CAPITA SYMONDS

Planning, Environment & Design

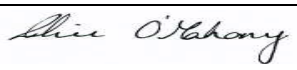
Phase II Ground Contamination Report Midland Crescent

Stadium Capital Holdings 2 Ltd

February 2012 – Final v1

CAPITA SYMONDS

Capita Symonds Management System

Client	Stadium Capital Holdings 2 Ltd	**Client's Ref**	
Report Title	Midland Crescent: Phase II Ground Contamination Report		
Sub-title (if applicable)			
Report version / status	Final V1		
Report date	February 2012	**Issue date**	February 2012
CSL Job No	CS/054209	**Sub-job No**	CS/054209
Project Director	Paul Landsborough	**Project Manager**	Tim Harrison
File name / path			
Prepared by:	Alice O'Mahony	**Signature (for file)**	
Checked by:	Tim Harrison	**Signature (for file)**	
Approved by:	Paul Landsborough	**Signature (for file)**	

CAPITA SYMONDS

Contents

Figures

Appendices

Executive Summary	
Introduction	This report presents the findings of a Phase II Site Investigation at the Midland Crescent site, Finchley Road, London, NW3 6LT The report has been prepared to better determine the presence or not of any below ground contamination, identify any key risks associated with proposed future development of the site and provide recommendations for any remediation works if required. Outline planning is understood to include plans for a new four storey commercial building including lower basement to the rear. Plans show no areas of soft landscaping.
Background Information	Site Location & Description The site is situated off Finchley Road, London, NW3 6LT. The site is centred on national grid reference 526180, 184890 and the site surface area is approximately 0.04 hectares. The site is divided into upper and lower areas with a set of concrete steps traversed the site from east to west. Scrap metal and rubbish covers a large portion of the upper site and the lower site is heavily vegetated. Environmental Setting Published geology of the site is recorded as London clay overlaying the Lambeth Group, Thanet Sand Formation and Upper Chalk. The London Clay underlying the site has been classified as an Unproductive Stratum and the site does not lie within a source protection zone. The soil at the site has been given a soil vulnerability class of 'high leaching potential' as a worst case scenario. The nearest surface water feature is a series of ponds (Highgate Ponds) located over 1400m north east of the site boundary surface. Historical Development Earliest mapping (1871) shows structures onsite associated with the Finchley Road Station which was located immediately to the west of the site. In 1915 the site underwent redevelopment with a commercial structure identified as Midland Crescent built onsite. This was subsequently demolished in 1995 leaving the footprint of the site as it is today.
Scope of Works	A total of four exploratory holes were excavated across the site comprising: ▪ 4No. window sample holes to a maximum depth of 5m bgl. ▪ associated soil testing; and, ▪ 4No. gas and groundwater monitoring visits.
Ground Conditions Encountered	Ground conditions encountered at the site comprised: ▪ Made Ground at a maximum thickness of 3.6m; over, ▪ London Clay which was proven to 5m bgl. Perched groundwater was encountered in two window sample locations (WS03 & WS04. The soil gas investigation at the site identified low concentrations of carbon dioxide and methane and a negligible flow rate beneath the site. The preliminary gas risk assessment characterised the site as Characteristic Situation 1, Very Low Risk.
Generic Quantitative Risk Assessment	No significant sitewide concentrations of contaminants in soil that pose a risk to future site users for the proposed development albeit localised areas of elevated contaminants (Chromium and PAHs) have been identified based on conservative assessment criteria in the Made Ground and underlying London Clay . ▪ Widespread presence of Chromium at concentrations that marginally exceed the GAC ▪ A single isolated occurrence of Benzo(a)pyrene that marginally exceeds the GAC Notwithstanding the commercial GAC consider the dermal contact, ingestion and inhalation pathways. Both the dermal contact and ingestion pathways are not considered active as the building footprint of the future development proposals for the site cover for 100% of the site. Additionally both Chromium and Benzo(a)pyrene are not considered to be volatile contaminants that pose and inhalation risk to future commercial users of the site.
Summary and Recommendations	On the basis of the exploratory ground investigation and generic risk assessment a significant contamination risk has not been identified and remediation is not recommended to be required to support the proposed commercial development of the site. Notwithstanding, the following issues will be required to be managed through construction and development phase activities: ▪ Construction Workers: appropriate health and safety protocols should be adopted during construction works with the provision of suitable Personal Protective Equipment (PPE) (ref. HSG 66 'Protection of Workers and the General Public during Development of Contaminated Land'). A copy of this report should be kept in the site Health and Safety file to inform future groundworks. ▪ Unidentified Contamination: the preparation of a Method Statement to deal with any unidentified contamination that may be discovered during groundworks. ▪ Materials Management: consideration should be given to the appropriate handling, assessment and management of materials arisings generated during groundworks.

1. Introduction

1.1 Capita Symonds Ltd (CSL) has been commissioned by Stadium Capital Holdings 2 Ltd to undertake a Phase II ground contamination site investigation in support of redevelopment of the Midland Crescent site, Finchley Road, London, NW3 6LT.

1.2 The main objective of the report is to determine the presence of any below ground contamination including soil gas generation, identify any key risks associated with the future commercial development of the site and provide outline recommendations for remediation works if required.

1.3 Outline planning permission has been granted (Ref: PWX0002163) for the erection of a basement plus four storey building, with retail and food & drink uses on the front part of the ground floor and office use in the basement, part ground floor and three upper floors. Significant earthworks are not expected to be required to facilitate the proposed development as the current topography supports lower ground floor use without significant re-profiling of the site.

1.4 This report builds upon the findings of the information which has been previously submitted to the Local Planning authority with reference to the discharge of Condition 4a associated with permission (Ref:PWX0002163) and which is detailed below:

- Phase I Geo-environmental Desk Study, Midland Crescent, November 2007; and
- Programme of Ground Investigation, Midland Crescent, January 2012

1.5 This report has been prepared to support the discharge of Condition 4b attached to the above referenced permission and in particular provides the following information:

- Ground Conditions: a summary of encountered ground conditions including soil gas assessment;
- Conceptual Site Model: based on findings of the previous Desk Study and the site investigation;
- Generic Risk Assessment: of soil chemical results against appropriate generic assessment criteria; and
- Summary and Recommendations: a summary of the key findings and recommendations for any further works required to support the proposed development.

2. Background Information

SITE LOCATION

2.1 The site is located off Finchley Road in North West London, NW3 6LT. The site is centred on national grid reference 526180, 184890. A site location plan is provided as Figure 1.

2.2 The immediate environs of the site consist of commercial and residential land uses. Immediately to the south and north of the site are railway lines that are approximately 10m lower than the level of the site. Bordering the west of the site is an unused strip of land between the railway lines. The site is bordered to the east by Finchley Road. Above the railway line to the north of the site is a mixed commercial/residential property.

SITE DESCRIPTION

2.3 A Capita Symonds consultant undertook a site walkover on the 24th January 2012 as part of the Phase II Ground Contamination Report, to confirm the findings of a previous Phase I Desk Study. A site layout plan is provided as Figure 2.

2.4 In broad terms the site conditions are consistent with those identified through the Phase I Desk Study. The site comprises a roughly square parcel of land and the site surface area is approximately 0.04 hectares and is accessed via Finchley Road to the east. The site is currently vacant, heavily overgrown with vegetation and rubbish and scrap metal present across the site, as either fly tipped or from the former building / structures. There are steps leading from the eastern section down to the western site and a small brick hut is located in the north west of the site. It was not possible at the time of the walkover to determine the purpose of the hut and what was contained therein.

2.5 The site is at an elevation of approximately 60m AOD, sloping on the western perimeter which is 2 to 3m lower than the eastern boundary which is level with Finchley Road. The topography of the local area is variable, but generally slopes in a south westerly direction.

2.6 The north, west and southern boundaries are clearly bound by a combination of brick walls and metal fencing. The eastern boundary of the site fronts onto Finchley Road and is fenced with wooden hoardings with an access gate in the centre.

2.7 The majority of the site surface is vegetated with a small proportion of the surface being hard cover. There are two areas of hardstanding, one comprising the steps down to the western area of the site and the other comprising an area of concrete near the access gate in the east of the site.

2.8 There was no recorded presence of underground or above ground storage tanks at the site based on observations during the site walkover or any other areas of contamination concern.

ENVIRONMENTAL SETTING

GEOLOGY

2.9 A review was undertaken of the relevant published BGS 1:50,000 Solid and Drift Geological Map (Sheet 256 North London) and readily available BGS borehole records. The published geology of the site is summarised in Table 2.1 below.

TABLE 2.1 DESCRIPTION OF THE PUBLISHED SOLID AND DRIFT GEOLOGY UNDERLYING THE SITE.

Age	*Formation*	*Lithology*	*Approximate Thickness*
Eocene	London Clay	Grey argillaceous over consolidated fissured clay, with silty and sandy horizons. Lower part sandy in east. Includes Harwich Formation at base generally less than 2 m thick.	>50m
Palaeocene	Lambeth Group	Clay mottled in part with beds of sand and shelly clay.	15-20m
	Thanet Sand Formation	Sand, fine grained	7-10m
Cretaceous	Upper Chalk	White chalk with beds of flint, nodular chalks, hard grounds and marl streams.	>60m

2.10 Although published geology does not detail the presence of Made Ground at the site, the site is built up behind a retaining wall which is indicative of a significant thickness of Made Ground being present beneath the site.

BGS Borehole Logs

2.11 There are two BGS boreholes located within 250m of the site boundary. The borehole logs provide geological information up to 177m bgl and confirm the sequence of:

- London Clay (88m)
- Sand (10m)
- Chalk (77m)

Table 2.2 Summary of BGS logs in vicinity of site

Reference	*Name*	*NGR*	*Length (m)*	*Distance (m)*
TQ28 SE46	Electric Light Station Hampstead	525840, 184879	177m	240 west
TQ28 SE488/A	Holy Trinity, Finchley Road	526360, 184700	15m	250m South east

Radon

2.12 Reference to the HPA 'Indicative Atlas of Radon in England and Wales' (Map 5 - London, Sussex and west Kent), shows the site to lie in an area where 0 - 1% of homes are at or above the action level.

2.13 A review of BRE (2007 edition) 'Radon guidance on protective measures for new buildings' (Map 5 - London, Sussex and west Kent), shows the site is not in an area where radon protection measures are required.

Hydrology and Hydrogeology

2.14 The Environment Agency (EA) aquifer designations are consistent with the Water Framework Directive and reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

2.15 The EA have designated the London Clay underlying the site as an Unproductive Stratum. These are strata with low permeability that have negligible significance for water supply or base flow to rivers.

2.16 The soil at the site has been given a soil vulnerability class of 'high leaching potential' as a worst case scenario (applied to all areas classified as 'urban' due to a lack of data). These are generally assumed to be soils which readily transmit liquid discharges, because they are either shallow or susceptible to rapid flow directly to rock, gravel or groundwater.

2.17 The site does not lie within a source protection zone for the protection of groundwater. There are no water abstractions or discharge consents within 500m of the site boundary. The nearest water abstraction is recorded as being 853m south east of the site for irrigation purposes from groundwater.

2.18 There are no surface water features within 1km of the site. The nearest surface water feature is a series of Ponds (Highgate Ponds) 1400m north east of the site.

SITE HISTORY

2.19 The earliest map from 1871 shows structures on the site which appear to be associated with Finchley Road Station which was located immediately adjacent to the west of the site. In 1915 the site was redeveloped to include retail spaces and was identified on the 1954 map as Midland Crescent. These structures were demolished in 1995 and the site is currently vacant, disused land housing a small brick built hut of unknown purpose and a large electronic advertising hoarding.

2.20 Potential contaminating historic uses within 250m of the site boundary are summarised in Table 2.3 below.

TABLE 2.3: SUMMARY OF THE HISTORICAL DEVELOPMENT OF THE SURROUNDING AREA

Map Dates	Approximate Location	Description
1871 – 1955	5 m west	Finchley Road Station
1954 – 1960		Leather Goods Factory
1871	20 m east	Earthworks
	170 m north west	Finchley Road Station
1935	135 m north west	Hampstead Borough Council Works Depot
1896 - 1984	130 m west	Electricity Lighting Station/Depot/Works
1994		Electricity Sub Station
1954 - 1960	120 m north west	Garage
1954 – 1970	70 m north	Building Contractors Yard
1970 - 1992		Chemical Works/works
1954 – 2007	150 m south	Electricity Sub Station
1954 - 1986	55 m south west	Coal Depot
1971 - 1994		Refuse Transfer Depot/Waste Transfer Station

3. Scope of Works

METHODOLOGY

3.1 The design of the exploratory ground investigation was in general accordance with British Standard BS5930: 1999: Code of Practice for Site Investigations, BS10175: 2001 Investigation of Potentially Contaminated Sites.

3.2 A ground contamination plan outlining the proposed scope of works was developed for the site investigation on the basis of the findings of the Phase I Desk Study. The ground contamination plan was issued to the council on 19th January 2012 to inform the council of the planned scope of works and is presented in Appendix A. Harrison Group Environmental was the main contractor for the ground investigation works conducted on site under the supervision of Capita Symonds.

3.3 In total 4No. exploratory holes complete with soil gas installations were positioned to provide representative coverage and ensure sufficient information to assess the ground conditions and soil gas generation beneath the site.

3.4 A summary of the works undertaken across the site is presented in Table 3.1 below.

TABLE 3.1. SUMMARY OF INTRUSIVE WORKS SCOPE.

Item	*Description*
Site	Midland Crescent, Finchley Road, London, NW6 3LT.
Site Area	Approximately 0.04 hectares.
Date of Intrusive Works	24th & 26th January 2012.
Utility Clearance	Cable Avoidance Tool (CAT) was used for each location and a hand dug pit to 1.2m bgl (below ground level) was undertaken before any drilling commenced. Utility plans were provided to Harrisons Environmental from the client.
Soil Samples	Total of 9No. soil samples were submitted for chemical analysis.
Installations	Soil gas 38mm installations in 4No. exploratory holes comprising plain standpipe from ground level to 1m and slotted pipe making up the remainder to the base of the exploratory hole.
Monitoring	4No. rounds of soil gas and groundwater water monitoring were undertaken between the 26th of January and the 7th of February.

3.5 No groundwater samples were submitted for laboratory analysis.

3.6 Borehole construction details are presented in Table 3.2 below, exploratory hole logs are provided in the Harrison Group Environmental Factual Report, Appendix B and an exploratory hole location plan is presented as Figure 2. Soil and groundwater chemical and geotechnical laboratory testing details are provided in Table 3.3. with lab results in Appendix B.

TABLE 3.2. SUMMARY OF BOREHOLE CONSTRUCTION DETAILS.

Borehole	*Depth to base of Installation*	*Installation*	*Screening detail*
WS01	2.3 m bgl	Single: 38mm diameter	Made Ground
WS02	5.0 m bgl	Single: 38mm diameter	Made Ground
WS03	3.8 m bgl	Single: 38mm diameter	Made Ground
WS04	3.5 m bgl	Single: 38mm diameter	Made Ground

TABLE 3.3. SUMMARY OF CONTAMINATION AND GEOTECHNICAL LABORATORY TESTING.

Determinand	*Total Number of Samples Tested*
	Soils
Metals	9*
Total TPH	1
Speciated TPH	4
Speciated PAH	6
PCB	1
BTEX & MTBE	4
Asbestos	3

Notes:
* As, Cd, Cr, Cu, Ni, Zn, Pb, Hg, Se, WSB

4. Ground Conditions

STRATIGRAPHY

4.1 Table 4.1 below provides a summary of the stratigraphic units encountered at the site during the exploratory ground investigation. Borehole logs are provided in Appendix B, as part of the Factual Report produced by Harrison Group Environmental.

TABLE 4.1 SUMMARY OF GROUND CONDITIONS ENCOUNTERED.

Stratum	*Description*	*Depth to base (m bgl)*	*Thickness (m)*	*Aquifer Classification*
Made ground	Dark grey slightly gravelly clayey material. Gravel is angular to subangular fine to coarse brick, clinker, tile and metal wire fragments. Frequent whole bricks and brick cobbles.	2.3 to 3.65	2.3-3.65	NA
London Clay	Firm brow mottled CLAY.	5	Not proven	Unproductive Strata

4.2 Perched groundwater was encountered in two out of the four exploratory holes.

4.3 No obvious visual or olfactory evidence of contamination was encountered during the works associated with asbestos containing materials or solvent contaminants. Field observations from the ground investigation works conducted at the site are summarised in Table 4.2 below.

TABLE 4.2. SUMMARY OF FIELD OBSERVATIONS

Exploratory hole	*Field Observation (depth m bgl)*
WS01	Made Ground comprised coarse brick pieces and whole bricks, concrete encountered at 3m bgl.
WS02	Coarse brick and brick fragments encountered in the Made Ground until 3.65m bgl, London Clay encountered to bottom of hole at 5m bgl.
WS03	Made ground encountered until 2.m bgl which was underlain by London Clay until a depth of the 3.8m bgl. Groundwater was found at the base of the stand pipe. This is believed to be coming from a drainage pipe attached to the neighbouring property to the north of the site.
WS04	WS04 comprised made ground until 3.3m bgl. London Clay was proven beneath the Made Ground until the window sample completed at 3.5m bgl.

GROUNDWATER

4.4 Groundwater monitoring was undertaken in all exploratory hole locations on three occasions between the 1st and the 7th February 2012 by a CSL consultant in order to determine groundwater conditions beneath the site. Perched groundwater was encountered in two out of the four exploratory holes although there was an insufficient amount of this perched groundwater to collect representative water samples for chemical analysis.

TABLE 4.3 SUMMARY OF GROUNDWATER MONITORING

Location	Formation Screened	Depth to base of installation (m bgl)	Water Level (m bgl)		
			01/02/2012	03/02/2012	07/02/2012
WS01	Made Ground	2.3	0	0	0
WS02	Made Ground	5.0	0	0	0
WS03	Made Ground	3.8	2.6	1.6	1.7
WS04	Made Ground	3.5	2.8	2.7	1.9

SOIL GAS

4.5 Soil gas monitoring was undertaken across the site on four occasions by CSL consultant on the 26th January and the 1st, 3rd and 8th February, 2012. The soil gas readings have been assessed in accordance with CIRIA C665, Assessing risks posed by hazardous ground gases to buildings, London 2007. The assessment uses the system proposed by Wilson and Card where a gas screening value is used to assess the risks posed by gassing sites. The results of the soil gas monitoring results are provided in Appendix C.

4.6 For the assessment, the maximum concentration and the maximum flow rate for each monitoring round has been used to conservatively determine the Gas Screening Value (GSV) for each borehole.

$$GSV = \frac{\text{maximum borehole flow rate (l/hr)}}{100} \times \text{maximum gas concentration of CH4 / CO2 (\%)}$$

TABLE 4.4 SOIL GAS ASSESSMENT, CIRIA C665, WILSON AND CARD METHOD

Borehole	*Maximum concentration CH4*	*Maximum concentration CO2 (%)*	*Maximum Flow (l/hr)*	*Gas Screening Value CH4*	*Gas Screening Value CO2*	*Risk Classification (Wilson and Card)*
WS01	0.7	0.5	0.7	0.0049	0.0035	Very Low Risk
WS02	0.7	0.6	0.1	0.0007	0.0006	Very Low Risk
WS03	0.6	1.3	0.1	0.0006	0.0013	Very Low Risk
WS04	0.6	1.0	0.1	0.0006	0.001	Very Low Risk

4.7 The GSVs referred to in Table 4.4 above indicate that the Risk Classification in accordance with the Wilson and Card method for the site is Very Low Risk. This would give the land proposed for commercial end use a Gas Characteristic Situation 1, where gas protection measures are not considered necessary.

5. Conceptual Site Model

5.1 A conceptual site model (CSM) was developed in the Phase 1 desk study for the site and a proposed commercial end use and is presented as Figure 3 and discussed below. This CSM is based on the desk top information and is confirmed by the ground conditions observed during the site investigation.

5.2 The CSM provides a qualitative evaluation of potential pollutant linkages at the site based on plausible contaminant source – pathway – receptor linkages identified at the site.

CONTAMINATION SOURCES

5.3 The Capita Symonds, Phase 1 Geoenvironmental Report, Midland Crescent, November 2007 January 2011 and associated site investigation identified the following potential contamination sources at the site.

i) **Made Ground / Demolition Rubble**: made ground associated with anthropogenic sources of contamination including metals and asbestos containing material and soil gas generation; and

ii) **Historic land use associated with rail land**: potential shallow ground contamination with inorganic and organic contaminants including hydrocarbons such as fuel oils, solvents and PCBs.

5.4 A number of potential contamination sources have been identified associated with current and historical uses in the immediate site surroundings. The likelihood of these land uses acting as a source of contamination to the site is limited due to the underlying strata which is not considered to support significant lateral contaminant migration. As such these potential off site contamination sources are not considered to a pose a significant risk to the site.

POTENTIAL ENVIRONMENTAL PATHWAYS

5.5 Potential migration pathways are considered with reference to CLEA model v.1.06 exposure pathways, the Environment Agency guidance relating to pathways to controlled waters, and CIRIA guidance in relation to ground gas:

AIRBORNE MIGRATION PATHWAYS

5.6 The particulate (dust) inhalation pathways is not considered to be active at the site as the building footprint of the future development proposals for the site cover 100% of the site which will effectively act as a barrier to the generation and migration of soil dust.

5.7 The particulate (dust) inhalation pathway will however be active during the construction and enabling works associated with the development.

5.8 The vapour inhalation pathway will potentially be active in the future development scenario, particularly the indoor pathway in areas of built structures.

AQUEOUS MIGRATION PATHWAYS

5.9 The aqueous migration pathway will not be active in the proposed future development of the site. Although localised perched groundwater was encountered within the Made Ground a consistent groundwater table has not been identified. As such it is unlikely that a significant lateral migration pathway is present beneath the site.

5.10 The vertical pathway for shallow groundwater migration is not considered relevant at the site due to the presence of impermeable London Clay formation which acts as an aquitard and prevents downward migration.

LAND MIGRATION PATHWAYS

5.11 The land migration pathway will not be active in the proposed future development of the site. The future development plans comprise construction of office and retail premises with no areas of soft landscaping. The building footprint and surrounding areas of hardstanding will effectively act as a barrier to the future end user from dermal and ingestion pathways.

5.12 The land migration pathway will be active during the construction and enabling works associated with the development.

IDENTIFIED RECEPTORS

5.13 In the context of the site proposals, the following potential receptors have been identified:

i) future site users;
ii) construction workers; and
iii) built structures / infrastructure.

5.14 The potential source-pathway-receptor linkages identified at the site are summarised in Table 6.1. below.

TABLE 6.1. SUMMARY OF THE PRELIMINARY RISK ASSOCIATED WITH IDENTIFIED POLLUTANT LINKAGES.

Identified receptor	*Identified Source*	*Identified Pathway*	*Identified Pollutant Linkage*
Future site users.	Made Ground [demolition materials inc. possibility of ACM]	Dermal contact / ingestion / particulate inhalation.	No
		Vapour inhalation (indoor and outdoor).	Yes
		Vapour intrusion to water supply pipework.	Yes
Construction workers.		Dermal contact / ingestion / particulate inhalation	Yes
		Vapour inhalation (outdoor)	Yes
		Surface run-off.	No
Built structures		Soil gas ingress	No

5.15 Groundwater and surface water are not considered to be a receptor to any site based contamination beneath the site. A significant groundwater body has not been identified beneath the site and the underlying London Clay is not classified as a water bearing strata. Furthermore, a sensitive local surface water receptor has not been identified in the vicinity of the site and as such the likelihood of lateral pathway for contaminant migration is considered to be extremely unlikely.

6. Generic Quantitative Risk Assessment

Assessment Methodology

6.1 This section provides a generic quantitative risk assessment (GQRA) of the potential pollutant linkages using the soil chemical laboratory results from the exploratory holes located on the site.

Human Health

6.2 The assessment methodology has been derived with reference to the Environment Agency 'Model Procedures for the Management of Land Contamination CLR 11'.

6.3 Generic Assessment Criteria (GAC) has been developed to assess the generic risk to human health and have been produced using CLEA v1.06. The GACs have been developed for a commercial user taking into account the dermal contact, ingestion and inhalation pathways and are considered appropriate to assess risk to future site users at the site under the current planning permission. Notwithstanding the commercial GAC is considered conservative as the dermal contact and ingestion pathways will not be active in the proposed future end use.

6.4 The GAC along with the methodology and significant parameters used in the production of the GAC are presented as Appendix D. Screening tables of the laboratory soil data against the GAC are provided in Appendix E.

Statistical Analyses

6.5 Where exceedances of GAC were identified the results were statistically assessed using an ESI statistical package based on '*Guidance on Comparing Soil Contamination Data with a Critical Concentration (CIEH/CL:AIRE)*'.

6.6 The 95th percentile upper confidence limit of the mean (US95) has been calculated for individual contaminant analytical datasets. The US95 is considered to be conservatively representative of an individual contaminant concentration and, if in excess of the GAC is indicative of potentially widespread contamination from the respective contaminant.

6.7 Where the US95 exceeds the GAC the maximum value test has been performed to determine the potential presence of outliers within an individual dataset. Data identified as being an outlier is not considered to be representative of that contaminant and has been assessed separately. Where an outlier exceeds the required assessment criteria, that location is considered to be a potential contamination hotspot.

6.8 Analytical data below detection limit, e.g. x = <0.01 mg/kg, have been considered as equal to detection limit, i.e. x = 0.01 mg/kg, to enable the statistical treatment as described above.

6.9 US95 have been compared with GAC to make an initial assessment of the potential for contamination of the site and identify contaminants of concern (COC) that could pose unacceptable risks to site receptors identified in the CSM.

Controlled Waters

6.10 GQRA has not been undertaken for controlled waters as the CSM did not identify any controlled water pollutant linkages.

Assessment Results of GQRA for Human Health - Soils

6.11 A total of 9No. soil samples have been tested for various COC and have been assessed against the GAC for commercial properties which take into account the derma contact, ingestion and inhalation pathways.

6.12 The generic assessment identified exceedances of the GAC for only Chromium (total) and Benzo(a)pyrene. No other samples exceed the GAC for commercial end use in the data set.

TABLE 6.1 SUMMARY OF STATISTICAL ANALYSIS OF SOIL RESULTS

Contaminant	*Commercial GAC (mg/kg)*	*No. Samples*	*Maximum Concentration (mg/kg)*	*UCL (95%) (mg/kg)*	*No. Exceedances*
Total Chromium	34.2	9	56.7	40.28	5
Benzo(a)pyrene	14.3	6	20.7	5.29	1
Notes. GAC for Chromium VI used as a surrogate for total chromium.					

6.13 The ESI statistics package was applied to the Chromium and Benzo(a)pyrene data sets and the results of the statistical analysis were as follows:

- Chromium – 5No. of the 9No. soil samples were identified as exceeding the GAC for Chromium VI of 34.2mg/kg taken from within the Made Ground and underlying London Clay. The maximum concentration of Chromium (total) found was 56.7 mg/kg in window sample WS03, located in the north west of the site. None of the values entered for Chromium were identified as outliers and the upper confidence limit remained above the GAC of 40.28 mg/kg is greater than the GAC indicating the presence of widespread contamination.

- Benzo(a)pyrene – 1No. of the 6No. soil samples was identified as exceeding the GAC for Benzo(a)pyrene of 14.3 mg/kg with a maximum concentration of 20.7 mg/kg. This exceedance was located in window sample WS02 in the south eastern corner. This value was identified as an outlier.

6.14 Asbestos screening was undertaken on 3No. samples taken from window samples WS01 and WS03 with no presence detected.

SUMMARY

6.15 Numerical assessment of the soil samples identified:

- Chromium: widespread presence at concentrations that marginally exceeds the GAC; and
- Benzo(a)pyrene: a single isolated occurrence that marginally exceeds the GAC.

6.16 The commercial GAC is considered to be conservative as it assesses the dermal contact, ingestion and inhalation pathways. In the future development scenario both the dermal contact and ingestion pathways will not be active – thus leaving the only relevant pathway as inhalation.

6.17 The identified contaminant exceedances of Chromium and Benzo(a)pyrene do not pose a risk through the inhalation pathway. As such these contaminants although exceeding the GAC are not considered to pose a risk to future users of the commercial development.

7. Summary and Recommendations

7.1 This section provides a summary of the findings and recommendations on the basis of the site investigation and generic risk assessment undertaken and proposed commercial redevelopment.

7.2 In summary a significant contamination risk has not been identified and remediation is not recommended to be required to support the proposed commercial development of the site.

7.3 The key findings can be summarised as:

- **Field Observations:** No visual or olfactory evidence of contamination including asbestos containing materials, fuels or solvents were identified during the site investigation works.
- **Ground Conditions**: Made Ground was encountered at variable thickness reflecting the sites topography at each location comprising mostly brick fragments, concrete, clinker and loose fill. London Clay was encountered beneath the made ground at 3 of the 4 locations.
- **Soil Contamination**: No contaminants were identified at concentrations that are likely to pose a risk to future commercial users. Exceedances of chromium and benzo(a)pyrene were identified although the main pathway for these contaminants is dermal contact and ingestion. Hardstanding and building footprint associated with the proposed development is considered to provide an adequate barrier to these pathways and as such these contaminants are not considered to pose a risk to proposed commercial end users.
- **Controlled Water**: sensitive controlled water receptors have not been identified. A significant groundwater resource was not identified beneath the site. Furthermore, the London Clay is classified as unproductive stratum and a sensitive nearby surface water feature has not been identified.
- **Soil Gas**: the gas regime is characterised as very low risk and as such the requirement for gas protection measures has not been identified to support the commercial development.

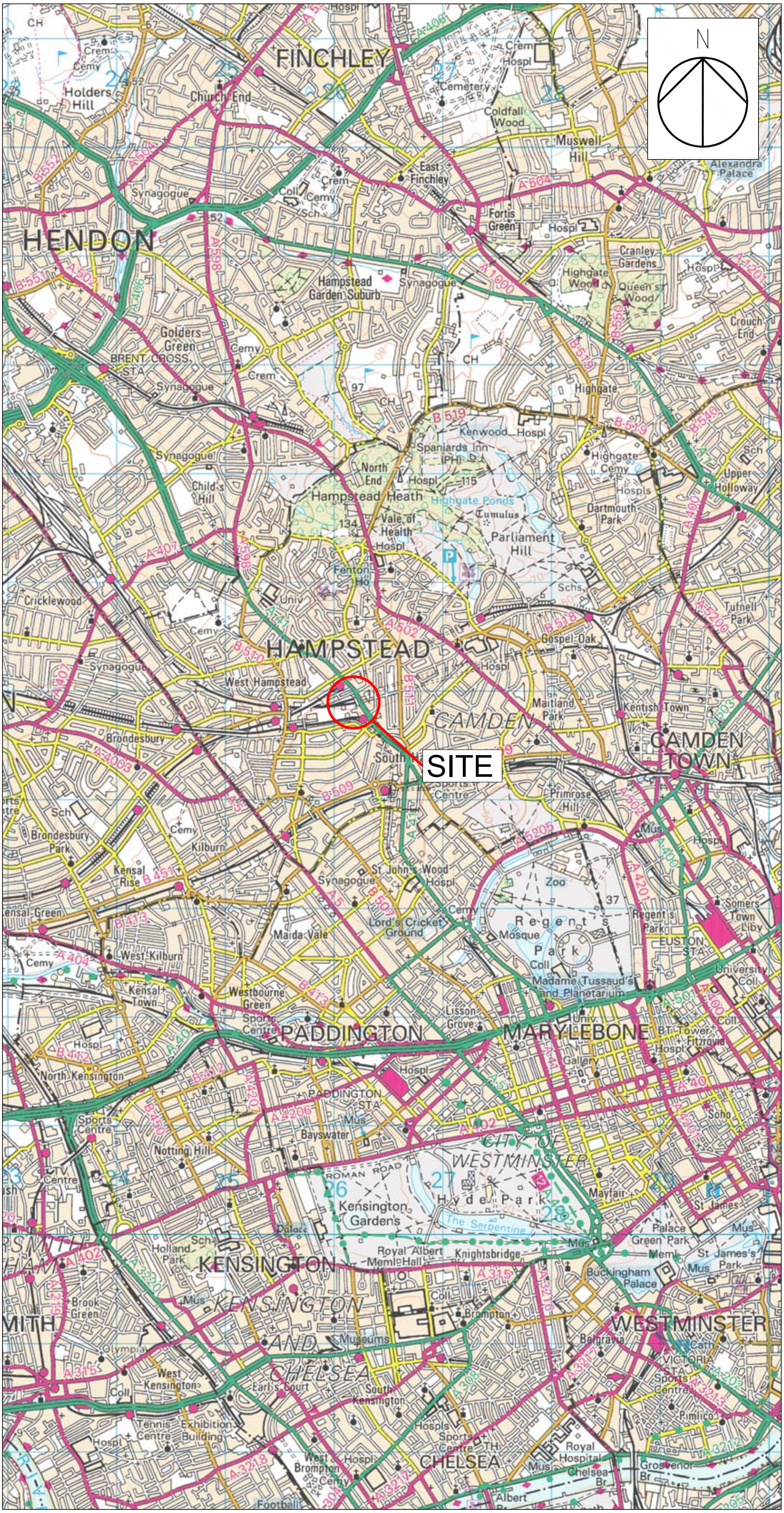
RECOMMENDATIONS / DEVELOPMENT CONSIDERATIONS

7.4 On the basis of the exploratory ground investigation, soil gas monitoring and generic risk assessment a significant contamination risk to future site users, built structures or controlled waters has not been identified for ground conditions beneath the site. As such remediation works are not recommended to be required to facilitate the proposed future commercial development of the site.

7.5 Notwithstanding, the following issues will be required to be managed through construction phase activities.

- **Construction Workers**: appropriate health and safety protocols should be adopted during construction works with the provision of suitable Personal Protective Equipment (PPE) (ref. *HSG 66 'Protection of Workers and the General Public during Development of Contaminated Land'*). A copy of this report should be kept in the site Health and Safety file to inform future groundworks.
- **Unidentified Contamination**: the preparation of a Method Statement to deal with any unidentified contamination that may be discovered during groundworks.
- **Materials Management**: consideration should be given to the appropriate handling, assessment and management of materials arisings generated during groundworks. .

Figures



Rev	Date	By	Notes

Client
STADIUM CAPITAL HOLDINGS

Project
MIDLAND CRESCENT

Drawing Title
FIGURE 1
SITE LOCATION PLAN

Drawing Status	Scale @ A4 Size
	1:50,000

Date	Drawn	Checked	Approved
FEB 2012	JMB		

Drawing No
CS054209-FIG-001

Z:\ZENV\Projects\CS054209_Midland Crescent\B Work Task\CAD\FIG\CS054209-FIG-001.dwg

CAPITA SYMONDS

Planning | Environment | Design
incorporating Lovejoy and Andrew Martin Associates

Capita Symonds House, Wood Street,
East Grinstead, West Sussex. RH19 1UU
Tel +44(0)1342 327161
Fax +44(0)1342 315927
www.capitasymonds.co.uk

Rev	Date	By	Notes

Client

STADIUM CAPITAL HOLDINGS

Project

MIDLAND CRESCENT

Drawing Title

FIGURE 2 SITE LAYOUT & EXPLORATORY HOLE LOCATION PLAN

Drawing Status		Scale @ A3 Size	
		1:250	
Date	**Drawn**	**Checked**	**Approved**
FEB 2012	JMB	AO	RB

Drawing No

CS054209-FIG-002

Z:\ZENV\Projects\CS054209_Midland Crescent\B Work Task\CAD\FIG\CS054209-FIG-002.dwg

CAPITA SYMONDS

Planning | Environment | Design

incorporating Lovejoy and Andrew Martin Associates

Capita Symonds House, Wood Street,
East Grinstead, West Sussex. RH19 1UU
Tel +44(0)1342 327161
Fax +44(0)1342 315927
www.capitasymonds.co.uk

N

SOURCES

(1) MADE GROUND / SHALLOW SOILS

RECEPTORS

(A) FUTURE SITE USERS

(B) BUILT STRUCTURES

PATHWAYS

(i) SOIL GAS INGRESS

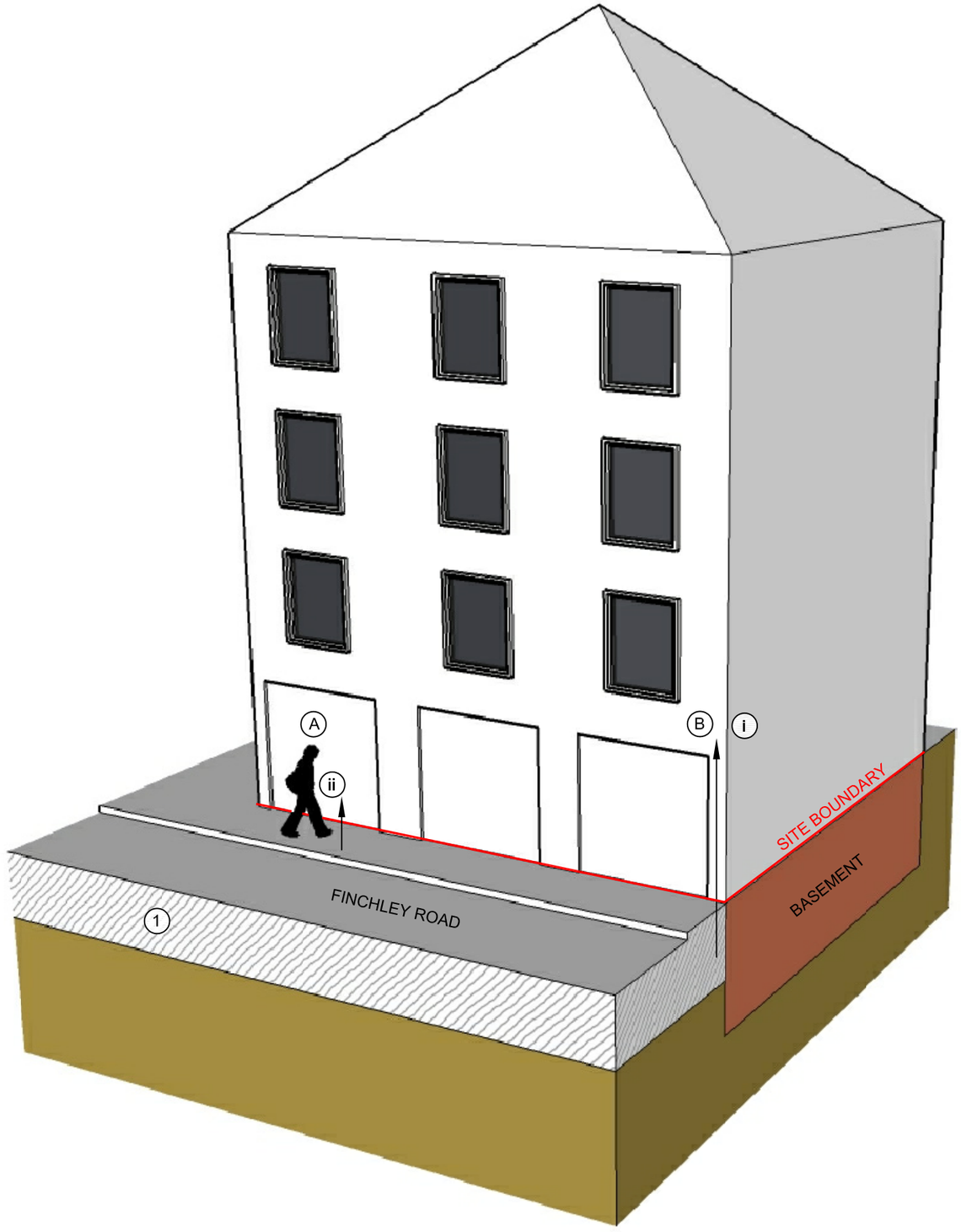
(ii) INDOOR INHALATION OF VAPOURS

PATHWAYS

GEOLOGY

MADE GROUND

LONDON CLAY



Rev	Date	By	Notes

Client

STADIUM CAPITAL HOLDINGS

Project

MIDLAND CRESCENT

Drawing Title

FIGURE 3
CONCEPTUAL SITE MODEL

Drawing Status		Scale @ A3 Size	
		N/A	
Date	**Drawn**	**Checked**	**Approved**
FEB 2012	JMB	AO	RB

Drawing No

CS054209-FIG-003

Z:\ZENV\Projects\CS054209_Midland Crescent\B Work Task\CAD\FIG\CS054209-FIG-003.dwg

CAPITA SYMONDS

Planning | Environment | Design
incorporating Lovejoy and Andrew Martin Associates

Capita Symonds House, Wood Street,
East Grinstead, West Sussex. RH19 1UU
Tel +44(0)1342 327161
Fax +44(0)1342 315927
www.capitasymonds.co.uk

Appendices

Appendix A Ground Contamination Plan

CAPITA SYMONDS

Midland Crescent **Ref CS054209**
Ground Contamination Plan **19/01/2012**

Purpose of Document

The purpose of this document is to outline the scope of ground investigations works across the Midland Crescent site. This document should be read in conjunction with the Capita Symonds Limited (CSL) Phase I Geoenvironmental Report, Midland Crescent, London.

Ground Investigation - Objectives

The ground investigation works have been designed to achieve the following main objectives:
- Determine the thickness and nature of the underlying strata;
- Determine the chemical quality of Made Ground and natural strata;
- Identify if perched groundwater is present within the made ground; and
- Assess the soil gas generation across the site.

Site Description

The site is located on Finchley Road in North West London, NW3 6LT (centered on National Grid Reference 526180, 184890) and the surface area of the site is approximately 0.04 hectares. The site is bordered to the north and south by two railway lines and to the east by Finchley Road.

Site History

Map Dates	Description	Comments
1871-1896	Railway Land	Land and structures associated with Finchley Road Station which is located immediately adjacent to the west of the site.
1915-1995	Buildings	Site appears to have undergone development which is identified as Midland Crescent in 1954 mapping.
2012	Vacant Land	Site is currently disused.

Access

The site is accessed via Finchley Road to the east.

Historic Ground Investigation

No previous intrusive ground investigation has been conducted at the site.

Contaminants of Concern

A number of potential contamination sources have been identified associated with current and historic land uses. The main areas of ground contamination sources are provided below

i) Made Ground / Demolition Rubble: Potentially shallow ground contamination with inorganic and organic contaminants including asbestos, carbon dioxide and methane; and
ii) Historic land use associated with rail lines: potential shallow ground contamination with inorganic and organic contaminants including hydrocarbons such as fuel, oils, solvents and PCBs.

Published Geology

Ground Conditions	Strata	Description	Thickness
British Geological Survey (BGS) 1:50,000 Solid and Drift Geological Map, North London (Sheet 256)	Made Ground	The site is built up behind a retaining wall which is indicative of a significant thickness of Made Ground being present beneath the site.	Variable
	London Clay	Clay, silt and sand	>50m
	Lambeth Group	Clay, sand, pebbles and shells	15-20m
	Thanet Sand Formation	Sand fine grained	07-10m
	Upper Chalk	Chalk - white, soft, massively bedded, flinty with thin marl seams in the lower part and conspicuous indurated chalk at the top.	60m+

Hydrogeology

The Environment Agency (EA) has designated the underlying deposits (London Clay) present beneath the site as an Unproductive Aquifer.

Ground Investigation Works

Exploratory Hole Density

The exploratory hole type and number is outlined below to provide general coverage across the site. Provisional locations are shown on the attached Figure 3. All locations are subject to minor revision to take account of site specifics and following a detailed site walkover.

- Four window sample holes up to 5m in depth or to base of Made Ground; and
- Install 50mm diameter monitoring well with gravel filter.

Chemical Sampling Requirement

The schedule for soil sampling will be confirmed by the CSL engineer and will broadly comprise of:

- Metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc;
- Speciated PAH; and
- Controlled working group TPH and BTEX

Contamination samples should be collected in accordance with the following frequency:
Two samples in the top 1m (0.25 to 0.5m bgl and 0.75 to 1.0m bgl)
At least one sample every meter or more frequent if field observations identify changing ground conditions or visual evidence of contamination.

Post Investigation Monitoring

Gas: soil gas monitoring is to be undertaken by CSL in accordance with Chemical Sampling and Analysis Specification. This will comprise of four visits.

Land Surveying

The locations of each window sample hole will be determined by accurate offset measurements to the site boundary.

Key Technical Interfaces

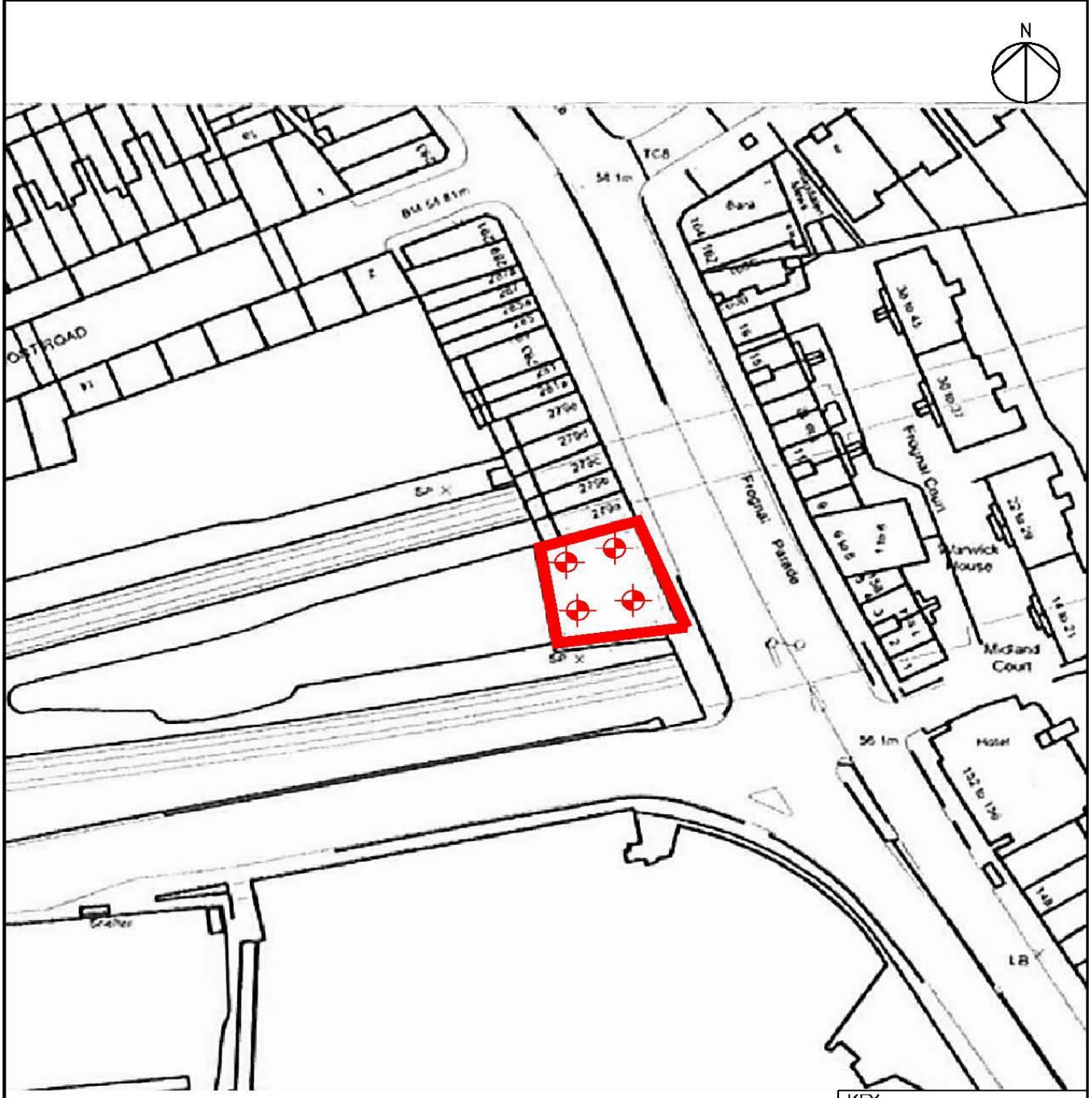
Services: Prior to commencement of intrusive investigation works the following procedure should be implement by the Principal Contractor

- Review of service tracing plan;
- Utility on site clearance by appropriately qualified service tracing team; and
- Hand dug inspection pit to 1.2mbgl;

Safety, Health & Environment

All works shall be undertaken in accordance with the requirements of the project specific Construction Code of Practice or similar document and Construction Environmental Management Plans.
In summary the approach to management of health and safety responsibilities is as follows

- Ground Investigation works will be managed as a notifiable project under CDM Regulations 2007.
- Principal Contractor preparation of Construction Phase Health and Safety Plan to include approach to management of below ground utilities, welfare and decontamination, access and egress, traffic management, reinstatement and any other site specific issues.
- Suitable level of personal protective equipment to be used and o include as a minimum high visibility clothing, hard hat, ear defenders and gloves.



BASED ON ORDNANCE SURVEY MAPPING AND REPRODUCED BY CAPITA SYMONDS LIMITED. LICENCE NO. 100023544 WITH THE PERMISSION OF THE CONTROLLER OF HMSO. CROWN COPYRIGHT.

MIDLAND CRESCENT

STADIUM CAPITAL HOLDINGS

FIGURE 1: PROPOSED EXPLORATORY HOLE LOCATION PLAN

CAPITA SYMONDS
Level Seven, 52 Grosvenor Gardens, Belgravia, London SW1W 0AU
Tel: +44 (0)20 7901 9911 Fax: +44 (0)20 7870 9399

DRAWN BY	CHECKED BY	PASSED BY	DATE	SCALES @ A4 SIZE	ISSUE STATUS	DRAWING NUMBER	REV.
JMB	AO	TH	JAN 2012	1:800	-	CS054209/Figure 1	

-10mm 0 10mm

CAD FILE NAME : F:\Environment\ZWTY\CS\227301\CAD\Figure 2_site plan.dwg
CTB FILE NAME :
PLOTTED DATE :

Appendix B Harrison Group Environmental Factual Report

HARRISON GROUP ENVIRONMENTAL LIMITED

Document: Site Investigation

Project: Midland Crescent, Finchley Road, London NW3 6LT

Reference No.: GL16386

Date: February 2012

Prepared for: Capita Symonds Limited

Client: Stadium Capital Holdings 2 Limited

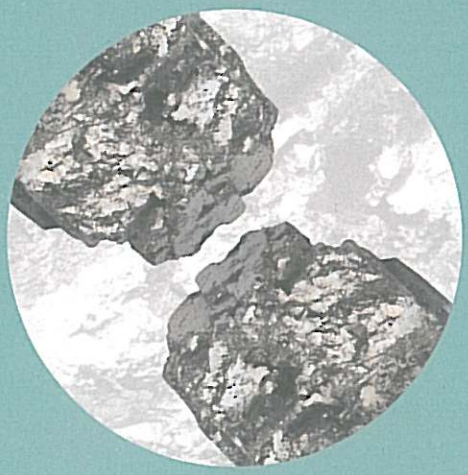
REPORT STATUS:

		INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE
		INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE
		INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE
0		INIT KB SIGN KB COMMENTS DATE 6/2/12	INIT JK SIGN [signature] COMMENTS DATE 6/2/12	INIT KB SIGN KB COMMENTS DATE 6/2/12	INIT JK SIGN [signature] COMMENTS DATE 6/2/12
Revision	**Comments**	**Prepared By**	**Approved By**	**Issued By**	**Audited By**

This sheet to be kept on PSI / Report file.
Auditors to insert their comments on the table, to annotate the report itself or provide comments on a separate sheet. (Please state which)
For final reports a hard copy of the signed off form will be kept on the appropriate QA file.

Document:	Site Investigation
Project:	Midland Crescent, Finchley Road, London NW3 6LT
Reference No.:	GL16386
Date:	February 2012
Prepared for:	Capita Symonds Limited
Client:	Stadium Capital Holdings 2 Limited

harrisongeotechnical
ENGINEERING



A division of Harrison Group Environmental Ltd.

CONTENTS

FOREWORD

General Conditions Relating To Site Investigation

This investigation has been devised to generally comply with the relevant principles and requirements of BS10175: 2001 “Investigation of potentially contaminated sites - Code of practice”. The recommendations made and opinions expressed in this report are based on the information obtained from the sources described using a methodology intended to provide reasonable consistency and robustness.

The opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between exploratory positions, these are only for guidance and no liability can be accepted for their accuracy.

Boring and sampling procedures are undertaken in accordance with B.S.5930, “Code of Practice for Site Investigations”. Likewise in situ and laboratory testing complies with B.S.1377, “Methods of Tests for Soils for Civil Engineering Purposes”, unless stated otherwise in the text. Chemical Testing has been undertaken by UKAS/MCERTS accredited laboratory.

The groundwater conditions entered on the boring records are those observed at the time of investigation. The normal rate of boring usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions.

Some items of the investigation have been provided by third parties and whilst Harrison Group have no reason to doubt the accuracy, the items relied on have not been verified. No responsibility can be accepted for errors within third party items presented in this report.

This report is produced for the benefit of the client alone. No responsibility can be accepted for any consequences of this information being passed to a third party who may act upon its contents/recommendations.

REPORT ON A

GROUND INVESTIGATION

AT

MIDLAND CRESCENT, FINCHLEY ROAD,

LONDON NW3 6LT

1 TERMS OF REFERENCE & INTRODUCTION

The work covered by this report was undertaken on behalf of Stadium Capital Holdings 2 Ltd, in accordance with the NEC (Short Form) contract issued by Capita Symonds Ltd (CSL). CSL acted as the engineer for this project.

A ground investigation was carried out at Midland Crescent, Finchley Road, London NW3 6LT.

The purpose of this ground investigation was to obtain samples for environmental testing and to install pipes for gas and groundwater monitoring by others.

2 SITE DESCRIPTION

The site was accessed directly off Finchley Road, at approximate National Grid Reference 526180, 184937 with an elevation of about 61m above Ordnance Datum (aOD).

The area under investigation formed a square of land, measuring roughly 20m by 20m at its' widest points, and was steeply sloped down to the west. At the time of our visits no significant above ground structures were evident with the surface formed by a cover of small vegetation, building rubble, general rubbish and scrap metal. Concrete steps traversed the site from the middle of the site to the west edge.

The eastern perimeter of the site was formed with Finchley Road. The southern and western boundaries comprised National Rail land and the northern boundary was formed with commercial and residential properties.

A Site Location Plan (GL16386-DR001) is presented in Appendix A.

3 FIELDWORK

Details of the site investigation methods employed have been presented on the appended data sheet and a brief summary of the fieldwork has been presented below. All site investigation methods were undertaken in accordance with BS5930:1999+A2 2010, 'Code of Practice for Site Investigations' and BS10175:2001, 'Investigation of Potentially Contaminated Sites'.

The scope of the fieldworks conducted, comprised the following:

- 4 no. Window Sampler Boreholes.

The intrusive fieldworks were carried out on the 24th and 26th January 2012. The locations of the exploratory holes are shown on the appended drawing GL16386-DR002.

3.1 Window Sampler Boreholes

Four window sample boreholes, WS1 to WS4, were undertaken in order to sample and log the sub-soils underlying the site. Upon completion all boreholes were installed with combined gas and groundwater monitoring wells, as summarised below in table 3.2.

A detailed description of all the strata encountered, position and types of samples taken, along with any groundwater observations made at the time of drilling are included on the window sample borehole logs presented in Appendix B.

3.2 Installations

All of the window sampler boreholes were installed with standpipes for monitoring the gas and groundwater within the soils encountered. Table 3.2 below summarises these installations.

Monitoring Point I.D	Diameter of Installation (mm)	Base Depth of Installation (m bgl)	Response Zone (m bgl)		Target Strata
			Top	Base	
WS1	38	2.30	1.00	2.30	Made Ground
WS2	38	5.00	1.00	5.00	Made Ground and London Clay
WS3	38	3.80	1.00	3.80	Made Ground and London Clay
WS4	38	3.50	1.00	3.50	Made Ground and London Clay

Table 3.2: Summary of Gas and Groundwater installations.

Detailed descriptions of the installations and their corresponding backfill materials are included on the relevant exploratory hole logs presented in Appendix B.

4 LABORATORY TESTING

4.1 Environmental Laboratory Testing

All environmental laboratory testing on the soil samples recovered from the exploratory holes was scheduled by CSL in order to facilitate the assessment of the chemical characteristics and potential contamination of the site.

Alcontrol laboratories carried out the analytical chemical testing to UKAS accredited procedures unless stated otherwise.

The schedule of laboratory testing and all results are presented in Appendix C.

Report Compiled by:

Katharine Barker M.Sci. (Hons) F.G.S.
Geotechnical Engineer.

Report Checked by

John Keay B.Sc. (Hons), F.G.S.
Associate Director Geotechnical.

REFERENCES

BSI British Standard BS5930:1999 (with Amendment 2:2010), 'Code of Practice for Site Investigations'.

BSI British Standard, 2001, BS10175:2001, 'Investigation of Potentially Contaminated Sites'

BSI British Standard. 1990. BS1377:1990, 'Methods of Test for Soils for Civil Engineering Purposes'.

BRE Digest 365, 1991 (with amendments from 2003 and 2007)

Building Research Establishment, 2005. Special Digest 1:2005, 'Concrete in Aggressive Ground'.

LIST OF APPENDICES

APPENDIX A: DRAWINGS

Site Location Plan (GL16386-DR001)

Exploratory Hole Location Plan (GL16386-DR002)

APPENDIX B: EXPLORATORY HOLE RECORDS

Data Sheet: Site Investigation Methods

Key to Site Investigation Records

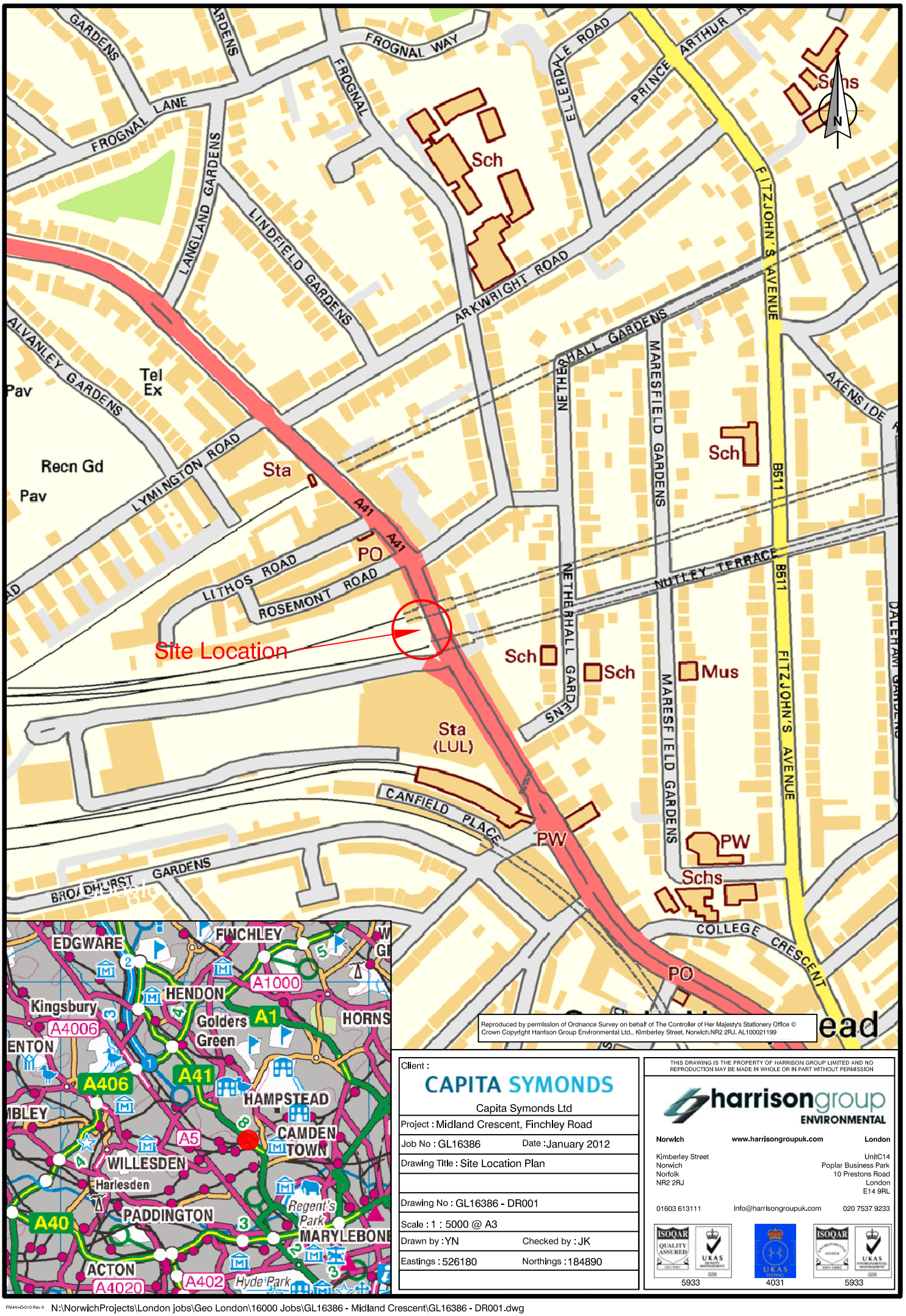
Window Sample Borehole Records

APPENDIX C: LABORATORY TESTING

Chemical Laboratory Test Results (Soils)

APPENDIX A

DRAWINGS



Client : CAPITA SYMONDS

Capita Symonds Ltd

Project : Midland Crescent, Finchley Road

Job No : GL16386 Date : January 2012

Drawing Title : Site Location Plan

Drawing No : GL16386 - DR001

Scale : 1 : 5000 @ A3

Drawn by : YN Checked by : JK

Eastings : 526180 Northings : 184890

harrisongroup ENVIRONMENTAL

Norwich
Kimberley Street
Norwich
Norfolk
NR2 2RJ

www.harrisongroupuk.com

London
UnitC14
Poplar Business Park
10 Prestons Road
London
E14 9RL

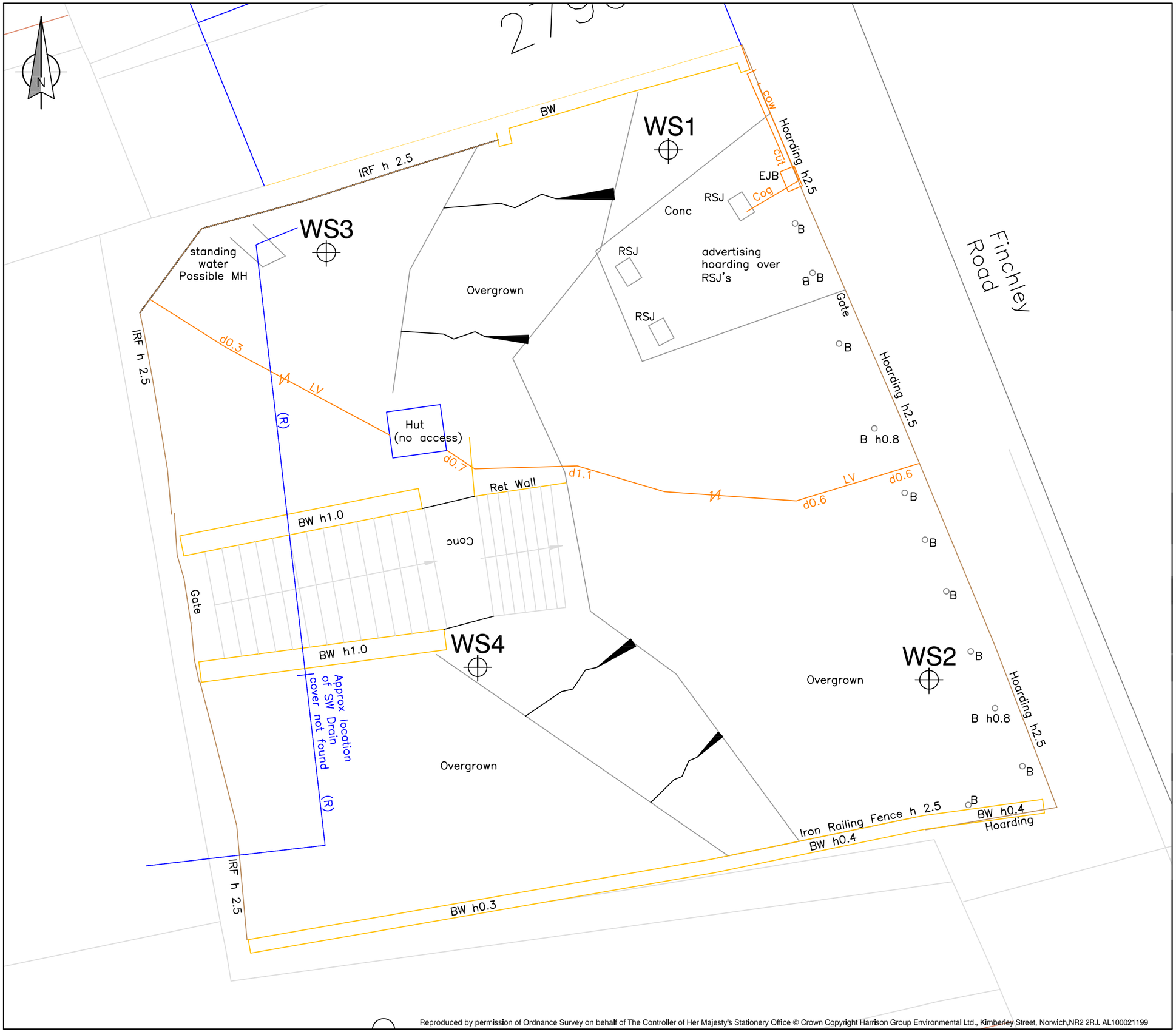
01603 613111 Info@harrisongroupuk.com 020 7537 9233

5933 4031 5933

FM-Hrv-D-010 Rev A N:\NorwichProjects\London jobs\Geo London\16000 Jobs\GL16386 - Midland Crescent\GL16386 - DR001.dwg

FM-Hn-D-005 Rev A

N:\Norwitch\Projects\London jobs\Geo London\16000 Jobs\GL16386 - Midland Crescent\GL16386 - DR002.dwg



Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office © Crown Copyright Harrison Group Environmental Ltd., Kimberley Street, Norwich,NR2 2RJ. AL100021199

Key :

WS1 Window Sample Borehole

Client : CAPITA SYMONDS

Capita Symonds Ltd

Project : Midland Crescent, Finchley

Job No : GL16386 Date : January 2012

Drawing Title : Fieldwork Location Plan

Drawing No : GL16386 - DR002

Scale : 1 : 100 @ A3

Drawn by : YN Checked by : JK

Eastings : 526180 Northings : 184890

harrisongroup ENVIRONMENTAL

Norwich www.harrisongroupuk.com London

01603 613111 info@harrisongroupuk.com 020 7537 9233

ISOQAR QUALITY ASSURED ISO 9001 5933 | UKAS QUALITY MANAGEMENT 026 | UKAS TESTING 4031 | ISOQAR ENVIRONMENTAL SYSTEM ISO 14001 5933 | UKAS ENVIRONMENTAL MANAGEMENT 026

APPENDIX B

EXPLORATORY HOLE RECORDS

DATA SHEET: SITE INVESTIGATION METHODS

The following sheet provides basic details of the site investigation methods employed in the direct investigation phase of this report. Detailed method statements may be provided if requested, or further information may be obtained from the relevant British Standard, or Environment Agency publications. Prior to any excavation being undertaken, a surface sweep using a cable detector is undertaken, in order to avoid services. Details of the lithology encountered are generally presented on the relevant field record sheets, which also detail the type and depths of samples taken, the results of any in-situ tests, and any groundwater observations noted at the time. Other pertinent information may also be recorded.

WINDOW SAMPLER BOREHOLES

The window sampler system comprises a series of varying diameter (max 80mm) steel tubes of either 1m or 2m length having a slot or window cut along the side. The tubes are driven into the ground using a light percussive hammer attached to solid rods, and withdrawn by use of a jack. The hammer may be machine mounted, or for restricted access work, hand held. The soil sample is forced up into the tube during the driving, samples being obtained directly through the slot or window. The sampler generally achieves depths of around 3-5m in favourable soils. Use of a super heavy tracked rig allows samples to be retrieved in liners. Greater diameter boreholes are also achievable (<115mm).

HAND DUG TRIAL PITS

Hand dug pits may be undertaken for a variety of reasons, which include service observation pits, obtaining near surface samples, and examining foundations of existing buildings. Pits are excavated using a shovel, postholers and other suitable equipment. Detailed records of hand dug pits are only normally recorded where foundation depths and information is required.

harrisongroup

Key to Site Investigation Records

Project: Midland Crescent, Finchley Road, London

Project ID.: GL16386

Client: Stadium Capital Holdings 2 Limited
Engineer: Capita Symonds Limited
Contractor: Harrison Group Environmental Limited

In-situ Testing & Observations

S or C	Standard Penetration Test as per BS1377:1990 'Methods of test for soils for civil engineering purposes'. Uncorrected test result shown on the log at the relevant depth. S - split spoon or C - solid cone.
✳	n100 - dynamic penetration test graphical presentation of the blows taken to drive 100mm.
+	Equivalent SPT 'N' value. Based on standard empirical calculation after Card & Roche for sandy soils unless specificed in the text.
IV	In-situ (down hole) vane shear strength peak - p or remoulded - r
HV	In-situ hand vane test, shear strength reported in kPa peak - p or remoulded - r
PP	Pocket penetrometer test, shear strength reported in kPa
K	In-situ permeability test result, expressed in m/s
PID	In-situ screening by photo-Ionisation detector, expressed as ppm Head space testing undertaken as per contract documents.

TCR	Total Core Recovery, %	As defined in BS5930:1999. Details of flush returns etc. are given on the relevant log sheet.
SCR	Solid Core Recovery, %	
RQD	Rock Quality Designation, %	
If	Fracture spacing, mm	

▽	Groundwater strike	▼	Level to which groundwater has risen after the specified time. (Nominal 20 mins)

Sampling

D / GD	Small / geotechnical disturbed sample, around 1kg
B / GB	Bulk / geotechnical disturbed sample, around 5Kg
LB	Large bulk disturbed sample, around 20Kg for earthworks testing
W	Water sample
ES	Environmental soil sample, in more than one container if appropriate
EW	Environmental water sample, in more than one container if appropriate
U / UT	Undisturbed / Ultra thin undisturbed driven tube sample. Nominal 100mm diameter, 450mm length in CP boreholes, 38mm diameter, 100mm length in WS borehole. Dimension of trial pit cores to be specfied on the individual records. The number of blows taken to drive the sample tube the full length is reported on the log sheet at the appropriate depth. 'NR' indicates no recovery achieved.
P	Pushed piston sampler, nominal 100mm diameter
LS / C	Liner sample, e.g. from windowless sampler / Core sample, e.g. from rotary core drilling
CBR	California Bearing Ratio (CBR) test - either mould sample taken or in situ testing. See individual record sheet for further information

General comments

1. Samples have been described in accordance with BS5930:1999 'Code of practice for site investigation' unless an alternative material specific weathering classification is considered more appropriate. This will be recorded in the report text.
2. Electronic data provided in relation to this project has been produced using the Association of Geotechnical & Geoenvironmental Specalists (AGS) data transfer format, with specific reference the their publication

Electronic Transfer of Geotechnical and Geoenvironmental Data Edition 3.1, 2004 including addendum May 2005'. All legend and backfill codes are as per this document.

Site specific comments

harrisongroup

Window Sample Record

WS1
Sheet 1 of 1

Project: Midland Crescent, Finchley Road, London

Project ID: GL16386

Coordinates:

Ground Level:

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	Remarks and Test Results	Installations
MADE GROUND. Grey gravelly CLAY. Gravel is angular to subangular fine to coarse brick, clinker and tile. Frequent whole bricks.				ES1	0.20		0.20
				ES2	0.60		
				ES3	0.90		1.00
				ES4	1.20-2.10		
MADE GROUND (assumed). No core recovery.		2.30					2.30
At 3.10m: concrete.		3.10					3.10
Window Sample Complete at 3.10 m							

Drive Records

Diameter (mm)	From (m)	To (m)	Recovery (%)
101	1.20	2.10	100
87	2.10	3.10	20

Water Level Observations

Date	Water Strike (m)	Standing Time (Mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Client: Stadium Capital Holdings 2 Limited
Engineer: Capita Symonds Limited
Contractor: Harrison Group Environmental Limited
Date: 24/01/2012
Plant: Premier Window Sampling Rig
Drilled By: P. Kirnig
Logged By: K. Barker
Checked By: J. Keay

Remarks:
1. Inspection pit excavated from GL to 1.20mbgl.
2. Groundwater was not encountered.
3. Concrete obstruction encountered at 3.10mbgl. Window sample hole terminated.
4. Window sample hole collapsed back to 2.30mbgl.
5. Installation details: 38mm diameter HDPE standpipe installed from 2.30mbgl to GL. Slotted from 2.30mbgl to 1.00mbgl, plain from 1.00mbgl to GL. Finished with gas tap, end cap and flush fitting cover. Geowrap and geosock used.
6. Backfill details: Arisings from 3.10mbgl to 2.30mbgl, gravel filter packs from 2.30mbgl to 1.00mbgl, bentonite pellets from 1.00mbgl to 0.20mbgl and concrete from 0.20mbgl to GL.

Harrison Group Environmental Ltd, Unit A11, Poplar Business Park, 10 Prestons Road, London E14 9RL

harrisongroup

Window Sample Record

WS2
Sheet 1 of 1

Project: Midland Crescent, Finchley Road, London

Project ID: GL16386

Coordinates:

Ground Level:

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	Remarks and Test Results
MADE GROUND. Brown gravelly CLAY. Gravel is angular to subangular fine to coarse brick, clinker and tile. Occasional brick cobbles.				ES1	0.30	
				ES2	0.80	
				ES3	1.30-1.50	
MADE GROUND. Brown mottled grey slightly gravelly CLAY. Gravel is angular to subrounded fine and medium flint and brick.		1.55		ES4	1.80-2.00	
				ES5	2.70-2.90	
				ES6	3.40-3.60	
(Firm) brown mottled grey CLAY.		3.65		ES7	4.50-5.00	

Installations: 0.20, 1.00

Window Sample Complete at 5.00 m

Drive Records

Diameter (mm)	From (m)	To (m)	Recovery (%)
101	1.00	2.00	100
87	2.00	3.00	90
87	3.00	4.00	100
77	4.00	5.00	100

Water Level Observations

Date	Water Strike (m)	Standing Time (Mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Client: Stadium Capital Holdings 2 Limited
Engineer: Capita Symonds Limited
Contractor: Harrison Group Environmental Limited
Date: 24/01/2012
Plant: Premier Window Sampling Rig
Drilled By: P. Kirnig
Logged By: K. Barker
Checked By: J. Keay

Remarks:

1. Inspection pit excavated from GL to 1.00mbgl.
2. Groundwater was not encountered.
3. Installation details: 38mm diameter HDPE standpipe installed from 5.00mbgl to GL. Slotted from 5.00mbgl to 1.00mbgl, plain from 1.00mbgl to GL. Finished with gas tap, end cap and flush fitting cover. Geowrap and geosock used.
4. Backfill details: Gravel filter packs from 5.00mbgl to 1.00mbgl, bentonite pellets from 1.00mbgl to 0.20mbgl and concrete from 0.20mbgl to GL.

Harrison Group Environmental Ltd, Unit A11, Poplar Business Park, 10 Prestons Road, London E14 9RL

harrisongroup

Window Sample Record

WS3
Sheet 1 of 1

Project: Midland Crescent, Finchley Road, London

Project ID: GL16386

Coordinates:

Ground Level:

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	Remarks and Test Results	Installations
MADE GROUND. Dark grey slightly gravelly CLAY. Gravel is angular to subangular fine to coarse brick, clinker, tile and metal wire fragments. One carpet piece.				ES1	0.20		0.20
				ES2	0.80-1.00		
MADE GROUND. Brown and grey slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse brick, flint and concrete.		1.00					1.00
				ES3	2.00-2.25		
(Firm to stiff) fissured brown locally mottled grey CLAY. Occasional selenite crystals.		2.30					
				ES4	3.00-3.25		
				ES5	3.50-3.80		▽
At 3.80m: sandstone fragments recovered.		3.80					3.80
Window Sample Complete at 3.80 m							

Drive Records

Diameter (mm)	From (m)	To (m)	Recovery (%)
87	1.00	2.00	100
77	2.00	3.00	100
67	3.00	3.80	100

Water Level Observations

Date	Water Strike (m)	Standing Time (Mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
24/01/12	3.50	-	-	-	

Client: Stadium Capital Holdings 2 Limited
Engineer: Capita Symonds Limited
Contractor: Harrison Group Environmental Limited
Date: 24/01/2012-26/01/2012
Plant: Premier Window Sampling Rig
Drilled By: P. Kirnig
Logged By: K. Barker
Checked By: J. Keay

Remarks:
1. Inspection pit excavated from GL to 1.00mbgl.
2. Obstruction encountered at 3.80mbgl. Window sample hole terminated.
3. Installation details: 38mm diameter HDPE standpipe installed from 3.80mbgl to GL. Slotted from 3.80mbgl to 1.00mbgl, plain from 1.00mbgl to GL. Finished with gas tap, end cap and flush fitting cover. Geowrap and geosock used.
4. Backfill details: Gravel filter packs from 3.80mbgl to 1.00mbgl, bentonite pellets from 1.00mbgl to 0.20mbgl and concrete from 0.20mbgl to GL.

Harrison Group Environmental Ltd, Unit A11, Poplar Business Park, 10 Prestons Road, London E14 9RL

harrisongroup

Window Sample Record

WS4
Sheet 1 of 1

Project: Midland Crescent, Finchley Road, London

Project ID: GL16386

Coordinates:

Ground Level:

Description	Legend	Depth (m)	O.D. Level (m)	Sample Test Type	Sample Test Depth (m)	Remarks and Test Results	Installations
Grass over MADE GROUND. Brick and concrete GRAVEL.		0.10					
MADE GROUND. Brown slightly gravelly CLAY. Gravel is angular to subangular fine to coarse brick. Occasional whole bricks.				ES1	0.25-0.50		
MADE GROUND. Brown clayey SAND and GRAVEL with ash. Gravel is angular to subangular fine to coarse brick.		0.60		ES2	0.75-1.00		
MADE GROUND. Brown slightly gravelly CLAY. Gravel is angular to subangular fine to coarse brick. Occasional roots.		1.20		ES3	2.00-2.25		
MADE GROUND. Grey and brown slightly gravelly CLAY. Gravel is angular to subangular fine to coarse brick, wood and ash fragments.		2.80		ES4	3.00-3.25		
(Firm to stiff) brown CLAY.		3.30		ES5	3.30-3.50		
Window Sample Complete at 3.50 m		3.50					

Installations: 0.20, 1.00, 3.50

Drive Records

Diameter (mm)	From (m)	To (m)	Recovery (%)
87	1.00	2.00	100
77	2.00	3.00	100
67	3.00	3.50	100

Water Level Observations

Date	Water Strike (m)	Standing Time (Mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Client: Stadium Capital Holdings 2 Limited
Engineer: Capita Symonds Limited
Contractor: Harrison Group Environmental Limited
Date: 26/01/2012
Plant: Premier Window Sampling Rig
Drilled By: P. Kirnig
Logged By: K. Barker
Checked By: J. Keay

Remarks:

1. Inspection pit excavated from GL to 1.00mbgl.
2. Groundwater was not encountered.
3. Hole squeezing started at 3.00mbgl and window sample hole terminated 3.50mbgl.
4. Installation details: 38mm diameter HDPE standpipe installed from 3.50mbgl to GL. Slotted from 3.50mbgl to 1.00mbgl, plain from 1.00mbgl to GL. Finished with gas tap, end cap and flush fitting cover. Geowrap and geosock used.
5. Backfill details: Gravel filter packs from 3.50mbgl to 1.00mbgl, bentonite pellets from 1.00mbgl to 0.20mbgl and concrete from 0.20mbgl to GL.

Harrison Group Environmental Ltd, Unit A11, Poplar Business Park, 10 Prestons Road, London E14 9RL

APPENDIX C

LABORATORY TESTING

ALcontrol Laboratories

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: mkt@alcontrol.com
Website: www.alcontrol.com

Harrison Group Ltd
Unit C14
Poplar Business Park
10 Prestons Road
London
E14 9RL

Attention: G I

CERTIFICATE OF ANALYSIS

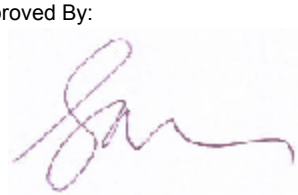
Date:	03 February 2012
Customer:	H_HARRIS_LON
Sample Delivery Group (SDG):	120125-82
Your Reference:	GL16386
Location:	Midland Cresent
Report No:	169531

We received 13 samples on Wednesday January 25, 2012 and 6 of these samples were scheduled for analysis which was completed on Friday February 03, 2012. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:



Sonia McWhan

Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
5070266	WS1	ES1	0.20	24/01/2012
5070268	WS1	ES2	0.60	24/01/2012
5070269	WS1	ES3	0.90	24/01/2012
5070270	WS1	ES4	1.20 - 2.10	24/01/2012
5070271	WS2	ES1	0.30	24/01/2012
5070273	WS2	ES2	0.80	24/01/2012
5070275	WS2	ES3	1.30 - 1.50	24/01/2012
5070276	WS2	ES4	1.80 - 2.00	24/01/2012
5070278	WS2	ES5	2.70 - 2.90	24/01/2012
5070279	WS2	ES6	3.40 - 3.60	24/01/2012
5070280	WS2	ES7	4.50 - 5.00	24/01/2012
5070281	WS3	ES1	0.20	24/01/2012
5070283	WS3	ES2	0.80 - 1.00	24/01/2012

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

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

SOLID

Results Legend

X **Test**

N **No Determination Possible**

			Lab Sample No(s)	5070266		5070268			5070273		5070276	5070281	5070283	
			Customer Sample Reference	WS1		WS1			WS2		WS2	WS3	WS3	
			AGS Reference	ES1		ES2			ES2		ES4	ES1	ES2	
			Depth (m)	0.20		0.60			0.80		1.80 - 2.00	0.20	0.80 - 1.00	
			Container	250g Amber Jar	400g Tub (ALE214)	250g Amber Jar	400g Tub (ALE214)	60g VOC (ALE215)	250g Amber Jar	400g Tub (ALE214)	60g VOC (ALE215)	250g Amber Jar	250g Amber Jar	60g VOC (ALE215)
Asbestos Identification (Soil)	All	NDPs: 0 Tests: 3			X		X			X				
Boron Water Soluble	All	NDPs: 0 Tests: 6		X		X			X			X	X	X
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 3				X			X					X
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 3				X			X					X
GRO by GC-FID (S)	All	NDPs: 0 Tests: 3						X			X				X
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 6		X		X			X			X	X	X
	Cadmium	NDPs: 0 Tests: 6		X		X			X			X	X	X
	Chromium	NDPs: 0 Tests: 6		X		X			X			X	X	X
	Copper	NDPs: 0 Tests: 6		X		X			X			X	X	X
	Lead	NDPs: 0 Tests: 6		X		X			X			X	X	X
	Mercury	NDPs: 0 Tests: 6		X		X			X			X	X	X
	Nickel	NDPs: 0 Tests: 6		X		X			X			X	X	X
	Selenium	NDPs: 0 Tests: 6		X		X			X			X	X	X
	Zinc	NDPs: 0 Tests: 6		X		X			X			X	X	X
PAH by GCMS	All	NDPs: 0 Tests: 3				X			X					X

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

SOLID

Results Legend

X **Test**

N **No Determination Possible**

			Lab Sample No(s)	5070266	5070268	5070273	5070276	5070281	5070283
			Customer Sample Reference	WS1	WS1	WS2	WS2	WS3	WS3
			AGS Reference	ES1	ES2	ES2	ES4	ES1	ES2
			Depth (m)	0.20	0.60	0.80	1.80 - 2.00	0.20	0.80 - 1.00
			Container	250g Amber Jar	400g Tub (ALE214)	250g Amber Jar	400g Tub (ALE214)	60g VOC (ALE215)	250g Amber Jar	400g Tub (ALE214)	60g VOC (ALE215)	250g Amber Jar	250g Amber Jar	60g VOC (ALE215)
PCBs by GCMS	All	NDPs: 0 Tests: 1											X	
Sample description	All	NDPs: 0 Tests: 6		X		X			X			X	X	X
TPH CWG GC (S)	All	NDPs: 0 Tests: 3			X			X					X	

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Sample Descriptions

Grain Sizes

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

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
5070266	WS1	0.20	Light Brown	Silt Loam	0.063 - 0.1 mm	Stones	Brick
5070268	WS1	0.60	Dark Brown	Silty Clay	0.063 - 0.1 mm	Stones	Brick
5070273	WS2	0.80	Light Brown	Loamy Sand	0.1 - 2 mm	Stones	Brick
5070276	WS2	1.80 - 2.00	Light Brown	Silt Loam	0.063 - 0.1 mm	None	None
5070281	WS3	0.20	Light Brown	Sandy Silt Loam	0.1 - 2 mm	Stones	None
5070283	WS3	0.80 - 1.00	Light Brown	Silt Loam	0.063 - 0.1 mm	None	None

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

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

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

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS1	WS2	WS2	WS3	WS3
			Depth (m)	0.20	0.60	0.80	1.80 - 2.00	0.20	0.80 - 1.00
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	24/01/2012	24/01/2012	24/01/2012	24/01/2012	24/01/2012	24/01/2012
			Date Received	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
			SDG Ref	120125-82	120125-82	120125-82	120125-82	120125-82	120125-82
			Lab Sample No.(s)	5070266	5070268	5070273	5070276	5070281	5070283
			AGS Reference	ES1	ES2	ES2	ES4	ES1	ES2
PCB congener 118	<3 µg/kg	TM168							<3 M
PCB congener 81	<3 µg/kg	TM168							<3 M
PCB congener 77	<3 µg/kg	TM168							<3 M
PCB congener 123	<3 µg/kg	TM168							<3 M
PCB congener 114	<3 µg/kg	TM168							<3 M
PCB congener 105	<3 µg/kg	TM168							<3 M
PCB congener 126	<3 µg/kg	TM168							<3 M
PCB congener 167	<3 µg/kg	TM168							<3 M
PCB congener 156	<3 µg/kg	TM168							<3 M
PCB congener 157	<3 µg/kg	TM168							<3 M
PCB congener 169	<3 µg/kg	TM168							<3 M
PCB congener 189	<3 µg/kg	TM168							<3 M
Sum of detected WHO 12 PCBs	<36 µg/kg	TM168							<36
Arsenic	<0.6 mg/kg	TM181		11.6 M	9.7 M	16.1 M	12.5 M	32.7 M	17 M
Cadmium	<0.02 mg/kg	TM181		0.569 M	0.345 M	0.809 M	0.47 M	1.51 M	0.521 M
Chromium	<0.9 mg/kg	TM181		30.9 M	21.9 M	24.7 M	53.3 M	48.2 M	54.6 M
Copper	<1.4 mg/kg	TM181		24.7 M	18.1 M	32 M	17.9 M	183 M	54.5 M
Lead	<0.7 mg/kg	TM181		83.6 M	91.6 M	286 M	23.5 M	1520 M	113 M
Mercury	<0.14 mg/kg	TM181		<0.14	<0.14	0.316	<0.14	0.661	<0.14
Nickel	<0.2 mg/kg	TM181		24.4 M	15.8 M	14 M	54.9 M	43.9 M	40.9 M
Selenium	<1 mg/kg	TM181		<1 #	<1 #	<1 #	<1 #	1.1 #	<1 #
Zinc	<1.9 mg/kg	TM181		113 M	274 M	212 M	81.4 M	1480 M	178 M
Boron, water soluble	<1 mg/kg	TM222		<1 M	1.24 M	1.32 M	1.83 M	1.33 M	1.67 M

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

PAH by GCMS

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS2	WS3			
			Depth (m)	0.60	0.80	0.80 - 1.00			
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid			
			Date Sampled	24/01/2012	24/01/2012	24/01/2012			
			Date Received	25/01/2012	25/01/2012	25/01/2012			
			SDG Ref	120125-82	120125-82	120125-82			
			Lab Sample No.(s)	5070268	5070273	5070283			
			AGS Reference	ES2	ES2	ES2			
Naphthalene-d8 % recovery**	%	TM218		99.5	90.8	95.5			
Acenaphthene-d10 % recovery**	%	TM218		96.5	88.5	95.4			
Phenanthrene-d10 % recovery**	%	TM218		96.4	89	95			
Chrysene-d12 % recovery**	%	TM218		107	104	93.7			
Perylene-d12 % recovery**	%	TM218		108	105	85.2			
Naphthalene	<9 µg/kg	TM218		5010 M	612 M	63.4 M			
Acenaphthylene	<12 µg/kg	TM218		3310 M	2180 M	91.9 M			
Acenaphthene	<8 µg/kg	TM218		994 M	223 M	25.5 M			
Fluorene	<10 µg/kg	TM218		3480 M	515 M	59.6 M			
Phenanthrene	<15 µg/kg	TM218		23300 M	10100 M	1460 M			
Anthracene	<16 µg/kg	TM218		5330 M	4460 M	264 M			
Fluoranthene	<17 µg/kg	TM218		19300 M	37200 M	2390 M			
Pyrene	<15 µg/kg	TM218		15100 M	32900 M	1930 M			
Benz(a)anthracene	<14 µg/kg	TM218		8050 M	21100 M	896 M			
Chrysene	<10 µg/kg	TM218		6570 M	16800 M	939 M			
Benzo(b)fluoranthene	<15 µg/kg	TM218		7090 M	23300 M	1030 M			
Benzo(k)fluoranthene	<14 µg/kg	TM218		3290 M	10500 M	390 M			
Benzo(a)pyrene	<15 µg/kg	TM218		6790 M	20700 M	761 M			
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		3090 M	11000 M	397 M			
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		953 M	3420 M	108 M			
Benzo(g,h,i)perylene	<24 µg/kg	TM218		3320 M	12200 M	488 M			
PAH, Total Detected USEPA 16	<118 µg/kg	TM218		115000	207000	11300			

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

TPH CWG (S)

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample Ref.	WS1	WS2	WS3			
			Depth (m)	0.60	0.80	0.80 - 1.00			
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid			
			Date Sampled	24/01/2012	24/01/2012	24/01/2012			
			Date Received	25/01/2012	25/01/2012	25/01/2012			
			SDG Ref	120125-82	120125-82	120125-82			
			Lab Sample No.(s)	5070268	5070273	5070283			
			AGS Reference	ES2	ES2	ES2			
GRO Surrogate % recovery**	%	TM089		96	91	97			
GRO >C5-C12	<44 µg/kg	TM089		<44	<44	93.8			
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		<5 #	<5 #	<5 #			
Benzene	<10 µg/kg	TM089		<10 M	<10 M	<10 M			
Toluene	<2 µg/kg	TM089		<2 M	2.4 M	2.72 M			
Ethylbenzene	<3 µg/kg	TM089		<3 M	<3 M	<3 M			
m,p-Xylene	<6 µg/kg	TM089		<6 M	<6 M	<6 M			
o-Xylene	<3 µg/kg	TM089		<3 M	<3 M	<3 M			
sum of detected mpo xylene by GC	<9 µg/kg	TM089		<9	<9	<9			
sum of detected BTEX by GC	<24 µg/kg	TM089		<24	<24	<24			
Aliphatics >C5-C6	<10 µg/kg	TM089		<10	<10	<10			
Aliphatics >C6-C8	<10 µg/kg	TM089		<10	<10	<10			
Aliphatics >C8-C10	<10 µg/kg	TM089		<10	10.8	29.9			
Aliphatics >C10-C12	<10 µg/kg	TM089		<10	<10	16.3			
Aliphatics >C12-C16	<100 µg/kg	TM173		2760	4410	39800			
Aliphatics >C16-C21	<100 µg/kg	TM173		3660	6830	20700			
Aliphatics >C21-C35	<100 µg/kg	TM173		20400	47800	11800			
Aliphatics >C35-C44	<100 µg/kg	TM173		3650	15300	935			
Total Aliphatics >C12-C44	<100 µg/kg	TM173		30500	74300	73300			
Aromatics >EC5-EC7	<10 µg/kg	TM089		<10	<10	<10			
Aromatics >EC7-EC8	<10 µg/kg	TM089		<10	<10	<10			
Aromatics >EC8-EC10	<10 µg/kg	TM089		<10	10.8	21.8			
Aromatics >EC10-EC12	<10 µg/kg	TM089		<10	<10	10.9			
Aromatics >EC12-EC16	<100 µg/kg	TM173		3690	14300	815000			
Aromatics >EC16-EC21	<100 µg/kg	TM173		23600	171000	49600			
Aromatics >EC21-EC35	<100 µg/kg	TM173		65700	540000	52100			
Aromatics >EC35-EC44	<100 µg/kg	TM173		17300	149000	21400			
Aromatics >EC40-EC44	<100 µg/kg	TM173		5110	49200	8080			
Total Aromatics >EC12-EC44	<100 µg/kg	TM173		110000	875000	938000			
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173		141000	949000	1010000			
Total Aliphatics >C5-35	<100 µg/kg	TM173		26900	59000	72400			
Total Aromatics >C5-35	<100 µg/kg	TM173		93000	725000	916000			
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173		120000	784000	989000			

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Asbestos Identification

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	WS1 ES 1 0.20 SOLID 24/01/2012 00:00:00 120125-82 5,070,266 TM048	02/02/12	Tomasz Pawlikowski	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	WS1 ES 2 0.60 SOLID 24/01/2012 00:00:00 120125-82 5,070,268 TM048	31/01/12	Kevin Bowron	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	WS2 ES 2 0.80 SOLID 24/01/2012 00:00:00 120125-82 5,070,273 TM048	02/02/12	Paul Poynton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Detected

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10-7

NDP	No Determination Possible	**#**	ISO 17025 Accredited	*	Subcontracted Test	**M**	MCERTS Accredited
NFD	No Fibres Detected	**PFD**	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	**EC**	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

CERTIFICATE OF ANALYSIS

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	5070266	5070268	5070273	5070276	5070281	5070283
Customer Sample Ref.	WS1	WS1	WS2	WS2	WS3	WS3
AGS Ref.	ES1	ES2	ES2	ES4	ES1	ES2
Depth	0.20	0.60	0.80	1.80 - 2.00	0.20	0.80 - 1.00
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Asbestos Identification (Soil)	02-Feb-2012	01-Feb-2012	02-Feb-2012			
Boron Water Soluble	01-Feb-2012	01-Feb-2012	01-Feb-2012	31-Jan-2012	31-Jan-2012	31-Jan-2012
EPH CWG (Aliphatic) GC (S)		02-Feb-2012	02-Feb-2012			01-Feb-2012
EPH CWG (Aromatic) GC (S)		02-Feb-2012	02-Feb-2012			01-Feb-2012
GRO by GC-FID (S)		31-Jan-2012	31-Jan-2012			30-Jan-2012
Metals by iCap-OES (Soil)	01-Feb-2012	01-Feb-2012	01-Feb-2012	01-Feb-2012	01-Feb-2012	01-Feb-2012
PAH by GCMS		01-Feb-2012	01-Feb-2012			30-Jan-2012
PCBs by GCMS						31-Jan-2012
Sample description	26-Jan-2012	30-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012
TPH CWG GC (S)		02-Feb-2012	02-Feb-2012			02-Feb-2012

SDG:	120125-82	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169531
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Appendix

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

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

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

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

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

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

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

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

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

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

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

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

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

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

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

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

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

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

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

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

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

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D&C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DCM	SOXTHERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
ELEMENTAL SULPHUR	D&C	DCM	SOXTHERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOXTHERM	GC-MS
HERBICIDES	D&C	HEXANE: ACETONE	SOXTHERM	GC-MS
PESTICIDES	D&C	HEXANE: ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE: ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE: ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE: ACETONE	END OVER END	GC-FID
EPH CWG BY GC	D&C	HEXANE: ACETONE	END OVER END	GC-FID
PCB AROCLOR 1254 / PCB CON	D&C	HEXANE: ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE: ACETONE	MICROWAVE TM218.	GC-MS
>C6-C40	WET	HEXANE: ACETONE	SHAKER	GC-FID
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE: ACETONE	SHAKER	GC-FID
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DCM:ACETONE	SONICATE	GC-MS

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
PCB AROCLOR 1254	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
SVOC	DCM	LIQUID/LIQUID SHAKE	GC MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST OCP/OPP	DCM	LIQUID/LIQUID SHAKE	GC MS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GC MS
PHENOLS MS	ACETONE	SOLID PHASE EXTRACTION	GC MS
TPH by INFRA RED (IR)	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
MINERAL OIL by IR	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
GLYCOLS	NONE	DIRECT INJECTION	GC FID

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

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

Visual Estimation Of Fibre Content

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

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

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

ALcontrol Laboratories

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: mkt@alcontrol.com
Website: www.alcontrol.com

Harrison Group Ltd
Unit C14
Poplar Business Park
10 Prestons Road
London
E14 9RL

Attention: G I

CERTIFICATE OF ANALYSIS

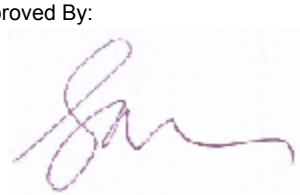
Date:	03 February 2012
Customer:	H_HARRIS_LON
Sample Delivery Group (SDG):	120131-28
Your Reference:	GL16386
Location:	Midland Cresent
Report No:	169621

We received 8 samples on Saturday January 28, 2012 and 3 of these samples were scheduled for analysis which was completed on Friday February 03, 2012. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:



Sonia McWhan

Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
5095626	WS3	ES3	2.00 - 2.25	26/01/2012
5095627	WS3	ES4	3.00 - 3.25	26/01/2012
5095628	WS3	ES5	3.50 - 3.80	26/01/2012
5095629	WS4	ES1	0.25 - 0.50	26/01/2012
5095630	WS4	ES2	0.75 - 1.00	26/01/2012
5095632	WS4	ES3	2.00 - 2.25	26/01/2012
5095633	WS4	ES4	3.00 - 3.25	26/01/2012
5095634	WS4	ES5	3.30 - 3.50	26/01/2012

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

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

SOLID

Results Legend

X **Test**

N **No Determination Possible**

			5095627	5095630	5095632
		Lab Sample No(s)			
		Customer Sample Reference	WS3	WS4	WS4
		AGS Reference	ES4	ES2	ES3
		Depth (m)	3.00 - 3.25	0.75 - 1.00	2.00 - 2.25
		Container	250g Amber Jar (AL	250g Amber Jar (AL	60g VOC (ALE215)	250g Amber Jar (AL
Boron Water Soluble	All	NDPs: 0 Tests: 3	X	X		X
EPH by FID	All	NDPs: 0 Tests: 1				X
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 1		X		
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 1		X		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 1			X	
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 3	X	X		X
	Cadmium	NDPs: 0 Tests: 3	X	X		X
	Chromium	NDPs: 0 Tests: 3	X	X		X
	Copper	NDPs: 0 Tests: 3	X	X		X
	Lead	NDPs: 0 Tests: 3	X	X		X
	Mercury	NDPs: 0 Tests: 3	X	X		X
	Nickel	NDPs: 0 Tests: 3	X	X		X
	Selenium	NDPs: 0 Tests: 3	X	X		X
	Zinc	NDPs: 0 Tests: 3	X	X		X
PAH by GCMS	All	NDPs: 0 Tests: 3	X	X		X

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

SOLID

Results Legend

X **Test**

N **No Determination Possible**

			Lab Sample No(s)	5095627	5095630	5095632
			Customer Sample Reference	WS3	WS4	WS4
			AGS Reference	ES4	ES2	ES3
			Depth (m)	3.00 - 3.25	0.75 - 1.00	2.00 - 2.25
			Container	250g Amber Jar (AL	250g Amber Jar (AL	60g VOC (ALE215)	250g Amber Jar (AL
Sample description	All	NDPs: 0 Tests: 3		X	X		X
TPH CWG GC (S)	All	NDPs: 0 Tests: 1			X		

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Sample Descriptions

Grain Sizes

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

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
5095627	WS3	3.00 - 3.25	Light Brown	Clay	<0.063 mm	N/A	N/A
5095630	WS4	0.75 - 1.00	Dark Brown	Silty Clay	0.1 - 2 mm	Stones	N/A
5095632	WS4	2.00 - 2.25	Light Brown	Clay	<0.063 mm	N/A	N/A

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

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

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

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample R	WS3	WS4	WS4			
			Depth (m)	3.00 - 3.25	0.75 - 1.00	2.00 - 2.25			
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid			
			Date Sampled	26/01/2012	26/01/2012	26/01/2012			
			Date Received	28/01/2012	28/01/2012	28/01/2012			
			SDG Ref	120131-28	120131-28	120131-28			
			Lab Sample No.(s)	5095627	5095630	5095632			
			AGS Reference	ES4	ES2	ES3			
EPH Surrogate % recovery**	%	TM061			85 M				
EPH Range >C10 - C40	<35 mg/kg	TM061			93.2 M				
Arsenic	<0.6 mg/kg	TM181	11.6 M	13 M	14.2 M				
Cadmium	<0.02 mg/kg	TM181	0.504 M	0.565 M	0.547 M				
Chromium	<0.9 mg/kg	TM181	56.7 M	21.4 M	50.9 M				
Copper	<1.4 mg/kg	TM181	21.4 M	92.5 M	22.9 M				
Lead	<0.7 mg/kg	TM181	15.8 M	172 M	27.9 M				
Mercury	<0.14 mg/kg	TM181	<0.14	0.28	<0.14				
Nickel	<0.2 mg/kg	TM181	41 M	18.7 M	41.3 M				
Selenium	<1 mg/kg	TM181	1.07 #	<1 #	<1 #				
Zinc	<1.9 mg/kg	TM181	76 M	272 M	80.1 M				
Boron, water soluble	<1 mg/kg	TM222	2.1 M	<1 M	1.14 M				

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

PAH by GCMS

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample R	WS3	WS4	WS4			
			Depth (m)	3.00 - 3.25	0.75 - 1.00	2.00 - 2.25			
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid			
			Date Sampled	26/01/2012	26/01/2012	26/01/2012			
			Date Received	28/01/2012	28/01/2012	28/01/2012			
			SDG Ref	120131-28	120131-28	120131-28			
			Lab Sample No.(s)	5095627	5095630	5095632			
			AGS Reference	ES4	ES2	ES3			
Naphthalene-d8 % recovery**	%	TM218		98.7	98.1	102			
Acenaphthene-d10 % recovery**	%	TM218		98.6	98.8	103			
Phenanthrene-d10 % recovery**	%	TM218		99	99.4	99.7			
Chrysene-d12 % recovery**	%	TM218		100	104	102			
Perylene-d12 % recovery**	%	TM218		99.7	102	99.3			
Naphthalene	<9 µg/kg	TM218		<9 M	174 M	20.1 M			
Acenaphthylene	<12 µg/kg	TM218		<12 M	519 M	25 M			
Acenaphthene	<8 µg/kg	TM218		<8 M	96.3 M	<8 M			
Fluorene	<10 µg/kg	TM218		<10 M	142 M	<10 M			
Phenanthrene	<15 µg/kg	TM218		<15 M	2610 M	46.1 M			
Anthracene	<16 µg/kg	TM218		<16 M	944 M	22.4 M			
Fluoranthene	<17 µg/kg	TM218		<17 M	5790 M	80.8 M			
Pyrene	<15 µg/kg	TM218		<15 M	4870 M	76.6 M			
Benz(a)anthracene	<14 µg/kg	TM218		<14 M	3210 M	77.1 M			
Chrysene	<10 µg/kg	TM218		<10 M	2740 M	53.9 M			
Benzo(b)fluoranthene	<15 µg/kg	TM218		<15 M	4730 M	94.9 M			
Benzo(k)fluoranthene	<14 µg/kg	TM218		<14 M	1580 M	45.7 M			
Benzo(a)pyrene	<15 µg/kg	TM218		<15 M	3420 M	65.3 M			
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		<18 M	2180 M	52.6 M			
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<23 M	628 M	<23 M			
Benzo(g,h,i)perylene	<24 µg/kg	TM218		<24 M	2480 M	55.9 M			
PAH, Total Detected USEPA 16	<118 µg/kg	TM218		<118	36100	716			

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

TPH CWG (S)

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample R	WS4
			Depth (m)	0.75 - 1.00
			Sample Type	Soil/Solid
			Date Sampled	26/01/2012
			Date Received	28/01/2012
			SDG Ref	120131-28
			Lab Sample No.(s)	5095630
			AGS Reference	ES2
GRO Surrogate % recovery**	%	TM089		151
GRO >C5-C12	<44 µg/kg	TM089		<44
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		<5 #
Benzene	<10 µg/kg	TM089		<10 M
Toluene	<2 µg/kg	TM089		<2 M
Ethylbenzene	<3 µg/kg	TM089		<3 M
m,p-Xylene	<6 µg/kg	TM089		<6 M
o-Xylene	<3 µg/kg	TM089		<3 M
sum of detected mpo xylene by GC	<9 µg/kg	TM089		<9
sum of detected BTEX by GC	<24 µg/kg	TM089		<24
Aliphatics >C5-C6	<10 µg/kg	TM089		<10
Aliphatics >C6-C8	<10 µg/kg	TM089		<10
Aliphatics >C8-C10	<10 µg/kg	TM089		<10
Aliphatics >C10-C12	<10 µg/kg	TM089		<10
Aliphatics >C12-C16	<100 µg/kg	TM173		10500
Aliphatics >C16-C21	<100 µg/kg	TM173		7010
Aliphatics >C21-C35	<100 µg/kg	TM173		30200
Aliphatics >C35-C44	<100 µg/kg	TM173		5680
Total Aliphatics >C12-C44	<100 µg/kg	TM173		53300
Aromatics >EC5-EC7	<10 µg/kg	TM089		<10
Aromatics >EC7-EC8	<10 µg/kg	TM089		<10
Aromatics >EC8-EC10	<10 µg/kg	TM089		<10
Aromatics >EC10-EC12	<10 µg/kg	TM089		<10
Aromatics >EC12-EC16	<100 µg/kg	TM173		2970
Aromatics >EC16-EC21	<100 µg/kg	TM173		11700
Aromatics >EC21-EC35	<100 µg/kg	TM173		44000
Aromatics >EC35-EC44	<100 µg/kg	TM173		12900
Aromatics >EC40-EC44	<100 µg/kg	TM173		3540
Total Aromatics >EC12-EC44	<100 µg/kg	TM173		71500
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173		125000
Total Aliphatics >C5-35	<100 µg/kg	TM173		47600
Total Aromatics >C5-35	<100 µg/kg	TM173		58700
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173		106000

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Extractable Petroleum Hydrocarbons (EPH) By GC-FID

EPH (DRO) (C10-C40)

Sample No	Customer Sample Ref.	Depth	Matrix (mg/kg)	EPH	Interpretation
5107217	WS4	2.00 - 2.25	SOLID	93.2	No Identification Possible

Extractable Petroleum Hydrocarbons (formally Diesel Range Organics) :- Any compound extractable in n-hexane within the carbon range C10-C40, includes Aliphatic (Min Oil), Aromatic (PAHs) and naturally occurring compounds.

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10-7

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	5095627	5095630	5095632
Customer Sample Ref.	WS3	WS4	WS4
AGS Ref.	ES4	ES2	ES3
Depth	3.00 - 3.25	0.75 - 1.00	2.00 - 2.25
Type	SOLID	SOLID	SOLID
Boron Water Soluble	02-Feb-2012	02-Feb-2012	02-Feb-2012
EPH by FID			03-Feb-2012
EPH CWG (Aliphatic) GC (S)		03-Feb-2012	
EPH CWG (Aromatic) GC (S)		03-Feb-2012	
GRO by GC-FID (S)		02-Feb-2012	
Metals by iCap-OES (Soil)	03-Feb-2012	03-Feb-2012	03-Feb-2012
PAH by GCMS	02-Feb-2012	02-Feb-2012	02-Feb-2012
Sample description	01-Feb-2012	01-Feb-2012	01-Feb-2012
TPH CWG GC (S)		03-Feb-2012	

CERTIFICATE OF ANALYSIS

SDG:	120131-28	**Location:**	Midland Cresent	**Order Number:**	
Job:	H_HARRIS_LON-58	**Customer:**	Harrison Group Ltd	**Report Number:**	169621
Client Reference:	GL16386	**Attention:**	G I	**Superseded Report:**	

Appendix

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

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

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

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

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

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

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

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

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

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

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

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

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

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

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

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

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

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

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

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

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

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D&C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DCM	SOXTHERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
ELEMENTAL SULPHUR	D&C	DCM	SOXTHERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOXTHERM	GC-MS
HERBICIDES	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
PESTICIDES	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH CWG BY GC	D&C	HEXANE:ACETONE	END OVER END	GC-FID
PCB AROCLOR 1254 / PCB CON	D&C	HEXANE:ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE:ACETONE	MICROWAVE TM218.	GC-MS
>C6-C40	WET	HEXANE:ACETONE	SHAKER	GC-FID
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE:ACETONE	SHAKER	GC-FID
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DCM:ACETONE	SONICATE	GC-MS

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
PCB AROCLOR 1254	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
SVOC	DCM	LIQUID/LIQUID SHAKE	GC MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PESTOCP/OPP	DCM	LIQUID/LIQUID SHAKE	GC MS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GC MS
PHENOLS MS	ACETONE	SOLID PHASE EXTRACTION	GC MS
TPH by INFRARED (IR)	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
MINERAL OIL by IR	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
GLYCOLS	NONE	DIRECT INJECTION	GC FID

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

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

Visual Estimation Of Fibre Content

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

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

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

Appendix C Soil Gas Monitoring Results

Midland Crescent - Round 1
Gas Monitoring Sheet

Location I.D	Date	Time	Temp	Atmospheric Pressure	Relative Pressure	PID (peak)	PID (stabilised)	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	Flow Rate (l/hr)
WS01	26/01/2012	11.00		995	-0.3			0.7	23.3	0.5	0	0	0.01
WS02	26/01/2010	11.30		995	-0.165			0.7	23.5	0.1	0	0	0.01

Midland Crescent - Round 2
Gas Monitoring Sheet

Location I.D	Date	Time	Temp	Atmospheric Pressure	Relative Pressure	PID (peak)	PID (stabilised)	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	Flow Rate (l/hr)	Water Level
WS01	01/02/2012	15.00		1021	-0.01			0.6	23.8	0.3	0	0	-0.7	0
WS02	01/02/2010	15.30		1020	-0.01			0.6	24.1	0.1	0	0	0.1	0
WS03	01/02/2008	15.50		1019	-0.35			0.6	23.4	0.8	0	0	0.1	2.6
WS04	01/02/2006	16.15		1019	-0.3			0.6	23.3	1	0	0	0.01	2.8

Midland Crescent - Round 3
Gas Monitoring Sheet

Location I.D	Date	Time	Temp	Atmospheric Pressure	Relative Pressure	PID (peak)	PID (stabilised)	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	Flow Rate (l/hr)	Water Level
WS01	03/02/2012	15.00		1026	-0.13			0.6	23.8	0.1	0	0	0.01	0
WS02	03/02/2010	15.30		1026	-0.03			0.6	23.8	0.6	0	0	0.01	0
WS03	03/02/2008	15.50		1026	-0.03			0.6	24.1	0.7	0	0	0.1	1.6
WS04	03/02/2006	16.15		1026	-0.03			0.6	24.1	0.6	0	0	0.1	2.7

Midland Crescent - Round 4
Gas Monitoring Sheet

Location I.D	Date	Time	Temp	Atmospheric Pressure	Relative Pressure	PID (peak)	PID (stabilised)	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	Flow Rate (l/hr)	Water Level
WS01	08/02/2012	15.00		1027	-0.08			0.4	23.3	0.1	0	0	0.1	0
WS02	08/02/2010	15.30		1027	-0.06			0.4	23.1	0.6	0	0	0.1	0
WS03	08/02/2008	15.50		1027	-0.27			0.3	23.9	1.3	0	0	0.1	1.7
WS04	08/02/2006	16.15		1027	-0.06			0.3	22.9	0.1	0	0	0.1	1.9

Appendix D Generic Assessment Criteria and Assessment Methodology

A.1 GENERIC ASSESSMENT CRITERIA

The GACs for the identified contaminants of concern are provided in Table A.7 and Table A.8 for 0.0-1.0m bgl and >1.0 m bgl, respectively. The CLEA output spreadsheets for the GACs are available on request.

Table A.7 GACS for Human Health 0.0-1.0 m bgl

Contaminant of Concern	Commercial
Arsenic	6.35E+02
Boron	1.92E+05
Cadmium	2.30E+02
Chromium (VI)	3.42E+01
Copper	7.17E+04
Lead^	4.88E+03
Mercury (Inorganic)	3.64E+03
Nickel	1.79E+03
Selenium	1.30E+04
Vanadium	3.16E+03
Zinc	6.65E+05
Inorganic Cyanide	4.45E+02
TPH – Ali 5-6	2.56E+03 (3.68E+02)
TPH – Ali 6-8	5.61E+03 (1.57E+02)
TPH – Ali 8-10	1.36E+03 (7.92E+01)
TPH – Ali 10-12	6.50E+03 (4.77E+01)
TPH – Ali 12-16	4.47E+04 (2.37E+01)
TPH – Ali 16-35	1.45E+06
TPH – Aro 5-7	1.57E+04 (1.11E+03)
TPH – Aro 7-8	3.50E+04 (8.5E+02)
TPH – Aro 8-10	2.30E+03 (6.10E+02)
TPH – Aro 10-12	1.14E+04 (3.62E+02)
TPH – Aro 12-16	3.51E+04 (1.68E+02)
TPH – Aro 16-21	2.81E+04
TPH – Aro 21-35	2.84E+04
Benzene	1.58E+01
Chloroethene	4.03E-02
1,2-dichloroethane (1,2-DCA)	3.56E-01
Ethylbenzene	9.63E+03 (5.08E+02)
Tetrachloroethane, 1,1,2,2	1.56E+02
Tetrachloroethane, 1,1,1,2	6.27E+01
Tetrachloroethene (PCE)	7.22E+01
Tetrachloromethane	1.74E+00
Toluene	3.50E+04 (8.35E+02)

Contaminant of Concern	Commercial
Trichloroethane, 1,1,1	3.92E+02
Trichloroethene (TCE)	6.61E+00
Xylene*	3.46E+03 (5.64E+02)
Acenaphthene	8.49E+04 (5.67E+01)
Acenapthylene	8.43E+04 (8.55E+01)
Anthracene	5.25E+05
Benzo(a)anthracene	9.10E+01
Benzo(a)pyrene	1.43E+01
Benzo(b)fluoranthene	1.02E+02
Benzo(g,h,i)perylene	6.59E+02
Benzo(k)fluoranthene	1.43E+02
Chrysene	1.40E+02
Dibenzo(a,h)anthracene	1.29E+01
Fluoranthene	2.26E+04
Fluorene	6.35E+04 (3.08E+01)
Indeno(1,2,3-cd)pyrene	6.10E+01
Naphthalene	1.14E+02 (7.5E+01)
Phenanthrene	2.19E+04
Pyrene	5.43E+04
Phenol	3.08E+04

Notes.

^CLEA model has been used to derive an assessment criteria based on lead intake, using the withdrawn JECFA Provisional Tolerable Weekly Intake value of 25 ug/kg bw/day. In the absence of UK guidance CSL have used this as an *interim* approach, which may not be protective of risks posed to Human Health from lead in soils. The Risk Assessor using this document can consider using alternative methods (for example USEPA lead uptake models IEUBK or ALM) to assess the lead risks to Human Health from soils,.

* The lower value of m/p/o xylene derived in CLEA v1.06

NR – Not Required as contaminant or pathway not applicable

Values in bracket presents the theoretical soil saturation limit (lower of the solubility or vapour saturation limit). For GACs above the reported soil saturation value and where vapour pathway is an important contributor the CLEA Software Handbook (SC050021/SR4) states that the following should be considered:

- Free phase contamination may be present
- Exposure from the vapour pathways will be over predicted
- Where the vapour pathway dominates exposure (greater than 90 per cent) then it is unlikely that the relevant HCV will be exceeded at soil concentrations at least a factor of ten higher than the relevant HCV
- Where vapour pathways is only one of the exposure pathways considered then a manual calculation as set out in Chapter 4.12 of SC050021/SR4 could be considered

Where vapour pathway is the only exposure route then SC050021/SR4 states the following should be considered in cases where GAC is greater than the theoretical soil saturation limit:

- Exposure is unlikely to reach the relevant HCV and the risk based on the assumed conceptual model is likely to be negligible
- Vapour pathway exposure should be calculated using algorithms suitable for free phase or NAPL sources
- Screening could be considered using the lower saturation limit, which is the approach adopted by the USEPA. However, this may not be practical in many cases because of very low limits and is in any case highly conservative.

No Material containing free-phase product is permitted

The reported GACs do not represent remediation validation criteria

Appendix E Screening Tables

			Asbestos	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	MTBE	Benzene	Toluene	Ethyl Benzene	Xylenes	m/p Xylenes	o Xylene	Naphthalene	Acenaphthylene
		n		7	9	9	9	9	9	3	9	2	9	0	0	0	0	0	0	0	5	5
		No > GAC		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Max		2.1	32.7	1.51	56.7	183	1520	0.661	54.9	1.1	1480	0	0	0.00272	0	0	0	0	5.01	3.31
		Min		<1.14	<9.7	<0.345	<21.4	<17.9	<15.8	<0.28	<14	<1.07	<76	<0	<0	<0.0024	<0	<0	<0	<0	<0.0201	<0.025
		Mean		1.52	15.38	0.65	40.29	51.89	259.27	0.42	32.77	1.09	307.39	<0.005	<0.010	0.003	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.18	1.23
		GAC		192000	635	230	34	71700	4880	3460	1790	13000	665000		16	35000	9630		3460	3460	114	84300
		US95																				
		Outliers																				
		LOD																				
Location Reference	Depth	Sample Date	Unit / Lab Ref		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WS01	0.20	24/01/2012		Not Detected	<1	11.6	0.569	30.9	24.7	83.6	<0.14	24.4	<1	113									
WS01	0.60	24/01/2012		Not Detected	1.24	9.7	0.345	21.9	18.1	91.6	<0.14	15.8	<1	274	<0.005	<0.010	<0.002	<0.003		<0.006	<0.003	5.01	3.31
WS02	0.8	24/01/2012		Not Detected	1.32	16.1	0.809	24.7	32	286	0.316	14	<1	212	<0.005	<0.010	0.0024	<0.003		<0.006	<0.003	0.612	2.18
WS02	1.8-2.00	24/01/2012			1.83	12.5	0.47	53.3	17.9	23.5	<0.14	54.9	<1	81.4									
WS03	0.2	24/01/2012			1.33	32.7	1.51	48.2	183	1520	0.661	43.9	1.1	1480									
WS03	0.8-1.00	24/01/2012			1.67	17	0.521	54.6	54.5	113	<0.14	40.9	<1	178	<0.005	<0.010	0.00272	<0.003		<0.006	<0.003	0.0634	0.0919
WS03	3.0-3.25	26/01/2012			2.1	11.6	0.504	56.7	21.4	15.8	<0.14	41	1.07	76								<0.009	<12
WS04	0.75-1.00	26/01/2012			<1	13	0.565	21.4	92.5	172	0.28	18.7	<1	272	<0.005	<0.010	<0.002	<0.003		<0.006	<0.003	0.174	0.519
WS04	2.00-2.25	26/01/2012			1.14	14.2	0.547	50.9	22.9	27.9	<0.14	41.3	<1	80.1								0.0201	0.025

			Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo[a]anthra	Chrysene	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Benzo[a]pyrene	Indeno[1,2,3-cd]pyrene	Dibenzo[a,h]anthracene	Benzo[g,h,i]perylene	Total (USEPA16) PAHs	Aliphatics >C5-C6
			4	4	5	5	5	5	5	5	5	5	5	5	4	5	5	0
			0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
			0.994	3.48	23.3	5.33	37.2	32.9	21.1	16.8	23.3	10.5	20.7	11	3.42	12.2	207	0
			<0.0255	<0.0596	<0.0461	<0.0224	<0.0808	<0.0766	<0.0771	<0.0539	<0.0653	<0.0457	<0.0653	<0.0526	<0.108	<0.0559	<0.716	<0
			0.33	1.05	7.50	2.20	12.95	10.98	6.67	5.42	6.98	3.16	6.35	3.34	1.28	3.71	74.02	#DIV/0!
			84900	63500	21900	525000	22600	54300	91	140	102	143	14	61	13	659		2560
Location Reference	**Depth**	**Sample Date**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
WS01	**0.20**	24/01/2012																
WS01	**0.60**	24/01/2012	0.994	3.48	23.3	5.33	19.3	15.1	8.05	6.57	7.09	3.29	6.79	3.09	0.953	3.32	115	<0.010
WS02	**0.8**	24/01/2012	0.223	0.515	10.1	4.46	37.2	32.9	21.1	16.8	23.3	10.5	20.7	11	3.42	12.2	207	<0.010
WS02	**1.8-2.00**	24/01/2012																
WS03	**0.2**	24/01/2012																
WS03	**0.8-1.00**	24/01/2012	0.0255	0.0596	1.46	0.264	2.39	1.93	0.896	0.939	1.03	0.39	0.761	0.397	0.108	0.488	11.3	<0.010
WS03	**3.0-3.25**	26/01/2012	<.008	<0.010	<0.015	<0.016	<0.017	<0.015	<0.014	<0.010	<0.015	<0.014	<0.015	<0.018	<0.023	<0.024	<0.118	
WS04	**0.75-1.00**	26/01/2012	0.0963	0.142	2.61	0.944	5.79	4.87	3.21	2.74	3.42	1.58	3.42	2.18	0.628	2.48	36.1	<0.010
WS04	**2.00-2.25**	26/01/2012	<0.008	<0.010	0.0461	0.0224	0.0808	0.0766	0.0771	0.0539	0.0653	0.0457	0.0653	0.0526	<0.023	0.0559	0.716	

			Aliphatics >C6-C8	Aliphatics >C8 - C10	Aliphatics >C10 - C12	Aliphatics >C12 - C16	Aliphatics >C16 - C21	Aliphatics >C21 - C35	Aliphatics > C35-C44	Toal Aliphatics >C12-C44	Aromatics >C5-C7	Aromatics > C7-C8	Aromatics > C8-C10	Aromatics > C10-C12	Aromatics > C12-C16
			0	2	1	4	4	4	4	4	0	0	2	1	4
			0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0.0299	0.0163	10.5	20.7	47.8	*15.3*	*74.3*	0	0	0.0218	0.0109	81.5
			<0	<0.0108	<0.0163	<2.76	<3.66	<11.8	<0.935	<30.5	<0	<0	<0.0108	<0.0109	<2.97
			#DIV/0!	0.02	0.02	5.41	9.55	27.55	6.39	57.85	#DIV/0!	#DIV/0!	0.02	0.01	25.62
			5610	1360	6500	44700	1.45+06	1.45+06			15700	35000	2300	11400	35100
Location Reference	**Depth**	**Sample Date**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
WS01	**0.20**	24/01/2012													
WS01	**0.60**	24/01/2012	<0.010	<0.010	<0.010	2.76	3.66	20.4	3.65	30.5	<0.010	<0.010	<0.010	<0.010	3.69
WS02	**0.8**	24/01/2012	<0.010	0.0108	<0.010	4.41	6.83	47.8	15.3	74.3	<0.010	<0.010	0.0108	<0.010	14.3
WS02	**1.8-2.00**	24/01/2012													
WS03	**0.2**	24/01/2012													
WS03	**0.8-1.00**	24/01/2012	<0.010	0.0299	0.0163	3.98	20.7	11.8	0.935	73.3	<0.010	<0.010	0.0218	0.0109	81.5
WS03	**3.0-3.25**	26/01/2012													
WS04	**0.75-1.00**	26/01/2012	<0.010	<0.010	<0.010	10.5	7.01	30.2	5.68	53.3	<0.010	<0.010	<0.010	<0.010	2.97
WS04	**2.00-2.25**	26/01/2012													

			Aromatics > C16-C21	Aromatics < C21-C35	Aromatics <C35-C44	Aromatics > C40-C44	Total Aromatics > C12-C44	Toal Aliphatics & Aromatics > C5-C44	Toal Aliphatics >C5-C35	Toal Aromatics > C5-C35	Toal Aliphatics & Aromatics >C5-C35	Total PCB
			4	4	4	4	4	4	4	4	4	
			0	0	0	0	0	0	0	0	0	
			171	540	*149*	*49.2*	*938*	*1010*	*72.4*	*916*	*989*	
			<11.7	<44	<12.9	<3.54	<71.5	<125	<26.9	<58.7	<106	
			63.98	175.45	50.15	16.48	498.63	556.25	51.48	448.18	499.75	
			28100	28400								
Location Reference	**Depth**	**Sample Date**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	
WS01	**0.20**	24/01/2012										
WS01	**0.60**	24/01/2012	23.6	65.7	17.3	5.11	110	141	26.9	93	120	
WS02	**0.8**	24/01/2012	171	540	149	49.2	875	949	59	725	784	
WS02	**1.8-2.00**	24/01/2012										
WS03	**0.2**	24/01/2012										
WS03	**0.8-1.00**	24/01/2012	49.6	52.1	21.4	8.08	938	1010	72.4	916	989	**<3**
WS03	**3.0-3.25**	26/01/2012										
WS04	**0.75-1.00**	26/01/2012	11.7	44	12.9	3.54	71.5	125	47.6	58.7	106	
WS04	**2.00-2.25**	26/01/2012										

Capita Symonds Ltd
Level Seven
52 Grosvenor Gardens
Belgravia
London SW1W 0AU

Tel +44 (0)20 7901 9911
Fax +44 (0)20 7901 9901

www.capitasymonds.com