samples for contamination and geotechnical purposes;
- six rounds of gas and groundwater monitoring; and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

The report includes a contaminated land assessment which has been undertaken in accordance with the methodology presented in Contaminated Land Report (CLR) 11[1] and involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the United Kingdom. The risk assessment is thus divided into three stages comprising Preliminary Risk Assessment, Generic Quantitative Risk Assessment, and Site-Specific Risk Assessment.

The exploratory methods adopted in this investigation have been selected on the basis of the constraints of the site including but not limited to access and space limitations, together with any budgetary or timing constraints. Where it has not been possible to reasonably use an EC7 compliant investigation technique a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

1 *Model Procedures for the Management of Land Contamination* issued jointly by the Environment Agency and the Department for Environment, Food and Rural Affairs (DEFRA) Sept 2004

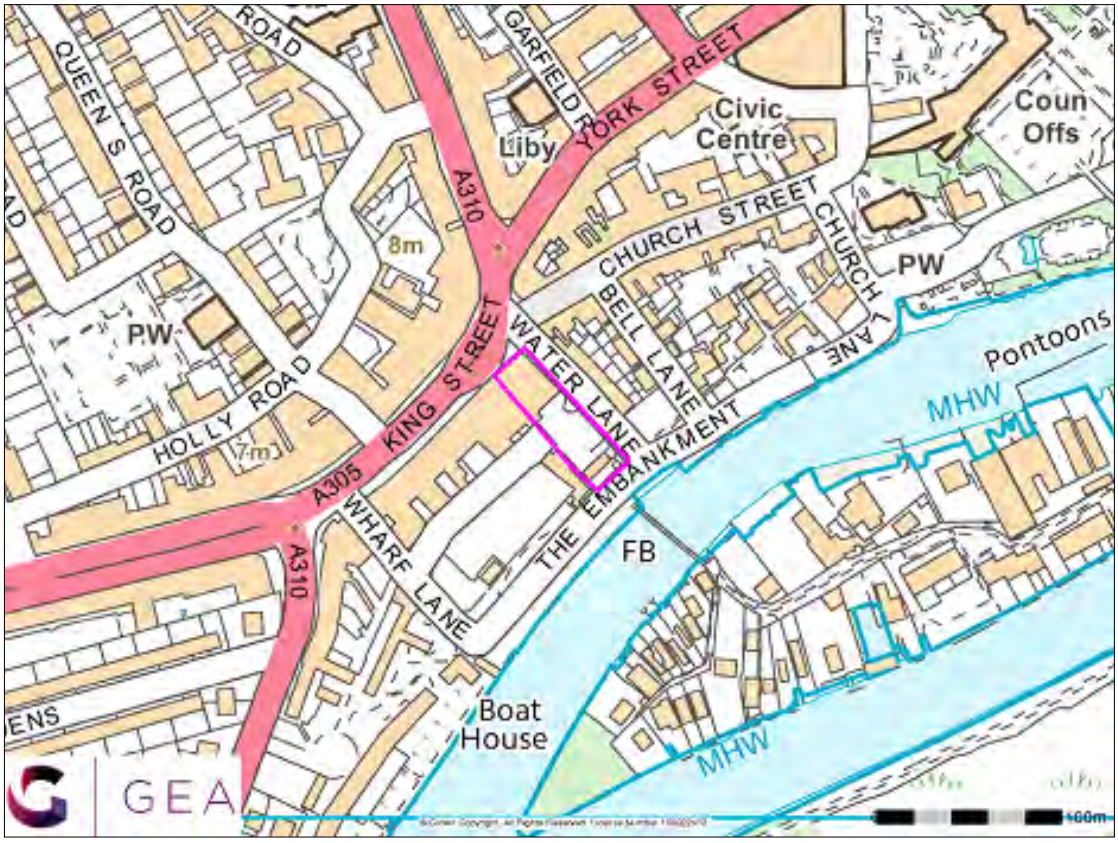
1.4 Limitations

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

2.0 THE SITE

2.1 Site Description

The investigation has been limited to the eastern part of the area referred to in Section 1.1, as shown on the map extract below and hereafter referred to as "the site". The site is rectangular in shape, measuring approximately 70 m north-south by 25 m east-west, and is located 500 m south of Twickenham Railway Station and 25 m north of the River Thames. It can also be located by National Grid Reference 516310, 173220 and is shown on the map extract below.



The site is occupied by three commercial buildings, each of two storeys, with associated car park and is completely covered by hardstanding. The buildings can be accessed via King Street to the north, whilst the car park is accessed by Water Lane to the east and a delivery road to the west. The site is bounded to the north by King Street, to the east by Water Lane, to the south by a road known as The Embankment and to the west by a swimming pool building.

The site falls gently to the southeast toward the car park entrance from 7.5 m OD in the north to 7.0 m OD in the southeast. It is also elevated from street level by about 1.5 m, which lies at 5.5 m OD.

During the site walkover, which was conducted in conjunction with the site work, no obvious signs of contamination were observed, although small scale fuel / oil patches were present in some of the car parking spaces.

2.2 Site History

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

The earliest map studied, dated 1880, shows the site to have been occupied by a public house and a garden. The surrounding road network is shown largely in its existing configuration, whilst the surrounding area appeared to have been mainly residential with associated gardens. Richmond House and associated gardens neighboured the west of the site. Insurance plans dated 1907 show that another building to the west of the site was the Council Town Hall and associated urban depot.

The surrounding area developed into a more commercially dominated area through to 1914, when it is mainly shown in its existing condition. A motor works had been built 200 m northwest and 200 m northeast of the site and a tank was present 200 m to the east of the site.

By 1934 the existing neighbouring terraced buildings fronting onto King Street had been built, whilst Richmond House had been replaced by the existing swimming pool building. On site, the configuration of the pub and carpark had changed slightly.

The site and surrounding area remained largely unchanged until sometime before 1972, when the existing car park and an early version of the existing terraced buildings had been constructed on site, although they remained to be used as a pub. The tank to the east of the site was last shown on the 1960 map, when it is assumed to have been removed.

The site remained unchanged until 1991, when it is shown in its existing condition and has since remained unchanged.

2.3 Other Information

A search of public registers and databases has been made via the Envirocheck database and relevant extracts from the search are appended. Full results of the search can be provided if required.

The search indicates that the Environment Agency (EA) has no records of landfill sites within 1 km of the site.

According to the Envirocheck data there are 56 contemporary trade entries within 250 m of site, eight of which are still active.

According to the EA, the site is not located within a groundwater protection zone. The site is not in an area at potential risk of groundwater flooding at the surface or in an area of extreme risk to flooding from rivers or sea. Water Lane is noted to be at low risk from surface water flooding.

There are six incidents of pollution to controlled waters within 100 m of the site, all category 3 minor incidents.

Reference to records compiled by the Health Protection Agency (formerly the National Radiological Protection Board) indicates that the site falls within an area where less than 1% of homes are affected by radon emissions and therefore radon protective measures will not be necessary.

2.4 Geology

The British Geological Survey (BGS) map of the area indicates that the site is underlain by Langley Silt over Kempton Park Gravel, which in turn is underlain by the London Clay Formation.

A BGS borehole record, ref TQ17SE176, located 100 m to the east of the site, found Langley Silt to 3.9 m, whereupon the Kempton Park Gravel was encountered to a depth of 7.25 m. The London Clay was then present to the full depth of the investigation of 10.5 m.

2.5 Hydrology and Hydrogeology

The Kempton Park Gravel is classified by the Environment Agency (EA) as a Secondary 'A' Aquifer which is defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The Langley Silt and London Clay Formation are classified as an Unproductive Stratum, referring to rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

The nearest surface water feature is the River Thames, located 25 m to the south of the site. Reference to the Lost Rivers of London[2] does not indicate that the site is within 1 km of any lost rivers.

Groundwater is likely to be present at the base of the Kempton Park Gravel and flowing towards the River Thames.

The site is entirely covered by the existing building and hardstanding and therefore infiltration of rainwater into the ground beneath the site is limited such that the majority of surface runoff is likely to drain into combined sewers in the road.

2.6 Preliminary Risk Assessment

Part IIA of the Environmental Protection Act 1990, which was inserted into that Act by Section 57 of the Environment Act 1995, provides the main regulatory regime for the identification and remediation of contaminated land. The determination of contaminated sites is based on a "suitable for use" approach, which involves managing the risks posed by contaminated land by making risk-based decisions. This risk assessment is carried out on the basis of a source-pathway-receptor approach.

2.6.1 Source

The desk study findings indicate that the site does not have a contaminative history, in that it has been occupied by a pub and carpark and then the existing buildings since 1880. There may be expected to be an increased thickness of made ground as a result of the car park being slightly raised from street level. The council depot noted on the 1907 insurance plan may also be a source of localised hydrocarbon contamination.

No sources of soil gas have been identified on site or in the surrounding area.

[2] Nicholas Barton and Stephen Myers (2016) *London's Lost Rivers. Revised Edition.* Historical Publications Ltd

2.6.2 Receptor

The proposed redevelopment of the building for a mixed use of residential and commercial purposes will result in the end users representing relatively high sensitivity receptors. Adjacent sites and shallow groundwater are considered to be moderately sensitive receptors and the deep aquifer beneath the site is a particularly sensitive receptor. Buried services are likely to come into contact with any contaminants present within the soils through which they pass and site workers are likely to come into contact with any contaminants present in the soils during construction works.

2.6.3 Pathway

The permeable layers within the Langley Silt and Kempton Park Gravel will allow groundwater migration into the site from adjacent sites and vice versa. However, the negligibly permeable London Clay will limit the potential for groundwater percolation into the underlying chalk and thus a pathway is not considered likely to exist to the principal aquifer.

Within the site, end users will be isolated from direct contact with any contaminants present within the made ground by the presence of the buildings and the extent of the hardstanding. Buried services may be exposed to any contaminants present within the soil through direct contact and site workers will come into contact with the soils during construction works. There is thus considered to be a low potential for a contaminant pathway to be present between any potential contaminant source and a target for the particular contaminant.

2.6.4 Preliminary Risk Appraisal

On the basis of the above it is considered that there is a LOW risk of there being a significant contaminant linkage at this site that would result in a requirement for major remediation work.

2.7 Preliminary UXO Risk Assessment

The preliminary UXO Risk assessment report (Ref: EP5167-00, dated 04/08/2017), a copy of which is appended, recommends that due to the known falling of a V-1 bomb immediately south of the site a detailed risk assessment should be completed. In lieu of the detailed risk assessment, on-site supervision in the form of magnetometer surveying was carried out during the ground investigation. It should be noted that the magnetometer surveying during the site works will not cover any future construction works and a detailed risk assessment will be required in due course.

3.0 EXPLORATORY WORK

In order to meet the objectives described in Section 1.2, two boreholes were drilled using a cable percussion rig to a depth of 25.0 m below ground level. In addition, three boreholes were advanced to depths of 4.0 m and 5.0 m using an opendrive sampling rig (Terrier rig). UXO supervision and magnetometer scanning was performed in all boreholes during drilling.

During boring, disturbed and undisturbed samples were obtained from the boreholes for subsequent laboratory examination and testing. Standard Penetration Tests (SPTs) were also carried out in the boreholes at regular intervals to provide additional quantitative data on the strength of the soils encountered.

Combined groundwater and gas monitoring standpipes were installed to a depth of 6.0 m in Borehole Nos 1 and 2, with another installed to 5.0 m in Borehole No WS4. Two of six scheduled monitoring visits completed over fortnightly intervals have been completed to date, the results of which are discussed in Section 4.4 below.

A selection of the samples recovered from the boreholes was submitted to a soil mechanics laboratory for a programme of geotechnical testing and an analytical laboratory for contamination testing. A groundwater sample was recovered from each of the standpipes and also submitted for contamination testing.

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

The borehole records are appended, together with a site plan indicating the exploratory positions. The Ordnance Datum (OD) levels on the borehole records have been provided by the consulting engineers labelled on a drawing detailing existing levels (25159/SI-01, not dated)

3.1 Sampling Strategy

The borehole locations and labels were agreed with the consulting engineers, Price and Myers, prior to work beginning and were positioned on site by a geotechnical engineer from GEA to avoid all services and underground infrastructure. The proposed development is understood to extend into the adjacent swimming pool complex to the west. However, given access restrictions into the swimming pool complex, the site investigation was completed in the car park to the rear of the existing buildings that are to be demolished.

Three samples of the made ground and two samples of the natural soil have been tested for the presence of contamination. The analytical suite of testing was selected to identify a range of typical industrial contaminants for the purposes of general coverage. For this investigation the analytical suite for the soil included a range of metals, Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH), total cyanide and monohydric phenols. In addition, samples were screened for asbestos, as a precautionary measure. A single sample was tested for Waste Acceptance Criteria (WAC) results.

Three groundwater samples were obtained from the standpipes and were tested for common industrial contaminants, including a range of metals, speciation of total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH), total cyanide and monohydric phenols, BOD / COD and VOC.

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

4.0 GROUND CONDITIONS

The investigation has generally confirmed the expected ground conditions in that, beneath a variable thickness of made ground, Kempton Park Gravel is underlain by the London Clay, which extended to the full depth of the investigation, of 25.0 m.

4.1 Made Ground

The made ground typically comprised dark brown silty slightly sandy gravelly clay with fragments of brick, slate, concrete, tarmac, ash and coal that extended to depths of between 0.6 m and 1.7 m (6.4 m OD and 5.3 m OD).

In Borehole No WS1, a hydrocarbon odour was noted at approximately 0.6 m depth.

No other obvious evidence of contamination was noted on site, but three samples of the made ground have been analysed for a range of contaminants as a precautionary measure and the results are detailed within Section 4.6.

4.2 Kempton Park Gravel

The Kempton Park Gravel typically comprised a medium dense becoming dense greyish light brown slightly gravelly fine to coarse grained subrounded to subangular sand to depths of 4.9 m and 5.8 m (2.1 m OD and 1.8 m OD).

Within Borehole No WS1, a layer of soft to firm greyish light brown clayey silt with coarse gravel sized pockets of grey clay with hydrocarbon odour was present at a depth of 3.7 m (3.3 m OD). A sample of this soil was analysed for a range of contaminants.

When drilling Borehole No 2, a strong hydrocarbon odour was noted in association with a water strike at 4.5 m (2.5 m OD). Soil samples taken from towards the base of this stratum were inspected and noted to have a strong hydrocarbon odour. As a result a sample of the soil at 4.7 m (2.3 m OD) was analysed for a range of contaminants.

4.3 London Clay

The London Clay comprised firm becoming stiff, medium strength becoming very high strength fissured dark grey silty clay with occasional partings of fine sand and selenite crystals to the full depth investigated, of 25.0 m (-18.0 m OD).

A hydrocarbon odour was noted toward the top of this stratum at 5.2 m (1.8 m OD). Plasticity index test results indicate the London Clay to be of high shrinkability.

4.4 Groundwater

Groundwater was encountered during drilling within the Kempton Park Gravel as fast inflows in Borehole Nos 1 and 2 at depths of 5.3 m and 4.5 m (2.45 m OD and 2.5 m OD) respectively. A slow inflow was also encountered at 4.5 m (2.5 m OD) within Borehole WS4.

The table below includes the results of the groundwater monitoring visits to date.

Date	Borehole No	Depth to water (m) [Level (m OD)]
05/09/2017	1	4.96 [2.89]
	2	4.34 [2.66]
	3	4.22 [2.78]
27/9/2017	1	Inaccessible
	2	4.31 [2.69]
	3	4.12 [2.88]
10/10/2017	1	4.84 [3.01]
	2	4.32 [2.70]
	3	4.22 [2.78]

The above readings suggest groundwater to be flowing in a southwesterly direction, towards the River Thames.

4.5 Ground Gas

Three of the six scheduled gas monitoring visits have been carried out to date, at fortnightly intervals over a six-week period. The monitoring has recorded slightly elevated concentrations of carbon dioxide and slightly reduced concentrations of oxygen. No flow, concentrations of methane or abnormal temperatures were measured and PID monitoring of the standpipes has not recorded any elevated concentrations of volatile vapour.

In determining the significance of soil gas concentrations, both the methane and carbon dioxide concentrations and borehole flow rates are used to define a characteristic situation, renamed as the Gas Screening Value (GSV). In the worst case, where carbon dioxide concentration was recorded at 3.4 %, a GSV of 0.0034 has been determined, in accordance with guidance provided by CIRIA.[3]

Due to the low concentrations of carbon dioxide, no methane recorded at site and a GSV of less than 0.07, the site can be defined as Characteristic Situation 1, according to Table 8.5 of CIRIA guidance, and as having a very low risk. This should be reviewed upon the completion of all six monitoring visits.

4.6 Soil Contamination

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

Determinant	WS1 – 0.5 m	WS2 – 0.4 m	WS2 – 3.7 m	WS4 – 1.4 m	BH2 – 4.7 m
pH	7.3	7.5	7.8	7.7	8.5
Asbestos	Not detected	Not detected	Not detected	Not detected	Not detected
Arsenic	19	20	15	17	18
Cadmium	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	20,1	22	24	19	47
Lead	190	75	8.1	260	15
Mercury	<0.3	<0.3	<0.3	<0.3	<0.3
Selenium	<1	<1	<1	<1	<1
Copper	36	45	10	30	21
Nickel	23	25	21	20	42
Zinc	110	120	31	57	65
Total Cyanide	<1	<1	<1	<1	<1
Total Phenols	<1	<1	<1	<1	<1
Total PAH	1.62	96	86.2	13.5	64.1
Sulphide	1.5	1.0	<1.0	3.0	<1

3 Wilson, S, Oliver, S, Mallett, H, Hutchings, H and Card, G (2006) *Assessing risks posed by hazardous ground gases to buildings* CIRIA Report C659

Determinant	WS1 – 0.5 m	WS2 – 0.4 m	WS2 – 3.7 m	WS4 – 1.4 m	BH2 – 4.7 m
Benzo(a)pyrene	0.16	8.4	0.99	1.5	0.3
Naphthalene	<0.05	3.4	1.0	<0.05	11
TPH	57	370	620	97	410
Total organic carbon %	2.0	2.7	0.2	1.5	0.4

4.6.1 Generic Quantitative Risk Assessment

The use of a risk-based approach has been adopted to provide an initial screening of the test results to assess the need for subsequent site-specific risk assessments. It is understood the building will be used for residential and commercial purposes. Given that the basement and ground level floors will be used for commercial purposes, a commercial end use has been adopted. To this end contaminants of concern are those that have values in excess of generic human health risk based guideline values which are either that of the CLEA[4] Soil Guideline Values where available, or are Generic Screening Values calculated using the CLEA UK Version 1.06[5] software, or are based on the DEFRA Category 4 Screening values[6]. The key generic assumptions for this end use are as follows;

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

It is considered that these assumptions are acceptable for this generic assessment of this site. The tables of generic screening values derived by GEA and an explanation of how each value has been derived are included in the Appendix.

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

- additional testing to zone the extent of the contaminated material and thus reduce the uncertainty with regard to its potential risk;

[4] *Updated Technical Background to the CLEA Model (Science Report SC050021/SR3) Jan 2009* and Soil Guideline Value reports for specific contaminants; all DEFRA and Environment Agency.
[5] Contaminated Land Exposure Assessment (CLEA) Software Version 1.06 Environment Agency 2009
[6] CL:AIRE (2013) *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination* Final Project Report SP1010 and DEFRA (2014) *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination* Policy Companion Document SP1010

- site specific risk assessment to refine the assessment criteria and allow an assessment to be made as to whether the concentration present would pose an unacceptable risk at this site; or

- soil remediation or risk management to mitigate the risk posed by the contaminant to a degree that it poses an acceptable risk.

When compared to the Generic Screening Values for a commercial end use, the results of the chemical analyses have indicated no elevated levels of contaminants. However, raised levels of Total Petroleum Hydrocarbons (TPH) and Polyaromatic Hydrocarbons (PAH) were identified within the samples collected from Borehole No WS2 at depths of 0.4 m and 3.7 m, as well as Borehole No 2 at a depth of 4.7 m. Of the TPH concentrations, speciated testing revealed the majority of the contamination comprised the C10 to C21 aromatic hydrocarbons, which is indicative of the soluble components of a diesel type source.

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

Part 2: DESIGN BASIS REPORT

This section of the report provides an interpretation of the findings detailed in Part 1, in the form of a ground model, and then provides advice and recommendations with respect to the proposed development.

5.0 INTRODUCTION

It is understood that it is proposed to demolish the existing building and construct two four-storey apartment blocks. The four-storey structure located in the south of the site is proposed to include a single-storey basement for car parking and it is understood that the proposed development will extend into the swimming pool complex adjacent to the site.

6.0 GROUND MODEL

The desk study has revealed that the site does not have a contaminative history, in that it was occupied by a public house and car park before being occupied by the existing building. On the basis of the fieldwork, the ground conditions at this site can be characterised as follows.

- Below a variable thickness of made ground, Kempton Park Gravel is underlain by London Clay, which was proved to the full depth of investigation, of 25.0 m;
- the made ground typically comprises dark brown silty slightly sandy gravelly clay with fragments of brick, slate, concrete, tarmac, ash and coal and extends to depths of between 0.6 m and 1.7 m (6.4 m OD and 5.3 m OD);
- the Kempton Park Gravel generally consists of medium dense becoming dense greyish light brown slightly gravelly fine to coarse grained subrounded to subangular sand to depths of 4.9 m and 5.8 m (2.1 m OD and 1.8 m OD);
- within Borehole No WS1, a layer of soft to firm greyish light brown clayey silt contains a hydrocarbon odour at a depth of 3.7 m (3.3 m OD).
- the London Clay comprises firm becoming stiff, high strength becoming very high strength fissured dark grey silty clay with occasional partings of fine sand and selenite crystals to the full depth investigated, of 20.0 m (-16.29 m OD);
- groundwater was measured immediately after drilling at depths of 3.8 m (-0.09 m OD) and 5.1 m (-1.58 m OD). It has since been monitored on three occasions at depths of between 4.12 m and 4.96 m (2.66 m OD and 3.01 m OD) and appears to be flowing in a northerly direction toward the River Thames;
- contamination testing has indicated no elevated levels of contaminants within the made ground tested. Soil samples recovered from the natural Kempton Park Gravel at Borehole No 1 revealed high concentrations of Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH), although they are still below the generic screening values of a commercial end use; and
- contamination testing of the groundwater recovered from Borehole No 2 has revealed elevated levels of PAH and TPH.

7.0 ADVICE AND RECOMMENDATIONS

It is understood that the proposed lower ground floor is to extend to a depth of 4.0 m, such that formation level should be within the medium dense sandy gravel of the Kempton Park Gravel. Ground water has been recorded at depths of between 4.12 m and 4.96 m (2.66 m OD and 3.01 m OD) and therefore care should be taken not to penetrate the groundwater level. A contiguous bored piled wall is likely to be the best way of forming the basement retaining walls.

Contamination analysis has indicated that TPH and PAH contamination is present within the groundwater in the southwestern part of the site.

Additional investigation should be carried out when the adjacent swimming pool site becomes available to confirm the ground conditions.

7.1 Lower Ground Floor Construction

The formation level for the basement is likely to be within the medium dense gravelly sand of the Kempton Park Gravel at a depth of about 4.0 m. Groundwater has been measured at depths of between 4.12 m and 4.96 m (2.66 m OD and 3.01 m OD) and is therefore not expected to be encountered within the basement excavation. However care should be taken not to penetrate the groundwater level during excavation. Monitoring of the standpipes will be continued as part of the monitoring schedule to confirm the groundwater table but at this stage, it should be assumed that groundwater would not be encountered in the basement excavation.

In addition to groundwater from the gravel, shallow inflows of perched water may be encountered from within the made ground. Ideally, a number of trial excavations should be carried out, to depths as close to the full basement depth as possible, to provide an indication of stability and the extent to which the excavation may be affected by groundwater inflows.

The design of lower ground floor support in the temporary and permanent conditions needs to take account of the necessity to maintain the stability of the surrounding structures and the possible requirement to control groundwater inflows. There are a number of methods by which the sides of the basement excavation could be supported in the temporary and permanent conditions. The choice of wall may be governed to a large extent by whether it is to be incorporated into the permanent works and have a load bearing function.

On the basis that groundwater will not be encountered within the basement excavation, the retaining walls could be formed through contiguous bored piles, which have the advantage of being incorporated into the permanent works and may be able to provide support for structural loads. The wall will need to encroach into the basement by as little as possible to maximise usable space, but will need to be of sufficient stiffness in view of the 4.0 m retained height. The retaining wall will also need to be designed to support any pressure imposed by the proposed adjacent apartment blocks should a raft or spread foundation be adopted. Alternatively a secant bored piled wall could be adopted.

The ground movements associated with the basement excavation will depend on the method of excavation and support and the overall stiffness of the basement structure in the temporary condition. Thus, a suitable amount of propping will be required to provide the necessary rigidity. In this respect the timing of the provision of support to the wall will have an important effect on movements.

7.1.1 Lower Ground Floor Retaining Walls

The following parameters are suggested for the design of the permanent basement retaining walls.

Stratum	Bulk Density (kg/m^3)	Effective Cohesion ($c' - kN/m^2$)	Effective Friction Angle (ϕ' – degrees)
Made ground	1700	Zero	27
Kempton Park Gravel	1800	Zero	33
London Clay	1950	Zero	24

Groundwater is unlikely to be encountered within the basement excavations during construction, and monitoring of the standpipes should be continued in order to establish equilibrium levels. At this stage, it is recommended that a water level of -2.89 m OD be adopted in the design of new retaining walls, but that monitoring is continued. Reference should be made to BS8102:2009[7] with regard to requirements for waterproofing.

7.1.2 Lower Ground Floor Heave

The 4.0 m deep excavation of the basement will result in a net unloading of around 70 kN/m^2, which will result in heave of the underlying London Clay. However, given the approximately 1.0 m thickness of Kempton Park Gravel overlying the London Clay and the expected loading of the proposed structure, the movements will be reduced. Further consideration should however be given to these movements once final loads and levels are known.

7.2 Piled Foundations

Some form of bored pile is likely to be the most appropriate type. A conventional rotary augered pile could be utilised but consideration will need to be given to the possible instability and water ingress within the made ground and granular parts of the Kempton Park Gravel. The use of bored piles installed using continuous flight auger (cfa) techniques may therefore be the most appropriate and the limited site access may be a factor in the selection of the most appropriate pile type.

The following table of ultimate coefficients may be used for the preliminary design of bored piles, based on the SPT and cohesion / depth graph in the appendix.

Stratum	Depths m	kN / m^2
Ultimate Skin Friction		
Made Ground [basement excavation]	GL to 1.0 [GL to 4.0]	Ignore
Kempton Park Gravel [incl. basement excavation]	1.0 to 6.0 [4.0 to 6.0]	25 [10]
London Clay	7.0 to 20.00	Increasing linearly from 30 to 110
Ultimate End Bearing		
London Clay	15.00 to 25.00	Increasing linearly from 1260 to 1980

7 BS8102 (2009) *Code of practice for protection of below ground structures against water from the ground*

In the absence of pile tests, guidance from the London District Surveyors Association (LDSA)[8] suggests that a factor of safety of 2.6 should be applied to the above coefficients in the computation of safe theoretical working loads. On the basis of the above coefficients the following pile capacities have been estimated.

Pile diameter mm	Depth Below Ground Level m	Safe Working Load kN
450 (no basement excavation)	15	385
	20	710
450 (incl. 4.0 m basement excavation)	15	330
	20	660

The above examples are not intended to constitute any form of recommendation with regard to pile size or type, but merely serve to illustrate the use of the above coefficients. Specialist piling contractors should be consulted with regard to the design of a suitable piling scheme and their attention should be drawn to potential groundwater inflows and instability within the made ground and Kempton Park Gravel, as well as the presence of silt layers and possible claystones within the London Clay.

7.3 Spread Foundations

Moderate width strip or pad foundations bearing on the medium dense sand and gravel of the Kempton Park Gravel below basement level may be designed to apply a net allowable bearing pressure of 175 kN/m^2. This value incorporates an adequate factor of safety against bearing capacity failure, and should ensure that settlements remain within normal tolerable limits. The recommended bearing pressure takes account of the variable depth to the base of the stratum across the site and any foundations should be nominally reinforced to protect against differential settlement.

For the northerly building that does not include a basement level, moderate width strip or pad foundations bearing on the medium dense sand and gravel of the Kempton Park Gravel below ground floor level may be designed to apply a net allowable bearing pressure of 200 kN/m^2.

7.4 Raft Foundations

A basement raft foundation could be adopted bearing onto the medium dense sand and gravel of the Kempton Park Gravel, provided that the loads can be relatively uniformly distributed. The basement excavation will result in an unloading of 70 kN/m^2. Depending on the gross pressure applied by the raft, the resultant net pressure may be relatively low, such that a raft foundation may be appropriate and not result in significant settlement. Formation level should be proof rolled and any soft spots removed and backfilled with suitably compacted granular fill. The raft foundation should be nominally reinforced in order to resist any heave pressures or where it spans cohesive and granular material.

Ground movements associated with the construction of a raft foundation should be considered in more detail when final loads and levels are known.

[8] LDSA (2009) *Foundations No 1 – Guidance notes for the design of straight shafted bored piles in London Clay*. LDSA

7.5 Shallow Excavations

On the basis of the borehole findings it is considered that it will be generally feasible to form relatively shallow excavations terminating within the made ground without the requirement for lateral support, although localised instabilities may occur where more granular material or groundwater is encountered.

Significant inflows of groundwater into shallow excavations are not generally anticipated, although seepages may be encountered from perched water tables within the made ground. Such inflows should be suitably controlled by sump pumping.

However, if deeper excavations are considered or if excavations are to remain open for prolonged periods it is recommended that provision be made for battered side slopes or lateral support. Where personnel are required to enter excavations, a risk assessment should be carried out and temporary lateral support or battering of the excavation sides considered in order to comply with normal safety requirements.

7.6 Effect of Sulphates

Chemical analyses of the made ground have revealed moderate concentrations of soluble sulphate and a classification of Class DS-1 conditions in accordance with Table C2 of BRE Special Digest 1:SD Third Edition (2005). The measured pH values of the samples show that an ACEC class of AC-1^{d} would be appropriate for the site. This assumes a mobile water condition at the site. The guidelines contained in the digest should be followed in the design of foundation concrete.

Chemical analyses of the London Clay have revealed relatively moderate concentrations of soluble sulphate and near-neutral pH and a classification of Class DS-2 conditions in accordance with Table C2 of BRE Special Digest 1:SD Third Edition (2005). The measured pH values of the samples show that an ACEC class of AC-2s would be appropriate for the site. This assumes a static water condition at the site. The guidelines contained in the digest should be followed in the design of foundation concrete.

7.7 Lower Ground and Ground Floor Slabs

The medium dense sand and gravel of the Kempton Park Gravel should provide a suitable stratum for a ground bearing floor slab. However, formation level should be checked and proof rolled before any construction works begin. Any soft spots should be excavated and backfilled with suitably compacted granular fill.

7.8 Contamination Risk Assessment

The contamination testing has not indicated elevated concentrations of contaminants within the soil samples tested when compared to the adopted generic human health thresholds for a commercial end use. Soil samples recovered from the natural Kempton Park Gravel in Borehole No 1 revealed elevated concentrations of Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH), although they are still below the generic chronic human health screening values of a commercial end use.

Groundwater sampling has revealed elevated concentrations of Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH) within the groundwater sample taken from Borehole No WS2 when compared to drinking water standards. Of the TPH contamination, speciated testing revealed the majority of the contamination comprised chain

C10 to C21 aromatic hydrocarbons. The speciation of the hydrocarbons present is indicative of the soluble components of a diesel type source which has migrated in solution within the groundwater from an upgradient source. The high concentrations of TPH and PAH were encountered within the natural soils in Borehole No 1 which is located up-gradient from Borehole No WS2 suggesting that the potential source may be located in this area of the site. It is possible that a diesel type hydrocarbon could be leaching into the groundwater possibly partially dissolving some tarmac during its passage through the ground and is then flowing with the groundwater towards the River Thames.

The proposed lower ground floor excavation in the south of the site may result in a proportion of the source of the contaminants being removed as part of the proposed scheme. However, in the north of the site, where the building without a lower ground floor is to be located, there is potential for the contamination to remain. It is therefore recommended that further investigation be carried out within this area with a view to locating and delineating the source of the hydrocarbon contaminants so that it can be either excavated and removed from site or degraded insitu such that it no longer poses a risk to the down-gradient groundwater quality.

End users would only be at risk in areas of soft landscaping, as the presence of the proposed buildings and surrounding areas of hardstanding will form a physical barrier between end users and the remaining made ground. At this stage, it is recommended that a 600 mm thick layer of clean topsoil and subsoil be imported to site and placed in areas of soft landscaping, therefore protecting end users from any contaminants left in the remaining made ground. Validation testing or appropriate certification should then be undertaken in order to confirm the contaminants present within the imported fill to ensure they fall below the appropriate Generic Screening Values.

Given the allowable space on site, it may be possible to continue the basement excavation to locate and remove the source of the contamination. However, should such an excavation confirm that the source extends beyond the site boundary, consideration may need to be given to the installation of a containment barrier or in-situ treatment curtain. It would therefore be preferable to carry out additional investigation at an early stage to locate the source and identify whether removal or in-situ treatment is likely to be more cost effective at this site. This additional investigation could be carried out in conjunction with the additional ground investigation recommended for the adjacent swimming pool site, which should be conducted to confirm the ground conditions in that area of the site.

Ground gas monitoring has not recorded any elevated concentrations of methane, volatile organic carbons or carbon dioxide and no depleted oxygen concentrations. A low GSV that refers to Characteristic Situation 1 has been determined. In the absence of any known sources of gas it is not considered that ground gas remediation measures are likely to be required. However, this will need to be confirmed upon the conclusion of the three remaining gas monitoring visits. Notwithstanding the results of the monitoring it would be prudent to consider the installation of a vapour-proof membrane to protect against odour nuisance in view of the hydrocarbon contamination measured in the groundwater.

7.8.1 Site Workers

A programme of working should be identified to protect workers handling any soil. The method of site working should be in accordance with guidelines set out by HSE[9] and CIRIA[10] and the requirements of the Local Authority Environmental Health Officer.

9 HSE (1992) HS(G)66 *Protection of workers and the general public during the development of contaminated land* HMSO

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

A watching brief should be maintained during the site works and if any suspicious soil is encountered, it should be inspected by a suitably qualified engineer and further testing carried out if required.

7.8.2 Services

Consideration may need to be given to the protection of buried plastic services within the underlying soils. Details of the proposed protection measures for buried plastic services will need to be approved by the EHO and the relevant service authority prior to the adoption of any scheme. It is possible that barrier pipe will be required or that additional testing along proposed service trenches will need to be carried out.

7.9 Waste Disposal

Under the European Waste Directive, waste is classified as being either Hazardous or Non-Hazardous and landfills receiving waste are classified as accepting hazardous or non-hazardous wastes or the non-hazardous sub-category of inert waste in accordance with the Waste Directive. Waste classification is a staged process and this investigation represents the preliminary sampling exercise of that process. Once the extent and location of the waste that is to be removed has been defined, further sampling and testing may be necessary. The results from this ground investigation should be used to help define the sampling plan for such further testing, which could include WAC leaching tests where the totals analysis indicates the soil to be a hazardous waste or inert waste from a contaminated site. It should however be noted that the Environment Agency guidance WM3[11] states that landfill WAC analysis, specifically leaching test results, must not be used for waste classification purposes. WAC testing of the made ground has been conducted from soils recovered in Borehole No 2 and the results are appended.

Any spoil arising from excavations or landscaping works, which is not to be re-used in accordance with the CL:AIRE[12] guidance, will need to be disposed of to a licensed tip. Waste going to landfill is subject to landfill tax at either the standard rate of £86.10 per tonne (about £155 per m^3) or at the lower rate of £2.70 per tonne (roughly £5 per m^3). However, the classifications for tax purposes and disposal purposes differ and currently all made ground and topsoil is taxable at the 'standard' rate and only naturally occurring soil and stones, which are accurately described as such in terms of the 2011 Order, would qualify for the 'lower rate' of landfill tax.

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

Soil Type	Waste Classification (Waste Code)	WAC Testing Required Prior to Landfill Disposal?	Comments
Made ground	Non - Hazardous (17 05 04)	Maybe – check with receiving landfill	-
Natural Soils (around groundwater level)	Hazardous (17 05 04)	Maybe – check with receiving landfill	-
Natural soils	Inert (17 05 04)	Should not be required but confirm with receiving landfill	-

Under the requirements of the European Waste Directive all waste needs to be pre-treated prior to disposal. The pre-treatment process must be physical, thermal, chemical or biological, including sorting. It must change the characteristics of the waste in order to reduce its volume,

11 Environment Agency 2015. *Guidance on the classification and assessment of waste.* Technical Guidance WM3 First Edition
12 CL:AIRE March 2011. *The Definition of Waste: Development Industry Code of Practice* Version 2

hazardous nature, facilitate handling or enhance recovery. The waste producer can carry out the treatment but they will need to provide documentation to prove that this has been carried out. Alternatively, the treatment can be carried out by an approved contractor. The Environment Agency has issued a position paper[13] which states that in certain circumstances, segregation at source may be considered as pre-treatment and thus excavated material may not have to be treated prior to landfilling if the soils can be segregated onsite prior to excavation by sufficiently characterising the soils insitu prior to excavation.

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

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

8.0 OUTSTANDING RISKS AND ISSUES

This section of the report aims to highlight areas where further work is required as a result of limitations on the scope of this investigation, or where issues have been identified by this investigation that warrant further consideration. The scope of risks and issues discussed in this section is by no means exhaustive, but covers the main areas where additional work may be required.

The ground is a heterogeneous natural material and variations will inevitably arise between the locations at which it is investigated. This report provides an assessment of the ground conditions based on the discrete points at which the ground was sampled, but the ground conditions should be subject to review as the work proceeds to ensure that any variations from the Ground Model are properly assessed by a suitably qualified person.

Groundwater and gas monitoring should be continued in accordance with the proposed schedule of four additional visits.

The proposed development covers a greater area than has been investigated. Additional investigation will be required in due course in the additional development areas to the west of the site.

The recommendations of the preliminary UXO risk assessment report with regard to the need for a detailed risk assessment prior to construction and the potential need for specialist supervision should be drawn to the attention of prospective contractors.

If during the ground works any visual or olfactory evidence of contamination is identified further investigation be carried out and the risk assessment reviewed. These areas of doubt should be drawn to the attention of prospective contractors and further investigation will be required or sufficient contingency should be provided to cover the outstanding risk.

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

APPENDIX FOR PARTS

Borehole Records

Trial Pit Records

Geotechnical Test Results

SPT & Cohesion/Depth Graph

Contamination Test Results

Generic Screening Values

Ground gas and water monitoring

Envirocheck Extracts

Historical Maps

Preliminary UXO Risk Assessment

Site Plan

GEA

Geotechnical & Environmental Associates
Widbury Barn | Widbury Hill | Ware | SG12 7QE

Site	Borehole Number
Twickenham Riverside, Twickenham, TW1 3SD	BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 12.00m 150mm cased to 25.00m	7.75	London Borough of Richmond	J17205
	Location	**Dates**	**Engineer**	**Sheet**
		14/08/2017- 15/08/2017	Price & Myers	1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.80)	Tarmac over concrete/ brick rubble		
0.50	D1				6.95	0.80			
						(0.30)	Made ground (brown silty clay with occasional brick fragments).		
1.00	D2				6.65	1.10			
							Medium dense brown clayey sandy GRAVEL		
1.50-1.95	SPT(C)	1.50	DRY	1,1/3,3,2,2					
1.50	D3								
2.00	B4								
2.50-2.95	SPT(C)	2.50	2.20	2,2/4,5,5,6					
3.00	B5								
						(4.70)			
3.50-3.95	SPT(C)	3.50	3.30	2,2/3,3,3,3					
4.00	B6						Frequent cobbles of flint		
4.50-4.95	SPT(C)	4.50	DRY	2,3/5,3,3,5					
				fast(1) at 5.30m, no rise after 20 mins, sealed at 5.30m.					▼1
5.80	D7				1.95	5.80			
6.00-6.45	SPT	6.00	DRY	2,2/2,2,3,3			Firm to stiff medium strength to very high strength brownish grey slightly fissured silty CLAY with selenite crystals and occasional partings of fine sand.		
6.00	D8								
6.00	D9								
7.00	D10								
7.50-7.90	U11			36 blows					
7.90	D12								
9.00-9.45	SPT	6.00	DRY	2,3/3,3,5,6					
9.00	D13								
9.00	D14								

Remarks
Inspection pit excavated to 1.2 m depth

Scale (approx)	Logged By
1:50	JD

Figure No.
J17205.BH1

GEA	Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Twickenham Riverside, Twickenham, TW1 3SD	Borehole Number **BH1**

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 12.00m 150mm cased to 25.00m	7.75	London Borough of Richmond	J17205
	Location	**Dates** 14/08/2017- 15/08/2017	**Engineer** Price & Myers	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00	D15								
10.50-10.95	U16			40 blows					
10.95	D17								
11.50	D18								
12.00	D19			14/08/2017:DRY					
12.00-12.45	SPT	12.00	DRY	15/08/2017:DRY 3,4/7,6,8,9					
13.00	D20								
13.50-13.95	U21			40 blows					
13.95	D22								
14.50	D23								
15.00-15.45 15.00	SPT D24	15.00	DRY	3,5/6,7,9,9		(19.20)			
16.00	D25								
16.50-16.95	U26			45 blows					
16.95	D27								
17.50	D28								
18.00-18.45 18.00	SPT D29	15.00	DRY	3,6/8,7,7,9					
19.00	D30								
19.50-19.95	U31			40 blows					

Remarks
Inspection pit excavated to 1.2 m depth

Scale (approx)	Logged By
1:50	JD

Figure No.
J17205.BH1

GEA Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Twickenham Riverside, Twickenham, TW1 3SD	Borehole Number BH1
Boring Method Cable Percussion	**Casing Diameter** 200mm cased to 12.00m 150mm cased to 25.00m	**Ground Level (mOD)** 7.75	**Client** London Borough of Richmond	**Job Number** J17205
	Location	**Dates** 14/08/2017- 15/08/2017	**Engineer** Price & Myers	**Sheet** 3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
19.95	D32								
20.50	D33								
21.00-21.45	SPT	15.00	DRY	5,8/10,10,11,12					
21.00	D34								
22.00	D35								
22.50-22.95	U36			50 blows					
22.95	D37								
23.50	D38								
24.00-24.45	SPT	15.00	DRY	5,8/10,11,11,14					
24.00	D39								
25.00	D40			15/08/2017:DRY	-17.25	25.00	Complete at 25.45m		
25.00-25.45	U41			70 blows					
25.45	D42								

Remarks
Inspection pit excavated to 1.2 m depth

Scale (approx)	Logged By
1:50	JD

Figure No.
J17205.BH1

GEA
Geotechnical & Environmental Associates
Widbury Barn | Widbury Hill | Ware | SG12 7QE

Site	Borehole Number
Twickenham Riverside, Twickenham, TW1 3SD	BH2

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 10.00m 150mm cased to 17.50m	7.00	London Borough of Richmond	J17205
	Location	**Dates**	**Engineer**	**Sheet**
		16/08/2017- 17/08/2017	Price & Myers	1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.60)	Tarmac over concrete/ brick rubble		
0.50	D1				6.40	0.60	Medium dense brown sandy GRAVEL		
1.00	B2								
1.50-1.95	SPT(C)	1.50	DRY	1,2/2,3,2,3					
2.00	B3								
2.50-2.95	SPT(C)	2.50	2.20	2,4/4,6,5,6					
						(4.60)			
3.00	B4								
3.50-3.95	SPT(C)	3.50	2.90	2,3/4,5,6,6					
4.00	B5						frequent cobbles of flint		
4.60	W6			fast(1) at 4.50m, no rise after 20 mins, sealed at 4.50m.					▼1
4.70	D7						Strong hydrocarbon odour		
4.50-4.95	SPT(C)	4.50	4.00	2,2/2,4,4,4					
					1.80	5.20	Firm to stiff medium strength to very high strength brownish grey slightly fissured silty CLAY with selenite crystals and occasional partings of fine sand.		
6.00-6.45	SPT	6.00	5.70	1,2/2,3,4,5					
7.00	D9								
7.50-7.95	U10			55 blows					
7.95	D11								
8.50	D12								
9.00-9.45	SPT	6.00	DRY	3,3/4,5,6,6					

Remarks
Inspection pit excavated to 1.2 m depth
Chiselling from 10.3 m to 10.9 m depth for 1 hour and from 17.3 m to 17.6 m for 30 minutes

Scale (approx)	Logged By
1:50	JD

Figure No. J17205.BH2

GEA Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Twickenham Riverside, Twickenham, TW1 3SD	Borehole Number **BH2**

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 10.00m 150mm cased to 17.50m	7.00	London Borough of Richmond	J17205
	Location	**Dates** 16/08/2017- 17/08/2017	**Engineer** Price & Myers	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00	D14						Claystone		
10.50	D15								
11.00	D16			16/08/2017:DRY					
11.00-11.45	U17			17/08/2017:DRY 50 blows					
11.45	D18								
12.00	D19								
12.50-12.95	SPT	12.00	DRY	4,6/8,8,10,10					
13.50	D21								
14.00-14.45	U22			55 blows					
14.45	D23								
15.00	D24					(19.80)			
15.50-15.95	SPT	15.50	DRY	6,7/8,9,10,11					
16.50	D26								
17.00-17.30	U27			100 blows					
17.30	D28						Claystone		
18.00	D29								
18.50-18.95	SPT	17.50	DRY	4,6/7,7,9,11					
19.50	D31								

Remarks	Scale (approx)	Logged By
	1:50	JD
	Figure No.	J17205.BH2

GEA	Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Twickenham Riverside, Twickenham, TW1 3SD	Borehole Number **BH2**

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 10.00m 150mm cased to 17.50m	7.00	London Borough of Richmond	J17205
	Location	**Dates** 16/08/2017- 17/08/2017	**Engineer** Price & Myers	**Sheet** 3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
20.00-20.45	U32			110 blows					
20.45	D33								
21.00	D34								
21.50-21.95	SPT	17.50	DRY	5,7/9,11,11,12					
22.50	D36								
23.00-23.45	U37			80 blows					
23.45	D38								
24.00	D39								
25.00	U41			17/08/2017:DRY	-18.00	25.00	Complete at 25.45m		
25.00-25.45	SPT	17.50	DRY	4,5/9,10,12,16					
25.45	D42								

Remarks

Scale (approx)	Logged By
1:50	JD

Figure No. J17205.BH2

GEA	Geotechnical & Environmental Associates Widbury Barn | Widbury Hill | Ware | SG12 7QE	Site Twickenham Riverside, Twickenham, TW1 3SD	Number **WS1**
Excavation Method Open-drive Sampler	**Dimensions**	**Ground Level (mOD)** 7.40	**Client** London Borough of Richmond	**Job Number** J17205
	Location	**Dates** 10/08/2017	**Engineer** Price & Myers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				7.25	(0.15) 0.15	Tarmac		
0.40	D1			6.80	(0.45) 0.60	Made ground (Very dark brown with blackish grey staining silty sandy clay with rare rootlets and fragments of flint, coal, ash, tarmac, brick and decaying carbon. Slight hydrocarbon odour).		
1.00-1.45	SPT N60=21	DRY	1,2/2,2,7,10		(1.10)	Made ground (light brown slightly sandy clayey silt with occasional rootlets and fragments of brick tarmac and flint).		
2.00-2.45	SPT(C) N60=32	DRY	4,5/6,7,9,10	5.70	1.70	Medium dense greyish brown slightly clayey gravelly fine to coarse grained subrounded to subangular SAND. Gravel is fine to coarse grained and subrounded to subangular.		
3.00-3.45	SPT(C) N60=19	DRY	5,6/6,5,4,4		(3.30)			
3.70	D2					Layer of soft to firm greyish light brown clayey silt with coarse gravel sized pockets of grey clay with a hydrocarbon odour.		
4.00-4.45	SPT(C) N60=23	DRY	4,4/5,6,6,6					
5.00-5.45	SPT(C) N60=12	DAMP	4,2/3,3,3,3	2.40	5.00	Complete at 5.00m		

Remarks
Groundwater seepage at 4.9 m depth

Scale (approx)	Logged By
1:50	JD

Figure No.
j17205.WS1

GEA

Geotechnical & Environmental Associates
Widbury Barn | Widbury Hill | Ware | SG12 7QE

Site	Number
Twickenham Riverside, Twickenham, TW1 3SD	WS2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Open-drive Sampler		7.75	London Borough of Richmond	J17205
	Location	**Dates** 10/08/2017	**Engineer** Price & Myers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				7.65	0.10	Tarmac		
0.50	D1				(0.90)	Made ground (Dark brown silty slightly sandy gravelly clay with fragments of brick, slate, concrete, ash, coal, tarmac. Slight hydrocarbon odour).		
1.00-1.45	SPT N60=9	DRY	2,2/2,2,2,3	6.75	1.00			
1.20	D2				(0.50)	Made ground (brown silty sandy clay with fragments of tarmac, ash, brick and chalk).		
				6.25	1.50	Dense becoming very dense light brown gravelly fine to coarse grained subrounded to subangular SAND.		
2.00-2.45	SPT(C) N60=37	DRY	7,10/10,10,9,8					
					(2.50)	becoming very gravelly		
3.00-3.45	SPT(C) N60=18	DRY	3,5/5,4,4,5					
4.00-4.33	SPT(C) 26*/115 50/215	DRY	18,8/18,17,15	3.75	4.00	Terminated at 4.00m		

Remarks
Groundwater not encountered
Borehole terminated at 4.0 m depth due to refusal of sampler

Scale (approx)	Logged By
1:50	JD

Figure No. j17205.WS2

GEA

Geotechnical & Environmental Associates
Widbury Barn | Widbury Hill | Ware | SG12 7QE

Site	Number
Twickenham Riverside, Twickenham, TW1 3SD	WS4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Open-drive Sampler		7.00	London Borough of Richmond	J17205
	Location	**Dates** 10/08/2017	**Engineer** Price & Myers	**Sheet** 1/1

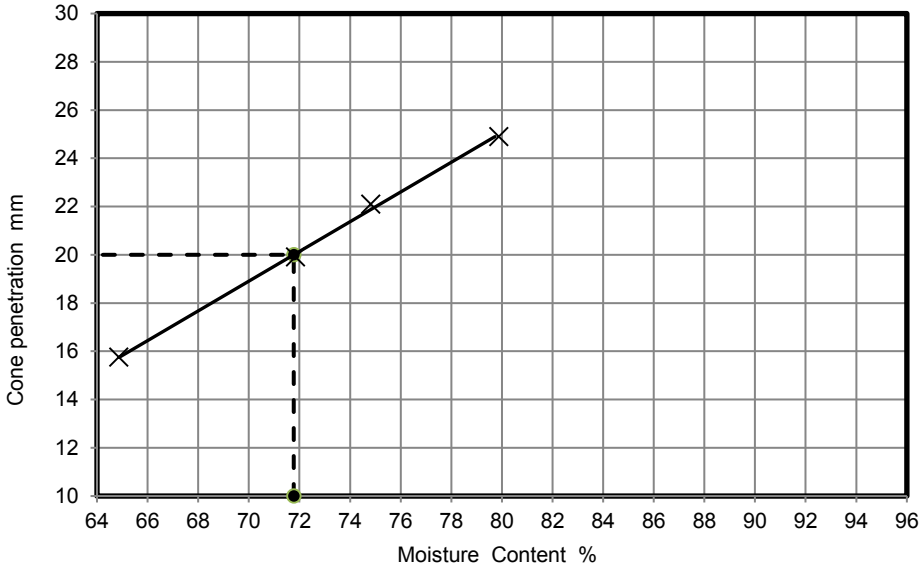
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				6.90	0.10	Tarmac		
						Made ground (brown silty sandy gravelly clay with occasional rootlets and fragments of brick, ash, coal, flint and plastic).		
					(1.60)			
1.00-1.45	SPT(C) N60=3	DRY	0,0/0,1,1,1					
1.40	1D							
				5.30	1.70	Medium dense becoming dense greyish light brown slightly gravelly fine to coarse grained subrounded to subangular SAND. Gravel is subrounded to subangular.		
2.00-2.45	SPT(C) N60=40	DRY	5,8/10,9,10,11					
3.00-3.45	SPT(C) N60=37	DRY	5,7/8,9,10,10		(3.20)			
4.00-4.45	SPT(C) N60=32	DRY	6,8/10,8,7,7					
			slow(1) at 4.50m.					▽1
				2.10	4.90	Firm slightly fissured orange-brown mottled grey silty CLAY		
5.00-5.45	SPT(C) N60=20	DAMP	3,3/3,5,5,7		(0.55)			
				1.55	5.45	Complete at 5.45m		

Remarks
Groundwater seepage at 4.5 m depth
Groundwater monitoring standpipe installed to 5.0 m depth

Scale (approx)	Logged By
1:50	JD

Figure No. j17205.WS4

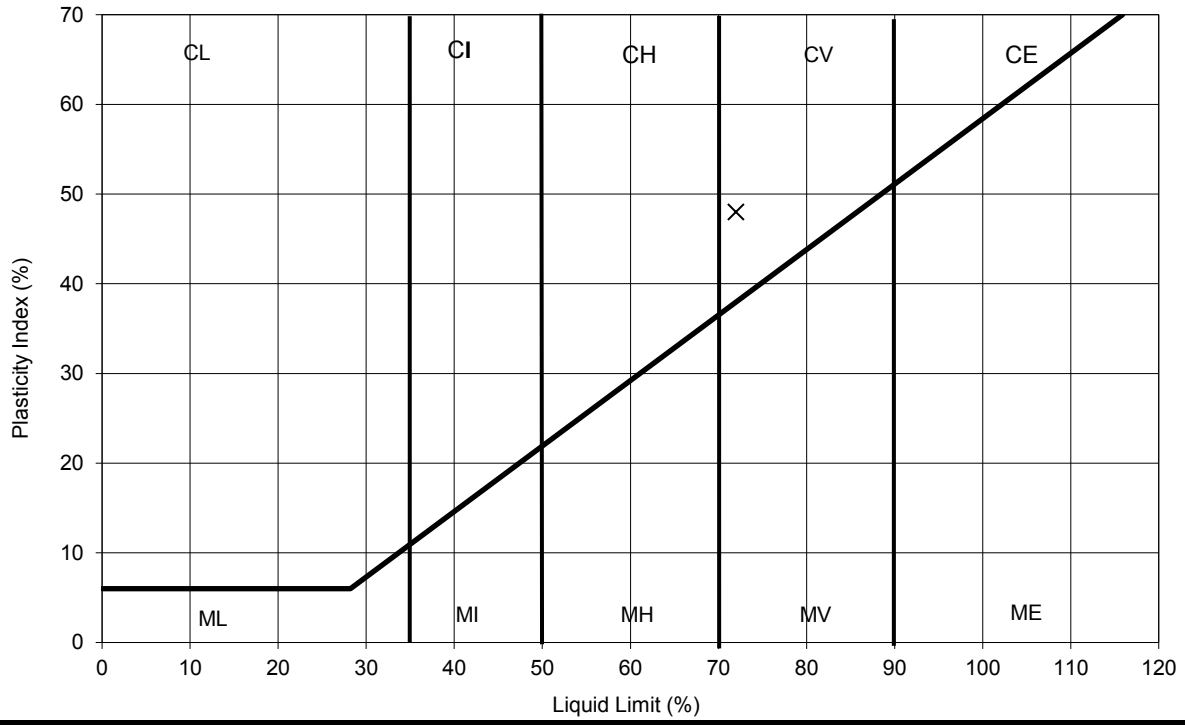
	LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX			Job No.	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	13
Project No.	J17205	Client	GEA	Depth Top	9.00 m
Soil Description	Dark grey silty CLAY			Depth Base	- m
				Sample Type	D
				Samples received	18/08/2017
				Schedules received	07/09/2017
				Project Started	07/09/2017
				Date Tested	20/09/2017



NATURAL MOISTURE CONTENT	**29**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**72**	**%**
PLASTIC LIMIT	**24**	**%**
PLASTICITY INDEX	**48**	**%**

Remarks

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

Checked and Approved

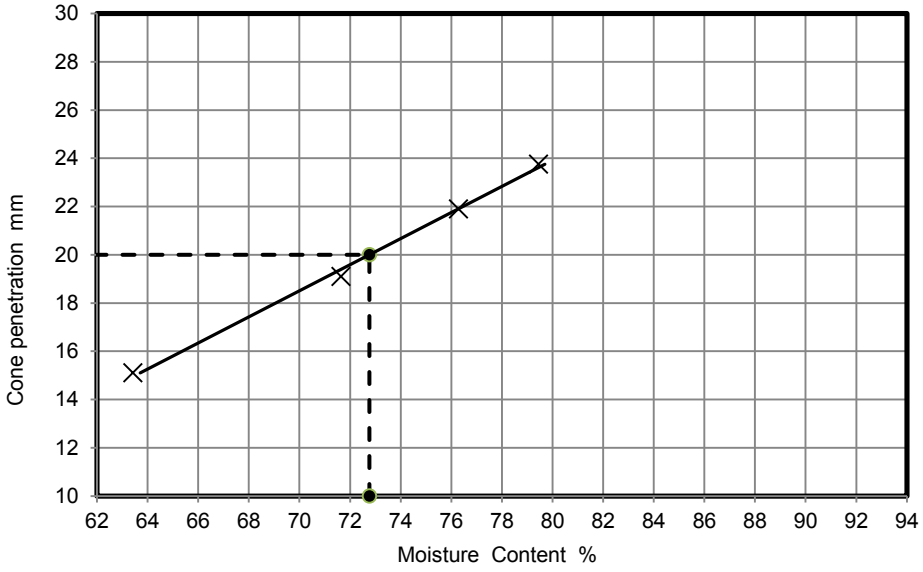
Initials: J.P
Date: 21/09/2017

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
Tel: 01923 711 288 Email: James@k4soils.com

2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

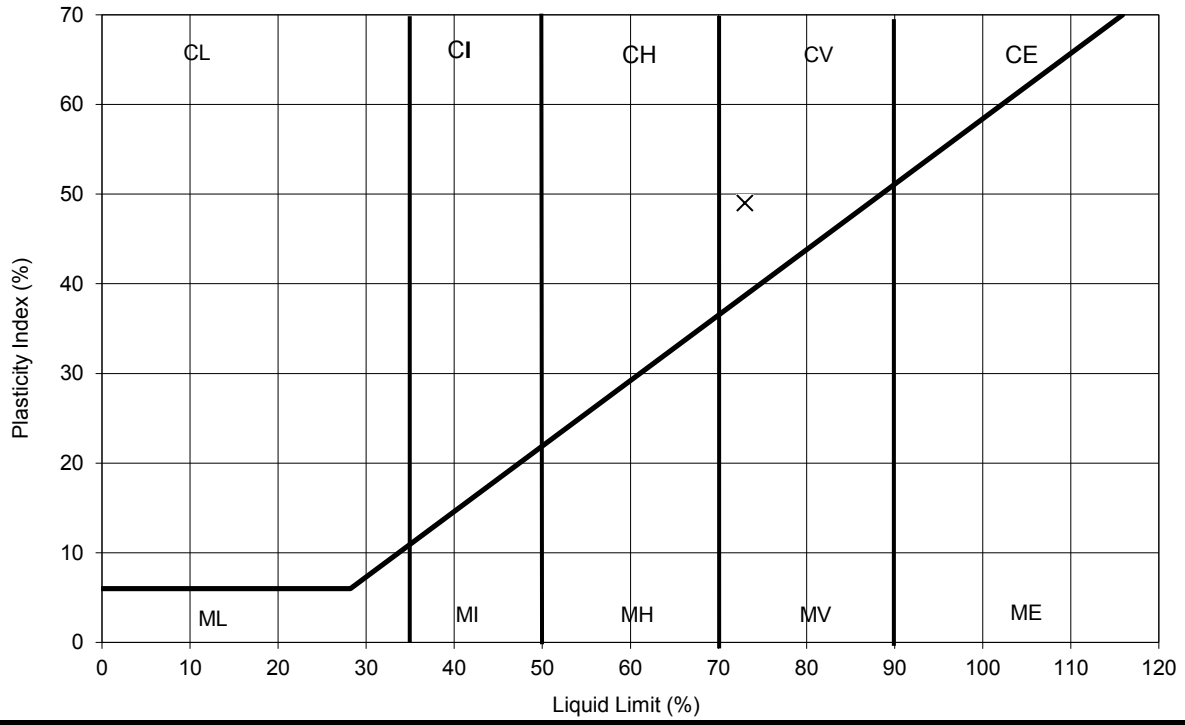
	LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX			Job No.	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	19
Project No.	J17205	Client	GEA	Depth Top	12.00 m
Soil Description	Dark grey silty CLAY			Depth Base	- m
				Sample Type	D
				Samples received	18/08/2017
				Schedules received	07/09/2017
				Project Started	07/09/2017
				Date Tested	20/09/2017



NATURAL MOISTURE CONTENT	**27**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**73**	**%**
PLASTIC LIMIT	**24**	**%**
PLASTICITY INDEX	**49**	**%**

Remarks

PLASTICITY INDEX



TEST METHOD

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Tel: 01923 711 288 Email: James@k4soils.com

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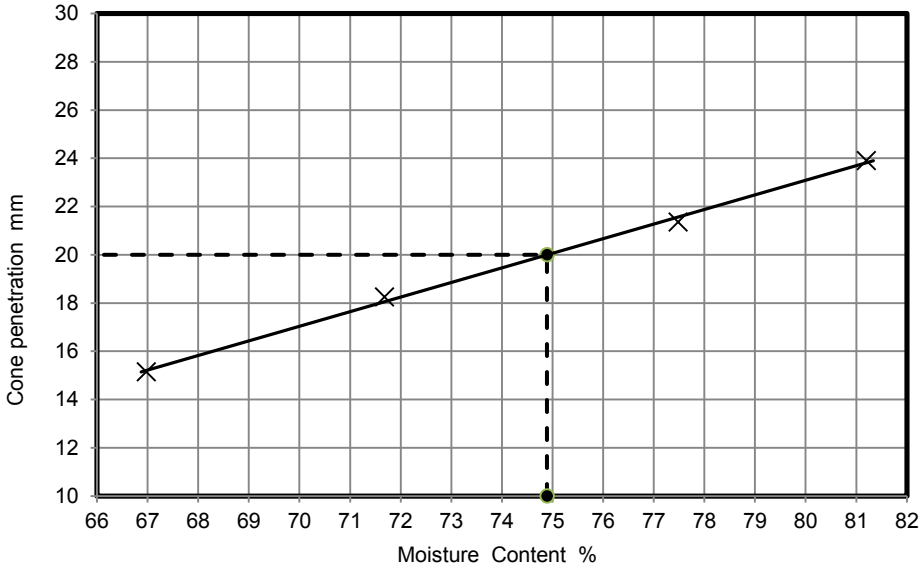
Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

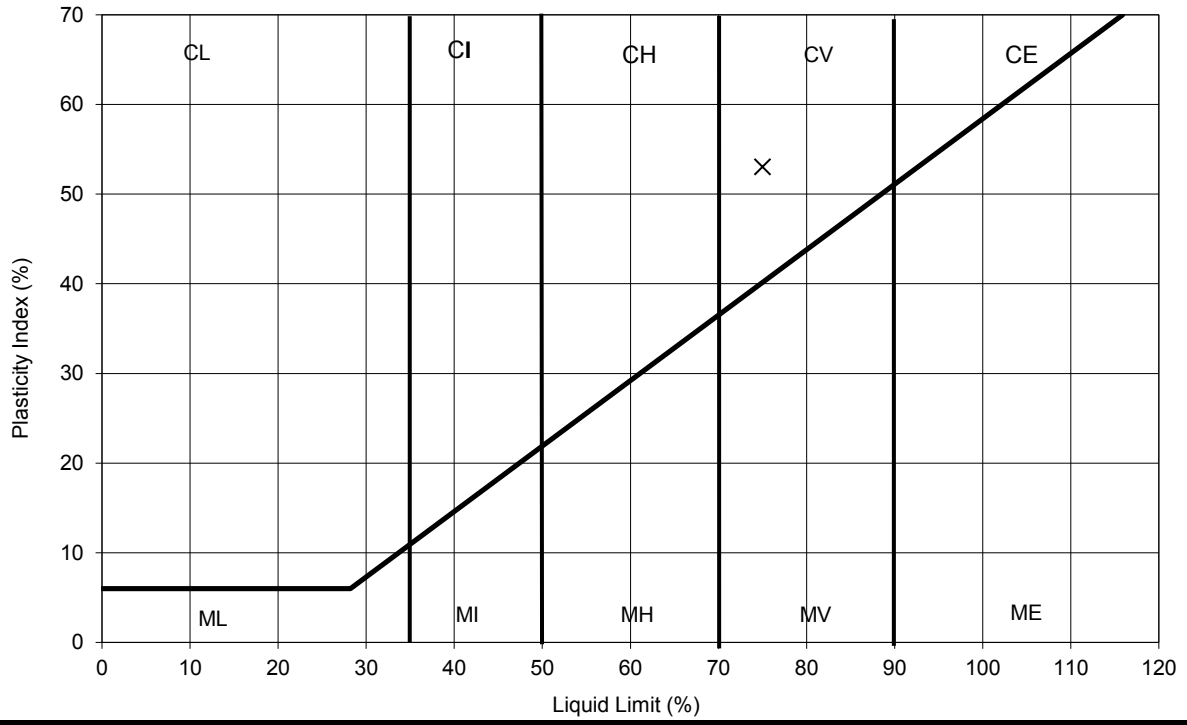
				Job No.	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	30
Project No.	J17205	Client	GEA	Depth Top	19.00 m
Soil Description	Dark grey silty CLAY			Depth Base	- m
				Sample Type	D
				Samples received	18/08/2017
				Schedules received	07/09/2017
				Project Started	07/09/2017
				Date Tested	20/09/2017



NATURAL MOISTURE CONTENT	**26**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**75**	**%**
PLASTIC LIMIT	**22**	**%**
PLASTICITY INDEX	**53**	**%**

Remarks

PLASTICITY INDEX



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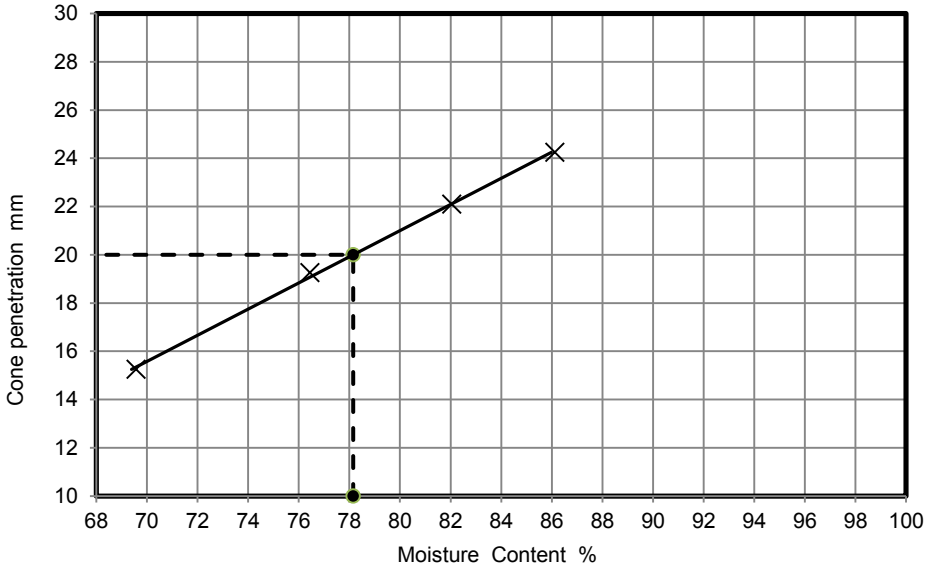
Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

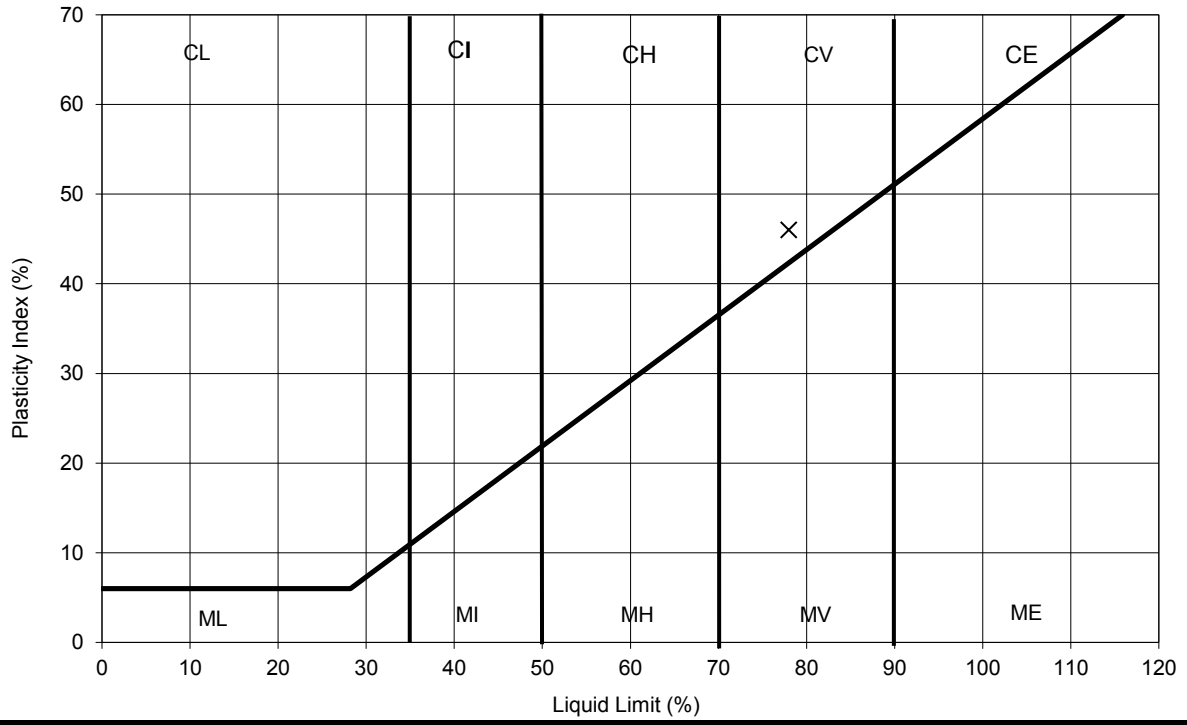
	LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX			Job No.	23261
				Borehole/Pit No.	BH2
Site Name	Twickenham			Sample No.	9
Project No.	J17205	Client	GEA	Depth Top	7.00 m
Soil Description	Dark brown slightly mottled dark grey silty CLAY			Depth Base	- m
				Sample Type	D
				Samples received	18/08/2017
				Schedules received	07/09/2017
				Project Started	07/09/2017
				Date Tested	20/09/2017



NATURAL MOISTURE CONTENT	**29**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**78**	**%**
PLASTIC LIMIT	**32**	**%**
PLASTICITY INDEX	**46**	**%**

Remarks

PLASTICITY INDEX



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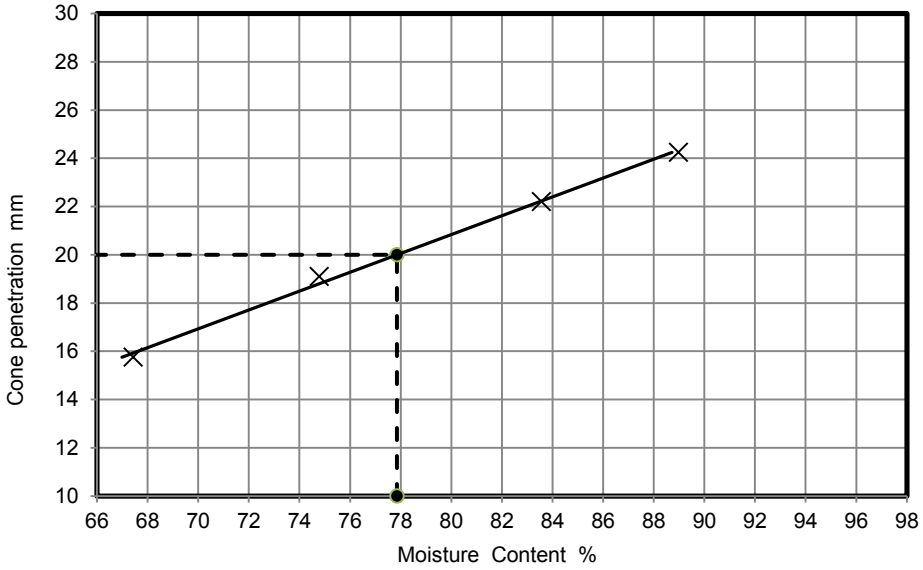
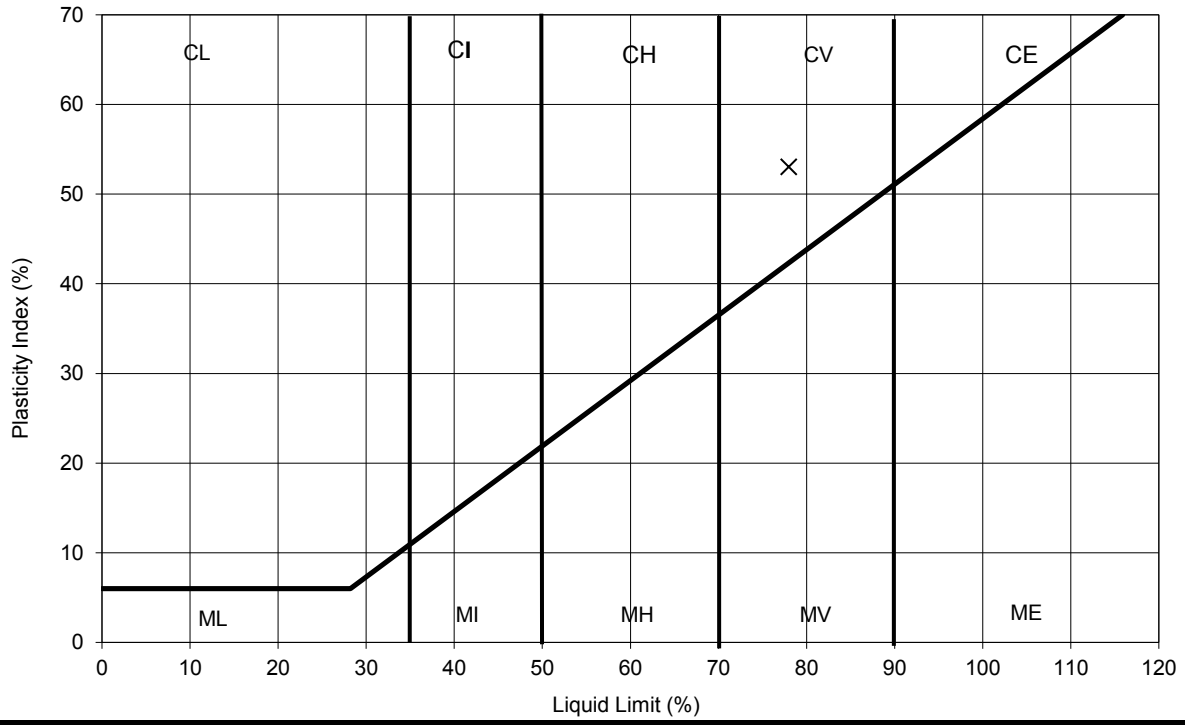
	LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX			Job No.	23261
				Borehole/Pit No.	BH2
Site Name	Twickenham			Sample No.	25
Project No.	J17205	Client	GEA	Depth Top	15.50 m
Soil Description	Dark grey silty CLAY			Depth Base	- m
				Sample Type	D
				Samples received	18/08/2017
				Schedules received	07/09/2017
				Project Started	07/09/2017
				Date Tested	20/09/2017



NATURAL MOISTURE CONTENT	**26**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**78**	**%**
PLASTIC LIMIT	**25**	**%**
PLASTICITY INDEX	**53**	**%**

Remarks

PLASTICITY INDEX



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Date: 21/09/2017

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Tel: 01923 711 288 Email: James@k4soils.com

2519

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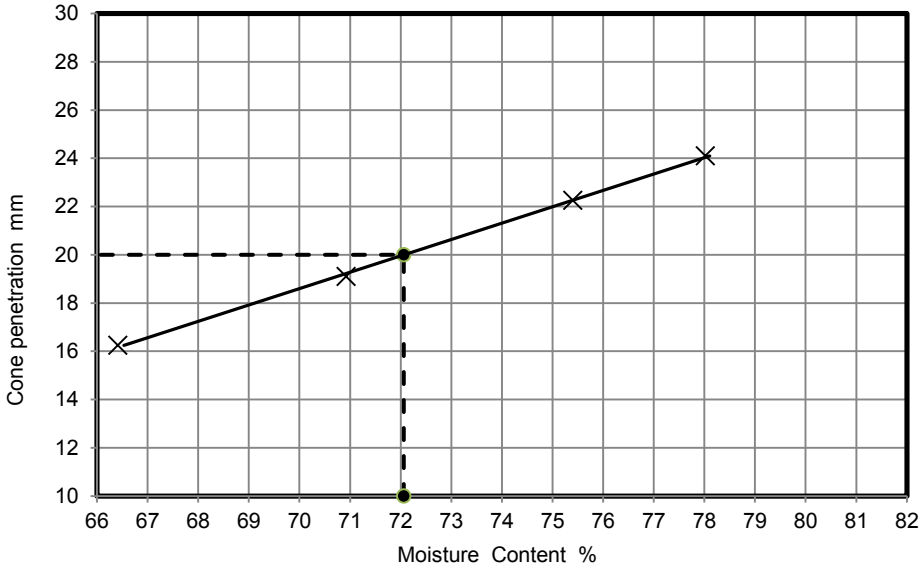
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

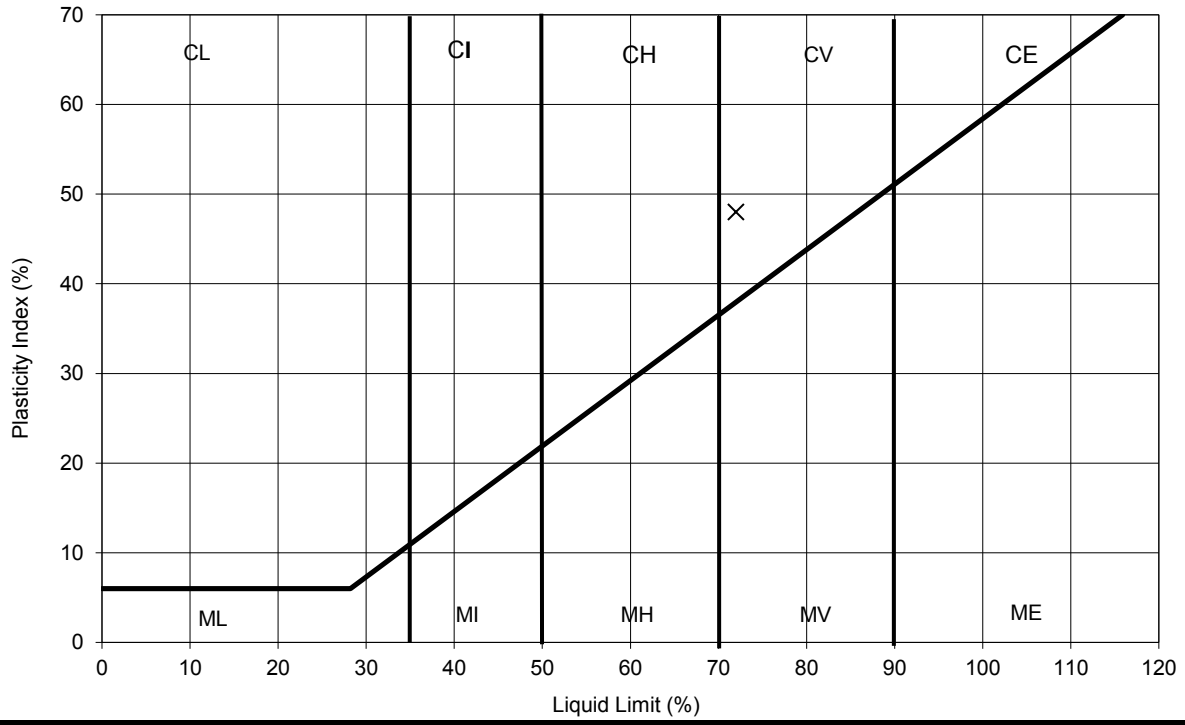
				Job No.	23261
				Borehole/Pit No.	BH2
Site Name	Twickenham			Sample No.	40
Project No.	J17205	Client	GEA	Depth Top	25.00 m
Soil Description	Dark grey silty CLAY			Depth Base	- m
				Sample Type	D
				Samples received	18/08/2017
				Schedules received	07/09/2017
				Project Started	07/09/2017
				Date Tested	20/09/2017



NATURAL MOISTURE CONTENT	**26**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**72**	**%**
PLASTIC LIMIT	**24**	**%**
PLASTICITY INDEX	**48**	**%**

Remarks

PLASTICITY INDEX



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BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

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Date: 21/09/2017

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Tel: 01923 711 288 Email: James@k4soils.com

2519

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Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results

Job No.	Project Name	Programme	
23261	Twickenham	Samples received	18/08/2017
		Schedule received	07/09/2017
Project No.	Client	Project started	07/09/2017
J17205	GEA	Testing Started	20/09/2017

Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top	Base	Type		%	%	%	%	%	
BH1	13	9.00	-	D	Dark grey silty CLAY	29	100	72	24	48	
BH1	19	12.00	-	D	Dark grey silty CLAY	27	100	73	24	49	
BH1	30	19.00	-	D	Dark grey silty CLAY	26	100	75	22	53	
BH2	9	7.00	-	D	Dark brown slightly mottled dark grey silty CLAY	29	100	78	32	46	
BH2	25	15.50	-	D	Dark grey silty CLAY	26	100	78	25	53	
BH2	40	25.00	-	D	Dark grey silty CLAY	26	100	72	24	48	

UKAS TESTING 2519

Test Methods: BS1377: Part 2: 1990:
Natural Moisture Content : clause 3.2
Atterberg Limits: clause 4.3, 4.4 and 5.0

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved

Initials **J.P**

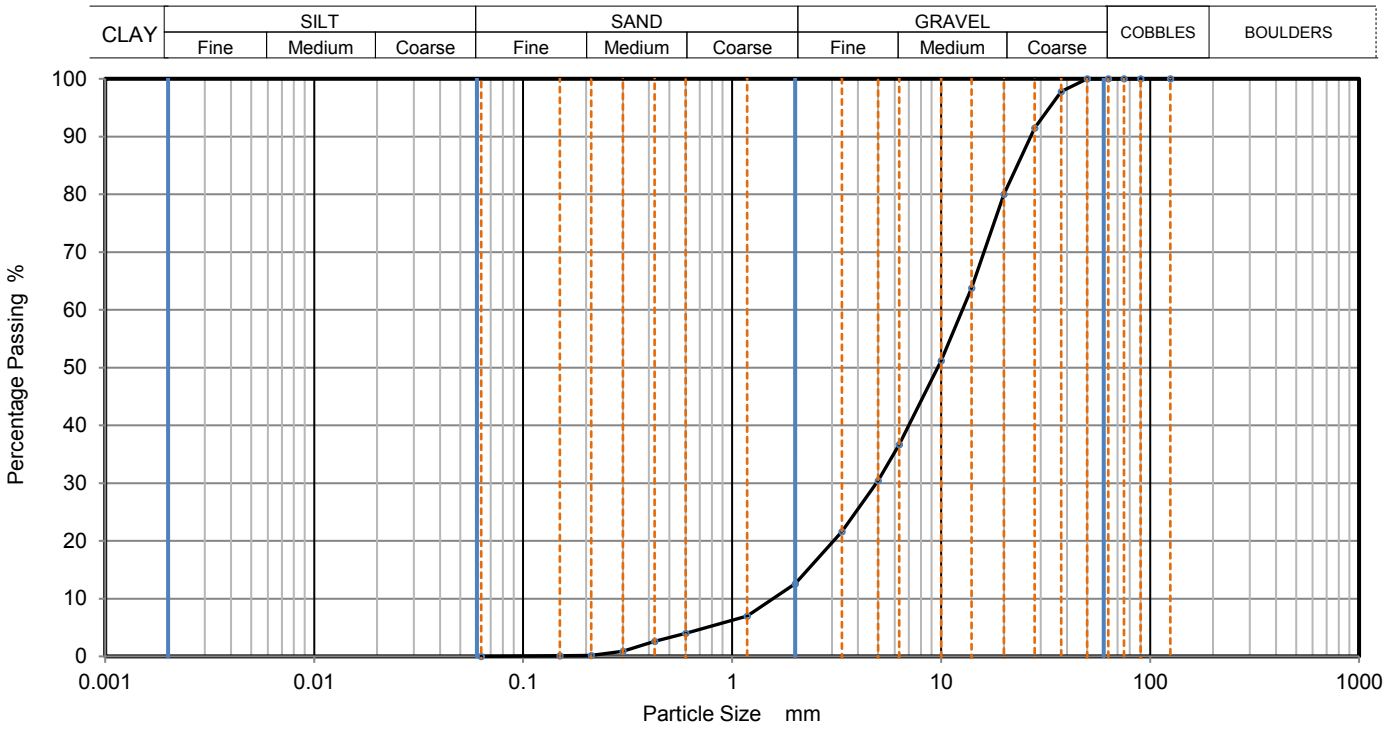
Date: 21/09/2017

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

PARTICLE SIZE DISTRIBUTION

Site Name	Twickenham			Sample No.	5
Project No.	J17205	Client	GEA	Depth Top	3.00 m
Soil Description	Brown sandy GRAVEL (gravel is fmc and angular to rounded)			Depth Base	m
				Sample Type	B
				Samples received	18/08/2017
				Schedules received	07/09/2017
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	07/09/2017
				Date tested	19/09/2017

Job Ref	23261
Borehole/Pit No.	BH1



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	98		
28	92		
20	80		
14	64		
10	51		
6.3	37		
5	30		
3.35	22		
2	13		
1.18	7		
0.6	4		
0.425	3		
0.3	1		
0.212	0		
0.15	0		
0.063	0		

Dry Mass of sample, g: 5530

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	87.4
Sand	12.5
Fines <0.063mm	0.1

Grading Analysis		
D100	mm	
D60	mm	12.7
D30	mm	4.91
D10	mm	1.57
Uniformity Coefficient		8.1
Curvature Coefficient		1.2

Remarks

Preparation and testing in accordance with BS1377 unless noted below

K4 Soils Laboratory

Unit 8, Olds Close, Watford, Herts, WD18 9RU

Email: james@k4soils.com

Tel: 01923 711288

Checked and Approved

Initials: **J.P**

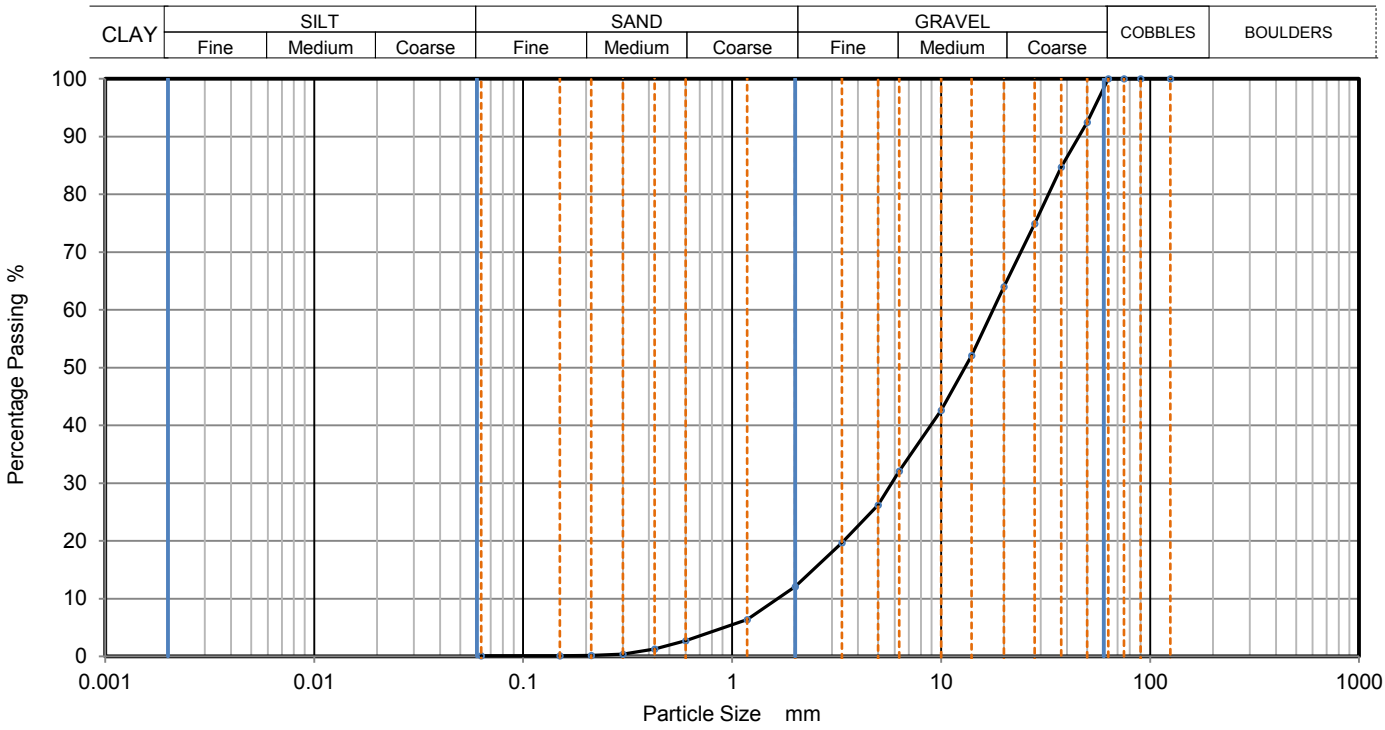
Date: 21/09/2017

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

PARTICLE SIZE DISTRIBUTION

Site Name	Twickenham			Job Ref	23261
				Borehole/Pit No.	BH2
Project No.	J17205	Client	GEA	Sample No.	5
				Depth Top	4.00 m
Soil Description	Brown sandy GRAVEL (gravel is fmc and angular to rounded)			Depth Base	m
				Sample Type	B
				Samples received	18/08/2017
				Schedules received	07/09/2017
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	07/09/2017
				Date tested	19/09/2017



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	93		
37.5	85		
28	75		
20	64		
14	52		
10	43		
6.3	32		
5	26		
3.35	20		
2	12		
1.18	6		
0.6	3		
0.425	1		
0.3	0		
0.212	0		
0.15	0		
0.063	0		

Dry Mass of sample, g	6298

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	87.9
Sand	11.9
Fines <0.063mm	0.1

Grading Analysis		
D100	mm	
D60	mm	17.7
D30	mm	5.8
D10	mm	1.65
Uniformity Coefficient		11
Curvature Coefficient		1.1

Remarks

Preparation and testing in accordance with BS1377 unless noted below

K4 Soils Laboratory

Unit 8, Olds Close, Watford, Herts, WD18 9RU

Email: james@k4soils.com

Tel: 01923 711288

Checked and Approved

Initials: **J.P**

Date: 21/09/2017

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Sulphate Content (Gravimetric Method) for 2:1 Soil: Water Extract and pH Value - Summary of Results

Tested in accordance with BS1377 : Part 3 : 1990, clause 5.3 and clause 9

Job No.	Project Name	Programme	
23261	Twickenham	Samples received	18/08/2017
		Schedule received	07/09/2017
Project No.	Client	Project started	07/09/2017
J17205	GEA	Testing Started	19/09/2017

Hole No.	Sample				Soil description	Dry Mass passing 2mm	SO3 Content	SO4 Content	pH	Remarks
	Ref	Top	Base	Type		%	g/l	g/l		
BH1	13	9.00	-	D	Dark grey silty CLAY	100	0.48	0.58	7.80	
BH2	40	25.00	-	D	Dark grey silty CLAY	100	0.50	0.59	7.90	

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
Initials J.P
Date: 21/09/2017

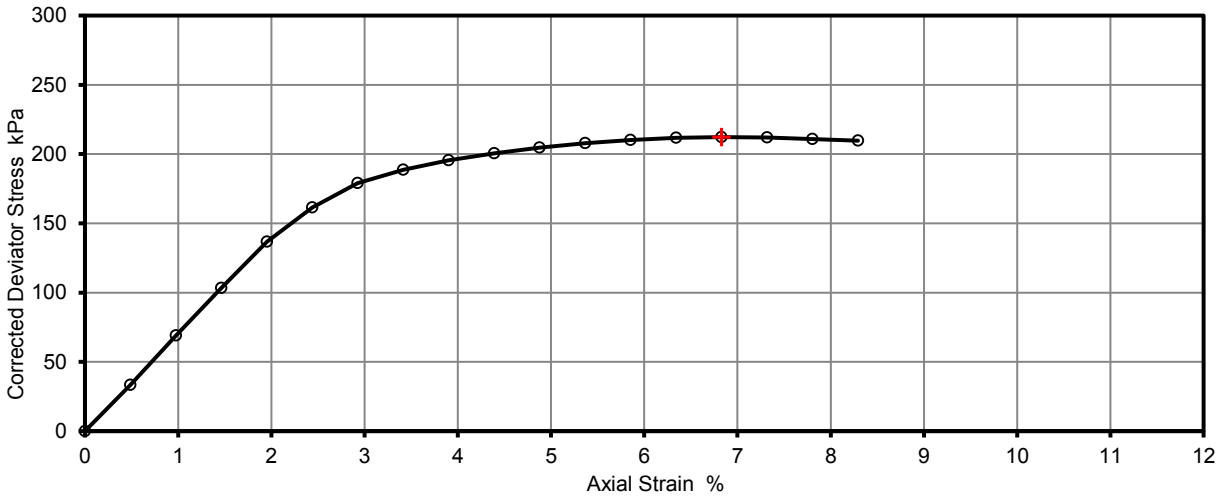
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	11
Project No.	J17205	Client	GEA	Depth Top	7.50 m
Soil Description	High strength slightly fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	24/08/2017

Remarks

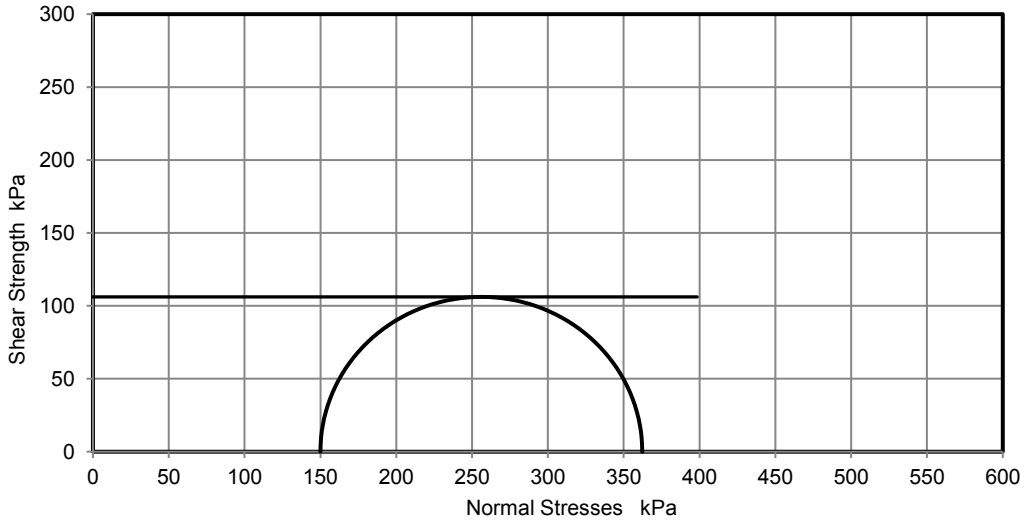
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.93	Mg/m3
Moisture Content	28	%
Dry Density	1.51	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	150	kPa
Axial Strain	6.8	%
Deviator Stress, (σ1 - σ3)f	212	kPa
Undrained Shear Strength, cu	106	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

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Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
Initials: J.P
Date 30/08/2017

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

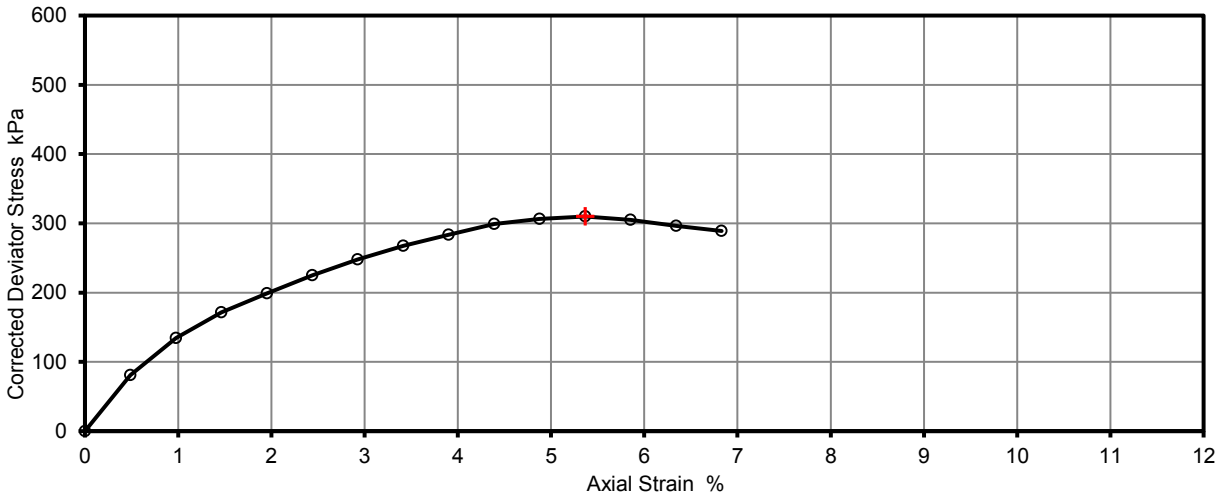
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	16
Project No.	J17205	Client	GEA	Depth Top	10.50 m
Soil Description	Very high strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	24/08/2017

Remarks

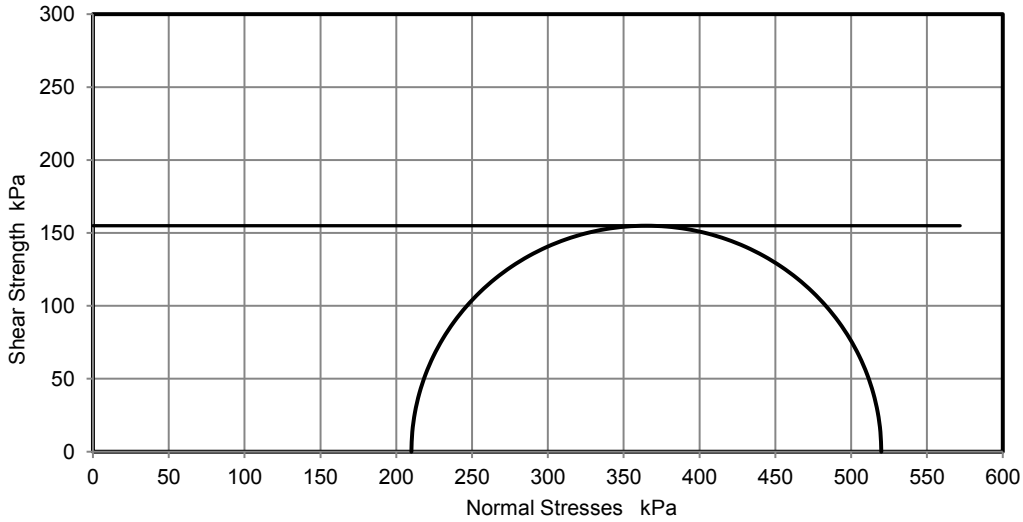
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.95	Mg/m3
Moisture Content	27	%
Dry Density	1.54	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	210	kPa
Axial Strain	5.4	%
Deviator Stress, (σ1 - σ3)f	310	kPa
Undrained Shear Strength, cu	155	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



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Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
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Date 30/08/2017

2519

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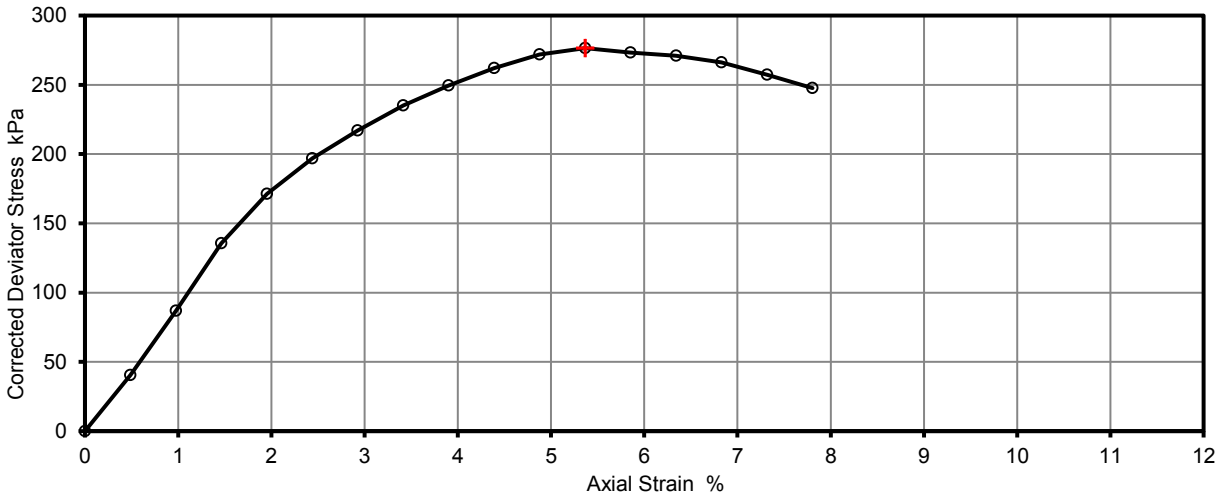
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	21
Project No.	J17205	Client	GEA	Depth Top	13.50 m
Soil Description	High strength fissured dark grey silty CLAY with occasional dark grey silt/sand pockets			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	24/08/2017

Remarks

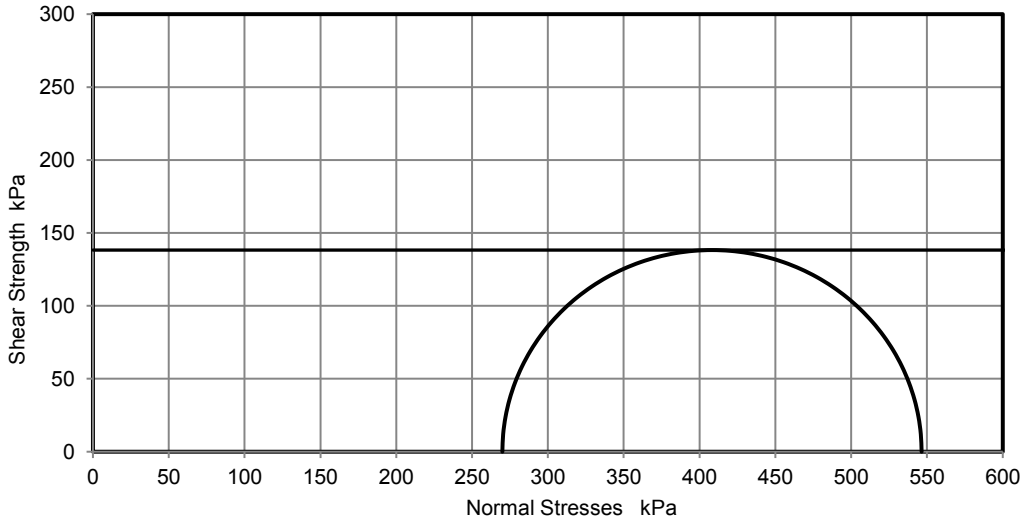
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.95	Mg/m3
Moisture Content	26	%
Dry Density	1.54	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	270	kPa
Axial Strain	5.4	%
Deviator Stress, (σ1 - σ3)f	276	kPa
Undrained Shear Strength, cu	138	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



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Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

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UKAS TESTING
2519

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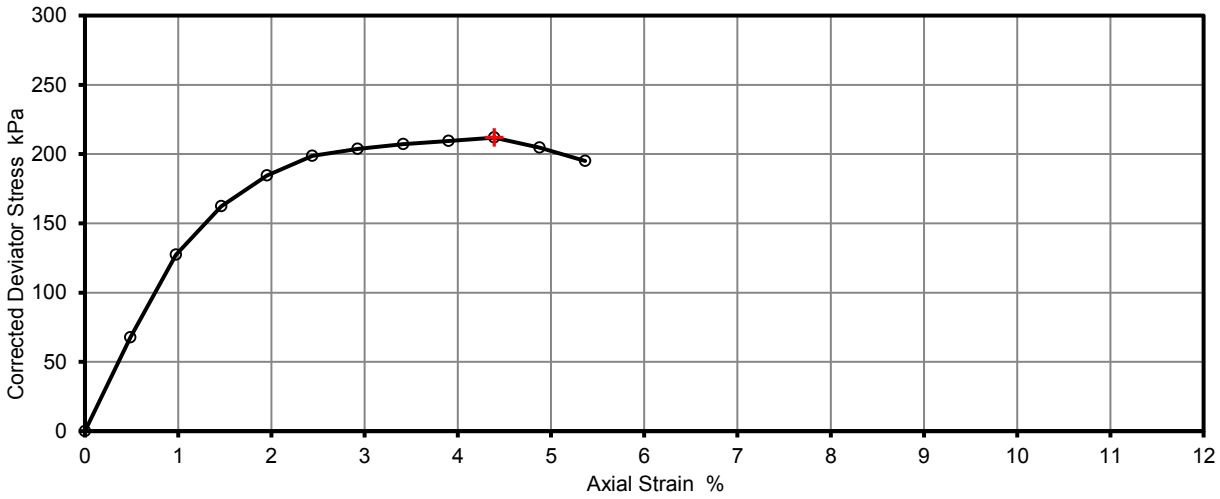
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	26
Project No.	J17205	Client	GEA	Depth Top	16.50 m
Soil Description	High strength dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	24/08/2017

Remarks

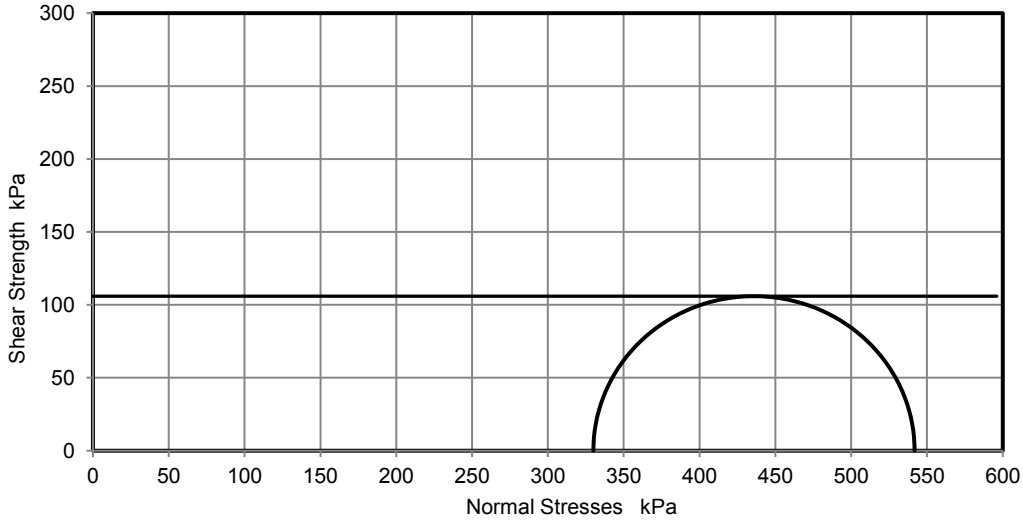
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.93	Mg/m3
Moisture Content	27	%
Dry Density	1.52	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	330	kPa
Axial Strain	4.4	%
Deviator Stress, (σ1 - σ3)f	212	kPa
Undrained Shear Strength, cu	106	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



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Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
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	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	31
Project No.	J17205	Client	GEA	Depth Top	19.50 m
Soil Description	Medium strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	24/08/2017

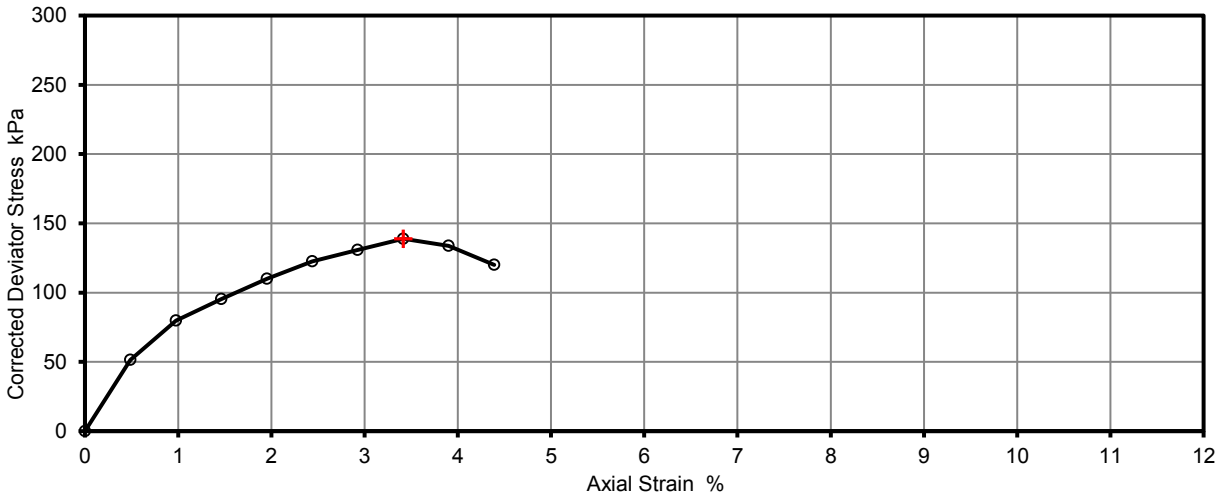
Remarks

Possible Membrane leak

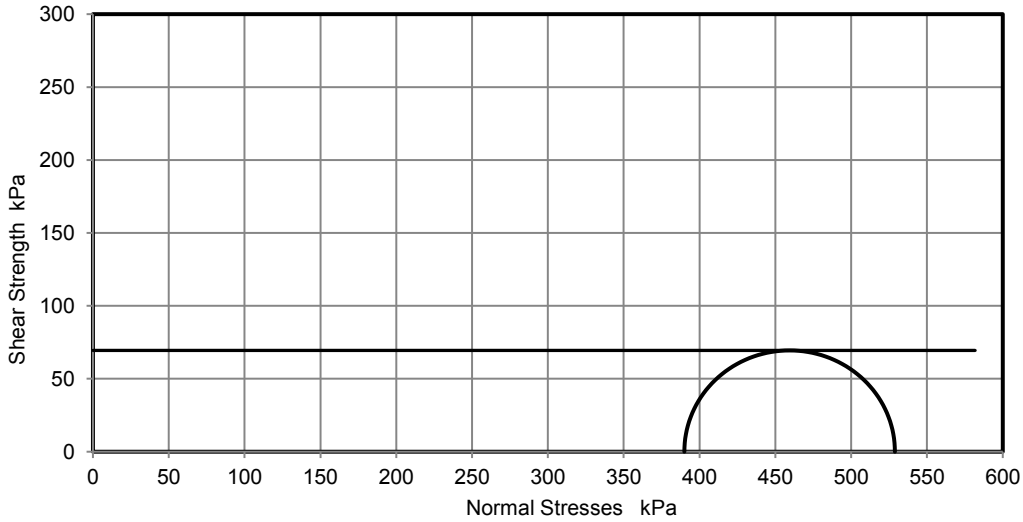
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.88	Mg/m3
Moisture Content	27	%
Dry Density	1.48	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	390	kPa
Axial Strain	3.4	%
Deviator Stress, (σ1 - σ3)f	139	kPa
Undrained Shear Strength, cu	69	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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Watford Herts WD18 9RU
Tel: 01923 711 288
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2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	31
Project No.	J17205	Client	GEA	Depth Top	19.50 m
Soil Description	Very high strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	30/08/2017

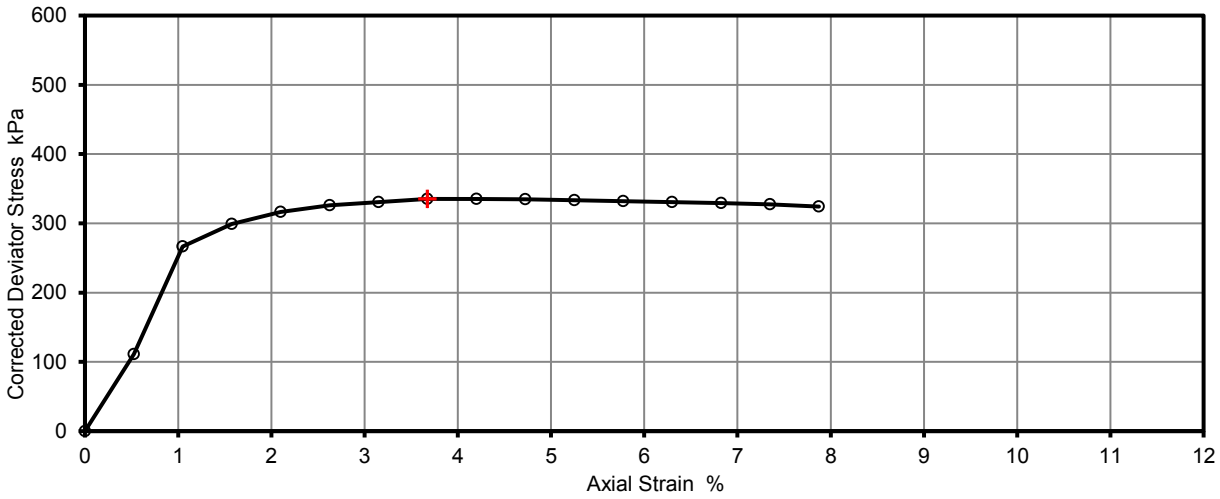
Remarks

Repeat Test

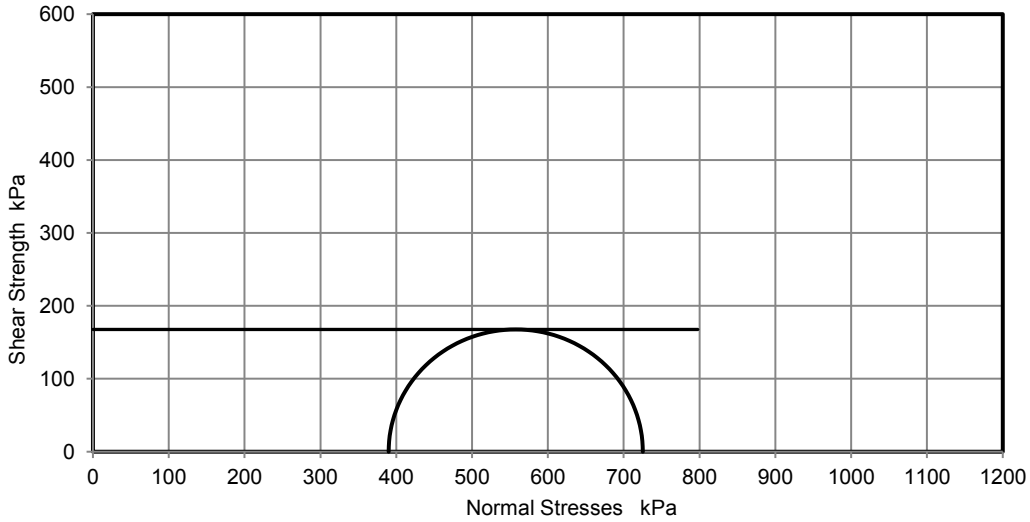
Position within sample

Test Number	1	
Length	76.2	mm
Diameter	38.1	mm
Bulk Density	1.99	Mg/m3
Moisture Content	27	%
Dry Density	1.56	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	390	kPa
Axial Strain	3.7	%
Deviator Stress, (σ1 - σ3)f	335	kPa
Undrained Shear Strength, cu	168	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



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Watford Herts WD18 9RU
Tel: 01923 711 288
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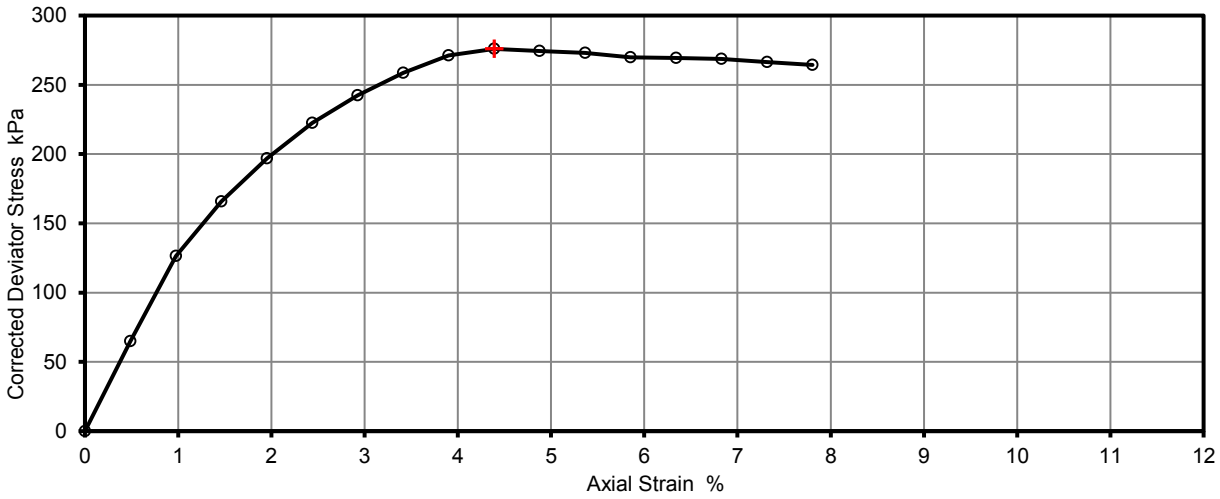
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	36
Project No.	J17205	Client	GEA	Depth Top	22.50 m
Soil Description	High strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	24/08/2017

Remarks

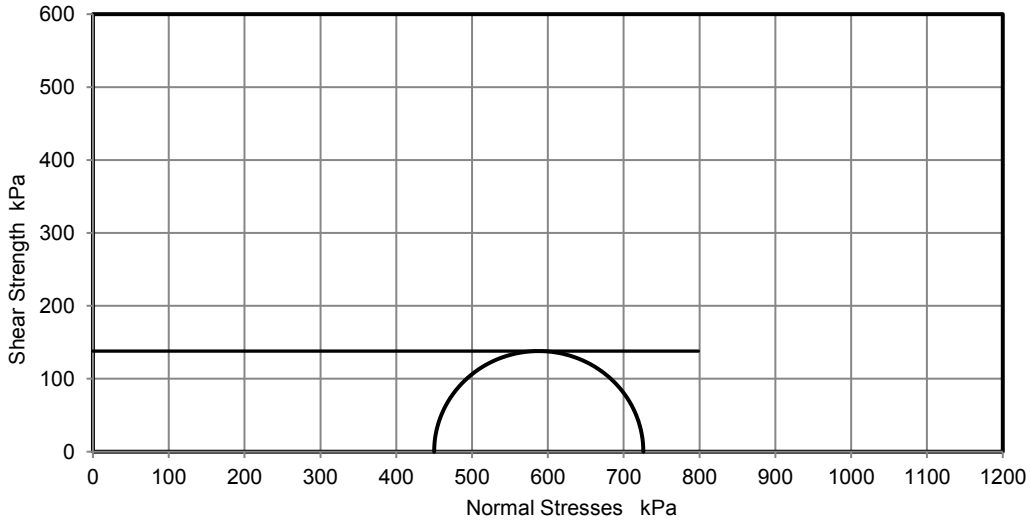
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.83	Mg/m3
Moisture Content	28	%
Dry Density	1.43	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	450	kPa
Axial Strain	4.4	%
Deviator Stress, (σ1 - σ3)f	276	kPa
Undrained Shear Strength, cu	138	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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Watford Herts WD18 9RU
Tel: 01923 711 288
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2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

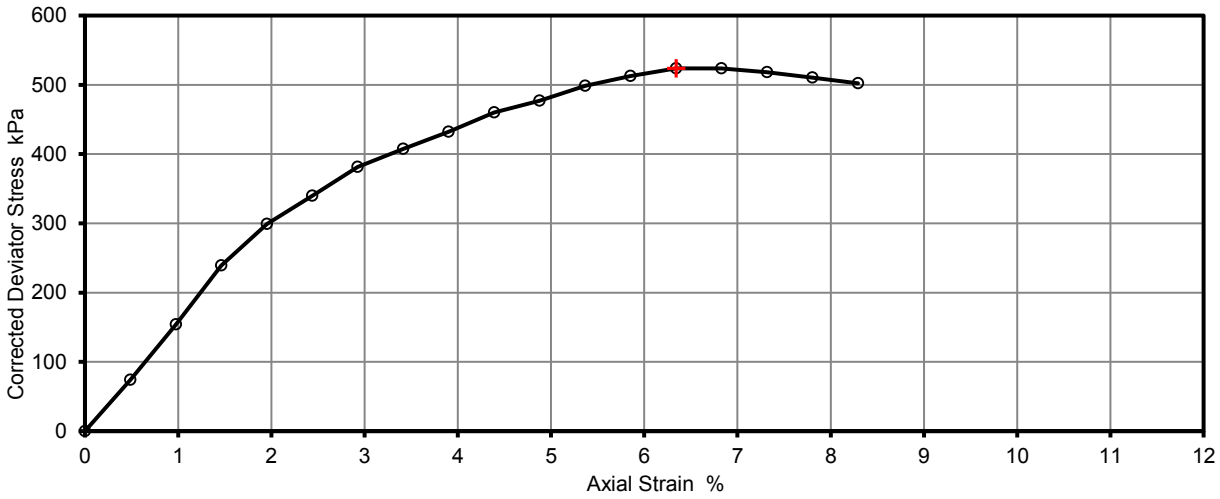
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH1
Site Name	Twickenham			Sample No.	41
Project No.	J17205	Client	GEA	Depth Top	25.00 m
Soil Description	Very high strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	25/08/2017

Remarks

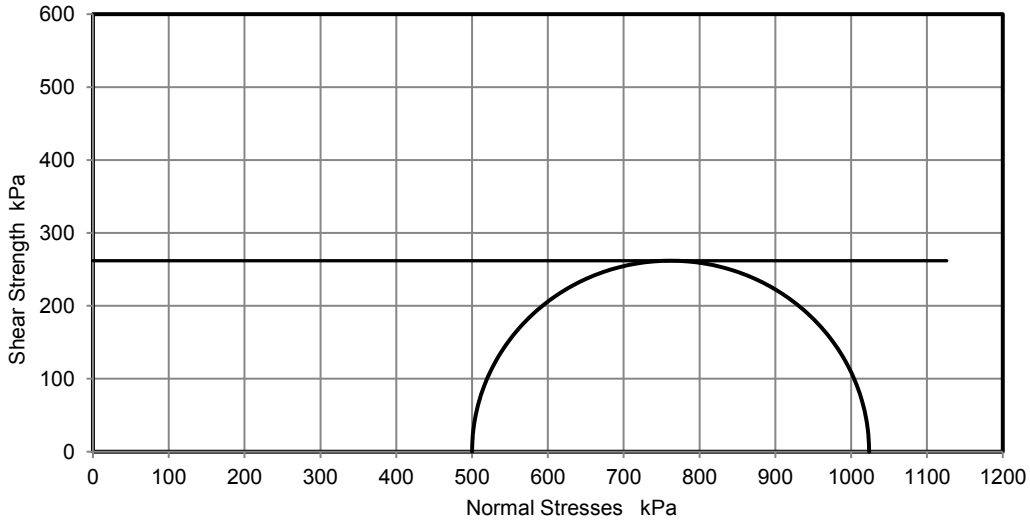
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.97	Mg/m3
Moisture Content	24	%
Dry Density	1.58	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	500	kPa
Axial Strain	6.3	%
Deviator Stress, (σ1 - σ3)f	524	kPa
Undrained Shear Strength, cu	262	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



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Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

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UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

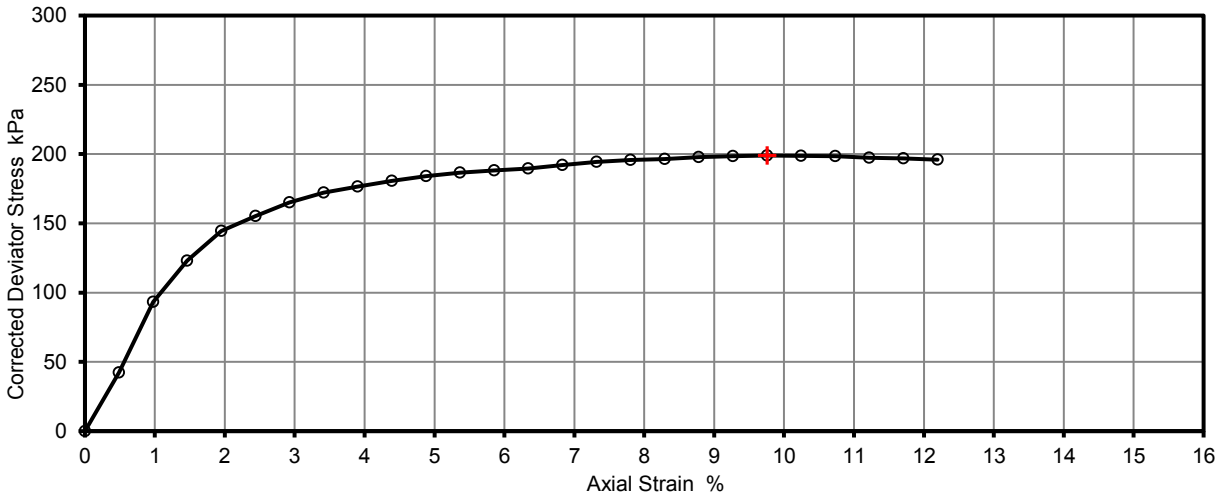
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH2
Site Name	Twickenham			Sample No.	10
Project No.	J17205	Client	GEA	Depth Top	7.50 m
Soil Description	High strength fissured dark greyish brown silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	25/08/2017

Remarks

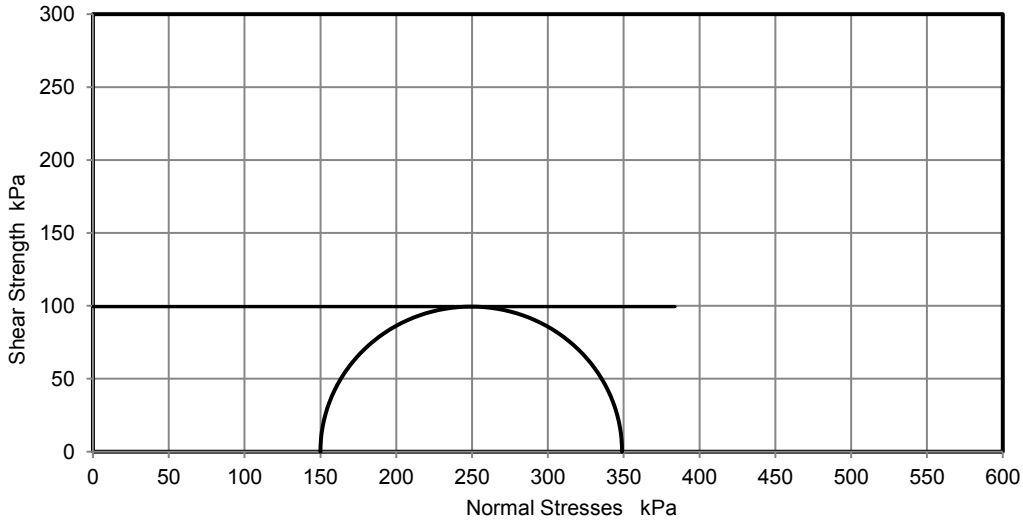
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.89	Mg/m3
Moisture Content	27	%
Dry Density	1.49	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	150	kPa
Axial Strain	9.8	%
Deviator Stress, (σ1 - σ3)f	199	kPa
Undrained Shear Strength, cu	99	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



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Watford Herts WD18 9RU
Tel: 01923 711 288
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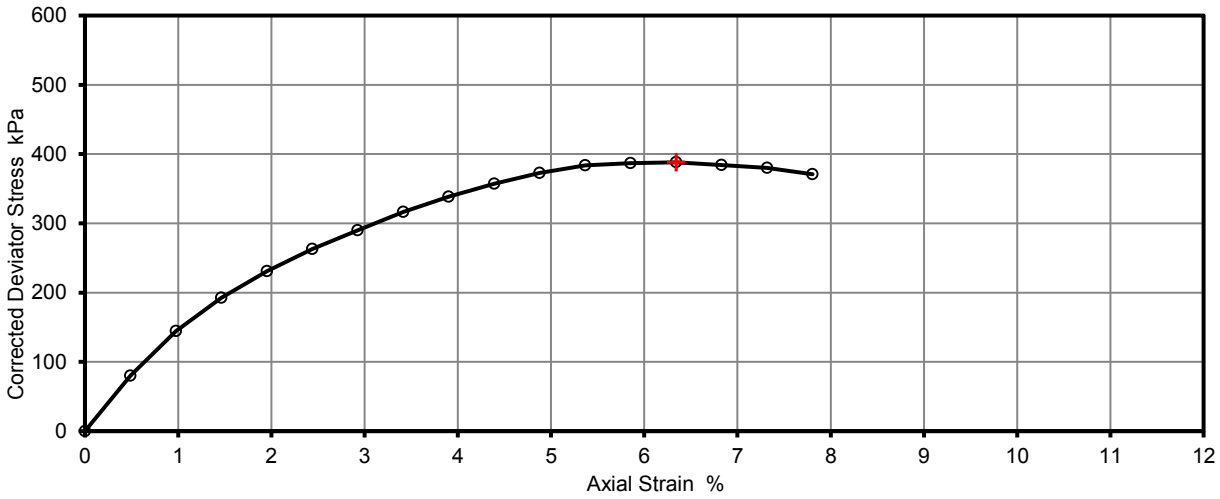
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH2
Site Name	Twickenham			Sample No.	17
Project No.	J17205	Client	GEA	Depth Top	11.00 m
Soil Description	Very high strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	25/08/2017

Remarks

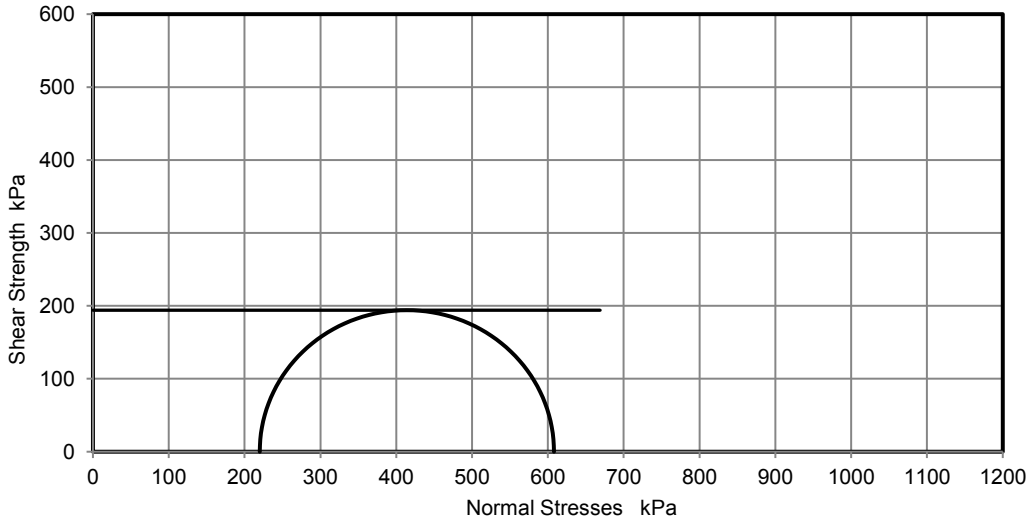
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.96	Mg/m3
Moisture Content	25	%
Dry Density	1.57	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	220	kPa
Axial Strain	6.3	%
Deviator Stress, (σ1 - σ3)f	388	kPa
Undrained Shear Strength, cu	194	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
Initials: J.P
Date 30/08/2017

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

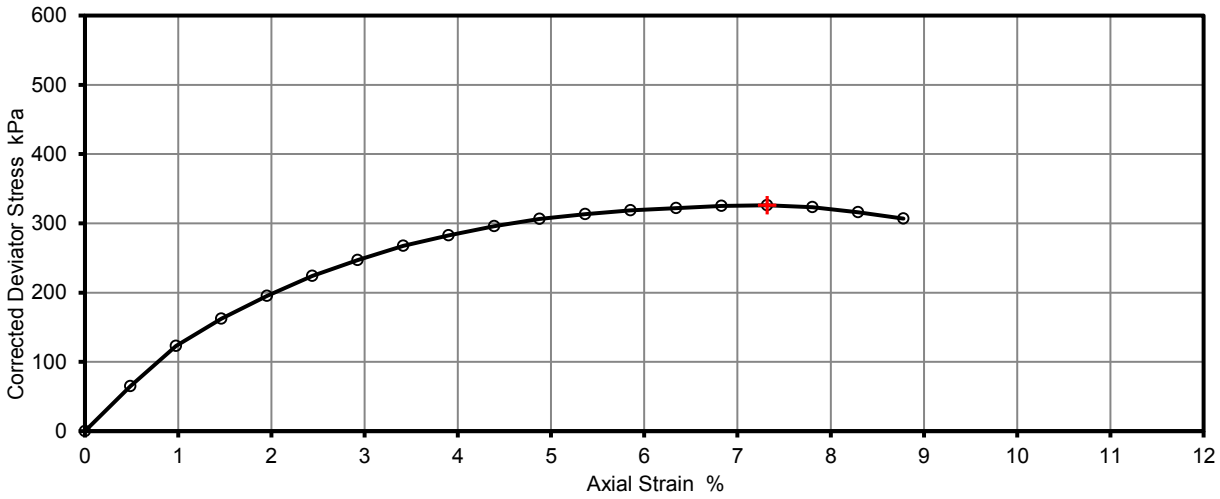
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH2
Site Name	Twickenham			Sample No.	22
Project No.	J17205	Client	GEA	Depth Top	14.00 m
Soil Description	Very high strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	25/08/2017

Remarks

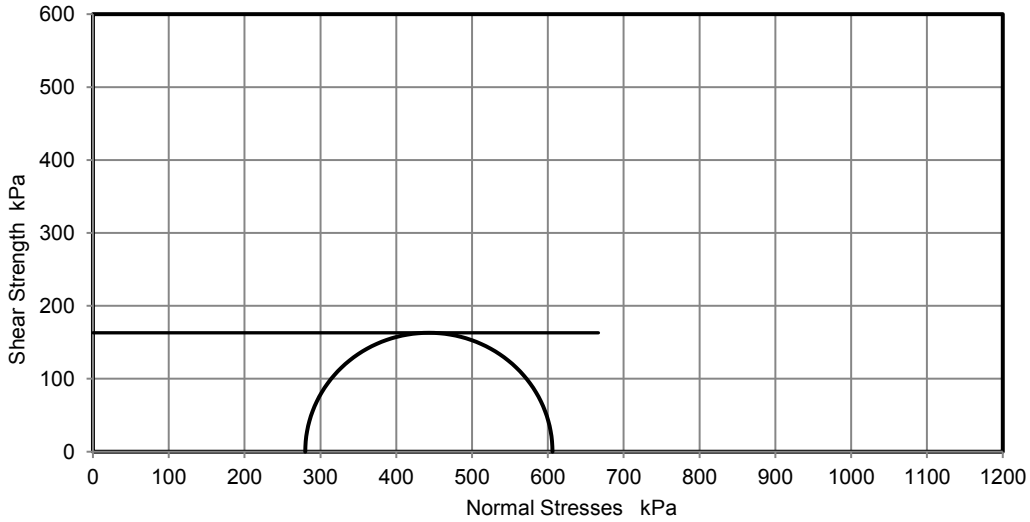
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.96	Mg/m3
Moisture Content	25	%
Dry Density	1.57	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	280	kPa
Axial Strain	7.3	%
Deviator Stress, (σ1 - σ3)f	326	kPa
Undrained Shear Strength, cu	163	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

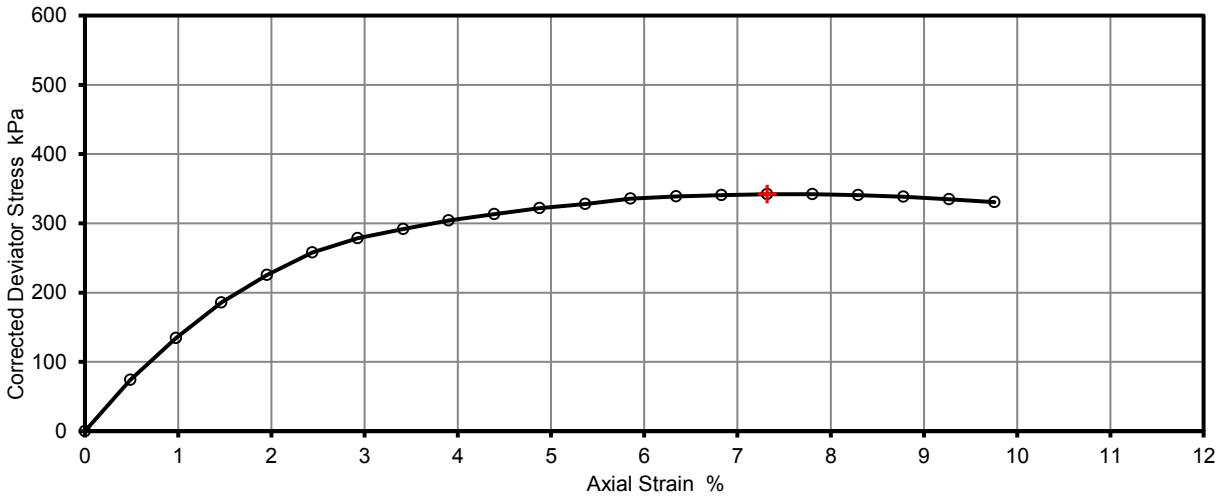
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH2
Site Name	Twickenham			Sample No.	27
Project No.	J17205	Client	GEA	Depth Top	17.00 m
Soil Description	Very high strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	25/08/2017

Remarks

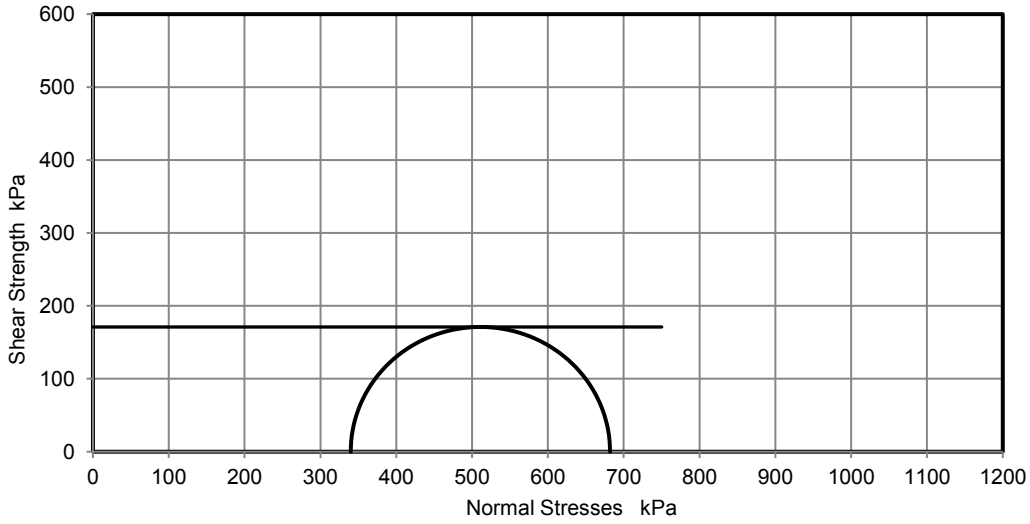
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.88	Mg/m3
Moisture Content	23	%
Dry Density	1.52	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	340	kPa
Axial Strain	7.3	%
Deviator Stress, (σ1 - σ3)f	342	kPa
Undrained Shear Strength, cu	171	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

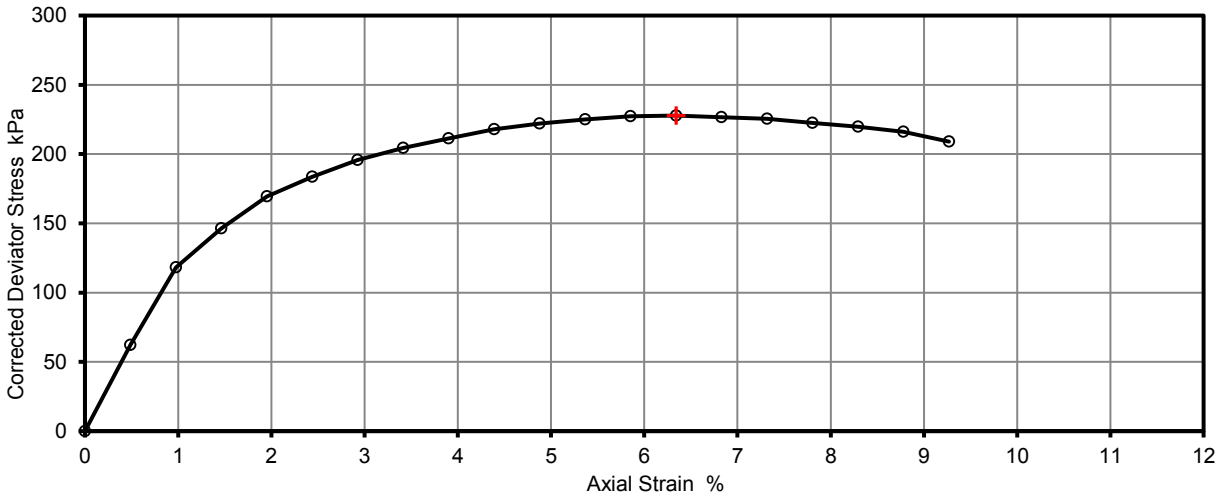
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH2
Site Name	Twickenham			Sample No.	32
Project No.	J17205	Client	GEA	Depth Top	20.00 m
Soil Description	High strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	25/08/2017

Remarks

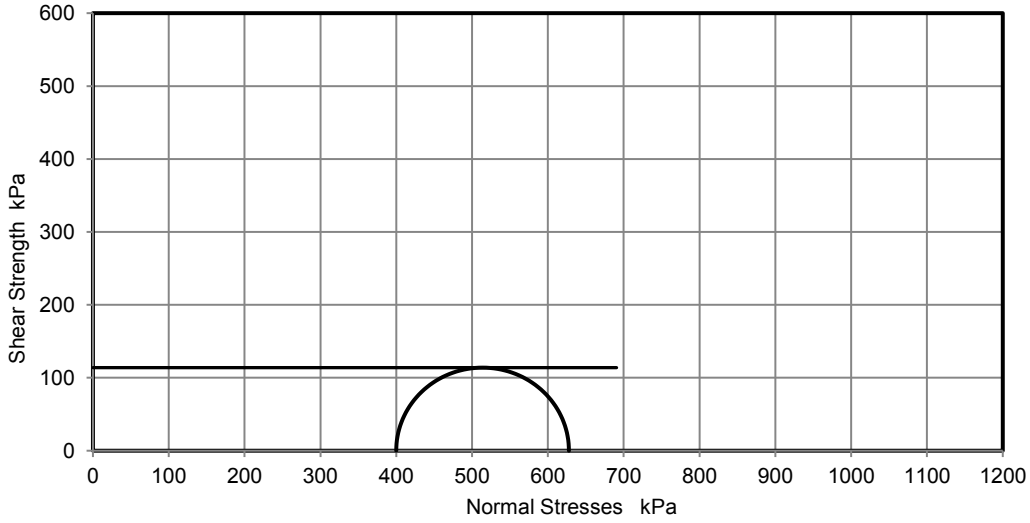
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.91	Mg/m3
Moisture Content	26	%
Dry Density	1.51	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	400	kPa
Axial Strain	6.3	%
Deviator Stress, (σ1 - σ3)f	228	kPa
Undrained Shear Strength, cu	114	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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Date 30/08/2017

UKAS TESTING 2519

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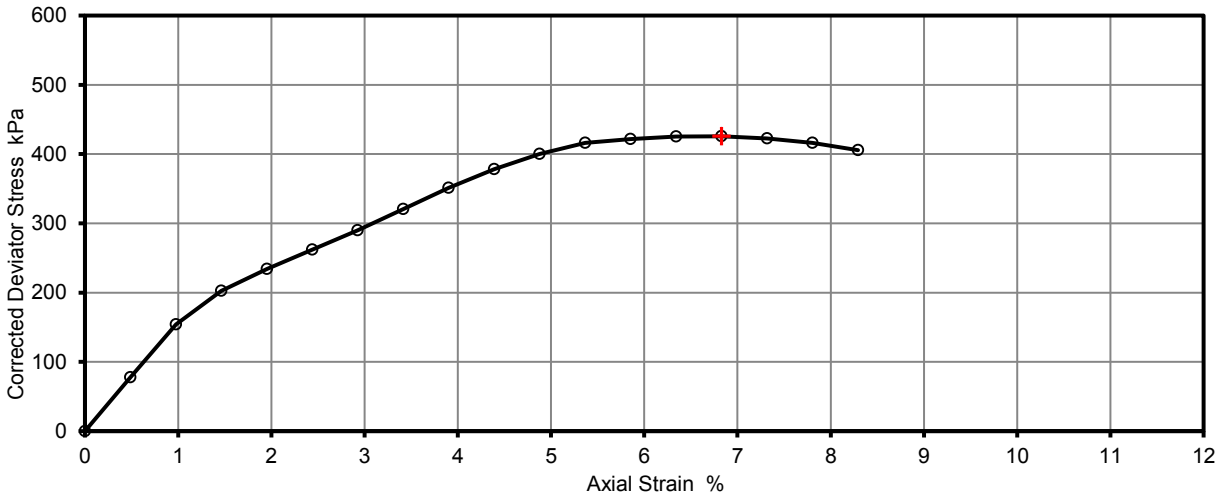
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	23261
				Borehole/Pit No.	BH2
Site Name	Twickenham			Sample No.	37
Project No.	J17205	Client	GEA	Depth Top	23.00 m
Soil Description	Very high strength fissured dark grey silty CLAY			Depth Base	- m
				Sample Type	U
				Samples received	18/08/2017
				Schedules received	21/08/2017
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	25/08/2017

Remarks

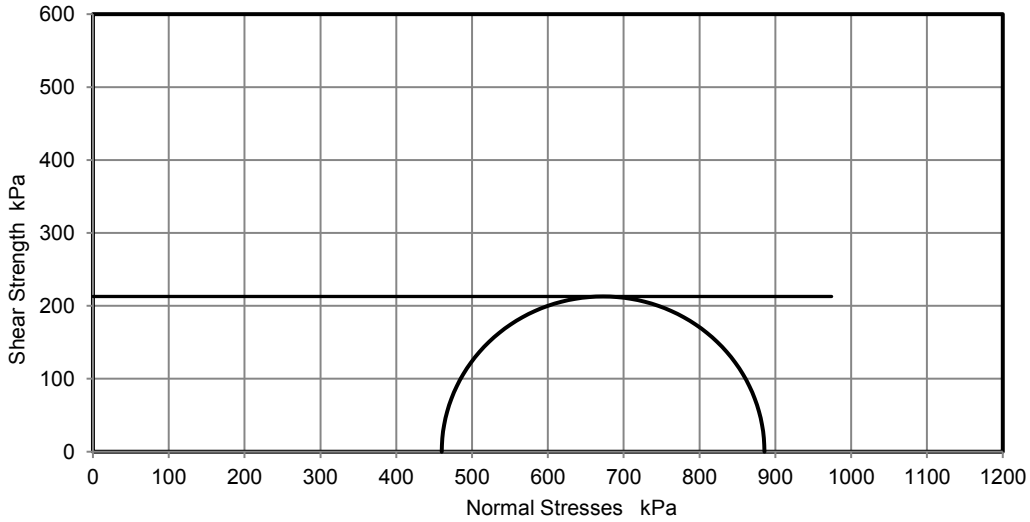
Position within sample

Test Number	1	
Length	205.0	mm
Diameter	105.0	mm
Bulk Density	1.92	Mg/m3
Moisture Content	25	%
Dry Density	1.54	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	460	kPa
Axial Strain	6.8	%
Deviator Stress, (σ1 - σ3)f	426	kPa
Undrained Shear Strength, cu	213	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

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Initials: J.P
Date 30/08/2017

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Unconsolidated Undrained Triaxial Compression tests without measurement of pore pressure
Summary of Results

Tests carried out in accordance with BS1377:Part 7 : 1990 clause 8 or 9 as appropriate to test

Job No.	Project Name	Programme	
23261	Twickenham	Samples received	18/08/2017
		Schedule received	21/08/2017
Project No.	Client	Project started	22/08/2017
J17205	GEA	Testing Started	24/08/2017

Hole No.	Sample				Soil Description	Test Type	Density		*w*	Length	Diameter	σ3	At failure				Remarks
	Ref	Top	Base	Type			bulk	dry					Axial strain	σ1 - σ3	cu	Mode	
							Mg/m3		%	mm	mm	kPa	%	kPa	kPa		
BH1	11	7.50	-	U	High strength slightly fissured dark grey silty CLAY	UU	1.93	1.51	28	205	105	150	6.8	212	106	B	
BH1	16	10.50	-	U	Very high strength fissured dark grey silty CLAY	UU	1.95	1.54	27	205	105	210	5.4	310	155	B	
BH1	21	13.50	-	U	High strength fissured dark grey silty CLAY with occasional dark grey silt/sand pockets	UU	1.95	1.54	26	205	105	270	5.4	276	138	B	
BH1	26	16.50	-	U	High strength dark grey silty CLAY	UU	1.93	1.52	27	205	105	330	4.4	212	106	B	
BH1	31	19.50	-	U	Medium strength fissured dark grey silty CLAY	UU	1.88	1.48	27	205	105	390	3.4	139	69	B	Possible Membrane leak
BH1	31	19.50	-	U	Very high strength fissured dark grey silty CLAY	UU	1.99	1.56	27	76.2	38.1	390	3.7	335	168	B	Repeat test
BH1	36	22.50	-	U	High strength fissured dark grey silty CLAY	UU	1.83	1.43	28	205	105	450	4.4	276	138	B	
BH1	41	25.00	-	U	Very high strength fissured dark grey silty CLAY	UU	1.97	1.58	24	205	105	500	6.3	524	262	B	
BH2	10	7.50	-	U	High strength fissured dark greyish brown silty CLAY	UU	1.89	1.49	27	205	105	150	9.8	199	99	B	
BH2	17	11.00	-	U	Very high strength fissured dark grey silty CLAY	UU	1.96	1.57	25	205	105	220	6.3	388	194	B	
BH2	22	14.00	-	U	Very high strength fissured dark grey silty CLAY	UU	1.96	1.57	25	205	105	280	7.3	326	163	B	
BH2	27	17.00	-	U	Very high strength fissured dark grey silty CLAY	UU	1.88	1.52	24	205	105	340	7.3	342	171	B	
BH2	32	20.00	-	U	High strength fissured dark grey silty CLAY	UU	1.91	1.51	26	205	105	400	6.3	228	114	B	

Legend
UU - single stage test (single and multiple specimens)
UUM - Multistage test on a single specimen
suffix R - remoulded or recompacted
σ3 Cell pressure
σ1 - σ3 Maximum corrected deviator stress
cu Undrained shear strength, ½ (σ1 - σ3)
Mode of failure ; B - Brittle; P - Plastic; C - Compound

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: james@k4soils.com

Checked and Approved
Initials: J.P
Date: 30/08/2017

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Unconsolidated Undrained Triaxial Compression tests without measurement of pore pressure
Summary of Results

Tests carried out in accordance with BS1377:Part 7 : 1990 clause 8 or 9 as appropriate to test

Job No.	Project Name	Programme	
23261	Twickenham	Samples received	18/08/2017
		Schedule received	21/08/2017
Project No.	Client	Project started	22/08/2017
J17205	GEA	Testing Started	24/08/2017

Hole No.	Sample				Soil Description	Test Type	Density		w	Length	Diameter	σ3	At failure				Remarks
	Ref	Top	Base	Type			bulk	dry					Axial strain	σ1 - σ3	cu	Mode	
							Mg/m3		%	mm	mm	kPa	%	kPa	kPa		
BH2	37	23.00	-	U	Very high strength fissured dark grey silty CLAY	UU	1.92	1.54	25	205	105	460	6.8	426	213	B	

Legend
UU - single stage test (single and multiple specimens)
UUM - Multistage test on a single specimen
suffix R - remoulded or recompacted
σ3 Cell pressure
σ1 - σ3 Maximum corrected deviator stress
cu Undrained shear strength, ½ (σ1 - σ3)
Mode of failure ; B - Brittle P - Plastic C - Compound

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
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2519
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MSF-5-R7b

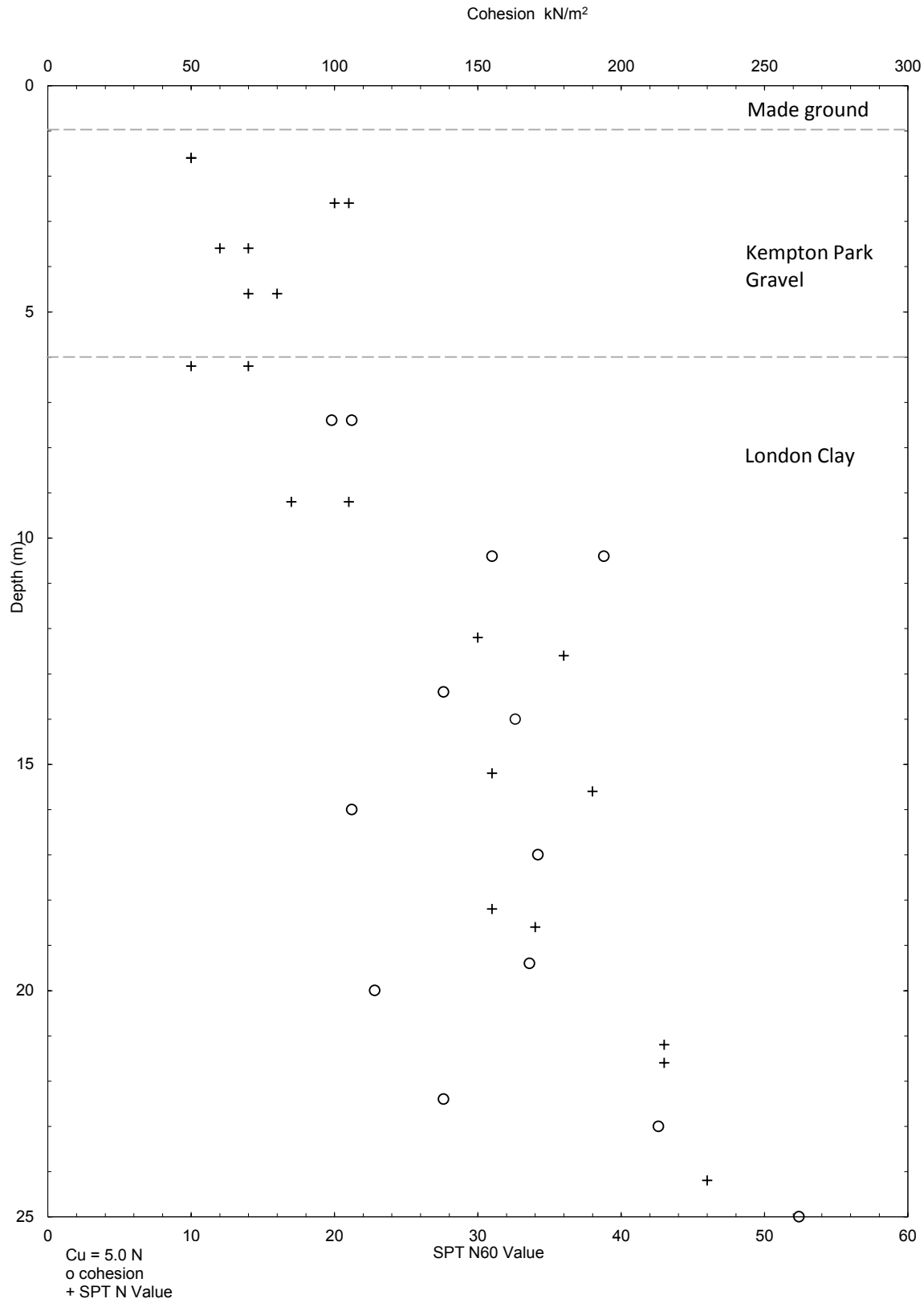
GEA
www.gea-ltd.co.uk
Herts | 01727 824666 Notts | 01509 674888

SPT & Cohesion / Depth Graph

Site	Alford House, Aveline Street, London, SE11 5DQ
Client	Notting Hill Housing
Engineer	Conisbee

Job Number J17149

Sheet 1 / 1



Jack Deaney
Geotechnical & Environmental Associates
Widbury Barn
Widbury Hill
Ware
Hertfordshire
SG127QE

e: Jack@gea-ltd.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 17-57135

Replaces Analytical Report Number : 17-57135, issue no. 1

Project / Site name:	Twickenham	**Samples received on:**	10/08/2017
Your job number:	J17205	**Samples instructed on:**	11/08/2017
Your order number:	J17205	**Analysis completed by:**	25/08/2017
Report Issue Number:	2	**Report issued on:**	25/08/2017
Samples Analysed:	4 soil samples		

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 17-57135

Project / Site name: Twickenham
Your Order No: J17205

Lab Sample Number				797882	797883	797884	797885	
Sample Reference				WS2	WS2	WS1	WS4	
Sample Number				1	1	1	1	
Depth (m)				0.40	3.70	0.50	1.40	
Date Sampled				10/08/2017	10/08/2017	10/08/2017	10/08/2017	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	15	12	10	12	
Total mass of sample received	kg	0.001	NONE	1.8	0.51	1.8	2.0	
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	7.8	7.3	7.7	
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Total Sulphate as SO_4	mg/kg	50	MCERTS	570	190	780	490	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.039	0.058	0.13	0.023	
Sulphide	mg/kg	1	MCERTS	1.0	< 1.0	1.5	3.0	
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	46	11	7.4	15	
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.7	0.2	2.0	1.5	
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	3.4	1.0	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	0.76	0.18	< 0.05	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	1.8	7.7	< 0.05	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	0.59	8.3	< 0.05	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	6.3	34	0.18	1.0	
Anthracene	mg/kg	0.05	MCERTS	1.3	4.2	< 0.05	0.27	
Fluoranthene	mg/kg	0.05	MCERTS	22	14	0.23	2.1	
Pyrene	mg/kg	0.05	MCERTS	19	9.3	0.23	2.0	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	6.5	2.1	0.17	1.3	
Chrysene	mg/kg	0.05	MCERTS	5.4	1.9	0.14	0.93	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	7.4	1.1	0.17	1.2	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	5.6	0.72	0.12	1.1	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	8.4	0.99	0.16	1.5	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	3.6	0.33	0.10	0.80	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	1.0	0.09	< 0.05	0.25	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.3	0.34	0.12	0.96	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	96.0	86.2	1.62	13.5	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	20	15	19	17	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	24	20	19	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	41	10	36	30	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	75	8.1	190	260	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	1.2	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	25	21	23	20	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	31	110	57	

Analytical Report Number: 17-57135

Project / Site name: Twickenham
Your Order No: J17205

Lab Sample Number				797882	797883	797884	797885	
Sample Reference				WS2	WS2	WS1	WS4	
Sample Number				1	1	1	1	
Depth (m)				0.40	3.70	0.50	1.40	
Date Sampled				10/08/2017	10/08/2017	10/08/2017	10/08/2017	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	-	< 1.0	-	-	
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	-	
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	-	
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	370	620	< 10	97	
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	< 0.001	-	-	
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	-	
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	-	
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	2.5	-	-	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	19	-	-	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	45	-	-	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	28	-	-	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	95	-	-	
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	< 0.001	-	-	
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	-	
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	-	
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	7.6	-	-	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	43	-	-	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	180	-	-	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	280	-	-	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	510	-	-	
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
TPH (C10 - C12)	mg/kg	2	MCERTS	8.7	10	< 2.0	< 2.0	
TPH (C12 - C16)	mg/kg	4	MCERTS	97	62	< 4.0	5.7	
TPH (C16 - C21)	mg/kg	1	MCERTS	160	220	< 1.0	21	
TPH (C21 - C35)	mg/kg	1	MCERTS	94	310	< 1.0	63	
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	-	-	-	
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	-	-	-	
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	-	-	-	
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	-	-	-	
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	-	-	-	
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	-	-	-	
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	-	-	-	
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	-	-	-	

Analytical Report Number : 17-57135

Project / Site name: Twickenham

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
797882	WS2	1	0.40	Brown clay.
797883	WS2	1	3.70	Light brown sandy clay.
797884	WS1	1	0.50	Brown clay and loam with gravel.
797885	WS4	1	1.40	Brown clay and loam with gravel and brick.

Analytical Report Number : 17-57135

Project / Site name: Twickenham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests. 2:1 extraction.	L082-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding.	L076-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding.	L076-PL	D	MCERTS

Analytical Report Number : 17-57135

Project / Site name: Twickenham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

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

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

Jack Deaney
Geotechnical & Environmental Associates
Widbury Barn
Widbury Hill
Ware
Hertfordshire
SG127QE

e: Jack@gea-ltd.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 17-58604

Project / Site name:	Twickenham	**Samples received on:**	25/08/2017
Your job number:	J17205	**Samples instructed on:**	25/08/2017
Your order number:	J17205	**Analysis completed by:**	04/09/2017
Report Issue Number:	1	**Report issued on:**	04/09/2017
Samples Analysed:	1 soil sample		

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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Analytical Report Number: 17-58604

Project / Site name: Twickenham
Your Order No: J17205

Lab Sample Number				806634				
Sample Reference				BH2				
Sample Number				None Supplied				
Depth (m)				4.70				
Date Sampled				18/08/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	21				
Total mass of sample received	kg	0.001	NONE	1.1				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.5				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO_4	mg/kg	50	MCERTS	220				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.029				
Sulphide	mg/kg	1	MCERTS	< 1.0				
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	19				
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.4				
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	11				
Acenaphthylene	mg/kg	0.05	MCERTS	0.20				
Acenaphthene	mg/kg	0.05	MCERTS	6.3				
Fluorene	mg/kg	0.05	MCERTS	6.9				
Phenanthrene	mg/kg	0.05	MCERTS	19				
Anthracene	mg/kg	0.05	MCERTS	6.0				
Fluoranthene	mg/kg	0.05	MCERTS	7.4				
Pyrene	mg/kg	0.05	MCERTS	4.6				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.2				
Chrysene	mg/kg	0.05	MCERTS	0.54				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.34				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.23				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.30				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05				
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	64.1				
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	47				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	21				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	42				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	65				
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	410				
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1				
TPH (C10 - C12)	mg/kg	2	MCERTS	31				
TPH (C12 - C16)	mg/kg	4	MCERTS	150				
TPH (C16 - C21)	mg/kg	1	MCERTS	170				
TPH (C21 - C35)	mg/kg	1	MCERTS	43				

Analytical Report Number : 17-58604

Project / Site name: Twickenham

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
806634	BH2	None Supplied	4.70	Light brown clay.

Analytical Report Number : 17-58604

Project / Site name: Twickenham

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

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

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

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
BH2		S	17-58604	806634	c	Sulphide in soil	L010-PL	c

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

Jack Deaney
Geotechnical & Environmental Associates
Widbury Barn
Widbury Hill
Ware
Hertfordshire
SG127QE

e: Jack@gea-ltd.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 17-58605

Project / Site name:	Twickenham	**Samples received on:**	25/08/2017
Your job number:	J17205	**Samples instructed on:**	25/08/2017
Your order number:	J17205	**Analysis completed by:**	07/09/2017
Report Issue Number:	1	**Report issued on:**	07/09/2017
Samples Analysed:	1 WAC 10:1 Sample		

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**17-58605**						
					Client:	**GEA**	
Location	**Twickenham**						
Lab Reference (Sample Number)	806635 / 806636				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	18/08/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH2						
Depth (m)	1.00						
Solid Waste Analysis							
TOC (%)**	1.9				3%	5%	6%
Loss on Ignition (%) **	6.4				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	79				500	--	--
Total PAH (WAC-17) (mg/kg)	4.2				100	--	--
pH (units)**	8.5				--	>6	--
Acid Neutralisation Capacity (mol / kg)	31				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:01	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0033			0.0213	0.5	2	25
Barium *	0.0073			0.0476	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0005			< 0.0040	0.5	10	70
Copper *	0.0037			0.024	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0061			0.0398	0.5	10	30
Nickel *	0.0009			0.0061	0.4	10	40
Lead *	0.0034			0.022	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0069			0.045	4	50	200
Chloride *	13			82	800	4000	25000
Fluoride	0.11			0.75	10	150	500
Sulphate *	13			83	1000	20000	50000
TDS	87			570	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	11.4			74.8	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	85						
Moisture (%)	15						

Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation ** = MCERTS accrediited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 17-58605

Project / Site name: Twickenham

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
806635	BH2	None Supplied	1.00	Brown loam and clay with gravel.

Analytical Report Number : 17-58605

Project / Site name: Twickenham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-UK	W	NONE
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	in-house method	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS

Analytical Report Number : 17-58605

Project / Site name: Twickenham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

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

Jack Deaney
Geotechnical & Environmental Associates
Widbury Barn
Widbury Hill
Ware
Hertfordshire
SG127QE

e: Jack@gea-ltd.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 17-59287

Replaces Analytical Report Number : 17-59287, issue no. 1

Project / Site name:	Twickenham	**Samples received on:**	05/09/2017
Your job number:	J17205	**Samples instructed on:**	05/09/2017
Your order number:	J17205	**Analysis completed by:**	27/09/2017
Report Issue Number:	2	**Report issued on:**	27/09/2017
Samples Analysed:	3 water samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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Analytical Report Number: 17-59287

Project / Site name: Twickenham

Your Order No: J17205

Lab Sample Number				810572	810573	810574		
Sample Reference				BH1	BH2	WS4		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				4.86	4.34	4.22		
Date Sampled				05/09/2017	05/09/2017	05/09/2017		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	7.3	7.2	7.5		
Electrical Conductivity at 20 °C	µS/cm	10	NONE	1500	1200	660		
Sulphate as SO_4	µg/l	45	ISO 17025	75600	192000	59000		
Sulphate as SO_4	mg/l	0.045	ISO 17025	76	190	59		
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0		
Chloride	mg/l	0.15	ISO 17025	270	35	67		
Ammonia as NH_3	µg/l	15	ISO 17025	460	180	910		
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	0.96	4.73	1.95		
Nitrate as N	mg/l	0.01	ISO 17025	8.49	3.55	9.51		
Nitrate as NO_3	mg/l	0.05	ISO 17025	37.6	15.7	42.1		
Total Phenols								
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10		
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	1120	< 0.01		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	3.80	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	136	< 0.01		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	60.8	< 0.01		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	22.9	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	4.73	< 0.01		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	2.47	< 0.01		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	1.40	< 0.01		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Total PAH								
Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	1350	< 0.16		

Analytical Report Number: 17-59287

Project / Site name: Twickenham

Your Order No: J17205

Lab Sample Number				810572	810573	810574		
Sample Reference				BH1	BH2	WS4		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				4.86	4.34	4.22		
Date Sampled				05/09/2017	05/09/2017	05/09/2017		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.68	2.37	2.70		
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02	0.02		
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.3	0.3	0.2		
Lead (dissolved)	µg/l	0.2	ISO 17025	0.3	0.3	< 0.2		
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05		
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.6	2.8	12		
Monoaromatics								
Benzene	µg/l	1	ISO 17025	-	< 1.0	-		
Toluene	µg/l	1	ISO 17025	-	< 1.0	-		
Ethylbenzene	µg/l	1	ISO 17025	-	< 1.0	-		
p & m-xylene	µg/l	1	ISO 17025	-	3.5	-		
o-xylene	µg/l	1	ISO 17025	-	2.8	-		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	-	< 1.0	-		
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	-	< 1.0	-		
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	-	< 1.0	-		
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	-	< 1.0	-		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	-	< 10	-		
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	-	< 10	-		
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	-	< 10	-		
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	-	< 10	-		
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	-	< 10	-		
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	-	< 1.0	-		
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	-	< 1.0	-		
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	-	24	-		
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	-	1200	-		
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	-	3000	-		
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	-	1500	-		
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	-	320	-		
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	-	6100	-		
TPH (C8 - C10)	µg/l	10	ISO 17025	< 10	24	< 10		
TPH (C10 - C12)	µg/l	10	NONE	< 10	1200	< 10		
TPH (C12 - C16)	µg/l	10	NONE	< 10	3000	< 10		
TPH (C16 - C21)	µg/l	10	NONE	< 10	1500	< 10		
TPH (C21 - C35)	µg/l	10	NONE	< 10	320	< 10		

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 17-59287

Project / Site name: Twickenham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonia as NH3 in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025
Electrical conductivity at 20oC of water	Determination of electrical conductivity in water by electrometric measurement.	In-house method	L031-PL	W	NONE
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPH in (Water)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding.	L070-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

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

GEA
Widbury Barn
Widbury Hill
Ware
Herts SG12 7QE

Generic Risk-Based Soil Screening Values

Site	Twickenham Riverside, Twickenham, TW1 3SD	**Job Number** J17205
Client	London Borough of Richmond Civic Centre	**Sheet** 1 / 1
Engineer	Price & Myers	

Proposed End Use Commercial

Soil pH 8

Soil Organic Matter content % 1.0

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

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

Notes

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

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

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

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

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

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

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

GEA
www.gea-ltd.co.uk
Herts | 01727 824666 Notts | 01509 674888

Gas Monitoring

Site	Twickenham Riverside, Twickenham, London, TW1 3SD	**Job Number** J17205
Client	London Borough of Richmond	**Sheet** 1/3
Engineer	Elliott Wood	

Date	05/09/2017					
Air Temperature °C	30					
Barometric Pressure (mB)	1011					
Visit No	1					
Borehole No	1	2	WS4			
PID ppm	5	0	0.2			
Condition of Standpipe	Good	Good	Good			
Combustible gas (CH4) % LEL	0	0	0			
Combustible gas (CH4) % vol	0	0	0			
Carbon Dioxide (CO2) % vol	2.8	2.0	2.4			
Oxygen (O2) % vol	15.6	18.0	17.5			
Hydrogen ppm	0	0	0			
Carbon Monoxide ppm	0	0	0			
Hydrogen Sulphide (H2S) ppm	0	0	0			
Flow Rate (max) l/hr	0	0	0			
Relative Downhole Pressure mb	1011	1013	1018			
Downhole Temperature °C	30	30	29			
Water Level m [m OD]	4.86 [2.89]	4.34 [2.66]	4.22 [2.78]			
Remarks	No free phase substance	No free phase substance	No free phase substance	Ground water sampled from each borehole for general suite contamination		

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Gas Monitoring

Site	Twickenham Riverside, Twickenham, London, TW1 3SD	**Job Number** J17205
Client	London Borough of Richmond	**Sheet** 2/3
Engineer	Elliott Wood	

Date	27/09/2017					
Air Temperature °C	28					
Barometric Pressure (mB)	1017					
Visit No	2					
Borehole No	1	2	WS4			
PID ppm		0				
Condition of Standpipe	Inaccessible	Good	Good			
Combustible gas (CH4) % LEL	-	0	0			
Combustible gas (CH4) % vol	-	0	0			
Carbon Dioxide (CO2) % vol	-	0.2	3.7			
Oxygen (O2) % vol	-	20.5	15			
Hydrogen ppm	-	0	0			
Carbon Monoxide ppm	-	0	0			
Hydrogen Sulphide (H2S) ppm	-	0	0			
Flow Rate (max) l/hr	-	0	0			
Relative Downhole Pressure mb	-	1017	1017			
Downhole Temperature °C	-	27.5	28.5			
Water Level m [m OD]	-	4.31 [2.69]	4.12 [2.88]			
Remarks	Inaccessible					

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Gas Monitoring

Site	Twickenham Riverside, Twickenham, London, TW1 3SD	**Job Number** J17205
Client	London Borough of Richmond	**Sheet** 3/3
Engineer	Elliott Wood	

Date	10/10/2017					
Air Temperature °C	26					
Barometric Pressure (mB)	1014					
Visit No	3					
Borehole No	1	2	WS4			
PID ppm	0	0	0			
Condition of Standpipe	Good	Good	Good			
Combustible gas (CH4) % LEL	0	0	0			
Combustible gas (CH4) % vol	0	0	0			
Carbon Dioxide (CO2) % vol	0.4	1	3.4			
Oxygen (O2) % vol	20.2	19.4	15.8			
Hydrogen ppm	0	0	0			
Carbon Monoxide ppm	0	0	0			
Hydrogen Sulphide (H2S) ppm	0	0	0			
Flow Rate (max) l/hr	0	0	0			
Relative Downhole Pressure mb	1013	1013	1014			
Downhole Temperature °C	27	25.5	26			
Water Level m [m OD]	4.84 [2.91]	4.32 [2.68]	4.22 [2.78]			
Remarks						

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
134500386_1_1

Customer Reference:
J17205

National Grid Reference:
516310, 173220

Slice:
A

Site Area (Ha):
0.2

Search Buffer (m):
1000

Site Details:

1c, King Street
TWICKENHAM
TW1 3SD

Client Details:

Mr S Branch
GEA Ltd
Widbury Barn
Widbury Hill
Ware
Herts
SG12 7QE

Contents

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Radon Potential dataset Copyright Notice

Report Version v53.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1			Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1		2	1	4
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control	pg 3				3
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 3		3	1	2
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 4		Yes		
Pollution Incidents to Controlled Waters	pg 4		10	7	12
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality	pg 9		1		1
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register	pg 9				1
Water Abstractions	pg 9				4 (*22)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 16	Yes	n/a	n/a	n/a
Drift Deposits	pg 16	1	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 16	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 16	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences	pg 16	Yes	Yes	n/a	n/a
Flooding from Rivers or Sea without Defences	pg 18	Yes	Yes	n/a	n/a
Areas Benefiting from Flood Defences	pg 19	Yes	Yes	n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences	pg 19	Yes	Yes	n/a	n/a
OS Water Network Lines	pg 20		3	6	17

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites					
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 23	1	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Potentially Infilled Land (Non-Water)	pg 23			1	1
Potentially Infilled Land (Water)					
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology			n/a	n/a	n/a
BGS Estimated Soil Chemistry					
BGS Recorded Mineral Sites	pg 24				3
BGS Urban Soil Chemistry	pg 24		Yes	Yes	Yes
BGS Urban Soil Chemistry Averages	pg 27	Yes			
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 27	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 27		Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 27	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 28		Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 28	Yes	Yes	n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 29		56	41	103
Fuel Station Entries	pg 45			1	1
Points of Interest - Commercial Services	pg 45		8	3	29
Points of Interest - Education and Health	pg 49			1	
Points of Interest - Manufacturing and Production	pg 49		13	3	27
Points of Interest - Public Infrastructure	pg 52		3	7	14
Points of Interest - Recreational and Environmental	pg 54		2		8
Gas Pipelines					
Underground Electrical Cables					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves	pg 56		1		
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (SE)	257	1	516450 172950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NW (W)	274	1	516000 173250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (S)	286	1	516400 172900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (SE)	302	1	516450 172900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (S)	327	1	516309 172850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A14SW (SE)	382	1	516700 173050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (NE)	438	1	516700 173450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SE (W)	464	1	515850 173050
1	**Discharge Consents** Operator: J E Perry Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Palm Beach, Eel Pie Island, Twickenham, London Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctwc.0573 Permit Version: 1 Effective Date: 20th December 1985 Issued Date: 20th December 1985 Revocation Date: 16th April 1991 Discharge Type: Unknown Discharge Environment: Saline Estuary Receiving Water: River Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A13SE (E)	155	2	516500 173200
2	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: CSO ON UNADOPTED SEWERAGE NETWORK (NOT WATER COMPANY) Location: Surface Water Outfall, Church Lane/Embankment, Twickenham, Middlesex Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Cntw.0228 Permit Version: 1 Effective Date: 16th January 1990 Issued Date: 16th January 1990 Revocation Date: 30th June 1991 Discharge Type: Discharge Of Other Matter-Surface Water Discharge Environment: Saline Estuary Receiving Water: River Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A13NE (NE)	188	2	516500 173300
3	**Discharge Consents** Operator: Mr S Pannifer Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: 2b Cole Park Road, Twickenham, Middlesex Authority: Environment Agency, Thames Region Catchment Area: Not Given Reference: Ctwc.2291 Permit Version: 1 Effective Date: 21st March 1988 Issued Date: 21st March 1988 Revocation Date: 12th August 1996 Discharge Type: Discharge Of Other Matter-Surface Water Discharge Environment: Freshwater Stream/River Receiving Water: River Crane **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A18SW (N)	456	2	516200 173700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Anyand Park Road, Twickenhamanyand Park Roadtwickenham Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp.2369 Permit Version: 2 Effective Date: 3rd September 2010 Issued Date: 3rd September 2010 Revocation Date: Not Supplied Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Saline Estuary Receiving Water: Tidal Thames **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 100m	A18NE (N)	680	2	516500 173900
4	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Anyand Park Road, Twickenhamanyand Park Roadtwickenham Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp.2369 Permit Version: 1 Effective Date: 2nd November 1989 Issued Date: 2nd November 1989 Revocation Date: 2nd September 2010 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Saline Estuary Receiving Water: Tidal Thames **Status: Temporary Consents (Water Act 1989, Section 113)** Positional Accuracy: Located by supplier to within 100m	A18NE (N)	680	2	516500 173900
5	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Twickenham Technical College Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp.2134 Permit Version: 2 Effective Date: 3rd September 2010 Issued Date: 3rd September 2010 Revocation Date: 13th October 2015 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Crane **Status: Surrendered under EPR 2010** Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	988	2	515400 173700
5	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Twickenham Technical College Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp.2134 Permit Version: 1 Effective Date: 2nd November 1989 Issued Date: 2nd November 1989 Revocation Date: 2nd September 2010 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Crane **Status: Temporary Consents (Water Act 1989, Section 113)** Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	988	2	515400 173700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
6	**Integrated Pollution Prevention And Control** Name: Proper Energy Limited Location: Twickenham Biodiesel Plant Epr/Bp3334gu/S002, 37, Hamilton Road,,, TWICKENHAM, Middlesex, TW2 6SN Authority: Environment Agency - South East Region, North East Thames Area Permit Reference: EP3530ZQ Original Permit Ref: Bp3334gu Effective Date: 26th February 2013 **Status: Surrender Effective** Application Type: Surrender App. Sub Type: Whole Positional Accuracy: Automatically positioned to the address Activity Code: 4.1 A(1) (A) (II) Activity Description: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols Primary Activity: Y	A12NW (W)	843	2	515443 173383
6	**Integrated Pollution Prevention And Control** Name: Proper Energy Limited Location: Twickenham Biodiesel Plant, 37, Hamilton Road,,, TWICKENHAM, Middlesex, TW2 6SN Authority: Environment Agency - South East Region, North East Thames Area Permit Reference: BP3334GU Original Permit Ref: Bp3334gu Effective Date: 21st April 2009 **Status: Superseded By Variation** Application Type: Application App. Sub Type: New Positional Accuracy: Automatically positioned to the address Activity Code: 4.1 A(1) (A) (II) Activity Description: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols Primary Activity: Y	A12NW (W)	843	2	515443 173383
6	**Integrated Pollution Prevention And Control** Name: Proper Energy Limited Location: Twickenham Biodiesel Plant, 37, Hamilton Road,,, TWICKENHAM, Middlesex, TW2 6SN Authority: Environment Agency, Thames Region Permit Reference: BP3334GU Original Permit Ref: Bp3334gu Effective Date: 21st April 2009 **Status: Effective** Application Type: Application App. Sub Type: New Positional Accuracy: Automatically positioned to the address Activity Code: 4.1 A(1) (A) (II) Activity Description: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols Primary Activity: Y	A12NW (W)	843	2	515443 173383
7	**Local Authority Pollution Prevention and Controls** Name: Sky Dry Cleaners Location: 13 York Street, Twickenham, Tw1 3jz Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: LBRUT/DC/28 Dated: 1st April 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A13NW (N)	106	3	516300 173359
8	**Local Authority Pollution Prevention and Controls** Name: Kings Clothes Care Specialists Location: 45 King Street, Twickenham, Tw1 3sg Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: LBRUT/DC/15 Dated: 1st April 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A13SW (SW)	137	3	516184 173132
9	**Local Authority Pollution Prevention and Controls** Name: Mel Dry Cleaners Location: 24 Heath Road, Twickenham, Tw1 4bz Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: LBRUT/DC/19 Dated: 1st April 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A13SW (W)	213	3	516075 173162

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
10	**Local Authority Pollution Prevention and Controls** Name: Shell Oak Lane Location: 5-11 Richmond Road, TWICKENHAM, Middlesex, TW1 3AB Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: 17/PVR Dated: 31st December 1998 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A13NE (NE)	306	3	516459 173508
11	**Local Authority Pollution Prevention and Controls** Name: Beaucare Dry Cleaners Location: 146 Heath Road, Twickenham, Tw1 4bn Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: LBRUT/DC/01 Dated: 1st April 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A12SE (W)	603	3	515678 173144
12	**Local Authority Pollution Prevention and Controls** Name: Esso Petroleum Co Ltd Location: West London Terminal, Bedfont Road, Staines, Middlesex, TW19 7LZ Authority: London Borough of Hounslow, Environmental Health Department Permit Reference: PPC083 Dated: 28th July 1999 Process Type: Local Authority Air Pollution Control Description: PG1/13 Processes for the storage, loading and unloading of petrol at terminals **Status: Authorised** Positional Accuracy: Located by supplier to within 100m	A19SE (NE)	858	4	517100 173600
	Nearest Surface Water Feature	A13SE (SE)	13	-	516347 173176
13	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 11th May 1995 Incident Reference: SE950210 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	5	2	516300 173200
13	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Embankment, TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Storm Sewage Note: Not Supplied Incident Date: 4th July 1998 Incident Reference: THSE1998039493 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	8	2	516300 173195
14	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Wharfe Lane Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: Not Supplied Incident Reference: SE920329 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SE (SE)	28	2	516370 173180

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
15	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 29th October 1995 Incident Reference: SE950500 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NW (N)	48	2	516300 173300
16	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 2nd May 1997 Incident Reference: THSE1997032206 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (S)	82	2	516300 173100
17	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: ISLEWORTH, Middlesex Authority: Environment Agency, Thames Region Pollutant: General Note: Not Supplied Incident Date: 16th July 1997 Incident Reference: THSE1997028732 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (NE)	93	2	516400 173270
17	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: General Note: Not Supplied Incident Date: 6th July 1998 Incident Reference: THNE1998039473 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (NE)	113	2	516400 173300
18	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 14th June 1995 Incident Reference: SE950302 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	145	2	516205 173095
18	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 23rd March 1990 Incident Reference: SE900082 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	146	2	516200 173100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
18	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 28th April 1995 Incident Reference: SE950185 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	149	2	516200 173095
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: 153 Fulwell Park A, TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: General Note: No Pollution Found Incident Date: 10th October 1998 Incident Reference: THNE1998040836 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	356	2	516005 173005
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 5th September 1997 Incident Reference: THN11997029365 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	359	2	516005 173000
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Marlow Crescent Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed incident Incident Date: 23rd March 1999 Incident Reference: THNE1999042288 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Approximate location provided by supplier	A13SW (SW)	360	2	516000 173005
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Ivy Bridge Estate, ISLEWORTH Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 17th May 1996 Incident Reference: N1960264 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	363	2	516005 172995
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 19th September 1995 Incident Reference: SE950447 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	363	2	516000 173000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: The Barmy Elms P/H Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Other Note: Not Supplied Incident Date: 1st August 1996 Incident Reference: SE960454 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	366	2	516000 172995
20	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Riverside, TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 7th August 1990 Incident Reference: SE900241 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14SW (E)	455	2	516800 173200
21	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Near Railway Street, TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 30th September 1996 Incident Reference: N1960510 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18SW (NW)	532	2	516000 173700
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 17th May 1991 Incident Reference: SE910115 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	689	2	516200 172500
23	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Swan Island Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 12th December 1989 Incident Reference: SE890431 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	715	2	516100 172500
24	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Swan Island Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 26th May 1992 Incident Reference: SE920170 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	731	2	516030 172510

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
24	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Eel Pie Island Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: Not Supplied Incident Reference: SE950360 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (SW)	753	2	516000 172500
25	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: HAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 22nd March 1996 Incident Reference: SE960127 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14SE (E)	755	2	517100 173200
26	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: STRAWBERRY HILL Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 11th August 1992 Incident Reference: SE920269 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	782	2	516040 172450
27	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 15th January 1994 Incident Reference: NE940030 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	790	2	515500 173400
28	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Swanisland, TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 17th February 1997 Incident Reference: THSE1997031884 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	810	2	516100 172400
28	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 9th April 1998 Incident Reference: 38469 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	815	2	516100 172395

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
29	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 1st February 1990 Incident Reference: N1900047 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	951	2	515700 174000
30	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Marble Hill Park Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 17th November 1991 Incident Reference: SE910330 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14NE (E)	977	2	517300 173400
	River Quality Name: Not Supplied GQA Grade: Unclassified Tidal River Reach: Not Supplied Estimated Distance (km): Not Supplied Flow Rate: Not Supplied Flow Type: Not Supplied Year: 1995	A13SE (SE)	239	2	516427 172959
	River Quality Name: Crane GQA Grade: River Quality C Reach: Duke Of N'S R (Lower) - Tideway Estimated Distance (km): 3.4 Flow Rate: Flow less than 0.31 cumecs Flow Type: River Year: 2000	A18SW (N)	556	2	516115 173782
31	**Substantiated Pollution Incident Register** Authority: Environment Agency - Thames Region, South East Area Incident Date: 14th August 2003 Incident Reference: 181948 Water Impact: Category 2 - Significant Incident Air Impact: Category 4 - No Impact Land Impact: Category 4 - No Impact Positional Accuracy: Located by supplier to within 10m Pollutant: Pollutant Not Identified: Not Identified	A18SW (N)	504	2	516139 173734
32	**Water Abstractions** Operator: Trustees Of Ham Polo Club Licence Number: 28/39/35/0008 Permit Version: 102 Location: River Thames At Ham Polo Club, Petersham, Surrey Authority: Environment Agency, Thames Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Tidal Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Ham Polo Club - Petersham Surrey Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 28th January 2015 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A15NW (E)	989	2	517329 173290

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Richmond Golf Club Licence Number: 28/39/35/0005 Permit Version: 100 Location: Richmond Golf Club - Borehole 'A' Authority: Environment Agency, Thames Region Abstraction: Golf Courses: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 269 Yearly Rate (m3): 28200 Details: Richmond Golf Club, Sudbrook Park Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 11th February 1974 Permit End Date: 30th September 2007 Positional Accuracy: Located by supplier to within 100m	(E)	1998	2	518200 172450
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise Map Sheet: Sheet 39 West London Scale: 1:100,000	A13NW (NW)	0	2	516309 173215
	Drift Deposits Drift Deposit: Low permeability drift deposits occuring at the surface and overlying Major and Minor Aquifers are head, clay-with-flints, brickearth, peat, river terrace deposits and marine and estuarine alluvium Map Sheet: Sheet 39 West London Scale: 1:100,000	A13NW (NW)	0	2	516309 173215
	Bedrock Aquifer Designations Aquifer Designation: Unproductive Strata	A13NW (NW)	0	1	516309 173215
	Superficial Aquifer Designations Aquifer Designation: Unproductive Strata	A13NW (NW)	0	1	516309 173215
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial/Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	0	2	516322 173225
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SE (SE)	0	2	516326 173198
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13SE (SE)	0	2	516323 173185
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (E)	0	2	516322 173218
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	5	2	516321 173227
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SE (SE)	9	2	516342 173178
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	23	2	516336 173236
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	43	2	516363 173238
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	57	2	516372 173248

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	69	2	516382 173255
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	75	2	516387 173258
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (E)	81	2	516417 173232
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	94	2	516404 173267
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (SW)	101	2	516235 173128
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (S)	102	2	516282 173087
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	111	2	516180 173180
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13SW (SW)	111	2	516233 173115
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	115	2	516424 173278
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (SW)	131	2	516232 173088
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	139	2	516416 173322
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	163	2	516433 173338
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13SW (SW)	163	2	516213 173063
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	166	2	516458 173315
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (E)	169	2	516495 173273
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	170	2	516443 173338

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	179	2	516483 173308
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (SW)	180	2	516204 173047
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13SW (SW)	184	2	516203 173043
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	188	2	516090 173195
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (SW)	213	2	516187 173018
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	216	2	516067 173175
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	220	2	516513 173335
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	229	2	516522 173338
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	237	2	516050 173160
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13SW (SW)	250	2	516173 172983
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial/Tidal Models Boundary Accuracy: As Supplied	A13SE (E)	0	2	516333 173215
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (E)	0	2	516327 173217
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SE (SE)	9	2	516342 173178
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13SE (SE)	63	2	516396 173156
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (E)	81	2	516417 173232
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (S)	102	2	516282 173087

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A13NE (NE)	166	2	516458 173315
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (E)	169	2	516495 173273
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NE (NE)	171	2	516454 173327
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13NE (E)	0	2	516322 173218
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13SE (S)	16	2	516312 173171
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13NE (NE)	23	2	516336 173236
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13NE (E)	103	2	516426 173258
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13SW (SW)	111	2	516233 173115
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13NE (NE)	115	2	516424 173278
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13SW (SW)	142	2	516237 173069
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13NE (NE)	148	2	516453 173295
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13NE (NE)	162	2	516471 173295
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13NE (NE)	166	2	516465 173308
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13NE (NE)	171	2	516487 173289
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13SW (SW)	184	2	516203 173043
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13NE (NE)	229	2	516522 173338
	Areas Benefiting from Flood Defences Type: Area Benefiting from Flood Defences Boundary Accuracy: As Supplied	A13SW (SW)	250	2	516173 172983
	Flood Water Storage Areas None				
	Flood Defences Type: Flood Defences Reference: Not Supplied	A13NE (E)	0	2	516325 173218
	Flood Defences Type: Flood Defences Reference: Not Supplied	A13SE (SE)	64	2	516383 173141

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
33	**OS Water Network Lines** Watercourse Form: Tidal river Watercourse Length: 639.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Not Supplied Primacy: 2	A13SE (SE)	43	5	516369 173156
34	**OS Water Network Lines** Watercourse Form: Tidal river Watercourse Length: 336.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Not Supplied Primacy: 1	A13SW (S)	171	5	516300 173009
35	**OS Water Network Lines** Watercourse Form: Tidal river Watercourse Length: 626.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Not Supplied Primacy: 1	A13SW (S)	171	5	516300 173009
36	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 23.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A13NE (NE)	316	5	516615 173357
37	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 11.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A13NE (NE)	336	5	516628 173373
38	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 12.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A13NE (NE)	336	5	516628 173373
39	**OS Water Network Lines** Watercourse Form: Tidal river Watercourse Length: 1021.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Not Supplied Primacy: 1	A14NW (E)	452	5	516794 173242
40	**OS Water Network Lines** Watercourse Form: Tidal river Watercourse Length: 169.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Not Supplied Primacy: 1	A8NW (S)	494	5	516123 172728
41	**OS Water Network Lines** Watercourse Form: Tidal river Watercourse Length: 86.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A8NW (S)	494	5	516123 172728

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Local Authority Landfill Coverage Name: London Borough of Richmond Upon Thames - Has no landfill data to supply		0	6	516309 173215
59	**Potentially Infilled Land (Non-Water)** Bearing Ref: SE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A8NE (SE)	401	-	516535 172833
60	**Potentially Infilled Land (Non-Water)** Bearing Ref: W Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A12NW (W)	894	-	515382 173308

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry No data available				
61	**BGS Recorded Mineral Sites** Site Name: Ham Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 19674 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A8NE (SE)	646	1	516620 172600
62	**BGS Recorded Mineral Sites** Site Name: Twickenham Gravel Pit Location: , Twickenham, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 164159 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary, Devensian Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12NW (W)	892	1	515383 173298
63	**BGS Recorded Mineral Sites** Site Name: Ham Gravel Pit Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 164161 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary, Devensian Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A8SE (S)	973	1	516417 172208
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516188, 173322 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 20.00 mg/kg Cadmium Measured Concentration: 0.70 mg/kg Chromium Measured Concentration: 58.20 mg/kg Lead Measured Concentration: 380.60 mg/kg Nickel Measured Concentration: 23.80 mg/kg	A13NW (NW)	119	1	516188 173322
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516264, 172716 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 22.90 mg/kg Cadmium Measured Concentration: 0.40 mg/kg Chromium Measured Concentration: 60.00 mg/kg Lead Measured Concentration: 89.90 mg/kg Nickel Measured Concentration: 30.20 mg/kg	A8NW (S)	466	1	516264 172716

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516755, 173443 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.90 mg/kg Cadmium Measured Concentration: 0.80 mg/kg Chromium Measured Concentration: 69.10 mg/kg Lead Measured Concentration: 799.90 mg/kg Nickel Measured Concentration: 26.80 mg/kg	A14NW (NE)	480	1	516755 173443
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 515794, 173274 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.30 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 56.20 mg/kg Lead Measured Concentration: 355.90 mg/kg Nickel Measured Concentration: 19.50 mg/kg	A12NE (W)	481	1	515794 173274
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516270, 173829 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 15.90 mg/kg Cadmium Measured Concentration: 1.00 mg/kg Chromium Measured Concentration: 76.60 mg/kg Lead Measured Concentration: 509.40 mg/kg Nickel Measured Concentration: 22.60 mg/kg	A18SW (N)	576	1	516270 173829
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516653, 172693 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 16.30 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 70.90 mg/kg Lead Measured Concentration: 79.80 mg/kg Nickel Measured Concentration: 22.10 mg/kg	A9NW (SE)	583	1	516653 172693
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 515887, 172759 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 13.00 mg/kg Cadmium Measured Concentration: 2.00 mg/kg Chromium Measured Concentration: 74.20 mg/kg Lead Measured Concentration: 272.30 mg/kg Nickel Measured Concentration: 35.00 mg/kg	A7NE (SW)	607	1	515887 172759

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516728, 173723 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.70 mg/kg Cadmium Measured Concentration: 0.50 mg/kg Chromium Measured Concentration: 70.20 mg/kg Lead Measured Concentration: 473.30 mg/kg Nickel Measured Concentration: 29.90 mg/kg	A19SW (NE)	643	1	516728 173723
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 515724, 173777 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.80 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 76.90 mg/kg Lead Measured Concentration: 264.90 mg/kg Nickel Measured Concentration: 19.30 mg/kg	A17SE (NW)	769	1	515724 173777
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517228, 173180 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.30 mg/kg Cadmium Measured Concentration: 0.50 mg/kg Chromium Measured Concentration: 61.50 mg/kg Lead Measured Concentration: 75.40 mg/kg Nickel Measured Concentration: 20.70 mg/kg	A14SE (E)	883	1	517228 173180
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517162, 172797 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 35.90 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 59.80 mg/kg Lead Measured Concentration: 418.30 mg/kg Nickel Measured Concentration: 41.40 mg/kg	A9NE (SE)	908	1	517162 172797
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516389, 174188 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 25.30 mg/kg Cadmium Measured Concentration: 1.00 mg/kg Chromium Measured Concentration: 78.00 mg/kg Lead Measured Concentration: 456.20 mg/kg Nickel Measured Concentration: 40.00 mg/kg	A18NE (N)	940	1	516389 174188

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516303, 172232 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 28.10 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 49.80 mg/kg Lead Measured Concentration: 98.50 mg/kg Nickel Measured Concentration: 27.70 mg/kg	A8SW (S)	945	1	516303 172232
	BGS Urban Soil Chemistry Averages Source: British Geological Survey, National Geoscience Information Service Sample Area: London Count Id: 7209 Arsenic Minimum Concentration: 1.00 mg/kg Arsenic Average Concentration: 17.00 mg/kg Arsenic Maximum Concentration: 161.00 mg/kg Cadmium Minimum Concentration: 0.10 mg/kg Cadmium Average Concentration: 0.90 mg/kg Cadmium Maximum Concentration: 165.20 mg/kg Chromium Minimum Concentration: 13.00 mg/kg Chromium Average Concentration: 79.00 mg/kg Chromium Maximum Concentration: 2094.00 mg/kg Lead Minimum Concentration: 11.00 mg/kg Lead Average Concentration: 280.00 mg/kg Lead Maximum Concentration: 10000.00 mg/kg Nickel Minimum Concentration: 2.00 mg/kg Nickel Average Concentration: 28.00 mg/kg Nickel Maximum Concentration: 506.00 mg/kg	A13NW (NW)	0	1	516309 173215
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	516309 173215
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	20	1	516351 173170
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	516309 173215
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	20	1	516351 173170
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	516309 173215
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	516309 173215

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	516309 173215
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	20	1	516351 173170
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	0	1	516324 173184
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	516309 173215
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13NE (E)	65	1	516404 173220
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	516309 173215
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	516309 173215

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
64	**Contemporary Trade Directory Entries** Name: Snappy Snaps Location: 3, London Road, Twickenham, TW1 3SX Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	58	-	516257 173302
64	**Contemporary Trade Directory Entries** Name: Snappy Snaps Location: 3, London Road, Twickenham, Middlesex, TW1 3SX Classification: Photo & Digital Imaging Bureaus **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	58	-	516257 173302
65	**Contemporary Trade Directory Entries** Name: Centurion Location: Church Street, Twickenham, TW1 3NJ Classification: Car Body Repairs **Status: Inactive** Positional Accuracy: Automatically positioned in the proximity of the address	A13NE (NE)	87	-	516351 173314
65	**Contemporary Trade Directory Entries** Name: C C F N I H R Location: Grange House, 15, Church Street, Twickenham, TW1 3NL Classification: Laboratories **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (NE)	95	-	516360 173316
65	**Contemporary Trade Directory Entries** Name: Cleaners Of Twickenham Location: 9-11, Church Street, Twickenham, TW1 3NJ Classification: Carpet, Curtain & Upholstery Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (NE)	125	-	516388 173330
66	**Contemporary Trade Directory Entries** Name: Carriages & Cars Location: 7, York Street, Twickenham, Middlesex, TW1 3JZ Classification: Garage Services **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A13NW (N)	92	-	516292 173346
66	**Contemporary Trade Directory Entries** Name: Sky Location: 13, York Street, Twickenham, TW1 3JZ Classification: Dry Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (N)	108	-	516302 173361
66	**Contemporary Trade Directory Entries** Name: Tiger Books International Location: 26a, York Street, Twickenham, TW1 3LJ Classification: Distribution Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (N)	112	-	516336 173355
66	**Contemporary Trade Directory Entries** Name: Oven Cleaning Twickenham Location: 26-28, York Street, Twickenham, TW1 3LJ Classification: Oven cleaning **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (N)	123	-	516343 173364
66	**Contemporary Trade Directory Entries** Name: Mccoy Hill Location: 31, Garfield Road, Twickenham, Middlesex, TW1 3JS Classification: Damp & Dry Rot Control **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A13NE (N)	140	-	516327 173388
67	**Contemporary Trade Directory Entries** Name: Woodentots Location: 90, Queens Road, Twickenham, TW1 4ET Classification: Toys, Games & Sporting Goods - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (W)	94	-	516180 173243
67	**Contemporary Trade Directory Entries** Name: Positive Metering Systems Location: 88, Queens Road, Twickenham, TW1 4ET Classification: Chemical Plant & Equipment **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (W)	103	-	516171 173255

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
67	**Contemporary Trade Directory Entries** Name: The Little Body Shop Location: 59, Holly Road, Twickenham, TW1 4HF Classification: Car Body Repairs **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	124	-	516153 173209
67	**Contemporary Trade Directory Entries** Name: Twickenham Coachworks Location: Holly Road, Twickenham, TW1 4HF Classification: Car Body Repairs **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (W)	135	-	516139 173227
68	**Contemporary Trade Directory Entries** Name: Bromptons Dry Cleaners Location: 19, London Road, Twickenham, TW1 3SX Classification: Dry Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	111	-	516237 173351
69	**Contemporary Trade Directory Entries** Name: Nicholas Dyson Location: Eel Pie Boat Yard,Eel Pie Island, Twickenham, Middlesex, TW1 3DY Classification: Antiques - Repairing & Restoring **Status: Active** Positional Accuracy: Manually positioned within the geographical locality	A13SE (SE)	129	-	516465 173146
69	**Contemporary Trade Directory Entries** Name: Eel Pie Boatyard Ltd Location: Eel Pie Island, Twickenham, Middlesex, TW1 3DY Classification: Ports, Docks & Harbours **Status: Active** Positional Accuracy: Manually positioned to the address or location	A13SE (E)	131	-	516475 173172
69	**Contemporary Trade Directory Entries** Name: Eel Pie Island Slipways Ltd Location: Eel Pie Island, Twickenham, TW1 3DY Classification: Boatbuilders & Repairers **Status: Active** Positional Accuracy: Automatically positioned to the address	A13SE (E)	132	-	516476 173172
69	**Contemporary Trade Directory Entries** Name: Dock & Slipway Location: Eel Pie Island, Twickenham, TW1 3DY Classification: Ports, Docks & Harbours **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (E)	132	-	516476 173172
70	**Contemporary Trade Directory Entries** Name: Merlin Cleaners Location: 45, King Street Parade, King Street, Twickenham, TW1 3SG Classification: Dry Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	134	-	516189 173130
70	**Contemporary Trade Directory Entries** Name: Pressgang Location: 45, King Street Parade, King Street, Twickenham, TW1 3SG Classification: Dry Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	134	-	516189 173130
70	**Contemporary Trade Directory Entries** Name: Pack & Send Location: 45, King Street Parade, King Street, Twickenham, TW1 3SG Classification: Freight Forwarders **Status: Active** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	135	-	516189 173130
70	**Contemporary Trade Directory Entries** Name: Minuteman Press Location: 55, King Street Parade, King Street, Twickenham, TW1 3SG Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	156	-	516185 173102
70	**Contemporary Trade Directory Entries** Name: Elektrotek Location: 55 King St Pde,King St, Twickenham, Middlesex, TW1 3SG Classification: Electrical Appliance Repairs **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A13SW (SW)	157	-	516184 173102

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
71	**Contemporary Trade Directory Entries** Name: Eel Pie Rowing Supplies Location: Eel Pie Island, Twickenham, Middlesex, TW1 3DY Classification: Boatbuilders & Repairers **Status: Inactive** Positional Accuracy: Manually positioned within the geographical locality	A13SE (SE)	136	-	516450 173106
72	**Contemporary Trade Directory Entries** Name: Crump Location: 65, Holly Road, Twickenham, TW1 4HF Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	137	-	516141 173202
72	**Contemporary Trade Directory Entries** Name: Local Cleaning Twickenham Ltd Location: 1, Heath Road, Twickenham, TW1 4AW Classification: Carpet, Curtain & Upholstery Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	165	-	516144 173137
72	**Contemporary Trade Directory Entries** Name: Scan Medical Ltd Location: 67a, Holly Road, Twickenham, TW1 4HF Classification: Medical Equipment Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	169	-	516114 173184
72	**Contemporary Trade Directory Entries** Name: Car Care Location: 67, Holly Road, Twickenham, TW1 4HF Classification: Car Breakers & Dismantlers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	169	-	516114 173184
72	**Contemporary Trade Directory Entries** Name: Fotoswift Location: 10, Heath Road, Twickenham, TW1 4BZ Classification: Photographic Processors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	175	-	516113 173169
72	**Contemporary Trade Directory Entries** Name: Fardon Graham Location: 96a, Holly Road, Twickenham, TW1 4HF Classification: Print Finishers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	187	-	516089 173212
72	**Contemporary Trade Directory Entries** Name: Star Print Stationers & Artist'S Materials Location: 20, Heath Road, Twickenham, TW1 4BZ Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	204	-	516085 173160
72	**Contemporary Trade Directory Entries** Name: Charms Location: 22, Heath Road, Twickenham, TW1 4BZ Classification: Jewellery Manufacturers & Repairers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	207	-	516081 173161
72	**Contemporary Trade Directory Entries** Name: M E L Dry Cleaners Location: 24, Heath Road, Twickenham, TW1 4BZ Classification: Dry Cleaners **Status: Active** Positional Accuracy: Automatically positioned to the address	A13SW (W)	212	-	516077 173159
73	**Contemporary Trade Directory Entries** Name: Shotline Steel Swimming Pools Location: The Haven Studio, Eel Pie Island, Twickenham, TW1 3DY Classification: Swimming Pool Contractors, Repairers & Service **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	141	-	516414 173066
74	**Contemporary Trade Directory Entries** Name: Y-Cam Solutions Ltd Location: 29-39, London Road, Twickenham, TW1 3SZ Classification: Computer Manufacturers **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	148	-	516217 173382

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
74	**Contemporary Trade Directory Entries** Name: M F Airport Parking Location: 26, London Road, Twickenham, TW1 3AZ Classification: Car Painters & Sprayers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (N)	164	-	516255 173414
74	**Contemporary Trade Directory Entries** Name: London Boys Scrap Yards In Twickenham Location: 26, London Road, Twickenham, TW1 3AZ Classification: Car Breakers & Dismantlers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (N)	164	-	516255 173414
74	**Contemporary Trade Directory Entries** Name: Bright & Beautiful Location: Suite 102,26 London Road, Twickenham, Middlesex, TW1 3AZ Classification: Cleaning Services - Domestic **Status: Inactive** Positional Accuracy: Manually positioned within the geographical locality	A13NW (N)	164	-	516255 173414
74	**Contemporary Trade Directory Entries** Name: Office Machine Company Location: 26, London Road, Twickenham, TW1 3AZ Classification: Office Furniture & Equipment **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NW (N)	164	-	516255 173414
74	**Contemporary Trade Directory Entries** Name: Springer Miller International Location: Sovereign House, 26-30, London Road, Twickenham, TW1 3RW Classification: Hospitals **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (N)	164	-	516255 173414
74	**Contemporary Trade Directory Entries** Name: The Printing Room Location: 37, London Road, TWICKENHAM, TW1 3SZ Classification: Printers **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	171	-	516208 173403
74	**Contemporary Trade Directory Entries** Name: Bonjour Dry Cleaners Location: 34, London Road, Twickenham, TW1 3RR Classification: Dry Cleaners **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NW (N)	181	-	516244 173429
74	**Contemporary Trade Directory Entries** Name: London Dry Cleaners Location: 36, London Road, Twickenham, Middlesex, TW1 3RR Classification: Dry Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (N)	187	-	516241 173434
75	**Contemporary Trade Directory Entries** Name: P A K 2000 Location: Queens House, 2, Holly Road, Twickenham, Middlesex, TW1 4EG Classification: Packaging Materials Manufacturers & Suppliers **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A13NW (NW)	154	-	516154 173336
76	**Contemporary Trade Directory Entries** Name: Amsoil Location: 31, York Street, Twickenham, TW1 3JZ Classification: Lubricant Manufacturers & Distributors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (N)	165	-	516353 173406
76	**Contemporary Trade Directory Entries** Name: Performance Oils Ltd Location: 31, York Street, Twickenham, TW1 3JZ Classification: Lubricant Manufacturers & Distributors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (N)	165	-	516353 173406
76	**Contemporary Trade Directory Entries** Name: Repromac Location: 31, York Street, Twickenham, TW1 3JZ Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (N)	165	-	516353 173406

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
77	**Contemporary Trade Directory Entries** Name: Conservation & Restorer Of Fine Art Location: Studio 2, 27a, Arragon Road, Twickenham, TW1 3NG Classification: Art Restoration & Picture Cleaning **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (N)	219	-	516368 173458
77	**Contemporary Trade Directory Entries** Name: Sauflon Pharmaceuticals Ltd Location: 49-53, York Street, Twickenham, TW1 3LP Classification: Optical Goods - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (NE)	235	-	516416 173451
77	**Contemporary Trade Directory Entries** Name: Sauflon Location: 49-53, York Street, Twickenham, TW1 3LP Classification: Optical Goods - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (NE)	235	-	516416 173451
78	**Contemporary Trade Directory Entries** Name: Zenith Time Co (Gb) Ltd Location: 17, Heath Road, Twickenham, TW1 4AW Classification: Clocks & Watches - Manufacturers & Wholesalers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	224	-	516085 173119
79	**Contemporary Trade Directory Entries** Name: The Platonic Fireplace Co Location: Unit 3 Ground Floor, Phoenix Wharf, Eel Pie Island, Twickenham, TW1 3DY Classification: Fireplaces & Mantelpieces **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (E)	234	-	516579 173205
80	**Contemporary Trade Directory Entries** Name: Scientaire Thermal Systems Ltd Location: 40c, Heath Road, Twickenham, TW1 4BZ Classification: Air Conditioning Equipment & Systems **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	243	-	516047 173152
80	**Contemporary Trade Directory Entries** Name: Hedsor Engineers Ltd Location: 40c, Heath Road, Twickenham, TW1 4BZ Classification: Engineers - General **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	243	-	516047 173152
80	**Contemporary Trade Directory Entries** Name: Bst Aircon Location: 40c, Heath Road, Twickenham, Middlesex, TW1 4BZ Classification: Air Conditioning Equipment & Systems **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	243	-	516047 173152
81	**Contemporary Trade Directory Entries** Name: Mondo Circuits Ltd Location: 35, Grosvenor Road, Twickenham, TW1 4AD Classification: Printed Circuit Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	253	-	516113 173435
82	**Contemporary Trade Directory Entries** Name: Lenslocker Camera And Lens Hire Location: 57b, York Street, Twickenham, TW1 3LP Classification: Photographic Equipment & Supplies - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (NE)	261	-	516443 173464
82	**Contemporary Trade Directory Entries** Name: Shell Oak Lane Location: 5-11, Richmond Road, Twickenham, TW1 3AB Classification: Petrol Filling Stations **Status: Active** Positional Accuracy: Manually positioned to the address or location	A13NE (NE)	306	-	516459 173508
83	**Contemporary Trade Directory Entries** Name: Patricia Garner Location: 55, Arragon Road, Twickenham, TW1 3NG Classification: Art Restoration & Picture Cleaning **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NE (N)	267	-	516324 173518

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
137	**Contemporary Trade Directory Entries** Name: Chemdry Pro Care Location: 18, Crane Road, Twickenham, TW2 6RY Classification: Carpet, Curtain & Upholstery Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12NW (W)	966	-	515307 173240
138	**Contemporary Trade Directory Entries** Name: Pressing Needs Location: 9, Erncroft Way, Twickenham, TW1 1DA Classification: Ironing & Home Laundry Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	972	-	515767 174073
139	**Contemporary Trade Directory Entries** Name: Billy Allen Autos Ltd Location: 56, The Green, Twickenham, Middlesex, TW2 5AB Classification: Car Breakers & Dismantlers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	976	-	515320 173033
139	**Contemporary Trade Directory Entries** Name: Billy Allen Autos Ltd Location: 56, The Green, Twickenham, TW2 5AB Classification: Car Engine Tuning & Diagnostic Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A12SW (W)	976	-	515320 173033
139	**Contemporary Trade Directory Entries** Name: Billy Allen Location: 56, The Green, Twickenham, Middlesex, TW2 5AB Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	976	-	515320 173033
139	**Contemporary Trade Directory Entries** Name: Billy Allen Autos Ltd Location: 56, The Green, Twickenham, TW2 5AB Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	976	-	515320 173033
139	**Contemporary Trade Directory Entries** Name: Richmond International Geoscience Location: 1a, May Road, Twickenham, TW2 6QW Classification: Oil & Gas Exploration Supplies & Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	991	-	515302 173042
139	**Contemporary Trade Directory Entries** Name: Reynolds Bros Ltd Location: A, 1, May Road, Twickenham, TW2 6QW Classification: Concrete Contractors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	992	-	515302 173040
140	**Fuel Station Entries** Name: Shell Oak Lane Location: 5-11, Richmond Road, Twickenham, TW1 3AB Brand: SHELL Premises Type: Petrol Station **Status: Open** Positional Accuracy: Manually positioned to the address or location	A13NE (NE)	306	-	516459 173508
141	**Fuel Station Entries** Name: New Island Filling Station Location: East Lancashire Road, TWICKENHAM, Middlesex, TW1 3DY Brand: OBSOLETE Premises Type: Not Applicable **Status: Obsolete** Positional Accuracy: Manually positioned to the address or location	A8SW (S)	798	-	516010 172446
142	**Points of Interest - Commercial Services** Name: The Little Body Shop Location: 59 Holly Rd, Twickenham, Middlesex, TW1 4HW Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A13SW (W)	123	7	516154 173208

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
142	**Points of Interest - Commercial Services** Name: The Little Body Shop Location: 59 Holly Road, Twickenham, TW1 4HF Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A13SW (W)	123	7	516154 173208
142	**Points of Interest - Commercial Services** Name: The Little Body Shop Location: 59 Holly Road, Twickenham, TW1 4HF Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A13SW (W)	123	7	516155 173208
142	**Points of Interest - Commercial Services** Name: Twickenham Autos Location: 65 Holly Road, Twickenham, TW1 4HF Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A13SW (W)	138	7	516141 173202
142	**Points of Interest - Commercial Services** Name: Carcare Location: 67 Holly Road, Twickenham, TW1 4HF Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A13SW (W)	169	7	516114 173184
143	**Points of Interest - Commercial Services** Name: Pure Juice Company Ltd Location: 44 London Road, Twickenham, TW1 3RR Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A13NW (N)	206	7	516233 173452
143	**Points of Interest - Commercial Services** Name: Pure Juice Company Ltd Location: 44 London Road, Twickenham, TW1 3RR Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A13NW (N)	206	7	516233 173452
144	**Points of Interest - Commercial Services** Name: Hedsor Engineers Ltd Location: 40c Heath Road, Twickenham, TW1 4BZ Category: Construction Services Class Code: Metalworkers Including Blacksmiths Positional Accuracy: Positioned to address or location	A13SW (W)	244	7	516046 173152
145	**Points of Interest - Commercial Services** Name: Shell Oak Lane Location: 5-11 Richmond Road, Twickenham, TW1 3AB Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A13NE (NE)	297	7	516452 173501
145	**Points of Interest - Commercial Services** Name: Car Wash Location: 5-11 Richmond Road, Twickenham, TW1 3AB Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A13NE (NE)	306	7	516459 173508
146	**Points of Interest - Commercial Services** Name: Macopharma (UK Ltd) Location: Regal House 70, London Road, Twickenham, TW1 3QS Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A18SW (N)	372	7	516162 173603
147	**Points of Interest - Commercial Services** Name: Orleans Garage Location: 91-93 Richmond Road, Twickenham, TW1 3AW Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19SW (NE)	583	7	516689 173678
147	**Points of Interest - Commercial Services** Name: Orleans Garage Location: 91-93 Richmond Road, Twickenham, TW1 3AW Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19SW (NE)	584	7	516689 173678

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
155	**Points of Interest - Commercial Services** Name: French Correction Garage Location: 148 Amyand Park Road, Twickenham, TW1 3HY Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19NW (NE)	925	7	516691 174086
156	**Points of Interest - Commercial Services** Name: Billy Allen Autos Ltd Location: 56 The Green, Twickenham, TW2 5AB Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A12SW (W)	975	7	515322 173027
156	**Points of Interest - Commercial Services** Name: Billy Allen Autos Ltd Location: 56 The Green, Twickenham, TW2 5AB Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A12SW (W)	976	7	515320 173033
157	**Points of Interest - Education and Health** Name: St Johns & Amyand House Location: St. Johns & Amyand House, Strafford Road, Twickenham, TW1 3AD Category: Health Practitioners and Establishments Class Code: Hospitals Positional Accuracy: Positioned to address or location	A18SE (N)	431	7	516405 173668
158	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13NW (NW)	74	7	516215 173284
158	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13NW (NW)	125	7	516219 173357
158	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13NW (NW)	126	7	516219 173358
159	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SE (SE)	95	7	516428 173146
159	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SE (SE)	95	7	516428 173147
159	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SE (SE)	104	7	516443 173158
159	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SE (SE)	104	7	516443 173159
159	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SE (SE)	117	7	516452 173145

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
160	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SW (W)	169	7	516112 173190
160	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SW (W)	169	7	516112 173190
161	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SE (E)	228	7	516573 173189
162	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13NW (NW)	237	7	516113 173413
162	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13NW (NW)	237	7	516113 173413
163	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13NE (NE)	355	7	516492 173545
163	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A13NE (NE)	356	7	516496 173543
164	**Points of Interest - Manufacturing and Production** Name: Regus Plc Location: Regal House 70, London Road, Twickenham, TW1 3QS Category: Industrial Features Class Code: Business Parks and Industrial Estates Positional Accuracy: Positioned to address or location	A18SW (N)	372	7	516162 173603
165	**Points of Interest - Manufacturing and Production** Name: Tank Location: TW1 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A18SW (N)	622	7	516167 173863
166	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A12SW (W)	679	7	515598 173173
167	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12SW (W)	704	7	515576 173143
167	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A12SW (W)	716	7	515562 173156

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
172	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12SW (W)	883	7	515408 173065
173	**Points of Interest - Manufacturing and Production** Name: Works Location: TW2 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12SW (W)	899	7	515376 173182
173	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12SW (W)	900	7	515375 173182
173	**Points of Interest - Manufacturing and Production** Name: Works Location: TW2 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A12SW (W)	902	7	515373 173196
173	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12SW (W)	903	7	515372 173194
173	**Points of Interest - Manufacturing and Production** Name: Works Location: TW2 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A12SW (W)	909	7	515366 173182
173	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12SW (W)	912	7	515363 173184
173	**Points of Interest - Manufacturing and Production** Name: Enessa Works Location: TW2 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A12NW (W)	927	7	515347 173232
173	**Points of Interest - Manufacturing and Production** Name: Enessa Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12NW (W)	930	7	515344 173234
174	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12SW (W)	976	7	515314 173059
174	**Points of Interest - Manufacturing and Production** Name: Works Location: TW2 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A12SW (W)	977	7	515314 173057
175	**Points of Interest - Public Infrastructure** Name: Twickenham Police Station Location: 41 London Road, Twickenham, TW1 3SY Category: Central and Local Government Class Code: Police Stations Positional Accuracy: Positioned to address or location	A13NW (NW)	196	7	516191 173423

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
175	**Points of Interest - Public Infrastructure** Name: Metropolitan Police Service Location: 41 London Road, Twickenham, TW1 3SY Category: Central and Local Government Class Code: Police Stations Positional Accuracy: Positioned to address or location	A13NW (NW)	196	7	516191 173423
175	**Points of Interest - Public Infrastructure** Name: Metropolitan Police Service Twickenham Location: 41 London Road, Twickenham, TW1 3SY Category: Central and Local Government Class Code: Police Stations Positional Accuracy: Positioned to address or location	A13NW (NW)	196	7	516191 173423
176	**Points of Interest - Public Infrastructure** Name: Shell Oak Lane Location: 5-11 Richmond Road, Twickenham, TW1 3AB Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A13NE (NE)	306	7	516459 173508
176	**Points of Interest - Public Infrastructure** Name: Shell Oak Lane Location: 5-11 Richmond Road, Twickenham, TW1 3AB Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A13NE (NE)	306	7	516459 173508
176	**Points of Interest - Public Infrastructure** Name: Shell Oak Lane Location: 5-11 Richmond Road, Twickenham, TW1 3AB Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A13NE (NE)	306	7	516459 173508
176	**Points of Interest - Public Infrastructure** Name: Oak Lane Cemetery Location: Not Supplied Category: Infrastructure and Facilities Class Code: Cemeteries and Crematoria Positional Accuracy: Positioned to an adjacent address or location	A18SE (N)	318	7	516386 173556
176	**Points of Interest - Public Infrastructure** Name: Oak Lane Cemetery Location: TW1 Category: Infrastructure and Facilities Class Code: Cemeteries and Crematoria Positional Accuracy: Positioned to an adjacent address or location	A18SE (N)	323	7	516398 173557
177	**Points of Interest - Public Infrastructure** Name: Twickenham Rail Station Location: Mary'S Terrace, TW1 Category: Public Transport, Stations and Infrastructure Class Code: Railway Stations, Junctions and Halts Positional Accuracy: Positioned to address or location	A18SW (N)	467	7	516171 173705
177	**Points of Interest - Public Infrastructure** Name: Twickenham Station Location: Mary'S Terrace, TW1 Category: Public Transport, Stations and Infrastructure Class Code: Railway Stations, Junctions and Halts Positional Accuracy: Positioned to address or location	A18SW (N)	467	7	516171 173705
177	**Points of Interest - Public Infrastructure** Name: Weir Location: TW1 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A18SW (N)	502	7	516147 173735
177	**Points of Interest - Public Infrastructure** Name: Weir Location: TW1 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A18SW (N)	521	7	516232 173771
178	**Points of Interest - Public Infrastructure** Name: Weir Location: TW1 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A18SW (NW)	528	7	516056 173727

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
178	**Points of Interest - Public Infrastructure** Name: Weir Location: TW1 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A17SE (NW)	544	7	515969 173693
179	**Points of Interest - Public Infrastructure** Name: Weir Location: TW1 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A18SE (N)	581	7	516322 173833
179	**Points of Interest - Public Infrastructure** Name: Weir Location: TW1 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A18NE (N)	668	7	516346 173919
180	**Points of Interest - Public Infrastructure** Name: Bishco Location: Electroline House 15, Lion Road, Twickenham, TW1 4JH Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to address or location	A12SW (W)	708	7	515568 173192
180	**Points of Interest - Public Infrastructure** Name: Bishco London Ltd Location: Electroline House 15, Lion Road, Twickenham, TW1 4JH Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to address or location	A12SW (W)	708	7	515568 173192
181	**Points of Interest - Public Infrastructure** Name: Weir Location: TW1 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A18NE (N)	764	7	516364 174014
182	**Points of Interest - Public Infrastructure** Name: Barnham's Location: 190 Heath Road, Twickenham, TW2 5TX Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to address or location	A12SW (W)	780	7	515507 173093
183	**Points of Interest - Public Infrastructure** Name: Weir Location: TW1 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A18NE (N)	846	7	516328 174098
183	**Points of Interest - Public Infrastructure** Name: Weir Location: TW1 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A18NW (N)	918	7	516290 174171
184	**Points of Interest - Public Infrastructure** Name: Weir Location: TW2 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A12NW (W)	855	7	515458 173495
185	**Points of Interest - Public Infrastructure** Name: Weir Location: TW2 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A12NW (W)	960	7	515337 173450
186	**Points of Interest - Recreational and Environmental** Name: Playground Location: Wharf Lane, TW1 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A13SW (SW)	92	7	516247 173128

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
187	**Points of Interest - Recreational and Environmental** Name: Play Area Location: Not Supplied Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A13NW (NW)	134	7	516164 173315
188	**Points of Interest - Recreational and Environmental** Name: Playground Location: Not Supplied Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A18NE (N)	737	7	516386 173984
188	**Points of Interest - Recreational and Environmental** Name: Playground Location: Lancaster Place, TW1 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to address or location	A18NE (N)	743	7	516388 173990
188	**Points of Interest - Recreational and Environmental** Name: Playground Location: Lancaster Place, TW1 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to address or location	A18NE (N)	745	7	516389 173992
189	**Points of Interest - Recreational and Environmental** Name: Playground Location: Not Supplied Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A14NE (E)	788	7	517119 173342
189	**Points of Interest - Recreational and Environmental** Name: Playground Location: Riverside, TW1 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A14NE (E)	788	7	517119 173342
190	**Points of Interest - Recreational and Environmental** Name: Playground Location: Not Supplied Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A9NE (SE)	818	7	517035 172754
190	**Points of Interest - Recreational and Environmental** Name: Playground Location: Riverside Drive, TW10 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A9NE (SE)	818	7	517035 172754
191	**Points of Interest - Recreational and Environmental** Name: Playground Location: Craneford Way, TW2 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to address or location	A17SW (W)	958	7	515379 173583

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
192	**Local Nature Reserves** Name: Ham Lands Multiple Area: Y Area (m2): 600138.24 Source: Natural England Designation Date: 1st January 1992	A13SE (SE)	201	8	516418 172997

Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	**London Borough of Richmond upon Thames - Environmental Health Department** 4 Waldegrave Road, Teddington, Middlesex, TW11 8EN	Telephone: 020 8891 1411 Fax: 020 8891 7702 Website: www.richmond.gov.uk
4	**London Borough of Hounslow - Environmental Health Department** Civic Centre, Lampton Road, Hounslow, Middlesex, TW3 4DN	Telephone: 020 8583 2000 Website: www.hounslow.gov.uk
5	**Ordnance Survey** Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 023 8079 2000 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk
6	**London Borough of Richmond upon Thames** Civic Centre, 44 York Street, Twickenham, Middlesex, TW1 3BZ	Telephone: 020 8891 1411 Fax: 020 8891 7702 Website: www.richmond.gov.uk
7	**PointX** 7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY	Website: www.pointx.co.uk
8	**Natural England** County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
9	**Historic England** 1 Waterhouse Square, 138 - 142 Holborn, London, EC1N 2ST	Telephone: 0370 333 0607 Email: customers@historicengland.org.uk Website: www.historicengland.org.uk
10	**Environment Agency - Head Office** Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.

Geology 1:50,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WMGR	Infilled Ground	Artificial Deposit	Cenozoic - Cenozoic
	MGR	Made Ground (Undivided)	Artificial Deposit	Holocene - Holocene
	WGR	Worked Ground (Undivided)	Void	Holocene - Holocene

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silty, Peaty, Sandy [Unlithified Deposits Coding Scheme]	Flandrian - Flandrian
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Flandrian - Flandrian
	LASI	Langley Silt Member	Clay and Silt	Devensian - Devensian
	KPGR	Kempton Park Gravel Formation	Sand and Gravel	Devensian - Devensian
	TPGR	Taplow Gravel Formation	Sand and Gravel	Wolstonian - Wolstonian
	BHT	Boyn Hill Gravel Member	Sand and Gravel	Wolstonian - Hoxnian
	HEAD	Head	Clay, Silt, Sand and Gravel	Quaternary - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	LC	London Clay Formation	Clay and Silt	Eocene - Eocene

GEA

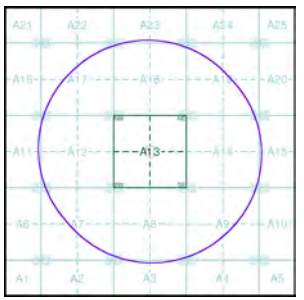
Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	**1**
Map Sheet No:	**270**
Map Name:	**South London**
Map Date:	**1998**
Bedrock Geology:	**Available**
Superficial Geology:	**Available**
Artificial Geology:	**Available**
Faults:	**Not Supplied**
Landslip:	**Available**
Rock Segments:	**Not Supplied**

Geology 1:50,000 Maps - Slice A



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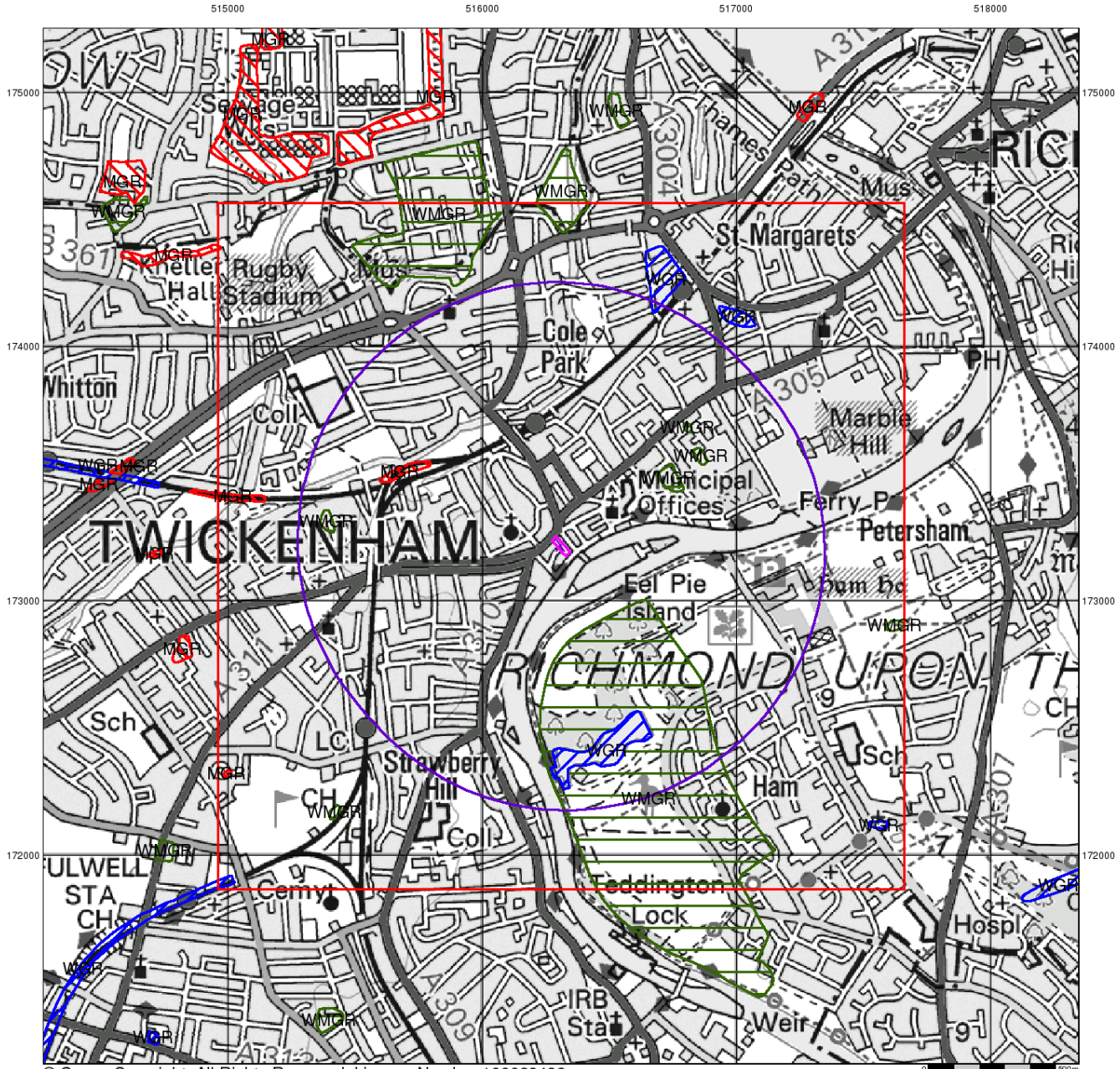
Order Number:	134500386_1_1
Customer Reference:	J17205
National Grid Reference:	516310, 173220
Slice:	A
Site Area (Ha):	0.2
Search Buffer (m):	1000

Site Details:

1c, King Street, TWICKENHAM, TW1 3SD



GEA

Artificial Ground and Landslip

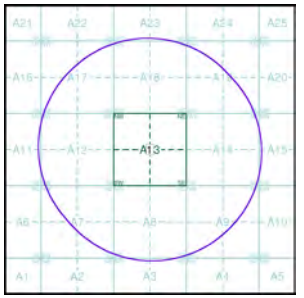
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



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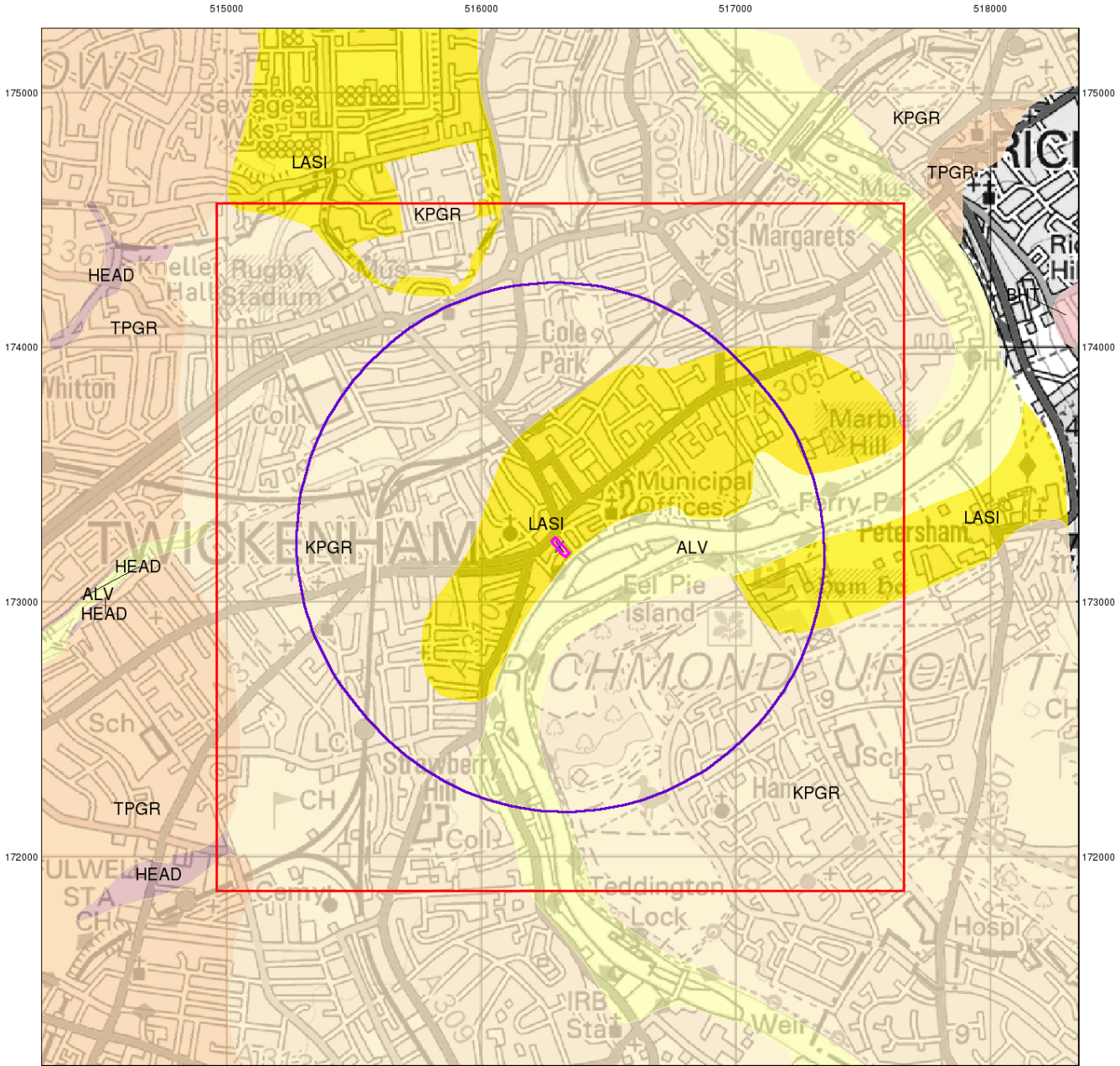
1c, King Street, TWICKENHAM, TW1 3SD

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



GEA

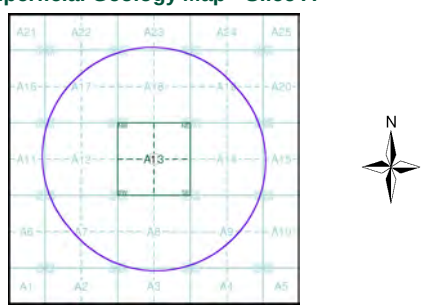
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



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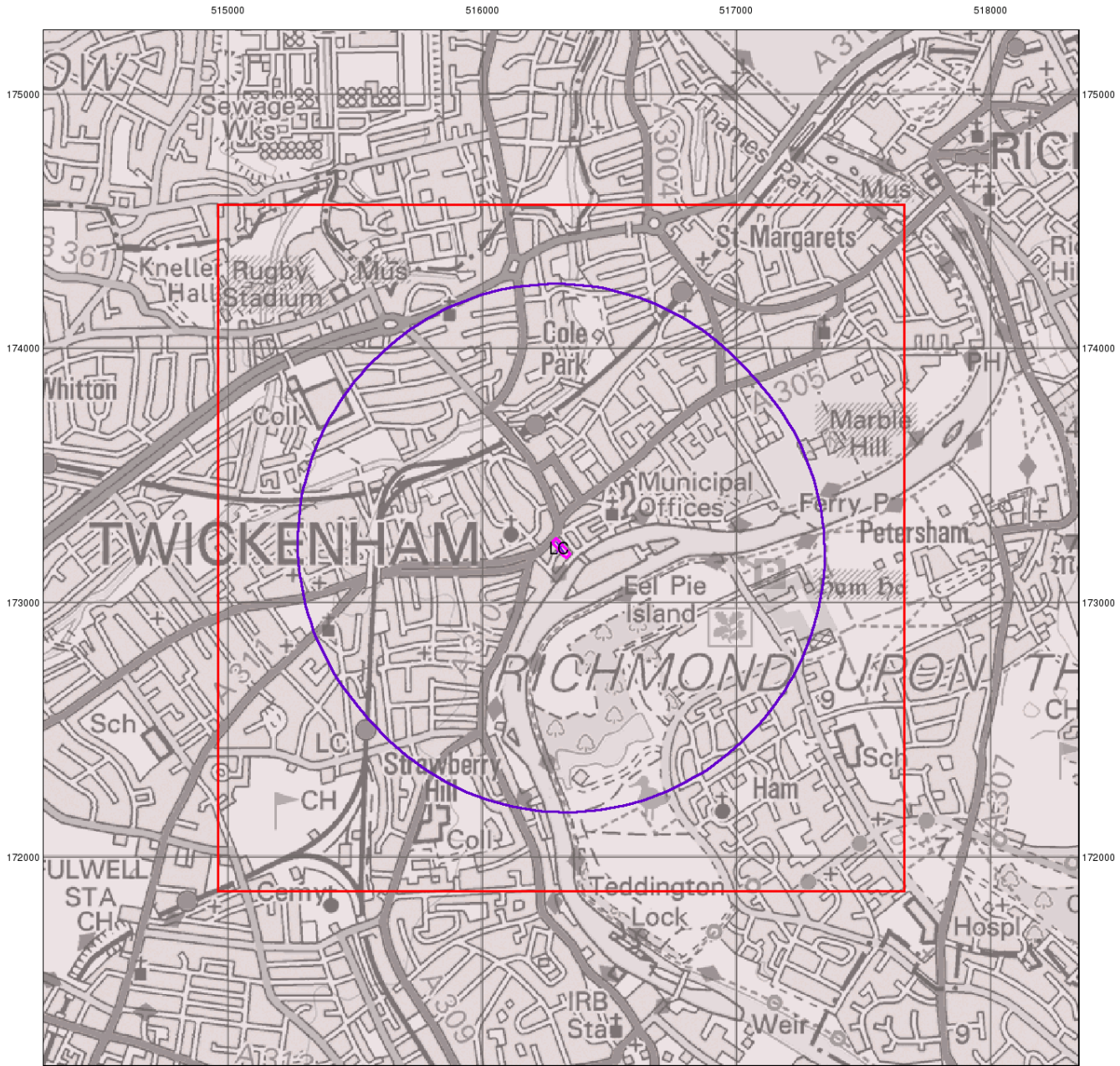


GEA

Bedrock and Faults

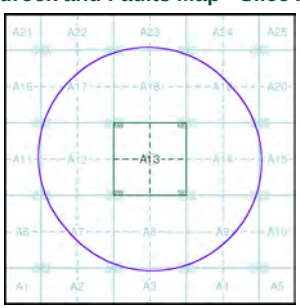
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



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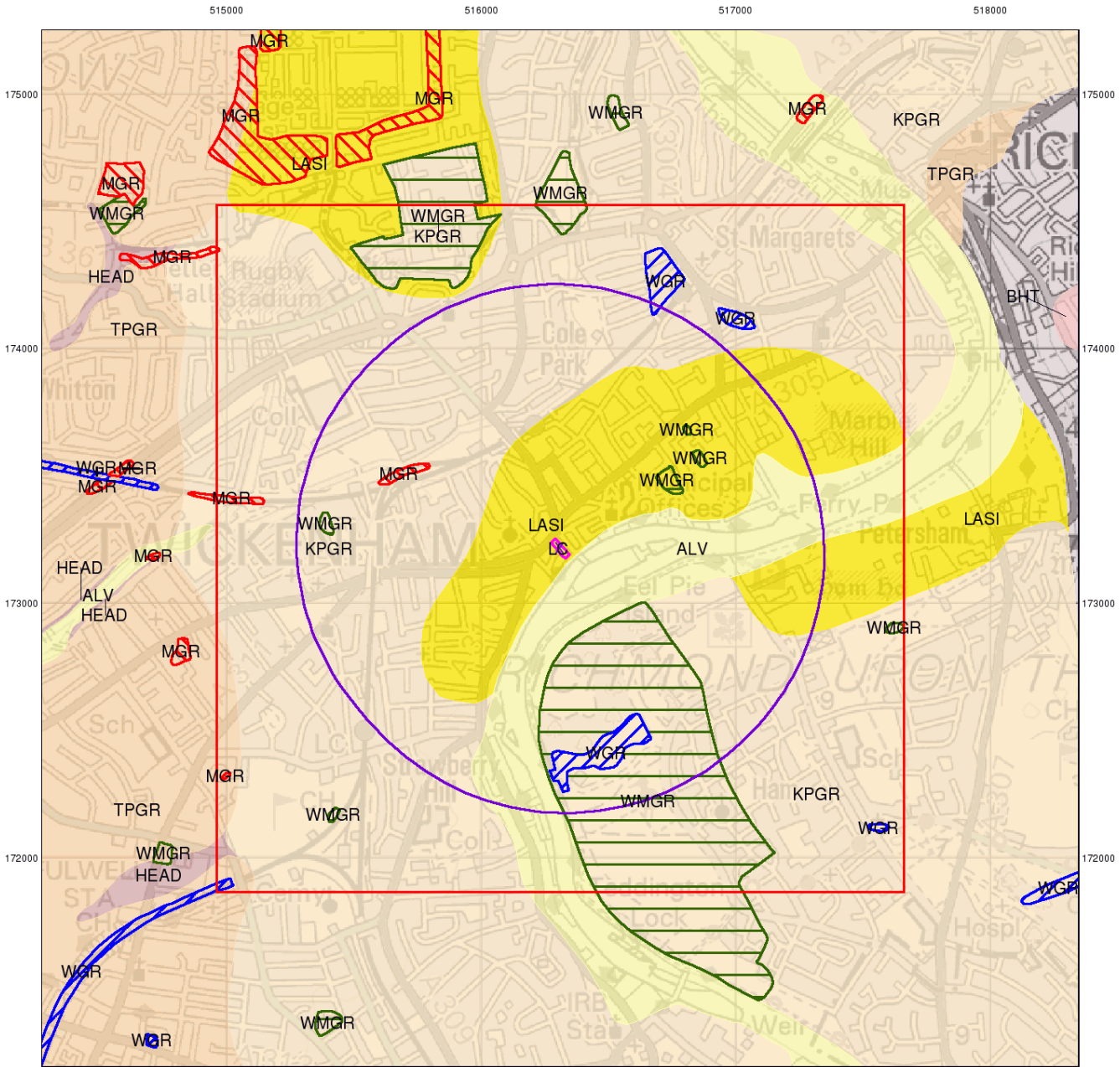


GEA

Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

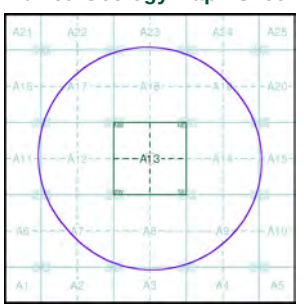
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



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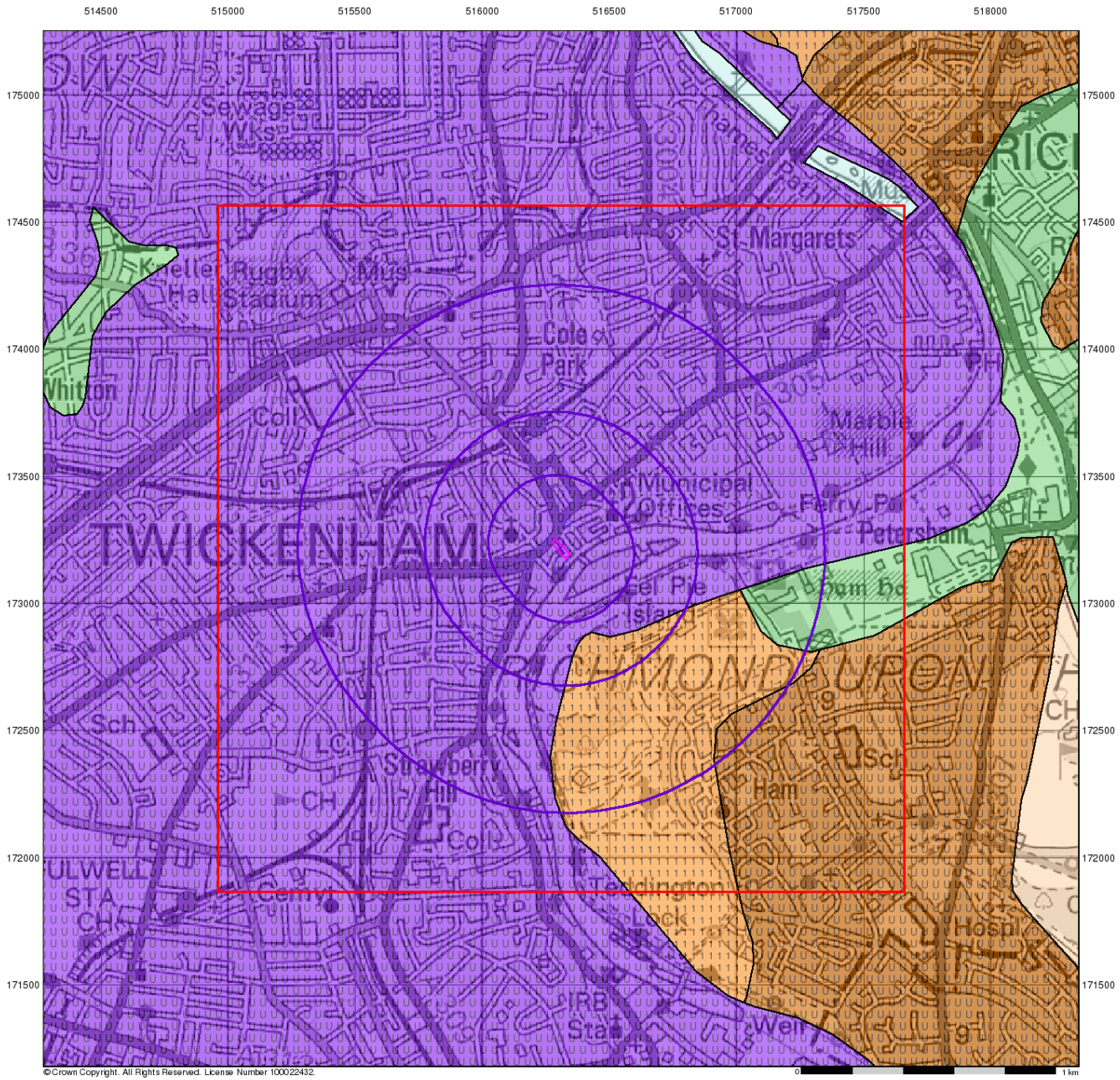


GEA

Groundwater Vulnerability

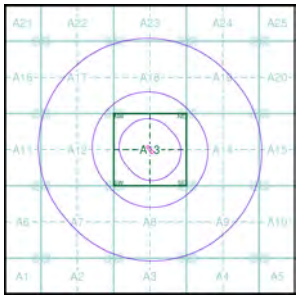
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	134500386_1_1
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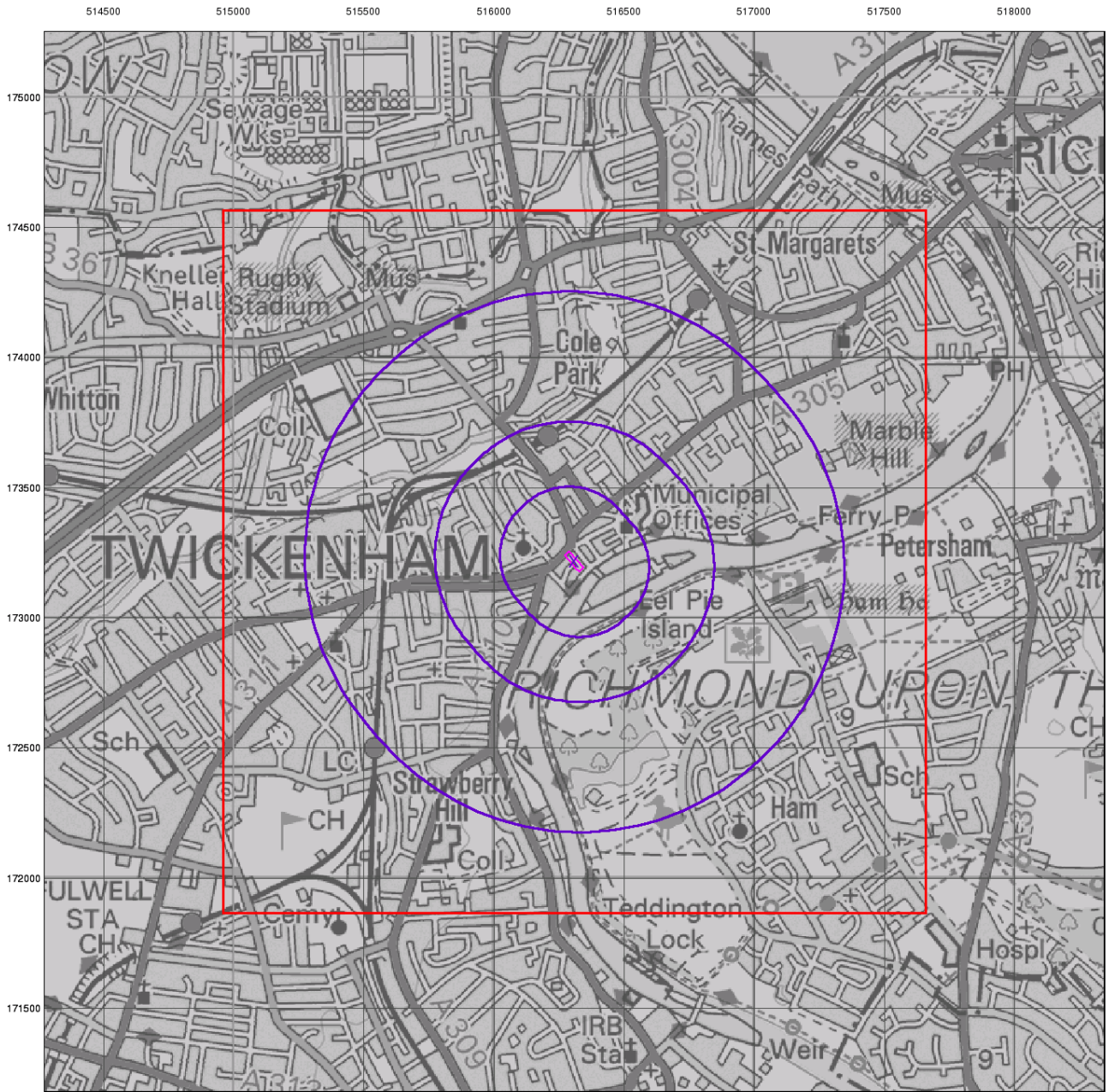
National Grid Reference:	516310, 173220
Slice:	A
Site Area (Ha):	0.2
Search Buffer (m):	1000

Site Details

1c, King Street, TWICKENHAM, TW1 3SD



GEA

Bedrock Aquifer Designation

General

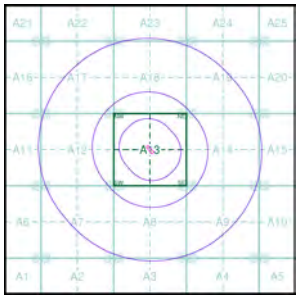
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A

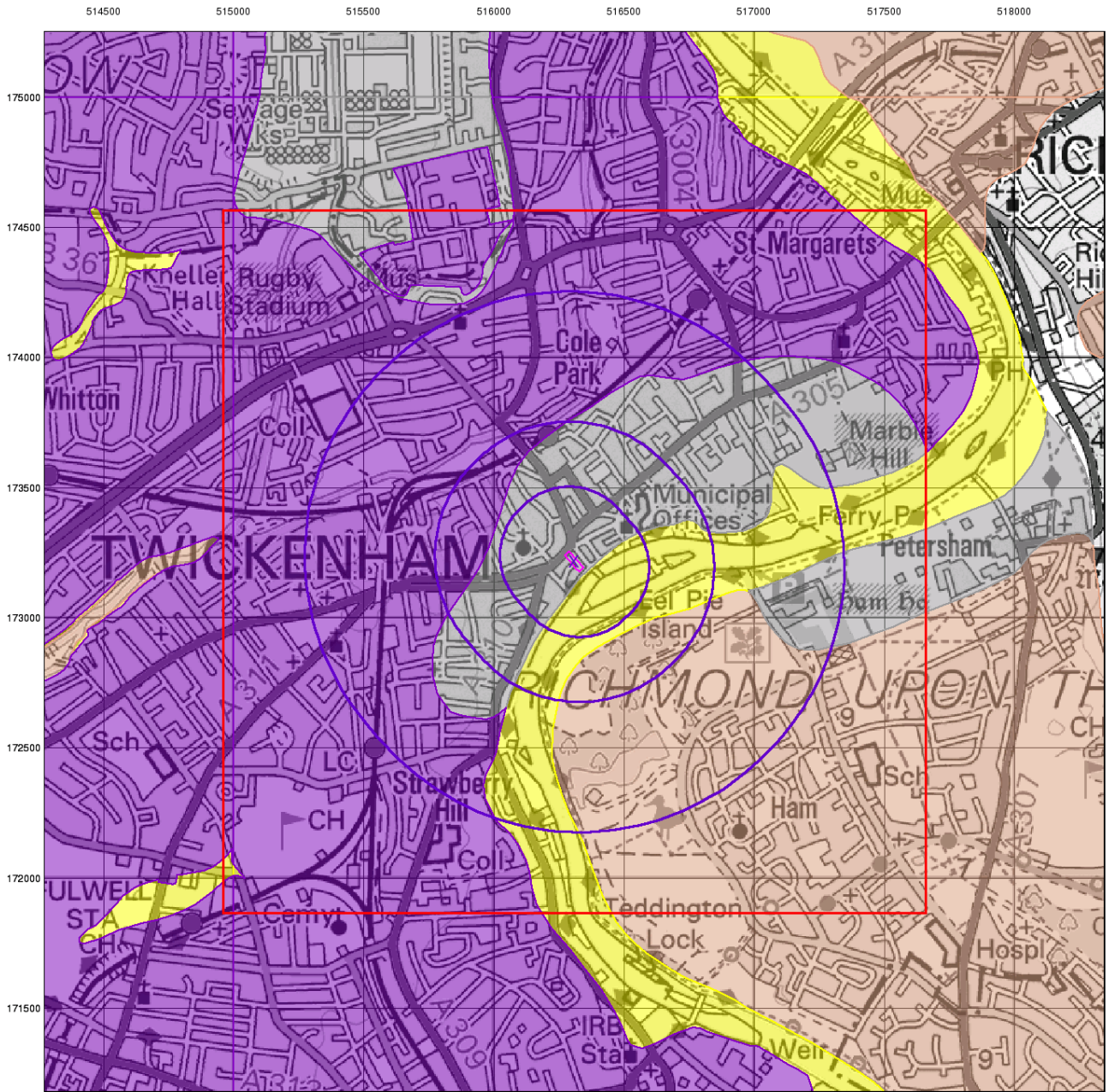


Order Details

Order Number:	134500386_1_1
Customer Ref:	J17205
National Grid Reference:	516310, 173220
Slice:	A
Site Area (Ha):	0.2
Search Buffer (m):	1000

Site Details

1c, King Street, TWICKENHAM, TW1 3SD



GEA

Superficial Aquifer Designation

General

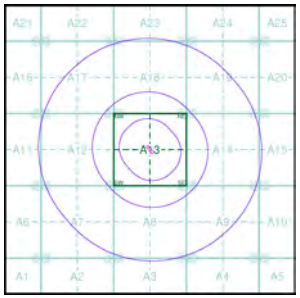
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

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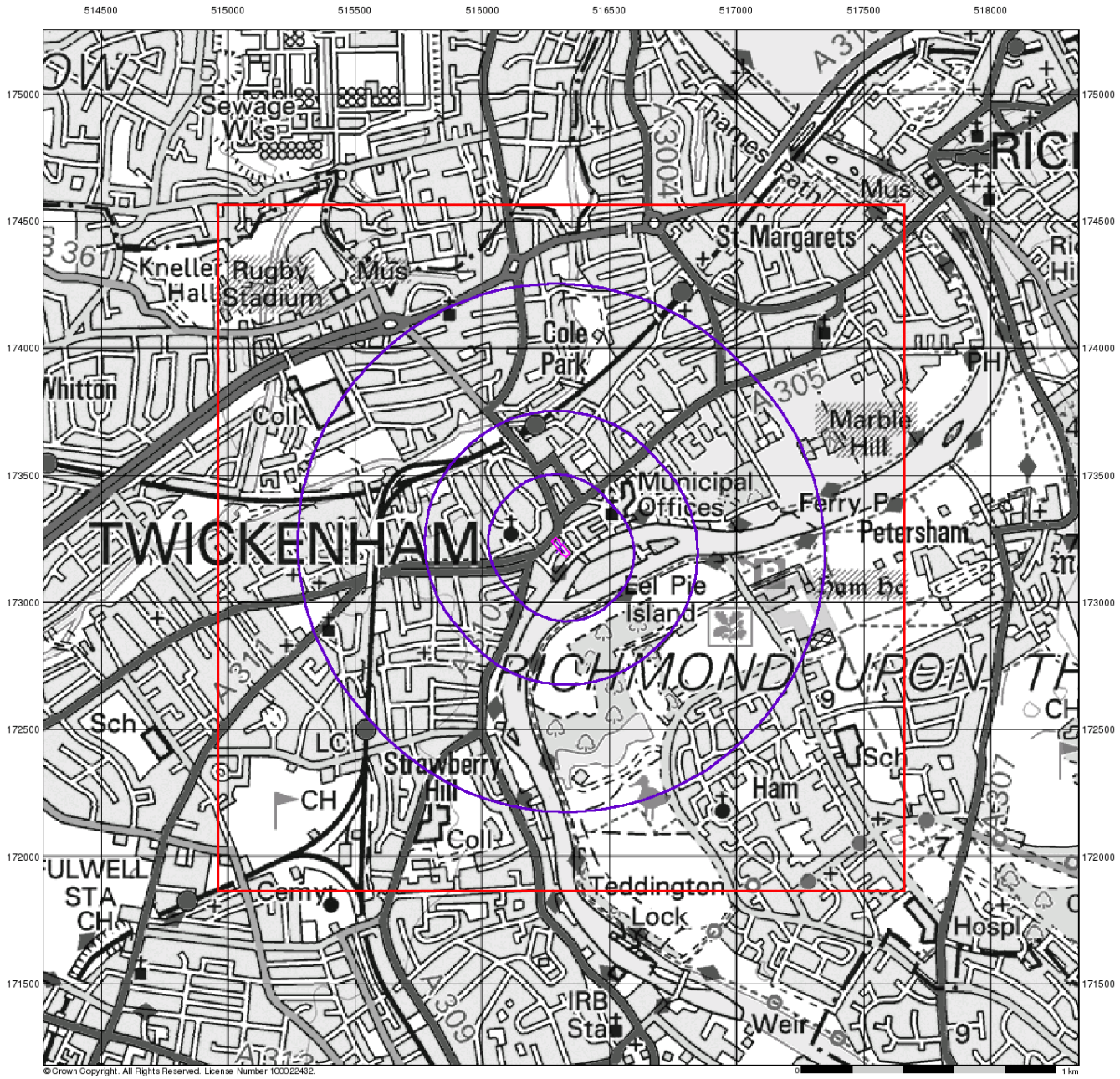
National Grid Reference:	516310, 173220
Slice:	A
Site Area (Ha):	0.2
Search Buffer (m):	1000

Site Details

1c, King Street, TWICKENHAM, TW1 3SD



Source Protection Zones

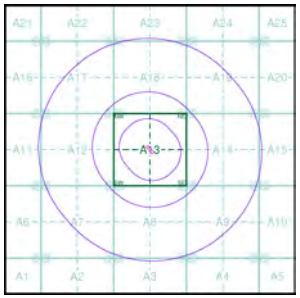
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

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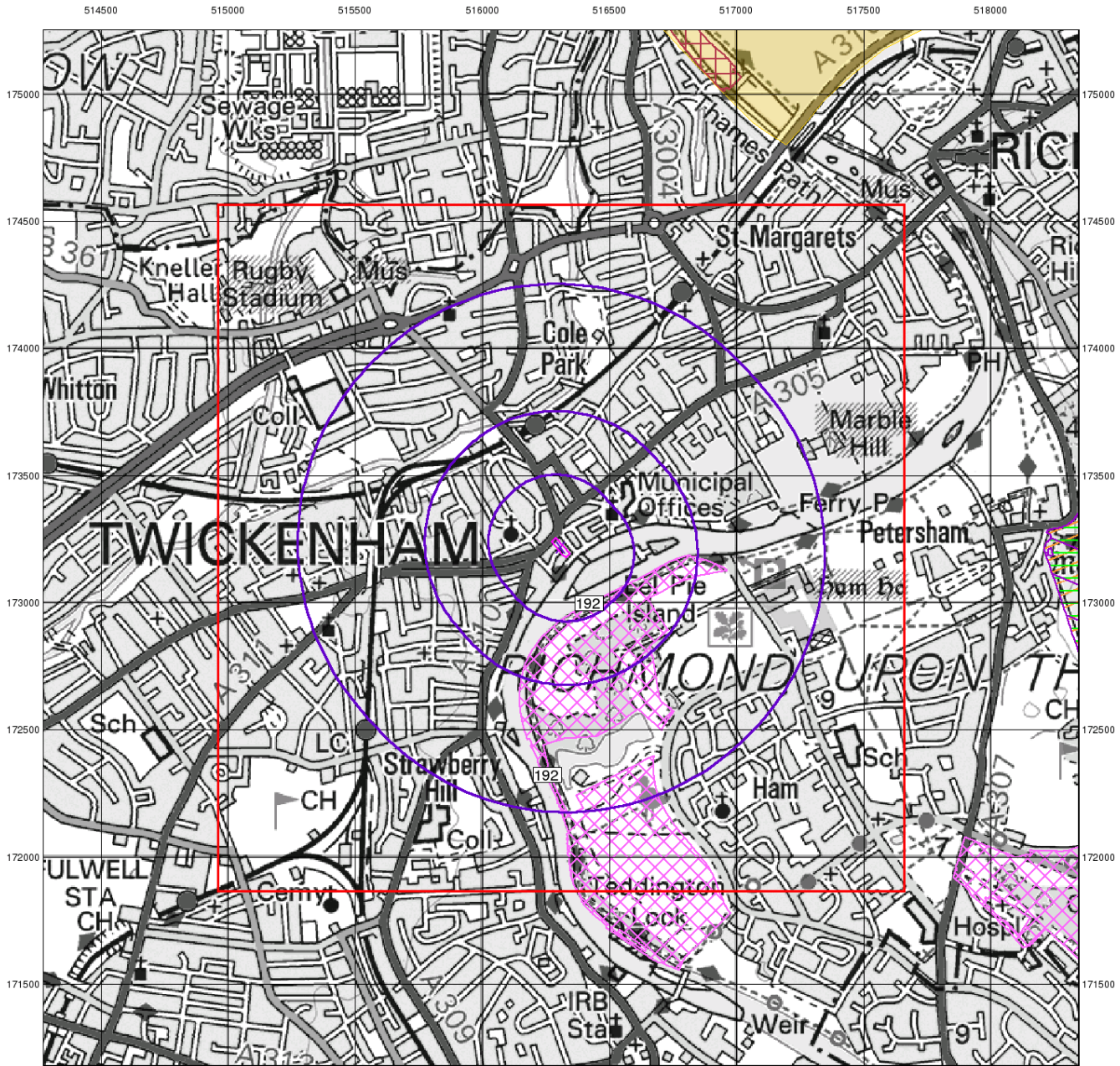
Site Details

1c, King Street, TWICKENHAM, TW1 3SD

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



GEA

Sensitive Land Uses

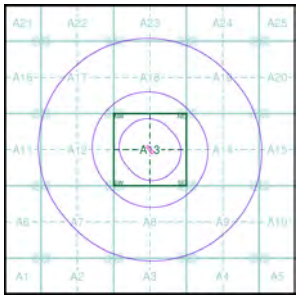
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice A



Order Details

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1c, King Street, TWICKENHAM, TW1 3SD