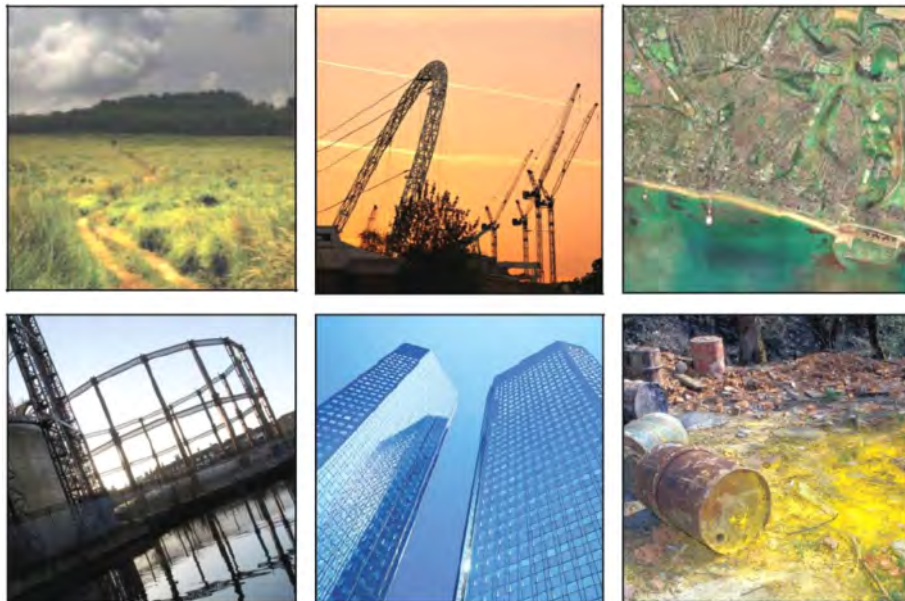




London Gate
Blyth Road, Hayes

Phase 2 – Environmental Site Investigation
For
J E R Partners

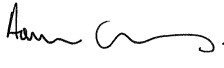
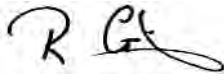


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Final Version
HLEL13784/001R

This report has been prepared within the RPS Group Quality Management System to British Standard EN ISO 9001 : 2000.			
Report Type:		Phase 2 Environmental Site Investigation	
Report Status:		FINAL	
Project Reference:		HLEI13784	
	Consultant	Signature	Date
Report Author:	Aaron Cousins Senior Consultant		23rd September 2010
Technical Review:	Rob Glavin Technical Director		23rd September 2010

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1.0 EXECUTIVE SUMMARY

J E R Partners commissioned RPS Health, Safety & Environment to undertake an intrusive Phase II Environmental Site Investigation of London Gate, Blyth Road, Hayes prior to the proposed transaction.

A Master Plan for the Site has been provided and it is likely that any future development would follow this development format. The development proposed under the Master Plan comprises the refurbishment of existing commercial/industrial buildings (No. 1 London Gate and part of No. 2 London Gate were previously refurbished) and the construction of new commercial buildings. The eastern extent of the site is to be redeveloped to residential properties with small private garden areas.

The site is situated to the west of Hayes in an area dominated by mixed commercial/industrial and residential land uses. The site is partly underlain by a narrow band of clay (Brickearth) which is directly underlain by the Taplow Gravel Formation. The Taplow Gravel Formation was identified at a depth of approximately two metres below ground level and is classified as a Principal Aquifer.

The Taplow Gravel Formation is underlain by the London Clay Formation to a considerable depth (the base was proven during the site investigation). The London Clay is will provide significant protection to the underlying strata and associated groundwater due to its low permeability. The key surface water courses identified in the vicinity of the site are the Grand Union Canal (200 m north) and the River Crane 900m southeast.

A historical map review identified that the site and the surrounding area have a long industrial history. Historical landuses known to have operated on site include the manufacture of gramophones and vinyl records, x-ray scanners and microwaves. It is understood that part of the site may have been used for the manufacture of munitions during World War II.

The site investigation comprised the advancement of twenty boreholes to a maximum depth of six metres below ground level. Prior to the recent site investigation the site has been subjected to extensive soil and groundwater investigation. Previous site investigations have comprised the excavation of thirty three trial pits and approximately forty boreholes. Soils collected during previous site investigations were analysed for a broad range of potential contaminants include volatile organic compounds and semi-volatile organic compounds. The results of these investigations

have been incorporated into this assessment. In 1999 RPS undertook a radiological assessment; this confirms that the risk from potential radiological hazards is low.

A total of six boreholes were installed as groundwater monitoring wells. Groundwater and ground gas monitoring were undertaken following completion of the site investigation.

A total of twenty five soil samples were analysed for a broad range of potential contaminants associated with the historic uses of the site. The analytical data from this and previous site investigations was compared to site specific assessment criteria derived using CLEA Ver 1.06 based on the proposed land use as set out in the Master Plan. None of the samples collected from the proposed residential zone of the site were found to contain contaminant concentrations exceeding the relevant assessment criteria. Slight and sporadic contamination by polycyclic aromatic hydrocarbons was encountered across the remainder of the site, found in association with made ground containing fragments of ash.

Due to both the current and proposed site lay-out, with extensive hardstanding and only limited soft landscaping the potential for site users to be exposed to contaminated soil is limited. Furthermore, no significantly volatile contaminants have been identified. As a result, the potential risk to human health is considered to be low. A previous trial pitting exercise, undertaken by RPS in 2002, indicated the presence of phytotoxic metals at concentrations that may inhibit plant growth. As a result, clean growing media was recommended in any areas of soft landscaping.

Four groundwater samples were analysed for a broad range of potential contaminants; no contaminants were found to exceed adopted screening criteria. This suggests that soil contamination present on site is not significantly mobile and is not having a discernible impact on the overall quality of groundwater.

Ground gas monitoring was undertaken on two occasions. A risk assessment was undertaken in accordance with CIRA C665 for both the commercial and residential zones of the site. Based on the available data, the risk assessment identified a potential risk in the residential zone of the site.

2.0 INTRODUCTION

2.1 Preamble

J E R Partners commissioned RPS Health, Safety & Environment to undertake an intrusive Phase II Environmental Site Investigation of London Gate, Blyth Road, Hayes prior to the proposed property transaction. This report also includes an environmental risk assessment to determine the likely redevelopment constraints, risk of future liability, the potential risk to current and future users and the wider environment.

A Master Plan has been produced for the site; it is likely that any future redevelopment will follow the basic principal of this Master Plan. A copy of the Master Plan is enclosed as Figure 3.. The proposed development primarily comprises the refurbishment of existing commercial/industrial buildings (No. 1 London Gate and part of No. 2 London Gate were previously refurbished). The eastern extent of the site is to be redeveloped to residential properties with small private garden areas.

The information contained within this report is based upon the available information at the time of reporting.

2.2 Site Location and Description

The site is situated to the west of Hayes in Middlesex at National Grid Reference TQ 0925 7955. The site is approximately triangular in shape and is occupies an area of approximately 6.6 hectares.

The area surrounding the site is dominated by mixed commercial/industrial and residential land uses. Residential properties are situated beyond the eastern portion of the site, beyond Blyth Road. Immediately to the south of the site is a mainline railway and the west of the site are residential properties and small units occupied by mixed commercial uses.

The site currently comprises six individual buildings with associated service yards and car parking. No. 1 London Gate and part of No. 2 London Gate (formerly referred to as Mercury and Vulcan) were previously refurbished, along with the car park which dominates the western extent of the site. The remaining four buildings (refereed to as Phoenix, Neptune, Jubilee and Apollo) are currently derelict and awaiting demolition/refurbishment. The eastern extent of the site (Apollo) is occupied by a small factory which presses vinyl records. Under the Master Plan, this area of the site

would be demolished and redeveloped as residential properties with small private gardens and associated car parking and soft landscaping.

2.3 Site History

The earliest historical map, dated 1868, shows the site to be mostly undeveloped, although the Great Western Railway existed to the south and some small buildings were located adjacent to Dawley Road.

Historical maps indicate that the Gramophone and Typewriter Company was first established on site *circa* 1907. In later years the company was renamed His Masters Voice, Electronic and Music Industries (EMI) and finally Thorn EMI.

Blyth Road was constructed along the northern perimeter of the site *circa* 1914. By this time a number of industrial buildings had been constructed on the site, including buildings associated with the gramophone factory and a printing works. Many other unlabelled structures and tanks had also been constructed on site. Railway sidings appeared to serve the site at this time.

The western area of the site appears to have remained vacant until the 1930's when a number of buildings and two large tanks were constructed. The Goss Works had been demolished and replaced with a large unlabelled building.

During the 1970's, four circular tanks were constructed close to the eastern boundary of the site; one of these tanks remains. By 1997 the site was occupied by Thomson-Thorn Missile Electronics, Pilkington Thorn Optronics, Thorn Microwave Devices and EMI Music. These companies specialised in defence electronics, optronics, microwave technology and music production respectively. During the late 1990's a number of the original buildings had been demolished, including the large building at the western end of the site and the original gramophone factory.

2.4 Published Geology

Based on British Geological Survey (BGS) 1:50,000 scale survey sheet No 269 and BGS logs for the area the stratigraphic sequence in the vicinity of the site is as follows:

- Made Ground (Quaternary)
- Brickearth (Quaternary)
- Taplow Gravel (Quaternary)

- London Clay (Tertiary)
- Lambeth Group (Tertiary)
- Chalk (Cretaceous)

The previous site investigation (dated July 1999) confirmed the shallow geology geological sequence (to the London Clay), and provided detail on stratum as listed below.

Made Ground

Made Ground is present across the site as a result of past construction and demolition activities. This Made Ground has been shown to comprise a tarmac or reinforced concrete surface layer overlying Made Ground with varying proportions of brick, concrete, sand, ash, clinker and flint gravel. The maximum thickness of Made Ground identified on site was 2.1 m.

Brickearth

Brickearth, comprising up to 1.4m thickness of orangey sandy clay, sand with some flint gravel was encountered beneath the Made Ground.

Taplow Gravel (a unit of the River Terrace Gravels)

The Taplow Gravel Formation was found beneath the Brickearth across the site. This deposit was described as dense sandy gravels in a variably silty and clayey matrix, shown to range between 1.5m and 6.9m in thickness at the site.

London Clay Formation

The London Clay comprises a low permeability, firm to stiff, brown and blue/grey clay with variable silty and sandy parts. The previous site investigation identified orange and brown clay at the top of this stratum, indicating a degree of weathering to have occurred. The London Clay is likely to be approximately 90m in thickness beneath the site although the thickness was not proved by the previous investigations.

Lambeth Group (previously known as Woolwich and Reading Beds)

The Lambeth Group is known to comprise generally mottled, slightly-sandy clay with occasional silt and pebble lenses, although not encountered by previous investigations. BGS data indicates it is likely to be between 15m and 30m in thickness beneath the site.

Upper Chalk Group

Highly fissured, fine grained, micritic, pure limestone with occasional flint nodules. Interbedded marls and calcareous mudstones exist in lower parts. The total thickness of this unit is likely to be around 100m.

2.5 Hydrogeology and Hydrology

The Taplow Gravel beneath the site is classified by the Environment Agency as a Principal Aquifer. However, no active groundwater abstractions have been identified within the vicinity of the site.

The low permeability London Clay (Non Aquifer) and clay fractions of the Lambeth group (Minor Aquifer) are likely to impede vertical groundwater migration thus offering a degree of protection to the deep Chalk aquifer from any shallow contamination.

Data from the previous site investigations indicate that the dominant groundwater flow direction is likely to be to the southeast. There have been up to six abstraction wells on the site historically although most of these are now thought to have been decommissioned.

Environment Agency data indicates that there are two watercourses within 1km of the site, which are classified under the General Quality Assessment (GQA) scheme. These are the Grand Union Canal which lies approximately 200m northeast and The River Crane approximately 900m southeast. These watercourses are classified as a Grade B (Good) and Grade C (Fair) quality respectively. Other unclassified surface water bodies include various lakes and reservoirs in the surrounding area within historic gravel extraction pits. The closest of these is located at in particular at Stockley Park.

2.6 Previous Site Investigations

RPS has been provided with the following reports/data which relate to previous site investigations. These reports are summarised in detail within the RPS Phase I Environmental Review (HLL1013/009R August 2006). Key points relating directly to soil and groundwater contamination are summarised below.

- Geo-Environmental Assessment Report, Thorn EMI Complex, Blyth Road, Oscar Faber for Hayes Resolution (Hayes) Limited & Middlesex Development Company Limited, August 1999 (Ref: PJHB/CED/CEN.FinalReport02)
- Radiological Survey of Blyth Road Site, Hayes, AEA Technology, August 1999 (REF:AEAT - 5977)
- Tree Pit and Water Feature Investigation, RPS 2002 (Ref: LC8383 - letter report)

Geo-Environmental Assessment Report of Thorn EMI Complex, Blyth Road, Oscar Faber, August 1999

This assessment was carried to investigate ground and groundwater conditions to allow a risk assessment of the site prior to purchase by Resolution (Hayes) Ltd and Middlesex Development Company.

The scope of the site investigation included:

- 16 cable percussive boreholes (8 groundwater monitoring wells);
- 19 window sample boreholes;
- Soil screening with a Geiger counter
- Analysis of soil and groundwater samples for a broad range of determinands.

A summary of the findings are listed below:

- Groundwater monitoring identified water levels between 2.85 m.bgl and 3.35 m.bgl indicating groundwater to flow to the southeast.
- Several concrete obstructions were identified at shallow depths in several boreholes.
- No visual or olfactory evidence of contamination was identified except for a moderate to strong creosote odour at WS24 (to the west of Apollo House).
- Soil analytical data was initially screened using the ICRL guidelines (which have been superseded by CLEA).
- The report identified arsenic and zinc at concentrations exceeding ICRL values in the eastern site area.
- Metals, polycyclic aromatic hydrocarbons petroleum hydrocarbons (diesel range) were identified in shallow soils in the western area of the site.

- Several volatile organic compounds were identified at detectable concentrations in soil samples (considered likely to be representative of solvents used in degreasing and extraction associated with historic manufacturing processes).
- The report did not identify groundwater contamination at concentrations exceeding the ICRL threshold levels.

The report concluded that widespread soil contamination was not identified during the site investigation. Localised hotspots were identified in shallow samples of made ground although this does not appear to have had a discernable impact on groundwater quality. The analytical data has been incorporated into this review and are discussed in greater detail in Section 4.2 of this report.

Radiological Survey of Blyth Road, Hayes by AEA Technology, August 1999

A radiological survey was carried out on behalf of RPS in 1999 in order to investigate radiological conditions on site. The survey investigated Vulcan House, Apollo House, Jubilee House, Phoenix House and also all external areas which were accessible.

The report concluded that although minor radiological contamination was identified it was generally consistent with natural background levels and did not represent a significant hazard to site personnel or future site users.

Tree Pit and Water Feature Investigation, RPS 2002

RPS Consultants collected soil samples from excavated tree pits and water pits excavated for the construction of water features during refurbishment of Mercury House and Vulcan house. Composite samples were taken from twenty-nine tree pits and four water feature pits. The investigation identified slight and sporadic soil contamination by copper and zinc within the Made Ground. The analytical data is discussed further in Section 4.2 of this report.

2.7 Potential Areas of Concern

Based upon the information presented in previous it is apparent that while soil contamination is not widespread there is the potential for localised soil contamination to be present as a result of current and historic industrial landuses.

2.8 Preliminary Conceptual Model

Using all the available information, a preliminary Conceptual Site Model (CSM) was developed prior to commencing the site investigation. This was used to identify the principal sources, pathways and receptors (i.e. potential Pollutant Linkages) on this site, and is summarised in Table 1 below:

Table 1: Preliminary Conceptual Site Model

Potential Sources	Potential Pathways	Potential Receptors	Risk Rating
Industrial Processes (historical and current) Metals, fuels & oils. Made Ground Metals, fuels, oils & ground gas.	Human Health -Dermal contact. -Inhalation of soil dust. -Ingestion of soil dust. -Inhalation ground gases.	Human Health -Current site users. -Future site users. -Construction/ maintenance personnel.	Moderate Previous site investigations identified limited contamination in the form of metals and PAHs. No VOCs or SVOCs were identified at significant concentrations.
	Controlled Waters -Leaching of mobile contaminants from made ground. -Vertical and lateral migration of mobile contaminants in permeable strata. -Migration along subsurface structures.	Controlled Waters -Principal Aquifer (associated with the Taplow Gravel)	Moderate The potential risk to the Grand Union Canal and the River Crane is considered to be low due to the considerable distance from the site.
	Infrastructure -Direct contact with contaminated soils -Migration of ground gas from made ground.	Infrastructure -Current building structures -Future building structures -Underground services.	Moderate Potential risk associated with ground gas.

The site investigation works were targeted to provide further detailed information on the potential Pollutant Linkages in this preliminary CSM.

3.0 SITE INVESTIGATION

3.1 Objectives

The objectives of the site investigation were to assess the general ground conditions and the presence of soil and groundwater contamination resulting from historical/current industrial use of the site.

3.2 Description of Works

The site investigation was carried out from Tuesday 7th September 2010 until Friday 10th September 2010 and comprised:

- The advancement of twelve boreholes to a maximum depth of 6.0 m.bgl using sonic drilling techniques;
- The advancement of eight window sampler boreholes to a maximum depth of 2.2 m.bgl.
- Installation of six groundwater monitoring wells.

Boreholes were positioned in key source areas of potential contamination as well as to provide general site coverage. Figure 2 illustrates the location of all borehole locations. Borehole logs are presented as Appendix A

The soils arising from each borehole were carefully examined for visual and olfactory evidence of contamination. Headspace testing was undertaken on site for volatile organic compounds (VOCs) using a portable Photo-Ionisation Detector (PID), which responds to a broad range of VOCs. The results are recorded on the borehole logs (in parts per million in air). As no significant readings were identified, and as no significantly elevated concentrations were identified by the previous site investigations, analysis of volatile organic compounds and semi volatile organic compounds was not considered to be warranted.

A total of 25 samples of soil were analysed for a range of the following determinands:

pH, arsenic, boron, cadmium, chromium, copper, lead, mercury, nickel, sulphide, total cyanide, , sulphate, selenium, zinc, phenols, polyaromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPHs).

Groundwater samples were collected from four of the monitoring wells following the site investigation on 14th September 2010. These samples were analysed for the same determinands as the soils. Analytical certificates for all samples are presented as Appendix B.

The installations were also monitored for concentrations of methane, carbon dioxide and oxygen, in addition to atmospheric pressure and flow rate, the results of which are presented in Appendix D.

3.3 Ground Conditions

Geology

The encountered strata are listed in Table 3 and described in the following section.

Table 3: Encountered Strata

Strata	Depth to Top of Strata (m bgl)	Thickness (m)
Made Ground	Ground level	Up to 1.9 m (BH1)
Brickearth (limited areas of site)	0.7 m.bgl (BH15)	Up to 1.1m (BH15)
Taplow Gravels	0.4 m.bgl (BH07)	Up to 4.6m (BH7)
London Clay	4.3 m.bgl (BH10)	Not proven

Made Ground generally comprising soft sandy gravelly clay with fragments of brick, concrete and clinker was encountered across the site to a maximum depth of 1.9 m.bgl.

As with previous site investigations, several boreholes were abandoned at relatively shallow depths due to concrete obstructions.

Soft to firm sandy gravelly clay with fragments of flint, interpreted as Brick Earth deposits, was identified at several locations across the site with a maximum thickness of 1.1m being identified in BH15. This strata was not encountered at all locations but was more prevalent in the western areas of the site.

Orange brown sandy fine to coarse gravel, primarily of flint, was encountered across the entirety of the site. This material, interpreted as the Taplow Gravel, was found to contain large volumes of groundwater and was identified to a maximum thickness of 4.6m (BH07). The Taplow Gravel was underlain by the low permeability London Clay.

Groundwater

Groundwater was encountered in within the Taplow Gravel Formation across the entirety of the site. Following completion of site investigation, groundwater was recorded at levels of between 3.05m.bgl and 3.32 m.bgl, groundwater levels in the Taplow Gravel were found to be fairly consistent across the site.

Field Evidence of Contamination

Other than some dark staining of the Made Ground deposits at many locations across the site, no further visual or olfactory evidence of contamination was identified. Soils were screened using a photo ionisation detector; however, no significantly elevated concentrations of volatile contaminants were identified.

4.0 ANALYTICAL RESULTS

4.1 Soil Guidelines

The analytical data has been assessed using Site Specific Assessment Criteria (AC) derived using CLEA v1.06 and the most appropriate contaminant and exposure data. The assessment has been based upon the existing Master Plan.

Residential landuse is considerably more sensitive than commercial landuse, hence it was necessary to zone the site based upon the proposed development. Site specific assessment criteria were developed for each zone based on the proposed landuse.

For both the commercial and residential zones of the site, the following exposure pathways were assumed to be potentially active:

- Dermal contact with soil and soil dust (indoor & outdoor);
- Ingestion of soil and soil dust (indoor & outdoor);
- Inhalation of soils and soil dust (indoor & outdoor); and
- Inhalation of soil vapour (indoor & outdoor).

In addition, the following exposure pathways are potentially active following completion of the residential zone:

- Soil attached to and consumption of home grown vegetables.

The key model input values for each land use are as follows:

Commercial Zone

- Landuse (generic): Commercial landuse;
- Receptor (generic): Female receptor (16-65 years of age);
- Exposure (generic): 49 years;
230 days/year;
8.3 hrs/day indoors & 0.7 hrs/day outdoors;
- Soil Type (specific) Sand;
- Soil pH (specific): 8.34 (representative of analytical data);
- Soil Organic Matter (specific): 2.19 (representative of analytical data);

Residential Zone

- Landuse (generic): Residential landuse with plant uptake;
- Receptor (generic): Female receptor (0-6 years of age);
365 days/year
23 hrs/day indoors & 1 hr/day outdoors;

- Soil pH (specific): 8.34 (representative of analytical data)
- Soil Organic Matter (specific): 2.19 (representative of analytical data)

A complete copy of the CLEA model input and output data is presented as Appendix C.

4.2 Soil Analysis

Commercial Zone

The analytical data resulting from the recent and previous site investigations have been assessed against the derived AC, as outlined in Section 4.1.

Soil Properties

Soil pH was found to range between 7.1 and 10.9 with a mean value of 8.34. Soil organic matter was found to range between 0.1 % and 13% with mean value of 2.19%.

Inorganic Contaminants

During the 2010 RPS site investigation a total of twenty two soil samples were analysed for a broad range of potential inorganic contaminants. None of the contaminants tested for were recorded at concentrations exceeding the derived AC.

The analytical data associated from 2002 RPS site investigation identified elevated concentrations of copper and zinc in comparison to Dutch Intervention Values (DIV) which are no longer considered to be relevant. The derived site specific AC are greater than the DIV. The identified contaminant concentrations are considerably less than the AC and therefore not considered likely to represent a potential risk to human health.

None of the data from the 1999 Oscar Faber exceeded the up-to-date AC for inorganic contaminants.

Organic Contaminants

During the recent site investigation a total of fifteen samples of made ground and seven samples of natural strata were analysed for the broad range of organic contaminants.

Two of the samples of made ground were found to contain concentrations of polycyclic aromatic hydrocarbons (PAHs) in exceedance of the appropriate AC. No other contaminants were identified at elevated concentrations.

Benzo(a)pyrene was identified at a maximum concentration of 43 mg/kg in the sample collected from BH02 (0.3-0.5 m.bgl) compared to the derived AC of 14.4 mg/kg. Benzo(a)pyrene and dibenz(a,h)anthracene were identified at elevated concentrations of 60 mg/kg and 14 mg/kg respectively in the samples collected from WS12 (0.2-0.6 m.bgl) compared to the AC values of 14.4 mg/kg and 13 mg/kg respectively.

None of the samples of natural strata were found to contain elevated contaminant concentrations.

The analytical data collected during the 2002 RPS trial pitting exercise was compared to the derived AC. None of the contaminant concentrations recorded exceeded the current site specific AC.

The analytical data associated with the 1999 Oscar Faber investigations was also compared to the derived AC. The only sample found to contain contaminant concentrations exceeding the AC was that collected from BH1 (0.25 m.bgl). This borehole was located towards the western extent of the commercial zone of the site which has already been subject to redevelopment. The sample was found to contain elevated concentrations of benzo(a)anthracene (134.88 mg/kg), benzo(a)pyrene (103.73 mg/kg) and dibenzo(ah)anthracene (21.54 mg/kg).

Residential Zone

The analytical data from both the recent and previous site investigations have been assessed against the derived AC, as outlined in Section 4.1.

Soil Properties

Soil pH was found to range between 7.2 and 7.8, with a mean value of 7.47. Soil organic matter content was found to range between 0.72% and 1.2% with mean value of 0.89%.

Inorganic Contaminants

During the 2010 RPS site investigation a total of three soil samples were analysed for a broad range of potential inorganic contaminants. None of the contaminants were identified at concentrations exceeding the derived AC.

The analytical data associated with the previous site investigations was also compared to the derived AC. No elevated contaminant concentrations were identified.

Organic Contaminants.

No elevated concentrations of organic contaminants were identified during the recent site investigation.

On comparison of the derived AC to the analytical data associated with the previous site investigations, no elevated contaminant concentrations were identified.

During the 1999 Oscar Faber site investigation soil samples were analysed for a wide range of volatile organic compounds including solvents. The vast majority of compounds were identified at concentrations less than the laboratory limit of detection. Trichloroethene was, however, detected in BH2 at a concentration of 0.000183 mg/kg and in BH15 at 0.000041 mg/kg. In addition, 1,2-dichloroethene was identified in WS23 at a concentration of 0.0000023 mg/kg. Although no AC exist for these contaminants the identified trace concentrations are considered to be low and are not considered likely to represent a potential risk to either human health or groundwater.

Summary of Soil Analysis

No inorganic contaminants were identified at concentrations exceeding the derived AC in any of the analytical data sets. The organic contaminants benz(a)anthracene, benzo(a)pyrene and dibenz(ah)anthracene were identified at concentrations exceeding the AC in the commercial zone of the site (to the east). The identified contamination appears to be limited to isolated locations at the western extremity of the site and in the car park to the west of Apollo House. No contamination was identified in the residential zone of the site (to the west).

4.3 Groundwater Analysis

Groundwater samples were collected from monitoring wells BH3, BH8, BH11 and BH15 following the site investigation on 14th September 2010. Groundwater level monitoring was undertaken on three occasions including the 14th September 2010.

The site is situated on a Principal Aquifer associated with the Taplow Gravels Formation, however, no potable abstractions have been identified in the vicinity. Therefore, the results of the groundwater analysis have been compared to Environmental Quality Standard (EQS) for a hardness of 100 to 150 (mg/l CaCO₃) which are protective of freshwater courses. Where such values are not available, the UK Drinking Water Standard values have been adopted. The screening levels used for the assessment of groundwater are presented in Appendix C.

Inorganic Contaminants

No inorganic contaminants were identified at concentrations exceeding the appropriate EQS values.

Organic Contaminants

Polycyclic aromatic hydrocarbons and petroleum hydrocarbons were not identified at concentrations exceeding the laboratory limit of detection which are 0.01µg/l and 10 µg/l respectively. No organic contaminants were identified at concentrations exceeding the appropriate EQS values.

Summary of Groundwater Analysis

No elevated contaminant concentrations were identified in groundwater samples.

4.4 Ground Gas Monitoring Results

Ground gas monitoring was undertaken on three occasions during September 2010. Installations were monitored for concentrations of methane, carbon dioxide and oxygen, in addition to flow rates, relative pressure and barometric pressure. A Photo-Ionisation Detector (PID) was also used to record concentrations of volatile organic compounds (VOCs). The results are presented in Appendix D.

CIRIA Report C665 '*Assessing risks posed by hazardous ground gases to buildings*' outlines indicative guideline concentrations for carbon dioxide and methane in association with gas flow rates for which gas protection measures may be required in new residential or commercial developments.

Commercial Zone

The maximum recorded concentration of methane was 2.1% v/v (BH6). Methane generally ranged between 0.0% v/v and 0.1%v/v the remaining monitoring wells. The maximum-recorded concentration of carbon dioxide was 2.3% v/v (BH9). The maximum detectable flow rate identified was 0.2 l/hr.

The risk assessment methodology is based on the Modified Wilson and Card approach that characterises the gas regime into a series of Characteristic Situations (1 to 5), with corresponding indicative gas protection measures. Using this methodology, the ground gas regime associated with the commercial zone of the site corresponds to Characteristic Situation 1, whereby no specific gas protection measures are required.

Residential Zone

The maximum recorded concentration of methane identified in the proposed residential zone of the site was 30.4% v/v (BH7). The maximum-recorded concentration of carbon dioxide was 3.1% v/v (BH7). The maximum flow rate identified in the residential zone of the site was 0.2 l/hr.

The methodology is based on the NHBC Traffic Light System that characterises and ranks the gas regime as Green, Amber 1, Amber 2 or Red, with corresponding indicative gas protection measures. Using this methodology, the ground gas regime for the residential zone of the site corresponds to Red, whereby further gas risk assessment and remedial mitigation measures would be required to be incorporated into the building design.

British Standard 8485:2007 (Code of Practice for Characterisation and Remediation from Ground Gas in Affected Developments) outlines typical gas protection measures and prescribes a point scoring system for specifying an appropriate level of gas protection. This system prescribes a target level of points to be achieved, based on the Characteristic Situation and the sensitivity of the development. Each individual level of gas protection measures (i.e. gas-proof membrane; floor slab; passive venting) is given a range of points depending on the quality / standard of the protection measure (i.e. thickness of membrane; or degree of ventilation), and points are summed for each level of protection to be incorporated into the design. This document should be consulted when outlining / designing appropriate gas protection measures.

5.0 ENVIRONMENTAL RISK ASSESSMENT

The UK approach to the management of land contamination is a risk-based approach as implemented by Part IIA of the Environmental Protection Act (1990). Part IIA identifies that harm to human health and the environment arises not solely from the presence of contaminating substances or 'sources', but from their migration along a 'pathway' to where they can impact a 'receptor'.

5.1 Qualitative Risk Assessment

Discussion of the likelihood and significance of environmental risk to potential receptors at the site and the surrounds is detailed below.

Current Site Users

Localised benz(a)anthracene, benzo(a)pyrene and dibenz(ah)anthracene contamination has been identified in shallow made ground deposits in the car park of 1 London Gate and in the car park close to Apollo House. These contaminants are commonly associated with the presence of combustion products in soil and are not significantly volatile. Potential exposure pathways associated with human health are therefore limited to dermal contact and the inhalation/ingestion of soil and soil dust.

The majority of the site, including the areas where this contamination has been identified, is covered by either building structures or hardstanding which will break the dermal contact and inhalation/ingestion pathways negating the risk to current site users.

The only areas of soft landscaping present on site are those areas within the car park of 1 London Gate and 2 London Gate, which have previously been refurbished. The primary purpose of the 2002 RPS trial pitting exercise was to investigate the risk associated with these areas of landscaping. The analytical data was reassessed as part of this report and no significant contaminant concentrations were identified.

Based on the nature of the site and current site use, the potential risk to current site users is considered to be **LOW**.

Future Site Users

Based upon the current Master Plan, the site will be dominated by commercial landuses (commercial zone). The eastern extent of the site will be developed to a residential end use and the risk assessment has been undertaken to reflect this.

Commercial Zone

Based on the current Master Plan, on completion of the commercial redevelopment the vast majority of the site will be covered by building structures or hardstanding. This will form a physical barrier between non-volatile soil contaminants and future site users.

In areas of proposed soft landscaping the potential pathways can be effectively broken by the use of a simple physical barrier. A 300mm layer of clean imported topsoil is likely to be sufficient. No elevated concentrations of volatile soil contaminants have been identified and the risk associated with the localised non-volatile contamination can easily be negated by the use of physical barriers, therefore, based on the available information, the risk to future site users in the commercial zone of the site is considered to be **LOW**.

Residential Zone

No elevated contaminant concentrations have been identified in this area of the site, therefore based on the available information, the risk to future site users in the residential zone of the site is considered to be **LOW**.

Ground workers

Ground workers involved in site maintenance activities and in redevelopment if the site may potentially be exposed to contamination in shallow soils. CLEA V1.06 cannot be used to assess the acute (short term exposure) risk that personnel in close contact with exposed soils may experience during demolition, redevelopment or site maintenance duties.

The risks can easily be controlled by the use of appropriate personnel protective equipment (disposable coveralls, gloves and particulate/vapour masks) and by adopting high levels of personal hygiene. Providing such measures are taken, based on the available information, the potential risk is considered to be **LOW**.

Groundwater

No significant groundwater contamination was identified by the recent groundwater monitoring programme and no significant potential source of groundwater contamination has been identified by the extensive site investigations.

Based on the soil and groundwater analytical data, the risk to the overall quality of groundwater is considered to be **LOW**.

Surface Water

No significant soil or groundwater contamination has been identified; therefore the potential risk to surface water is **LOW**.

Infrastructure

Based on the identified ground gas concentrations and negligible flow levels, there is the potential for ground gas to impact building structures. At present, based on the available information, the potential risk is considered to be **MODERATE**.

Hydrocarbon contaminants present in shallow soils may potentially permeate plastic (polymetric) service pipes. However, based on the identified hydrocarbon concentrations the potential risk is considered to be **LOW**.

Adjacent Properties

Based on the absence of freely mobile soil contaminants the potential risk to adjacent properties is considered to be low. During the ground gas monitoring programme elevated methane concentrations were identified. At present, based on the available information, the potential risk to adjacent properties is considered to be **MODERTE**.

Ecological Receptors

No sensitive ecological receptors have been identified in the vicinity of the site.

Relatively high concentrations of copper and zinc have been identified in shallow made ground across the site. These metals are phytotoxic and can inhibit the healthy growth of plants. RPS previously recommended the importation of clean topsoil for all areas of soft landscaping in order to break the potential human health contaminant pathways. This imported material will also provide a quality growing medium for plants thereby negating much of the risk associated with phytotoxic contaminants. Based on the available information, the potential risk to ecological receptors is considered to be **LOW**.

5.2 Conceptual Model

The potential source-pathway-receptor linkages at the subject site discussed above are summarised in the table below.

Pathway: Receptor:	Contact / ingestion of Contaminated Soils	Volatilisation (incl. inhalation of dusts / vapours) Ground Gas	Leaching of Contaminants / GW Migration
Current Site Users	Low	Low	n/a
Future Site Users	Low	Low	n/a
Ground- workers	Low	Low	n/a
Groundwater	n/a	n/a	Low
Surface Water	n/a	n/a	Low
Infrastructure	Low	Moderate	Low
Adjacent Properties	n/a	Moderate	Low
Ecological Receptors	Low	Low	Low

Key:

High	High risk
Mod-High	Moderate to high risk
Mod	Moderate risk
Low-Mod	Low to moderate risk
Low	Low risk
n/a	Not applicable

The risk assessment is based upon the available information relating to the site. Should ground conditions inconsistent with those outlined in this report be encountered RPS should be contacted to enable further assessment.

6.0 CONCLUSIONS AND RECOMMENDATIONS

J E R Partners commissioned RPS Health, Safety & Environment to undertake an intrusive Phase II Environmental Site Investigation of London Gate, Blyth Road, Hayes prior to the proposed transaction.

A Master Plan for the Site has been provided and it is likely that any future development would follow this development format. The development proposed under the Master Plan comprises the refurbishment of existing commercial/industrial buildings (No. 1 London Gate and part of No. 2 London Gate were previously refurbished) and the construction of new commercial buildings. The eastern extent of the site is to be redeveloped to residential properties with small private garden areas.

The site is situated to the west of Hayes in an area dominated by mixed commercial/industrial and residential land uses. The site is partly underlain by a narrow band of clay (Brickearth) which is directly underlain by the Taplow Gravel Formation. The Taplow Gravel Formation was identified at a depth of approximately two metres below ground level and is classified as a Principal Aquifer.

The Taplow Gravel Formation is underlain by the London Clay Formation to a considerable depth (the base was proven during the site investigation). The London Clay is will provide significant protection to the underlying strata and associated groundwater due to its low permeability. The key surface water courses identified in the vicinity of the site are the Grand Union Canal (200 m north) and the River Crane 900 m southeast.

A historical map review identified that the site and the surrounding area have a long industrial history. Historical landuses known to have operated on site include the manufacture of gramophones and vinyl records, x-ray scanners and microwaves. It is understood that part of the site may have been used for the manufacture of munitions during World War II.

The site investigation comprised the advancement of twenty boreholes to a maximum depth of six metres below ground level. Prior to the recent site investigation the site has been subjected to extensive soil and groundwater investigation. Previous site investigations have comprised the excavation of thirty three trial pits and approximately forty boreholes. Soils collected during previous site investigations were analysed for a broad range of potential contaminants include volatile organic compounds and semi-volatile organic compounds. The results of these investigations

have been incorporated into this assessment. In 1999 RPS undertook a radiological assessment; this confirms that the risk from potential radiological hazards is low.

A total of six boreholes were installed as groundwater monitoring wells. Groundwater and ground gas monitoring were undertaken following completion of the site investigation.

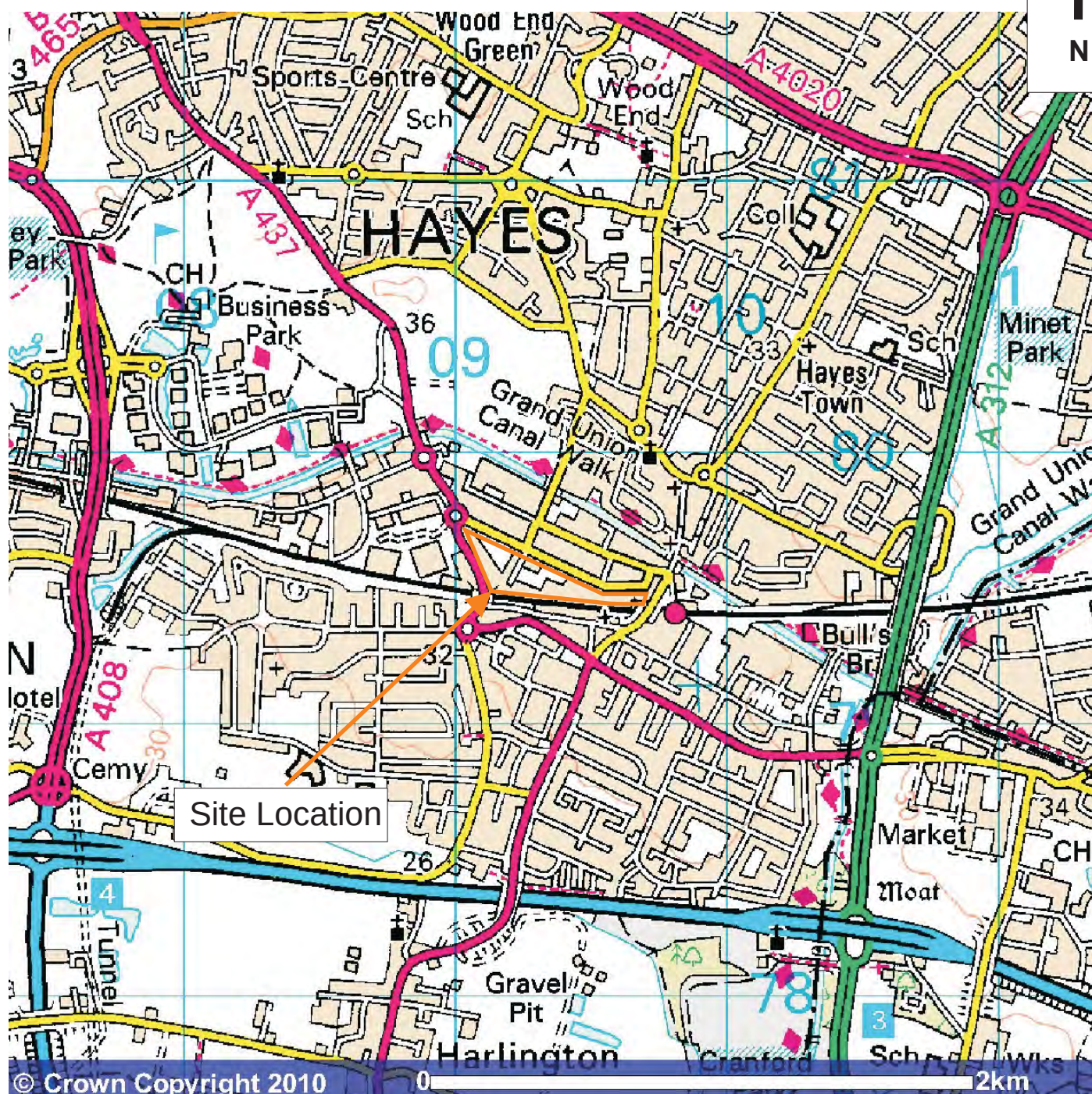
A total of twenty five soil samples were analysed for a broad range of potential contaminants associated with the historic uses of the site. The analytical data from this and previous site investigations was compared to site specific assessment criteria derived using CLEA Ver 1.06 based on the proposed land use as set out in the Master Plan. None of the samples collected from the proposed residential zone of the site were found to contain contaminant concentrations exceeding the relevant assessment criteria. Slight and sporadic contamination by polycyclic aromatic hydrocarbons was encountered across the remainder of the site, found in association with made ground containing fragments of ash.

Due to both the current and proposed site lay-out, with extensive hardstanding and only limited soft landscaping the potential for site users to be exposed to contaminated soil is limited. Furthermore, no significantly volatile contaminants have been identified. As a result, the potential risk to human health is considered to be low. A previous trial pitting exercise, undertaken by RPS in 2002, indicated the presence of phytotoxic metals at concentrations that may inhibit plant growth. As a result, clean growing media was recommended in any areas of soft landscaping.

Four groundwater samples were analysed for a broad range of potential contaminants; no contaminants were found to exceed adopted screening criteria. This suggests that soil contamination present on site is not significantly mobile and is not having a discernible impact on the overall quality of groundwater.

Ground gas monitoring was undertaken on two occasions. A risk assessment was undertaken in accordance with CIRA C665 for both the commercial and residential zones of the site. Based on the available data, the risk assessment identified a potential risk in the residential zone of the site.

FIGURES



RPS

Unit 12, Watersedge Business Park, Modwen Road, Salford Quays, M5 3EZ
T 0161 2373315 F 0161 2373315 W www.rpsgroup.com

Client: J E R Partner

Project: Blythe Road, Hayes

Title: Site Location Plan

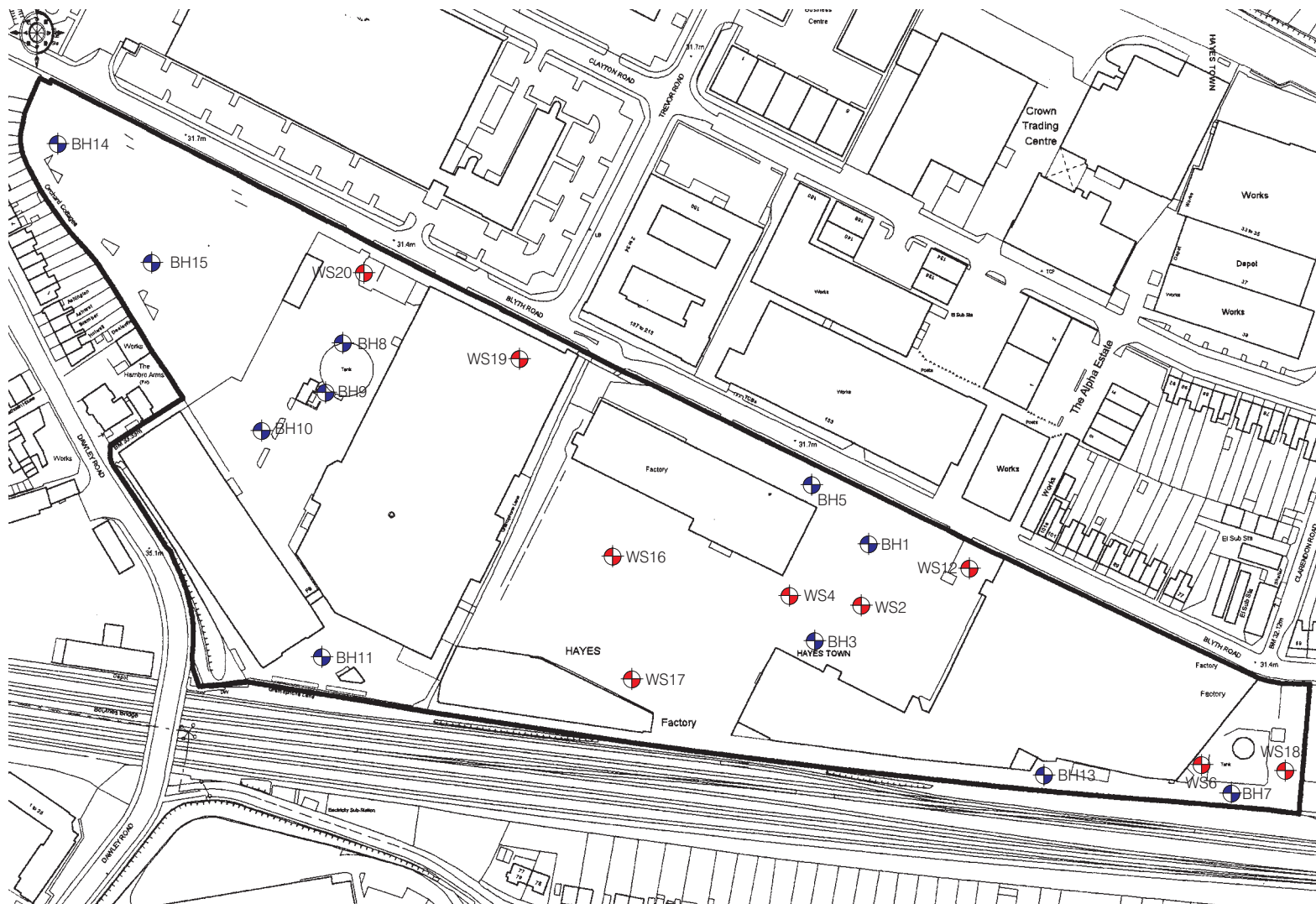
Date: Sept 10

Scale: NTS

Figure: 1

Rev: 1

Job Ref: RCEI13889



Unit 12, Watersedge Business Park, Modwen Road, Salford Quays, M5 3EZ
T 01612373315 F 0161 2373315 W www.rpsgroup.com

Client: J E R Partners

Project: Blythe Road

Title: Borehole Location Plan

Date: Sept 2010

Scale: NTS

Drawn: JR

Checked: AC

Job Ref: RCEI13889

Figure Number: 2

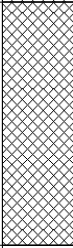
Rev: 1

www.rpsgroup.com

1.2 Location



APPENDIX A: BOREHOLE LOGS

			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes		Borehole Number BH01	
Machine : Flush : Core Dia: Method :			Casing Diameter			Ground Level (mOD)		Client J E R Partners		Job Number 13784	
			Location			Dates 09/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
							(0.30) 0.30 (1.60) 1.90	Concrete. [Made Ground] Dark grey sandy fine to coarse subangular GRAVEL of flint with fragments of brick, concrete and clinker. [Made Ground]	 		
								Complete at 1.90m			
Remarks Backfilled with arisings. No groundwater encountered. Abandoned at 1.9 m.bgl due to concrete obstruction.								Scale (approx) 1:50		Logged By AC	
								Figure No. 13784.BH01			

RPS		RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315				Site London Gate, Blyth Road, Hayes		Number WS2	
Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client J E R Partners		Job Number 13784	
		Location		Dates 10/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.30-0.50	S1 1.6 ppm				(0.30)	Concrete. [Made Ground]			
0.50-0.70	S2 0 ppm				0.30				
0.70-0.90	S3 0.5 ppm				(0.40)	Pale brown gravelly fine to coarse SAND with fragments of brick, concrete and clinker. [Made Ground]			
0.90-1.00	S4 4.1 ppm				0.70				
					(0.20)	Soft to firm orange brown sandy gravelly CLAY. Gravel is fine to coarse subangular flint. [Brickearth]			
					0.90				
					(0.10)	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]			
					1.00				
						Complete at 1.00m			
Remarks Backfilled with arisings. Abandoned at 1.0 m.bgl due to dense gravels. No groundwater encountered.								Scale (approx)	Logged By
								1:50	AC
								Figure No. 13784.WS2	

			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes			Borehole Number BH03	
Machine : Flush : Core Dia: Method :			Casing Diameter			Ground Level (mOD)		Client J E R Partners			Job Number 13784	
			Location			Dates 10/09/2010		Engineer Aaron Cousins			Sheet 1/1	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.50					S1 0.2 ppm		(0.10)	Bitumen bonded aggregate. [Made Ground]				
							0.10	Concrete. [Made Ground]				
							(0.20)	Dark grey ashy sandy GRAVEL with fragments of brick, concrete and clinker. [Made Ground]				
							0.30					
							(0.90)					
1.20	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]											
					Water strike(1) at 3.20m.		(3.60)					
							4.80	Stiff to very stiff dark grey CLAY. [London Clay Formation]				
							(1.20)					
							6.00					
								Complete at 6.00m				
Remarks Advanced using sonic drilling techniques. Damp from 3.2 m.bgl.									Scale (approx) 1:50	Logged By AC	Figure No. 13784.BH03	

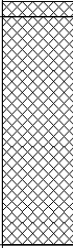
		RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315				Site London Gate, Blyth Road, Hayes		Number WS04		
		Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client J E R Partners		Job Number 13784
		Location		Dates 10/09/2010		Engineer Aaron Cousins		Sheet 1/1		
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water	
0.80-1.00	S1 0 ppm				0.30	Concrete. [Made Ground]				
					0.70	Dark brown ashy sandy GRAVEL with fragments of brick, concrete and clinker. [Made Ground]				
1.90-2.20	S2 0 ppm				1.00	Soft to firm orange brown sandy gravelly CLAY. Gravel is fine to coarse subangular flint. [Brickearth]				
					0.90					
					1.90	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]				
					0.30					
					2.20	Complete at 2.20m				
Remarks Backfilled with arisings. Abandoned at 2.2 m.bgl due to dense gravels. No groundwater encountered.								Scale (approx)		Logged By
								1:50		
								13784.WS04		

			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes			Borehole Number BH05				
Machine :			Casing Diameter			Ground Level (mOD)		Client J E R Partners			Job Number 13784				
Flush :								Engineer Aaron Cousins			Sheet 1/1				
Core Dia:			Location			Dates 09/09/2010									
Method :															
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description			Legend	Water			
							(0.10)	Bitumen bonded aggregate. [Made Ground]							
							(0.10)	Concrete. [Made Ground]							
							(0.40)								
							0.50	Complete at 0.50m							
Remarks No installation. Backfilled with arisings. No groundwater encountered. Abandoned at 0.5 m.bgl due to thickness of concrete.												Scale (approx) 1:50		Logged By AC	
												Figure No. 13784.BH05			

		RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315				Site London Gate, Blyth Road, Hayes		Number WS06	
Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client J E R Partners		Job Number 13784	
		Location		Dates 10/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
					(0.35) 0.35	COncrete. [Made Ground]			
						Complete at 0.35m			
Remarks Terminated at 0.35 m.bgl due to concrete obstruction.						Scale (approx) 1:50		Logged By AC	
						Figure No. 13784.WS06			

RPS			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes			Borehole Number BH07	
Machine :			Casing Diameter			Ground Level (mOD)		Client J E R Partners			Job Number 13784	
Flush :								Engineer Aaron Cousins			Sheet 1/1	
Core Dia:			Location			Dates 10/09/2010						
Method :												
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.50					S1 0 ppm		(0.10) 0.10 (0.30) 0.40	Bitumen bonded aggregate. [Made Ground] Soft pale brown sandy gravelly CLAY with fragments of brick, concrete and clinker. [Made Ground] Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]				
1.50					S2 0 ppm		(4.60)					
					Water strike(1) at 3.00m.		5.00	Complete at 5.00m				
Remarks Casing could not be advanced beyond 2.0 m.bgl due to dense gravels. Damp from 3.0 m.bgl. Advanced using sonic drilling techniques. Abandoned at 5.0 m.bgl due to very dense gravel.									Scale (approx) 1:50	Logged By AC	Figure No. 13784.BH07	

RPS			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes			Borehole Number BH08	
Machine :			Casing Diameter			Ground Level (mOD)		Client J E R Partners			Job Number 13784	
Flush :								Engineer Aaron Cousins			Sheet 1/1	
Core Dia:			Location			Dates 08/09/2010						
Method :												
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.20-1.00					S1 0 ppm		(0.10)	Bitumen bonded aggregate. [Made Ground]				
							0.10	Concrete. [Made Ground]				
							(0.20)	Pale brown fine to coarse sandy GRAVEL of flint brick, concrete and clinker. [Made Ground]				
1.00-1.20					S2 0 ppm		0.30					
							(0.90)					
							1.20	Soft to firm orange brown sandy gravelly CLAY. Gravel is fine to coarse subangular flint. [Brickearth]				
1.80-2.00					S3 0 ppm		(0.60)					
							1.80	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]				
					Water strike(1) at 2.50m.					▽1		
							(4.00)					
							5.80					
							(0.20)	Stiff to very stiff dark grey CLAY. [London Clay Formation]				
							6.00	Complete at 6.00m				
Remarks Advanced using sonic drilling techniques. Damp from 2.5 m.bgl.									Scale (approx) 1:50	Logged By AC		
									Figure No. 13784.BH08			

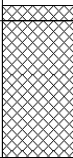
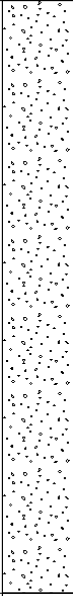
			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes		Borehole Number BH09	
Machine : Flush : Core Dia: Method :			Casing Diameter			Ground Level (mOD)		Client J E R Partners		Job Number 13784	
			Location			Dates 08/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.20-1.00					S1		(0.10) 0.10 (1.50) 1.60	Bitumen bonded aggregate. [Made Ground] Soft pale brown sandy gravelly CLAY with fragments of brick, concrete and clinker. [Made Ground]			
								Complete at 1.60m			
Remarks No installation. Backfilled with arisings. No groundwater encountered. Advanced using sonic drilling techniques. Terminated at 1.6 m.bgl due to concrete obstruction.									Scale (approx) 1:50	Logged By AC	Figure No. 13784.BH09

			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes		Borehole Number BH10
Machine : Flush : Core Dia: Method :			Casing Diameter		Ground Level (mOD)		Client J E R Partners		Job Number 13784	
			Location		Dates 08/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.15					S1 0 ppm		(0.20)	Concrete. [Made Ground]		
0.50-1.00					S2 0 ppm		(0.40)	Soft pale brown sandy gravelly CLAY with fragments of brick, concrete and clinker. [Made Ground]		
							0.60	Soft to firm orange brown sandy gravelly CLAY. Gravel is fine to coarse subangular flint. [Brickearth]		
							(2.20)			
							2.80	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]		V ₁
3.00-3.50					Water strike(1) at 3.00m. S3 0 ppm		(1.50)			
							4.30	Stiff to very stiff dark grey CLAY. [London Clay Formation]		
							(1.70)			
							6.00			
								Complete at 6.00m		
Remarks Backfilled with arisings. Advanced using sonic drilling techniques. Damp from 3.0 m.bgl.									Scale (approx) 1:50	Logged By AC
									Figure No. 13784.BH10	

RPS			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes			Borehole Number BH11	
Machine :			Casing Diameter			Ground Level (mOD)		Client J E R Partners			Job Number 13784	
Flush :												
Core Dia:			Location			Dates 09/09/2010		Engineer Aaron Cousins			Sheet 1/1	
Method :												
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.40-0.60					S1 0 ppm		(0.20)	Bitumen bonded aggregate. [Made Ground]				
							0.20	Soft pale brown ashy sandy gravelly CLAY with fragments of brick, concrete and clinker. [Made Ground]				
1.80					S2 0 ppm		(1.00)					
							1.20					
							(0.50)	Soft to firm orange brown sandy gravelly CLAY. Gravel is fine to coarse subangular flint. [Brickearth]				
							1.70	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]				
					Water strike(1) at 3.00m.		(2.30)			▽1		
							4.00					
								Complete at 4.00m				
Remarks Advanced using sonic drilling techniques. Damp from 3.0 m.bgl.									Scale (approx) 1:50	Logged By AC	Figure No. 13784.BH11	

		RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315				Site London Gate, Blyth Road, Hayes		Number WS12	
Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client J E R Partners		Job Number 13784	
		Location		Dates 10/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.20-0.60	S1 0.3 ppm				(0.20)	Bitumen bonded aggregate. [Made Ground]			
					0.20	Concrete. [Made Ground]			
					(0.40)				
					0.60	Complete at 0.60m			
Remarks Backfilled with arisings. Abandoned at 0.6 m.bgl due to concrete obstruction. No groundwater encountered.								Scale (approx)	Logged By
								1:50	AC
								Figure No. 13784.WS12	

RPS			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes			Borehole Number BH13	
Machine :			Casing Diameter			Ground Level (mOD)		Client J E R Partners			Job Number 13784	
Flush :								Engineer Aaron Cousins			Sheet 1/1	
Core Dia:			Location			Dates 10/09/2010						
Method :												
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.40					S1 0 ppm		(0.40) 0.40 (0.20) 0.60	Concrete. [Made Ground]				
								Soft pale brown sandy gravelly CLAY with fragments of brick, concrete and clinker. [Made Ground]				
1.80					S2 0 ppm		(2.80)	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]				
					Water strike(1) at 2.50m.		3.40					
								Complete at 3.40m				
Remarks Casing could not be advanced beyond 2.0 m.bgl due to dense gravels. Damp from 2.5 m.bgl. Advanced using sonic drilling techniques. Abandoned at 3.4 m.bgl due to very dense gravels.									Scale (approx) 1:50	Logged By AC	Figure No. 13784.BH13	

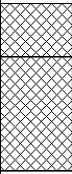
			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes		Borehole Number BH14
Machine : Flush : Core Dia: Method :			Casing Diameter		Ground Level (mOD)		Client J E R Partners		Job Number 13784	
			Location		Dates 09/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-1.00					S1 0 ppm		(0.10) 0.10	Bitumen bonded aggregate. [Made Ground]		
1.00-2.00					S2 0 ppm		(0.90) 1.00	Soft dark grey ashy sandy gravelly CLAY. Gravel is fine to coarse sa of flint with fragments of brick, concrete and clinker. [Made Ground]		
3.00					Water strike(1) at 2.50m. S3 0 ppm		(3.90) 4.90	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]		▽1
							(1.10) 6.00	Stiff to very stiff dark grey CLAY. [London Clay Formation]		
								Complete at 6.00m		
Remarks No installation. Backfilled with arisings. Damp from 2.5 m.bgl. Advanced using sonic drilling techniques.									Scale (approx) 1:50	Logged By AC
									Figure No. 13784.BH14	

RPS			RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315					Site London Gate, Blyth Road, Hayes			Borehole Number BH15	
Machine :			Casing Diameter			Ground Level (mOD)		Client J E R Partners			Job Number 13784	
Flush :												
Core Dia:			Location			Dates 09/09/2010		Engineer Aaron Cousins			Sheet 1/1	
Method :												
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.30-0.70					S1 0 ppm		(0.10) 0.10	Bitumen bonded aggregate. [Made Ground]				
0.70-1.00					S2 0 ppm		(0.20) 0.30	Concrete with green staining. [Made Ground]				
							(0.30) 0.40	Dark grey ashy sandy GRAVEL of flint with fragments of brick, concrete and clinker. [Made Ground]				
1.50-1.80					S3 0 ppm		(0.40) 0.70	Soft to firm orange brown sandy gravelly CLAY. Gravel is fine to coarse subangular flint. [Brickearth]				
							(1.10) 1.80	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]				
					Water strike(1) at 3.00m.		(3.70) 5.50					
							(0.50) 6.00	Stiff to very stiff dark grey CLAY. [London Clay Formation]				
								Complete at 6.00m				
Remarks Damp from 3.0 m.bgl. Advanced using sonic drilling techniques.									Scale (approx)	Logged By		
									1:50	AC		
									Figure No. 13784.BH15			

		RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315				Site London Gate, Blyth Road, Hayes		Number WS16	
Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client J E R Partners		Job Number 13784	
		Location		Dates 10/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.30-0.50	S1 1.3 ppm				(0.30)	Concrete. [Made Ground]			
					(0.30)	Pale grey sandy fine to coarse subangular flint GRAVEL with fragments. of brick and concrete. [Made Ground]			
					(0.20)				
					(0.10)				
					(0.60)	Concrete. [Made Ground]			
						Complete at 0.60m			
Remarks No groundwater encountered. Abandoned at 0.6 m.bgl due to concrete obstruction. Backfilled with arisings.								Scale (approx) 1:50	Logged By AC
								Figure No. 13784.WS16	

		RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315				Site London Gate, Blyth Road, Hayes		Number WS17	
		Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client J E R Partners	
		Location		Dates 10/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.30-0.40	S1				(0.30)	Concrete. [Made Ground]			
					0.30	Soft orange brown sandy gravelly CLAY with fragments of brick, concrete and clinker. [Made Ground]			
1.30-1.40	S2				(0.80)				
1.50-1.80	S3				1.10	Soft to firm orange brown sandy gravelly CLAY. Gravel is fine to coarse subangular flint. [Brickearth]			
					1.50	Orange brown sandy fine to coarse subangular to subrounded flint GRAVEL. [Taplow Gravel Formation]			
					1.90	Complete at 1.90m			
Remarks Backfilled with arisings. Abandoned at 1.9 m.bgl due to dense gravel. No groundwater encountered.								Scale (approx)	Logged By
								1:50	AC
								Figure No. 13784.WS17	

RPS RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315				Site London Gate, Blyth Road, Hayes		Number WS18			
Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client J E R Partners		Job Number 13784	
		Location		Dates 10/09/2010		Engineer Aaron Cousins		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
					(0.35) 0.35	Concrete. [Made Ground]			
						Complete at 0.35m			
Remarks Terminated at 0.35 m.bgl due to concrete obstruction.							Scale (approx) 1:50	Logged By AC	
							Figure No. 13784.WS18		

		RPS Health, Safety and Environment 52 Princess Street Manchester, M1 6JX Tel: 0161 2379858 Fax: 0161 2373315				Site London Gate, Blyth Road, Hayes		Number WS19		
		Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client J E R Partners		Job Number 13784
		Location		Dates 10/09/2010		Engineer Aaron Cousins		Sheet 1/1		
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water	
0.40-0.80	S1 0 ppm					Concrete. [Made Ground]				
						Pale grey sandy GRAVEL with fragments of brick, concrete and clinker. [Made Ground]				
						Complete at 1.10m				
Remarks Backfilled with arisings. Abandoned at 1.1 m.bgl due to unknown obstruction. No groundwater encountered.								Scale (approx) 1:50		Logged By AC
								Figure No. 13784.WS19		

[illegible]

APPENDIX B: CERTIFICATES OF CHEMICAL ANALYSIS



Aaron Cousins

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i2 Analytical Ltd.
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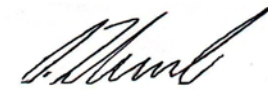
t: 01923 67 00 20
f: 01923 67 00 30
e: info@i2analytical.com

Analytical Report Number : 10-24330

Project / Site name:	Blyth Rd, Hayes	Samples received on:	15/09/2010
Your job number:	RCEI1389	Samples instructed on:	15/09/2010
Your order number:		Analysis completed by:	20/09/2010
Report Issue Number:	1	Report issued on:	20/09/2010
Samples Analysed:	25 soil samples - 4 water samples		

Signed: 

Dr Claire Stone
UK Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: 

David Ashworth
UK Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155367	155368	155369	155370	155371
Sample Reference				BH02	BH02	BH02	BH03	WS04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.50	0.50-0.70	0.90-1.00	0.50	0.80-1.00
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	60	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	7.5	8.4	6.5	12	23
Total mass of sample received	kg	0.001	NONE	0.61	0.60	0.54	0.78	0.53

General Inorganics

pH	pH Units	N/A	MCERTS	9.7	10.9	7.1	8.3	7.6
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO ₄ (2:1)	g/l	0.0025	MCERTS	0.64	0.308	0.112	0.168	0.12
Water Soluble Sulphate as SO ₄ (2:1)	mg/kg	2.5	MCERTS	640	308	112	168	120
Sulphide	mg/kg	1	NONE	1.7	20	< 1.0	< 1.0	< 1.0
Organic Matter	%	0.1	MCERTS	3.5	1.5	< 0.10	7.6	13

Total Phenols

Total Phenols (monohydric)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.65	0.16	< 0.05	0.67	0.06
Acenaphthylene	mg/kg	0.05	MCERTS	2.9	0.16	0.12	0.31	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	5.5	0.53	< 0.05	0.27	< 0.05
Fluorene	mg/kg	0.05	MCERTS	5.2	0.68	0.07	0.37	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	44	7.7	0.12	4.7	0.15
Anthracene	mg/kg	0.05	MCERTS	25	2.3	< 0.05	1.6	< 0.05
Fluoranthene	mg/kg	0.1	MCERTS	49	8.0	0.15	11	0.19
Pyrene	mg/kg	0.05	MCERTS	49	5.8	0.10	8.6	0.16
Benzo(a)anthracene	mg/kg	0.2	MCERTS	49	4.3	< 0.20	7.1	< 0.20
Chrysene	mg/kg	0.05	MCERTS	39	3.2	< 0.05	5.2	0.13
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	58	4.5	< 0.10	8.9	0.21
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	23	1.7	< 0.05	2.9	< 0.05
Benzo(a)pyrene	mg/kg	0.1	MCERTS	43	3.2	< 0.10	5.6	0.11
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	23	1.7	< 0.05	3.7	0.16
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	5.6	0.50	< 0.05	1.0	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	22	1.7	< 0.05	3.9	0.18

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	440	46	< 1.6	66	< 1.6
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	87	7.1	7.0	15	6.6
Boron (water soluble)	mg/kg	0.2	MCERTS	2.4	2.7	3.2	2.3	5.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	< 0.2	1.2	0.4
Chromium (hexavalent)	mg/kg	4.3	NONE	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	140	36	18	19	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	130	41	7.6	180	77
Lead (aqua regia extractable)	mg/kg	2	MCERTS	98	19	6.5	230	42
Mercury (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.6	< 0.2
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	32	16	14	30	51
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	430	120	25	340	80

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155367	155368	155369	155370	155371
Sample Reference				BH02	BH02	BH02	BH03	WS04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.50	0.50-0.70	0.90-1.00	0.50	0.80-1.00
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C6 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C10 - C12	mg/kg	1	MCERTS	1.0	4.7	< 1.0	13	< 1.0
TPH7 - Aliphatic >C12 - C16	mg/kg	2	MCERTS	12	19	< 2.0	96	< 2.0
TPH7 - Aliphatic >C16 - C21	mg/kg	8	MCERTS	41	50	< 8.0	170	< 8.0
TPH7 - Aliphatic >C21 - C35	mg/kg	8	MCERTS	76	99	< 8.0	250	< 8.0
TPH7 - Aliphatic (C5 - C35)	mg/kg	10	MCERTS	130	170	< 10	530	< 10

TPH7 - Aromatic >C5 - C7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C7 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C10 - C12	mg/kg	1	MCERTS	5.0	2.0	< 1.0	33	< 1.0
TPH7 - Aromatic >C12 - C16	mg/kg	2	MCERTS	32	27	< 2.0	110	< 2.0
TPH7 - Aromatic >C16 - C21	mg/kg	10	MCERTS	380	67	< 10	360	< 10
TPH7 - Aromatic >C21 - C35	mg/kg	10	MCERTS	990	290	< 10	880	< 10
TPH7 - Aromatic (C5 - C35)	mg/kg	10	MCERTS	1400	390	< 10	1400	< 10

PCBs by GC-ECD

PCB Congener 28	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 52	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 101	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 118	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 138	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 153	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 180	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
Total PCBs	mg/kg	0.2	MCERTS	N/A	N/A	N/A	N/A	N/A

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155372	155373	155374	155375	155376
Sample Reference				WS04	BH07	BH07	BH08	BH08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90-2.20	0.50	1.50	1.00-1.20	1.80-2.00
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	6.2	7.6	5.2	18	13
Total mass of sample received	kg	0.001	NONE	0.53	0.78	0.74	0.69	0.81

General Inorganics

pH	pH Units	N/A	MCERTS	8.3	7.4	7.2	7.3	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO ₄ (2:1)	g/l	0.0025	MCERTS	0.224	0.0264	0.0068	0.14	0.072
Water Soluble Sulphate as SO ₄ (2:1)	mg/kg	2.5	MCERTS	224	26.4	6.8	140	72
Sulphide	mg/kg	1	NONE	3.5	< 1.0	< 1.0	14	< 1.0
Organic Matter	%	0.1	MCERTS	1.3	0.72	0.75	3.7	0.99

Total Phenols

Total Phenols (monohydric)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.07	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.10	0.07	0.05	0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.08	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.29	< 0.05	< 0.05	0.30	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.09	< 0.05	< 0.05	0.09	< 0.05
Fluoranthene	mg/kg	0.1	MCERTS	0.32	< 0.10	< 0.10	0.59	< 0.10
Pyrene	mg/kg	0.05	MCERTS	0.29	0.05	< 0.05	0.52	0.05
Benzo(a)anthracene	mg/kg	0.2	MCERTS	0.36	< 0.20	< 0.20	0.43	< 0.20
Chrysene	mg/kg	0.05	MCERTS	0.36	< 0.05	< 0.05	0.45	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	0.39	< 0.10	< 0.10	0.83	< 0.10
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.11	< 0.05	< 0.05	0.21	< 0.05
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.25	< 0.10	< 0.10	0.50	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.48	< 0.05	< 0.05	0.86	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.17	< 0.05	< 0.05	0.06	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.53	< 0.05	< 0.05	0.82	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	3.8	< 1.6	< 1.6	5.8	< 1.6
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.5	15	9.4	27	16
Boron (water soluble)	mg/kg	0.2	MCERTS	1.7	2.8	1.1	5.5	2.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4.3	NONE	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	37	21	40	72
Copper (aqua regia extractable)	mg/kg	1	MCERTS	27	9.4	6.6	240	27
Lead (aqua regia extractable)	mg/kg	2	MCERTS	20	11	4.7	300	33
Mercury (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	17	24	13	55	42
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	32	32	18	130	54

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155372	155373	155374	155375	155376
Sample Reference				WS04	BH07	BH07	BH08	BH08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90-2.20	0.50	1.50	1.00-1.20	1.80-2.00
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C6 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C10 - C12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C12 - C16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH7 - Aliphatic >C16 - C21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH7 - Aliphatic >C21 - C35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH7 - Aliphatic (C5 - C35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

TPH7 - Aromatic >C5 - C7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C7 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C10 - C12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aromatic >C12 - C16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	11	< 2.0
TPH7 - Aromatic >C16 - C21	mg/kg	10	MCERTS	< 10	< 10	< 10	22	< 10
TPH7 - Aromatic >C21 - C35	mg/kg	10	MCERTS	< 10	< 10	< 10	43	< 10
TPH7 - Aromatic (C5 - C35)	mg/kg	10	MCERTS	< 10	< 10	< 10	76	< 10

PCBs by GC-ECD

PCB Congener 28	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 52	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 101	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 118	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 138	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 153	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 180	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
Total PCBs	mg/kg	0.2	MCERTS	N/A	N/A	N/A	N/A	N/A

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155377	155378	155379	155380	155381
Sample Reference				BH09	BH10	BH11	BH11	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-1.60	0.50-1.00	0.40-0.60	1.80	0.20-0.60
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		
Stone Content				%	0.1	NONE	< 0.1	< 0.1
Moisture Content				%	N/A	NONE	13	12
Total mass of sample received				kg	0.001	NONE	0.67	0.61

General Inorganics

pH	pH Units	N/A	MCERTS	9.9	8.4	7.5	7.3	9.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO ₄ (2:1)	g/l	0.0025	MCERTS	0.72	0.232	0.244	0.1	0.84
Water Soluble Sulphate as SO ₄ (2:1)	mg/kg	2.5	MCERTS	720	232	244	100	840
Sulphide	mg/kg	1	NONE	5.0	1.6	< 1.0	< 1.0	1.2
Organic Matter	%	0.1	MCERTS	1.3	0.63	1.7	0.82	2.1

Total Phenols

Total Phenols (monohydric)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.25
Acenaphthylene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	< 0.05	1.3
Acenaphthene	mg/kg	0.05	MCERTS	0.05	< 0.05	< 0.05	< 0.05	9.3
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	12
Phenanthrene	mg/kg	0.05	MCERTS	0.51	0.10	0.06	< 0.05	61
Anthracene	mg/kg	0.05	MCERTS	0.23	< 0.05	< 0.05	< 0.05	47
Fluoranthene	mg/kg	0.1	MCERTS	3.9	0.20	0.17	< 0.10	63
Pyrene	mg/kg	0.05	MCERTS	4.1	0.19	0.15	< 0.05	51
Benzo(a)anthracene	mg/kg	0.2	MCERTS	3.9	< 0.20	< 0.20	< 0.20	62
Chrysene	mg/kg	0.05	MCERTS	2.4	< 0.05	0.08	< 0.05	57
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	5.5	0.17	0.25	< 0.10	80
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.5	0.07	0.22	< 0.05	49
Benzo(a)pyrene	mg/kg	0.1	MCERTS	3.9	0.11	0.14	< 0.10	60
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.2	0.07	0.20	< 0.05	44
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.53	< 0.05	0.11	< 0.05	14
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.3	0.10	0.28	< 0.05	42

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	31	< 1.6	1.8	< 1.6	650
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.3	9.2	10	17	12
Boron (water soluble)	mg/kg	0.2	MCERTS	3.3	1.8	1.8	1.7	3.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.2	0.7	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4.3	NONE	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	130	81	16	320	14
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	16	58	18	11
Lead (aqua regia extractable)	mg/kg	2	MCERTS	140	20	420	11	15
Mercury (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	29	34	18	170	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	230	40	130	38	38

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155377	155378	155379	155380	155381
Sample Reference				BH09	BH10	BH11	BH11	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-1.60	0.50-1.00	0.40-0.60	1.80	0.20-0.60
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C6 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C10 - C12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C12 - C16	mg/kg	2	MCERTS	6.7	< 2.0	< 2.0	< 2.0	< 2.0
TPH7 - Aliphatic >C16 - C21	mg/kg	8	MCERTS	44	< 8.0	< 8.0	< 8.0	< 8.0
TPH7 - Aliphatic >C21 - C35	mg/kg	8	MCERTS	69	< 8.0	< 8.0	< 8.0	< 8.0
TPH7 - Aliphatic (C5 - C35)	mg/kg	10	MCERTS	120	< 10	< 10	< 10	< 10

TPH7 - Aromatic >C5 - C7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C7 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C10 - C12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	12
TPH7 - Aromatic >C12 - C16	mg/kg	2	MCERTS	18	< 2.0	18	< 2.0	45
TPH7 - Aromatic >C16 - C21	mg/kg	10	MCERTS	36	< 10	20	< 10	600
TPH7 - Aromatic >C21 - C35	mg/kg	10	MCERTS	180	< 10	40	< 10	1600
TPH7 - Aromatic (C5 - C35)	mg/kg	10	MCERTS	230	< 10	79	< 10	2300

PCBs by GC-ECD

PCB Congener 28	mg/kg	0.02	MCERTS	N/A	N/A	< 0.02	< 0.02	N/A
PCB Congener 52	mg/kg	0.02	MCERTS	N/A	N/A	< 0.02	< 0.02	N/A
PCB Congener 101	mg/kg	0.02	MCERTS	N/A	N/A	< 0.02	< 0.02	N/A
PCB Congener 118	mg/kg	0.02	MCERTS	N/A	N/A	< 0.02	< 0.02	N/A
PCB Congener 138	mg/kg	0.02	MCERTS	N/A	N/A	< 0.02	< 0.02	N/A
PCB Congener 153	mg/kg	0.02	MCERTS	N/A	N/A	< 0.02	< 0.02	N/A
PCB Congener 180	mg/kg	0.02	MCERTS	N/A	N/A	< 0.02	< 0.02	N/A
Total PCBs	mg/kg	0.2	MCERTS	N/A	N/A	< 0.2	< 0.2	N/A

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155382	155383	155384	155385	155386
Sample Reference				BH13	BH14	BH14	BH15	BH15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.10-1.00	1.00-2.00	0.30-0.70	0.70-1.00
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	29	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	6.8	6.5	17	6.3
Total mass of sample received	kg	0.001	NONE	0.71	0.67	0.70	0.76	0.72

General Inorganics

pH	pH Units	N/A	MCERTS	7.8	7.3	7.3	7.2	9.0
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO ₄ (2:1)	g/l	0.0025	MCERTS	0.06	0.096	0.0244	0.096	0.248
Water Soluble Sulphate as SO ₄ (2:1)	mg/kg	2.5	MCERTS	60	96	24.4	96	248
Sulphide	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	66
Organic Matter	%	0.1	MCERTS	1.2	0.63	0.71	1.7	2.1

Total Phenols

Total Phenols (monohydric)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.08	0.18
Acenaphthylene	mg/kg	0.05	MCERTS	0.11	0.17	0.12	0.39	0.39
Acenaphthene	mg/kg	0.05	MCERTS	0.08	< 0.05	0.06	0.14	0.22
Fluorene	mg/kg	0.05	MCERTS	0.09	< 0.05	< 0.05	0.13	0.22
Phenanthrene	mg/kg	0.05	MCERTS	0.93	0.29	0.47	1.6	3.1
Anthracene	mg/kg	0.05	MCERTS	0.33	0.15	0.23	0.64	1.2
Fluoranthene	mg/kg	0.1	MCERTS	1.3	0.80	1.4	4.4	8.6
Pyrene	mg/kg	0.05	MCERTS	0.94	0.66	1.2	3.8	8.0
Benzo(a)anthracene	mg/kg	0.2	MCERTS	0.75	0.58	0.78	3.1	5.9
Chrysene	mg/kg	0.05	MCERTS	0.84	0.43	0.66	2.4	3.9
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	0.94	0.54	1.1	3.4	6.5
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.25	0.22	0.35	1.4	2.5
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.51	0.32	0.62	2.3	4.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.1	0.51	1.7	4.5	3.0
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.24	0.23	0.43	1.2	0.12
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	0.62	1.9	4.7	2.9

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	9.6	5.6	11	34	51
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	9.0	13	9.4	6.5
Boron (water soluble)	mg/kg	0.2	MCERTS	1.9	1.6	1.4	1.0	1.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.5
Chromium (hexavalent)	mg/kg	4.3	NONE	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	46	87	120	23	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	26	12	13	30	40
Lead (aqua regia extractable)	mg/kg	2	MCERTS	96	20	17	64	44
Mercury (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	31	48	61	22	12
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	51	31	34	74	70

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155382	155383	155384	155385	155386
Sample Reference				BH13	BH14	BH14	BH15	BH15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.10-1.00	1.00-2.00	0.30-0.70	0.70-1.00
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C6 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C10 - C12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C12 - C16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH7 - Aliphatic >C16 - C21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH7 - Aliphatic >C21 - C35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH7 - Aliphatic (C5 - C35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

TPH7 - Aromatic >C5 - C7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C7 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C10 - C12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	2.1	1.8
TPH7 - Aromatic >C12 - C16	mg/kg	2	MCERTS	12	15	14	16	14
TPH7 - Aromatic >C16 - C21	mg/kg	10	MCERTS	26	22	21	34	47
TPH7 - Aromatic >C21 - C35	mg/kg	10	MCERTS	87	49	58	100	200
TPH7 - Aromatic (C5 - C35)	mg/kg	10	MCERTS	130	85	93	150	260

PCBs by GC-ECD

PCB Congener 28	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 52	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 101	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 118	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 138	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 153	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 180	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
Total PCBs	mg/kg	0.2	MCERTS	N/A	N/A	N/A	N/A	N/A

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155387	155388	155389	155390	155391
Sample Reference				WS16	WS17	WS17	WS19	BH20
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.50	0.30-0.40	1.30-1.40	0.40-0.80	0.20-1.00
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)								
	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	9.2	< 0.1	< 0.1	9.8
Moisture Content	%	N/A	NONE	6.2	12	13	5.3	12
Total mass of sample received	kg	0.001	NONE	0.63	0.65	0.57	0.62	0.81

General Inorganics

pH	pH Units	N/A	MCERTS	9.1	7.7	7.5	10.1	8.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO ₄ (2:1)	g/l	0.0025	MCERTS	0.208	0.44	0.252	0.68	0.196
Water Soluble Sulphate as SO ₄ (2:1)	mg/kg	2.5	MCERTS	208	440	252	680	196
Sulphide	mg/kg	1	NONE	17	< 1.0	< 1.0	6.4	< 1.0
Organic Matter	%	0.1	MCERTS	0.66	0.75	0.78	1.9	0.79

Total Phenols

Total Phenols (monohydric)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.27	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.06	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.12	< 0.05	< 0.05	0.52	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.36	< 0.05
Fluoranthene	mg/kg	0.1	MCERTS	0.19	< 0.10	< 0.10	2.3	0.11
Pyrene	mg/kg	0.05	MCERTS	0.16	0.07	< 0.05	2.3	0.09
Benzo(a)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	< 0.20	2.0	< 0.20
Chrysene	mg/kg	0.05	MCERTS	0.09	< 0.05	0.06	1.4	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	0.16	< 0.10	< 0.10	2.9	0.19
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.71	0.18
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.10	< 0.10	< 0.10	1.9	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.08	< 0.05	< 0.05	1.2	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.26	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	1.4	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.6	< 1.6	< 1.6	18	< 1.6
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.9	14	11	2.7	11
Boron (water soluble)	mg/kg	0.2	MCERTS	0.9	3.4	2.3	1.6	1.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.3	< 0.2	< 0.2	0.3	< 0.2
Chromium (hexavalent)	mg/kg	4.3	NONE	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	9.0	30	34	12	44
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.5	22	23	27	28
Lead (aqua regia extractable)	mg/kg	2	MCERTS	37	75	14	53	21
Mercury (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	7.8	27	30	9.7	24
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	220	50	48	64	53

Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155387	155388	155389	155390	155391
Sample Reference				WS16	WS17	WS17	WS19	BH20
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.50	0.30-0.40	1.30-1.40	0.40-0.80	0.20-1.00
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C6 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aliphatic >C10 - C12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	2.6	< 1.0
TPH7 - Aliphatic >C12 - C16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	14	< 2.0
TPH7 - Aliphatic >C16 - C21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	27	< 8.0
TPH7 - Aliphatic >C21 - C35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	54	< 8.0
TPH7 - Aliphatic (C5 - C35)	mg/kg	10	MCERTS	< 10	< 10	< 10	98	< 10

TPH7 - Aromatic >C5 - C7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C7 - C8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C8 - C10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH7 - Aromatic >C10 - C12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	4.0	< 1.0
TPH7 - Aromatic >C12 - C16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	17	13
TPH7 - Aromatic >C16 - C21	mg/kg	10	MCERTS	< 10	< 10	< 10	33	15
TPH7 - Aromatic >C21 - C35	mg/kg	10	MCERTS	< 10	< 10	< 10	170	26
TPH7 - Aromatic (C5 - C35)	mg/kg	10	MCERTS	< 10	< 10	< 10	220	54

PCBs by GC-ECD

PCB Congener 28	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 52	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 101	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 118	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 138	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 153	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
PCB Congener 180	mg/kg	0.02	MCERTS	N/A	N/A	N/A	N/A	N/A
Total PCBs	mg/kg	0.2	MCERTS	N/A	N/A	N/A	N/A	N/A



Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number	155392	155393	155394	155395	
Sample Reference	BH03	BH08	BH14	BH015	
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH units	N/A	ISO 17025	7.7	7.5	7.7	7.5	
Total Cyanide	µg/l	25	ISO 17025	< 25	< 25	< 25	< 25	
Sulphate as SO ₄	µg/l	100	NONE	140000	82000	130000	76000	
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	

Total Phenols

Total Phenols (monohydric)	µg/l	15	ISO 17025	< 15	< 15	< 15	< 15	
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Boron (dissolved)	µg/l	10	NONE	280	210	370	200	
Cadmium (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	
Chromium (hexavalent)	µg/l	10	NONE	< 10	< 10	< 10	< 10	
Chromium (dissolved)	µg/l	1	ISO 17025	5.7	6.5	15	3.2	
Copper (dissolved)	µg/l	3	ISO 17025	5.9	3.8	10	5.8	
Lead (dissolved)	µg/l	5	ISO 17025	18	15	17	19	
Mercury (dissolved)	µg/l	1.5	ISO 17025	< 1.5	< 1.5	< 1.5	< 1.5	
Nickel (dissolved)	µg/l	1	ISO 17025	13	18	20	12	
Selenium (dissolved)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Zinc (dissolved)	µg/l	1	ISO 17025	9.3	2.9	22	3.1	



Analytical Report Number: 10-24330

Project / Site name: Blyth Rd, Hayes

Lab Sample Number				155392	155393	155394	155395	
Sample Reference				BH03	BH08	BH14	BH015	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled				None Supplied	None Supplied	None Supplied	None Supplied	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	

TPH7 - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	

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

Analytical Report Number : 10-24330
Project / Site name: Blyth Rd, Hayes

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

Stone content

of a sample is calculated as the % weight of the stones not passing a 2 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
155367	BH02	None Supplied	0.30-0.50	Brown sandy gravel with rubble.
155368	BH02	None Supplied	0.50-0.70	Beige clay and sand with gravel and rubble.
155369	BH02	None Supplied	0.90-1.00	Brown clay and gravel with stones.
155370	BH03	None Supplied	0.50	Black sandy clay with gravel and tar.
155371	WS04	None Supplied	0.80-1.00	Black sandy clay with gravel and tar.
155372	WS04	None Supplied	1.90-2.20	Light brown sandy clay with gravel and rubble.
155373	BH07	None Supplied	0.50	Light brown sandy clay with gravel and rubble.
155374	BH07	None Supplied	1.50	Light brown sand with rubble.
155375	BH08	None Supplied	1.00-1.20	Brown clay with rubble.
155376	BH08	None Supplied	1.80-2.00	Light brown clay and sand with gravel and rubble.
155377	BH09	None Supplied	0.20-1.60	Brown sandy gravel with rubble and brick.
155378	BH10	None Supplied	0.50-1.00	Brown clay.
155379	BH11	None Supplied	0.40-0.60	Brown clay.
155380	BH11	None Supplied	1.80	Light brown clay and sand with gravel and rubble.
155381	WS12	None Supplied	0.20-0.60	Light brown sandy gravel with rubble.
155382	BH13	None Supplied	0.40	Light brown clay and gravel with rubble.
155383	BH14	None Supplied	0.10-1.00	Light brown clay and gravel with rubble.
155384	BH14	None Supplied	1.00-2.00	Light brown clay and sand with gravel and stones.
155385	BH15	None Supplied	0.30-0.70	Brown clay.
155386	BH15	None Supplied	0.70-1.00	Brown sandy clay with gravel and rubble.
155387	WS16	None Supplied	0.30-0.50	Brown clay and sand with gravel and rubble.
155388	WS17	None Supplied	0.30-0.40	Light brown clay and gravel with stones.
155389	WS17	None Supplied	1.30-1.40	Light brown clay.
155390	WS19	None Supplied	0.40-0.80	Brown sandy gravel with rubble.
155391	BH20	None Supplied	0.20-1.00	Light brown clay and gravel with stones.

Analytical Report Number : 10-24330

Project / Site name: Blyth Rd, Hayes

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Boron in water	Determination of boron by acidification followed by ICP-OES.	In-house method based on MEWAM	L039-UK	W	NONE
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-UK	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L017-UK	W	MCERTS
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW	In-house method based on USEPA8260	L036-UK	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L026-UK	D	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L026-UK	W	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L038-UK	D	MCERTS
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited matrices: SW PW	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-UK	W	ISO 17025
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L019-UK	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L006-UK	W	MCERTS
Monohydric phenols in water	Determination of phenols in water by distillation followed by colorimetry. Accredited matrices: SW PW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L006-UK	W	ISO 17025
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L023-UK	D	MCERTS
PCB's By GC-ECD in soil	Determination of PCB by extraction with acetone and hexane followed by GC-ECD.	In-house method based on USEPA 8082	L027-UK	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L005-UK	W	MCERTS
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L005-UK	W	ISO 17025
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-UK	D	MCERTS
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in hexane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025

Analytical Report Number : 10-24330

Project / Site name: Blyth Rd, Hayes

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Stones content of soil	Stones not passing through a 2 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK	D	NONE
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-UK	W	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L038-UK	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L010-UK	D	NONE
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L010-UK	W	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L007-UK	W	MCERTS
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L007-UK	W	ISO 17025
TPH7 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-UK	W	NONE
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-UK	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

APPENDIX C: ASSESSMENT CRITERIA

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Report generated 21/09/2010

Report title Blyth Road, Hayes - Commercial

Created by AC at RPS HSE



BASIC SETTINGS

Land Use Commercial

Building Office (pre 1970)

Receptor Female (com)

Start age class 17

End age class 17

Exposure Duration 49 years

Soil Sand

Exposure Pathways

Direct soil and dust ingestion	☒	Dermal contact with indoor dust	☒	Inhalation of indoor dust	☒
Consumption of homegrown produce	☐	Dermal contact with soil	☒	Inhalation of soil dust	☒
Soil attached to homegrown produce	☐			Inhalation of indoor vapour	☒
				Inhalation of outdoor vapour	☒



Land Use Commercial

Age Class	Exposure Frequencies (days yr ⁻¹)						Occupation Periods (hr day ⁻¹)		Soil to skin adherence factors (mg cm ²)		Direct soil ingestion rate (g day ⁻¹)
	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with indoor dust	Dermal contact with soil	Inhalation of dust and vapour, indoor	Inhalation of dust and vapour, outdoor	Indoors	Outdoors	Indoor	Outdoor	
1	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
2	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
3	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
4	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
5	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
6	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
7	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
8	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
9	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
10	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
11	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
12	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
13	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
14	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
15	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
16	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
17	230	0	230	170	230	170	8.3	0.7	0.14	0.14	0.05
18	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00



Receptor Female (com)

Age Class	Body weight (kg)	Body height (m)	Inhalation rate (m ³ day ⁻¹)	Max exposed skin factor		Total skin area (m ²)	Consumption rates (g FW kg ⁻¹ BW day ⁻¹)					
				Indoor (m ² m ⁻²)	Outdoor (m ² m ⁻²)		Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
1	5.60	0.7	8.5	0.00	0.00	3.43E-01	7.12	10.69	16.03	1.83	2.23	3.82
2	9.80	0.8	13.3	0.00	0.00	4.84E-01	6.85	3.30	5.46	3.96	0.54	11.96
3	12.70	0.9	12.7	0.00	0.00	5.82E-01	6.85	3.30	5.46	3.96	0.54	11.96
4	15.10	0.9	12.2	0.00	0.00	6.36E-01	6.85	3.30	5.46	3.96	0.54	11.96
5	16.90	1.0	12.2	0.00	0.00	7.04E-01	3.74	1.77	3.38	1.85	0.16	4.26
6	19.70	1.1	12.2	0.00	0.00	7.94E-01	3.74	1.77	3.38	1.85	0.16	4.26
7	22.10	1.2	12.4	0.00	0.00	8.73E-01	3.74	1.77	3.38	1.85	0.16	4.26
8	25.30	1.2	12.4	0.00	0.00	9.36E-01	3.74	1.77	3.38	1.85	0.16	4.26
9	27.50	1.3	12.4	0.00	0.00	1.01E+00	3.74	1.77	3.38	1.85	0.16	4.26
10	31.40	1.3	12.4	0.00	0.00	1.08E+00	3.74	1.77	3.38	1.85	0.16	4.26
11	35.70	1.4	12.4	0.00	0.00	1.19E+00	3.74	1.77	3.38	1.85	0.16	4.26
12	41.30	1.4	13.4	0.00	0.00	1.29E+00	3.74	1.77	3.38	1.85	0.16	4.26
13	47.20	1.5	13.4	0.00	0.00	1.42E+00	3.74	1.77	3.38	1.85	0.16	4.26
14	51.20	1.6	13.4	0.00	0.00	1.52E+00	3.74	1.77	3.38	1.85	0.16	4.26
15	56.70	1.6	13.4	0.00	0.00	1.60E+00	3.74	1.77	3.38	1.85	0.16	4.26
16	59.00	1.6	13.4	0.00	0.00	1.63E+00	3.74	1.77	3.38	1.85	0.16	4.26
17	70.00	1.6	14.8	0.08	0.08	1.78E+00	2.94	1.40	1.79	1.61	0.22	2.97
18	70.90	1.6	12.0	0.00	0.00	1.80E+00	2.94	1.40	1.79	1.61	0.22	2.97

Building Office (pre 1970)

Building footprint (m ²)	4.24E+02
Living space air exchange rate (hr ⁻¹)	1.00E+00
Living space height (above ground, m)	9.60E+00
Living space height (below ground, m)	0.00E+00
Pressure difference (soil to enclosed space, Pa)	4.40E+00
Foundation thickness (m)	1.50E-01
Floor crack area (cm ²)	1.65E+03
Dust loading factor (µg m ⁻³)	1.00E+02

Soil Sand

Porosity, Total (cm ³ cm ⁻³)	5.40E-01
Porosity, Air-Filled (cm ³ cm ⁻³)	3.00E-01
Porosity, Water-Filled (cm ³ cm ⁻³)	2.40E-01
Residual soil water content (cm ³ cm ⁻³)	7.00E-02
Saturated hydraulic conductivity (cm s ⁻¹)	7.36E-03
van Genuchten shape parameter <i>m</i> (dimensionless)	3.51E-01
Bulk density (g cm ⁻³)	1.18E+00
Threshold value of wind speed at 10m (m s ⁻¹)	7.20E+00
Empirical function (<i>F_x</i>) for dust model (dimensionless)	1.22E+00
Ambient soil temperature (K)	2.83E+02
Soil pH	8.34E+00
Soil Organic Matter content (%)	2.19E+00
Fraction of organic carbon (g g ⁻¹)	1.27E-02
Effective total fluid saturation (unitless)	3.62E-01
Intrinsic soil permeability (cm ²)	9.83E-08
Relative soil air permeability (unitless)	7.68E-01
Effective air permeability (cm ²)	7.54E-08

**Soil - Vapour Model**

Depth to top of source (no building) (cm)	0
Depth to top of source (beneath building) (cm)	65
Default soil gas ingress rate?	Yes
Soil gas ingress rate (cm ³ s ⁻¹)	1.50E+02
Building ventilation rate (cm ³ s ⁻¹)	1.13E+06
Averaging time surface emissions (yr)	49
Finite vapour source model?	No
Thickness of contaminated layer (cm)	200

Air Dispersion Model

Mean annual windspeed at 10m (m s ⁻¹)	5.00
Air dispersion factor at height of 0.8m *	68.00
Air dispersion factor at height of 1.6m *	120.00
Fraction of site cover (m ² m ⁻²)	0.8

* Air dispersion factor in g m⁻² s⁻¹ per kg m⁻³

Soil - Plant Model

	Dry weight conversion factor	Homegrown fraction		Soil loading factor	Preparation correction factor
	g DW g ⁻¹ FW	Average	High		
		dimensionless		g g ⁻¹ DW	dimensionless
Green vegetables	0.096	0.05	0.33	1.00E-03	2.00E-01
Root vegetables	0.103	0.06	0.40	1.00E-03	1.00E+00
Tuber vegetables	0.210	0.02	0.13	1.00E-03	1.00E+00
Herbaceous fruit	0.058	0.06	0.40	1.00E-03	6.00E-01
Shrub fruit	0.166	0.09	0.60	1.00E-03	6.00E-01
Tree fruit	0.157	0.04	0.27	1.00E-03	6.00E-01

Gardener type None

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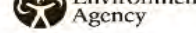
RESULTS



		Assessment Criterion (mg kg ⁻¹)			Ratio of ADE to HCV			Saturation Limit (mg kg ⁻¹)	50% rule?	
		oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
1	Arsenic	6.35E+02	6.95E+02	NR	1.00	0.91	NR	NR	No	No
2	Cadmium	3.99E+02	3.87E+02	2.30E+02	0.41	0.59	1.00	NR	Yes	No
3	Chromium (III)	3.31E+05	3.34E+04	3.04E+04	0.09	0.91	1.00	NR	No	No
4	Chromium (VI)	2.01E+03	3.48E+01	3.42E+01	0.02	0.98	1.00	NR	No	No
5	Lead	7.11E+03	4.96E+04	6.22E+03	0.87	0.13	1.00	NR	No	No
6	Mercury, inorganic	4.41E+03	2.09E+04	3.64E+03	0.83	0.17	1.00	NR	No	No
7	Nickel	2.22E+04	1.79E+03	NR	0.07	1.00	NR	NR	No	No
8	Selenium	1.30E+04	NR	NR	1.00	NR	NR	NR	No	No
9	Copper	1.78E+05	9.60E+04	7.17E+04	0.25	0.75	1.00	NR	Yes	No
10	Zinc	6.67E+05	2.09E+08	6.65E+05	1.00	0.00	1.00	NR	Yes	No
11	Acenaphthene	1.10E+05	5.41E+05	9.12E+04	0.83	0.17	1.00	1.23E+02 (sol)	No	No
12	Acenaphthylene	1.10E+05	5.55E+05	9.16E+04	0.83	0.17	1.00	1.85E+02 (sol)	No	No
13	Anthracene	5.49E+05	2.09E+07	5.35E+05	0.97	0.03	1.00	2.55E+00 (vap)	No	No
14	Benz[a]anthracene	2.52E+02	1.53E+02	9.53E+01	0.38	0.62	1.00	3.75E+00 (sol)	No	No
15	Benzo[a]pyrene	3.66E+01	2.38E+01	1.44E+01	0.39	0.61	1.00	1.99E+00 (vap)	No	No
16	Benzo[b]fluoranthene	2.60E+02	1.69E+02	1.02E+02	0.39	0.61	1.00	2.66E+00 (sol)	No	No
17	Benzo[ghi]perylene	1.66E+03	1.10E+03	6.61E+02	0.40	0.60	1.00	3.37E-02 (vap)	No	No
18	Benzo[k]fluoranthene	3.66E+02	2.38E+02	1.44E+02	0.39	0.61	1.00	1.50E+00 (sol)	No	No
19	Chrysene	3.66E+02	2.33E+02	1.42E+02	0.39	0.61	1.00	9.63E-01 (vap)	No	No
20	Dibenz[ah]anthracene	3.29E+01	2.14E+01	1.30E+01	0.39	0.61	1.00	8.60E-03 (vap)	No	No

[illegible]



		Soil Distribution				Media Concentrations													
						Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables
		%	%	%	%	mg kg ⁻¹	mg m ⁻³	mg kg ⁻¹	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW
1	Arsenic	100.0	0.0	0.0	100.0	6.35E+02	NR	3.18E+02	7.63E-06	4.32E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
2	Cadmium	99.8	0.2	0.0	100.0	2.30E+02	NR	1.15E+02	2.77E-06	1.57E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
3	Chromium (III)	100.0	0.0	0.0	100.0	3.04E+04	NR	1.52E+04	3.65E-04	2.07E-04	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
4	Chromium (VI)	98.9	1.1	0.0	100.0	3.42E+01	NR	1.71E+01	4.11E-07	2.33E-07	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
5	Lead	100.0	0.0	0.0	100.0	6.22E+03	NR	3.11E+03	7.47E-05	4.23E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
6	Mercury, inorganic	100.0	0.0	0.0	100.0	3.64E+03	NR	1.82E+03	4.38E-05	2.48E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
7	Nickel	100.0	0.0	0.0	100.0	1.79E+03	NR	8.94E+02	2.15E-05	1.22E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
8	Selenium	99.6	0.4	0.0	100.0	1.30E+04	NR	6.51E+03	1.56E-04	8.87E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
9	Copper	99.8	0.2	0.0	100.0	7.17E+04	NR	3.59E+04	8.62E-04	4.89E-04	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
10	Zinc	99.5	0.5	0.0	100.0	6.65E+05	NR	3.33E+05	8.00E-03	4.53E-03	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
11	Acenaphthene	99.3	0.7	0.0	100.0	9.12E+04	2.31E+03	4.56E+04	1.10E-03	6.21E-04	2.09E-01	1.30E-01	7.37E-02	NA	NA	NA	NA	NA	NA
12	Acenaphthylene	99.1	0.9	0.0	100.0	9.16E+04	2.23E+03	4.58E+04	1.10E-03	6.24E-04	2.05E-01	1.31E-01	7.40E-02	NA	NA	NA	NA	NA	NA
13	Anthracene	99.7	0.3	0.0	100.0	5.35E+05	1.35E+03	2.67E+05	6.42E-03	3.64E-03	1.25E-01	2.48E-01	1.41E-01	NA	NA	NA	NA	NA	NA
14	Benzo[a]anthracene	100.0	0.0	0.0	100.0	9.53E+01	3.05E-03	4.76E+01	1.14E-06	6.49E-07	3.17E-07	6.27E-06	3.55E-06	NA	NA	NA	NA	NA	NA
15	Benzo[a]pyrene	100.0	0.0	0.0	100.0	1.44E+01	1.55E-05	7.20E+00	1.73E-07	9.81E-08	2.00E-09	5.50E-07	3.12E-07	NA	NA	NA	NA	NA	NA
16	Benzo[b]fluoranthene	100.0	0.0	0.0	100.0	1.02E+02	1.58E-04	5.12E+01	1.23E-06	6.98E-07	2.03E-08	4.33E-06	2.45E-06	NA	NA	NA	NA	NA	NA
17	Benzo[ghi]perylene	100.0	0.0	0.0	100.0	6.61E+02	3.57E-04	3.31E+02	7.95E-06	4.50E-06	4.53E-08	1.40E-05	7.93E-06	NA	NA	NA	NA	NA	NA
18	Benzo[k]fluoranthene	100.0	0.0	0.0	100.0	1.44E+02	1.34E-04	7.21E+01	1.73E-06	9.82E-07	1.72E-08	5.10E-06	2.89E-06	NA	NA	NA	NA	NA	NA
19	Chrysene	100.0	0.0	0.0	100.0	1.42E+02	6.49E-04	7.12E+01	1.71E-06	9.70E-07	8.22E-08	8.58E-06	4.86E-06	NA	NA	NA	NA	NA	NA
20	Dibenz[ah]anthracene	100.0	0.0	0.0	100.0	1.30E+01	2.96E-05	6.49E+00	1.56E-07	8.84E-08	3.63E-09	4.14E-07	2.34E-07	NA	NA	NA	NA	NA	NA

[illegible]



		Average Daily Exposure (mg kg ⁻¹ bw day ⁻¹)							Distribution by Pathway (%)							
		Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
1	Arsenic	2.86E-04	0.00E+00	1.42E-05	1.83E-06	0.00E+00	0.00E+00	0.00E+00	94.70	0.00	4.69	0.61	0.00	0.00	0.00	0.00
2	Cadmium	1.04E-04	0.00E+00	1.71E-07	6.63E-07	0.00E+00	1.91E-04	2.86E-07	49.69	0.00	0.08	0.32	0.00	0.00	49.77	0.14
3	Chromium (III)	1.37E-02	0.00E+00	0.00E+00	8.73E-05	0.00E+00	8.60E-04	3.86E-06	93.49	0.00	0.00	0.60	0.00	0.00	5.88	0.03
4	Chromium (VI)	1.54E-05	0.00E+00	0.00E+00	9.84E-08	0.00E+00	9.57E-05	0.00E+00	49.84	0.00	0.00	0.32	0.00	0.00	49.84	0.00
5	Lead	2.80E-03	0.00E+00	0.00E+00	1.79E-05	0.00E+00	3.71E-04	4.29E-07	87.77	0.00	0.00	0.56	0.00	0.00	11.65	0.01
6	Mercury, inorganic	1.64E-03	0.00E+00	0.00E+00	1.05E-05	0.00E+00	1.43E-05	0.00E+00	98.51	0.00	0.00	0.63	0.00	0.00	0.86	0.00
7	Nickel	8.05E-04	0.00E+00	6.64E-06	5.14E-06	0.00E+00	1.86E-03	8.57E-07	49.10	0.00	0.41	0.31	0.00	0.00	49.82	0.05
8	Selenium	5.86E-03	0.00E+00	0.00E+00	3.75E-05	0.00E+00	5.00E-04	8.57E-07	91.59	0.00	0.00	0.59	0.00	0.00	7.83	0.00
9	Copper	3.23E-02	0.00E+00	0.00E+00	2.06E-04	0.00E+00	1.00E-01	9.71E-06	49.83	0.00	0.00	0.32	0.00	0.00	49.83	0.01
10	Zinc	3.00E-01	0.00E+00	0.00E+00	1.91E-03	0.00E+00	3.86E-01	3.43E-05	49.84	0.00	0.00	0.32	0.00	0.00	49.84	0.01
11	Acenaphthene	4.11E-02	0.00E+00	8.81E-03	2.62E-04	9.86E-03	1.40E-05	3.57E-07	68.41	0.00	14.69	0.44	16.08	0.35	0.02	0.00
12	Acenaphthylene	4.12E-02	0.00E+00	8.85E-03	2.64E-04	9.65E-03	2.00E-06	1.57E-07	68.72	0.00	14.75	0.44	15.72	0.35	0.00	0.00
13	Anthracene	2.41E-01	0.00E+00	5.17E-02	1.54E-03	6.15E-03	1.14E-06	1.57E-07	80.21	0.00	17.22	0.51	1.92	0.13	0.00	0.00
14	Benzo[a]anthracene	4.29E-05	0.00E+00	9.20E-06	2.74E-07	2.48E-08	8.57E-07	1.57E-07	81.86	0.00	17.57	0.52	0.03	0.02	0.00	0.00
15	Benzo[a]pyrene	6.48E-06	0.00E+00	1.39E-06	4.14E-08	9.87E-10	1.57E-06	8.57E-08	81.88	0.00	17.58	0.52	0.00	0.01	0.00	0.00
16	Benzo[b]fluoranthene	4.61E-05	0.00E+00	9.90E-06	2.95E-07	7.97E-09	1.57E-06	1.86E-07	81.88	0.00	17.58	0.52	0.00	0.01	0.00	0.00
17	Benzo[ghi]perylene	2.98E-04	0.00E+00	6.39E-05	1.90E-06	2.49E-08	8.57E-07	1.43E-07	81.89	0.00	17.58	0.52	0.00	0.01	0.00	0.00
18	Benzo[k]fluoranthene	6.49E-05	0.00E+00	1.39E-05	4.15E-07	9.10E-09	1.29E-06	1.00E-07	81.88	0.00	17.58	0.52	0.00	0.01	0.00	0.00
19	Chrysene	6.41E-05	0.00E+00	1.38E-05	4.10E-07	1.78E-08	1.57E-06	2.43E-07	81.88	0.00	17.58	0.52	0.00	0.02	0.00	0.00
20	Dibenz[ah]anthracene	5.84E-06	0.00E+00	1.25E-06	3.73E-08	8.40E-10	5.71E-07	4.71E-07	81.88	0.00	17.58	0.52	0.00	0.01	0.00	0.00

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		Soil-to-water partition coefficient ($\text{cm}^3 \text{g}^{-1}$)	Vapour pressure (Pa)	Water solubility (mg L^{-1})	Soil-to-plant concentration factor for green vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for root vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tree fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)
1	Arsenic	5.00E+02	NR	1.25E+06	0.00043 fw	0.0004 fw	0.00023 fw	0.00033 fw	0.0002 fw	0.0011 fw
2	Cadmium	1.00E+02	NR	1.62E+06	0.052 fw	0.029 fw	0.031 fw	0.016 fw	0.0031 fw	0.0014 fw
3	Chromium (III)	4.80E+03	NR	5.85E+05	0.00003 fw	0.00003 fw	0.00003 fw	0.00003 fw	0.00003 fw	0.00003 fw
4	Chromium (VI)	1.80E+01	NR	2.30E+06	0.0002 fw	0.0001 fw	0.0001 fw	0.09 fw	0.0003 fw	0.09 fw
5	Lead	3.00E+03	NR	0.00E+00	model	model	model	model	model	model
6	Mercury, inorganic	5.00E+02	NR	7.40E+04	0.0038 fw	0.0069 fw	0.0043 fw	0.001 fw	0.0011 fw	0.001 fw
7	Nickel	5.00E+02	NR	2.50E+06	0.0038 fw	0.0043 fw	0.0019 fw	0.0025 fw	0.0025 fw	0.0034 fw
8	Selenium	5.00E+01	NR	2.17E+06	0.0108 fw	0.00364 fw	0.00083 fw	0.00271 fw	0.003 fw	0.003 fw
9	Copper	1.00E+02	NR	1.38E+06	0.0206 fw	0.0206 fw	0.0206 fw	0.0233 fw	0.0206 fw	0.0206 fw
10	Zinc	3.80E+01	NR	4.32E+06	0.054 fw	0.054 fw	0.054 fw	0.143 fw	0.054 fw	0.054 fw
11	Acenaphthene	2.98E+01	7.37E-02	4.11E+00	model	model	model	model	model	model
12	Acenaphthylene	2.31E+01	7.08E-02	7.95E+00	model	model	model	model	model	model
13	Anthracene	7.14E+01	8.49E-05	5.60E-02	model	model	model	model	model	model
14	Benzo[a]anthracene	9.86E+02	1.24E-06	3.80E-03	model	model	model	model	model	model
15	Benzo[a]pyrene	1.64E+03	2.00E-08	3.80E-03	model	model	model	model	model	model
16	Benzo[b]fluoranthene	1.33E+03	6.34E+08	2.00E-03	model	model	model	model	model	model
17	Benzo[ghi]perylene	5.30E+03	1.55E-10	2.60E-04	model	model	model	model	model	model
18	Benzo[k]fluoranthene	1.88E+03	1.64E-08	8.00E-04	model	model	model	model	model	model
19	Chrysene	6.98E+02	4.52E-08	2.00E-03	model	model	model	model	model	model
20	Dibenz[ah]anthracene	2.37E+03	1.66E-10	6.00E-04	model	model	model	model	model	model

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Report generated 21/09/2010

Report title Blyth Road, Hayes - Commercial

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BASIC SETTINGS

Land Use Commercial

Building Office (pre 1970)

Receptor Female (com)

Start age class 17

End age class 17

Exposure Duration 49 years

Soil Sand

Exposure Pathways

Direct soil and dust ingestion	☒
Consumption of homegrown produce	☐
Soil attached to homegrown produce	☐

Dermal contact with indoor dust	☒
Dermal contact with soil	☒

Inhalation of indoor dust	☒
Inhalation of soil dust	☒
Inhalation of indoor vapour	☒
Inhalation of outdoor vapour	☒



Land Use Commercial

Age Class	Exposure Frequencies (days yr ⁻¹)						Occupation Periods (hr day ⁻¹)		Soil to skin adherence factors (mg cm ²)		Direct soil ingestion rate (g day ⁻¹)
	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with indoor dust	Dermal contact with soil	Inhalation of dust and vapour, indoor	Inhalation of dust and vapour, outdoor	Indoors	Outdoors	Indoor	Outdoor	
1	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
2	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
3	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
4	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
5	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
6	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
7	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
8	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
9	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
10	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
11	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
12	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
13	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
14	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
15	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
16	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
17	230	0	230	170	230	170	8.3	0.7	0.14	0.14	0.05
18	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00



Receptor Female (com)

Age Class	Body weight (kg)	Body height (m)	Inhalation rate (m ³ day ⁻¹)	Max exposed skin factor		Total skin area (m ²)	Consumption rates (g FW kg ⁻¹ BW day ⁻¹)					
				Indoor (m ² m ⁻²)	Outdoor (m ² m ⁻²)		Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
1	5.60	0.7	8.5	0.00	0.00	3.43E-01	7.12	10.69	16.03	1.83	2.23	3.82
2	9.80	0.8	13.3	0.00	0.00	4.84E-01	6.85	3.30	5.46	3.96	0.54	11.96
3	12.70	0.9	12.7	0.00	0.00	5.82E-01	6.85	3.30	5.46	3.96	0.54	11.96
4	15.10	0.9	12.2	0.00	0.00	6.36E-01	6.85	3.30	5.46	3.96	0.54	11.96
5	16.90	1.0	12.2	0.00	0.00	7.04E-01	3.74	1.77	3.38	1.85	0.16	4.26
6	19.70	1.1	12.2	0.00	0.00	7.94E-01	3.74	1.77	3.38	1.85	0.16	4.26
7	22.10	1.2	12.4	0.00	0.00	8.73E-01	3.74	1.77	3.38	1.85	0.16	4.26
8	25.30	1.2	12.4	0.00	0.00	9.36E-01	3.74	1.77	3.38	1.85	0.16	4.26
9	27.50	1.3	12.4	0.00	0.00	1.01E+00	3.74	1.77	3.38	1.85	0.16	4.26
10	31.40	1.3	12.4	0.00	0.00	1.08E+00	3.74	1.77	3.38	1.85	0.16	4.26
11	35.70	1.4	12.4	0.00	0.00	1.19E+00	3.74	1.77	3.38	1.85	0.16	4.26
12	41.30	1.4	13.4	0.00	0.00	1.29E+00	3.74	1.77	3.38	1.85	0.16	4.26
13	47.20	1.5	13.4	0.00	0.00	1.42E+00	3.74	1.77	3.38	1.85	0.16	4.26
14	51.20	1.6	13.4	0.00	0.00	1.52E+00	3.74	1.77	3.38	1.85	0.16	4.26
15	56.70	1.6	13.4	0.00	0.00	1.60E+00	3.74	1.77	3.38	1.85	0.16	4.26
16	59.00	1.6	13.4	0.00	0.00	1.63E+00	3.74	1.77	3.38	1.85	0.16	4.26
17	70.00	1.6	14.8	0.08	0.08	1.78E+00	2.94	1.40	1.79	1.61	0.22	2.97
18	70.90	1.6	12.0	0.00	0.00	1.80E+00	2.94	1.40	1.79	1.61	0.22	2.97

Building Office (pre 1970)

Building footprint (m ²)	4.24E+02
Living space air exchange rate (hr ⁻¹)	1.00E+00
Living space height (above ground, m)	9.60E+00
Living space height (below ground, m)	0.00E+00
Pressure difference (soil to enclosed space, Pa)	4.40E+00
Foundation thickness (m)	1.50E-01
Floor crack area (cm ²)	1.65E+03
Dust loading factor (µg m ⁻³)	1.00E+02

Soil Sand

Porosity, Total (cm ³ cm ⁻³)	5.40E-01
Porosity, Air-Filled (cm ³ cm ⁻³)	3.00E-01
Porosity, Water-Filled (cm ³ cm ⁻³)	2.40E-01
Residual soil water content (cm ³ cm ⁻³)	7.00E-02
Saturated hydraulic conductivity (cm s ⁻¹)	7.36E-03
van Genuchten shape parameter <i>m</i> (dimensionless)	3.51E-01
Bulk density (g cm ⁻³)	1.18E+00
Threshold value of wind speed at 10m (m s ⁻¹)	7.20E+00
Empirical function (<i>F_x</i>) for dust model (dimensionless)	1.22E+00
Ambient soil temperature (K)	2.83E+02
Soil pH	8.34E+00
Soil Organic Matter content (%)	2.19E+00
Fraction of organic carbon (g g ⁻¹)	1.27E-02
Effective total fluid saturation (unitless)	3.62E-01
Intrinsic soil permeability (cm ²)	9.83E-08
Relative soil air permeability (unitless)	7.68E-01
Effective air permeability (cm ²)	7.54E-08

**Soil - Vapour Model**

Depth to top of source (no building) (cm)	0
Depth to top of source (beneath building) (cm)	65
Default soil gas ingress rate?	Yes
Soil gas ingress rate (cm ³ s ⁻¹)	1.50E+02
Building ventilation rate (cm ³ s ⁻¹)	1.13E+06
Averaging time surface emissions (yr)	49
Finite vapour source model?	No
Thickness of contaminated layer (cm)	200

Air Dispersion Model

Mean annual windspeed at 10m (m s ⁻¹)	5.00
Air dispersion factor at height of 0.8m *	68.00
Air dispersion factor at height of 1.6m *	120.00
Fraction of site cover (m ² m ⁻²)	0.8

* Air dispersion factor in g m⁻² s⁻¹ per kg m⁻³**Soil - Plant Model**

	Dry weight conversion factor	Homegrown fraction		Soil loading factor	Preparation correction factor
	g DW g ⁻¹ FW	Average	High		
		dimensionless		g g ⁻¹ DW	dimensionless
Green vegetables	0.096	0.05	0.33	1.00E-03	2.00E-01
Root vegetables	0.103	0.06	0.40	1.00E-03	1.00E+00
Tuber vegetables	0.210	0.02	0.13	1.00E-03	1.00E+00
Herbaceous fruit	0.058	0.06	0.40	1.00E-03	6.00E-01
Shrub fruit	0.166	0.09	0.60	1.00E-03	6.00E-01
Tree fruit	0.157	0.04	0.27	1.00E-03	6.00E-01

Gardener type None

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RESULTS



		Assessment Criterion (mg kg ⁻¹)			Ratio of ADE to HCV			Saturation Limit (mg kg ⁻¹)	50% rule?	
		oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
1	Aliphatics (C5-C6)	4.77E+06	3.96E+03	3.96E+03	0.00	1.00	1.00	5.70E+02 (sol)	Yes	Yes
2	Aliphatics (>C6-C8)	4.77E+06	1.06E+04	1.06E+04	0.00	1.00	1.00	2.98E+02 (sol)	Yes	Yes
3	Aliphatics (>C8-C10)	9.53E+04	2.88E+03	2.86E+03	0.02	0.98	1.00	1.68E+02 (vap)	Yes	Yes
4	Aliphatics (>C10-C12)	9.53E+04	1.44E+04	1.38E+04	0.08	0.92	1.00	1.04E+02 (vap)	Yes	Yes
5	Aliphatics (>C12-C16)	9.53E+04	1.18E+05	7.00E+04	0.58	0.42	1.00	5.18E+01 (sol)	Yes	Yes
6	Aliphatics (>C16-C35)	1.66E+06	NR	NR	1.00	NR	NR	1.86E+01 (sol)	Yes	No
7	Aromatics (EC5-EC7)	4.25E+05	2.84E+04	2.66E+04	0.06	0.94	1.00	1.94E+03 (sol)	No	No
8	Aromatics (>EC7-EC8)	4.25E+05	7.60E+04	6.45E+04	0.15	0.85	1.00	1.66E+03 (vap)	No	No
9	Aromatics (>EC8-EC10)	3.81E+04	5.03E+03	4.85E+03	0.07	0.93	1.00	1.32E+03 (vap)	Yes	Yes
10	Aliphatics (>C10-C12)	9.53E+04	1.44E+04	1.38E+04	0.08	0.92	1.00	1.04E+02 (vap)	Yes	Yes
11	Aromatics (>EC12-EC16)	3.81E+04	2.85E+05	3.68E+04	0.93	0.07	1.00	3.67E+02 (sol)	Yes	Yes
12	Aromatics (>EC16-EC21)	2.83E+04	NR	NR	1.00	NR	NR	1.17E+02 (vap)	Yes	No
13	Aromatics (>EC21-EC35)	2.84E+04	NR	NR	1.00	NR	NR	1.06E+01 (sol)	Yes	No
14										
15	Benzene	5.53E+02	2.84E+01	2.70E+01	0.05	0.95	1.00	1.94E+03 (sol)	No	No
16	Ethylbenzene	1.91E+05	2.11E+04	1.90E+04	0.10	0.90	1.00	1.06E+03 (vap)	No	No
17	Toluene	4.25E+05	7.60E+04	6.45E+04	0.15	0.85	1.00	1.66E+03 (vap)	No	No
18	Xylene, m-	3.43E+05	7.61E+03	7.44E+03	0.02	0.98	1.00	1.29E+03 (vap)	No	No
19	Xylene, o-	3.43E+05	8.11E+03	7.92E+03	0.02	0.98	1.00	9.77E+02 (sol)	No	No
20	Xylene, p-	3.43E+05	7.29E+03	7.13E+03	0.02	0.98	1.00	1.18E+03 (sol)	No	No

[illegible]



		Soil Distribution				Media Concentrations													
		Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
		%	%	%	%	mg kg ⁻¹	mg m ⁻³	mg kg ⁻¹	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW
1	Aliphatics (C5-C6)	65.1	1.3	33.6	100.0	3.96E+03	5.25E+06	1.98E+03	4.76E-05	2.70E-05	5.42E+01	1.65E+00	9.35E-01	NA	NA	NA	NA	NA	NA
2	Aliphatics (>C6-C8)	87.1	0.4	12.5	100.0	1.06E+04	5.24E+06	5.32E+03	1.28E-04	7.25E-05	5.41E+01	2.70E+00	1.53E+00	NA	NA	NA	NA	NA	NA
3	Aliphatics (>C8-C10)	97.3	0.1	2.7	100.0	2.86E+03	3.01E+05	1.43E+03	3.44E-05	1.95E-05	3.11E+00	3.36E-01	1.90E-01	NA	NA	NA	NA	NA	NA
4	Aliphatics (>C10-C12)	99.5	0.0	0.5	100.0	1.38E+04	2.90E+05	6.89E+03	1.66E-04	9.39E-05	2.99E+00	7.23E-01	4.10E-01	NA	NA	NA	NA	NA	NA
5	Aliphatics (>C12-C16)	99.9	0.0	0.1	100.0	7.00E+04	1.75E+05	3.50E+04	8.41E-04	4.77E-04	1.81E+00	1.27E+00	7.18E-01	NA	NA	NA	NA	NA	NA
6	Aliphatics (>C16-C35)	100.0	0.0	0.0	100.0	1.66E+06	2.42E+05	8.28E+05	1.99E-02	1.13E-02	2.50E+00	7.24E+00	4.11E+00	NA	NA	NA	NA	NA	NA
7	Aromatics (EC5-EC7)	78.7	18.6	2.7	100.0	2.66E+04	2.83E+06	1.33E+04	3.20E-04	1.81E-04	2.83E+01	2.94E+00	1.66E+00	NA	NA	NA	NA	NA	NA
8	Aromatics (>EC7-EC8)	91.8	7.2	1.0	100.0	6.45E+04	2.62E+06	3.22E+04	7.75E-04	4.39E-04	2.55E+01	4.15E+00	2.35E+00	NA	NA	NA	NA	NA	NA
9	Aromatics (>EC8-EC10)	98.7	1.0	0.3	100.0	4.85E+03	6.01E+04	2.42E+03	5.83E-05	3.30E-05	6.21E-01	1.95E-01	1.11E-01	NA	NA	NA	NA	NA	NA
10	Aliphatics (>C10-C12)	99.5	0.0	0.5	100.0	1.38E+04	2.90E+05	6.89E+03	1.66E-04	9.39E-05	2.99E+00	7.23E-01	4.10E-01	NA	NA	NA	NA	NA	NA
11	Aromatics (>EC12-EC16)	99.7	0.3	0.0	100.0	3.68E+04	7.26E+03	1.84E+04	4.42E-04	2.50E-04	7.50E-02	1.87E-01	1.06E-01	NA	NA	NA	NA	NA	NA
12	Aromatics (>EC16-EC21)	99.9	0.1	0.0	100.0	2.83E+04	1.09E+02	1.41E+04	3.40E-04	1.93E-04	1.15E-03	2.08E-02	1.18E-02	NA	NA	NA	NA	NA	NA
13	Aromatics (>EC21-EC35)	100.0	0.0	0.0	100.0	2.84E+04	4.41E-01	1.42E+04	3.42E-04	1.94E-04	5.33E-06	2.19E-03	1.24E-03	NA	NA	NA	NA	NA	NA
14																			
15	Benzene	78.7	18.6	2.7	100.0	2.70E+01	2.87E+03	1.35E+01	3.25E-07	1.84E-07	2.88E-02	2.99E-03	1.69E-03	NA	NA	NA	NA	NA	NA
16	Ethylbenzene	96.0	3.4	0.6	100.0	1.90E+04	4.47E+05	9.52E+03	2.29E-04	1.30E-04	4.23E+00	8.86E-01	5.02E-01	NA	NA	NA	NA	NA	NA
17	Toluene	91.8	7.2	1.0	100.0	6.45E+04	2.62E+06	3.22E+04	7.75E-04	4.39E-04	2.55E+01	4.15E+00	2.35E+00	NA	NA	NA	NA	NA	NA
18	Xylene, m-	96.4	3.2	0.4	100.0	7.44E+03	1.29E+05	3.72E+03	8.94E-05	5.07E-05	1.22E+00	2.97E-01	1.69E-01	NA	NA	NA	NA	NA	NA
19	Xylene, o-	96.0	3.6	0.4	100.0	7.92E+03	1.29E+05	3.96E+03	9.52E-05	5.39E-05	1.22E+00	3.06E-01	1.74E-01	NA	NA	NA	NA	NA	NA
20	Xylene, p-	96.1	3.4	0.5	100.0	7.13E+03	1.29E+05	3.57E+03	8.57E-05	4.86E-05	1.22E+00	2.92E-01	1.65E-01	NA	NA	NA	NA	NA	NA

[illegible]



		Average Daily Exposure (mg kg ⁻¹ bw day ⁻¹)							Distribution by Pathway (%)							
		Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
1	Aliphatics (C5-C6)	1.78E-03	0.00E+00	2.95E-04	1.14E-05	2.50E+00	1.43E+95	1.43E+95	0.04	0.00	0.01	0.00	49.90	0.05	0.04	49.96
2	Aliphatics (>C6-C8)	4.79E-03	0.00E+00	7.91E-04	3.06E-05	2.50E+00	1.43E+95	1.43E+95	0.10	0.00	0.02	0.00	49.80	0.09	0.11	49.89
3	Aliphatics (>C8-C10)	1.29E-03	0.00E+00	2.13E-04	8.23E-06	1.44E-01	1.43E+95	1.43E+95	0.44	0.00	0.07	0.00	49.29	0.19	0.52	49.48
4	Aliphatics (>C10-C12)	6.20E-03	0.00E+00	1.02E-03	3.97E-05	1.39E-01	1.43E+95	1.43E+95	2.12	0.00	0.35	0.01	47.11	0.40	2.47	47.53
5	Aliphatics (>C12-C16)	3.15E-02	0.00E+00	5.20E-03	2.01E-04	8.55E-02	1.43E+95	1.43E+95	12.87	0.00	2.12	0.08	34.08	0.84	14.99	35.01
6	Aliphatics (>C16-C35)	7.45E-01	0.00E+00	1.23E-01	4.76E-03	1.27E-01	1.43E+95	0.00E+00	37.25	0.00	6.15	0.24	5.77	0.59	50.00	0.00
7	Aromatics (EC5-EC7)	1.20E-02	0.00E+00	1.98E-03	7.65E-05	1.31E+00	4.29E-05	2.86E-03	0.90	0.00	0.15	0.01	98.36	0.36	0.00	0.22
8	Aromatics (>EC7-EC8)	2.90E-02	0.00E+00	4.79E-03	1.85E-04	1.18E+00	1.43E-04	7.43E-03	2.37	0.00	0.39	0.02	96.05	0.55	0.01	0.61
9	Aromatics (>EC8-EC10)	2.18E-03	0.00E+00	3.60E-04	1.39E-05	2.89E-02	1.43E+95	1.43E+95	3.46	0.00	0.57	0.02	45.44	0.50	4.04	45.96
10	Aliphatics (>C10-C12)	6.20E-03	0.00E+00	1.02E-03	3.97E-05	1.39E-01	1.43E+95	1.43E+95	2.12	0.00	0.35	0.01	47.11	0.40	2.47	47.53
11	Aromatics (>EC12-EC16)	1.66E-02	0.00E+00	2.73E-03	1.06E-04	3.76E-03	1.43E+95	1.43E+95	35.75	0.00	5.90	0.23	7.46	0.66	41.65	8.35
12	Aromatics (>EC16-EC21)	1.27E-02	0.00E+00	2.10E-03	8.14E-05	8.67E-05	1.43E+95	0.00E+00	42.43	0.00	7.01	0.27	0.18	0.11	50.00	0.00
13	Aromatics (>EC21-EC35)	1.28E-02	0.00E+00	2.11E-03	8.18E-05	3.81E-06	1.43E+95	0.00E+00	42.67	0.00	7.05	0.27	0.00	0.01	50.00	0.00
14																
15	Benzene	1.22E-05	0.00E+00	2.01E-06	7.78E-08	1.33E-03	0.00E+00	0.00E+00	0.90	0.00	0.15	0.01	98.58	0.36	0.00	0.00
16	Ethylbenzene	8.57E-03	0.00E+00	1.41E-03	5.48E-05	1.96E-01	7.14E-05	1.86E-03	4.11	0.00	0.68	0.03	93.56	0.69	0.03	0.89
17	Toluene	2.90E-02	0.00E+00	4.79E-03	1.85E-04	1.18E+00	1.43E-04	7.43E-03	2.37	0.00	0.39	0.02	96.05	0.55	0.01	0.61
18	Xylene, m-	3.35E-03	0.00E+00	5.53E-04	2.14E-05	5.67E-02	1.57E-04	2.00E-03	5.33	0.00	0.88	0.03	89.54	0.77	0.25	3.18
19	Xylene, o-	3.56E-03	0.00E+00	5.89E-04	2.28E-05	5.66E-02	1.57E-04	2.00E-03	5.66	0.00	0.93	0.04	89.15	0.79	0.25	3.18
20	Xylene, p-	3.21E-03	0.00E+00	5.30E-04	2.05E-05	5.68E-02	1.57E-04	2.00E-03	5.12	0.00	0.85	0.03	89.80	0.76	0.25	3.19

[illegible]



		Oral Health Criteria Value ($\mu\text{g kg}^{-1}$ BW day $^{-1}$)		Inhalation Health Criteria Value ($\mu\text{g kg}^{-1}$ BW day $^{-1}$)		Oral Mean Daily Intake ($\mu\text{g day}^{-1}$)	Inhalation Mean Daily Intake ($\mu\text{g day}^{-1}$)	Air-water partition coefficient (K_{aw}) ($\text{cm}^3 \text{cm}^{-3}$)	Coefficient of Diffusion in Air ($\text{m}^2 \text{s}^{-1}$)	Coefficient of Diffusion in Water ($\text{m}^2 \text{s}^{-1}$)	$\log K_{oc}$ ($\text{cm}^3 \text{g}^{-1}$)	$\log K_{ow}$ (dimensionless)	Dermal Absorption Fraction (dimensionless)	Soil-to-dust transport factor (g g^{-1} DW)	Sub-surface soil to indoor air correction factor (dimensionless)	Relative bioavailability via soil ingestion (unitless)	Relative bioavailability via dust inhalation (unitless)
1	Aliphatics (C5-C6)	TDI	5000	TDI	5000	9.99E+99	9.99E+99	2.10E+01	1.00E-05	1.00E-09	2.91	3.31	0.1	0.5	10	1	1
2	Aliphatics (>C6-C8)	TDI	5000	TDI	5000	9.99E+99	9.99E+99	2.73E+01	1.00E-05	1.00E-09	3.58	4.13	0.1	0.5	10	1	1
3	Aliphatics (>C8-C10)	TDI	100	TDI	290	9.99E+99	9.99E+99	4.15E+01	1.00E-05	1.00E-09	4.48	5.22	0.1	0.5	10	1	1
4	Aliphatics (>C10-C12)	TDI	100	TDI	290	9.99E+99	9.99E+99	6.44E+01	1.00E-05	1.00E-09	5.38	6.3	0.1	0.5	10	1	1
5	Aliphatics (>C12-C16)	TDI	100	TDI	290	9.99E+99	9.99E+99	1.71E+02	1.00E-05	1.00E-09	6.73	7.94	0.1	0.5	10	1	1
6	Aliphatics (>C16-C35)	TDI	2000	NR	0	9.99E+99	NR	1.07E+03	1.00E-05	1.00E-09	8.76	10.39	0.1	0.5	10	1	1
7	Aromatics (EC5-EC7)	TDI	223	TDI	1400	3	200	1.16E-01	8.77E-06	6.64E-10	1.83	2.13	0.1	0.5	10	1	1
8	Aromatics (>EC7-EC8)	TDI	223	TDI	1400	10	520	1.15E-01	7.78E-06	5.88E-10	2.31	2.73	0.1	0.5	10	1	1
9	Aromatics (>EC8-EC10)	TDI	40	TDI	60	9.99E+99	9.99E+99	2.53E-01	1.00E-05	1.00E-09	3.2	3.69	0.1	0.5	10	1	1
10	Aliphatics (>C10-C12)	TDI	100	TDI	290	9.99E+99	9.99E+99	6.44E+01	1.00E-05	1.00E-09	5.38	6.3	0.1	0.5	10	1	1
11	Aromatics (>EC12-EC16)	TDI	40	TDI	60	9.99E+99	9.99E+99	1.26E-02	1.00E-05	1.00E-09	3.7	4.29	0.1	0.5	10	1	1
12	Aromatics (>EC16-EC21)	TDI	30	NR	NR	9.99E+99	NR	6.95E-04	1.00E-05	1.00E-09	4.15	4.82	0.1	0.5	10	1	1
13	Aromatics (>EC21-EC35)	TDI	30	NR	NR	9.99E+99	NR	2.48E-05	1.00E-05	1.00E-09	5.1	5.95	0.1	0.5	10	1	1
14																	
15	Benzene	ID	0.29	ID	1.4	NR	NR	1.16E-01	8.77E-06	6.64E-10	1.83	2.13	0.1	0.5	10	1	1
16	Ethylbenzene	TDI	100	TDI	220	5	130	1.39E-01	7.04E-06	5.31E-10	2.65	3.15	0.1	0.5	10	1	1
17	Toluene	TDI	223	TDI	1400	10	520	1.15E-01	7.78E-06	5.88E-10	2.31	2.73	0.1	0.5	10	1	1
18	Xylene, m-	TDI	180	TDI	60	11	140	1.12E-01	7.03E-06	5.31E-10	2.69	3.2	0.1	0.5	10	1	1
19	Xylene, o-	TDI	180	TDI	60	11	140	9.20E-02	7.01E-06	5.31E-10	2.63	3.12	0.1	0.5	10	1	1
20	Xylene, p-	TDI	180	TDI	60	11	140	1.07E-01	7.04E-06	5.31E-10	2.65	3.15	0.1	0.5	10	1	1

[illegible]

		Soil-to-water partition coefficient (cm ³ g ⁻¹)	Vapour pressure (Pa)	Water solubility (mg L ⁻¹)	Soil-to-plant concentration factor for green vegetables (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for root vegetables (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for tree fruit (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)
1	Aliphatics (C5-C6)	1.03E+01	2.19E+04	3.59E+01	model	model	model	model	model	model
2	Aliphatics (>C6-C8)	4.83E+01	3.45E+03	5.37E+00	model	model	model	model	model	model
3	Aliphatics (>C8-C10)	3.84E+02	3.20E+02	4.27E-01	model	model	model	model	model	model
4	Aliphatics (>C10-C12)	3.05E+03	3.21E+01	3.39E-02	model	model	model	model	model	model
5	Aliphatics (>C12-C16)	6.82E+04	1.53E+00	7.59E-04	model	model	model	model	model	model
6	Aliphatics (>C16-C35)	7.31E+06	2.38E-02	2.54E-06	model	model	model	model	model	model
7	Aromatics (EC5-EC7)	8.59E-01	6.24E+03	1.78E+03	model	model	model	model	model	model
8	Aromatics (>EC7-EC8)	2.59E+00	1.73E+03	5.90E+02	model	model	model	model	model	model
9	Aromatics (>EC8-EC10)	2.01E+01	3.20E+02	6.46E+01	model	model	model	model	model	model
10	Aliphatics (>C10-C12)	3.05E+03	3.21E+01	3.39E-02	model	model	model	model	model	model
11	Aromatics (>EC12-EC16)	6.37E+01	1.14E+00	5.75E+00	model	model	model	model	model	model
12	Aromatics (>EC16-EC21)	1.79E+02	5.62E-03	6.53E-01	model	model	model	model	model	model
13	Aromatics (>EC21-EC35)	1.60E+03	1.61E-06	6.61E-03	model	model	model	model	model	model
14										
15	Benzene	8.59E-01	6.24E+03	1.78E+03	model	model	model	0.00E+00	0.00E+00	model
16	Ethylbenzene	5.67E+00	5.53E+02	1.80E+02	model	model	model	0.00E+00	0.00E+00	model
17	Toluene	2.59E+00	1.73E+03	5.90E+02	model	model	model	0.00E+00	0.00E+00	model
18	Xylene, m-	6.22E+00	4.95E+02	2.00E+02	model	model	model	0.00E+00	0.00E+00	model
19	Xylene, o-	5.42E+00	3.86E+02	1.73E+02	model	model	model	0.00E+00	0.00E+00	model
20	Xylene, p-	5.67E+00	4.75E+02	2.00E+02	model	model	model	0.00E+00	0.00E+00	model

[illegible]

CLEA Software Version 1.06

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Report generated 21/09/2010

Report title Blyth Rd, Hayes - Residential

Created by AC at RPS HSE



BASIC SETTINGS

Land Use Residential with homegrown produce

Building Small terraced house

Receptor Female (res)

Start age class 1

End age class 6

Exposure Duration 6 years

Soil Sand

Exposure Pathways

Direct soil and dust ingestion	☒
Consumption of homegrown produce	☒
Soil attached to homegrown produce	☒

Dermal contact with indoor dust	☒
Dermal contact with soil	☒

Inhalation of indoor dust	☒
Inhalation of soil dust	☒
Inhalation of indoor vapour	☒
Inhalation of outdoor vapour	☒



Land Use Residential with homegrown produce

Age Class	Exposure Frequencies (days yr ⁻¹)						Occupation Periods (hr day ⁻¹)		Soil to skin adherence factors (mg cm ²)		Direct soil ingestion rate (g day ⁻¹)
	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with indoor dust	Dermal contact with soil	Inhalation of dust and vapour, indoor	Inhalation of dust and vapour, outdoor	Indoors	Outdoors	Indoor	Outdoor	
1	180	180	180	180	365	365	23.0	1.0	0.06	1.00	0.10
2	365	365	365	365	365	365	23.0	1.0	0.06	1.00	0.10
3	365	365	365	365	365	365	23.0	1.0	0.06	1.00	0.10
4	365	365	365	365	365	365	23.0	1.0	0.06	1.00	0.10
5	365	365	365	365	365	365	19.0	1.0	0.06	1.00	0.10
6	365	365	365	365	365	365	19.0	1.0	0.06	1.00	0.10
7	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
8	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
9	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
10	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
11	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
12	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
13	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
14	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
15	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
16	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
17	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
18	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00



Receptor Female (res)

Age Class	Body weight (kg)	Body height (m)	Inhalation rate (m ³ day ⁻¹)	Max exposed skin factor			Consumption rates (g FW kg ⁻¹ BW day ⁻¹)					
				Indoor (m ² m ⁻²)	Outdoor (m ² m ⁻²)	Total skin area (m ²)	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
1	5.60	0.7	8.5	0.32	0.26	3.43E-01	7.12	10.69	16.03	1.83	2.23	3.82
2	9.80	0.8	13.3	0.33	0.26	4.84E-01	6.85	3.30	5.46	3.96	0.54	11.96
3	12.70	0.9	12.7	0.32	0.25	5.82E-01	6.85	3.30	5.46	3.96	0.54	11.96
4	15.10	0.9	12.2	0.35	0.28	6.36E-01	6.85	3.30	5.46	3.96	0.54	11.96
5	16.90	1.0	12.2	0.35	0.28	7.04E-01	3.74	1.77	3.38	1.85	0.16	4.26
6	19.70	1.1	12.2	0.33	0.26	7.94E-01	3.74	1.77	3.38	1.85	0.16	4.26
7	22.10	1.2	12.4	0.22	0.15	8.73E-01	3.74	1.77	3.38	1.85	0.16	4.26
8	25.30	1.2	12.4	0.22	0.15	9.36E-01	3.74	1.77	3.38	1.85	0.16	4.26
9	27.50	1.3	12.4	0.22	0.15	1.01E+00	3.74	1.77	3.38	1.85	0.16	4.26
10	31.40	1.3	12.4	0.22	0.15	1.08E+00	3.74	1.77	3.38	1.85	0.16	4.26
11	35.70	1.4	12.4	0.22	0.14	1.19E+00	3.74	1.77	3.38	1.85	0.16	4.26
12	41.30	1.4	13.4	0.22	0.14	1.29E+00	3.74	1.77	3.38	1.85	0.16	4.26
13	47.20	1.5	13.4	0.22	0.14	1.42E+00	3.74	1.77	3.38	1.85	0.16	4.26
14	51.20	1.6	13.4	0.22	0.14	1.52E+00	3.74	1.77	3.38	1.85	0.16	4.26
15	56.70	1.6	13.4	0.21	0.14	1.60E+00	3.74	1.77	3.38	1.85	0.16	4.26
16	59.00	1.6	13.4	0.21	0.14	1.63E+00	3.74	1.77	3.38	1.85	0.16	4.26
17	70.00	1.6	14.8	0.33	0.27	1.78E+00	2.94	1.40	1.79	1.61	0.22	2.97
18	70.90	1.6	12.0	0.33	0.27	1.80E+00	2.94	1.40	1.79	1.61	0.22	2.97

**Building** Small terraced house

Building footprint (m ²)	2.80E+01
Living space air exchange rate (hr ⁻¹)	5.00E-01
Living space height (above ground, m)	4.80E+00
Living space height (below ground, m)	0.00E+00
Pressure difference (soil to enclosed space, Pa)	3.10E+00
Foundation thickness (m)	1.50E-01
Floor crack area (cm ²)	4.23E+02
Dust loading factor (µg m ⁻³)	5.00E+01

Soil Sand

Porosity, Total (cm ³ cm ⁻³)	5.40E-01
Porosity, Air-Filled (cm ³ cm ⁻³)	3.00E-01
Porosity, Water-Filled (cm ³ cm ⁻³)	2.40E-01
Residual soil water content (cm ³ cm ⁻³)	7.00E-02
Saturated hydraulic conductivity (cm s ⁻¹)	7.36E-03
van Genuchten shape parameter <i>m</i> (dimensionless)	3.51E-01
Bulk density (g cm ⁻³)	1.18E+00
Threshold value of wind speed at 10m (m s ⁻¹)	7.20E+00
Empirical function (F _x) for dust model (dimensionless)	1.22E+00
Ambient soil temperature (K)	2.83E+02
Soil pH	7.47E+00
Soil Organic Matter content (%)	8.90E-01
Fraction of organic carbon (g g ⁻¹)	5.16E-03
Effective total fluid saturation (unitless)	3.62E-01
Intrinsic soil permeability (cm ²)	9.83E-08
Relative soil air permeability (unitless)	7.68E-01
Effective air permeability (cm ²)	7.54E-08

**Soil - Vapour Model**

Depth to top of source (no building) (cm)	0
Depth to top of source (beneath building) (cm)	65
Default soil gas ingress rate?	Yes
Soil gas ingress rate ($\text{cm}^3 \text{s}^{-1}$)	2.50E+01
Building ventilation rate ($\text{cm}^3 \text{s}^{-1}$)	1.87E+04
Averaging time surface emissions (yr)	6
Finite vapour source model?	No
Thickness of contaminated layer (cm)	200

Air Dispersion Model

Mean annual windspeed at 10m (m s^{-1})	5.00
Air dispersion factor at height of 0.8m *	2400.00
Air dispersion factor at height of 1.6m *	0.00
Fraction of site cover ($\text{m}^2 \text{m}^{-2}$)	0.75

* Air dispersion factor in $\text{g m}^{-2} \text{s}^{-1}$ per kg m^{-3} **Soil - Plant Model**

	Dry weight conversion factor	Homegrown fraction		Soil loading factor	Preparation correction factor
	g DW g^{-1} FW	Average	High		
		dimensionless		g g^{-1} DW	dimensionless
Green vegetables	0.096	0.05	0.33	1.00E-03	2.00E-01
Root vegetables	0.103	0.06	0.40	1.00E-03	1.00E+00
Tuber vegetables	0.210	0.02	0.13	1.00E-03	1.00E+00
Herbaceous fruit	0.058	0.06	0.40	1.00E-03	6.00E-01
Shrub fruit	0.166	0.09	0.60	1.00E-03	6.00E-01
Tree fruit	0.157	0.04	0.27	1.00E-03	6.00E-01

Gardener type Average

CLEA Software Version 1.06

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Report generated 21-Sep-10

Report title Blyth Rd, Hayes - Residential

Created by AC at RPS HSE



RESULTS



		Assessment Criterion (mg kg ⁻¹)			Ratio of ADE to HCV			Saturation Limit (mg kg ⁻¹)	50% rule?	
		oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
1	Arsenic	3.24E+01	8.50E+01	NR	1.00	0.38	NR	NR	No	No
2	Cadmium	5.45E+00	2.97E+01	5.17E+00	0.91	0.10	1.00	NR	Yes	Yes
3	Chromium (III)	1.95E+04	3.55E+03	3.00E+03	0.15	0.85	1.00	NR	No	No
4	Chromium (VI)	1.24E+01	4.25E+00	3.38E+00	0.20	0.80	1.00	NR	Yes	No
5	Lead	2.73E+02	6.00E+03	2.61E+02	0.96	0.04	1.00	NR	Yes	No
6	Mercury, inorganic	1.81E+02	2.55E+03	1.69E+02	0.93	0.07	1.00	NR	No	No
7	Nickel	5.31E+02	1.27E+02	NR	0.14	1.00	NR	NR	Yes	Yes
8	Selenium	3.50E+02	NR	NR	1.00	NR	NR	NR	Yes	No
9	Copper	2.66E+03	1.04E+04	2.33E+03	0.78	0.22	1.00	NR	Yes	No
10	Zinc	3.75E+03	2.55E+07	3.75E+03	1.00	0.00	1.00	NR	Yes	No
11	Acenaphthene	1.95E+02	1.70E+03	1.75E+02	0.90	0.10	1.00	5.06E+01 (sol)	No	No
12	Acenaphthylene	1.58E+02	1.74E+03	1.45E+02	0.92	0.08	1.00	7.63E+01 (sol)	No	No
13	Anthracene	2.07E+03	8.17E+04	2.02E+03	0.98	0.02	1.00	1.04E+00 (vap)	No	No
14	Benz[a]anthracene	6.69E+00	5.89E+00	3.13E+00	0.47	0.53	1.00	1.52E+00 (sol)	No	No
15	Benzo[a]pyrene	1.17E+00	2.61E+00	8.08E-01	0.69	0.31	1.00	8.11E-01 (vap)	No	No
16	Benzo[b]fluoranthene	7.78E+00	1.78E+01	5.41E+00	0.70	0.30	1.00	1.08E+00 (sol)	No	No
17	Benzo[ghi]perylene	6.61E+01	1.27E+02	4.35E+01	0.66	0.34	1.00	1.37E-02 (vap)	No	No
18	Benzo[k]fluoranthene	1.22E+01	2.66E+01	8.35E+00	0.69	0.31	1.00	6.11E-01 (sol)	No	No
19	Chrysene	8.20E+00	1.93E+01	5.76E+00	0.70	0.30	1.00	3.91E-01 (vap)	No	No
20	Dibenz[ah]anthracene	1.16E+00	2.14E+00	7.53E-01	0.65	0.35	1.00	3.50E-03 (vap)	No	No

[illegible]



		Soil Distribution				Media Concentrations													
		Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
		%	%	%	%	mg kg ⁻¹	mg m ⁻³	mg kg ⁻¹	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW
1	Arsenic	100.0	0.0	0.0	100.0	3.24E+01	NR	1.62E+01	1.38E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-02	1.30E-02	7.45E-03	1.07E-02	6.48E-03	3.56E-02
2	Cadmium	99.8	0.2	0.0	100.0	5.17E+00	NR	2.59E+00	2.20E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.69E-01	1.50E-01	1.60E-01	8.28E-02	1.60E-02	7.24E-03
3	Chromium (III)	100.0	0.0	0.0	100.0	3.00E+03	NR	1.50E+03	1.28E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.01E-02	9.01E-02	9.01E-02	9.01E-02	9.01E-02	9.01E-02
4	Chromium (VI)	98.9	1.1	0.0	100.0	3.38E+00	NR	1.69E+00	1.44E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.76E-04	3.38E-04	3.38E-04	3.04E-01	1.01E-03	3.04E-01
5	Lead	100.0	0.0	0.0	100.0	2.61E+02	NR	1.31E+02	1.11E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-02	1.84E-01	1.84E-01	0.00E+00	0.00E+00	0.00E+00
6	Mercury, inorganic	100.0	0.0	0.0	100.0	1.69E+02	NR	8.43E+01	7.18E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.41E-01	1.16E+00	7.25E-01	1.69E-01	1.86E-01	1.69E-01
7	Nickel	100.0	0.0	0.0	100.0	1.27E+02	NR	6.37E+01	5.42E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.84E-01	5.48E-01	2.42E-01	3.19E-01	3.19E-01	4.33E-01
8	Selenium	99.6	0.4	0.0	100.0	3.50E+02	NR	1.75E+02	1.49E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.78E+00	1.27E+00	2.91E-01	9.49E-01	1.05E+00	1.05E+00
9	Copper	99.8	0.2	0.0	100.0	2.33E+03	NR	1.16E+03	9.90E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.79E+01	4.79E+01	4.79E+01	5.42E+01	4.79E+01	4.79E+01
10	Zinc	99.5	0.5	0.0	100.0	3.75E+03	NR	1.87E+03	1.59E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.02E+02	2.02E+02	2.02E+02	5.36E+02	2.02E+02	2.02E+02
11	Acenaphthene	98.3	1.7	0.0	100.0	1.75E+02	1.08E+01	8.74E+01	7.44E-08	0.00E+00	6.66E-03	3.15E-05	0.00E+00	8.52E+01	1.15E+02	3.25E+01	0.00E+00	0.00E+00	1.38E+01
12	Acenaphthylene	97.9	2.1	0.0	100.0	1.45E+02	8.58E+00	7.25E+01	6.17E-08	0.00E+00	5.41E-03	2.61E-05	0.00E+00	8.69E+01	1.18E+02	3.00E+01	0.00E+00	0.00E+00	1.69E+01
13	Anthracene	99.3	0.7	0.0	100.0	2.02E+03	1.25E+01	1.01E+03	8.60E-07	0.00E+00	7.97E-03	1.19E-04	0.00E+00	4.42E+02	6.26E+02	2.24E+02	0.00E+00	0.00E+00	3.52E+01
14	Benzo[a]anthracene	99.9	0.1	0.0	100.0	3.13E+00	2.47E-04	1.57E+00	1.33E-09	0.00E+00	1.95E-07	2.62E-08	0.00E+00	2.08E-02	7.75E-02	5.36E-02	0.00E+00	0.00E+00	1.97E-04
15	Benzo[a]pyrene	100.0	0.0	0.0	100.0	8.08E-01	2.14E-06	4.04E-01	3.44E-10	0.00E+00	2.68E-09	3.92E-09	0.00E+00	2.27E-03	1.21E-02	8.57E-03	0.00E+00	0.00E+00	1.42E-05
16	Benzo[b]fluoranthene	100.0	0.0	0.0	100.0	5.41E+00	2.05E-05	2.71E+00	2.30E-09	0.00E+00	2.54E-08	2.90E-08	0.00E+00	2.15E-02	9.95E-02	6.85E-02	0.00E+00	0.00E+00	1.57E-04
17	Benzo[ghi]perylene	100.0	0.0	0.0	100.0	4.35E+01	5.78E-05	2.18E+01	1.85E-08	0.00E+00	6.96E-08	1.17E-07	0.00E+00	1.32E-02	2.02E-01	1.48E-01	0.00E+00	0.00E+00	3.00E-05
18	Benzo[k]fluoranthene	100.0	0.0	0.0	100.0	8.35E+00	1.90E-05	4.17E+00	3.55E-09	0.00E+00	2.38E-08	3.75E-08	0.00E+00	1.82E-02	1.09E-01	7.71E-02	0.00E+00	0.00E+00	1.01E-04
19	Chrysene	99.9	0.1	0.0	100.0	5.76E+00	6.45E-05	2.88E+00	2.45E-09	0.00E+00	7.73E-08	4.41E-08	0.00E+00	6.60E-02	2.00E-01	1.31E-01	0.00E+00	0.00E+00	8.23E-04
20	Dibenz[ah]anthracene	100.0	0.0	0.0	100.0	7.53E-01	4.23E-06	3.76E-01	3.20E-10	0.00E+00	4.68E-09	3.05E-09	0.00E+00	1.08E-03	7.80E-03	5.30E-03	0.00E+00	0.00E+00	4.96E-06

[illegible]



		Average Daily Exposure (mg kg ⁻¹ bw day ⁻¹)							Distribution by Pathway (%)							
		Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
1	Arsenic	2.40E-04	2.27E-05	3.70E-05	7.62E-07	0.00E+00	0.00E+00	0.00E+00	79.89	7.54	12.31	0.25	0.00	0.00	0.00	0.00
2	Cadmium	3.84E-05	1.32E-04	1.97E-07	1.22E-07	0.00E+00	7.54E-04	1.21E-06	11.21	38.70	0.06	0.04	0.00	0.00	49.96	0.04
3	Chromium (III)	2.23E-02	3.53E-04	0.00E+00	7.07E-05	0.00E+00	3.39E-03	1.64E-05	85.34	1.35	0.00	0.27	0.00	0.00	12.97	0.06
4	Chromium (VI)	2.51E-05	1.45E-04	0.00E+00	7.95E-08	0.00E+00	3.77E-04	0.00E+00	7.39	42.60	0.00	0.02	0.00	0.00	49.99	0.00
5	Lead	1.94E-03	7.88E-05	0.00E+00	6.15E-06	0.00E+00	1.46E-03	1.82E-06	55.55	2.26	0.00	0.18	0.00	0.00	41.96	0.05
6	Mercury, inorganic	1.25E-03	5.64E-04	0.00E+00	3.97E-06	0.00E+00	5.63E-05	0.00E+00	66.71	30.08	0.00	0.21	0.00	0.00	3.00	0.00
7	Nickel	9.45E-04	4.66E-04	2.43E-05	3.00E-06	0.00E+00	7.31E-03	3.64E-06	32.77	16.18	0.84	0.10	0.00	0.00	49.90	0.10
8	Selenium	2.60E-03	1.82E-03	0.00E+00	8.24E-06	0.00E+00	1.97E-03	3.64E-06	40.59	28.46	0.00	0.13	0.00	0.00	30.82	0.00
9	Copper	1.73E-02	5.26E-02	0.00E+00	5.48E-05	0.00E+00	3.94E-01	4.12E-05	12.34	37.63	0.00	0.04	0.00	0.00	49.97	0.03
10	Zinc	2.78E-02	2.72E-01	0.00E+00	8.81E-05	0.00E+00	1.52E+00	1.45E-04	4.63	45.36	0.00	0.01	0.00	0.00	49.99	0.01
11	Acenaphthene	1.30E-03	5.16E-02	8.66E-04	4.11E-06	6.16E-03	5.51E-05	1.52E-06	2.16	86.03	1.44	0.01	10.27	0.00	0.09	0.00
12	Acenaphthylene	1.08E-03	5.32E-02	7.18E-04	3.41E-06	5.00E-03	7.88E-06	6.67E-07	1.79	88.65	1.20	0.01	8.34	0.00	0.01	0.00
13	Anthracene	1.50E-02	2.68E-01	1.00E-02	4.76E-05	7.38E-03	4.50E-06	6.67E-07	5.00	89.19	3.34	0.02	2.46	0.00	0.00	0.00
14	Benzo[a]anthracene	2.32E-05	2.58E-05	1.55E-05	7.37E-08	1.82E-07	3.38E-06	6.67E-07	35.83	39.85	23.93	0.11	0.28	0.00	0.00	0.00
15	Benzo[a]pyrene	5.99E-06	3.82E-06	4.00E-06	1.90E-08	2.64E-09	6.19E-06	3.64E-07	43.32	27.60	28.93	0.14	0.02	0.00	0.00	0.00
16	Benzo[b]fluoranthene	4.01E-05	3.19E-05	2.68E-05	1.27E-07	2.47E-08	6.19E-06	7.88E-07	40.57	32.19	27.09	0.13	0.02	0.00	0.00	0.00
17	Benzo[ghi]perylene	3.23E-04	6.03E-05	2.16E-04	1.02E-06	6.92E-08	3.38E-06	6.06E-07	53.82	10.06	35.94	0.17	0.01	0.00	0.00	0.00
18	Benzo[k]fluoranthene	6.19E-05	3.39E-05	4.13E-05	1.96E-07	2.36E-08	5.06E-06	4.24E-07	45.08	24.66	30.11	0.14	0.02	0.00	0.00	0.00
19	Chrysene	4.27E-05	6.92E-05	2.85E-05	1.35E-07	7.33E-08	6.19E-06	1.03E-06	30.37	49.20	20.28	0.10	0.05	0.00	0.00	0.00
20	Dibenz[ah]anthracene	5.58E-06	2.36E-06	3.73E-06	1.77E-08	4.45E-09	2.25E-06	2.00E-06	47.75	20.17	31.89	0.15	0.04	0.00	0.00	0.00

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		Soil-to-water partition coefficient ($\text{cm}^3 \text{g}^{-1}$)	Vapour pressure (Pa)	Water solubility (mg L^{-1})	Soil-to-plant concentration factor for green vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for root vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tree fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)
1	Arsenic	5.00E+02	NR	1.25E+06	0.00043 fw	0.0004 fw	0.00023 fw	0.00033 fw	0.0002 fw	0.0011 fw
2	Cadmium	1.00E+02	NR	1.62E+06	0.052 fw	0.029 fw	0.031 fw	0.016 fw	0.0031 fw	0.0014 fw
3	Chromium (III)	4.80E+03	NR	5.85E+05	0.00003 fw	0.00003 fw	0.00003 fw	0.00003 fw	0.00003 fw	0.00003 fw
4	Chromium (VI)	1.80E+01	NR	2.30E+06	0.0002 fw	0.0001 fw	0.0001 fw	0.09 fw	0.0003 fw	0.09 fw
5	Lead	3.00E+03	NR	0.00E+00	model	model	model	model	model	model
6	Mercury, inorganic	5.00E+02	NR	7.40E+04	0.0038 fw	0.0069 fw	0.0043 fw	0.001 fw	0.0011 fw	0.001 fw
7	Nickel	5.00E+02	NR	2.50E+06	0.0038 fw	0.0043 fw	0.0019 fw	0.0025 fw	0.0025 fw	0.0034 fw
8	Selenium	5.00E+01	NR	2.17E+06	0.0108 fw	0.00364 fw	0.00083 fw	0.00271 fw	0.003 fw	0.003 fw
9	Copper	1.00E+02	NR	1.38E+06	0.0206 fw	0.0206 fw	0.0206 fw	0.0233 fw	0.0206 fw	0.0206 fw
10	Zinc	3.80E+01	NR	4.32E+06	0.054 fw	0.054 fw	0.054 fw	0.143 fw	0.054 fw	0.054 fw
11	Acenaphthene	1.21E+01	7.37E-02	4.11E+00	model	model	model	model	model	model
12	Acenaphthylene	9.39E+00	7.08E-02	7.95E+00	model	model	model	model	model	model
13	Anthracene	2.90E+01	8.49E-05	5.60E-02	model	model	model	model	model	model
14	Benzo[a]anthracene	4.01E+02	1.24E-06	3.80E-03	model	model	model	model	model	model
15	Benzo[a]pyrene	6.65E+02	2.00E-08	3.80E-03	model	model	model	model	model	model
16	Benzo[b]fluoranthene	5.41E+02	6.34E+08	2.00E-03	model	model	model	model	model	model
17	Benzo[ghi]perylene	2.15E+03	1.55E-10	2.60E-04	model	model	model	model	model	model
18	Benzo[k]fluoranthene	7.64E+02	1.64E-08	8.00E-04	model	model	model	model	model	model
19	Chrysene	2.84E+02	4.52E-08	2.00E-03	model	model	model	model	model	model
20	Dibenz[ah]anthracene	9.61E+02	1.66E-10	6.00E-04	model	model	model	model	model	model

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Report generated 21/09/2010

Report title Blyth Road, Hayes - Residential

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BASIC SETTINGS

Land Use Residential with homegrown produce

Building Small terraced house

Receptor Female (res)

Start age class 1

End age class 6

Exposure Duration 6 years

Soil Sand

Exposure Pathways

Direct soil and dust ingestion	☒
Consumption of homegrown produce	☒
Soil attached to homegrown produce	☒

Dermal contact with indoor dust	☒
Dermal contact with soil	☒

Inhalation of indoor dust	☒
Inhalation of soil dust	☒
Inhalation of indoor vapour	☒
Inhalation of outdoor vapour	☒



Land Use Residential with homegrown produce

Age Class	Exposure Frequencies (days yr ⁻¹)					
	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with indoor dust	Dermal contact with soil	Inhalation of dust and vapour, indoor	Inhalation of dust and vapour, outdoor
1	180	180	180	180	365	365
2	365	365	365	365	365	365
3	365	365	365	365	365	365
4	365	365	365	365	365	365
5	365	365	365	365	365	365
6	365	365	365	365	365	365
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0

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Receptor Female (res)

Age Class	Body weight (kg)	Body height (m)	Inhalation rate (m ³ day ⁻¹)	Max exposed skin factor			Consumption rates (g FW kg ⁻¹ BW day ⁻¹)					
				Indoor (m ² m ⁻²)	Outdoor (m ² m ⁻²)	Total skin area (m ²)	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
1	5.60	0.7	8.5	0.32	0.26	3.43E-01	7.12	10.69	16.03	1.83	2.23	3.82
2	9.80	0.8	13.3	0.33	0.26	4.84E-01	6.85	3.30	5.46	3.96	0.54	11.96
3	12.70	0.9	12.7	0.32	0.25	5.82E-01	6.85	3.30	5.46	3.96	0.54	11.96
4	15.10	0.9	12.2	0.35	0.28	6.36E-01	6.85	3.30	5.46	3.96	0.54	11.96
5	16.90	1.0	12.2	0.35	0.28	7.04E-01	3.74	1.77	3.38	1.85	0.16	4.26
6	19.70	1.1	12.2	0.33	0.26	7.94E-01	3.74	1.77	3.38	1.85	0.16	4.26
7	22.10	1.2	12.4	0.22	0.15	8.73E-01	3.74	1.77	3.38	1.85	0.16	4.26
8	25.30	1.2	12.4	0.22	0.15	9.36E-01	3.74	1.77	3.38	1.85	0.16	4.26
9	27.50	1.3	12.4	0.22	0.15	1.01E+00	3.74	1.77	3.38	1.85	0.16	4.26
10	31.40	1.3	12.4	0.22	0.15	1.08E+00	3.74	1.77	3.38	1.85	0.16	4.26
11	35.70	1.4	12.4	0.22	0.14	1.19E+00	3.74	1.77	3.38	1.85	0.16	4.26
12	41.30	1.4	13.4	0.22	0.14	1.29E+00	3.74	1.77	3.38	1.85	0.16	4.26
13	47.20	1.5	13.4	0.22	0.14	1.42E+00	3.74	1.77	3.38	1.85	0.16	4.26
14	51.20	1.6	13.4	0.22	0.14	1.52E+00	3.74	1.77	3.38	1.85	0.16	4.26
15	56.70	1.6	13.4	0.21	0.14	1.60E+00	3.74	1.77	3.38	1.85	0.16	4.26
16	59.00	1.6	13.4	0.21	0.14	1.63E+00	3.74	1.77	3.38	1.85	0.16	4.26
17	70.00	1.6	14.8	0.33	0.27	1.78E+00	2.94	1.40	1.79	1.61	0.22	2.97
18	70.90	1.6	12.0	0.33	0.27	1.80E+00	2.94	1.40	1.79	1.61	0.22	2.97

Building Small terraced house

Building footprint (m ²)	2.80E+01
Living space air exchange rate (hr ⁻¹)	5.00E-01
Living space height (above ground, m)	4.80E+00
Living space height (below ground, m)	0.00E+00
Pressure difference (soil to enclosed space, Pa)	3.10E+00
Foundation thickness (m)	1.50E-01
Floor crack area (cm ²)	4.23E+02
Dust loading factor (µg m ⁻³)	5.00E+01

Soil Sand

Porosity, Total (cm ³ cm ⁻³)	5.40E-01
Porosity, Air-Filled (cm ³ cm ⁻³)	3.00E-01
Porosity, Water-Filled (cm ³ cm ⁻³)	2.40E-01
Residual soil water content (cm ³ cm ⁻³)	7.00E-02
Saturated hydraulic conductivity (cm s ⁻¹)	7.36E-03
van Genuchten shape parameter <i>m</i> (dimensionless)	3.51E-01
Bulk density (g cm ⁻³)	1.18E+00
Threshold value of wind speed at 10m (m s ⁻¹)	7.20E+00
Empirical function (<i>F_x</i>) for dust model (dimensionless)	1.22E+00
Ambient soil temperature (K)	2.83E+02
Soil pH	7.47E+00
Soil Organic Matter content (%)	8.90E-01
Fraction of organic carbon (g g ⁻¹)	5.16E-03
Effective total fluid saturation (unitless)	3.62E-01
Intrinsic soil permeability (cm ²)	9.83E-08
Relative soil air permeability (unitless)	7.68E-01
Effective air permeability (cm ²)	7.54E-08



**Soil - Vapour Model**

Depth to top of source (no building) (cm)	0
Depth to top of source (beneath building) (cm)	65
Default soil gas ingress rate?	Yes
Soil gas ingress rate ($\text{cm}^3 \text{s}^{-1}$)	2.50E+01
Building ventilation rate ($\text{cm}^3 \text{s}^{-1}$)	1.87E+04
Averaging time surface emissions (yr)	6
Finite vapour source model?	No
Thickness of contaminated layer (cm)	200

Air Dispersion Model

Mean annual windspeed at 10m (m s^{-1})	5.00
Air dispersion factor at height of 0.8m *	2400.00
Air dispersion factor at height of 1.6m *	0.00
Fraction of site cover ($\text{m}^2 \text{m}^{-2}$)	0.75

* Air dispersion factor in $\text{g m}^{-2} \text{s}^{-1}$ per kg m^{-3} **Soil - Plant Model**

	Dry weight conversion factor	Homegrown fraction		Soil loading factor	Preparation correction factor
	g DW g^{-1} FW	Average	High		
		dimensionless		g g^{-1} DW	dimensionless
Green vegetables	0.096	0.05	0.33	1.00E-03	2.00E-01
Root vegetables	0.103	0.06	0.40	1.00E-03	1.00E+00
Tuber vegetables	0.210	0.02	0.13	1.00E-03	1.00E+00
Herbaceous fruit	0.058	0.06	0.40	1.00E-03	6.00E-01
Shrub fruit	0.166	0.09	0.60	1.00E-03	6.00E-01
Tree fruit	0.157	0.04	0.27	1.00E-03	6.00E-01

Gardener type Average

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Report title Blyth Road, Hayes - Residential

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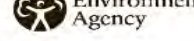
RESULTS



		Assessment Criterion (mg kg ⁻¹)			Ratio of ADE to HCV			Saturation Limit (mg kg ⁻¹)	50% rule?	
		oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
1	Aliphatics (C5-C6)	4.42E+03	1.61E+01	1.61E+01	0.00	1.00	1.00	3.50E+02 (sol)	Yes	Yes
2	Aliphatics (>C6-C8)	1.30E+04	3.40E+01	3.40E+01	0.00	1.00	1.00	1.44E+02 (sol)	Yes	Yes
3	Aliphatics (>C8-C10)	1.35E+03	8.07E+00	8.06E+00	0.00	1.00	1.00	7.10E+01 (vap)	Yes	Yes
4	Aliphatics (>C10-C12)	3.43E+03	3.92E+01	3.91E+01	0.01	0.99	1.00	4.25E+01 (vap)	Yes	Yes
5	Aliphatics (>C12-C16)	4.36E+03	3.26E+02	3.20E+02	0.04	0.96	1.00	2.11E+01 (sol)	Yes	Yes
6	Aliphatics (>C16-C35)	2.68E+04	NR	NR	1.00	NR	NR	7.55E+00 (sol)	Yes	No
7	Aromatics (EC5-EC7)	7.42E+01	1.02E+02	4.30E+01	0.58	0.42	1.00	1.04E+03 (sol)	No	No
8	Aromatics (>EC7-EC8)	1.29E+02	2.37E+02	8.36E+01	0.65	0.35	1.00	7.58E+02 (vap)	No	No
9	Aromatics (>EC8-EC10)	4.94E+01	1.39E+01	1.28E+01	0.15	0.85	1.00	5.45E+02 (vap)	Yes	Yes
10	Aliphatics (>C10-C12)	3.43E+03	3.92E+01	3.91E+01	0.01	0.99	1.00	4.25E+01 (vap)	Yes	Yes
11	Aromatics (>EC12-EC16)	1.26E+02	8.58E+02	1.21E+02	0.92	0.08	1.00	1.50E+02 (sol)	Yes	Yes
12	Aromatics (>EC16-EC21)	2.23E+02	NR	NR	1.00	NR	NR	4.77E+01 (vap)	Yes	No
13	Aromatics (>EC21-EC35)	8.53E+02	NR	NR	1.00	NR	NR	4.30E+00 (sol)	Yes	No
14										
15	Benzene	9.66E-02	1.03E-01	4.99E-02	0.52	0.48	1.00	1.04E+03 (sol)	No	No
16	Ethylbenzene	9.37E+01	6.33E+01	3.78E+01	0.40	0.60	1.00	4.57E+02 (vap)	No	No
17	Toluene	1.29E+02	2.37E+02	8.36E+01	0.65	0.35	1.00	7.58E+02 (vap)	No	No
18	Xylene, m-	1.79E+02	2.07E+01	1.86E+01	0.10	0.90	1.00	5.50E+02 (vap)	No	No
19	Xylene, o-	1.64E+02	2.22E+01	1.96E+01	0.12	0.88	1.00	4.20E+02 (sol)	No	No
20	Xylene, p-	1.68E+02	1.99E+01	1.78E+01	0.11	0.89	1.00	5.07E+02 (sol)	No	No

[illegible]



		Soil Distribution				Media Concentrations													
						Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables
		%	%	%	%	mg kg ⁻¹	mg m ⁻³	mg kg ⁻¹	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg m ⁻³	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW	mg kg ⁻¹ FW
1	Aliphatics (C5-C6)	43.1	2.1	54.8	100.0	1.61E+01	3.46E+04	8.03E+00	6.83E-09	0.00E+00	2.70E+00	6.90E-04	0.00E+00	1.45E+01	2.06E+01	2.51E+00	0.00E+00	0.00E+00	3.09E+00
2	Aliphatics (>C6-C8)	73.3	0.8	25.9	100.0	3.40E+01	3.46E+04	1.70E+01	1.45E-08	0.00E+00	2.70E+00	1.00E-03	0.00E+00	1.06E+01	1.43E+01	3.59E+00	0.00E+00	0.00E+00	1.09E+00
3	Aliphatics (>C8-C10)	93.5	0.1	6.3	100.0	8.06E+00	2.01E+03	4.03E+00	3.43E-09	0.00E+00	1.56E-01	1.18E-04	0.00E+00	2.58E-01	5.01E-01	4.12E-01	0.00E+00	0.00E+00	6.51E-03
4	Aliphatics (>C10-C12)	98.7	0.0	1.3	100.0	3.91E+01	2.00E+03	1.95E+01	1.66E-08	0.00E+00	1.56E-01	2.59E-04	0.00E+00	4.95E-02	3.14E-01	5.34E-01	0.00E+00	0.00E+00	2.53E-04
5	Aliphatics (>C12-C16)	99.8	0.0	0.2	100.0	3.20E+02	1.97E+03	1.60E+02	1.36E-07	0.00E+00	1.54E-01	7.36E-04	0.00E+00	5.02E-04	1.15E-01	2.43E-01	0.00E+00	0.00E+00	1.37E-07
6	Aliphatics (>C16-C35)	100.0	0.0	0.0	100.0	2.68E+04	9.65E+03	1.34E+04	1.14E-05	0.00E+00	7.52E-01	1.49E-02	0.00E+00	3.05E-08	9.02E-02	1.92E-01	0.00E+00	0.00E+00	1.78E-14
7	Aromatics (EC5-EC7)	60.0	35.0	5.1	100.0	4.30E+01	8.57E+03	2.15E+01	1.83E-08	0.00E+00	6.32E-01	5.27E-04	0.00E+00	1.02E+02	2.24E+02	7.24E+01	0.00E+00	0.00E+00	1.69E+02
8	Aromatics (>EC7-EC8)	81.9	15.8	2.3	100.0	8.36E+01	7.47E+03	4.18E+01	3.56E-08	0.00E+00	5.21E-01	6.46E-04	0.00E+00	1.55E+02	2.55E+02	6.86E+01	0.00E+00	0.00E+00	1.54E+02
9	Aromatics (>EC8-EC10)	96.8	2.4	0.8	100.0	1.28E+01	3.83E+02	6.39E+00	5.44E-09	0.00E+00	2.98E-02	6.48E-05	0.00E+00	7.87E+00	1.07E+01	2.83E+00	0.00E+00	0.00E+00	2.11E+00
10	Aliphatics (>C10-C12)	98.7	0.0	1.3	100.0	3.91E+01	2.00E+03	1.95E+01	1.66E-08	0.00E+00	1.56E-01	2.59E-04	0.00E+00	4.95E-02	3.14E-01	5.34E-01	0.00E+00	0.00E+00	2.53E-04
11	Aromatics (>EC12-EC16)	99.2	0.8	0.0	100.0	1.21E+02	5.84E+01	6.05E+01	5.15E-08	0.00E+00	4.57E-03	7.80E-05	0.00E+00	2.94E+01	4.03E+01	1.52E+01	0.00E+00	0.00E+00	3.22E+00
12	Aromatics (>EC16-EC21)	99.7	0.3	0.0	100.0	2.23E+02	2.12E+00	1.12E+02	9.51E-08	0.00E+00	1.70E-04	2.08E-05	0.00E+00	1.84E+01	2.88E+01	1.73E+01	0.00E+00	0.00E+00	9.07E-01
13	Aromatics (>EC21-EC35)	100.0	0.0	0.0	100.0	8.53E+02	3.26E-02	4.27E+02	3.63E-07	0.00E+00	3.50E-06	8.34E-06	0.00E+00	3.33E+00	1.30E+01	1.94E+01	0.00E+00	0.00E+00	2.97E-02
14																			
15	Benzene	60.0	35.0	5.1	100.0	4.99E-02	9.94E+00	2.49E-02	2.12E-11	0.00E+00	7.32E-04	6.11E-07	0.00E+00	1.19E-01	2.60E-01	8.39E-02	0.00E+00	0.00E+00	1.97E-01
16	Ethylbenzene	90.6	8.0	1.4	100.0	3.78E+01	2.06E+03	1.89E+01	1.61E-08	0.00E+00	1.37E-01	2.17E-04	0.00E+00	5.24E+01	7.76E+01	2.00E+01	0.00E+00	0.00E+00	3.04E+01
17	Toluene	81.9	15.8	2.3	100.0	8.36E+01	7.47E+03	4.18E+01	3.56E-08	0.00E+00	5.21E-01	6.46E-04	0.00E+00	1.55E+02	2.55E+02	6.86E+01	0.00E+00	0.00E+00	1.54E+02
18	Xylene, m-	91.6	7.4	1.0	100.0	1.86E+01	7.53E+02	9.28E+00	7.90E-09	0.00E+00	4.99E-02	9.18E-05	0.00E+00	2.47E+01	3.63E+01	9.23E+00	0.00E+00	0.00E+00	1.34E+01
19	Xylene, o-	90.7	8.4	1.0	100.0	1.96E+01	7.41E+02	9.78E+00	8.32E-09	0.00E+00	4.90E-02	9.33E-05	0.00E+00	2.76E+01	4.10E+01	1.08E+01	0.00E+00	0.00E+00	1.68E+01
20	Xylene, p-	90.9	8.0	1.1	100.0	1.78E+01	7.51E+02	8.90E+00	7.57E-09	0.00E+00	4.98E-02	8.98E-05	0.00E+00	2.47E+01	3.66E+01	9.47E+00	0.00E+00	0.00E+00	1.44E+01

[illegible]



		Average Daily Exposure (mg kg ⁻¹ bw day ⁻¹)							Distribution by Pathway (%)							
		Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
1	Aliphatics (C5-C6)	1.19E-04	8.89E-03	6.12E-05	3.78E-07	2.50E+00	5.62E+95	6.06E+95	0.00	0.18	0.00	0.00	49.82	0.00	0.18	49.82
2	Aliphatics (>C6-C8)	2.52E-04	6.16E-03	1.29E-04	7.99E-07	2.50E+00	5.62E+95	6.06E+95	0.01	0.12	0.00	0.00	49.87	0.00	0.13	49.87
3	Aliphatics (>C8-C10)	5.98E-05	2.07E-04	3.07E-05	1.90E-07	1.45E-01	5.62E+95	6.06E+95	0.02	0.07	0.01	0.00	49.90	0.00	0.10	49.90
4	Aliphatics (>C10-C12)	2.90E-04	1.30E-04	1.49E-04	9.19E-07	1.45E-01	5.62E+95	6.06E+95	0.10	0.04	0.05	0.00	49.80	0.00	0.20	49.80
5	Aliphatics (>C12-C16)	2.37E-03	7.42E-05	1.22E-03	7.53E-06	1.42E-01	5.62E+95	6.06E+95	0.81	0.03	0.42	0.00	48.73	0.01	1.26	48.74
6	Aliphatics (>C16-C35)	1.99E-01	2.32E-03	1.02E-01	6.30E-04	6.97E-01	5.62E+95	0.00E+00	9.93	0.12	5.10	0.03	34.79	0.03	50.00	0.00
7	Aromatics (EC5-EC7)	3.19E-04	1.29E-01	1.64E-04	1.01E-06	5.84E-01	1.69E-04	1.21E-02	0.04	17.72	0.02	0.00	80.52	0.00	0.02	1.67
8	Aromatics (>EC7-EC8)	6.20E-04	1.43E-01	3.18E-04	1.97E-06	4.82E-01	5.63E-04	3.15E-02	0.09	21.77	0.05	0.00	73.21	0.00	0.09	4.79
9	Aromatics (>EC8-EC10)	9.48E-05	5.02E-03	4.87E-05	3.01E-07	2.76E-02	5.62E+95	6.06E+95	0.14	7.67	0.07	0.00	42.11	0.00	7.89	42.11
10	Aliphatics (>C10-C12)	2.90E-04	1.30E-04	1.49E-04	9.19E-07	1.45E-01	5.62E+95	6.06E+95	0.10	0.04	0.05	0.00	49.80	0.00	0.20	49.80
11	Aromatics (>EC12-EC16)	8.97E-04	1.79E-02	4.61E-04	2.85E-06	4.23E-03	5.62E+95	6.06E+95	1.91	38.08	0.98	0.01	9.01	0.01	40.98	9.02
12	Aromatics (>EC16-EC21)	1.66E-03	1.23E-02	8.51E-04	5.26E-06	1.58E-04	5.62E+95	0.00E+00	5.52	41.09	2.84	0.02	0.52	0.00	50.00	0.00
13	Aromatics (>EC21-EC35)	6.33E-03	5.40E-03	3.25E-03	2.01E-05	3.59E-06	5.62E+95	0.00E+00	21.09	17.99	10.84	0.07	0.01	0.00	50.00	0.00
14																
15	Benzene	3.70E-07	1.49E-04	1.90E-07	1.17E-09	6.78E-04	0.00E+00	0.00E+00	0.04	18.03	0.02	0.00	81.90	0.00	0.00	0.00
16	Ethylbenzene	2.80E-04	3.98E-02	1.44E-04	8.89E-07	1.27E-01	2.81E-04	7.88E-03	0.16	22.73	0.08	0.00	72.35	0.01	0.16	4.50
17	Toluene	6.20E-04	1.43E-01	3.18E-04	1.97E-06	4.82E-01	5.63E-04	3.15E-02	0.09	21.77	0.05	0.00	73.21	0.00	0.09	4.79
18	Xylene, m-	1.38E-04	1.84E-02	7.07E-05	4.37E-07	4.62E-02	6.19E-04	8.49E-03	0.19	24.88	0.10	0.00	62.50	0.01	0.84	11.49
19	Xylene, o-	1.45E-04	2.12E-02	7.45E-05	4.60E-07	4.54E-02	6.19E-04	8.49E-03	0.19	27.95	0.10	0.00	59.76	0.01	0.82	11.18
20	Xylene, p-	1.32E-04	1.88E-02	6.78E-05	4.19E-07	4.61E-02	6.19E-04	8.49E-03	0.18	25.30	0.09	0.00	62.14	0.01	0.83	11.45

[illegible]



		Oral Health Criteria Value ($\mu\text{g kg}^{-1}$ BW day $^{-1}$)		Inhalation Health Criteria Value ($\mu\text{g kg}^{-1}$ BW day $^{-1}$)		Oral Mean Daily Intake ($\mu\text{g day}^{-1}$)	Inhalation Mean Daily Intake ($\mu\text{g day}^{-1}$)	Air-water partition coefficient (K_{aw}) ($\text{cm}^3 \text{cm}^{-3}$)	Coefficient of Diffusion in Air ($\text{m}^2 \text{s}^{-1}$)	Coefficient of Diffusion in Water ($\text{m}^2 \text{s}^{-1}$)	$\log K_{oc}$ ($\text{cm}^3 \text{g}^{-1}$)	$\log K_{ow}$ (dimensionless)	Dermal Absorption Fraction (dimensionless)	Soil-to-dust transport factor (g g^{-1} DW)	Sub-surface soil to indoor air correction factor (dimensionless)	Relative bioavailability via soil ingestion (unitless)	Relative bioavailability via dust inhalation (unitless)
1	Aliphatics (C5-C6)	TDI	5000	TDI	5000	9.99E+99	9.99E+99	2.10E+01	1.00E-05	1.00E-09	2.91	3.31	0.1	0.5	10	1	1
2	Aliphatics (>C6-C8)	TDI	5000	TDI	5000	9.99E+99	9.99E+99	2.73E+01	1.00E-05	1.00E-09	3.58	4.13	0.1	0.5	10	1	1
3	Aliphatics (>C8-C10)	TDI	100	TDI	290	9.99E+99	9.99E+99	4.15E+01	1.00E-05	1.00E-09	4.48	5.22	0.1	0.5	10	1	1
4	Aliphatics (>C10-C12)	TDI	100	TDI	290	9.99E+99	9.99E+99	6.44E+01	1.00E-05	1.00E-09	5.38	6.3	0.1	0.5	10	1	1
5	Aliphatics (>C12-C16)	TDI	100	TDI	290	9.99E+99	9.99E+99	1.71E+02	1.00E-05	1.00E-09	6.73	7.94	0.1	0.5	10	1	1
6	Aliphatics (>C16-C35)	TDI	2000	NR	0	9.99E+99	NR	1.07E+03	1.00E-05	1.00E-09	8.76	10.39	0.1	0.5	10	1	1
7	Aromatics (EC5-EC7)	TDI	223	TDI	1400	3	200	1.16E-01	8.77E-06	6.64E-10	1.83	2.13	0.1	0.5	10	1	1
8	Aromatics (>EC7-EC8)	TDI	223	TDI	1400	10	520	1.15E-01	7.78E-06	5.88E-10	2.31	2.73	0.1	0.5	10	1	1
9	Aromatics (>EC8-EC10)	TDI	40	TDI	60	9.99E+99	9.99E+99	2.53E-01	1.00E-05	1.00E-09	3.2	3.69	0.1	0.5	10	1	1
10	Aliphatics (>C10-C12)	TDI	100	TDI	290	9.99E+99	9.99E+99	6.44E+01	1.00E-05	1.00E-09	5.38	6.3	0.1	0.5	10	1	1
11	Aromatics (>EC12-EC16)	TDI	40	TDI	60	9.99E+99	9.99E+99	1.26E-02	1.00E-05	1.00E-09	3.7	4.29	0.1	0.5	10	1	1
12	Aromatics (>EC16-EC21)	TDI	30	NR	NR	9.99E+99	NR	6.95E-04	1.00E-05	1.00E-09	4.15	4.82	0.1	0.5	10	1	1
13	Aromatics (>EC21-EC35)	TDI	30	NR	NR	9.99E+99	NR	2.48E-05	1.00E-05	1.00E-09	5.1	5.95	0.1	0.5	10	1	1
14																	
15	Benzene	ID	0.29	ID	1.4	NR	NR	1.16E-01	8.77E-06	6.64E-10	1.83	2.13	0.1	0.5	10	1	1
16	Ethylbenzene	TDI	100	TDI	220	5	130	1.39E-01	7.04E-06	5.31E-10	2.65	3.15	0.1	0.5	10	1	1
17	Toluene	TDI	223	TDI	1400	10	520	1.15E-01	7.78E-06	5.88E-10	2.31	2.73	0.1	0.5	10	1	1
18	Xylene, m-	TDI	180	TDI	60	11	140	1.12E-01	7.03E-06	5.31E-10	2.69	3.2	0.1	0.5	10	1	1
19	Xylene, o-	TDI	180	TDI	60	11	140	9.20E-02	7.01E-06	5.31E-10	2.63	3.12	0.1	0.5	10	1	1
20	Xylene, p-	TDI	180	TDI	60	11	140	1.07E-01	7.04E-06	5.31E-10	2.65	3.15	0.1	0.5	10	1	1

[illegible]

 Environment Agency		Soil-to-water partition coefficient (cm ³ g ⁻¹)	Vapour pressure (Pa)	Water solubility (mg L ⁻¹)	Soil-to-plant concentration factor for green vegetables (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for root vegetables (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)	Soil-to-plant concentration factor for tree fruit (mg g ⁻¹ plant DW or FW basis over mg g ⁻¹ DW soil)
1	Aliphatics (C5-C6)	4.20E+00	2.19E+04	3.59E+01	model	model	model	model	model	model
2	Aliphatics (>C6-C8)	1.96E+01	3.45E+03	5.37E+00	model	model	model	model	model	model
3	Aliphatics (>C8-C10)	1.56E+02	3.20E+02	4.27E-01	model	model	model	model	model	model
4	Aliphatics (>C10-C12)	1.24E+03	3.21E+01	3.39E-02	model	model	model	model	model	model
5	Aliphatics (>C12-C16)	2.77E+04	1.53E+00	7.59E-04	model	model	model	model	model	model
6	Aliphatics (>C16-C35)	2.97E+06	2.38E-02	2.54E-06	model	model	model	model	model	model
7	Aromatics (EC5-EC7)	3.49E-01	6.24E+03	1.78E+03	model	model	model	model	model	model
8	Aromatics (>EC7-EC8)	1.05E+00	1.73E+03	5.90E+02	model	model	model	model	model	model
9	Aromatics (>EC8-EC10)	8.18E+00	3.20E+02	6.46E+01	model	model	model	model	model	model
10	Aliphatics (>C10-C12)	1.24E+03	3.21E+01	3.39E-02	model	model	model	model	model	model
11	Aromatics (>EC12-EC16)	2.59E+01	1.14E+00	5.75E+00	model	model	model	model	model	model
12	Aromatics (>EC16-EC21)	7.29E+01	5.62E-03	6.53E-01	model	model	model	model	model	model
13	Aromatics (>EC21-EC35)	6.50E+02	1.61E-06	6.61E-03	model	model	model	model	model	model
14										
15	Benzene	3.49E-01	6.24E+03	1.78E+03	model	model	model	0.00E+00	0.00E+00	model
16	Ethylbenzene	2.31E+00	5.53E+02	1.80E+02	model	model	model	0.00E+00	0.00E+00	model
17	Toluene	1.05E+00	1.73E+03	5.90E+02	model	model	model	0.00E+00	0.00E+00	model
18	Xylene, m-	2.53E+00	4.95E+02	2.00E+02	model	model	model	0.00E+00	0.00E+00	model
19	Xylene, o-	2.20E+00	3.86E+02	1.73E+02	model	model	model	0.00E+00	0.00E+00	model
20	Xylene, p-	2.31E+00	4.75E+02	2.00E+02	model	model	model	0.00E+00	0.00E+00	model

[illegible]

Contaminant	Unit	EQS Saltwater	UK Drinking Water Standards
Cyanide	µg/l	-	50
Sulphate	µg/l	250000	250000
Sulphide	µg/l	n/a	-
Phenols	µg/l	30	0.5
Arsenic	µg/l	25	10
Boron	µg/l	7000	1000
Cadmium	µg/l	2.5	5
Chromium	µg/l	15	50
Copper	µg/l	5	2000
Lead	µg/l	25	10
Mercury	µg/l	0.3	1
Nickel	µg/l	30	20
Selenium	µg/l	-	10
Zinc	µg/l	-	5000
Napthalene	µg/l	5	-
Benzo(a)pyrene	µg/l	-	0.01
Benzene	µg/l	30	1
Toluene	µg/l	50	-
Poly Aromatic (PAH) Hydrocarbons	µg/l	-	0.1
Hydrocarbons	µg/l	-	10

APPENDIX D: Monitoring Data

Ground Gas Monitoring Data

Ground Gas Concentrations - 17th September 2010.

BH ID	Flow Rate (l/hr)		Methane (% vol)		Carbon Dioxide (% vol)		Oxygen (% vol)
	Peak	Steady	Peak	Steady	Peak	Steady	
BH03	0.1	ND	0.1	ND	ND	ND	20.7
BH07	ND	ND	ND	ND	ND	ND	20.4
BH08	0.1	ND	ND	ND	ND	ND	20.7
BH11	0.2	ND	0.1	ND	ND	ND	20.1
BH13	0.1	ND	0.1	0.1	0.2	0.2	20.0
BH15	0.2	ND	2.1	ND	0.8	0.6	18.6

Atm. Pressure –1011mb.

Ground Gas Concentrations - 22nd September 2010.

BH ID	Flow Rate (l/hr)		Methane (% vol)		Carbon Dioxide (% vol)		Oxygen (% vol)
	Peak	Steady	Peak	Steady	Peak	Steady	
BH03	0.0	0.0	0.0	0.0	1.8	1.8	18.3
BH07	0.2	0.1	0.0	0.0	0.2	0.2	19.5
BH08	0.2	0.2	0.0	0.0	2.3	2.2	10.7
BH11	0.1	0.0	0.0	0.0	0.0	0.0	19.8
BH13	0.0	0.0	30.4	13.2	3.1	2.1	11.9
BH15	0.1	0.1	0.1	0.0	0.0	0.0	19.9

Atm. Pressure – Falling from 1011 to 1009mb.

APPENDIX F: GENERAL NOTES

RPS CONSULTANTS
SITE INVESTIGATIONS - GENERAL NOTES

1. The assessments made in this report are based on the ground conditions as revealed by intrusive investigations, together with the results of any field or laboratory testing or chemical analysis undertaken and other relevant data which may have been obtained including previous site investigations. In any event, ground contamination often exists as small discrete areas of contamination ("hot spots") and there can be no certainty that any or all such areas have been located and/or sampled.
 2. There may be special conditions appertaining to the site which have not been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available.
 3. Where any data supplied by the Client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS Companies for inaccuracies within the data supplied by other parties.
 4. Whilst the report may express an opinion on possible ground conditions between or beyond trial pit or borehole locations, or on the possible presence of features based on either visual, verbal or published evidence this is for guidance only and no liability can be accepted for the accuracy thereof.
 5. Comments on groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. Groundwater conditions may vary due to seasonal or other effects.
 6. This report is prepared and written in the context of the agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or part after its original submission.
 7. The copyright in the written materials shall remain the property of the RPS Company but with a royalty-free perpetual licence to the client deemed to be granted on payment in full to the RPS Company by the client of the outstanding amounts.
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 9. These terms apply in addition to the RPS Group "Standard Terms of Business" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms of Business the said Standard Terms of Business shall prevail). In the absence of such a written contract the Standard Terms of Business will apply.
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