Cannock Chase District Council

Environmental Protection Act 1990, Part 2A: Initial Site Investigation

Infilled Land between View Street and Foster Avenue, Hednesford, Cannock, Staffordshire

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Prepared for:

Cannock Chase Council
PO Box 28
Beecroft Road
Cannock
Staffordshire
WS11 1BG

Prepared by:
Grontmij Limited
3rd Floor, Radcliffe House
Blenheim Court
Lode Lane
Solihull
B91 2AA

T 0121 7116600
F 0121 7116749
E gareth.taylor@grontmij.co.uk

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Report Reference	Issue Date	Reason for Issue	Prepared by		Checked by	Approved by
R622/106270/V1/2011	31/03/11	First Issue	**Name**	Rebecca Hearn	Gareth Taylor	Colin Macdonald
			Position	Assistant Environmental Consultant	Principal Environmental Consultant	Director, Land Quality
R622/106270/V2/2011	12/07/11	Update with additional sampling results	Name	Rebecca Hearn	Gareth Taylor	**Colin Macdonald**
			Position	Assistant Environmental Consultant	Principal Environmental Consultant	**Director, Land Quality**
R622/106270/V3/2011	08/08/11	Updated re WSWQ 2010 and sum of 4 PAHs	Name	Rebecca Hearn	Gareth Taylor	Colin Macdonald
			Position	Assistant Environmental Consultant	Principal Environmental Consultant	Director, Land Quality

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1 INTRODUCTION

1.1 Terms of Reference

In January 2010, Grontmij Limited (Grontmij) was appointed by Cannock Chase District Council (the Council) to assist in the implementation of the Council's Part 2A Contaminated Land inspection strategy. Part 2A of the Environmental Protection Act 1990 (Part 2A) requires each local authority to inspect areas of land which it believes may constitute Part 2A Contaminated Land.

Contaminated Land is defined in Section 78(2) of Part 2A of the Environmental Protection Act 1990 as:

"any land which appears to the local authority in whose area the land is situated to be in such a condition, by reason of substances in, on or under the land, that

- *significant harm is being caused or there is a significant possibility of such harm being caused; or*
- *pollution of controlled waters is being, or is likely to be, caused.*

.
Further information is provided in the Act and associated statutory guidance (DEFRA Circular 01/2006 – EPA 1990, Part 2A: Contaminated Land).

Grontmij assisted the Council to prioritise a list of sites which could constitute Part 2A contaminated land for inspection, on the basis of the Council's Part 2A Inspection Strategy. The site subject to this report, located between View Street and Foster Avenue, Hednesford, Cannock, Staffordshire (hereafter referred to as 'the site') was identified as a priority for inspection as:

- Environment Agency records indicate that the site, which comprises two discrete areas of land, appears to have been infilled with waste material
- The site is considered to be sensitive as 44 residential properties with gardens overly the inferred extent of landfill, and the site is underlain by a principal aquifer.

Following the completion of a desktop study (see Appendix A) and a successful application for funding from DEFRA, Grontmij was subsequently appointed by the Council to implement an exploratory site investigation, which was undertaken in December 2010. This report presents the findings of the detailed investigation, assesses the significance of the contaminant concentrations detected, and makes recommendations for further work.

The report is structured as follows:

- Section 2 provides site setting details and an overview of previous reports
- Section 3 describes the exploratory investigation undertaken
- Section 4 presents an assessment of risk factors identified in the investigation
- Section 5 is a Conceptual Site Model of potential pollutant linkages
- Section 6 provides a summary and conclusion.

This report is subject to the limitations presented in Appendix B.

2 BACKGROUND INFORMATION

2.1 Site Setting

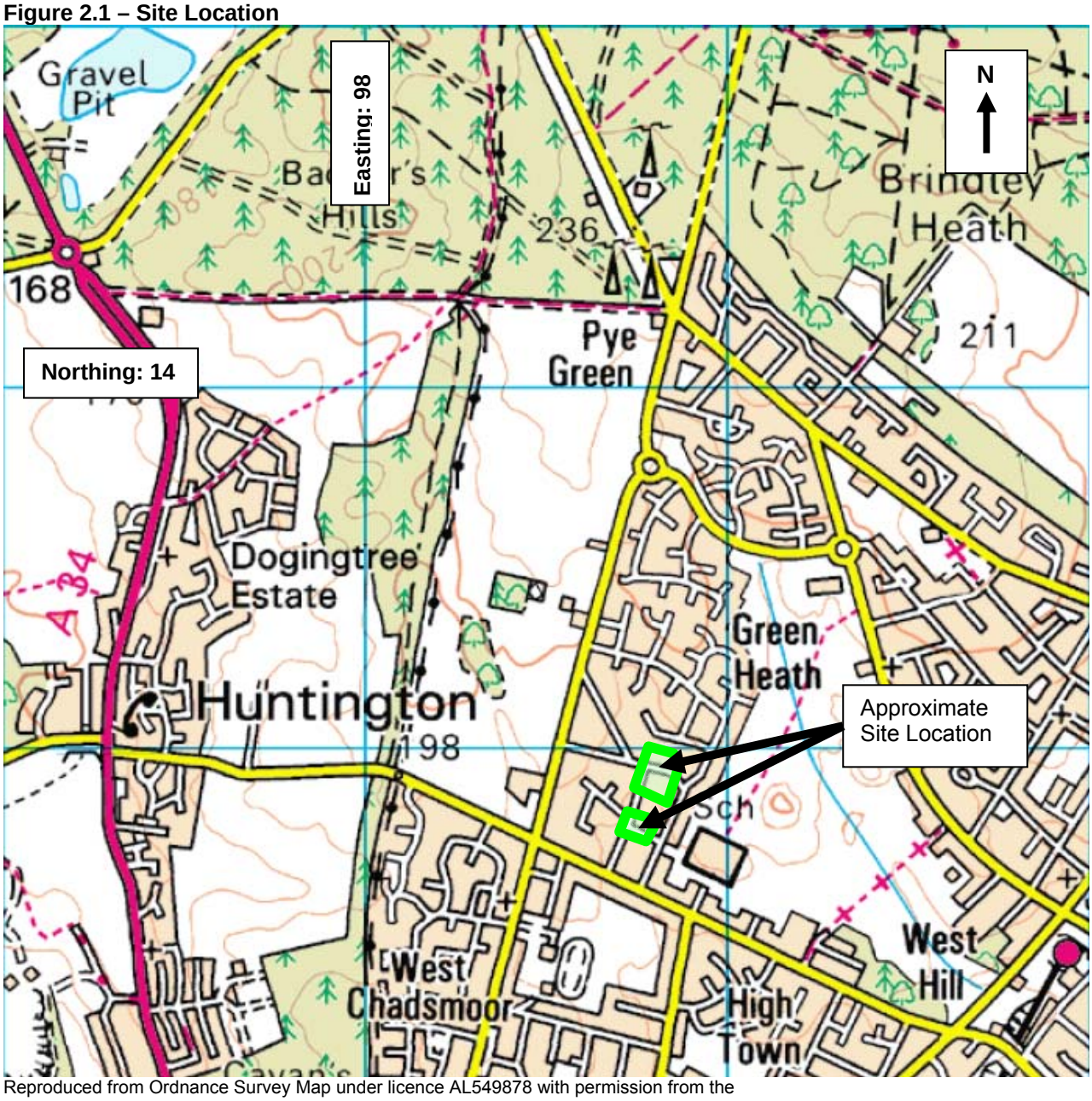
The site's setting and location are summarised in Table 2.1 and Figure 2.1.

Table 2.1 – Site Setting

Data	Information
Address	Land at View Street and Foster Avenue.. Hednesford, Cannock, Staffordshire. Postcode WS12 4HN is the approximate centre of the site. The site comprises two discrete areas of infilled land, to the north and south of Ward Street (see Drawing 1).
Current site use:	Residential houses and gardens – appear to date from 1960s/70s
Grid Reference:	Northern area: approximate NGR 398810,312850 Southern area: approximate NGR 398770,312730
Site Area:	Approximately 1.1 ha In total
Topography:	Undulating, but general trend is a slight gradient down towards the south-east
Surrounding land use	The site is surrounded by further residential properties, plus a secondary school with playing fields is located approximately 30m to the east.
Mapped Geology	British Geological Survey (BGS) mapping indicates bedrock of the Kidderminster Formation (interbedded sandstone and conglomerate) of the Sherwood Sandstone Group. The mapping indicates that there are no superficial deposits beneath the site.
BGS Log Review	Borehole logs available to view on the British Geological Survey (BGS) website have been inspected (included as Appendix G). The logs, from positions approximately 400m east of the site (at an elevation approx 10m lower than the site) and 400m south-west of the site (at a similar elevation to the site) indicate a sequence of alternating clay and gravel layers within the top 6m of strata. Groundwater was not encountered during drilling in the top 6m of strata
Hydrogeology	The Environment Agency website indicates the sandstone is a principal aquifer. Principal aquifers are layers of rock or drift deposits that have high inter-granular and/or fracture permeability and usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
Source Protection Zones (SPZs)	The Environment Agency website indicates that the site does not lie within a SPZ.
Surface Waters	Closest is small ditch approx 400 m east of the site.
Historical Land Use	Environment Agency records provided to the council indicate that the site was formerly operated as a landfill site and was subsequently developed as residential housing. The landfill is shown on Environment Agency "What's In Your Back Yard" website and is recorded as being operational between 31st December 1940 and 31st December 1943. The landfill is registered to have received household waste from dwellings of various types including houses, caravans, houseboats, campsites and prisons, and wastes from schools, colleges and universities. The site pre-dates the Control of Pollution Act 1974 and thus is unlikely to have operated under a formal licence.
Ecologically designated sites[1]	Multi-Agency Geographical Information for the Countryside (MAGIC) search indicates none within 1km of site boundary

[1] Includes sites designated as Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Special Area of Conservation (SAC, including candidate sites), Special Protection Area (SPA including potential sites), listed Wetlands of International Importance (Ramsar site) and Local Nature Reserves (LNR).

Figure 2.1 – Site Location



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2.2 Previous Reports

Grontmij has previously completed a desktop assessment of the site, as presented as Appendix A. The assessment included the review of on-line data resources, in-house mapping and records provided by the council, and a site walkover.

The desk study report included an initial Conceptual Site Model (CSM) of potential pollutant linkages, developed in accordance with the model procedures[2] and statutory guidance[3]. The CSM is re-presented as Table 2.2 overleaf.

[2] CLR11 Model Procedures for the Management of Land Contamination (EA & DEFRA September 2004)
[3] DEFRA Circular 02/2006, Environmental Protection Act 1990: Part IIA Contaminated Land:, September 2006.

Table 2.2 - Potential Pollutant Linkages

No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage[1]	Probability Of Linkage Occuring[1]	Overall Risk[1]	Comments
1	Residents of properties above infilled ground (including children playing in gardens)	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) and asbestos within landfill material	Dermal contact and direct ingestion, inhalation of dust/vapours, consumption of home-grown vegetables	Medium	Likely	Moderate	Grass and/or topsoil coverage likely to mitigate risk to an extent – risk is greatest where possibly impacted soils are exposed or could be encountered, for example, when digging a vegetable patch or when children play outdoors. Properties are constructed directly above a potentially significant contamination source. Sample collection and analysis required to refine conclusion on risk
2	Residents of properties above infilled ground	Methane and carbon dioxide from decomposition of waste elements of landfill material	Movement into buildings, subsequent asphyxiation and explosion risk	Medium	Likely	Moderate	Installation and monitoring of wells for gases and flow rates is required to refine conclusion on risk
3	Subsurface services serving the buildings (principally water supply)	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) within landfill material.	Chemical attack and tainting of water supply could occur at high contaminant concentrations / severe pH levels	Mild	Likely	Low to moderate	Further investigation data needed to refine assessment/CSM
4	Property (Structures) – sub-surface concrete	Sulphate and pH	Contact between contaminants and concrete	Mild	Likely	Low to moderate	Further investigation data needed to refine assessment/CSM

No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage[1]	Probability Of Linkage Occuring[1]	Overall Risk[1]	Comments
5	Principal aquifer (Sherwood Sandstone) beneath site	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs within landfill material.	Leaching of soil contaminants to aquifer – BGS logs indicate sequence of clays and gravels, which may or may not act as an aquiclude	Medium	Likely	Moderate	Risk will depend upon depth and concentration of contaminants, confirmation that an aquiclude is present / absent, leaching potential of contaminants. Investigation required to determine risk.
6	Ditch 400m to east	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs within landfill material.	Leaching of soil contaminants to aquifer and migration to watercourse	Mild	Low	Low	Ditch appears to be comparably shallow, periodically dry and clay-lined, i.e. unlikely to be in hydraulic continuity with groundwater beneath the site. Distance of ditch from site also mitigates risk due to attention of contaminants along flowpath between receptor and source. BGS logs in vicinity of drain (see Appendix G) indicate absence of shallow groundwater strike, i.e. unlikely any groundwater beneath site is in continuity with the ditch. No further assessment proposed

[1] Taken from Table 6.3, CIRIA report 552 (Contaminated Land Risk Assessment – A Guide to Good Practice. Severity classified as minor, mild, medium or severe. Probability classified as unlikely, low, likely or high. Overall risk considers both the severity and probability of the linkage (very low, low, moderate, high or very high). See extract in Appendix F

3 EXPLORATORY INTRUSIVE INVESTIGATION

In order to further examine the potential pollutant linkages identified in Table 2.2, and following a successful application for DEFRA funding, an exploratory site investigation was undertaken on the 7th and 10th December 2010. This section describes the site investigation undertaken and results obtained.

3.1 Scope and Methodology

The intrusive site investigation included the following:

- A consultation exercise with residents living at the site, including a mailshot and a public open evening;
- Obtaining plans of underground services and CAT-scanning proposed drilling locations, using a Radiodetection CAT1 and signal generator;
- Drilling four hand held window sample holes (WS1 – WS4) to a maximum depth of 4.0m bgl, at the locations shown on Drawing 1. The window sample holes, which were drilled by Sherwood Drilling Services, were positioned in the rear gardens of housing located above the extent of infill, as indicated on historical mapping and by anecdotal evidence. Borehole positions were selected on the basis of achieving a good representative initial coverage of the site. The purpose of the window sample holes was to examine shallow and deeper soil conditions, enable the retention of samples for laboratory testing, and facilitate the installation of 50mm diameter dedicated gas monitoring wells in each borehole;
- Advancing five hand dug pits (HP6 to HP10[4]) to a maximum depth of 0.7m, to examine shallow soil conditions and augment the coverage of the site provided by the above window sampler holes;
- Logging soil arisings in accordance with BS5930:1999, and additionally noting any visual or olfactory evidence of potential contamination;
- Retaining representative soil samples of the strata encountered, which were selected on the basis of field observations of potential contamination and achieving good spatial and depth coverage of the site
- Submitting retained samples to Alcontrol Geochem in cooled coolboxes and under full chain of custody documentation, and instructing the analysis of samples, and;
- Undertaking four ground gas monitoring rounds, using a Gas Data Ltd GFM435 gas analyser with internal flow pod.

Leaching tests were not undertaken as part of this exploratory investigation. The exploratory investigation findings would be reviewed and the need for further testing evaluated – see Section 4 onwards.

[4] The hand pits at this site were advanced on the same day as another site, and a sequential numbering system was adopted by the engineer – hence HP6 is the first of the five pits at this site

3.2 Results

3.2.1 Ground Conditions

The ground conditions encountered at the site generally comprised Made Ground above interbedded sands and clays, as discussed in further detail below.

Made Ground
Made Ground was encountered to a maximum depth of 0.9m bgl (in WS3) and was predominantly granular in nature, consisting of layers of sand and gravel with occasional clay layers or pockets. The gravel content of the Made Ground was variable, including fine to coarse ash, glass, quartz, brick, ceramics, fabric and mudstone. No evidence of municipal waste was encountered.

Natural Deposits
Encountered within all exploratory holes except HP8 (which encountered Made Ground from ground level to termination at 0.7m bgl) at depths ranging between 0.25m and 0.9m bgl, and proven to exploratory hole termination at a maximum of 4.0m bgl. The deposits typically comprised firm sandy gravelly clay, with bands of sand and gravel, silty sand and clayey sand (generally consistent with the BGS logs previously reviewed). The gravel content consisted of fine to coarse quartz.

Groundwater
No groundwater was encountered during the excavation of any exploratory holes.

The above findings are discussed further in Section 4 (updated CSM). Window sampler hole logs, providing full details of the strata encountered, are included within Appendix C.

3.2.2 Adequacy of Investigation Depth and Spatial Extent

Natural deposits were proven in seven of the eight exploratory hole locations, including all four deeper exploratory holes (i.e. WS1 to WS4). This suggests that the full potential depth of infill material at the site has been encountered and assessed, and gas monitoring (Section 3.2.5) is likely to be representative of the full body of infill.

As with most exploratory investigations, increased depth and spatial coverage of the site would be desirable to increase the confidence that the full depth of infill has been intersected. Nonetheless, the investigation represents a good initial assessment of ground conditions at the site, and at this stage, there is no need to consider further deeper drilling at the site.

3.2.3 Field Evidence of Contamination

The drilling arisings were inspected for visual and olfactory evidence of potential contamination. A summary of field observations recorded is presented in Table 3.1:

Table 3.1 - Field Evidence of Potential Contamination

Exploratory Hole	Visual and Olfactory Evidence of Contamination
WS1	0-0.8m bgl: Gravel of ash, coal, ceramic, brick within matrix
WS2	0-0.4m bgl; Occasional glass and fabric fragments
WS3	0-0.9m bgl; Gravel of ash brick and quartz within black matrix
HP8	0.3-0.7m bgl (termination depth); Fragments of brick rubble and ash within matrix

3.2.4 Soil Analysis Results

Nine samples were submitted for laboratory analysis, under full chain of custody documentation and within chilled coolboxes, to ALcontrol Geochem of Deeside. ALcontrol is UKAS accredited and holds MCERTS accreditation for most analyses performed. The samples were selected for analysis on the basis of the observations of potential contamination made in the field, and to achieve good spatial coverage of the site.

Table 3.1 presents a summary of the analysis results. The results have been compared to screening values protective of human health, assuming the receptor is a residential property where plant uptake of contaminants occurs, and the plants are subsequently ingested by humans. The screening values used, in order of preference, comprise:

- 2009 Soil Guideline Values (SGVs) published by the Environment Agency / DEFRA, generated using the latest Contaminated Land Exposure Assessment (CLEA) model, version 1.06
- Generic Assessment Criteria (GAC) published by Land Quality Management Limited (LQM) or the Environmental Industries Commission (EIC), or calculated by Grontmij, all using CLEA 1.06
- SGVs published by the Environment Agency / DEFRA between 2002 and 2007, calculated using prior versions of the CLEA model.

Full analytical testing results are included as Appendix D.

Table 3.2 - Soil Analysis Results Summary

Determinand	No. of Samples Tested	Minimum Value	Maximum Value	SGV / GAC[1]	Locations where SGV or GAC are exceeded
Arsenic	9	3.7	24	32	-
Barium	9	23	860	1300	-
Beryllium	9	0.09	2.0	51	-
Boron (water-soluble)	9	<1.0	<1.0	291	-
Cadmium	9	0.20	2.8	10	-
Chromium, hexavalent	9	<0.60	<1.2	4.3	-
Chromium, total	9	6.6	30	3,000	-
Copper	9	5.7	890	2,330	-
Lead	9	7.8	**490**	450[2]	**WS01 0.3m bgl**
Mercury	9	<0.14	<0.14	0.42[3]	-
Nickel	9	5.4	69	130	-
Selenium	9	<1.0	1.1	350	-
Vanadium	9	9.6	44	75	
Zinc	9	40	1100	3,750	-
Asbestos screen	9	No asbestos-containing materials detected			
Benzene	6	<0.01	0.04	0.16	-
Toluene	6	<0.01	0.04	270	-
Ethyl Benzene	6	<0.01	0.05	150	-
Xylene	3	<0.01	<0.01	98[4]	-
TPH – CWG Hydrocarbons	6	None of the banded aliphatic/aromatic TPH-CWG screening criteria were exceeded. Full speciated results are presented in Appendix D			-
Polyaromatic Hydrocarbons (PAHs)	6	None of the speciated PAH screening criteria were exceeded. Full speciated results are presented in Appendix D			-
Volatile Organic Compounds and Semi-Volatile Organic Compounds (excl.above)	3	All laboratory results below limit of detection with exception of below:			-
Dichloromethane	3	<0.01	0.1	0.98	-
Tetrachloroethene	3	<0.005	0.04	2.1	

Values presented in mg/kg, correct to two significant figures (screening values presented without any rounding). **Bold values** indicate locations where observed concentrations exceed the screening value.

[1] Fifteen samples were tested for Soil Organic Matter (%SOM) content. A minimum value of 1.88% and a maximum of 10.8% were recorded, with a mean of 4.4% and a median of 3.9%. It is therefore justified, as a conservative measure, to use the SGVs and GAC generated using a 2.5% SOM value in CLEA in an initial screen, where the SGVs/GAC are SOM-dependant (mercury, phenol, PAHs, TPH-CWG and abovementioned VOCs and SVOCs). All other SGVs / GAC are not SOM-dependant

[2] SGV quoted was generated by DEFRA using earlier version of CLEA. A new SGV using latest version of CLEA is awaited

[3] Testing results presented represent total mercury. SGV presented is for elemental mercury, the most stringent of the elemental, inorganic and methyl mercury SGVs

[4] SGV for para-xylene quoted (most stringent of the three isomers)

The concentrations of lead in soils from one location at the site exceed the generic screening values adopted.

3.2.5 Ground Gas Monitoring

Four rounds of ground gas monitoring were undertaken, using a Gas Data Instrument GFM435 with internal flow pod. A summary of the maximum gas monitoring results recorded at each well is presented in Table 3.3, with full monitoring data in Appendix E:

Table 3.3 - Summary of Gas Monitoring Data

Well	Maximum Values Recorded During Monitoring Events:					Gas Screening Value[1] (l/hr)	Situation "A" Characteristic Situation[1]
	Peak CH_4 (%)	*Steady CO_2 (%)*	*Steady CO (ppm)*	*Steady H_2S (ppm)*	*Flow (l/hr)*		
WS1	0.1	0.8	0	0	0.2	0.002	1
WS2	0.1	0.8	0	0	3.4	0.027	1
WS3	0.1	0.8	0	0	0.1	0.001	1
WS4	0.1	0.6	0	0	0.3	0.002	1

Atmospheric Pressure:		
	28/01/2011	1009mb (Steady)
	11/02/2011	995mb (falling trend)
	25/02/2011	1006mb(steady)
	11/03/2011	998mb (falling trend)

Readings obtained within a 3 minute measurement period, obtained with a GFM435 gas analyser.
CH_4 – methane; O_2 – oxygen; CO_2 carbon dioxide; CO – carbon monoxide;
H_2S – hydrogen sulphide; mbgl – metres below ground level mb – millibars l/hr – litres per hour.
[1]CIRIA Characteristic Situation based on methodology presented in CIRIA Report C665, Assessing Risks Posed by Hazardous Gases to Buildings. Where the flow rate recorded in the field is zero or negative, a flow of 0.01 l/hr is assumed

The summary data presented above indicates that, in regard to methane and carbon dioxide, CIRIA characteristic situation 1 should be applied to all of the wells. This is the lowest risk category (of six) presented in CIRIA report 665, and indicates that no special gas precautions would be required in the construction of new buildings. Additionally, zero hydrogen sulphide and carbon monoxide was recorded.

In view of the monitoring results highlighted above, ground gases are unlikely to pose a risk to the housing at the site.

3.2.6 Safety of Water Supply Pipes

Two publications have been reviewed in regard to potential risks to water supply pipes posed by contaminants in the ground:

- "Guidance for the Protection of Water Supply Pipes to be Used in Brownfield Sites" (UK Water Industry Research {UKWIR}, ref 10/WM/03/21, 2010 (re-issued version))
- The Selection of Materials for Water Supply Pipes to be Laid in Contaminated Land (Water Regulations Advisory Scheme {WRAS}, ref 9-04-03, October 2002)

Both reports present methodologies for the assessment of soil conditions and the specification of appropriate pipework materials to mitigate the presence of contaminants.

WRAS Screen

A comparison between the chemical analysis results obtained from samples taken from the top 1.2m of soil at View Street and the older WRAS screening values is presented in Table 3.4. Only soils from the top 1.2m of the soil profile have been selected for comparison as 1.2m is the typical maximum depth at which water pipes are laid within the highway – with local service connections to properties typically much shallower. Note, the table below does not constitute a full screen against all WRAS parameters; e.g. sulphate, cyanide and coal tar have not been tested for.

Table 3.4 - Initial WRAS Threshold Screen

Analyte	Test Results – Soils Within Top 1.2m of Soil Profile (mg/kg)		WRAS Threshold Value (mg/kg)
	max	Mean (where max>threshold))	
pH	6.2 - **8.02**	7.2	<5 or **>8**
Arsenic	**24**	**13**	**10**
Cadmium	2.8	-	3
Chromium (hexavalent)	<1.2	-	25
Chromium (total)	30	-	600
Lead	490	-	500
Mercury	<1.4	-	1
Selenium	1.1	-	3
Phenol	Not analysed	-	5
Polyaromatic Hydrocarbons	12	-	50
Toluene extractable	<0.01	-	50
Petroleum Hydrocarbons (TPH CWG total aliphatic & aromatic >C5-C44)	**192**	**131**	**50**

Bold values denote concentration in excess of WRAS threshold value

The maximum concentrations of arsenic and petroleum hydrocarbons, and the maximum soil pH level recorded, exceed the WRAS threshold values. The mean concentrations of arsenic and petroleum hydrocarbons also exceed the WRAS threshold values.

UKWIR Screen

The UKWIR approach is the most recent and reflects further studies undertaken since the WRAS document was published in 2002. Key features of the UKWIR report include:

- A pipework material-specific assessment procedure (Table 3.1 of the report). This allows chemical analysis results to be compared to various threshold criteria associated with six possible pipework material types
- The discounting of metallic pipework (other than copper or steel/ductile iron with protective wrapping) as a modern pipework material
- The specification of a different chemical testing suite to that recommended in the earlier WRAS document – including the use of physio-chemical parameters and exclusion of analysis for metals (given the above discounting of metallic pipework).

The chemical analysis for the view street site was scheduled prior to the publication of the re-issued UKWIR report (despite a re-issue data of 2010, the report was not available until January 2011). Therefore, some of the parameters required for a UKWIR screen are not available. The

available laboratory results from the top 1.2m of soil have been compared to the UKWIR thresholds. The screen has identified that:

- The total VOC result recorded in one (WS01) of three samples tested exceeds the UKWIR threshold for PVC pipework
- The total SVOC result in one (WS01) of three samples tested exceeds the UKWIR threshold for PE and PVC pipework
- The BTEX results for WS01 and WS03 exceed the UKWIR threshold for PVC pipework. WS01 also exceeds threshold for PE pipework

Summary

It is possible that the concentrations of contaminants at the site could adversely affect drinking water quality, depending on the materials used for water distribution (South Staffordshire Water pipes) and local connections to the network (probably installed by the house builder).

The results of the intrusive investigation and monitoring are discussed in more detail in the following sections.

4 FURTHER ANALYSIS OF RISK TO SENSITIVE RECEPTORS

4.1 Lead in Soil

4.1.1 Introduction

The site investigation has established that the concentration of lead in one sample exceeds the soil guideline value (SGV) applicable to the generic residential housing scenario, where plants are grown for human consumption. None of the nine other samples obtained at <0.7m bgl depth and analysed at the laboratory contained a lead concentration in excess of the SGV.

Generic SGVs and generic acceptance criteria (GAC) represent "safe" concentrations of contaminants, above which unacceptable impacts may occur and further assessment is generally required. Exceedance of SGVs or GAC does not necessarily mean that a significant possibility of significant harm ("SPOSH" - i.e. unacceptable risk to human health or the environment) is posed to human health. The SGVs and GAC have been derived using the CLEA model by various parties (see Section 3.2.3), using conservative input parameter values to generate screening values applicable, theoretically, to all UK sites. Therefore, an exceedance of a SGV or GAC does not necessarily mean that SPOSH exists - only that a generic, conservative screening value has been exceeded, and further assessment is required.

4.1.2 Statistical Analysis Approach

Guidance regarding how data collection, data review and statistical testing interact to produce defensible conclusions regarding the condition of land is provided within Part 2A of the Environmental Protection Act 1990 and Guidance on Comparing Soil Contamination Data with a Critical Concentration[5] ("the guidance").

In order for statistical analysis to be applied, the dataset under inspection should strictly be the result of an unbiased sampling strategy. While there are a number of reasons why the sampling strategy could be viewed as biased, we conclude that the strategy was as close to being unbiased as possible, as discussed below:

- Parts of the site, such as areas beneath houses and roads, were not accessible, thus some soils were much less likely to be sampled than others. However, it would be unreasonable to attempt to sample such soils in an initial investigation, and samples taken from garden areas are likely to be representative of infill material beneath the site as a whole (while acknowledging that recent additional made ground may have been placed to form structures)
- Residents were, in some cases, reluctant for some parts of their gardens to be disturbed, meaning that some soils were unlikely to be tested – but again, it is likely that the area available for sampling is likely to be representative of garden areas across the site as a whole
- Within each exploratory hole, contaminated land practitioners typically sample and analyse a "representative worst case" sample of the soil encountered – so, while a very small pocket of ash within otherwise "clean" soil may not be analysed, samples would typically be taken of a 0.2m wide band of ash, rather than from the "clean" soil above or below such a band. Such sampling and testing is desirable, as it gives an indication of "representative worst case" conditions. Thus, while such sampling is arguably biased, the bias is towards over-estimating typical concentrations of contaminants in the soil across the site. Thus, if

[5] The Chartered Institute of Environmental Health, CL:AIRE and The Soil and Groundwater Technology Association; May 2008.

the average concentration of such "representative worst case" samples is below the SGV or GAC, it follows that soil conditions across the site as a whole are also likely to be below the relevant SGV or GAC.

Statistical analysis of the dataset has therefore been undertaken, as described below.

4.1.3 Averaging Areas

The first step of statistical analysis is to define the "averaging area" over which data would be examined. An averaging area is an area of soil which, when sampled, is considered to provide a representative indicator of how much contaminant a receptor is exposed to.

Based on the history of the site (i.e. all the site is thought to be underlain by infill) and current use of the site (i.e. residential housing, with minor areas of lower sensitivity), the entire site was defined as a single averaging area, and all recorded lead concentrations in the soil obtained at <0.7m bgl depth were examined as a single dataset.

It could be argued that each residential property should be defined as a single averaging area, based upon the exposure of each individual receptor. However, as the goal of the investigation is to examine whether there is a significant possibility of significant harm (SPOSH) to sensitive receptors at the site *as a whole* (as characterised by the samples obtained and tested), and given that it was excessively intrusive to residents to obtain and test multiple samples from each garden during an initial investigation, such an approach was rejected.

4.1.4 Outlier Test

The second stage of statistical analysis requires a test to identify whether any outliers, potentially indicative of laboratory error or a separate population of data (for which a separate averaging area should be defined), are present.

The Guidance indicates that an outlier should only be excluded from a population of data if

The outlier is obviously and demonstrably the result of an error that can be identified and explained - in which case the correct value should be identified and the dataset amended, where possible, or the erroneous value excluded with justification, or

The outlier clearly indicates that more than one soil population exists within the dataset and this can be justified by (or informs the further development of) the conceptual model - in which case the different population expressed by the outlier(s) should be explored in more detail either by reviewing and refining zoning decisions and treating outlier values as a separate population or even individually or, if necessary, by undertaking further site sampling to verify conditions in the vicinity of outlier values.

In all other cases, outlying data should be assumed to be genuine and reflective of the full range of soil concentrations to which receptors may be exposed.

The ESI Limited Statistical Calculator has been used to test for outliers. The Calculator applies Grubb's Test to the entire dataset, but first requires the user to manually check that the dataset (excluding maximum value) is normally distributed, otherwise the test is not applicable. The dataset excluding maximum value was therefore checked, and was identified to be normally distributed.

The Calculator identified that the two highest lead concentrations recorded, 490mg/kg and 320mg/kg, within WS1 (0.3m) and WS2 (0.1m), were potentially statistical outliers. However:

- manual inspection of the spread of lead concentrations across the site identifies that the above results are of a similar order of magnitude to the remainder of the dataset
- all recorded lead concentrations have been plotted on a plan of the site. While is noteworthy that the four highest lead concentrations recorded are all located towards the north and western side of the northern part of the site, i.e. the area north of Ward Street, three of these four readings do not exceed the SGV of 450mg/kg, suggesting that a hotspot of contamination is not present. Similarly, there is no reason to believe that the WS1 and WS2 results have been obtained from an area of the site which is somehow different to the site as a whole, and thus representative of a separate population of data (e.g. the samples were not taken immediately downgradient of an obvious and localised source)
- the WS1 and WS2 lead results are not atypical concentrations of lead within a made ground soil, and are an entirely believable results (i.e. unlikely that a laboratory error has occurred).

The WS1 and WS2 results are therefore not considered to be outliers and have therefore not been excluded from the dataset.

4.1.5 Hypothesis Testing

The second stage of statistical analysis is to define a null and alternative hypothesis and examine whether the null hypothesis should be rejected.

In a Part 2a scenario, the null (H_0) and alternative (H_1) hypothesis to be tested is:

'Is there sufficient evidence that the true mean concentration of the contaminant (μ) is greater than the critical concentration (C_c)?'.

The Null Hypothesis (H_o) and the Alternative Hypothesis (H_1) are therefore:

- H_o $\mu \leq C_c$ i.e. the true mean concentration is equal to or less than the critical concentration
- H_1 $\mu > C_c$ i.e. the true mean concentration is greater than the critical concentration

The "critical concentration" is the adopted lead residential SGV of 450mg/kg.

The Guidance provides a detailed explanation of the hypothesis testing procedure, which includes comparison of the lower confidence limit of the (estimated) mean value with the critical concentration, to provide additional assurance that the (true) mean is also below the critical concentration at a defined level of confidence (conventionally 95%; this value has been adopted in this case).

The guidance also states that in the Part 2A scenario, if the sample mean is less than the critical concentration (C_c), the lower confidence limit of the sample mean must also be below the critical concentration, and the Null Hypothesis cannot be rejected.

The ESI Calculator has been used to calculate the mean of the recorded lead concentrations across the averaging area (the site), which is **144mg/kg**. As this value is below the critical concentration of 450mg/kg, the null hypothesis cannot be rejected, i.e. at a 95% level of confidence, the true mean concentration of lead beneath the averaging area (whole site) is less than or equal to the SGV of 450mg/kg.

4.1.6 Conclusion

On the basis of the above assessment, and given that a SGV represents a deliberately conservative value, reflective of assumptions and/or uncertainty associated with exposure frequency and duration, contaminant uptake and toxicology, below which harm to human health is very unlikely to occur, we conclude that:

- It is unlikely that a significant possibility of significant harm to human health is posed by lead beneath the site
- It is unlikely that the maximum concentration of lead recorded is representative of a separate data population, i.e. it is not considered to be a hotspot, requiring further investigation and the definition of an additional, smaller averaging area
- No further assessment in regard to human health risk is required.

4.2 Leaching to Aquifer

4.2.1 Introduction

The BGS log review and exploratory investigation has identified that contaminants within the made ground could leach to the principal aquifer beneath the site, given that the identified clay deposits beneath made ground contain a notable sand and gravel content and thus may not act as an aquiclude.

To further understand whether an aquiclude is likely to be present, and the potential risk to groundwater quality in the Principal aquifer, a groundwater monitoring round and chemical analysis of groundwater samples was undertaken at the installed locations, as described below.

4.2.2 Methodology

A groundwater monitoring round was undertaken on 31st May 2011. The four installed wells were monitored for groundwater depth, the water-bearing wells purged of three well volumes of groundwater in accordance with BS5930, and groundwater samples were taken. The samples were submitted to Alcontrol laboratories of Hawarden in temperature-controlled coolboxes and under full chain of custody documentation.

The three water samples (WS1 was dry) were scheduled for dissolved metals, PAHs and BTEX analysis.

4.2.3 Results

Groundwater depths of 1.20m bgl, 1.10m bgl and 1.60m bgl were recorded in wells WS2, WS3 and WS4 respectively, which were successfully advanced to 3m to 4m bgl. WS1, which was terminated at 2m bgl, was dry.

The chemical analysis results are presented in Table 4.1. The results have been compared to Tier 1 screening values protective of water quality within a Principal Aquifer (but not within a groundwater source protection zone) listed in the River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Directions 2010 ("WFD Directions") and UK Drinking Water Standards ("DWS") listed in the Water Supply (Water Quality) Regulations 1989/2000. The most stringent value published in the above documents has been adopted as the Tier 1 screening value; within the WFD Directions, this comprises the "general quality of groundwater" values listed in Part 8 only, as the site is not in a source protection zone and it is unlikely that any dissolved contaminants could reach a surface watercourse (i.e. "groundwater drinking water protected areas" and "groundwater impacts on surface waters" values are not applicable).

Table 4.1 – Groundwater Analytical Chemistry Results

Contaminant	No of Samples Tested	Minimum Value µg/l	Maximum Value µg/l	Tier 1 Screen µg/l
Arsenic (diss.filt)	3	0.54	1.1	10
Boron (diss.filt)	3	60	230	1000
Cadmium (diss.filt)	3	0.17	0.62	5.0
Chromium (diss.filt)	3	12	29	50
Copper (diss.filt)	3	2.2	3.4	2000
Lead (diss.filt)	3	0.05	0.16	10
Nickel (diss.filt)	3	3.3	3.9	20
Vanadium (diss.filt)	3	2.9	8.5	n/s
Zinc (diss.filt)	3	4.1	16	5000
Mercury (diss.filt)	3	<0.01	<0.01	1.0
Benzo(a)pyrene (aq)	**3**	**<0.01**	**0.92**	**0.01**
PAH, Total USEPA 16 (aq)	**3**	**(non-detects)**	**7.6**	**0.1**
Methyl tertiary butyl ether (MTBE)	3	<1.6	<1.6	n/s
Benzene	3	<1.3	<1.3	0.75
Toluene	3	<1.4	<1.4	n/s
Ethyl benzene	3	<2.5	<2.5	n/s
Total Xylenes	3	<4.2	<4.2	37.5**

* UK DWS
** WFD Directive Value
n/s No Tier 1 Standard Published
Bold values indicate Tier 1 Screening Value Exceeded

4.2.4 Discussion

Moderate dissolved PAH concentrations have been identified in the groundwater samples analysed. While the PAH concentrations exceed the adopted screening value, they are unlikely to be characteristic of an ongoing release of contaminants.

The above monitoring data (i.e. shallow groundwater depths) along with observations during drilling (no water ingress) indicate that the groundwater encountered in WS2 to WS4 is likely to be representative of a perched groundwater unit and not the Principal aquifer in the Sherwood Sandstone Group. The encountered shallow groundwater appears to be perched above clay layers, encountered beneath the made ground.

The presence of perched groundwater suggests that any leachate generated by the percolation of rainwater through the made ground is perching within the made ground or shallow natural strata, and is not migrating downwards to the principal aquifer. In other words, is it unlikely that a significant leaching pathway to the principal aquifer exists. Therefore, the moderate dissolved PAH concentrations recorded are unlikely to present a significant risk to the Principal aquifer.

4.3 Permeation of Contaminants into Water Pipes

4.3.1 Introduction

The sampling results presented in Section 3 indicate that the concentrations of contaminants in the soil could possibility pose a risk to the quality of drinking water, due to a permeation or tainting risk. To investigate the contaminant permeation / tainting risk further, samples of drinking water were collected from taps from a representative sample of properties, for submission to the laboratory.

4.3.2 Methodology

Three samples of mains tap water were obtained from the site on 31st May 2011. Where possible, the samples were taken from properties where higher concentrations of soil-borne contaminants were encountered, i.e. at locations where the greatest risk to drinking water quality may be posed, with other samples taken from positions allowing good coverage of the site, as follows:

- 32 Foster Avenue
- 9 Ward Street
- 53 View Street

Samples were obtained after allowing the tap to run for one minute. The samples were submitted to Alcontrol Laboratories for chemical analysis for metals and PAHs (considered common contaminants that could have entered water supply pipes, on the basis of field observations and laboratory testing of soil samples).

4.3.3 Results and Conclusion

The results of the analyses are summarised in Table 4.2 below, along with a comparison to UK Drinking Water Standards (UKDWS) taken from the Water Supply Water Quality Regulations 2010. Full testing results are included in Appendix F:

Table 4.2 - Tap Water Analysis Results

Contaminant	No of Samples Tested	Minimum Value µg/l	Maximum Value µg/l	UKDWS µg/l
Antimony	3	0.24	0.70	5.0
Arsenic	3	1.7	3.2	10
Boron	3	100	120	1000
Cadmium	3	0.15	0.38	5.0
Chromium	3	10	14	50
Copper	3	300	640	2000
Lead	3	0.10	4.4	10
Nickel	3	1.7	4.7	20
Zinc	3	180	660	5000
Mercury	3	<0.01	<0.01	1.0
Sum of Benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene*	3	<0.08	<0.08	0.10
Benzo(a)pyrene*	3	<0.009	<0.009	0.01

*There are no screening values in the WSWQ Regulations 2010 for the remaining commonly analysed 16 PAH compounds

The maximum recorded metal and PAH concentrations within tap water did not exceed the corresponding UK Drinking Water Standards, where standards exist.

The implications of the above findings are discussed further in the following report sections.

5 UPDATED CONCEPTUAL SITE MODEL

The CSM presented in the previous Grontmij desk study report (Appendix A) was updated, using the findings of the site investigation, as presented overleaf.

Table 5.1 - Pollutant Linkages, Post-Site Investigation

No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage[1]	Probability Of Linkage Occuring[1]	Overall Risk[1]	Comments
1	Residents of properties above infilled ground (including children playing in gardens)	Concentration of lead in WS01 at 0.3m bgl slightly exceeds adopted GAC. However, statistical assessment of dataset (Section 4) indicates that the true average lead concentration at the site is unlikely to pose significant risk to human health.	Dermal contact and direct ingestion, inhalation of dust/vapours, consumption of home-grown vegetables	Medium	Unlikely	Low	No further assessment proposed
2	Residents of properties above infilled ground	(Low concentrations of gases and low flow rates recorded)	Movement into buildings, subsequent asphyxiation and explosion risk	Medium	Unlikely	Low	No further assessment required
3	Subsurface services serving the buildings (principally water supply)	Concentrations of metals, hydrocarbons, VOCs, SVOCs and soil pH value within made ground exceed WRAS / UKWIR guideline values. Testing of tap water identified acceptable dissolved contaminant concentrations	Chemical attack and tainting of water supply could occur	Minor	Low	Very low	No further action proposed
4	Property (Structures) – sub-surface concrete	Weakly acidic to weakly alkaline pH values recorded (pH 6 to 8)	Contact between contaminants and concrete	Mild	Unlikely	Low	.pH appears to pose only a low risk. No sulphate testing undertaken, as class of concrete used to construct housing is unknown. Risk is considered to be a lower priority - no further assessment proposed.

No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage[1]	Probability Of Linkage Occuring[1]	Overall Risk[1]	Comments
5	Property (Structures) – residential buildings on site	Deleterious elements of infill	Differential settlement of infill, causing structural failure of buildings	Medium	Unlikely	Low	Although a detailed inspection of buildings has not been undertaken, no obvious evidence of structural failure was noted and all properties at the site appear to be currently occupied. As buildings appear to be fit for occupancy, it is unlikely that significant harm to the building has been caused or is being caused (ref: DEFRA Circular 01/2006 p86 – this is statutory guidance accompanying the Environmental Protection Act 1990.
6	Principal aquifer (Sherwood Sandstone) beneath site	PAH concentration in shallow groundwater exceeds drinking water standard. However, shallow (perched) depth of groundwater and low water ingress rate during drilling, plus presence of clay layers beneath made ground, suggest that the encountered groundwater is not representative of the principal aquifer, and contaminants from the made ground are not leaching to the "true" aquifer. Drinking water standard is therefore an inappropriate screening value	Vertical contaminant migration within unsaturated zone (Made Ground)	Medium	Low	Low/moderate	Identified dissolved PAH concentrations are unlikely to represent a significant source (from soils) of ongoing pollution of controlled waters and pollutant linkage to principal aquifer is likely to be (at worst) limited. No further assessment proposed

1 Taken from Table 6.3, CIRIA report 552 (Contaminated Land Risk Assessment – A Guide to Good Practice. Severity classified as minor, mild, medium or severe. Probability classified as unlikely, low, likely or high. Overall risk considers both the severity and probability of the linkage (very low, low, moderate, high or very high). See Appendix F for further details

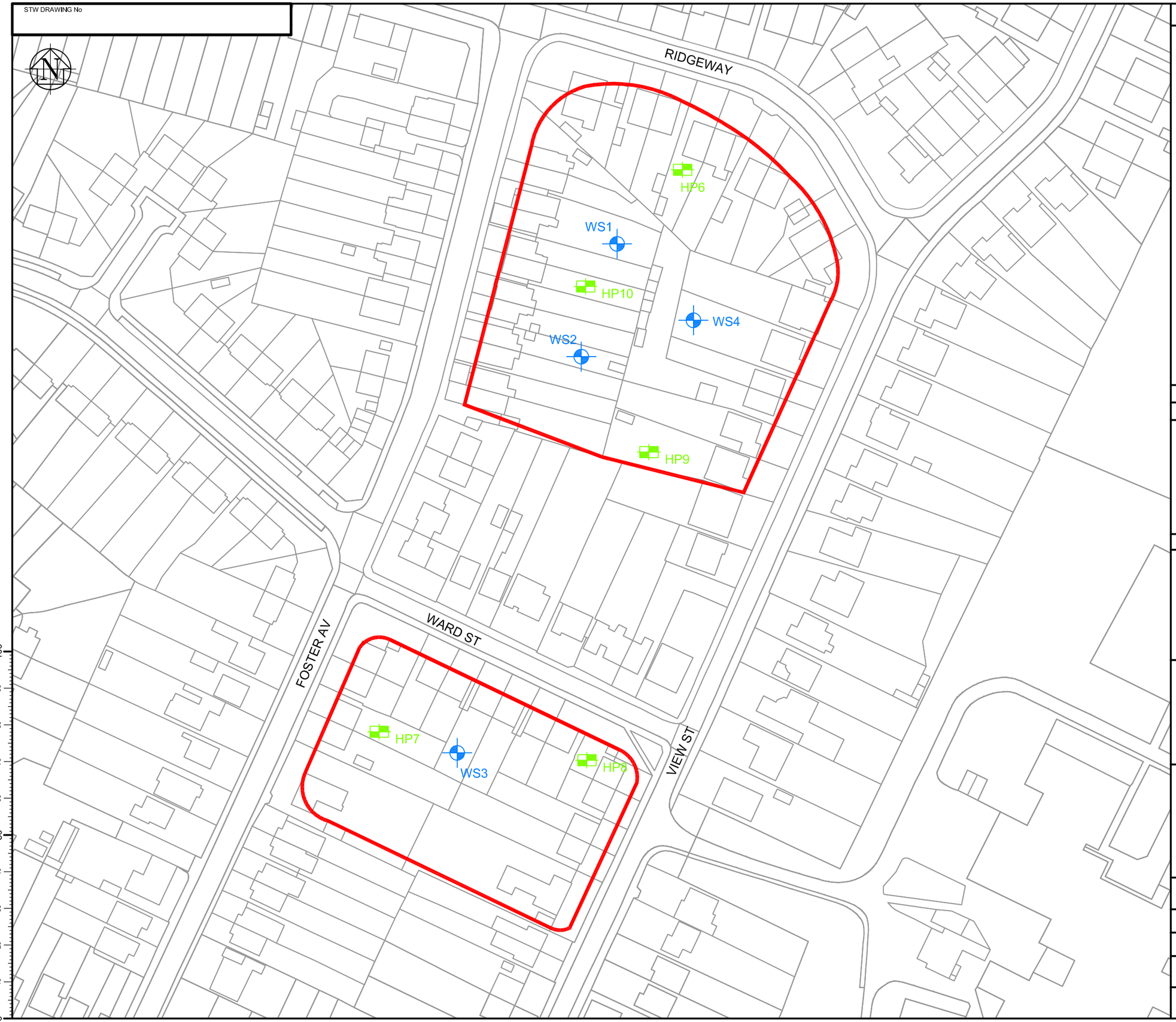
6 SUMMARY AND CONCLUSION

- Review of historical mapping and EA records provided to Cannock District Council, plus anecdotal evidence obtained during public consultation, identified that land between View Street and Foster Avenue, Hednesford, Staffordshire was infilled with unknown waste material which potentially posed a risk to human health and controlled waters.
- An exploratory investigation identified ground conditions comprising a maximum of 0.9m of Made Ground (sand, clay and gravel of materials including ash, glass, quartz, brick, ceramics, fabric and mudstone) over natural soils generally comprising firm sandy gravelly clay, with bands of sand and gravel, silty sand and clayey sand.
- The ground investigation identified that the concentration of lead in Made Ground in one location (of nine tested) exceeded generic human health screening criteria. However, upon statistical assessment of the dataset and consideration of the conservatism associated with the generic screening values, it was concluded that the concentrations of contaminants beneath the site are unlikely to pose a significant possibility of significant harm to human health.
- The slow groundwater ingress rate into wells, shallow groundwater depth and presence of clay layers beneath the Made Ground all suggest that dissolved PAHs encountered in water beneath the site are representative of a shallow perched water table and are unlikely to reach the principal aquifer, likely to be present at a greater depth beneath the site.
- Concentrations of contaminants within made ground exceed the generic screening criteria for contaminant permeation adopted by water companies. Samples of tap water quality were taken, giving acceptable results. No further action proposed.
- Gas monitoring has identified that the concentrations and flow rates of hazardous gases beneath the site are unlikely to pose a human health or explosion risk to the housing at the site. No further assessment in regard to gas is necessary.

On the basis of the preceding assessment and the limitations listed in Appendix B, the site is unlikely to meet the definition of Contaminated Land under Part 2A of the Environmental Protection Act 1990. No further work is proposed.

DRAWINGS

STW DRAWING No



NOTES

KEY:

- INFERRED EXTENT OF INFILLING
- WS1 — WINDOW SAMPLER
- HP1 — HAND PIT

REV	AMENDMENTS	ORIG	CHK'D	APR'D	DATE
-					

Grontmij

3rd Floor, Radcliffe House
Blenheim Court
Lode Lane
Solihull
B91 2AA

Tel : +44 (0)121 711 6600
Fax: +44 (0)121 711 6749
www.grontmij.co.uk

Bristol . Cumbria . Dublin . Edinburgh . Glasgow . Leeds . London . Peterborough . Reading . Solihull . Wrexham

CLIENT

Cannock Chase Council

PROJECT

VIEW STREET

TITLE

EXPLORATORY HOLE LOCATION PLAN

STATUS

FOR INFORMATION

ORIGINATOR	CHECKED	APPROVED
MIC	MJH	GVT
DATE 31/03/11	DATE 31/03/11	DATE 31/03/11

SCALE	ORIGINAL DRAWING SIZE
1:1000 @ A3	297 x 420 - A3

DRAWING No	REV.
106270-001	-

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APPENDIX A

Cannock Chase District Council

Environmental Protection Act 1990, Part IIa: Desktop Study and Walkover

Landfill between View Street and Foster Avenue, Hednesford, Cannock, Staffordshire

August 2010

Prepared for:
Cannock Chase Council
PO Box 28
Beecroft Road
Cannock
Staffordshire
WS11 1BG

Prepared by:
Grontmij Limited
3rd Floor, Radcliffe House
Blenheim Court
Lode Lane
Solihull
B91 2AA

T 0121 7116600
F 0121 7116749
E gareth.taylor@grontmij.co.uk

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			Name	Richard Swayne	Gareth Taylor	Gareth Taylor
			Position	Senior Consultant	Principal Consultant	Principal Consultant

CONTENTS

1 INTRODUCTION

1.1 Terms of Reference

In January 2010, Grontmij Limited (Grontmij) was appointed by Cannock Chase District Council (the Council) to assist in the implementation of the Council's Contaminated Land inspection strategy. Part IIa of the Environmental Protection Act 1990 (Part IIa) requires each local authority to inspect areas of land which it believes may be Part IIa Contaminated Land.

The scope of work agreed between Grontmij and the Council included:

- Prioritisation of an initial list of potentially contaminated sites for intrusive investigation work, based upon the sensitivity of each site, using existing limited desktop study data provided by the Council; and,
- Undertaking desktop reviews and walkovers, culminating in the production of reports for each priority site to improve the understanding of the sites and inform the planning of intrusive site investigations.

The prioritisation exercise identified an initial 12 sites requiring detailed desktop study and walkovers, including the landfill between View Street and Foster Avenue, which is discussed within this report. The site is considered to be sensitive as the residential properties overlie a former landfill which is recorded to contain household waste of various types and was operational pre-1943. The site is also underlain by a principal aquifer and the sites are located adjacent to a school with playing fields.

The site comprises two areas of concern between View Street and Foster Avenue. Area 1, north of Ward Street consists of approximately 27 residential properties with gardens, occupying an area of approximately 0.7 ha. Area 2, south of Ward Street consists of approximately 17 residential properties with gardens occupying an area of approximately 0.4 ha.

This report is subject to the limitations presented in Appendix A.

1.2 Site Setting

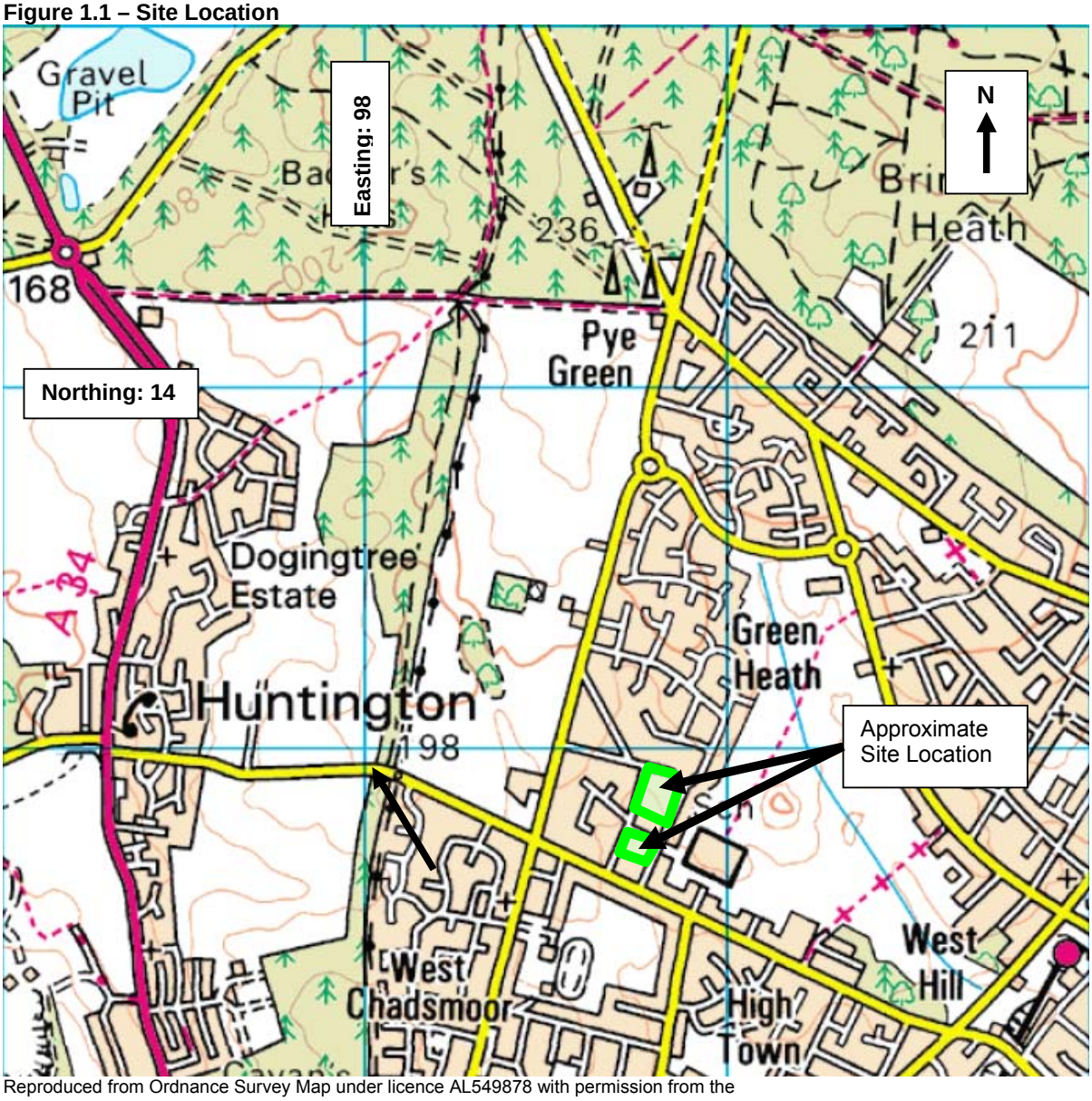
The setting of the site is summarised in Table 1.1. The location of the site is shown on Figure 1.1, and Drawing 1 provides surrounding land-use details.

Table 1.1 – Site Setting

Data	Information
Address	There are two areas of concern between View Street and Foster Avenue (see Drawing 1). Area 1: comprises land north of Ward Street, while Area 2 comprises land south of Ward Street. The general site address is: Ward St, Hednesford, Cannock, Staffordshire. The postcode for the centre of the site is WS12 4HN.
Current site use:	Residential houses and gardens – appear to date from 1960s/70s
Grid Reference:	Centre of area 1 is located at approximate NGR 398810,312850 Centre of area 2 is located at approximate NGR 398770,312730
Site Area:	Area 1 is approximately 0.7 ha. Area 2 is approximately 0.4 ha.
Topography:	Undulating, but general trend is a slight gradient down towards the south-east
Surrounding land use	The site is surrounded by further residential properties, plus a secondary school with playing fields is located approximately 30m to the east. Areas 1 and 2 of the site are intersected by Ward Street.
Mapped Geology	British Geological Survey (BGS) mapping indicates bedrock of the Kidderminster Formation (interbedded sandstone and conglomerate) of the Sherwood Sandstone Group. The mapping indicates that there are no superficial deposits beneath the site.
Hydrogeology	The Environment Agency website indicates the sandstone as a principal aquifer. Principal aquifers are layers of rock or drift deposits that have high inter-granular and/or fracture permeability and usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
Source Protection Zones (SPZs)	The Environment Agency website indicates that the site does not lie within a SPZ.
Surface Waters	There are no surface waters indicated within 250 m of the site.
Historical Land Use	Environment Agency records provided to the council indicate that the site was formerly operated as a landfill site and was subsequently developed as residential housing. The landfill is shown on Environment Agency "What's In Your Back Yard" website and is recorded as being operational between 31st December 1940 and 31st December 1943. The landfill is registered to have received household waste from dwellings of various types including houses, caravans, houseboats, campsites and prisons, and wastes from schools, colleges and universities. The site pre-dates the Control of Pollution Act 1974 and thus is unlikely to have operated under a formal license.
Ecologically designated sites[1]	MAGIC search indicates none within 1km of site boundary

[1] Includes sites designated as Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Special Area of Conservation (SAC, including candidate sites), Special Protection Area (SPA including potential sites), listed Wetlands of International Importance (Ramsar site) and Local Nature Reserves (LNR).

Figure 1.1 – Site Location



Reproduced from Ordnance Survey Map under licence AL549878 with permission from the Controller of HMSO, © Crown Copyright
Plan is not to scale.

1.3 Summary of available site information

Cannock Chase Council is not aware of any previous site investigation reports relating to the site.

1.4 Walkover

The site has been subject of a walkover, carried out from the public highway. . No obvious evidence of contamination was identified during the inspection, but such evidence is unlikely to be uncovered by a visual inspection of land occupied by residential properties.

2 PRELIMINARY CONCEPTUAL MODEL

2.1 Introduction

This section of the report presents a preliminary contaminated land assessment, on the basis of the available desktop data and information gathered during the walkover. The assessment presents an evaluation of the potential risks posed, should contaminants be present in the soil or groundwater beneath the site.

In the context of the Environmental Protection Act 1990 (EPA90), the Water Act 2003 and associated guidance[2,3], a preliminary (contaminated land) risk assessment should focus on whether the land at a subject site meets the statutory definition of Contaminated Land. Part IIA of the EPA90, as amended by the Water Act 2003, defines Contaminated Land as:

> *"any land which appears to the local authority in whose area it is situated to be in such condition by reason of substances in, on or under the land, that:*
>
> - *significant harm is being caused or there is a significant possibility of significant harm being caused; or*
> - *significant pollution of controlled waters is being caused or there is significant possibility of such pollution being caused".*

The procedure for assessing contaminated land involves the development of a Conceptual Site Model (CSM) comprising the assessment of potential contaminants, pathways and receptors.

2.1.1 Sources of Contaminants

The "contaminants" term in the conceptual model has been evaluated by inspection of existing desktop study data provided by the Council, and a preliminary site walkover. The following potential sources of contaminants have been identified:

- The site is underlain by a historical landfill site, which could contain contaminants including (but not limited to) metals, hydrocarbons, polyaromatic hydrocarbons (PAHs), volatile and semi-volatile organic compounds (VOCs and SVOCs); and,
- Methane and carbon dioxide gas, from the decomposition of any biodegradable material within the underlying landfill site.

[2] CLR11 Model Procedures for the Management of Land Contamination (EA & DEFRA September 2004)
[3] DEFRA Circular 02/2006, Environmental Protection Act 1990: Part IIA Contaminated Land: September 2006.

2.1.2 Receptors

DEFRA Circular 02/2006 defines a Receptor as:

> *"either (a) a living organism, a group of organisms, an ecological system or a piece of property which (i) is in a category listed in Table A as a type of receptor, and (ii) is being, or could be, harmed, by a contaminant; or (b) controlled waters which are being, or could be, polluted by a contaminant".*

Table 2.1 lists all of the receptors to be considered by a Part IIA or PPS23[4] assessment, and assesses whether the receptors are likely to be present at the site.

Table 2.1 - Potential Receptors

Receptor Type	Receptors	Present (✓ /✗)	Notes
Humans	On-site residents	✓	Residential properties (houses and gardens) above indicative extent of landfill. Gardens assumed to be used for growing food crops.
	Construction staff and site investigation personnel.	X	Not known if redevelopment proposed.
	Future occupants of the site	✓	Level of risk same as current residents so not considered further.
	Off site commercial workers or residents	✓	Possibly exposed to gases migrating off-site through permeable strata. Level of risk likely to be same, or lower, than on-site residents, and is not considered further
Ecosystems	Any designated ecological system[5], or living organism forming part of such a system	X	Inspection of MAGIC website has identified that the site does not lie within 250m of an ecologically designated site.
Property (Flora and Fauna)	Crops, including timber	X	Not present.
	Produce grown domestically, or on allotments for consumption	✓	Gardens assumed to be used for growing food crops. Risk posed is considered to be covered by human health (residential with gardens) pathway and is not considered further.
	Livestock	X	Not present.
	Other owned or domesticated animals	✓	Pets in residential properties. Risk posed is considered to be similar to that posed to on-site residents, and is not examined further
	Wild animals which are the subject of shooting or fishing rights	X	Not present.
Property (Buildings & Structures)	A 'building' means any structure, including any part below ground level, but	✓	Residential houses (and in particular, water service pipes and foundations) above

[4] Planning Policy Statement (PPS) 23: Planning and Pollution Control, Annex 2: Development on Land Affected by Contamination
[5] Includes sites designated as Sites of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Special Area of Conservation (SAC, including candidate sites), Special Protection Area (SPA including potential sites), listed Wetlands of International Importance (Ramsar site) and Local Nature Reserves (LNR).

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Receptor Type	Receptors	Present (✓ /✖)	Notes
	does not include plant or machinery within a building		indicative extent of landfill.
Controlled Waters[6]	Territorial waters	✖	None feasibly close enough to be affected.
	Coastal waters	✖	None feasibly close enough to be affected.
	Inland Freshwaters	✓	Un-named stream or drain 400m to east
	Groundwater	✓	Sherwood Sandstone principal aquifer beneath site.

2.1.3 Pathways

DEFRA Circular 02/2006 defines a pathway as:

> *"one or more routes or means by, or through, which a receptor: (a) is being exposed to, or affected by, a contaminant; or (b) could be exposed or affected".*

Pathways are examined as part of Table 2.2.

2.1.4 Potential Pollutant Linkages

The pollutant linkages identified are presented in Table 2.2.

[6] As defined in the Water Resources Act 1991 (Part III, Section 104). Generally includes most surface water bodies excluding drains which discharge into sewers.

Table 2.2 - Potential Pollutant Linkages

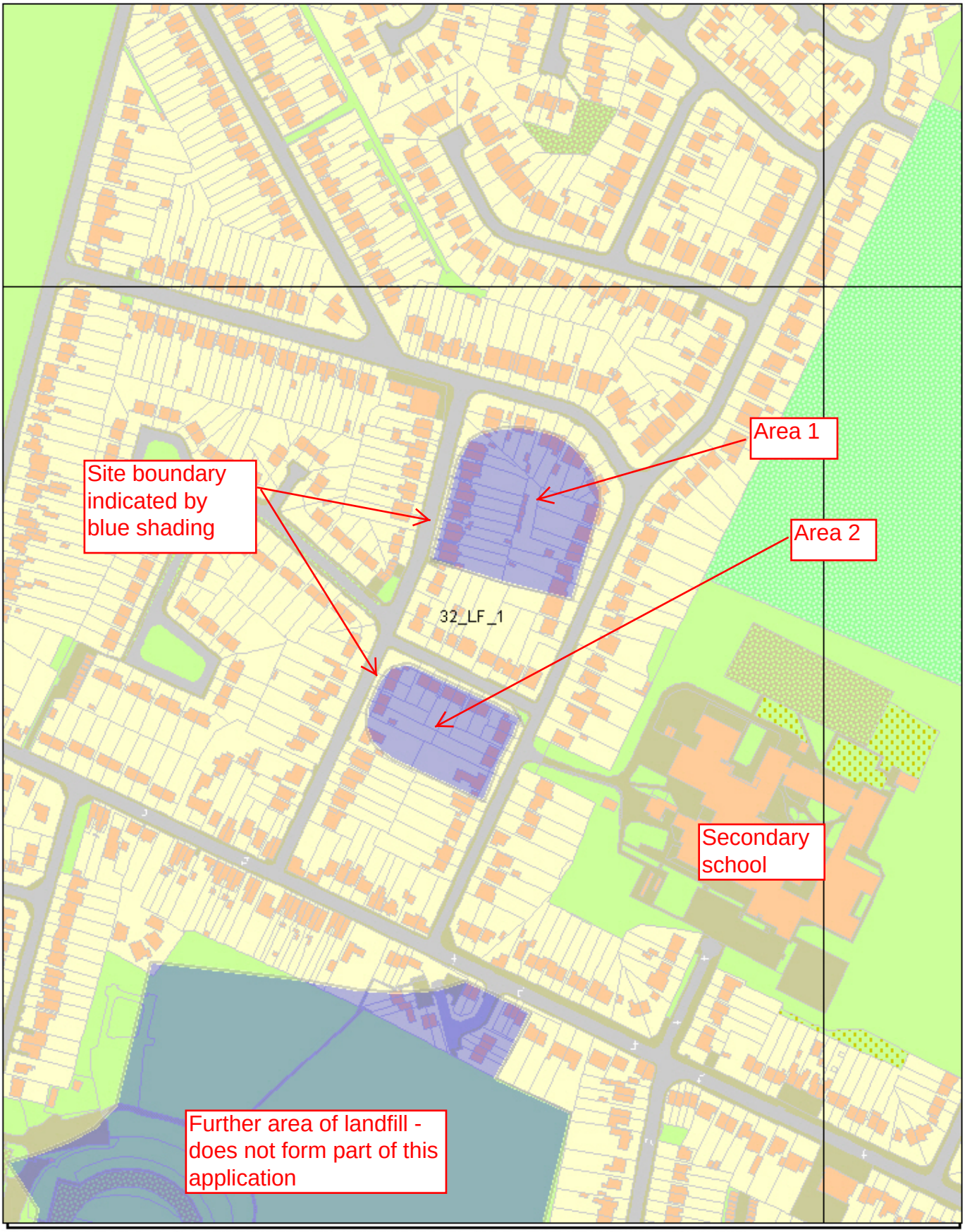
No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage[1]	Probability Of Linkage Occuring[1]	Overall Risk[1]	Comments
1	Residents of properties above infilled ground (including children playing in gardens)	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) and asbestos within landfill material	Dermal contact and direct ingestion, inhalation of dust/vapours, consumption of home-grown vegetables	Medium	Likely	Moderate	Grass and/or topsoil coverage likely to mitigate risk to an extent – risk is greatest where possibly impacted soils are exposed or could be encountered, for example, when digging a vegetable patch or when children play outdoors. Properties are constructed directly above a potentially significant contamination source. Sample collection and analysis required to refine conclusion on risk
2	Residents of properties above infilled ground	Methane and carbon dioxide from decomposition of deleterious elements of landfill material	Movement into buildings, subsequent asphyxiation and explosion risk	Medium	Likely	Moderate	Installation and monitoring of wells for gases and flow rates is required to refine conclusion on risk
3	Subsurface services serving the buildings (principally water supply)	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs) and asbestos within landfill material.	Chemical attack and tainting of water supply could occur at high contaminant concentrations / severe pH levels	Mild	Likely	Low to moderate	Further investigation data needed to refine assessment/CSM
4	Property (Structures) – sub-surface concrete	Sulphate and pH	Contact between contaminants and concrete	Mild	Likely	Low to moderate	Further investigation data needed to refine assessment/CSM

No.	Receptor	Contaminant(s)	Pathway(s)	Potential Severity of Linkage[1]	Probability Of Linkage Occuring[1]	Overall Risk[1]	Comments
5	Principal aquifer (Sherwood Sandstone) beneath site	Contaminants including (but not limited to) metals, hydrocarbons, (including PAHs), VOCs and SVOCs within landfill material.	Leaching of soil contaminants to aquifer – no aquiclude is indicated on BGS mapping	Medium	Likely	Moderate	Risk will depend upon depth and concentration of contaminants, confirmation that an aquiclude is absent, ,leaching potential of contaminants. Investigation required to determine risk.

[1] Taken from Table 6.3, CIRIA report 552 (Contaminated Land Risk Assessment – A Guide to Good Practice. Severity classified as minor, mild, medium or severe. Probability classified as unlikely, low, likely or high. Overall risk considers both the severity and probability of the linkage (very low, low, moderate, high or very high). See extract in Appendix B

3 CLOSING REMARKS

Potential pollutant linkages affecting the health of residents, controlled waters and property have been identified, and therefore an initial intrusive investigation should be undertaken to examine the likelihood of pollutant linkages existing at the site.



Appendix A (of desk study): Limitations Statement

1. This report has been prepared for the exclusive use of Cannock Chase District Council and copyright subsists with Grontmij Limited. Prior written permission must be obtained to reproduce all or part of the report.

2. This report and/or opinions have been prepared for the specific purpose stated in the document. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Grontmij Limited.

3. Observations were made of the site and of structures on the site as indicated within the report.

4. Grontmij has relied upon the existing data provided by Cannock Chase District Council to be accurate, and has not taken steps to independently check the accuracy of the data provided.

5. Our interpretation of any regulatory database information (including the MAGIC, the Environment Agency and British Geological Survey websites) assumes that the data provided is accurate. A disclaimer provided by database search companies is as follows: '*…the data is derived from historical sources or information available in public records or from third parties and is supplied to us without warranty by data suppliers and we cannot warrant the accuracy or completeness of the data or the reports*.' We cannot therefore accept any responsibility for the accuracy of the data used in this study, only that its interpretation has been carried out with due skill, care and diligence.

6. The scope of this study, as agreed with Cannock Chase Council, comprised a review of available information, and data was not purchased from a proprietary database.

Appendix B (of desk study) : Severity and Probability of Risk in Conceptual Site Models (after CIRIA552, Tables 6.3 to 6.5)

This report draws on guidance presented in CIRIA report 552, "Contaminated Land Risk Assessment, A Guide for Good Practice", wherein the "severity" term in the Conceptual Site Model is classified with reference to the sensitivity of the hazard and the receptor, as follows:

Situation	Severity Category	Description	Examples
ACUTE PROBLEM	Severe	Acute risk to human health likely to result in "significant harm" as defined in EPA90, catastrophic damage to buildings or property, acute risk of major pollution of controlled waters, acute risk of harm to ecosystems (as defined in Contaminated Land Regulations 2006)	High cyanide concentrations at the surface of a recreation area Major spillage into controlled waters Explosion, causing building collapse
SIGNIFICANT HARM TO SENSITIVE RECEPTOR	Medium	Chronic risk to human health likely to result in "significant harm" as defined in EPA90, chronic pollution of sensitive controlled waters, significant change at a sensitive ecosystems or species, significant damage to buildings or structures	Contaminant concentrations at a site in excess of SGVs, GAC or similar screening values Leaching of contaminants to sensitive aquifer Death of a species within a nature reserve
SIGNIFICANT HARM TO LESS SENSITIVE RECEPTOR	Mild	Pollution of non-sensitive waters, significant damage to buildings, structures, services or crops, damage to sensitive buildings, structures, services or the environment, which nonetheless result in "significant harm"	Pollution to (former) non-aquifer or to non-controlled surface watercourse. Damage to building rendering it unsafe to occupy (e.g. foundation or structural damage)
NON-SIGNIFICANT HARM	Minor	Harm, not necessarily resulting in "significant harm" but probably requiring expenditure to resolve or financial loss. Non-permanent risks to human health that are easily mitigated, e.g. by wearing PPE. Easily-repairable damage to structures or services	Contaminant concentrations requiring the wearing of PPE during site work, but no other long-term mitigation. Discolouration of concrete

The likelihood of an event (probability) takes into account both the presence of hazard and receptor and the integrity of the pathway between hazard and receptor, and is assessed as follows:

Category	There is a pollution linkage and:
High	Event is likely in the short term and almost inevitable over the long term. Or there is evidence of actual harm at/to the receptor
Likely	Event is possible in the short term and likely over the long term
Low	Event is unlikely in the short term and possible over the long term
Unlikely	Event is unlikely, even in the long term

Potential severity and probability have been assessed in the following matrix, to give an overall risk rating:

	Severity			
Probability	Severe	Medium	Mild	Minor
High	Very high	High	Moderate	Low/moderate
Likely	High	Moderate	Low/moderate	Low
Low	Moderate	Low/moderate	Low	Very low
Unlikely	Low/moderate	Low	Very low	Very low

The above risk categories are likely to result in the following actions:

- Very high: urgent intervention / investigation needed, remediation likely to be required
- High: urgent intervention / investigation needed, remediation possibly required in short term and probably required in long term
- Moderate: investigation needed to clarify and refine risk; remediation may be required over the long term
- Low: it is possible that harm could arise to a receptor, but if realised, such harm is likely to be, at worst, mild
- Very low: it is possible that harm could arise to a receptor, but if realised, such harm is unlikely to be severe.

APPENDIX B

Appendix B: Limitations Statement

1. This report has been prepared for the exclusive use of Cannock Chase District Council and copyright subsists with Grontmij Limited. Prior written permission must be obtained to reproduce all or part of the report.

2. This report and/or opinions have been prepared for the specific purpose stated in the document. The recommendations should not be used for other purposes or adjacent sites without further reference to Grontmij Limited.

3. Observations were made of the site and soil arisings as indicated within the report. Where access to portions of the site was unavailable or limited, Grontmij Limited renders no opinion as to the environmental status of such parts of the site.

4. Grontmij has relied upon the existing desktop study data provided by Cannock Chase District Council to be accurate, and has not taken steps to independently check the accuracy of the data provided.

5. Our interpretation of any regulatory database information (including the MAGIC and British Geological Survey websites) within an earlier report, and relied upon in this report, assumes that the data provided is accurate. A disclaimer provided by database search companies is as follows: ‘ the data is derived from historical sources or information available in public records or from third parties and is supplied to us without warranty by data suppliers and we cannot warrant the accuracy or completeness of the data or the reports.’ We cannot therefore accept any responsibility for the accuracy of the data used in this study, only that its interpretation has been carried out with due skill, care and diligence.

6. The conclusions and recommendations submitted in this report are based in part upon the data obtained from soil samples from exploratory holes. The nature and extent of variations between the exploratory holes is inferred in the report and could only be confirmed by further investigation. If variations or other latent conditions become evident, it will be necessary to re-evaluate the recommendations of this report.

7. The generalised soil profile described in the text is intended to convey trends in sub-surface conditions. The boundaries between strata are approximate and idealised and have been developed in interpretations of widely spaced explorations and samples; actual soil transitions may be more gradual. For specific information, refer to the exploration logs.

8. Water levels and/or gas readings have been taken in the borings and/or observation wells at times and under conditions stated on the exploration logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater or gas may occur due to variations in rainfall, atmospheric pressure and other factors different from those prevailing at the time the measurements were made.

9. The conclusions and recommendations of this report are based in part upon various types of chemical analysis of soil, water or gases, and are contingent upon their validity. These data have been reviewed and interpretations made in the report. Variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time and other factors. Should additional analytical or monitoring data

become available in the future, these data should be reviewed and conclusions and recommendations presented herein modified accordingly.

10. Chemical analyses have been performed for specific parameters during the course of this study, as detailed in the text. It must be noted that additional constituents not searched for during the current study may be present in soil, groundwater and soil voids at the site.

APPENDIX C

WINDOW SAMPLE LOG

WINDOW SAMPLE No
WS1

Project	Client	Logged By
View Street	Cannock Chase DC	MJH

Job No	Date	Ground Level (m)	Co-ordinates	Checked By
106270	07-12-10 07-12-10			GVT

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.10 0.30	ES ES					(0.76) 0.76	MADE GROUND: Grass over dark brown very clayey very gravelly coarse grained SAND with occasional roots and rootlets. Gravel is fine to coarse angular to rounded ash, coal, ceramic, brick, mudstone and quartz.	
0.70 1.00	ES ES					(1.24) 2.00	Firm light grey and orange brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is coarse sub rounded to well rounded quartz. Cobbles are quartz. (Glacial Till)	
							End of Hole at 2m bgl.	

Groundwater Strike Depth: (m) Rising to: (m) Groundwater Remarks	General Remarks	Final Depth
None Encountered	Location: Back garden of 42 Foster Avenue in lawn. No groundwater encountered	**2m bgl**

Contractor	Method/ Plant Used	
Sherwood Drilling	Hand held window sampling	All dimensions in metres Scale 1:50 Sheet 1 of 1

GRONTMIJ WINDOW SAMPLE LOG 2006 VIEW STREET.GPJ AGS3_ALL.GDT 12/21/10

WINDOW SAMPLE LOG

WINDOW SAMPLE No: **WS2**

Project	Client	Logged By
View Street	Cannock Chase DC	MJH

Job No	Date	Ground Level (m)	Co-ordinates	Checked By
106270	07-12-10 07-12-10			GVT

SAMPLES & TESTS			Water	STRATA				
Depth	Type	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Instrument / Backfill
0.10	ES					(0.42)	MADE GROUND: Grass over brown very clayey gravelly fine to coarse grained SAND with many roots and rootlets. Ravel is sub rounded to rounded quartz and occasional glass and fabric.	
0.30	ES					0.42	Firm light grey and orange brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is coarse sub rounded to well rounded quartz. Cobbles are quartz. (Glacial Till)	
0.70	ES					0.79	Light brown very silty very sandy GRAVEL. Gravel is sub angular to rounded quartz. (Glacial Till)	
1.00	ES					1.04	Stiff reddish brown sandy slightly gravelly CLAY. Gravel is fine to medium rounded to well rounded quartz. (Glacial Till)	
						(1.03)		
						2.07	Reddish brown very silty coarse grained SAND. (Glacial Till)	
						2.19	Firm reddish brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub rounded to well rounded quartz. (Glacial Till)	
						(0.57)		
						2.76	Reddish brown very silty coarse grained SAND. (Glacial Till)	
						3.13	Stiff reddish brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub rounded to well rounded quartz. (Glacial Till)	
						(0.87)		
						4.00	End of Hole at 4m bgl.	

Groundwater	General Remarks	Final Depth
Strike Depth: (m) Rising to: (m) Groundwater Remarks None Encountered	Location: Back garden of 32 Foster Avenue in lawn. No groundwater encountered	**4m bgl**

Contractor	Method/ Plant Used	
Sherwood Drilling	Hand held window sampling	All dimensions in metres Scale 1:50 Sheet 1 of 1

GRONTMIJ WINDOW SAMPLE LOG 2006 VIEW STREET.GPJ AGS3_ALL.GDT 12/21/10

WINDOW SAMPLE LOG

WINDOW SAMPLE No: **WS3**

Project	Client	Logged By
View Street	Cannock Chase DC	MJH

Job No	Date	Ground Level (m)	Co-ordinates	Checked By
106270	07-12-10 07-12-10			GVT

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.10 0.30	ES ES					(0.87)	MADE GROUND: Black clayey very gravelly fine to coarse grained SAND. Gravel is fine to coarse ash, brick and quartz.	
0.70	ES					0.87		
1.00	ES					(2.13)	Firm light brown slightly sandy slightly gravelly CLAY. Gravel is medium to coarse rounded to well rounded quartz. (Glacial Till)	
						3.00	End of Hole at 3m bgl.	

Groundwater			General Remarks	Final Depth
Strike Depth: (m)	Rising to: (m)	Groundwater Remarks	Location: Back garden of 9 Ward Street in lawn. No groundwater encountered	**3m bgl**
None Encountered				

Contractor	Method/ Plant Used	
Sherwood Drilling	Hand held window sampling	All dimensions in metres Scale 1:50

Sheet 1 of 1

GRONTMIJ WINDOW SAMPLE LOG 2006 VIEW STREET.GPJ AGS3_ALL.GDT 12/21/10

WINDOW SAMPLE LOG

WINDOW SAMPLE No: **WS4**

Project	Client	Logged By
View Street	Cannock Chase DC	MJH

Job No	Date	Ground Level (m)	Co-ordinates	Checked By
106270	07-12-10 07-12-10			GVT

SAMPLES & TESTS			Water	STRATA				
Depth	Type	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Instrument / Backfill
0.10	ES					(0.42)	MADE GROUND: Brown very clayey gravelly fine grained SAND with occasional roots and rootlets. Gravel is coarse sub rounded to well rounded quartz. (Topsoil)	
0.30	ES					0.42		
0.50	ES						Firm becoming stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub rounded to well rounded quartz. (Glacial Till)	
0.70	ES							
1.00	ES					(3.58)		
1.20	ES							
						4.00		
							End of Hole at 4m bgl.	

Groundwater		General Remarks	Final Depth
Strike Depth: (m)	Rising to: (m) Groundwater Remarks	Location: Back garden of 53 View Street in flower bed. No groundwater encountered	**4m bgl**
None Encountered			

Contractor	Method/ Plant Used	
Sherwood Drilling	Hand held window sampling	All dimensions in metres Scale 1:50

Sheet 1 of 1

GRONTMIJ WINDOW SAMPLE LOG 2006 VIEW STREET.GPJ AGS3_ALL.GDT 12/21/10

Notes: Logged by PSW

1. No groundwater was encountered within any of the below trial pits
2. Sample frequency: 0.1m, 0.3m & 0.7m
3. HPs undertaken on 10/12/2010.

HP No: 06	House Address:62 Broadway	Location of HP:
Depth (M BGL):	**Strata Description:**	**Additional notes:**
0.00-0.50	MADE GROUND: Dark grey slightly clayey silty gravelly SAND. Gravel is subrounded fine to coarse of sandstone	No evidence of contamination
0.50-0.70	Orange Brown slightly clayey, slightly silty, gravelly SAND. Gravel is subrounded to rounded fine to coarse of sandstone and quartz	No evidence of contamination

HP No: 07	House Address: 12 Foster Ave	Location of HP:
Depth (M BGL):	**Strata Description:**	**Additional notes:**
0.00 - 0.65	TOPSOIL; Soft brown slightly silty, slightly gravelly, sandy CLAY. Gravel is of various lithologies, predominantly quartz subangular to subrounded fine to coarse. Occasional rootlets	No evidence of contamination.
0.65-0.70	Yellow brown slightly clayey SAND and GRAVEL. Gravel is subrounded to rounded fine to coarse of quartz and sandstone. Occasional cobbles	No evidence of contamination.

HP No: 08	House Address: 41 View Street	Location of HP:
Depth (M BGL):	**Strata Description:**	**Additional notes: Ground frozen**
0.00-0.30	MADE GROUND; soft brown slightly silty gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies. Frequent fragments of brick	Brick fragment
0.30-0.50	MADE GROUND; soft brown slightly silty gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies with much brick and ash	Brick rubble and ash
0.50-0.70	MADE GROUND; yellow brown silty SAND with fragments of brick and ash	Fragments of brick and ash

HP No: 09	House Address: 45 View Street	Location of HP:
Depth (M BGL):	**Strata Description:**	**Additional notes:**
0.00-0.25	Grass over TOPSOIL; Soft brown slightly silty, slightly gravelly, sandy CLAY. Gravel is of various lithologies, predominantly quartz subangular to subrounded fine to coarse. Occasional rootlets	No evidence of contamination
0.25-0.50	Orange brown slightly clayey silty gravelly SAND. Gravel is subrounded fine to coarse of sand stone	No evidence of contamination
0.50-0.70	Orange brown clayey silty gravelly SAND. Gravel is subrounded fine to coarse of sand stone	No evidence of contamination

HP No: 10	House Address: 38 Foster Avenue	Location of HP: in Vegetable plot
Depth (M BGL):	**Strata Description:**	**Additional notes:**
0.00-0.65	TOPSOIL; Soft brown slightly silty, slightly gravelly, sandy CLAY. Gravel is of various lithologies, predominantly quartz subangular to subrounded fine to coarse. Occasional rootlets	No evidence of contamination.
0.65-0.70	Orange brown slightly clayey SAND and GRAVEL. Gravel is subrounded to rounded fine to coarse of quartz and sandstone. Occasional cobbles	No evidence of contamination.

APPENDIX D

ALcontrol Laboratories

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

Grontmij
Radcliffe House
3rd Floor
Blenheim Court, Lode lane
Solihull
West Midlands
B912AA

Attention: Gareth Taylor

CERTIFICATE OF ANALYSIS

Date:	13 January 2011
Customer:	H_GRONTMIJ_SOL
Sample Delivery Group (SDG):	101209-93
Your Reference:	
Location:	View Street
Report No:	110744

We received 17 samples on Thursday December 09, 2010 and 5 of these samples were scheduled for analysis which was completed on Thursday January 13, 2011. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

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

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Approved By:

Sonia McWhan

Laboratory Manager

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
2555490	WS1		0.10	07/12/2010
2555493	WS1		0.30	07/12/2010
2555489	WS1		0.70	07/12/2010
2555494	WS1		1.00	07/12/2010
2555497	WS2		0.10	07/12/2010
2555499	WS2		0.30	07/12/2010
2555500	WS2		0.70	07/12/2010
2555496	WS2		1.00	07/12/2010
2555501	WS3		0.10	07/12/2010
2555505	WS3		0.30	07/12/2010
2555506	WS3		0.70	07/12/2010
2555504	WS3		1.00	07/12/2010
2555510	WS4		0.10	07/12/2010
2555513	WS4		0.30	07/12/2010
2555511	WS4		0.70	07/12/2010
2555507	WS4		1.00	07/12/2010
2555509	WS4		1.20	07/12/2010

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

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Test Schedule

SOLID

Results Legend

X Test

N No Determination Possible

Lab Sample No(s)			2555493	2555497	2555501	2555506	2555513
Customer Sample Reference			WS1	WS2	WS3	WS3	WS4
AGS Reference							
Depth (m)			0.30	0.10	0.10	0.70	0.30
Container			250g Amber Jar / 400g Tub / 60g VOC	250g Amber Jar / 400g Tub	250g Amber Jar / 400g Tub / 60g VOC	250g Amber Jar / 400g Tub	250g Amber Jar / 400g Tub
Anions by Kone (soil)	All	NDPs: 0 Tests: 4	X	X	X		X
Asbestos Containing Material Screen	All	NDPs: 0 Tests: 5	X	X	X	X	X
Boron Water Soluble	All	NDPs: 0 Tests: 5	X	X	X	X	X
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 2	X		X		
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 2	X		X		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2	X		X		
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 5	X	X	X	X	X
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 5	X	X	X	X	X
	Barium	NDPs: 0 Tests: 5	X	X	X	X	X
	Beryllium	NDPs: 0 Tests: 5	X	X	X	X	X
	Cadmium	NDPs: 0 Tests: 5	X	X	X	X	X
	Chromium	NDPs: 0 Tests: 5	X	X	X	X	X
	Copper	NDPs: 0 Tests: 5	X	X	X	X	X
	Lead	NDPs: 0 Tests: 5	X	X	X	X	X
	Mercury	NDPs: 0 Tests: 5	X	X	X	X	X
	Nickel	NDPs: 0 Tests: 5	X	X	X	X	X
	Selenium	NDPs: 0 Tests: 5	X	X	X	X	X
	Vanadium	NDPs: 0 Tests: 5	X	X	X	X	X
	Zinc	NDPs: 0 Tests: 5	X	X	X	X	X
PAH by GCMS	All	NDPs: 0 Tests: 3		X		X	X
pH	All	NDPs: 0 Tests: 5	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 5	X	X	X	X	X

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

SOLID

Results Legend

X **Test**

N **No Determination Possible**

			Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container
			2555493	WS1		0.30	250g Amber Jar
							400g Tub
							60g VOC
			2555497	WS2		0.10	250g Amber Jar
							400g Tub
			2555501	WS3		0.10	250g Amber Jar
							400g Tub
							60g VOC
			2555506	WS3		0.70	250g Amber Jar
							400g Tub
			2555513	WS4		0.30	250g Amber Jar
							400g Tub
Semi Volatile Organic Compounds	All	NDPs: 0 Tests: 2	X				X
Total Organic Carbon	All	NDPs: 0 Tests: 5	X		X		X		X
TPH CWG GC (S)	All	NDPs: 0 Tests: 2	X				X
VOC MS (S)	All	NDPs: 0 Tests: 2			X				X

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Sample Descriptions

Grain Sizes

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

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
2555493	WS1	0.30	Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	Vegetation
2555497	WS2	0.10	Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	Vegetation
2555501	WS3	0.10	Dark Brown	Sandy Clay Loam	0.1 - 2 mm	Stones	N/A
2555506	WS3	0.70	Dark Brown	Sandy Clay Loam	0.1 - 2 mm	Stones	N/A
2555513	WS4	0.30	Light Brown	Sand	0.1 - 2 mm	Stones	N/A

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

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

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

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R	WS1	WS2	WS3	WS3	WS4
			Depth (m)	0.30	0.10	0.10	0.70	0.30
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	07/12/2010	07/12/2010	07/12/2010	07/12/2010	07/12/2010
			Date Received	09/12/2010	09/12/2010	09/12/2010	09/12/2010	09/12/2010
			SDG Ref	101209-93	101209-93	101209-93	101209-93	101209-93
			Lab Sample No.(s)	2555493	2555497	2555501	2555506	2555513
			AGS Reference					
Asbestos Containing Material Screen	-	TM001		No ACM Detected	No ACM Detected	No ACM Detected	No ACM Detected	No ACM Detected
Soil Organic Matter (SOM)	<0.35 %	TM132		11.2 #	5.72 #	6.57 #	6.28 #	0.638 #
pH	1 pH Units	TM133		7.5 M	6.89 M	7.99 M	8.02 M	6.83 M
Chromium, Hexavalent	<0.6 mg/kg	TM151		<0.6 #	<0.6 #	<0.6 #	<0.6 #	<1.2 #
Arsenic	<0.6 mg/kg	TM181		23.5 M	13.6 M	7.86 M	20.9 M	3.67 M
Barium	<0.6 mg/kg	TM181		857 #	139 #	104 #	78 #	22.8 #
Beryllium	<0.01 mg/kg	TM181		2 M	0.653 M	0.756 M	0.495 M	0.0849 M
Cadmium	<0.02 mg/kg	TM181		2.77 M	1.32 M	0.754 M	0.959 M	0.223 M
Chromium	<0.9 mg/kg	TM181		30.1 M	24.2 M	6.89 M	7.94 M	6.58 M
Copper	<1.4 mg/kg	TM181		152 M	890 M	24.5 M	27.1 M	5.74 M
Lead	<0.7 mg/kg	TM181		492 M	315 M	81.5 M	70.3 M	7.84 M
Mercury	<0.14 mg/kg	TM181		<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M
Nickel	<0.2 mg/kg	TM181		68.5 M	19 M	12 M	15.2 M	5.37 M
Selenium	<1 mg/kg	TM181		1.12 #	<1 #	<1 #	<1 #	<1 #
Vanadium	<0.2 mg/kg	TM181		30.1 #	19.4 #	9.58 #	10.8 #	9.56 #
Zinc	<1.9 mg/kg	TM181		1100 M	546 M	158 M	159 M	39.9 M
Boron, water soluble	<1 mg/kg	TM222		<1 M	<1 M	<1 M	<1 M	<1 M
Water Soluble Sulphate as SO4 2:1 Extract	<0.008 g/l	TM243		0.036 M	0.0172 M	0.0332 M		0.0161 M

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

PAH by GCMS

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R	WS2	WS3	WS4			
			Depth (m)	0.10	0.70	0.30			
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid			
			Date Sampled	07/12/2010	07/12/2010	07/12/2010			
			Date Received	09/12/2010	09/12/2010	09/12/2010			
			SDG Ref	101209-93	101209-93	101209-93			
			Lab Sample No.(s)	2555497	2555506	2555513			
			AGS Reference						
Naphthalene-d8 % recovery**	%	TM218		98.8	96	88.6			
Acenaphthene-d10 % recovery**	%	TM218		96.4	91.2	89.4			
Phenanthrene-d10 % recovery**	%	TM218		93.9	94.6	87			
Chrysene-d12 % recovery**	%	TM218		93.9	101	91.7			
Perylene-d12 % recovery**	%	TM218		97.9	101	95.9			
Naphthalene	<9 µg/kg	TM218		111 M	38.5 M	<9 M			
Acenaphthylene	<12 µg/kg	TM218		55.2 M	20.6 M	<12 M			
Acenaphthene	<8 µg/kg	TM218		10.5 M	<8 M	<8 M			
Fluorene	<10 µg/kg	TM218		21.7 M	<10 M	<10 M			
Phenanthrene	<15 µg/kg	TM218		335 M	208 M	<15 M			
Anthracene	<16 µg/kg	TM218		91.7 M	45.1 M	<16 M			
Fluoranthene	<17 µg/kg	TM218		520 M	480 M	<17 M			
Pyrene	<15 µg/kg	TM218		419 M	399 M	<15 M			
Benz(a)anthracene	<14 µg/kg	TM218		316 M	261 M	96.7 M			
Chrysene	<10 µg/kg	TM218		332 M	271 M	87.2 M			
Benzo(b)fluoranthene	<15 µg/kg	TM218		563 M	388 M	336 M			
Benzo(k)fluoranthene	<14 µg/kg	TM218		176 M	133 M	103 M			
Benzo(a)pyrene	<15 µg/kg	TM218		400 M	297 M	77.1 M			
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		381 M	229 M	126 M			
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		107 M	64.1 M	68.6 M			
Benzo(g,h,i)perylene	<24 µg/kg	TM218		496 M	284 M	137 M			
Polyaromatic hydrocarbons, Total	<118 µg/kg	TM218		4330 M	3120 M	1030 M			

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Semi Volatile Organic Compounds

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R	WS1	WS3
			Depth (m)	0.30	0.10
			Sample Type	Soil/Solid	Soil/Solid
			Date Sampled	07/12/2010	07/12/2010
			Date Received	09/12/2010	09/12/2010
			SDG Ref	101209-93	101209-93
			Lab Sample No.(s)	2555493	2555501
			AGS Reference		
Phenol	<100 µg/kg	TM157		<100	<100
Pentachlorophenol	<100 µg/kg	TM157		<100	<100
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157		<100	<100
Nitrobenzene	<100 µg/kg	TM157		<100	<100
Isophorone	<100 µg/kg	TM157		<100	<100
Hexachloroethane	<100 µg/kg	TM157		<100	<100
Hexachlorocyclopentadiene	<100 µg/kg	TM157		<100	<100
Hexachlorobutadiene	<100 µg/kg	TM157		<100	<100
Hexachlorobenzene	<100 µg/kg	TM157		<100	<100
n-Dioctyl phthalate	<100 µg/kg	TM157		<100	<100
Dimethyl phthalate	<100 µg/kg	TM157		<100	<100
Diethyl phthalate	<100 µg/kg	TM157		<100	<100
n-Dibutyl phthalate	<100 µg/kg	TM157		<100	<100
Dibenzofuran	<100 µg/kg	TM157		<100	<100
Carbazole	<100 µg/kg	TM157		<100	<100
Butylbenzyl phthalate	<100 µg/kg	TM157		<100	<100
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157		<100	<100
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157		<100	<100
bis(2-Chloroethyl)ether	<100 µg/kg	TM157		<100	<100
Azobenzene	<100 µg/kg	TM157		<100	<100
4-Nitrophenol	<100 µg/kg	TM157		<100	<100
4-Nitroaniline	<100 µg/kg	TM157		<100	<100
4-Methylphenol	<100 µg/kg	TM157		<100	<100
4-Chlorophenylphenylether	<100 µg/kg	TM157		<100	<100
4-Chloroaniline	<100 µg/kg	TM157		<100	<100
4-Chloro-3-methylphenol	<100 µg/kg	TM157		<100	<100
4-Bromophenylphenylether	<100 µg/kg	TM157		<100	<100
3-Nitroaniline	<100 µg/kg	TM157		<100	<100
2-Nitrophenol	<100 µg/kg	TM157		<100	<100
2-Nitroaniline	<100 µg/kg	TM157		<100	<100
2-Methylphenol	<100 µg/kg	TM157		<100	<100
1,2,4-Trichlorobenzene	<100 µg/kg	TM157		<100	<100
2-Chlorophenol	<100 µg/kg	TM157		<100	<100
2,6-Dinitrotoluene	<100 µg/kg	TM157		<100	<100
2,4-Dinitrotoluene	<100 µg/kg	TM157		<100	<100

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Semi Volatile Organic Compounds

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R	WS1	WS3				
			Depth (m)	0.30	0.10				
			Sample Type	Soil/Solid	Soil/Solid				
			Date Sampled	07/12/2010	07/12/2010				
			Date Received	09/12/2010	09/12/2010				
			SDG Ref	101209-93	101209-93				
			Lab Sample No.(s)	2555493	2555501				
			AGS Reference						
2,4-Dimethylphenol	<100 µg/kg	TM157		<100	<100				
2,4-Dichlorophenol	<100 µg/kg	TM157		<100	<100				
2,4,6-Trichlorophenol	<100 µg/kg	TM157		<100	<100				
2,4,5-Trichlorophenol	<100 µg/kg	TM157		<100	<100				
1,4-Dichlorobenzene	<100 µg/kg	TM157		<100	<100				
1,3-Dichlorobenzene	<100 µg/kg	TM157		<100	<100				
1,2-Dichlorobenzene	<100 µg/kg	TM157		<100	<100				
2-Chloronaphthalene	<100 µg/kg	TM157		<100	<100				
2-Methylnaphthalene	<100 µg/kg	TM157		<100	<100				
Acenaphthylene	<100 µg/kg	TM157		<100	<100				
Acenaphthene	<100 µg/kg	TM157		<100	<100				
Anthracene	<100 µg/kg	TM157		167	<100				
Benzo(a)anthracene	<100 µg/kg	TM157		744	<100				
Benzo(b)fluoranthene	<100 µg/kg	TM157		771	<100				
Benzo(k)fluoranthene	<100 µg/kg	TM157		666	<100				
Benzo(a)pyrene	<100 µg/kg	TM157		828	<100				
Benzo(g,h,i)perylene	<100 µg/kg	TM157		548	<100				
Chrysene	<100 µg/kg	TM157		878	<100				
Fluoranthene	<100 µg/kg	TM157		1870	<100				
Fluorene	<100 µg/kg	TM157		<100	<100				
Indeno(1,2,3-cd)pyrene	<100 µg/kg	TM157		490	<100				
Phenanthrene	<100 µg/kg	TM157		1160	<100				
Pyrene	<100 µg/kg	TM157		1690	<100				
Naphthalene	<100 µg/kg	TM157		<100	<100				
Dibenzo(a,h)anthracene	<100 µg/kg	TM157		<100	<100				

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

TPH CWG (S)

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R	WS1	WS3				
			Depth (m)	0.30	0.10				
			Sample Type	Soil/Solid	Soil/Solid				
			Date Sampled	07/12/2010	07/12/2010				
			Date Received	09/12/2010	09/12/2010				
			SDG Ref	101209-93	101209-93				
			Lab Sample No.(s)	2555493	2555501				
			AGS Reference						
GRO Surrogate % recovery**	%	TM089		27	40				
GRO >C5-C12	<44 µg/kg	TM089		<44	<44				
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		<5 #	<5 #				
Benzene	<10 µg/kg	TM089		<10 M	<10 M				
Toluene	<2 µg/kg	TM089		7.8 M	5.24 M				
Ethylbenzene	<3 µg/kg	TM089		28.6 M	17 M				
m,p-Xylene	<6 µg/kg	TM089		<6 M	<6 M				
o-Xylene	<3 µg/kg	TM089		<3 M	<3 M				
m,p,o-Xylene	<10 µg/kg	TM089		<10	<10				
BTEX, Total	<10 µg/kg	TM089		36.4	22.3				
Aliphatics >C5-C6	<10 µg/kg	TM089		<10	<10				
Aliphatics >C6-C8	<10 µg/kg	TM089		<10	<10				
Aliphatics >C8-C10	<10 µg/kg	TM089		<10	<10				
Aliphatics >C10-C12	<10 µg/kg	TM089		<10	<10				
Aliphatics >C12-C16	<100 µg/kg	TM173		2190	2350				
Aliphatics >C16-C21	<100 µg/kg	TM173		3450	3640				
Aliphatics >C21-C35	<100 µg/kg	TM173		53900	38800				
Aliphatics >C35-C44	<100 µg/kg	TM173		13100	5910				
Total Aliphatics >C12-C44	<100 µg/kg	TM173		72600	50700				
Aromatics >EC5-EC7	<10 µg/kg	TM089		<10	<10				
Aromatics >EC7-EC8	<10 µg/kg	TM089		<10	<10				
Aromatics >EC8-EC10	<10 µg/kg	TM089		33.8	22.3				
Aromatics >EC10-EC12	<10 µg/kg	TM089		<10	<10				
Aromatics >EC12-EC16	<100 µg/kg	TM173		8760	5060				
Aromatics >EC16-EC21	<100 µg/kg	TM173		22500	9600				
Aromatics >EC21-EC35	<100 µg/kg	TM173		101000	64700				
Aromatics >EC35-EC44	<100 µg/kg	TM173		56400	51200				
Aromatics >EC40-EC44	<100 µg/kg	TM173		20200	12900				
Total Aromatics >EC12-EC44	<100 µg/kg	TM173		189000	131000				
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173		262000	181000				
Total Aliphatics >C5-35	<100 µg/kg	TM173		59500	44800				
Total Aromatics >C5-35	<100 µg/kg	TM173		133000	79400				
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173		192000	124000				

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

VOC MS (S)

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R	WS1	WS3
			Depth (m)	0.30	0.10
			Sample Type	Soil/Solid	Soil/Solid
			Date Sampled	07/12/2010	07/12/2010
			Date Received	09/12/2010	09/12/2010
			SDG Ref	101209-93	101209-93
			Lab Sample No.(s)	2555493	2555501
			AGS Reference		
Dibromofluoromethane**	%	TM116		151	113
Toluene-d8**	%	TM116		93.2	91.3
4-Bromofluorobenzene**	%	TM116		146	151
Dichlorodifluoromethane	<4 µg/kg	TM116		<4 M	<4 M
Chloromethane	<7 µg/kg	TM116		<7 #	<7 #
Vinyl Chloride	<10 µg/kg	TM116		<10 #	<10 #
Bromomethane	<13 µg/kg	TM116		<13 M	<13 M
Chloroethane	<14 µg/kg	TM116		<14 M	<14 M
Trichlorofluorormethane	<6 µg/kg	TM116		<6 M	<6 M
1.1-Dichloroethene	<10 µg/kg	TM116		<10 #	<10 #
Carbon Disulphide	<7 µg/kg	TM116		<7 M	<7 M
Dichloromethane	<10 µg/kg	TM116		98.3 #	28.6 #
Methyl Tertiary Butyl Ether	<11 µg/kg	TM116		<11 M	<11 M
trans-1-2-Dichloroethene	<11 µg/kg	TM116		<11 M	<11 M
1.1-Dichloroethane	<8 µg/kg	TM116		<8 M	<8 M
cis-1-2-Dichloroethene	<5 µg/kg	TM116		<5 M	<5 M
2.2-Dichloropropane	<12 µg/kg	TM116		<12 M	<12 M
Bromochloromethane	<14 µg/kg	TM116		<14 M	<14 M
Chloroform	<8 µg/kg	TM116		<8 M	<8 M
1.1.1-Trichloroethane	<7 µg/kg	TM116		<7 M	<7 M
1.1-Dichloropropene	<11 µg/kg	TM116		<11 M	<11 M
Carbontetrachloride	<14 µg/kg	TM116		<14 M	<14 M
1.2-Dichloroethane	<5 µg/kg	TM116		<5 M	<5 M
Benzene	<9 µg/kg	TM116		44.4 M	17.2 M
Trichloroethene	<9 µg/kg	TM116		<9 M	<9 M
1.2-Dichloropropane	<12 µg/kg	TM116		<12 M	<12 M
Dibromomethane	<9 µg/kg	TM116		<9 M	<9 M
Bromodichloromethane	<7 µg/kg	TM116		<7 M	<7 M
cis-1-3-Dichloropropene	<14 µg/kg	TM116		<14 M	<14 M
Toluene	<5 µg/kg	TM116		37.1 M	28.9 M
trans-1-3-Dichloropropene	<14 µg/kg	TM116		<14	<14
1.1.2-Trichloroethane	<10 µg/kg	TM116		<10 M	<10 M
1.3-Dichloropropane	<7 µg/kg	TM116		<7 #	<7 #
Tetrachloroethene	<5 µg/kg	TM116		36.3 M	25.3 M
Dibromochloromethane	<13 µg/kg	TM116		<13 M	<13 M

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

VOC MS (S)

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R	WS1	WS3				
			Depth (m)	0.30	0.10				
			Sample Type	Soil/Solid	Soil/Solid				
			Date Sampled	07/12/2010	07/12/2010				
			Date Received	09/12/2010	09/12/2010				
			SDG Ref	101209-93	101209-93				
			Lab Sample No.(s)	2555493	2555501				
			AGS Reference						
1.2-Dibromoethane	<12 µg/kg	TM116		<12 M	<12 M				
Chlorobenzene	<5 µg/kg	TM116		<5 M	<5 M				
1.1.1.2-Tetrachloroethane	<10 µg/kg	TM116		<10 M	<10 M				
Ethylbenzene	<4 µg/kg	TM116		54.3 M	52.8 M				
p/m-Xylene	<14 µg/kg	TM116		<14 #	<14 #				
o-Xylene	<10 µg/kg	TM116		<10 M	<10 M				
Styrene	<10 µg/kg	TM116		<10 M	<10 M				
Bromoform	<10 µg/kg	TM116		<10 M	<10 M				
Isopropylbenzene	<5 µg/kg	TM116		<5 M	<5 M				
1.1.2.2-Tetrachloroethane	<10 µg/kg	TM116		<10 #	<10 #				
1.2.3-Trichloropropane	<17 µg/kg	TM116		<17 M	<17 M				
Bromobenzene	<10 µg/kg	TM116		<10 M	<10 M				
Propylbenzene	<11 µg/kg	TM116		<11 M	<11 M				
2-Chlorotoluene	<9 µg/kg	TM116		<9 M	<9 M				
1.3.5-Trimethylbenzene	<8 µg/kg	TM116		<8 #	<8 #				
4-Chlorotoluene	<12 µg/kg	TM116		<12 M	<12 M				
tert-Butylbenzene	<12 µg/kg	TM116		<12 #	<12 #				
1.2.4-Trimethylbenzene	<9 µg/kg	TM116		<9 #	<9 #				
sec-Butylbenzene	<10 µg/kg	TM116		<10 M	<10 M				
4-Isopropyltoluene	<11 µg/kg	TM116		<11 M	<11 M				
1.3-Dichlorobenzene	<6 µg/kg	TM116		<6 M	<6 M				
1.4-Dichlorobenzene	<5 µg/kg	TM116		<5 M	<5 M				
n-Butylbenzene	<10 µg/kg	TM116		<10 M	<10 M				
1.2-Dichlorobenzene	<12 µg/kg	TM116		<12 M	<12 M				
1.2-Dibromo-3-chloropropane	<14 µg/kg	TM116		<14 M	<14 M				
Tert-amyl methyl ether	<15 µg/kg	TM116		<15	<15				
1.2.4-Trichlorobenzene	<6 µg/kg	TM116		<6 #	<6 #				
Hexachlorobutadiene	<12 µg/kg	TM116		<12	<12				
Naphthalene	<13 µg/kg	TM116		<13 M	<13 M				
1.2.3-Trichlorobenzene	<6 µg/kg	TM116		<6 M	<6 M				

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Table of Results - Appendix

REPORT KEY

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

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

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

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM001	In - house Method	Determination of asbestos containing material by screening on solids		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser		
TM157	HP 6890 Gas Chromatograph (GC) system and HP 5973 Mass Selective Detector (MSD).	Determination of SVOC in Soils by GC-MS extracted by sonication in DCM/Acetone		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		
TM243				

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

CERTIFICATE OF ANALYSIS

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	2555493	2555497	2555501	2555506	2555513
Customer Sample Ref.	WS1	WS2	WS3	WS3	WS4
AGS Ref.					
Depth	0.30	0.10	0.10	0.70	0.30
Type	SOLID	SOLID	SOLID	SOLID	SOLID
Anions by Kone (soil)	10-Jan-2011	10-Jan-2011	10-Jan-2011		10-Jan-2011
Asbestos Containing Material Screen	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011
Boron Water Soluble	11-Jan-2011	11-Jan-2011	11-Jan-2011	11-Jan-2011	11-Jan-2011
EPH CWG (Aliphatic) GC (S)	11-Jan-2011		11-Jan-2011		
EPH CWG (Aromatic) GC (S)	11-Jan-2011		11-Jan-2011		
GRO by GC-FID (S)	13-Jan-2011		13-Jan-2011		
Hexavalent Chromium (s)	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011
Metals by iCap-OES (Soil)	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011
PAH by GCMS		11-Jan-2011		11-Jan-2011	08-Jan-2011
pH	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011
Sample description	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011
Semi Volatile Organic Compounds	10-Jan-2011		10-Jan-2011		
Total Organic Carbon	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011
TPH CWG GC (S)	13-Jan-2011		13-Jan-2011		
VOC MS (S)	11-Jan-2011		11-Jan-2011		

SDG:	101209-93	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_SOL-41	**Customer:**	Grontmij	**Report Number:**	110744
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Appendix

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

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

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

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

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

6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

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

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

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

11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.

12. Results relate only to the items tested

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

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

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

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).

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

18. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not
accredited.

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

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

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

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

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

24. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 -C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DCM	SOXTHERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
THIN LAYER CHROMATOGRAPHY	D&C	DCM	SOXTHERM	IATROSCAN
ELEMENTAL SULPHUR	D&C	DCM	SOXTHERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOXTHERM	GC-MS
HERBICIDES	D&C	HEXANE/ACETONE	SOXTHERM	GC-MS
PESTICIDES	D&C	HEXANE/ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH CWG BY GC	D&C	HEXANE/ACETONE	END OVER END	GC-FID
PCB TOT / PCB CON	D&C	HEXANE/ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE/ACETONE	MICROWAVE TM218.	GC-MS
C8-C40 (C8-C40) EZ FLASH	WET	HEXANE/ACETONE	SHAKER	GC-EZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE/ACETONE	SHAKER	GC-EZ
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DCM/ACETONE	SONICATE	GC-MS

LIQUID MATRICES EXTRACTION SUMMARY

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

Identification of Asbestos in Bulk Materials

The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

Visual Estimation Of Fibre Content

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

Further guidance on typical asbestos fibre content of manufactured products can be found in MDHS 100.

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

ALcontrol Laboratories

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

Grontmij
41 Corn Street
Bristol
Avon
BS1 1HS

Attention: Gareth Taylor

CERTIFICATE OF ANALYSIS

Date:	14 January 2011
Customer:	H_GRONTMIJ_BRI
Sample Delivery Group (SDG):	101230-5
Your Reference:	
Location:	View Street
Report No:	111108

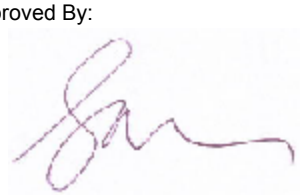
We received 15 samples on Saturday December 11, 2010 and 4 of these samples were scheduled for analysis which was completed on Friday January 14, 2011. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

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

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Approved By:



Sonia McWhan

Laboratory Manager

GROUP

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
2573515	PSWHP06		0.10	
2573516	PSWHP06		0.30	
2573517	PSWHP06		0.70	
2573518	PSWHP07		0.10	
2573519	PSWHP07		0.30	
2573522	PSWHP07		0.70	
2573523	PSWHP08		0.10	
2573524	PSWHP08		0.30	
2573527	PSWHP08		0.70	
2573528	PSWHP09		0.10	
2573529	PSWHP09		0.30	
2573530	PSWHP09		0.70	
2573531	PSWHP10		0.10	
2573532	PSWHP10		0.30	
2573533	PSWHP10		0.70	

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

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Test Schedule

SOLID

Results Legend

X Test

N No Determination Possible

Lab Sample No(s)			2573515	2573524			2573527		2573532	
Customer Sample Reference			PSWHP06	PSWHP08			PSWHP08		PSWHP10	
AGS Reference										
Depth (m)			0.10	0.30			0.70		0.30	
Container			250g Amber Jar	400g Tub	250g Amber Jar	400g Tub	60g VOC	250g Amber Jar	400g Tub	250g Amber Jar	400g Tub
Anions by Kone (soil)	All	NDPs: 0 Tests: 3	X		X					X	
Asbestos Containing Material Screen	All	NDPs: 0 Tests: 4		X		X			X		X
Boron Water Soluble	All	NDPs: 0 Tests: 4	X		X			X		X	
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 1			X						
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 1			X						
GRO by GC-FID (S)	All	NDPs: 0 Tests: 1					X				
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 4		X		X			X		X
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 4	X		X			X		X	
	Barium	NDPs: 0 Tests: 4	X		X			X		X	
	Beryllium	NDPs: 0 Tests: 4	X		X			X		X	
	Cadmium	NDPs: 0 Tests: 4	X		X			X		X	
	Chromium	NDPs: 0 Tests: 4	X		X			X		X	
	Copper	NDPs: 0 Tests: 4	X		X			X		X	
	Lead	NDPs: 0 Tests: 4	X		X			X		X	
	Mercury	NDPs: 0 Tests: 4	X		X			X		X	
	Nickel	NDPs: 0 Tests: 4	X		X			X		X	
	Selenium	NDPs: 0 Tests: 4	X		X			X		X	
	Vanadium	NDPs: 0 Tests: 4	X		X			X		X	
	Zinc	NDPs: 0 Tests: 4	X		X			X		X	

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

SOLID

Results Legend

X **Test**

N **No Determination Possible**

			Lab Sample No(s)	2573515	2573524	2573527	2573532
			Customer Sample Reference	PSWHP06	PSWHP08	PSWHP08	PSWHP10
			AGS Reference				
			Depth (m)	0.10	0.30	0.70	0.30
			Container	250g Amber Jar	400g Tub	250g Amber Jar	400g Tub	60g VOC	250g Amber Jar	400g Tub	250g Amber Jar	400g Tub
PAH by GCMS	All	NDPs: 0 Tests: 3		X					X		X	
pH	All	NDPs: 0 Tests: 4			X		X			X		X
Sample description	All	NDPs: 0 Tests: 4		X		X			X		X	
Semi Volatile Organic Compounds	All	NDPs: 0 Tests: 1				X						
Total Organic Carbon	All	NDPs: 0 Tests: 4		X		X			X		X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 1				X						
VOC MS (S)	All	NDPs: 0 Tests: 1						X				

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Sample Descriptions

Grain Sizes

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

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
2573515	PSWHP06	0.10	Dark Brown	Top Soil	0.063 - 0.1 mm	Stones	None
2573524	PSWHP08	0.30	Light Brown	Sandy Clay Loam	0.1 - 2 mm	Stones	None
2573527	PSWHP08	0.70	Light Brown	Sandy Loam	0.1 - 2 mm	Brick	Stones
2573532	PSWHP10	0.30	Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None

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

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

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

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R	PSWHP06	PSWHP08	PSWHP08	PSWHP10		
			Depth (m)	0.10	0.30	0.70	0.30		
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid		
			Date Sampled	-	-	-	-		
			Date Received	11/12/2010	11/12/2010	11/12/2010	11/12/2010		
			SDG Ref	101230-5	101230-5	101230-5	101230-5		
			Lab Sample No.(s)	2573515	2573524	2573527	2573532		
			AGS Reference						
Asbestos Containing Material Screen	-	TM001		No ACM Detected	No ACM Detected	No ACM Detected	No ACM Detected		
Soil Organic Matter (SOM)	<0.35 %	TM132		6.48 #	2.74 #	1.98 #	5.84 #		
pH	1 pH Units	TM133		6.79 M	7.98 M	6.2 M	6.82 M		
Chromium, Hexavalent	<0.6 mg/kg	TM151		<0.6 #	<0.6 #	<0.6 #	<1.2 #		
Arsenic	<0.6 mg/kg	TM181		12.1 M	10.7 M	6.07 M	14.5 M		
Barium	<0.6 mg/kg	TM181		136 #	153 #	56.6 #	221 #		
Beryllium	<0.01 mg/kg	TM181		1.47 M	1.63 M	0.476 M	1.01 M		
Cadmium	<0.02 mg/kg	TM181		1.26 M	1.01 M	0.327 M	1.72 M		
Chromium	<0.9 mg/kg	TM181		24 M	30.1 M	10.1 M	15.7 M		
Copper	<1.4 mg/kg	TM181		33.7 M	35.9 M	10.5 M	48.9 M		
Lead	<0.7 mg/kg	TM181		112 M	64 M	15 M	139 M		
Mercury	<0.14 mg/kg	TM181		<0.14 M	<0.14 M	<0.14 M	<0.14 M		
Nickel	<0.2 mg/kg	TM181		22.4 M	32.9 M	9.03 M	25.9 M		
Selenium	<1 mg/kg	TM181		1.02 #	<1 #	<1 #	<1 #		
Vanadium	<0.2 mg/kg	TM181		22.3 #	44.2 #	18.3 #	26.8 #		
Zinc	<1.9 mg/kg	TM181		378 M	133 M	53.4 M	587 M		
Boron, water soluble	<1 mg/kg	TM222		<1 M	<1 M	<1 M	<1 M		
Water Soluble Sulphate as SO4 2:1 Extract	<0.008 g/l	TM243		0.026 M	0.0194 M		0.0313 M		

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

PAH by GCMS

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R	PSWHP06	PSWHP08	PSWHP10			
			Depth (m)	0.10	0.70	0.30			
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid			
			Date Sampled	-	-	-			
			Date Received	11/12/2010	11/12/2010	11/12/2010			
			SDG Ref	101230-5	101230-5	101230-5			
			Lab Sample No.(s)	2573515	2573527	2573532			
			AGS Reference						
Naphthalene-d8 % recovery**	%	TM218		102	103	108			
Acenaphthene-d10 % recovery**	%	TM218		99.3	101	107			
Phenanthrene-d10 % recovery**	%	TM218		96.2	101	105			
Chrysene-d12 % recovery**	%	TM218		92.6	97.5	102			
Perylene-d12 % recovery**	%	TM218		92.8	101	103			
Naphthalene	<9 µg/kg	TM218		69.6 M	14 M	156 M			
Acenaphthylene	<12 µg/kg	TM218		56.6 M	<12 M	73.2 M			
Acenaphthene	<8 µg/kg	TM218		<8 M	<8 M	79.1 M			
Fluorene	<10 µg/kg	TM218		15.5 M	<10 M	90.4 M			
Phenanthrene	<15 µg/kg	TM218		247 M	28.6 M	1670 M			
Anthracene	<16 µg/kg	TM218		99.7 M	<16 M	270 M			
Fluoranthene	<17 µg/kg	TM218		368 M	25.6 M	2150 M			
Pyrene	<15 µg/kg	TM218		304 M	28.5 M	1640 M			
Benz(a)anthracene	<14 µg/kg	TM218		233 M	<14 M	857 M			
Chrysene	<10 µg/kg	TM218		252 M	16.4 M	894 M			
Benzo(b)fluoranthene	<15 µg/kg	TM218		485 M	22.6 M	1210 M			
Benzo(k)fluoranthene	<14 µg/kg	TM218		154 M	<14 M	427 M			
Benzo(a)pyrene	<15 µg/kg	TM218		335 M	22.1 M	842 M			
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		263 M	<18 M	591 M			
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		67.8 M	<23 M	157 M			
Benzo(g,h,i)perylene	<24 µg/kg	TM218		342 M	<24 M	745 M			
Polyaromatic hydrocarbons, Total	<118 µg/kg	TM218		3290 M	158 M	11900 M			

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Semi Volatile Organic Compounds

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Customer Sample R	PSWHP08
Depth (m)	0.30
Sample Type	Soil/Solid
Date Sampled	-
Date Received	11/12/2010
SDG Ref	101230-5
Lab Sample No.(s)	2573524
AGS Reference	

Component	LOD/Units	Method	
Phenol	<100 µg/kg	TM157	<100
Pentachlorophenol	<100 µg/kg	TM157	<100
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100
Nitrobenzene	<100 µg/kg	TM157	<100
Isophorone	<100 µg/kg	TM157	<100
Hexachloroethane	<100 µg/kg	TM157	<100
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<100
Hexachlorobutadiene	<100 µg/kg	TM157	<100
Hexachlorobenzene	<100 µg/kg	TM157	<100
n-Dioctyl phthalate	<100 µg/kg	TM157	<100
Dimethyl phthalate	<100 µg/kg	TM157	<100
Diethyl phthalate	<100 µg/kg	TM157	<100
n-Dibutyl phthalate	<100 µg/kg	TM157	<100
Dibenzofuran	<100 µg/kg	TM157	<100
Carbazole	<100 µg/kg	TM157	<100
Butylbenzyl phthalate	<100 µg/kg	TM157	<100
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	<100
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100
Azobenzene	<100 µg/kg	TM157	<100
4-Nitrophenol	<100 µg/kg	TM157	<100
4-Nitroaniline	<100 µg/kg	TM157	<100
4-Methylphenol	<100 µg/kg	TM157	<100
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100
4-Chloroaniline	<100 µg/kg	TM157	<100
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100
4-Bromophenylphenylether	<100 µg/kg	TM157	<100
3-Nitroaniline	<100 µg/kg	TM157	<100
2-Nitrophenol	<100 µg/kg	TM157	<100
2-Nitroaniline	<100 µg/kg	TM157	<100
2-Methylphenol	<100 µg/kg	TM157	<100
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100
2-Chlorophenol	<100 µg/kg	TM157	<100
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Semi Volatile Organic Compounds

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Customer Sample R	PSWHP08
Depth (m)	0.30
Sample Type	Soil/Solid
Date Sampled	-
Date Received	11/12/2010
SDG Ref	101230-5
Lab Sample No.(s)	2573524
AGS Reference	

Component	LOD/Units	Method	
2,4-Dimethylphenol	<100 µg/kg	TM157	<100
2,4-Dichlorophenol	<100 µg/kg	TM157	<100
2,4,6-Trichlorophenol	<100 µg/kg	TM157	<100
2,4,5-Trichlorophenol	<100 µg/kg	TM157	<100
1,4-Dichlorobenzene	<100 µg/kg	TM157	<100
1,3-Dichlorobenzene	<100 µg/kg	TM157	<100
1,2-Dichlorobenzene	<100 µg/kg	TM157	<100
2-Chloronaphthalene	<100 µg/kg	TM157	<100
2-Methylnaphthalene	<100 µg/kg	TM157	<100
Acenaphthylene	<100 µg/kg	TM157	<100
Acenaphthene	<100 µg/kg	TM157	<100
Anthracene	<100 µg/kg	TM157	<100
Benzo(a)anthracene	<100 µg/kg	TM157	<100
Benzo(b)fluoranthene	<100 µg/kg	TM157	<100
Benzo(k)fluoranthene	<100 µg/kg	TM157	<100
Benzo(a)pyrene	<100 µg/kg	TM157	<100
Benzo(g,h,i)perylene	<100 µg/kg	TM157	<100
Chrysene	<100 µg/kg	TM157	<100
Fluoranthene	<100 µg/kg	TM157	<100
Fluorene	<100 µg/kg	TM157	<100
Indeno(1,2,3-cd)pyrene	<100 µg/kg	TM157	<100
Phenanthrene	<100 µg/kg	TM157	133
Pyrene	<100 µg/kg	TM157	128
Naphthalene	<100 µg/kg	TM157	<100
Dibenzo(a,h)anthracene	<100 µg/kg	TM157	<100

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

TPH CWG (S)

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

	Customer Sample R	Depth (m)	Sample Type	Date Sampled	Date Received	SDG Ref	Lab Sample No.(s)	AGS Reference
	PSWHP08	0.30	Soil/Solid	-	11/12/2010	101230-5	2573524	

Component	LOD/Units	Method	
GRO Surrogate % recovery**	%	TM089	70
GRO >C5-C12	<44 µg/kg	TM089	<44
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5 #
Benzene	<10 µg/kg	TM089	<10 M
Toluene	<2 µg/kg	TM089	<2 M
Ethylbenzene	<3 µg/kg	TM089	<3 M
m,p-Xylene	<6 µg/kg	TM089	<6 M
o-Xylene	<3 µg/kg	TM089	<3 M
m,p,o-Xylene	<10 µg/kg	TM089	<10
BTEX, Total	<10 µg/kg	TM089	<10
Aliphatics >C5-C6	<10 µg/kg	TM089	<10
Aliphatics >C6-C8	<10 µg/kg	TM089	<10
Aliphatics >C8-C10	<10 µg/kg	TM089	<10
Aliphatics >C10-C12	<10 µg/kg	TM089	<10
Aliphatics >C12-C16	<100 µg/kg	TM173	4290
Aliphatics >C16-C21	<100 µg/kg	TM173	4150
Aliphatics >C21-C35	<100 µg/kg	TM173	12800
Aliphatics >C35-C44	<100 µg/kg	TM173	2210
Total Aliphatics >C12-C44	<100 µg/kg	TM173	23500
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10
Aromatics >EC10-EC12	<10 µg/kg	TM089	<10
Aromatics >EC12-EC16	<100 µg/kg	TM173	5270
Aromatics >EC16-EC21	<100 µg/kg	TM173	10800
Aromatics >EC21-EC35	<100 µg/kg	TM173	39700
Aromatics >EC35-EC44	<100 µg/kg	TM173	15600
Aromatics >EC40-EC44	<100 µg/kg	TM173	6500
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	71300
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	94800
Total Aliphatics >C5-35	<100 µg/kg	TM173	21300
Total Aromatics >C5-35	<100 µg/kg	TM173	55800
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173	77000

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

VOC MS (S)

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Customer Sample R	PSWHP08
Depth (m)	0.30
Sample Type	Soil/Solid
Date Sampled	-
Date Received	11/12/2010
SDG Ref	101230-5
Lab Sample No.(s)	2573524
AGS Reference	

Component	LOD/Units	Method	
Dibromofluoromethane**	%	TM116	112
Toluene-d8**	%	TM116	96.6
4-Bromofluorobenzene**	%	TM116	123
Dichlorodifluoromethane	<4 µg/kg	TM116	<4 M
Chloromethane	<7 µg/kg	TM116	<7 #
Vinyl Chloride	<10 µg/kg	TM116	<10 #
Bromomethane	<13 µg/kg	TM116	<13 M
Chloroethane	<14 µg/kg	TM116	<14 M
Trichlorofluorormethane	<6 µg/kg	TM116	<6 M
1.1-Dichloroethene	<10 µg/kg	TM116	<10 #
Carbon Disulphide	<7 µg/kg	TM116	<7 M
Dichloromethane	<10 µg/kg	TM116	71.6 #
Methyl Tertiary Butyl Ether	<11 µg/kg	TM116	<11 M
trans-1-2-Dichloroethene	<11 µg/kg	TM116	<11 M
1.1-Dichloroethane	<8 µg/kg	TM116	<8 M
cis-1-2-Dichloroethene	<5 µg/kg	TM116	<5 M
2.2-Dichloropropane	<12 µg/kg	TM116	<12 M
Bromochloromethane	<14 µg/kg	TM116	<14 M
Chloroform	<8 µg/kg	TM116	<8 M
1.1.1-Trichloroethane	<7 µg/kg	TM116	<7 M
1.1-Dichloropropene	<11 µg/kg	TM116	<11 M
Carbontetrachloride	<14 µg/kg	TM116	<14 M
1.2-Dichloroethane	<5 µg/kg	TM116	<5 M
Benzene	<9 µg/kg	TM116	<9 M
Trichloroethene	<9 µg/kg	TM116	<9 M
1.2-Dichloropropane	<12 µg/kg	TM116	<12 M
Dibromomethane	<9 µg/kg	TM116	<9 M
Bromodichloromethane	<7 µg/kg	TM116	<7 M
cis-1-3-Dichloropropene	<14 µg/kg	TM116	<14 M
Toluene	<5 µg/kg	TM116	<5 M
trans-1-3-Dichloropropene	<14 µg/kg	TM116	<14
1.1.2-Trichloroethane	<10 µg/kg	TM116	<10 M
1.3-Dichloropropane	<7 µg/kg	TM116	<7 #
Tetrachloroethene	<5 µg/kg	TM116	<5 M
Dibromochloromethane	<13 µg/kg	TM116	<13 M

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

VOC MS (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Non-conforming work.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.

Component	LOD/Units	Method	Customer Sample R					
			PSWHP08					
Depth (m)			0.30					
Sample Type			Soil/Solid					
Date Sampled			-					
Date Received			11/12/2010					
SDG Ref			101230-5					
Lab Sample No.(s)			2573524					
AGS Reference								
1.2-Dibromoethane	<12 µg/kg	TM116	<12 M					
Chlorobenzene	<5 µg/kg	TM116	<5 M					
1.1.1.2-Tetrachloroethane	<10 µg/kg	TM116	<10 M					
Ethylbenzene	<4 µg/kg	TM116	<4 M					
p/m-Xylene	<14 µg/kg	TM116	<14 #					
o-Xylene	<10 µg/kg	TM116	<10 M					
Styrene	<10 µg/kg	TM116	<10 M					
Bromoform	<10 µg/kg	TM116	<10 M					
Isopropylbenzene	<5 µg/kg	TM116	<5 M					
1.1.2.2-Tetrachloroethane	<10 µg/kg	TM116	<10 #					
1.2.3-Trichloropropane	<17 µg/kg	TM116	<17 M					
Bromobenzene	<10 µg/kg	TM116	<10 M					
Propylbenzene	<11 µg/kg	TM116	<11 M					
2-Chlorotoluene	<9 µg/kg	TM116	<9 M					
1.3.5-Trimethylbenzene	<8 µg/kg	TM116	<8 #					
4-Chlorotoluene	<12 µg/kg	TM116	<12 M					
tert-Butylbenzene	<12 µg/kg	TM116	<12 #					
1.2.4-Trimethylbenzene	<9 µg/kg	TM116	<9 #					
sec-Butylbenzene	<10 µg/kg	TM116	<10 M					
4-Isopropyltoluene	<11 µg/kg	TM116	<11 M					
1.3-Dichlorobenzene	<6 µg/kg	TM116	<6 M					
1.4-Dichlorobenzene	<5 µg/kg	TM116	<5 M					
n-Butylbenzene	<10 µg/kg	TM116	<10 M					
1.2-Dichlorobenzene	<12 µg/kg	TM116	<12 M					
1.2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14 M					
Tert-amyl methyl ether	<15 µg/kg	TM116	<15					
1.2.4-Trichlorobenzene	<6 µg/kg	TM116	<6 #					
Hexachlorobutadiene	<12 µg/kg	TM116	<12					
Naphthalene	<13 µg/kg	TM116	<13 M					
1.2.3-Trichlorobenzene	<6 µg/kg	TM116	<6 M					

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Table of Results - Appendix

REPORT KEY

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

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

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

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM001	In - house Method	Determination of asbestos containing material by screening on solids		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser		
TM157	HP 6890 Gas Chromatograph (GC) system and HP 5973 Mass Selective Detector (MSD).	Determination of SVOC in Soils by GC-MS extracted by sonication in DCM/Acetone		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer		
TM243				

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

CERTIFICATE OF ANALYSIS

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	2573515	2573524	2573527	2573532
Customer Sample Ref.	PSWHP06	PSWHP08	PSWHP08	PSWHP10
AGS Ref.				
Depth	0.10	0.30	0.70	0.30
Type	SOLID	SOLID	SOLID	SOLID
Anions by Kone (soil)	07-Jan-2011	07-Jan-2011		07-Jan-2011
Asbestos Containing Material Screen	05-Jan-2011	05-Jan-2011	05-Jan-2011	05-Jan-2011
Boron Water Soluble	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011
EPH CWG (Aliphatic) GC (S)		10-Jan-2011		
EPH CWG (Aromatic) GC (S)		10-Jan-2011		
GRO by GC-FID (S)		13-Jan-2011		
Hexavalent Chromium (s)	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011
Metals by iCap-OES (Soil)	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011
PAH by GCMS	11-Jan-2011		11-Jan-2011	11-Jan-2011
pH	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011
Sample description	06-Jan-2011	06-Jan-2011	06-Jan-2011	06-Jan-2011
Semi Volatile Organic Compounds		10-Jan-2011		
Total Organic Carbon	07-Jan-2011	07-Jan-2011	07-Jan-2011	07-Jan-2011
TPH CWG GC (S)		13-Jan-2011		
VOC MS (S)		11-Jan-2011		

SDG:	101230-5	**Location:**	View Street	**Order Number:**	
Job:	H_GRONTMIJ_BRI-5	**Customer:**	Grontmij	**Report Number:**	111108
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Appendix

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

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

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

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

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

6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

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

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

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

11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.

12. Results relate only to the items tested

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

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

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

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).

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

18. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not
accredited.

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

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

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

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

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

24. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 -C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DCM	SOXTHERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
THIN LAYER CHROMATOGRAPHY	D&C	DCM	SOXTHERM	IATROSCAN
ELEMENTAL SULPHUR	D&C	DCM	SOXTHERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOXTHERM	GC-MS
HERBICIDES	D&C	HEXANE/ACETONE	SOXTHERM	GC-MS
PESTICIDES	D&C	HEXANE/ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH CWG BY GC	D&C	HEXANE/ACETONE	END OVER END	GC-FID
PCB TOT / PCB CON	D&C	HEXANE/ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE/ACETONE	MICROWAVE TM218.	GC-MS
C8-C40 (C8-C40) EZ FLASH	WET	HEXANE/ACETONE	SHAKER	GC-EZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE/ACETONE	SHAKER	GC-EZ
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DCM/ACETONE	SONICATE	GC-MS

LIQUID MATRICES EXTRACTION SUMMARY

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

Identification of Asbestos in Bulk Materials

The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

Visual Estimation Of Fibre Content

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

Further guidance on typical asbestos fibre content of manufactured products can be found in MDHS 100.

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

ALcontrol Laboratories

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

Grontmij
Radcliffe House
3rd Floor
Blenheim Court, Lode lane
Solihull
West Midlands
B912AA

Attention: Gareth Taylor

Note that this laboratory report provides the results of sampling at multiple sites. Only the samples prefixed by "View Street" relate to the subject site.

CERTIFICATE OF ANALYSIS

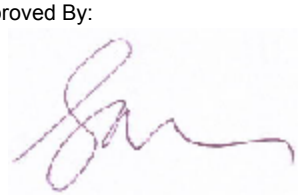
Date:	10 June 2011
Customer:	H_GRONTMIJ_SOL
Sample Delivery Group (SDG):	110602-58
Your Reference:	
Location:	Part 2a Assistance
Report No:	133432

We received 29 samples on Thursday June 02, 2011 and 25 of these samples were scheduled for analysis which was completed on Friday June 10, 2011. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

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

Approved By:



Sonia McWhan

Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
3588820	1 NEWLANDS LANE FIVEWAYS		0.30	31/05/2011
3588809	10 WESTGATE			31/05/2011
3588808	11 GOODWOOD			31/05/2011
3588826	11 NEWLANDS COURT FIVEWAYS		0.30	31/05/2011
3588818	110 STAFFORD LANE			31/05/2011
3588805	121 ARMITAGE ROAD			31/05/2011
3588806	125 ARMITAGE ROAD			31/05/2011
3588811	2 SANDOWN			31/05/2011
3588819	21 HERONDALE			31/05/2011
3588807	3 SLADE VIEW RISE			31/05/2011
3588787	3A BLAKE CLOSE			31/05/2011
3588810	4 KEMPTON			31/05/2011
3588813	41 SWALLOWFIELDS			31/05/2011
3588822	5 NEWLANDS COURT FIVEWAYS		0.30	31/05/2011
3588814	73 STAGBOROUGH			31/05/2011
3588815	8 STAGBOROUGH WAY			31/05/2011
3588788	83 BLAKE CLOSE			31/05/2011
3588823	9 NEWLANDS COURT FIVEWAYS		0.30	31/05/2011
3588803	99 ARMITAGE ROAD			31/05/2011
3588802	FIVEWAYS 1 NEWLANDS LANE			31/05/2011
3588798	FIVEWAYS 11 NEWLANDS COURT			31/05/2011
3588799	FIVEWAYS 5 NEWLANDS COURT			31/05/2011
3588800	FIVEWAYS 9 NEWLANDS COURT			31/05/2011
3588795	VIEW ST. 32 FOSTERS AVE.			31/05/2011
3588793	VIEW ST. 53 VIEW ST.			31/05/2011
3588797	VIEW ST. 9 WARD ST.			31/05/2011
3588790	VIEW ST. WS2		1.20	31/05/2011
3588791	VIEW ST. WS3		1.10	31/05/2011
3588789	VIEW ST. WS4		1.60	31/05/2011

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

ALcontrol Laboratories

Validated

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

LIQUID

Results Legend

- X — Test
- N — No Determination Possible

Test		
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 25
Mercury Dissolved	All	NDPs: 0 Tests: 25
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 25
VOC MS (W)	All	NDPs: 0 Tests: 3

Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Dissolved Metals by ICP-MS	Mercury Dissolved	PAH Spec MS - Aqueous (W)	VOC MS (W)
3588802	FIVEWAYS 1			1l green glass bottle	X	X	X	
3588811	2 SANDOWN			1l green glass bottle	X	X	X	
3588790	VIEW ST. WS2		1.20	1l green glass bottle	X	X	X	
				Vial				X
3588807	3 SLADE VIEW			1l green glass bottle	X	X	X	
3588787	3A BLAKE CLOSE			1l green glass bottle	X	X	X	
3588791	VIEW ST. WS3		1.10	1l green glass bottle	X	X	X	
				Vial				X
3588810	4 KEMPTON			1l green glass bottle	X	X	X	
3588789	VIEW ST. WS4		1.60	1l green glass bottle	X	X	X	
				Vial				X
3588799	FIVEWAYS 5			1l green glass bottle	X	X	X	
3588815	8 STAGBOROUGH			1l green glass bottle	X	X	X	
3588800	FIVEWAYS 9			1l green glass bottle	X	X	X	
3588797	VIEW ST. 9 WARD			1l green glass bottle	X	X	X	
3588809	10 WESTGATE			1l green glass bottle	X	X	X	
3588808	11 GOODWOOD			1l green glass bottle	X	X	X	
3588798	FIVEWAYS 11			1l green glass bottle	X	X	X	
3588819	21 HERONDALE			1l green glass bottle	X	X	X	
3588795	VIEW ST. 32			1l green glass bottle	X	X	X	
3588813	41			1l green glass bottle	X	X	X	
3588793	VIEW ST. 53 VIEW			1l green glass bottle	X	X	X	
3588814	73 STAGBOROUGH			1l green glass bottle	X	X	X	
3588788	83 BLAKE CLOSE			1l green glass bottle	X	X	X	
3588803	99 ARMITAGE			1l green glass bottle	X	X	X	
3588818	110 STAFFORD			1l green glass bottle	X	X	X	
3588805	121 ARMITAGE			1l green glass bottle	X	X	X	
3588806	125 ARMITAGE			1l green glass bottle	X	X	X	

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	99 ARMITAGE ROAD	121 ARMITAGE ROAD	125 ARMITAGE ROAD	83 BLAKE CLOSE	3A BLAKE CLOSE	FIVEWAYS 5 NEWLANDS COURT
			Depth (m)	.	.	.	.	.	.
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
			Date Sampled	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
			Date Received	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
			SDG Ref	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
			Lab Sample No.(s)	3588803	3588805	3588806	3588788	3588787	3588799
			AGS Reference						
Antimony (diss.filt)	<0.16 µg/l	TM152		0.367 #	0.327 #	0.881 #	0.297 #	0.301 #	2.25 #
Arsenic (diss.filt)	<0.12 µg/l	TM152		3.67 #	5.16 #	3.97 #	2.1 #	1.42 #	2.13 #
Boron (diss.filt)	<9.4 µg/l	TM152		58.5 #	57.7 #	66.9 #	125 #	85.7 #	102 #
Cadmium (diss.filt)	<0.1 µg/l	TM152		<0.1 #	<0.1 #	<0.1 #	0.117 #	0.201 #	0.165 #
Chromium (diss.filt)	<0.22 µg/l	TM152		12.4 #	12.2 #	13.7 #	13.4 #	7.95 #	16.5 #
Copper (diss.filt)	<0.85 µg/l	TM152		288 #	9.02 #	5.51 #	24.7 #	740 #	266 #
Lead (diss.filt)	<0.02 µg/l	TM152		0.107 #	0.293 #	1.09 #	0.165 #	0.311 #	0.266 #
Nickel (diss.filt)	<0.15 µg/l	TM152		2.16 #	1.01 #	1.4 #	0.993 #	4.32 #	1.19 #
Zinc (diss.filt)	<0.41 µg/l	TM152		74.4 #	7.67 #	29.2 #	14.5 #	606 #	94.9 #
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 #	<0.01 #	<0.01 #	<0.01 #	<0.01 #	<0.01 #

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	11 GOODWOOD	21 HERONDALE	4 KEMPTON	FIVEWAYS 9 NEWL ANDS COURT	FIVEWAYS 11 NEW LANDS COURT	FIVEWAYS 1 NEWL ANDS LANE
			Depth (m)	.	.	.	.	.	.
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
			Date Sampled	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
			Date Received	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
			SDG Ref	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
			Lab Sample No.(s)	3588808	3588819	3588810	3588800	3588798	3588802
			AGS Reference						
Antimony (diss.filt)	<0.16 µg/l	TM152		0.344 #	0.266 #	0.421 #	0.489 #	0.381 #	0.246 #
Arsenic (diss.filt)	<0.12 µg/l	TM152		1.85 #	2.08 #	2.03 #	2.22 #	1.94 #	2.06 #
Boron (diss.filt)	<9.4 µg/l	TM152		96.5 #	114 #	88.8 #	92.2 #	113 #	80.7 #
Cadmium (diss.filt)	<0.1 µg/l	TM152		<0.1 #	<0.1 #	<0.1 #	<0.1 #	0.101 #	<0.1 #
Chromium (diss.filt)	<0.22 µg/l	TM152		14.2 #	11.2 #	12.8 #	14.1 #	13.1 #	8.22 #
Copper (diss.filt)	<0.85 µg/l	TM152		49 #	96.6 #	32.7 #	176 #	48.5 #	73.3 #
Lead (diss.filt)	<0.02 µg/l	TM152		0.109 #	0.184 #	0.093 #	0.048 #	0.057 #	0.231 #
Nickel (diss.filt)	<0.15 µg/l	TM152		1.68 #	0.594 #	1.6 #	0.559 #	1.02 #	1.79 #
Zinc (diss.filt)	<0.41 µg/l	TM152		21.6 #	18 #	7.11 #	6.25 #	9.53 #	8.76 #
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 #	<0.01 #	<0.01 #	<0.01 #	<0.01 #	<0.01 #

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	2 SANDOWN	3 SLADE VIEW RISE	110 STAFFORD LANE	73 STAGBOROUGH	8 STAGBOROUGH WAY	41 SWALLOWFIELDS
			Depth (m)	.	.	.	.	.	.
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
			Date Sampled	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
			Date Received	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
			SDG Ref	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
			Lab Sample No.(s)	3588811	3588807	3588818	3588814	3588815	3588813
			AGS Reference						
Antimony (diss.filt)	<0.16 µg/l	TM152		0.202 #	0.426 #	0.303 #	0.246 #	0.239 #	0.298 #
Arsenic (diss.filt)	<0.12 µg/l	TM152		1.92 #	1.85 #	2.03 #	2.32 #	2.03 #	2.16 #
Boron (diss.filt)	<9.4 µg/l	TM152		107 #	128 #	123 #	135 #	118 #	123 #
Cadmium (diss.filt)	<0.1 µg/l	TM152		0.201 #	<0.1 #	0.179 #	0.142 #	0.276 #	0.108 #
Chromium (diss.filt)	<0.22 µg/l	TM152		12.5 #	13.3 #	11.2 #	13.5 #	11.9 #	11.3 #
Copper (diss.filt)	<0.85 µg/l	TM152		118 #	175 #	120 #	19.2 #	91.2 #	9.23 #
Lead (diss.filt)	<0.02 µg/l	TM152		0.862 #	0.042 #	0.329 #	0.121 #	0.398 #	0.126 #
Nickel (diss.filt)	<0.15 µg/l	TM152		4.46 #	1.69 #	1.06 #	1.49 #	15.3 #	0.697 #
Zinc (diss.filt)	<0.41 µg/l	TM152		295 #	26 #	29.9 #	6.85 #	356 #	2.69 #
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 #	<0.01 #	<0.01 #	<0.01 #	<0.01 #	<0.01 #

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	VIEW ST. 32 FOSTERS AVE.	VIEW ST. 53 VIEW ST.	VIEW ST. 9 WARD ST.	VIEW ST. WS2	VIEW ST. WS3	VIEW ST. WS4
			Depth (m)	.	.	.	1.20	1.10	1.60
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
			Date Sampled	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
			Date Received	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
			SDG Ref	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
			Lab Sample No.(s)	3588795	3588793	3588797	3588790	3588791	3588789
			AGS Reference						
Antimony (diss.filt)	<0.16 µg/l	TM152		0.449 #	0.697 #	0.236 #			
Arsenic (diss.filt)	<0.12 µg/l	TM152		1.71 #	1.88 #	3.17 #	0.535 #	1.1 #	0.912 #
Boron (diss.filt)	<9.4 µg/l	TM152		121 #	102 #	106 #	171 #	226 #	59.5 #
Cadmium (diss.filt)	<0.1 µg/l	TM152		0.179 #	0.381 #	0.149 #	0.605 #	<0.1 #	0.167 #
Chromium (diss.filt)	<0.22 µg/l	TM152		11.7 #	13.8 #	10 #	11.5 #	20.9 #	28.6 #
Copper (diss.filt)	<0.85 µg/l	TM152		302 #	644 #	361 #	2.24 #	3.42 #	<0.85 #
Lead (diss.filt)	<0.02 µg/l	TM152		4.37 #	0.103 #	0.23 #	0.072 #	0.16 #	0.05 #
Nickel (diss.filt)	<0.15 µg/l	TM152		4.71 #	1.66 #	3.73 #	3.9 #	3.3 #	3.91 #
Vanadium (diss.filt)	<0.24 µg/l	TM152					2.88 #	4.02 #	8.48 #
Zinc (diss.filt)	<0.41 µg/l	TM152		175 #	661 #	293 #	15.9 #	4.05 #	<0.41 #
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 #	<0.01 #	<0.01 #	<0.01 #	<0.01 #	<0.01 #

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	10 WESTGATE
			Depth (m)	.
			Sample Type	Water(GW/SW)
			Date Sampled	31/05/2011
			Date Received	02/06/2011
			SDG Ref	110602-58
			Lab Sample No.(s)	3588809
			AGS Reference	
Antimony (diss.filt)	<0.16 µg/l	TM152		0.203 #
Arsenic (diss.filt)	<0.12 µg/l	TM152		2.18 #
Boron (diss.filt)	<9.4 µg/l	TM152		106 #
Cadmium (diss.filt)	<0.1 µg/l	TM152		<0.1 #
Chromium (diss.filt)	<0.22 µg/l	TM152		13.9 #
Copper (diss.filt)	<0.85 µg/l	TM152		27.6 #
Lead (diss.filt)	<0.02 µg/l	TM152		0.066 #
Nickel (diss.filt)	<0.15 µg/l	TM152		1.47 #
Zinc (diss.filt)	<0.41 µg/l	TM152		9.15 #
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01 #

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

PAH Spec MS - Aqueous (W)

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	99 ARMITAGE ROAD	121 ARMITAGE ROAD	125 ARMITAGE ROAD	83 BLAKE CLOSE	3A BLAKE CLOSE	FIVEWAYS 5 NEWLANDS COURT
			Depth (m)	.	.	.	.	.	.
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
			Date Sampled	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
			Date Received	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
			SDG Ref	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
			Lab Sample No.(s)	3588803	3588805	3588806	3588788	3588787	3588799
			AGS Reference						
Naphthalene (aq)	<0.1 µg/l	TM178		<0.1 #	<0.1 #	<0.1 #	0.11 #	<0.1 #	<0.1 #
Acenaphthene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Acenaphthylene (aq)	<0.011 µg/l	TM178		<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #
Fluoranthene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #
Anthracene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Phenanthrene (aq)	<0.022 µg/l	TM178		<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #
Fluorene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #
Chrysene (aq)	<0.013 µg/l	TM178		<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #
Pyrene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178		<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178		<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178		<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178		none detected	none detected	none detected	0.11	none detected	none detected

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

PAH Spec MS - Aqueous (W)

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	11 GOODWOOD	21 HERONDALE	4 KEMPTON	FIVEWAYS 9 NEWL ANDS COURT	FIVEWAYS 11 NEW LANDS COURT	FIVEWAYS 1 NEWL ANDS LANE
			Depth (m)	.	.	.	.	.	.
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
			Date Sampled	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
			Date Received	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
			SDG Ref	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
			Lab Sample No.(s)	3588808	3588819	3588810	3588800	3588798	3588802
			AGS Reference						
Naphthalene (aq)	<0.1 µg/l	TM178		<0.1 #	<0.1 #	<0.1 #	<0.1 #	0.121 #	<0.1 #
Acenaphthene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Acenaphthylene (aq)	<0.011 µg/l	TM178		<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #
Fluoranthene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #
Anthracene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Phenanthrene (aq)	<0.022 µg/l	TM178		<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #
Fluorene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #
Chrysene (aq)	<0.013 µg/l	TM178		<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #
Pyrene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178		<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178		<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178		<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178		none detected	none detected	none detected	none detected	0.121	none detected

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

PAH Spec MS - Aqueous (W)

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	2 SANDOWN	3 SLADE VIEW RISE	110 STAFFORD LANE	73 STAGBOROUGH	8 STAGBOROUGH WAY	41 SWALLOWFIELDS
			Depth (m)	.	.	.	.	.	.
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
			Date Sampled	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
			Date Received	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
			SDG Ref	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
			Lab Sample No.(s)	3588811	3588807	3588818	3588814	3588815	3588813
			AGS Reference						
Naphthalene (aq)	<0.1 µg/l	TM178		<0.1 #	0.103 #	0.131 #	<0.1 #	<0.1 #	<0.1 #
Acenaphthene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Acenaphthylene (aq)	<0.011 µg/l	TM178		<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #	<0.011 #
Fluoranthene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #
Anthracene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Phenanthrene (aq)	<0.022 µg/l	TM178		<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #	<0.022 #
Fluorene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #
Chrysene (aq)	<0.013 µg/l	TM178		<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #	<0.013 #
Pyrene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #	<0.015 #
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #	<0.017 #
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178		<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #	<0.023 #
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178		<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #	<0.027 #
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178		<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #	<0.009 #
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #	<0.016 #
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178		none detected	0.103	0.131	none detected	none detected	none detected

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

PAH Spec MS - Aqueous (W)

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	VIEW ST. 32 FOSTERS AVE.	VIEW ST. 53 VIEW ST.	VIEW ST. 9 WARD ST.	VIEW ST. WS2	VIEW ST. WS3	VIEW ST. WS4
			Depth (m)	.	.	.	1.20	1.10	1.60
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
			Date Sampled	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011	31/05/2011
			Date Received	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011	02/06/2011
			SDG Ref	110602-58	110602-58	110602-58	110602-58	110602-58	110602-58
			Lab Sample No.(s)	3588795	3588793	3588797	3588790	3588791	3588789
			AGS Reference						
Naphthalene (aq)	<0.1 µg/l	TM178		0.104 #	<0.1 #	<0.1 #	<0.1 #	<0.1 #	<0.1 #
Acenaphthene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	0.0225 #	0.0156 #
Acenaphthylene (aq)	<0.011 µg/l	TM178		<0.011 #	<0.011 #	<0.011 #	<0.011 #	0.0181 #	<0.011 #
Fluoranthene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	0.981 #	0.465 #
Anthracene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	0.0538 #	0.0302 #
Phenanthrene (aq)	<0.022 µg/l	TM178		<0.022 #	<0.022 #	<0.022 #	<0.022 #	0.217 #	0.13 #
Fluorene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #	<0.014 #
Chrysene (aq)	<0.013 µg/l	TM178		<0.013 #	<0.013 #	<0.013 #	<0.013 #	0.935 #	0.434 #
Pyrene (aq)	<0.015 µg/l	TM178		<0.015 #	<0.015 #	<0.015 #	<0.015 #	1.11 #	0.559 #
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178		<0.017 #	<0.017 #	<0.017 #	<0.017 #	0.565 #	0.283 #
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178		<0.023 #	<0.023 #	<0.023 #	<0.023 #	0.625 #	0.279 #
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178		<0.027 #	<0.027 #	<0.027 #	<0.027 #	0.815 #	0.33 #
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178		<0.009 #	<0.009 #	<0.009 #	<0.009 #	0.916 #	0.352 #
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	0.112 #	0.0359 #
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178		<0.016 #	<0.016 #	<0.016 #	<0.016 #	0.689 #	0.198 #
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178		<0.014 #	<0.014 #	<0.014 #	<0.014 #	0.54 #	0.164 #
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178		0.104	none detected	none detected	none detected	7.6	3.28

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

PAH Spec MS - Aqueous (W)

Results Legend

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

Customer Sample R	10 WESTGATE
Depth (m)	.
Sample Type	Water(GW/SW)
Date Sampled	31/05/2011
Date Received	02/06/2011
SDG Ref	110602-58
Lab Sample No.(s)	3588809
AGS Reference	

Component	LOD/Units	Method	
Naphthalene (aq)	<0.1 µg/l	TM178	<0.1 #
Acenaphthene (aq)	<0.015 µg/l	TM178	<0.015 #
Acenaphthylene (aq)	<0.011 µg/l	TM178	<0.011 #
Fluoranthene (aq)	<0.017 µg/l	TM178	<0.017 #
Anthracene (aq)	<0.015 µg/l	TM178	<0.015 #
Phenanthrene (aq)	<0.022 µg/l	TM178	<0.022 #
Fluorene (aq)	<0.014 µg/l	TM178	<0.014 #
Chrysene (aq)	<0.013 µg/l	TM178	<0.013 #
Pyrene (aq)	<0.015 µg/l	TM178	<0.015 #
Benzo(a)anthracene (aq)	<0.017 µg/l	TM178	<0.017 #
Benzo(b)fluoranthene (aq)	<0.023 µg/l	TM178	<0.023 #
Benzo(k)fluoranthene (aq)	<0.027 µg/l	TM178	<0.027 #
Benzo(a)pyrene (aq)	<0.009 µg/l	TM178	<0.009 #
Dibenzo(a,h)anthracene (aq)	<0.016 µg/l	TM178	<0.016 #
Benzo(g,h,i)perylene (aq)	<0.016 µg/l	TM178	<0.016 #
Indeno(1,2,3-cd)pyrene (aq)	<0.014 µg/l	TM178	<0.014 #
PAH, Total Detected USEPA 16 (aq)	µg/l	TM178	none detected

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

VOC MS (W)

Results Legend

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

Component	LOD/Units	Method	Customer Sample R	VIEW ST. WS2	VIEW ST. WS3	VIEW ST. WS4			
			Depth (m)	1.20	1.10	1.60			
			Sample Type	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)			
			Date Sampled	31/05/2011	31/05/2011	31/05/2011			
			Date Received	02/06/2011	02/06/2011	02/06/2011			
			SDG Ref	110602-58	110602-58	110602-58			
			Lab Sample No.(s)	3588790	3588791	3588789			
			AGS Reference						
Toluene-d8**	%	TM208		98.2	99	99.3			
Methyl tertiary butyl ether (MTBE)	<1.6 µg/l	TM208		<1.6 #	<1.6 #	<1.6 #			
Benzene	<1.3 µg/l	TM208		<1.3 #	<1.3 #	<1.3 #			
Toluene	<1.4 µg/l	TM208		<1.4 #	<1.4 #	<1.4 #			
Ethylbenzene	<2.5 µg/l	TM208		<2.5 #	<2.5 #	<2.5 #			
m,p-Xylene	<2.5 µg/l	TM208		<2.5 #	<2.5 #	<2.5 #			
o-Xylene	<1.7 µg/l	TM208		<1.7 #	<1.7 #	<1.7 #			

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Table of Results - Appendix

REPORT KEY

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

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

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

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		

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

CERTIFICATE OF ANALYSIS

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	3588803	3588805	3588806	3588788	3588808	3588787	3588799	3588800	3588798	3588802
Customer Sample Ref.	99 ARMITAGE ROAD	121 ARMITAGE ROAD	125 ARMITAGE ROAD	83 BLAKE CLOSE	11 GOODWOOD	3A BLAKE CLOSE	FIVEWAYS 5 NEWLANDS COURT	FIVEWAYS 9 NEWLANDS COURT	FIVEWAYS 11 NEWLANDS COURT	FIVEWAYS 1 NEWLANDS LANE
AGS Ref.										
Depth										
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Dissolved Metals by ICP-MS	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	07-Jun-2011	08-Jun-2011	09-Jun-2011	09-Jun-2011	08-Jun-2011	08-Jun-2011
Mercury Dissolved	07-Jun-2011	07-Jun-2011	08-Jun-2011	07-Jun-2011	07-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	07-Jun-2011	08-Jun-2011
PAH Spec MS - Aqueous (W)	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011

Lab Sample No(s)	3588819	3588810	3588811	3588807	3588818	3588814	3588815	3588813	3588795	3588793
Customer Sample Ref.	21 HERONDALE	4 KEMPTON	2 SANDOWN	3 SLADE VIEW RISE	110 STAFFORD LANE	73 STAGBOROUGH	3 STAGBOROUGH WAY	41 SWALLOWFIELDS	VIEW ST. 32 FOSTERS AVE.	VIEW ST. 53 VIEW ST.
AGS Ref.										
Depth										
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Dissolved Metals by ICP-MS	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	08-Jun-2011	09-Jun-2011
Mercury Dissolved	07-Jun-2011	08-Jun-2011	08-Jun-2011	07-Jun-2011	07-Jun-2011	08-Jun-2011	07-Jun-2011	07-Jun-2011	07-Jun-2011	08-Jun-2011
PAH Spec MS - Aqueous (W)	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011

Lab Sample No(s)	3588809	3588797	3588790	3588791	3588789
Customer Sample Ref.	10 WESTGATE	VIEW ST. 9 WARD ST.	VIEW ST. WS2	VIEW ST. WS3	VIEW ST. WS4
AGS Ref.					
Depth			1.20	1.10	1.60
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Dissolved Metals by ICP-MS	07-Jun-2011	10-Jun-2011	08-Jun-2011	08-Jun-2011	09-Jun-2011
Mercury Dissolved	07-Jun-2011	07-Jun-2011	07-Jun-2011	07-Jun-2011	08-Jun-2011
PAH Spec MS - Aqueous (W)	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011	09-Jun-2011
VOC MS (W)			09-Jun-2011	09-Jun-2011	09-Jun-2011

SDG:	110602-58	**Location:**	Part 2a Assistance	**Order Number:**	
Job:	H_GRONTMIJ_SOL-54	**Customer:**	Grontmij	**Report Number:**	133432
Client Reference:		**Attention:**	Gareth Taylor	**Superseded Report:**	

Appendix

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

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

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

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

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

6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

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

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

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

11. Results relate only to the items tested.

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

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

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

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

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

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

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

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

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

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

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

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 -C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DCM	SOXTHERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
THIN LAYER CHROMATOGRAPHY	D&C	DCM	SOXTHERM	IATROSCAN
ELEMENTAL SULPHUR	D&C	DCM	SOXTHERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOXTHERM	GCMS
HERBICIDES	D&C	HEXANE/ACETONE	SOXTHERM	GCMS
PESTICIDES	D&C	HEXANE/ACETONE	SOXTHERM	GCMS
EPH (DRO)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH CWG BY GC	D&C	HEXANE/ACETONE	END OVER END	GC-FID
PCB TOT / PCB CON	D&C	HEXANE/ACETONE	END OVER END	GCMS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE/ACETONE	MICROWAVE TM218.	GCMS
C8-C40 (C8-C40) EZ FLASH	WET	HEXANE/ACETONE	SHAKER	GC-EZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE/ACETONE	SHAKER	GC-EZ
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DCM/ACETONE	SONICATE	GCMS

LIQUID MATRICES EXTRACTION SUMMARY

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

Identification of Asbestos in Bulk Materials & Soils

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

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

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

Visual Estimation Of Fibre Content

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

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

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

APPENDIX E

TABLE 1 - GAS MONITORING DATA

Site: *View Street* **Job No.** 106270

Monitoring Well Sampling & Testing Record

BH	Date	Pipe Internal Diameter mm	Monitored By	Gas													Weather		
				Borehole Pressure pa	Flow l/h	CH_4 % v/v	CH_4 GSV	CO_2 % v/v	CO_2 GSV	O_2 % v/v	CO ppm	H2S ppm	PID CF ppm	HEX %	LEL %	Gas Analyser	Atmospheric Pressure mbar	Conditions @ Monitoring	Ambient Temp °C
WS01	28/01/2011		RJH	-4.00	-1	0	0	0.8	-0.008	19.1	0	-10	1	0	0	GFM	1008	Clear	-5
WS01	11/02/2011		KS	NM	-0.1	0	0	0.7	-0.0007	19.2	-1	-10				GFM	994		10.0
WS01	25/02/2011		KS	1.00	0.2	0.1	0.0002	0.8	0.0016	19.3	-1	-10	1	0		GFM	1006	Cloudy	11
WS01	11/03/2011		KAS	1.00	(0.2) 0.1	0.1	0.0001	0.8	0.0008	19.2	-1	-10	1	0		GFM	998	Sunny	
WS02	28/01/2011		RJH	-4.00	-1	0	0	0.8	-0.008	19.1	-1	-10	1	0	0	GFM	1007	Clear	-5.0
WS02	11/02/2011		KS	NM	0.1	0	0	0.4	0.0004	19.5	-1	-10				GFM	994		10
WS02	25/02/2011		KS	21.00	3.4	0.1	0.0034	0.7	0.0238	19.4	-3	-10	1	0.003		GFM	1006	Cloudy	11
WS02	11/03/2011		KAS	-1.00	(0.6)0.2	0.1	0.0002	0.7	0.0014	19.5	-3	-10	1	0.003		GFM	998	Sunny	
WS03	28/01/2011		RJH	-5.00	-1.2	0	0	0.6	-0.0072	19.4	-1	-10	1	0	0	GFM	1009	Clear	-5
WS03	11/02/2011		KS	NM	0.1	0	0	0.8	0.0008	19.4	-1	-10	NM	NM	NM	GFM	0995		10.0
WS03	25/02/2011		KS	-6.00	-0.5	0.1	-0.0005	0.7	-0.0035	19.4	-3	-10	1	0.002	0	GFM	1006	Cloudy	11
WS03	11/03/2011		KAS	-4.00	-0.3	0.1	-0.0003	0.8	-0.0024	19.4	-3	-10	1	0.001	0	GFM	998	Sunny	
WS04	28/01/2011		RJH	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	GFM	NM	Clear	-5
WS04	11/02/2011		KS	NM	0.3	0	0	0.6	0.0018	19.0	-1	-10	NM	NM	NM	GFM	996		10
WS04	25/02/2011		KS	0.00	0.1	0.1	0.0001	0.1	0.0001	19.8	-1	-10	1	0.004		GFM	1005	Cloudy	11.0
WS04	11/03/2011		KAS	1.00	0.1	0.1	0.0001	0.1	0.0001	19.7	-3	-10	1	0	0	GFM	998	Sunny	

NOTES: NM = Not Measured

Figures in brackets indicate peak (or for O2 minimum) levels recorded.

GSV (l/hr) = [gas well gas concentration (%v/v)] **x** [gas well flow rate (l/hr)]

100

APPENDIX F

Appendix F: Severity and Probability of Risk in Conceptual Site Models (after CIRIA552, Tables 6.3 to 6.5)

This report draws on guidance presented in CIRIA report 552, "Contaminated Land Risk Assessment, A Guide for Good Practice", wherein the "severity" term in the Conceptual Site Model is classified with reference to the sensitivity of the hazard and the receptor, as follows:

Severity Category	Description	Examples
Severe	Acute risk to human health likely to result in "significant harm" as defined in EPA90, catastrophic damage to buildings or property, acute risk of major pollution of controlled waters, acute risk of harm to ecosystems (as defined in Contaminated Land Regulations 2006)	High cyanide concentrations at the surface of a recreation area Major spillage into controlled waters Explosion, causing building collapse
Medium	Chronic risk to human health likely to result in "significant harm" as defined in EPA90, chronic pollution of sensitive controlled waters, significant change at a sensitive ecosystems or species, significant damage to buildings or structures	Contaminant concentrations at a site in excess of SGVs, GAC or similar screening values Leaching of contaminants to sensitive aquifer Death of a species within a nature reserve
Mild	Pollution of non-sensitive waters, significant damage to buildings, structures, services or crops, damage to sensitive buildings, structures, services or the environment, which nonetheless result in "significant harm"	Pollution to (former) non-aquifer or to non-controlled surface watercourse. Damage to building rendering it unsafe to occupy (e.g. foundation or structural damage)
Minor	Harm, not necessarily resulting in "significant harm" but probably requiring expenditure to resolve or financial loss. Non-permanent risks to human health that are easily mitigated, e.g. by wearing PPE. Easily-repairable damage to structures or services	Contaminant concentrations requiring the wearing of PPE during site work, but no other long-term mitigation. Discolouration of concrete

The likelihood of an event (probability) takes into account both the presence of hazard and receptor and the integrity of the pathway between hazard and receptor, and is assessed as follows:

Category	There is a pollution linkage and:
High	Event is likely in the short term and almost inevitable over the long term. Or, there is evidence of actual harm at/to the receptor
Likely	Event is possible in the short term and likely over the long term
Low	Event is unlikely in the short term and possible over the long term
Unlikely	Event is unlikely, even in the long term

Potential severity and probability have been assessed in the following matrix, to give an overall risk rating:

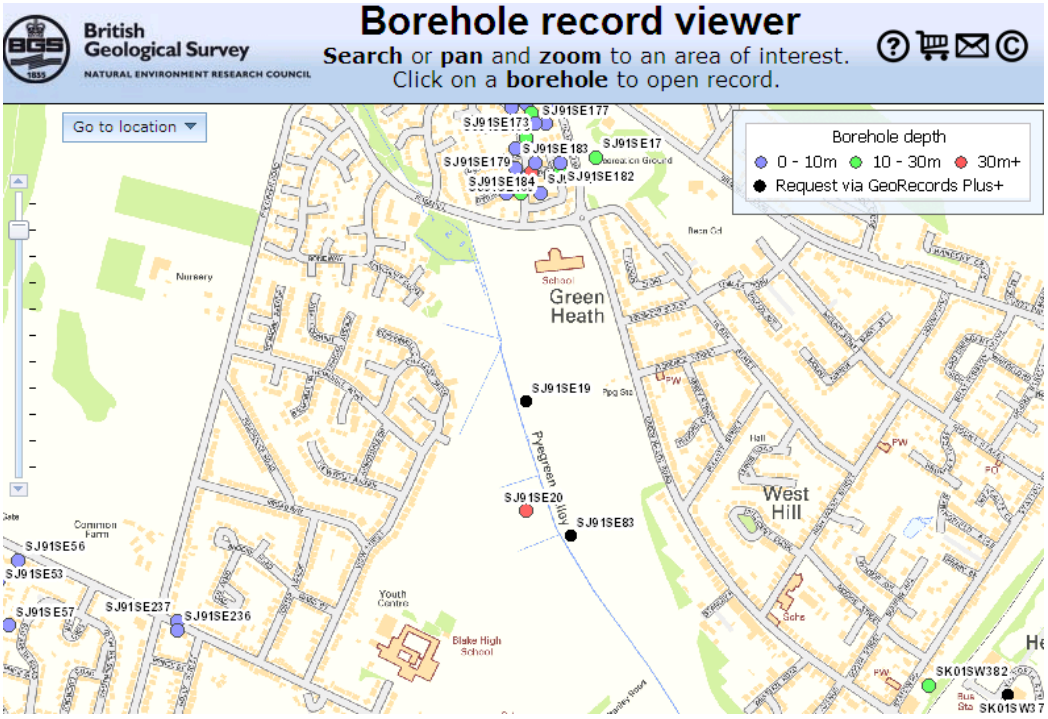
	Severity			
Probability	Severe	Medium	Mild	Minor
High	Very high	High	Moderate	Low/moderate
Likely	High	Moderate	Low/moderate	Low
Low	Moderate	Low/moderate	Low	Very low
Unlikely	Low/moderate	Low	Very low	Very low

The above risk categories are likely to result in the following actions:

- Very high: urgent intervention / investigation needed, remediation likely to be required
- High: urgent intervention / investigation needed, remediation possibly required in short term and probably required in long term
- Moderate: investigation needed to clarify and refine risk; remediation may be required over the long term
- Low: it is possible that harm could arise to a receptor, but if realised, such harm is likely to be, at worst, mild
- Very low: it is possible that harm could arise to a receptor, but if realised, such harm is unlikely to be severe

APPENDIX G

Information provided in this appendix is based upon records provided by British Geological Survey


British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL
Borehole record viewer
Search or pan and zoom to an area of interest.
Click on a borehole to open record.
Go to location
Borehole depth
0 - 10m
10 - 30m
30m+
Request via GeoRecords Plus+
SJ91SE177
SJ91SE173
SJ91SE183
SJ91SE17
SJ91SE179
SJ91SE184
SJ91SE182
Nursery
School
Green Heath
SJ91SE19
Pyegreen Valley
SJ91SE20
SJ91SE83
West Hill
Common Farm
SJ91SE56
SJ91SE53
SJ91SE57
SJ91SE237
SJ91SE236
Youth Centre
Blake High School
SK01SW382
SK01SW37

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 1 of 2 Next > >>

BOREHOLE LOG

BOREHOLE :- ONE

B.H. DIA. :- 200mm

TYPE OF BORING :- Shell and Auger

GROUND LEVEL :-

DATE OF BORING :- 15.9.87

WATER LEVEL :- 'DRY'

SCALE :- 1;50

'N' = Number of blows/305mm for Standard Penetration Test (SPT) or Dutch Cone Test (CPT)

Description of Strata	Sample	Depth	B. H.	Depth	O. D.	Remarks
				G.L.		N
Coarse, grey/brown sandy TOPSOIL with gravel and brick fragments FILL	B.1	G.L.				
	B.2	1.00		1.00		
Loose, brown fine and medium SAND with some fine, medium and coarse GRAVEl	CPT	1.00				N = 6
	3	1.45				
	B.4	1.80		1.80		
	SPT	2.00				N = 8
	5	2.45				
Soft to firm, brown very sandy CLAY with fine, medium and coarse GRAVEL and pockets of SAND	B.6	3.00				
	CPT	3.00				N = 34
	7	3.45				
	B.8	4.00		4.00		
Dense, red/brown clayey fine and medium SAND with some medium and coarse GRAVEL and pockets of CLAY	SPT	4.00				N = 50 blows for 550mm penetration
	9	4.45				
	B.10	4.75		4.75		
	B.11	4.90		5.10		
Dense, red fine and medium SAND with some fine and medium GRAVEL and sandstone fragments	CPT	5.00				N = 50 blows for 60mm penetration
	12	5.50				
	B.13	6.00		6.00		
Very dense, weakly cemented fine and medium SAND with fine and medium gravel (BUNTER PEBBLE BED?)						
Borehole complete 6.00m						

BELT ROAD, HEDNESFORD.

U - Undisturbed
B - Bulk
D - Disturbed

317

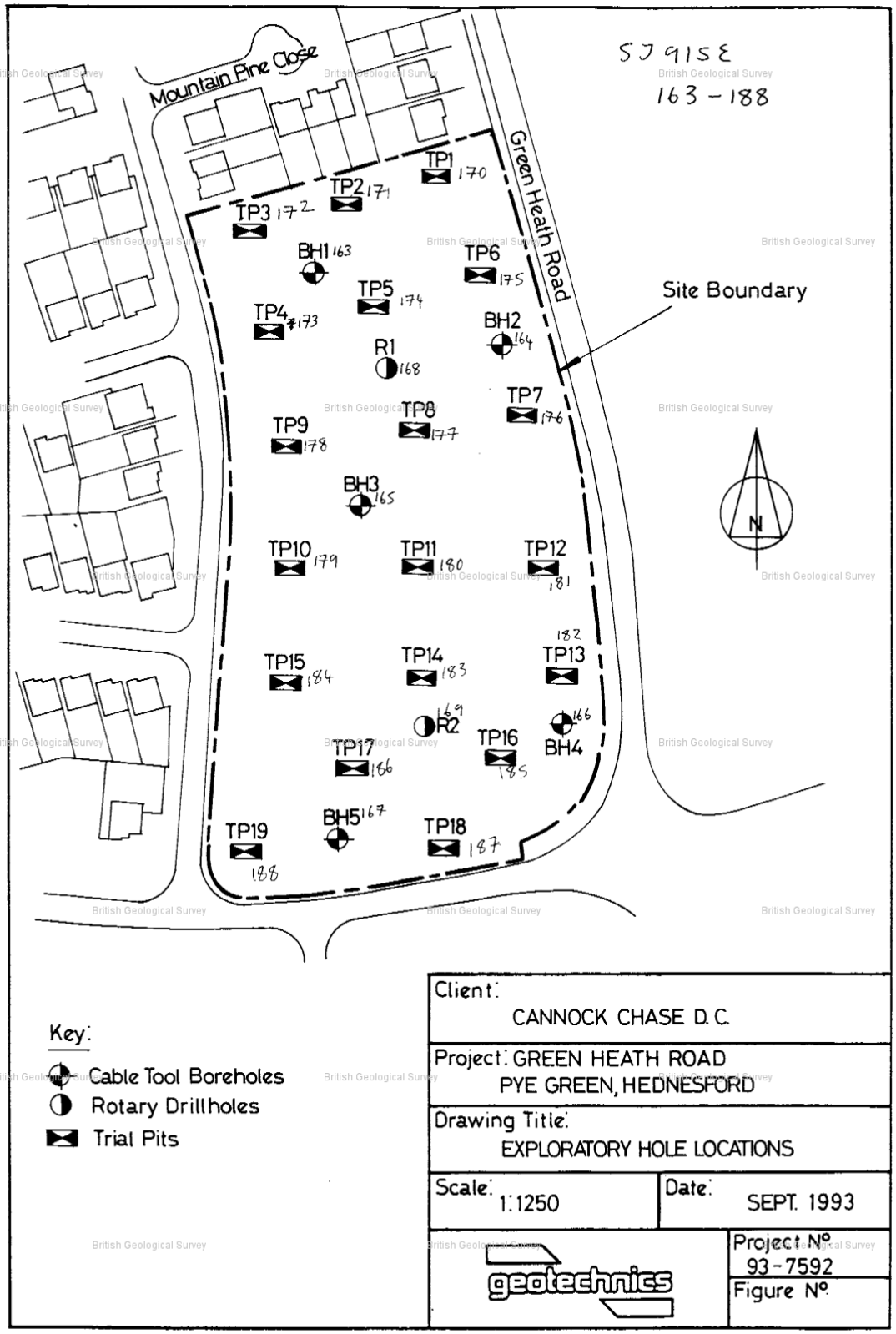
B.H. 1.

STRATA TEST LIMITED

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

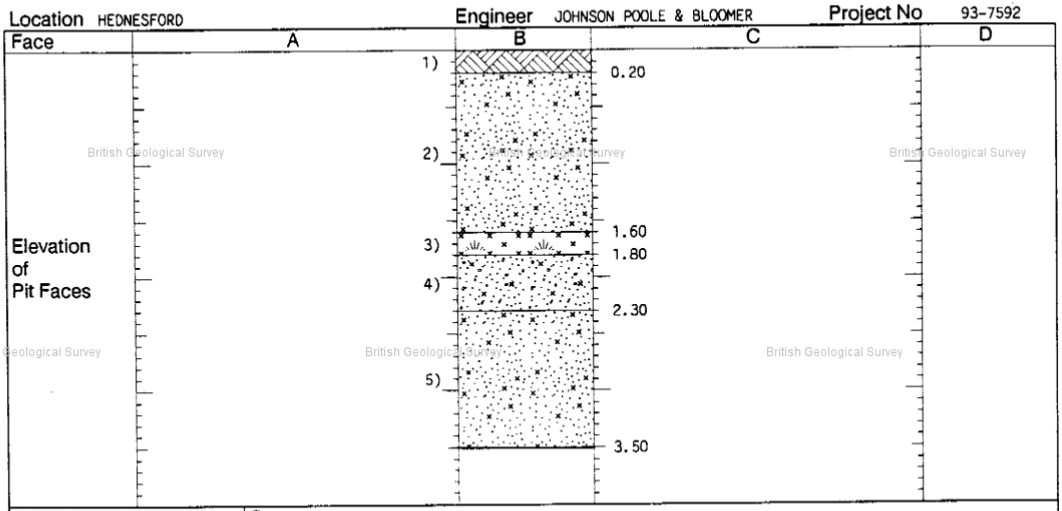
<< < Prev Page 1 of 2 Next > >>



TRIAL PIT RECORD

99/7 1359 SJ 91 SE 188

Project GREEN HEATH ROAD
Client CANNOCK CHASE DISTRICT COUNCIL
Trial Pit 19
Date 06/08/93
Location HEDNESFORD
Engineer JOHNSON POOLE & BLOOMER
Project No 93-7592



Samples and Tests			Strata	
Depth	Type	Strength kN/m²	Reference and Face B Depth	Description
			1) 0.20	Loose dark brown sandy SILT/TOPSOIL with some pockets of organic matter.
0.50 - 1.00 0.50 - 1.00	B J		2) 1.60	Medium dense orange silty fine to medium SAND with some fine gravel. Pockets of firm reddish brown CLAY below 0.50m.
			3) 1.80	Loose dark brown highly organic slightly clayey SILT.
2.00 2.00	B J		4) 2.30	Medium dense grey silty SAND with much fine to coarse gravel.
3.50 3.50	B J		5) 3.50	Medium dense to dense reddish brown slightly clayey silty SAND with fine to coarse gravel some organic material some pockets of grey and orange slightly clayey medium to coarse sand.

Plant	JCB 3CX
Shoring	None
Stability	Stable.
Groundwater	None.

Dimensions
B = 1.00
A
C = 2.90
D

Location Sketch Plan

Remarks

geotechnics

Logged by JT Symbols and abbreviations are explained on the accompanying key. All linear dimensions are in metres. Vert Scale 1:50

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

SJ 91 SE/20

SECTION OF West Cannock at No 4 Pit 9921.1295.

COUNTY Staffordshire

Communicated by J. Smethurst. Date of sinking

One-inch Map (N.S.) 154 Six-inch Map 57 NE

HEIGHT ABOVE O.D. 600 ft. DIP OF STRATA SJ 9921 1296

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Detailed in Mem. on 1" 154 p. 243

	Thickness. Yards.	feet	ins.	Depth from Surface. Yards.	feet	ins.
Coal	1	8		53	1	
Coal	2	4		82	3	
Brooch Coal	3	11		108	2	
Five Feet	5	3		226	9	
Four Feet	3	6		266	3	
Old Park (Main Heath	5	0		372	2	
Coal (Ragged Jack)	4	2		534	4	
Coal	1	4		552	1	
Coal	2	1		615	10	
Coal	2	3		625	1	
Yard	2	10		661	8	
Coal	1	3		674	11	
Bass	3	2		729	0	
Coal	2	2		737	0	
Cinder Coal	3	10		777	10	
Coal	1	4		803	10	
Shallow Coal	9	3		818	3	
Coal	2	2		845	10	
Deep Coal	4	4		901	9	

Coal 7 yds below Deep Coal.

17. 20m 2.00. A.&E.W.