

INTERIM VALIDATION REPORT

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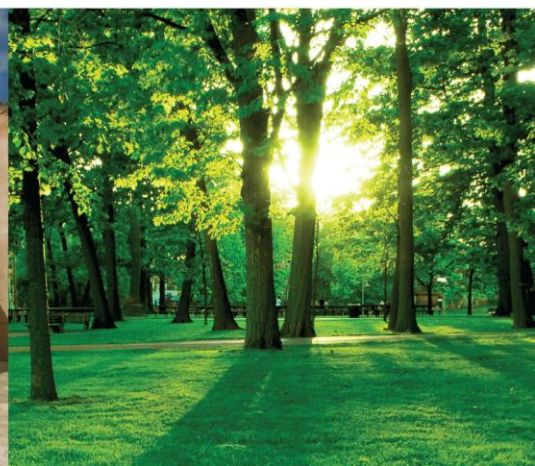
FORMER ROYD EDGE MILL,  
MELTHAM  
WEST YORKSHIRE

FOR

ROYD EDGE MILL DEVELOPMENTS LTD

REPORT REF: REMD 3537VAL

Engineering Geologists and Environmental Scientists



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APRIL 2024

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## QUALITY MANAGEMENT FOR SITE ASSESSMENT REPORT

Project	Royd Edge, Meltham	Interim Validation Report	
Client	Royd Edge Mill Developments Ltd		
Date	April 2024		
Version	Issue 1		
Prepared by	Frances A Bennett	BSc (Hons), CGeol, FGS, FIMMM, C.WEM, MCIWEM, CEnv, MIEEnvSci	Director Ashton Bennett Ltd
	Tristan Bennett	BSc (Hons)	Environmental Engineer



## 1. INTRODUCTION

### 1.1 The Report

Royd Edge Developments Ltd are developing residential housing with gardens and landscaped ground on land situated at the former Royd Edge Dyeworks, Meltham, West Yorkshire. This report describes the Interim Validation of the remediation undertaken on the site to make the site suitable for its proposed use. The report was commissioned in 2011 by the client and was carried out by the Ashton Bennett Consultancy.



A Phase I and Phase II Geoenvironmental Desk Study was undertaken on the site by this Consultancy in February 2007 and reported as Report No BGH 2575. A Phase II Geotechnical Ground Investigation was undertaken on the site by this Consultancy and reported to Brook Group Holdings Ltd as Report No BGH 2805 in November 2009 and a Remediation Statement was reported as Report No BGH 2754 in July 2010. The Remediation Statement presented as BGH 2754 described the remediation required on the site to render the site suitable for its proposed residential home use. An updated Remediation Statement was presented as REMD 3537Rem in 2024.

The remediation was undertaken in 2011 and initially reported to the client as Interim Validation Report BGH 2958 in April 2012. This report updates the initial 2012 Interim Validation Report by reassessing the final soil test results, following remediation, to updated LQM / CIEH 2015 guidelines for residential use with gardens.

This Interim Validation Report describes the remediation undertaken on the site, by removal of contamination, and validates that the site has been remediated of contamination to government guidelines in accordance with the Remediation Statement. Further remediation is required for installation of a radon membrane in house construction and for sealing of the gardens and landscaped ground. Once completed a Final Validation Report will be issued.

A Site Location Plan and a Site Plan are presented as Figure 1 and Figure 2. A Plan of Areas of Soil to be Remediated is presented as Figure 3. Photographs of the remediation are presented in Appendix A, environmental test results from remediation and environmental test results for validation at a MCERTS accredited laboratory are presented in Appendix B. Fuel Tank removal and waste slips for soil sent to landfill are presented in Appendix C.

## 1.2 Site Location

The site is accessed from the lane leading off Thick Hollins Road on the south side of Meltham in West Yorkshire. The centre of the site lies around National Grid Reference 410100E 409900N at a height of around 180m aOD.



**Figure 1 Site Location Plan**

## 1.3 The Author

This report was prepared by Frances A Bennett an engineering geologist who has a degree in Geology, a postgraduate qualification in Soil Mechanics and is a Chartered Geologist CGeol, Chartered Environmentalist CEnv and Chartered Water and Environmental Manager C.WEM and FIMMM with 45 years of experience in the fields of geology, geotechnical engineering, hydrogeology, contamination, mining, slope stability and waste disposal.

## 1.4 Sources of Information

The following data have been referenced in relation to compiling this Report:

1. Geological mapping from British Geological Survey 1:50,000,
2. Geological mapping from British Geological Survey 1:10,000
3. Karl Terzaghi, Ralph B Peck and Gholamreza Mesri, Soil Mechanics in Engineering Practice, John Wiley and Sons Inc., Third Edition (1996).
4. BS 5930:2015, Code of Practice for Ground Investigations, British Standards Institute
5. NHBC Part 4 Foundations, Chapter 4.4 Strip and Trench Fill Foundations,( 2010 and 2020).
6. Assessing Risks posed by hazardous ground gas to buildings, CIRIA C665, 2007.
7. Protecting Development from methane, CIRIA Report 149, CB Card, 1995.
8. Verification Requirements for Gas Protection Systems, YALPAG, Dec 2016.
9. BS8485: 2015+2019, Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
10. Verification Requirements for Cover Systems, YALPAC, October 2014.
11. The LQM / CIEH S4ULs for Human Health Risk Assessment, Land Quality Press, Nottingham, 2015.
12. Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, Report Ref. No. 10/WM/03/21.UKWIR. 2010.

The information for this report is also from sources recommended by the Institute of Civil Engineers (ICE), the Association of Geotechnical and Geoenvironmental Specialists (AGS), Construction Industry Research and Information Association (CIRIA) and the Department of the Environment Transport and the Regions (DETR). The report has been compiled in accordance with the latest ICE, DETR, Department of Environment, Food and Rural Affairs (DEFRA), British Standard Draft Documents and British Standards, CIRIA, CLR 11 & other CLEA Reports and Eurocode 7.

## 2. THE SITE

### 2.1 Site Description

The site comprises a former textile dyeworks and associated buildings situated on an area of land lying at the end of a lane leading to the west off Thick Hollins Road to the south of Meltham town centre in West Yorkshire. The site used to comprise empty single and two storey buildings of the former mill which ceased working around twenty years ago. The buildings have been demolished and the site now lies as open land.

The site is bounded to the north by open land and Hebble Lane at a higher ground level. To the east the site is bounded by open land a housing area known as Calmlands, Thick Hollins Clough and Thick Hollins Lane. To the west the site is bounded by open land and woodland

within the Royd Edge Clough valley. To the south the site is bounded by open land, houses and Royd Road.

## 2.2 Site Proposals

The proposals are to develop the site with 30 residential houses with gardens, landscaped ground and access roads as shown in Figure 2. The mill pond will be retained together with the culvert taking excess water from the mill pond and beneath the roadway to Royd Edge Clough along the south boundary of the site.

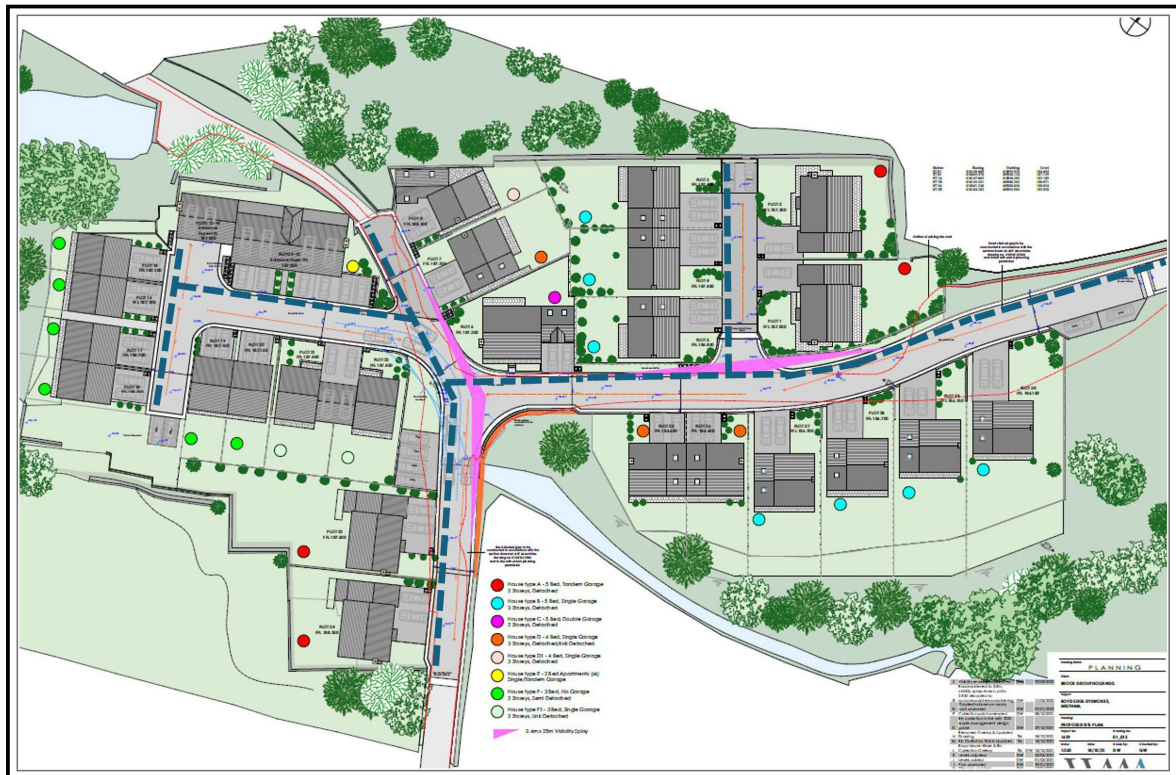


Figure 2 Site Plan

## 3. REMEDIATION OBJECTIVE

The objective of the remediation is to ensure that all material identified as being contaminated to a level above government guidelines for future use of the site for residential houses with gardens, landscaped ground and hard covered car parking is removed from site or is secured beneath the area of hard cover or sealed so that it cannot detrimentally affect sensitive receptors. The objective is to ensure that the contamination detected, and any undetected contamination is unlikely to detrimentally affect or cause harm to sensitive receptors, humans or the environment in the future by direct or indirect measures by removal of migration paths to sensitive receptors.

The object of the Interim Validation Report is to confirm that the Remediation has been undertaken in accordance with the Remediation Statement as far as can be determined from site visits, soil test results and information obtained from the client. The Final Validation Report will be compiled following completion of the houses and placing of the topsoil in gardens and landscaped areas.

## **4. RESULTS OF PHASE II and PHASE III GROUND INVESTIGATIONS**

### **4.1 Ground Investigations**

An initial Phase II ground Investigation was undertaken on the site in September 2006 comprising 41 boreholes and soil, groundwater and surface water testing for contamination and gas monitoring. A further Phase II ground Investigation was undertaken in March 2009 with 25 boreholes and soil testing to design remediation. In October 2009 a third Ground Investigation was undertaken for geotechnical design with two boreholes sunk in areas of deep made ground to check the depth of the made ground and to sample soils for further environmental testing.

### **4.2 Ground Conditions**

The ground conditions encountered were similar across the site of made ground underlain by clay and overlying bedrock comprising sandstone and mudstone. The boreholes drilled around the mill pond area in the north west of the site encountered soft clays overlying the bedrock.

The made ground extended from depths of around 1.00m bgl to 3.00m bgl in the western area of the site and deepening up to a maximum of 8.30m bgl in the southern part of the site immediately north of Royd Edge Clough. The made ground was usually underlain by firm clay representing weathered mudstone overlying weak mudstone encountered from depths as shallow as 0.135m bgl to 8.30m bgl. The made ground mostly comprised loose ash and clinker with gravel of sandstone and sand and reworked clay. The underlying clay was brown to grey and generally of firm consistency becoming stiff with depth and represented weathered mudstone. In the southern part of the site between the access road and Royd Edge Clough the made ground and/or clay was underlain by weak sandstone.

Boreholes drilled in the northwest of the site around the mill pond encountered 200mm of top soil underlain by loosely compacted sand and a thick layer of very soft to soft wet clay that extended to depths of up to 7.10mbgl and underlain by mudstone.

Boreholes drilled in the south west encountered bedrock at shallow depth, boreholes between the mill pond and Royd Edge Clough encountered bedrock at generally 1.00m to 3.00m bgl and boreholes drilled in the south of the site between the access road and Royd Edge Clough encountered bedrock at depths of 3.00m to over 8.00m bgl.

### **4.3 Surface and Groundwater Conditions**

Groundwater was encountered as dampness in several of the boreholes and the majority were dry. Monitoring in standpipes gave groundwater levels of 2.0m to 3.0m bgl and it is possible that these may be higher during and after heavy rainfall.

All groundwater samples, and surface water samples from upstream and downstream in the Royd Clough were found to be uncontaminated.

### **4.4 Gas Conditions**

Monitoring for toxic gases and calculations of percentage methane and carbon dioxide and level of flow according to CIRIA C665 and BS8485:2016 indicated that a methane/carbon dioxide membrane is not required for residential development. A radon barrier is required in construction of every house.

#### 4.5 Contamination Conditions

Contamination was assessed against ATRISK 2009 guidelines as they were the relevant guidelines when the site investigations were completed.

The site where tested was found to be free of phytotoxic compounds. The site was found to be contaminated by arsenic, chromium, and lead. Arsenic exceeded guideline levels in WSP at 0.80m, WSR at 1.5m, WSS at 0.5m, WST at 0.50m and WSU at 0.50m which are all situated in the eastern area of the site around the concrete pad where a building was demolished, arsenic guideline levels were also exceeded in WSB at 0.50m in the south west part of the site. Chromium exceeded guideline levels in WSB at 0.50m, WSC at 0.20m and WSK at 0.50m in the south west of the site area, WSH at 0.80m and WSJ at 0.50m immediately north of the Clough, WSN at 0.80m and 1.80m in the north of the site, and WSP at 0.80m, WSR at 1.50m, WSS at 0.50m, WST at 0.50m and WSU at 0.50m, to the east of the site and in BH1 and BH2 in the south of the site. Lead exceeds guideline values in WSS at 0.50m, WST at 0.50m and WSU at 0.50m in the east of the site.

The soil samples tested were found to be uncontaminated by cadmium, copper, mercury, nickel, selenium and zinc. No asbestos fibres were encountered in the soil samples tested. Levels of several polyaromatic hydrocarbons were elevated in soil samples including in the proposed landscaped ground to the north of plots 29 and 30 due to former fuel tanks in the area of these plots, and it was also detected in the area of the fuel tanks east of plot 18 and west of plots 15 and 16.

The test results confirmed the extent of remediation required. The results confirmed that the contamination by arsenic, cadmium, chromium, sulphide and lead is present in the western and southern areas of the site at depths from ground level to >1.50m bgl. The levels of PAHs were confirmed in the proposed landscaped area north of plots 29 and 30, probably due to the former presence of fuel tanks and possibly the area where waste from the mill chimney was deposited in the past.

The levels of hydrocarbons were only exceeded in the sample collected from waste within the fuel tank bunding which has been removed from site. Sulphate is not harmful to humans, it determines the type of cement to be used in underground concrete.

**TABLE 1**  
**Contamination Detected in Soils in Phase II Ground Investigation**

No of BHs	Borehole Nos	Contaminant	Level in mg/kg	ATRISK in mg/kg 2009
8	4, 5, 7, 11, 11, 12, 39, 40	Arsenic	38 to 574	32
1	36	Cadmium	15.50	10
3	12, 12, 31	Chromium	4885 (0.20m) 371.3(2.00m)	14.70 (Chromium VI) 910 (Chromium)
5	7, 12, 16, 36, 40	Lead	170 to 585 (0.20m)	168
2	1, 3	Sulphide	602 to 1901	250
6	1, 10, 11, 12, 19, 40	Sulphate	2717 to 7760	>2400mg/l
6	1, 3, 5, 7, 11, 36	PAHs	40 to 6468	Individual PAHs



**TABLE 2**  
**Contamination Detected in Soils in Phase III Ground Investigation**

Compound	No of Samples	Min value mg/kg	Max value mg/kg	Guideline residential with plant uptake	Samples exceeding ATRISK 2009 guidelines
<i>Phytotoxic</i>					
Copper	18	<3.2	256.5	4020	None
Nickel	18	<2.7	56.40	130	None
Zinc	18	<19.70	341.70	17200	None
<i>Metals</i>					
Arsenic	18	2.00	117.20	32.0	WSB, P, R, S, T, U
Cadmium	18	<0.10	0.93	10	None
Chromium	18	<3.20	73.30	14.7 (Cr VI)	WSB, C, H, J, K, N, P, R, S, T, U, BH1, BH2
Chromium VI	2	<0.10	<0.10	14.7	None
Lead	18	<3.80	1570	168	WSS, T, U, BH2
Mercury	18	<0.10	0.13	1	None
Selenium	18	<0.50	4.90	350	None
<i>Organics</i>					
PAH speciated	20	<1.55	4469	See Table 5 Report BGH 2754	WSE, WSG, WSL, WSM, WST
Phenol	2	<0.60	<0.70	1930	None
TPH speciated	8	See text	See text	See text in Report BGH 2754	None
TPH total	2	338	371	500	None
PCB	2	<0.005	<0.0052	1	None
<i>Others</i>					
Sulphate	9	39	1300	2400*	None
Sulphide	3	<0.50	15.70	250	None
pH	8	5.7	10.9	5-11	None
Asbestos	2	NBFO	NBFO	NBFO	None

\* BRE Special Digest

NBFO = No Bulk Fibres Found

## 5. REMEDIATION STRATEGY

### 5.1 Objectives

The objective of the Remediation Strategy was to ensure, according to the 1990 Environment Act the condition of the land is unlikely to cause pollution to the environment or harm to human health and controlled waters. The objective of the Remediation Strategy was to ensure an environmentally safe site for the construction and future use of the residential development. The objectives include:

1. earthworks required to achieve the necessary ground levels for development.
2. remediation of the hydrocarbon contaminated ground in the gardens and landscaped areas.



3. remediation of the arsenic, chromium and lead in garden and landscaped areas.
4. removal of the fuel tank and associated hydrocarbons.
5. sealing other areas of the site beneath hard cover.
6. sealing contamination beneath hard cover.
7. rendering environmentally safe all garden and landscaped and open areas.
8. Import of tested as uncontaminated subsoil/topsoil for gardens and landscaped areas.
9. Use of a radon resistant membrane in the construction of the houses.
10. Supervision of all work by a suitably qualified Environmental Scientist.
11. Validation of Remediation to confirm the remediation is undertaken in accordance with the Remediation Strategy and in accordance with legislation.

## 5.2 Strategy

Based on the results of the ground investigation there were four areas that require remediation in the west of the site. These include gardens associated with houses 23 and 24, (Area 1) landscaped area east of house 18, (Area 2) landscaped areas west of houses 14, 15 and 16 (Area 3) and the landscaped area north of plots 29 and 30 (Area 4). Arsenic, chromium, lead and hydrocarbons were encountered in these areas and required further investigation and removal to landfill, the areas of soil removed being determined by insitu testing during groundworks.

Removal of the fuel tank by a company licensed to undertake tank removal.

Remediation will also comprise the installation of radon resistant membranes, sealing of any other contaminated material encountered beneath hard cover and the sealing of gardens and landscaped areas with 600mm of tested as uncontaminated subsoil and topsoil on completion of the development.

All material that needs to be taken off site for whatever purpose will be transported by a licensed carrier to a landfill licensed to accept contaminated waste as tested for waste acceptance criteria disposal.

If any material is excavated by the Contractor that has an unusual odour/nature, then Ashton Bennett Consultancy will be notified by the site, samples will be collected for environmental testing and any necessary new remediation strategy reported to the Planning Services. In addition, Kirklees Council will be notified in writing immediately, should any unexpected contamination be encountered at any stage of the development process. Revision to the Remediation Statement will be submitted to and approved in writing by the Local Planning Authority and works will thereafter be carried out in accordance with the approved revised Remediation Statement.

## 6. REMEDIATION

### 6.1 General

The remediation methodology comprised the excavation and removal of material determined as contaminated in the western area of the site and in situ testing and selective testing of the exposed walls and floors of the excavations to ensure all contaminated material was removed.

Remediation included the removal of the overground fuel tank. Further remediation will include the sealing of all other areas of the site by hard cover or by a geotextile and 600mm of subsoil/topsoil in gardens and in landscaped areas. There is also a requirement for a radon resistant membrane for construction of the houses. There was no other remedial, protective or other works required due to contamination.

There were no requirements for consents, agreements, licences, discharge licences, waste management licences on the site other than described in the Remediation Statement.

There were no specific Health and Safety requirements for dealing with any detected contamination on the site other than protective clothing and gloves for handling soil.

There were no special necessary requirements to control dust, noise, odours associated with the remediation. There was no requirement for control of water run off associated with remediation. There was no requirement for any remediation of groundwater or surface water.

There were no observations during the ground works of any soil remaining in the ground with an unusual odour, colour or appearance that would suggest it was contaminated.

Removal of material excavated was undertaken by Brooks Group Holdings Ltd and their subcontractors and the transport of material was undertaken by a local haulier licensed by the local authority to transport contaminated waste. All laboratory testing for validation was carried out by a NAMAS MCERTS accredited laboratory. All excavated material was taken to a landfill licensed to accept the nature of the contaminated material excavated.

Further remediation will be undertaken by installation of radon barriers in construction of houses and by sealing of the gardens and landscaped areas with laying 600mm of imported tested as uncontaminated subsoil and topsoil. Test results for topsoil will be presented in the Final Validation Report and will lie within the guidelines values for environmental assessment for use of the site for residential with plant uptake in accordance with LQM / CIEH.

Photographs of the remediation are presented in Appendix A.

## 6.2 Detailed

Contamination was detected in the Phase II Ground Investigation and was further delineated in depth and extent by the Phase III Ground Investigation. Contamination generally comprised arsenic and sulphide from waste ash, chromium from dyes, polyaromatic hydrocarbons and lead from fuel and dyes, and sulphate.

Remediation was undertaken as follows:

- 1 Area 1 - excavating and removing to landfill the arsenic, lead and chromium contamination to 1.00m bgl in the western area of the site adjacent to the Clough and Plots 23 and 24. Area 90m<sup>2</sup> x 0.75m depth average = 72.5m<sup>3</sup>. To be replaced with hard cover or geotextile and 600mm of uncontaminated sub/topsoil.
- 2 Area 2 - excavating and removing area of PAH contamination east of Plot 18 to 0.50m. Area 75m<sup>2</sup> x 0.50m depth = 37.5m<sup>3</sup>. To be replaced with hard cover or geotextile and 600mm of uncontaminated topsoil
- 3 Area 3 - excavating and removing area between track and plots 14, 15 and 16. Area 120m<sup>2</sup> x 0.50m depth = 60m<sup>3</sup>. To be replaced with hard cover or geotextile and 600mm of uncontaminated sub/topsoil
- 4 Area 4 - excavating the area of proposed landscaped ground immediately south of Royd Edge Clough west of access road and removing hot spots of chromium and hydrocarbon contaminated ground. To be sealed with geotextile and 600mm of uncontaminated topsoil.
- 5 Ensuring any other hot spots of contamination will lie beneath hard cover.
- 6 Ensuring all other created landscaped areas will be sealed beneath a cover of a minimum of 600mm of topsoil.
- 7 Ensuring that the majority of the site, especially where hard covered for paving, is non permeable to prevent leaching to groundwater and surface water.



- 8 Ensuring all garden areas for plots will be covered in a geotextile and a minimum of 600mm of tested as uncontaminated imported topsoil.
- 9 Ensuring any excavated material for foundations is tested before reuse on the site.
- 10 Ensuring radon protection as appropriate is used to protect the house occupants.
- 11 All hard standing on areas of actual or potential contamination should be non permeable.
- 12 Ensuring the Royd Clough is protected prior to any earthwork adjacent to the watercourse and undertake testing to ensure potential contamination does not leach into the watercourse.
- 13 Use of water supply pipes that are resistant to hydrocarbons, PE-AL-PE type.

The remediation is detailed on Table 3 and graphically presented on Figure 3.

During excavation work there will be periodic visits by the environmental engineer to assess the potential for any additional contamination and to, if necessary, design remediation or mitigating measures. The Contractors will be required to call in the environmental engineer if any material of a strange colour or odour is encountered during development. Such material will be tested at the discretion of the environmental engineer and appropriate remediation/mitigation undertaken. Kirklees Council will be informed of any additional or alternative remediation strategy.

## **7. VALIDATION**

### **7.1 Remediation Undertaken**

The remediation was validated by site supervision, site visits and laboratory testing.

The four areas designated for removal of material to landfill around the west of the site were excavated in October 2011.

The elevated levels of chromium and lead in the area of the former dyehouse, Area 1, which is proposed landscaped ground and gardens, was remediated by removal of 1.0m of material close to the river, to landfill, reducing to 0.50m bgl close to the rear of the proposed houses. plots 23 and 24. Where this area will be used as gardens the area should be sealed with a geotextile and covered with a minimum of 600mm of subsoil and topsoil. The topsoil should be tested to be suitable for purpose and uncontaminated in accordance with up to date government guidelines for residential use of the site with gardens. The subsoil and topsoil should be tested before it is purchased and within the gardens once laid.

Areas 2 and 3, either side of the access road leading to the mill pond, were investigated by borehole 17, 18, 19 and S and by boreholes 7, N and NN. These areas were over excavated to remove 0.50m depth of soil to landfill and will be replaced with a geotextile and 600mm of topsoil.

The area of the demolished building north of the fuel tanks, Area 4, where WS1, WS2 and WS3 were sunk, was further investigated by boreholes WSE, WSG, WSL and WSM following removal of the fuel tank, and levels of PAHs and chromium were detected across the area. This area will be designated as landscaped ground and 0.50m of soil was removed to landfill over the area and the surface rechecked for contamination. As landscaped ground this area will have at least 600mm of suitable uncontaminated subsoil / topsoil placed on completion of the development.

The area where the fuel tanks were situated was investigated by Boreholes WSC and WSD which detected arsenic and chromium and it is recommended that this area is hard covered by the proposed houses 29 and 30 and the landscaped and garden areas are sealed with a geotextile and clean uncontaminated subsoil and topsoil of 600mm in thickness.

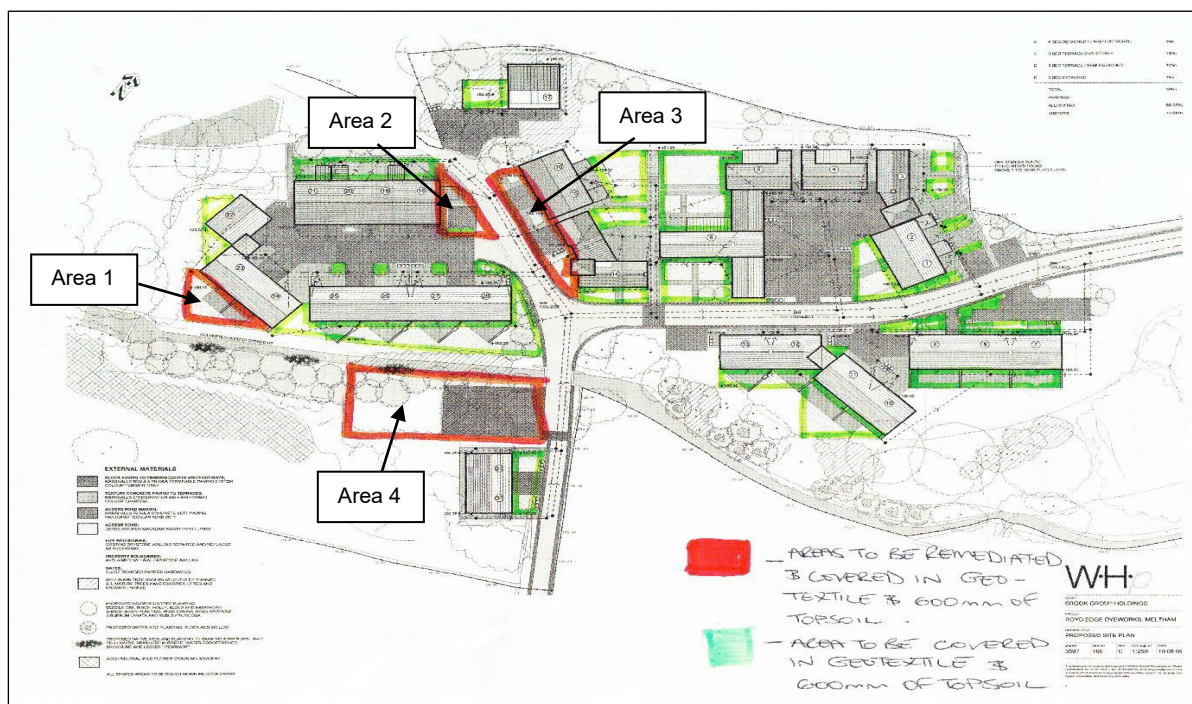
In the area of the deep made ground to the south of Royd Edge Road, it is not practical to remove all the contaminated material to 8.0m bgl. Further investigation in this area by Boreholes WSO, WSP, WSQ, WSR, WSS indicated contamination in the form of arsenic and chromium is widespread due to the waste ash and clinker. Where hard cover is not present, it is recommended that a geotextile is used with 600mm of soil in garden and in landscaped areas.

All landscaped areas that may be used by children should be covered in a geotextile and 600mm of subsoil/topsoil tested as uncontaminated according to government guidelines.

The contamination detected could detrimentally affect sensitive receptors on or off the site if mitigating measures and remediation are not undertaken. Contamination could potentially affect future occupants of houses, workmen and visitors by ingestion, skin contact and inhalation and could potentially detrimentally affect perched groundwater in the made ground and surface water in Royd Edge Clough. It is unlikely and a low risk that the contamination detected will detrimentally affect humans or the environment outside the site. Based on the levels of contamination detected there is a risk of harm to humans and to the watercourse and the remediation is aimed at reducing this risk by removing the hotspots of contamination and by sealing the made ground remaining from sensitive receptors by hard cover or by a geotextile and 600mm of uncontaminated soil.

The groundwater within the sandstone aquifer at depth is protected by a cover of relatively impermeable mudstone. The perched groundwater is only present after heavy rainfall and will in the future drain into the constructed drainage system and discharge to sewer. The watercourse is not at present receiving contamination based on test results and will be protected during construction and in the future from run off or leachate.

Table 3 below details the remediation and mitigating measures required for each house plot based on the testing undertaken.



**Figure 3 Plan of Areas of Soil Remediated**

The drawing in Figure 3 presented in the Remediation Plan and dated 10<sup>th</sup> August 2009 indicates areas for hard standing for houses and areas of access roads which are areas requiring no remediation as they will be hard covered preventing any contamination from detrimentally affecting sensitive receptors. Any excavation work in the future to extend houses or construct garages is unlikely to cause health concerns based on the level and spread of contamination detected.

Any areas annotated to be covered by concrete sett paving should be underlain by a geotextile in areas of actual or potential contamination. In the area to the north of the access road between plot numbers 1 to 6 inclusive and in front of plot 17 it is unlikely that contamination will be present, and this should be checked following excavation to determine whether or not a geotextile is required.

All other garden and landscaped areas should be protected by a geotextile and 600mm of uncontaminated subsoil / topsoil tested to conform with up to date government guidelines for residential use with plant uptake.

**TABLE 3  
Contamination Detected and Remediation for House Plots**

Plot No	Boreholes in area	Contamination Detected	Remediation Proposed
1	24, 37	none	Check garden areas-clean 600mm topsoil
2	24, 37	none	Check garden areas-clean 600mm topsoil
3	25	Not tested	Requires Testing in garden areas
4	26	Not tested	Requires Testing in garden areas
5	27	Not tested	Requires Testing in garden areas
6	21, 22	arsenic	Sealing garden with geotextile and 600mm clean topsoil
7	36, T, U,	cadmium, arsenic, chromium, lead, PAH	Sealing garden with geotextile and 600mm clean topsoil



8	8, S	arsenic, chromium, lead	Sealing garden with geotextile and 600mm clean topsoil
9	S	arsenic, chromium, lead	Sealing garden with geotextile and 600mm clean topsoil
10	BH1, BH2, 9	arsenic, chromium, lead	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas
11	BH1, 10, R	arsenic, chromium, sulphate	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas
12	11, R	arsenic, chromium, sulphate, PAH	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas
13	11, 40, 41	arsenic, lead, sulphide, sulphate, PAH	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas
14,15,16	7, 28	arsenic, lead, PAH	Remove PAH to landfill. (Area 125m <sup>2</sup> x 0.50m = 62.5m <sup>3</sup> ) and seal gardens with geotextile and 600mm topsoil
17		Not tested	Requires testing in garden area
18	17, 18, 19, S	arsenic, chromium, lead, sulphate	Check PAHs east of Plot 18. Landfill area 60m <sup>2</sup> x 0.50m = 30m <sup>3</sup> . Geotextile and clean topsoil for all gardens and landscaped ground
19	20	none	Geotextile and clean topsoil in garden areas
20	15	none	Geotextile and clean topsoil in garden areas
21	15	none	Geotextile and clean topsoil in garden areas
22	14	none	Geotextile and clean topsoil in garden areas
23	12, H	arsenic, chromium, lead, sulphate	Remove chromium to landfill, Area 90m <sup>3</sup> . and seal gardens with geotextile and clean topsoil
24	13, I, J	chromium	Remove chromium to landfill, Area 90m <sup>3</sup> . and seal gardens with geotextile and clean topsoil
25	13	none	Geotextile and clean topsoil in garden areas
26	J	chromium	Geotextile and clean topsoil in garden areas
27	J	chromium	Geotextile and clean topsoil in garden areas
28	J, 40	arsenic, chromium, lead, sulphate	Geotextile and clean topsoil in garden areas
29	D	none	Geotextile and clean topsoil in garden areas
30	C, 4	arsenic, chromium	Geotextile and clean topsoil in garden areas
Landscaped area SW area	1, 2, 3, 15, 16, E, F, G, K, L	Arsenic, chromium, sulphide, lead, PAH	Excavate hot spots and landfill 262.5m <sup>3</sup> , lay geotextile and 300mm of uncontaminated topsoil.

## 7.2 Validation of Contaminated Soil Remediation

### 7.2.1 General

The remediation of the contaminated soils in gardens and landscaped areas was undertaken according to the Remediation Statement and was supervised by regular visits from Ashton Bennett Ltd.

Following all excavation work in four areas of the site, soil samples were collected from the side walls, north, south, west and east walls and two samples were collected from the excavation floors to test the soils to ascertain if all the detected contamination had been removed.

Tests were undertaken on the soil samples as shown in Table 4. Results are presented in Tables 5 to 20 and are presented in full in Appendix B.



TABLE 4  
Testing Undertaken for Validation

Area of Remediation		Samples tested for arsenic, chromium lead	Samples tested for arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc	Samples tested for speciated PAHs	Samples tested for speciated TPHs
1	West of houses 23/24	4	3	3	3
4	North of houses 29/30	6	3	9	3
2	East of house 18	0	6	6	6
3	West of houses 14/15/16	0	3	3	3

This Consultancy attended site on October 11<sup>th</sup> 2011 and subsequent days as necessary to collect soil samples. This Consultancy attended on an appropriate number of other occasions to check the nature of material exposed on the site and to validate the remediation including remediating hydrocarbons and the collection of samples from site. The planning of work, consents, agreements and licences and site management was undertaken by the client.

### 7.2.2 Standards for Assessing Environmental Test Results

There are no definitive legal standards for contaminated land in the United Kingdom, although the Government Department of the Environment in the late 1970's published guidance on a restricted number of contaminants. Further guidance was published in March 2002 as the Contaminated Land Exposure Assessment (CLEA) by the Department of Environment, Food and Rural Affairs (DEFRA). These were withdrawn in August 2008 and new guidelines for some compounds were released in 2009. The UK Risk Assessment Framework is based on a tiered approach, Tier 1 being a risk screening or qualitative risk assessment, Tier 2 is a generic quantitative risk assessment and Tier 3 is a detailed quantitative risk assessment. Where the Tier 2 identifies a potentially unacceptable risk to human health either a Tier 3 Detailed Quantitative Risk Assessment (DQRA) is undertaken or risk management action recommended to remove the pathway and the risk.

For this site both a Tier 1 and Tier 2 assessment have been undertaken using generic assessment criteria and site specific assessment criteria based on CLEA 2009 and ATRISK 2017 which are based on the new CLEA guidance 2008 and 2009 (SC050021/SR3 (the CLEA Report) and SC050021/SR2 (the TOX report), SC050021/SR4, CLEA Software version 1.071 (2015) and toxicological reports and SGV technical notes (2009)). The figures used for assessment of lead are from DEFRA(2014b), Category 4 Screening Levels, which are based on the 'low level of toxicological concern (LLTC)'. C4SLs are 'estimates of contamination concentration in soil that present acceptable risk within the context of Part 2A'. In addition, assessment has used the LQM/CIEH S4ULs (2015) for Human Health Risk Assessment. The S4ULs are based on the principles of 'minimal' or 'tolerable' risk enshrined

in SR2 (EA2009A), which has not been withdrawn and are based on the EA software. The guidance set out in these documents has been used to establish a conceptual model of the risks on the site.

The site will be used for residential houses and gardens. The risk assessment has used a scenario of residential use as the model for assessment. In deriving the SSVs a child has been chosen as the critical receptor with exposure over a lifetime being the most appropriate and conservative scenario.

The assessment of the risks to users on the site has been undertaken within the framework set out in guidance published by DEFRA and the Environment Agency for the assessment of risks to human health associated with chronic long term exposure to contaminated soils. The guidance set out in this documentation has been used to establish a conceptual model of the risks on the site following redevelopment. The Contaminated Land Exposure Assessment (CLEA) model provides a means of establishing concentrations of contamination in soils at a site. If results exceed these concentrations then further assessment or intervention by mitigation or remediation may be required to reduce risks to human health.

ATRISK only present guidelines for 8 PAHs as they consider there is insufficient toxicological information to present guidelines for the other 8 USEPA genotoxic PAHs. LQM/CEIH reiterate lack of knowledge, but have provided guidelines for all 16 USEPA PAHs.

For the purposes of this report, the LQM / CIEH guideless 2015 have been used for assessment following remediation.

### 7.3 Environmental Test Results

**TABLE 5**  
**Results of PAH Tests on Remediated Area 1 (Houses 23 and 24)**

Polyaromatic Hydrocarbon Compounds In mg/kg	Levels of Polyaromatic Hydrocarbons In mg/kg							LQM/CIEH Guideline Residential with plant uptake mg/kg
	23A	23B	23C	S1	S2	S3	S4	
Naphthalene	<0.1	<0.1	<0.1	-	-	-	-	13
Acenaphthene	<0.1	<0.1	<0.1	-	-	-	-	1100
Acenaphthylene	<0.1	<0.1	<0.1	-	-	-	-	920
Fluorene	<0.1	<0.1	<0.1	-	-	-	-	860
Phenanthrene	<0.1	<0.1	<0.1	-	-	-	-	440
Anthracene	<0.1	<0.1	<0.1	-	-	-	-	11,000
Fluoranthene	<0.1	<0.1	0.1	-	-	-	-	890
Pyrene	<0.1	<0.1	<0.1	-	-	-	-	2000
Benzo(a)anthracene	<0.1	<0.1	<0.1	-	-	-	-	13
Chrysene	<0.1	<0.1	<0.1	-	-	-	-	27
Benzo(b)fluoranthene	<0.1	<0.1	<0.1	-	-	-	-	3.7
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	-	-	-	-	100
Benzo(a)pyrene	<0.1	<0.1	<0.1	-	-	-	-	4.95
Indeno (1,2,3,cd)pyrene	<0.1	<0.1	<0.1	-	-	-	-	41
Dibenzo(ah)anthracene	<0.1	<0.1	<0.1	-	-	-	-	0.3
Benzo(ghi)perylene	<0.1	<0.1	<0.1	-	-	-	-	350
<b>TOTAL PAH</b>	<b>&lt;0.1</b>	<b>&lt;0.1</b>	<b>0.1</b>	-	-	-	-	

**TABLE 6**  
**Results of TPH Fraction Tests on Remediated Area 1**

TPH Fraction	Test Results in mg/kg							LQM / CIEH Guideline Residential with plant uptake mg/kg
	23A	23B	23C	S1	S2	S3	S4	
<b>Aliphatics</b>								
>C8-C10	<0.01	<0.01	<0.01	-	-	-	-	150
>C10-C12	<1	<1	<1	-	-	-	-	760
>C12-C16	<1	<1	<1	-	-	-	-	4300
>C16-C35	4	<1	<1	-	-	-	-	110,000
>C35-C40	<1	<1	<1	-	-	-	-	110,000
<b>Aromatics</b>								
>C8-C10	<0.01	<0.01	<0.01	-	-	-	-	190
>C10-C12	<1	<1	<1	-	-	-	-	380
>C12-C16	<1	<1	<1	-	-	-	-	660
>C16-C21	<1	<1	<1	-	-	-	-	930
>C21-C35	<1	<1	1	-	-	-	-	1700
>C35-C40	<1	<1	<1	-	-	-	-	1700

The soil remaining around and beneath the remediated Area 1 was uncontaminated by speciated PAHs and Total Petroleum Hydrocarbons.

**TABLE 7**  
**Results of Gasoline Range Organics Tests on Remediated Area 1**

Gasoline Range Organics	Test Results in mg/kg							LQM / CIEH Guideline Residential with plant uptake mg/kg
	23A	23B	23C	S1	S2	S3	S4	
<b>BTEX</b>								
Benzene	<1	<1	<1	-	-	-	-	0.37
Toluene	<1	<1	<1	-	-	-	-	660
Ethyl benzene	<1	<1	<1	-	-	-	-	260
Xylene	<1	<1	<1	-	-	-	-	310-330
<b>Aromatics</b>								
C5-C7	<0.01	<0.01	<0.01	-	-	-	-	300
>C7-C8	<0.01	<0.01	<0.01	-	-	-	-	660
<b>Aliphatics</b>								
C5-C6	<0.01	<0.01	<0.01	-	-	-	-	160
>C6-C8	<0.01	<0.01	<0.01	-	-	-	-	530
<b>Total GRO</b>								
C5-C10	<0.01	<0.01	<0.01	-	-	-	-	



The soil remaining around and beneath the initial remediated area was uncontaminated by the gasoline range of Total Petroleum Hydrocarbons. It was not considered therefore necessary to test for hydrocarbons following the second excavation to remove chromium contamination.

**TABLE 8**  
**Results of Heavy Metal Tests on Remediated Area 1**

Metals	Test Results in mg/kg							LQM / CIEH Guideline Residential with plant uptake mg/kg
	23A	23B	23C	S1	S2	S3	S4	
Arsenic	21	14	16	16	7	13	19	37
Cadmium	<1	<1	<1	-	-	-	-	22
Chromium	2000	420	590	-	-	-	-	910
Chromium VI	-	-	-	<1	<1	<1	<1	20.5
Copper	45	90	250	-	-	-	-	2400
Lead	55	54	170	-	-	-	-	200
Mercury	<1	<1	<1	-	-	-	-	52.2
Nickel	28	16	32	-	-	-	-	180
Zinc	160	57	140	-	-	-	-	3700
pH	-	-	-	7.8	7.2	7.7	7.2	5 to 9

Levels of arsenic, cadmium, copper, lead, mercury, nickel and zinc were within the LQM / CIEH guidelines for residential use of the site. Elevated levels of chromium were detected in the sample 23A, during testing in Oct 2011 and therefore a further 0.50m of soil was removed and the area was retested for chromium VI as samples S1, S2, S3 and S4. Results indicated that the chromium VI had been remediated by the extra material taken to landfill.

**TABLE 9**  
**Results of PAH Tests on Remediated Area 2 (North of Houses 29 and 30)**

Polyaromatic Hydrocarbon Compounds In mg/kg	Levels of Polyaromatic Hydrocarbons In mg/kg									LQM / CIEH Guideline Residential with plant uptake mg/kg
	R1	R2	R3	R4	R5	R6	1/2A	1/2B	1/2C	
Naphthalene	0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	1.4	0.4	13
Acenaphthene	0.1	<0.1	0.1	<0.1	0.2	<0.1	<0.1	1.2	<0.1	1100
Acenaphthylene	0.3	0.8	0.5	<0.1	4.9	<0.1	0.9	32	1.9	920



Fluorene	0.3	1.0	0.5	<0.1	4.9	<0.1	1.2	43	2.3	860
Phenanthrene	3.6	14	11	1.1	42	0.4	11	240	13	440
Anthracene	1.2	7.1	5.6	0.4	17	0.3	4.8	86	4.4	11000
Fluoranthene	5.2	23	25	1.4	38	1.0	12	180	8.8	890
Pyrene	4.4	18	20	1.2	29	0.8	10	160	6.9	2000
Benzo(a)anthracene	1.8	6.8	5.8	0.4	8.1	0.4	4.4	73	2.8	13
Chrysene	1.5	5.5	5.9	0.4	7.6	0.4	4.4	72	2.8	27
Benzo(b)fluoranthene	2.2	7.6	6.7	0.5	8.4	0.5	5.8	100	3.5	3.7
Benzo(k)fluoranthene	2.2	7.6	6.7	0.5	8.4	0.5	5.8	100	3.5	100
Benzo(a)pyrene	1.1	3.8	3.5	0.3	4.4	0.2	3.3	57	1.9	4.95
Indeno (1,2,3,cd)pyrene	0.6	2.0	1.9	0.2	2.0	0.1	1.4	20	0.7	41
Dibenzo(ah)anthracene	0.3	0.6	0.8	<0.1	0.6	<0.1	0.4	5.7	0.2	0.3
Benzo(ghi)perylene	0.8	2.4	2.2	0.2	2.6	0.2	1.4	21	0.8	350
<b>TOTAL PAH</b>	<b>24</b>	<b>93</b>	<b>90</b>	<b>6.1</b>	<b>170</b>	<b>4.3</b>	<b>61</b>	<b>1100</b>	<b>50</b>	
<b>TOTAL TPH</b>	<b>38</b>	<b>450</b>	<b>710</b>	<b>11</b>	<b>78</b>	<b>35</b>	-	-	-	

**TABLE 10**  
Results of TPH Fraction Tests on Remediated Area 2

TPH Fraction	Test Results in mg/kg			LQM / CIEH Guideline Residential with plant uptake mg/kg
	1/2A	1/2B	1/2C	
<b>Aliphatics</b>				
>C8-C10	<0.20	<0.10	<0.20	150
>C10-C12	35	<1	<10	760
>C12-C16	25	<1	<10	4300
>C16-C35	108	2	33	110,000
>C35-C40	<10	<1	<10	110,000
<b>Aromatics</b>				
>C8-C10	<0.20	<0.10	<0.20	190
>C10-C12	<10	<1	<10	380
>C12-C16	19	5	170	660
>C16-C21	320	46	1100	930
>C21-C35	400	47	850	1700
>C35-C40	33	4	67	1700

The soil remaining around and beneath the remediated area was uncontaminated by speciated PAHs and Total Petroleum Hydrocarbons.



**TABLE 11**  
**Results of Gasoline Range Organics Tests on Remediated Area 2**

Gasoline Range Organics	Test Results in mg/kg			LQM / CIEH Guideline
	1/2A	1/2B	1/2C	
				Residential with plant uptake mg/kg
<b>BTEX</b>				
Benzene	<2	<1	<2	0.37
Toluene	<2	<1	<2	660
Ethyl benzene	<2	<1	<2	260
Xylene	<2	<1	<2	310-330
<b>Aromatics</b>				
C5-C7	<0.020	<0.010	<0.020	300
>C7-C8	<0.020	<0.010	<0.020	660
<b>Aliphatics</b>				
C5-C6	<0.020	<0.010	<0.020	160
>C6-C8	<0.020	<0.010	<0.020	530

The soil remaining around and beneath the remediated area was uncontaminated by the gasoline range of Total Petroleum Hydrocarbons.

**TABLE 12**  
**Results of Heavy Metal Tests on Remediated Area 2**

Metals	Test Results in mg/kg									LQM / CIEH Guideline Residential with plant uptake mg/kg
	R1	R2	R3	R4	R5	R6	1/2A	1/2B	1/2C	
Arsenic	10	11	12	6	27	15	9	5	7.6	37
Cadmium	-	-	-	-	-	-	<1	<1	<1	22
Chromium	38	30	27	18	45	36	44	39	62	910
Copper	-	-	-	-	-	-	68	75	82	2400
Lead	140	94	59	37	85	140	120	34	72	200
Mercury	-	-	-	-	-	-	<1	<1	<1	52.2
Nickel	-	-	-	-	-	-	13	16	22	180
Zinc	-	-	-	-	-	-	72	54	63	3700

Elevated levels of polyaromatic hydrocarbons were detected in Area 2 following removal of 0.50m of soils. A further 0.50m was therefore removed and visual evidence indicated three areas of the ground that still exhibited a hydrocarbon odour and black staining. These areas were tested as 1/2A, 1/2B and 1/2C and results indicated that some hydrocarbons remained. The soil in these three areas with black staining and a hydrocarbon odour were over excavated to reveal clear odourless soil. The chromium levels were within guidelines.



**TABLE 13**  
**Results of PAH Tests on Remediated Area 3 (east of house 18)**

Polyaromatic Hydrocarbon Compounds In mg/kg	Levels of Polyaromatic Hydrocarbons In mg/kg						LQM / CIEH Guideline Residential with plant uptake mg/kg
	18A	18B	18C	19A	19B	19C	
Naphthalene	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	13
Acenaphthene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1100 <sup>19</sup>
Acenaphthylene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	920
Fluorene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	860
Phenanthrene	<0.1	0.2	0.1	0.9	0.5	0.3	440
Anthracene	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	11,000
Fluoranthene	<0.1	0.3	0.3	1.1	0.8	0.5	890
Pyrene	<0.1	0.2	0.2	0.9	0.7	0.4	2000
Benzo(a)anthracene	<0.1	0.1	0.1	0.4	0.3	0.3	13
Chrysene	<0.1	0.2	0.2	0.5	0.3	0.3	27
Benzo(b)fluoranthene	<0.1	0.3	0.2	0.7	0.7	0.5	3.7
Benzo(k)fluoranthene	<0.1	0.1	0.2	0.7	0.7	0.5	100
Benzo(a)pyrene	<0.1	0.1	<0.1	0.3	0.4	0.2	4.95
Indeno (1,2,3,cd)pyrene	<0.1	<0.1	<0.1	0.1	0.2	0.1	41
Dibenzo(ah)anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3
Benzo(ghi)perylene	<0.1	<0.1	<0.1	0.2	0.2	0.2	350
<b>TOTAL PAH</b>	<0.1	<b>1.4</b>	<b>1.1</b>	<b>5.3</b>	<b>4.2</b>	<b>2.8</b>	

**TABLE 14**  
**Results of TPH Fraction Tests on Remediated Area 3**

TPH Fraction	Test Results in mg/kg						LQM / CIEH Guideline Residential with plant uptake mg/kg
	18A	18B	18C	19A	19B	19C	
<b>Aliphatics</b>							
>C8-C10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	150
>C10-C12	<1	<1	<1	<10	<10	1	760
>C12-C16	<1	<1	<1	<10	<10	1	4300
>C16-C35	<1	2	5	30	199	7	110,000
>C35-C40	<1	<1	<1	<10	<10	<1	110,000
<b>Aromatics</b>							
>C8-C10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	190
>C10-C12	<1	<1	<1	<10	<10	<1	380
>C12-C16	<1	<1	<1	<10	<10	<1	660
>C16-C21	<1	<1	<1	<10	56	1	930
>C21-C35	2	<1	3	12	120	6	1700
>C35-C40	<1	<1	<1	<10	10	<1	1700

The soil remaining around and beneath the remediated area was uncontaminated by Total Petroleum Hydrocarbons.

**TABLE 15**  
**Results of Gasoline Range Organics Tests on Remediated Area 3**

Gasoline Range Organics	Test Results in mg/kg						LQM / CIEH Guideline Residential with plant uptake mg/kg
	18A	18B	18C	19A	19B	19C	
<b>BTEX</b>							
Benzene	<1	<1	<1	1	<1	<1	0.37
Toluene	<1	<1	<1	<1	<1	<1	660
Ethyl benzene	<1	<1	<1	2	<1	<1	260
Xylene	<1	<1	<1	3	<1	<1	310-330
<b>Aromatics</b>							
C5-C7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	300
>C7-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	660
<b>Aliphatics</b>							
C5-C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	160
>C6-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	530

The soil remaining around and beneath the remediated area was uncontaminated by speciated PAHs and TPHs and the gasoline range of Total Petroleum Hydrocarbons.

**TABLE 16**  
**Results of Heavy Metal Tests on Remediated Area 3**

Metals	Test Results in mg/kg						LQM / CIEH Guideline Residential with plant uptake mg/kg
	18A	18B	18C	19A	19B	19C	
Arsenic	7	7	6	16	14	10	37
Cadmium	<1	<1	<1	<1	<1	<1	22
Chromium	37	22	16	28	22	38	920
Copper	31	21	14	53	42	33	2400
Lead	45	68	48	200	110	65	200
Mercury	<1	<1	<1	<1	<1	<1	52.2
Nickel	33	17	13	32	27	37	180
Zinc	81	54	38	120	83	170	3700

There were no heavy metal results that exceeded guidelines, however, the level of lead in sample 19A equalled the guideline at 200mg/kg and this area was over excavated to rockhead to reduce the lead level.



**TABLE 17**  
**Results of PAH Tests on Remediated Area 4 (West of houses 14, 15 and 16)**

Polyaromatic Hydrocarbon Compounds In mg/kg	Levels of Polyaromatic Hydrocarbons In mg/kg			LQM / CIEH Guideline
	14/15A	14/15B	14/15C	Residential with plant uptake mg/kg
Naphthalene	<0.1	<0.1	<0.1	13
Acenaphthene	<0.1	<0.1	<0.1	1100
Acenaphthylene	<0.1	<0.1	<0.1	920
Fluorene	<0.1	<0.1	<0.1	860
Phenanthrene	0.7	1.2	0.8	440
Anthracene	0.1	0.2	0.2	11,000
Fluoranthene	0.7	1.3	1.1	890
Pyrene	0.6	1.1	0.9	2000
Benzo(a)anthracene	0.3	0.4	0.4	13
Chrysene	0.4	0.5	0.5	27
Benzo(b)fluoranthene	0.5	0.9	0.7	3.7
Benzo(k)fluoranthene	0.5	0.9	0.7	100
Benzo(a)pyrene	0.3	0.4	0.4	4.95
Indeno (1,2,3,cd)pyrene	0.1	<0.1	0.2	41
Dibenzo(ah)anthracene	<0.1	<0.1	<0.1	0.3
Benzo(ghi)perylene	0.2	<0.1	0.2	350
<b>TOTAL PAH</b>	<b>3.9</b>	<b>6.0</b>	<b>5.4</b>	

**TABLE 18**  
**Results of TPH Fraction Tests on Remediated Area 4**

TPH Fraction	Test Results in mg/kg			LQM / CIEH Guideline Residential with plant uptake mg/kg
	14/15A	14/15B	14/15C	
<b>Aliphatics</b>				
>C8-C10	<0.10	<0.10	<0.10	150
>C10-C12	<10	<10	<1	760
>C12-C16	<10	<10	<1	4300
>C16-C35	<10	<10	4	110,000
>C35-C40	<10	<10	<1	110,000
<b>Aromatics</b>				
>C8-C10	<0.10	<0.10	<0.10	190
>C10-C12	<10	<10	<1	380
>C12-C16	<10	<10	<1	660
>C16-C21	<10	<10	2	930
>C21-C35	12	15	4	1700
>C35-C40	<10	<10	<1	1700

The soil remaining around and beneath the remediated area 4 was uncontaminated by Total Petroleum Hydrocarbons.

**TABLE 19**  
**Results of Gasoline Range Organics Tests on Remediated Area 4**

Gasoline Range Organics	Test Results in mg/kg			LQM / CIEH Guideline Residential with plant uptake mg/kg
	14/15A	14/15B	14/15C	
<b>BTEX</b>				
Benzene	<0.1	<0.1	<0.1	0.37
Toluene	<0.1	<0.1	<0.1	660
Ethyl benzene	<0.1	<0.1	<0.1	260
Xylene	<0.1	<0.1	<0.1	310-330
<b>Aromatics</b>				
C5-C7	<0.01	<0.01	<0.01	300
>C7-C8	<0.01	<0.01	<0.01	660
<b>Aliphatics</b>				
C5-C6	<0.01	<0.01	<0.01	160
>C6-C8	<0.01	<0.01	<0.01	530

The soil remaining around and beneath the remediated area was uncontaminated by the gasoline range of Total Petroleum Hydrocarbons.

**TABLE 20**  
**Results of Heavy Metal Tests on Remediated Area 4**

Metals	Test Results in mg/kg			LQM / CIEH Guideline Residential with plant uptake mg/kg
	14/15A	14/15B	14/15C	
Arsenic	16	7	12	37
Cadmium	<1	<1	<1	22
Chromium	20	15	23	910
Copper	34	20	40	2400
Lead	270	83	140	200
Mercury	<1	<1	<1	52.2
Nickel	18	11	27	180
Zinc	100	85	120	2400

One level of lead was elevated above guidelines after remediating area 4. This area was over excavated to remove the elevated lead.

#### 7.4 Summary

Remediation was undertaken by ensuring all material tested as contaminated was removed or placed beneath hard cover to prevent it reaching sensitive receptors. In garden and landscaped areas the contaminated soil was removed to at least 0.50m depth and in places to 1.00m depth of excavation to rockhead.

In garden and landscaped areas, the remaining soils will be covered by a geotextile and by 600mm of tested as uncontaminated subsoil / topsoil.

**TABLE 21**  
**Areas Validated and Areas to be Validated**

Plot No	Boreholes in area	Contamination Detected	Remediation Proposed	Validated or To be Validated
1	24, 37	none	Check garden areas-clean 600mm topsoil	To be Validated
2	24, 37	none	Check garden areas-clean 600mm topsoil	To be Validated
3	25	Not tested	Requires Testing in garden areas	To be Validated
4	26	Not tested	Requires Testing in garden areas	To be Validated
5	27	Not tested	Requires Testing in garden areas	To be Validated
6	21, 22	arsenic	Sealing garden with geotextile and 600mm clean topsoil	To be Validated
7	36, T, U,	cadmium, arsenic, chromium, lead, PAH	Sealing garden with geotextile and 600mm clean topsoil	To be Validated
8	8, S	arsenic, chromium, lead	Sealing garden with geotextile and 600mm clean topsoil	To be Validated
9	S	arsenic, chromium, lead	Sealing garden with geotextile and 600mm clean topsoil	To be Validated
10	BH1, BH2, 9	arsenic, chromium, lead	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas	To be Validated
11	BH1, 10, R	arsenic, chromium, sulphate	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas	To be Validated
12	11, R	arsenic, chromium, PAH, sulphate	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas	To be Validated
13	11, 40, 41	arsenic, lead, sulphate, PAH	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas	To be Validated
14,15,16	7, 28	Arsenic, lead, PAH	Remove PAH to landfill. (Area 125m <sup>2</sup> x 0.50m = 62.5m <sup>3</sup> )	Validated
			Seal gardens with geotextile and 600mm topsoil	To be Validated
17		Not tested	Requires testing in garden area	To be Validated
18	17, 18, 19, S	arsenic, chromium, lead, sulphate	Check PAHs east of Plot 18. Landfill area 60m <sup>2</sup> x 0.50m = 30m <sup>3</sup> .	Validated
			Geotextile and clean topsoil for all gardens and landscaped ground	To be Validated
19	20	none	Geotextile and clean topsoil in garden areas	To be Validated
20	15	none	Geotextile and clean topsoil in garden areas	To be Validated
21	15	none	Geotextile and clean topsoil in garden areas	To be Validated
22	14	none	Geotextile and clean topsoil in garden areas	To be Validated
23	12, H	arsenic, chromium, lead, sulphate	Remove chromium to landfill, Area 90m <sup>3</sup> .	Validated
			Seal gardens with geotextile and clean topsoil	To be Validated
24	13, I, J	chromium	Remove chromium to landfill, Area 90m <sup>3</sup> .	Validated
			Seal gardens with geotextile and clean topsoil	To be Validated
25	13	none	Geotextile and clean topsoil in garden areas	To be Validated
26	J	chromium	Geotextile and clean topsoil in garden areas	To be Validated
27	J	chromium	Geotextile and clean topsoil in garden areas	To be Validated



28	J, 40	arsenic, chromium, lead, sulphate	Geotextile and clean topsoil in garden areas	To be Validated
29	D	none	Geotextile and clean topsoil in garden areas	To be Validated
30	C, 4	arsenic, chromium	Geotextile and clean topsoil in garden areas	To be Validated
Landscaped area SW area	1, 2, 3, 15, 16, E, F, G, K, L	Arsenic, chromium, lead, PAH, sulphide	Excavate hot spots to landfill 262.5m <sup>3</sup>	Validated
			Lay geotextile and 600mm of uncontaminated topsoil.	To be Validated
Houses	all	Radon	Radon barrier beneath all house plots	To be Validated

All material removed from the site was carried by a licensed waste carrier and deposited at the appropriate landfill for the level of contamination. All waste soils were carried and landfilled according to government regulations and organised by Brook Group Holdings Ltd.

The risk assessment indicates there is a low risk of detected and undetected contamination detrimentally affecting the future occupants of the residential houses and workmen or other users of the site in the future and a low risk of the environment and controlled waters being detrimentally affected as the detected contamination has been remediated and undetected contamination lies beneath hard cover or beneath gardens or landscaped ground that are sealed with 600mm of subsoil/topsoil.

The remediation and mitigating measures undertaken will reduce the risk of detected contamination and any undetected contamination from migrating and reaching sensitive receptors. The site is fit for purpose according to the investigation and environmental testing and remediation undertaken and validated to date 2024.

This Interim Validation Report validates that the contamination detected in the Phase II and Phase III ground investigations has been remediated to levels recommended by the LQM / CIEH (2015) guidelines for use of the site for residential houses with gardens.

The installation of a radon membrane in the construction of the houses will be validated by an accredited third party that will issue a separate report.

The import and soil testing of subsoil and topsoil and the confirmation of 600mm of subsoil and topsoil in the gardens will be presented in a Final Validation Report. The test results of the imported material to prove it is suitable for use as a topsoil and uncontaminated according to LQM / CIEH guidelines will be detailed in a Final Validation Report.

## 8. GENERAL REMARKS

This report truly reflects the conditions found during the desk study and the ground investigations and remediation and interim Validation. Whilst the work and reports were undertaken in a professional manner taking due regard of additional information which became available as a result of ongoing research the results portrayed only pertain to the information attained and it is possible that other undetected information and undetected ground and gas conditions and undetected contamination and undetected mining may exist. The work and interim Validation was only undertaken within the site boundaries and should not be used for interpretation purposes elsewhere. These conclusions are only a brief summary of the report, and it is recommended that the Report REMD 3537VAL is read in full to ensure that all recommendations have been understood.

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# Appendix A





Area 1



Area 1



Area 2



Area 1



Area 1



Area 2



Area 2



Area 2



Areas 2 and 3

# Appendix B





# Scientific Analysis Laboratories Ltd

## Certificate of Analysis

Hadfield House  
Hadfield Street  
Cornbrook  
Manchester  
M16 9FE  
Tel : 0161 874 2400  
Fax : 0161 874 2468

Scientific Analysis Laboratories is a  
limited company registered in England and  
Wales (No 2514788) whose address is at  
Hadfield House, Hadfield Street, Manchester M16 9FE

**Report Number:** 255309-1

**Date of Report:** 03-Nov-2011

**Customer:** Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Customer Contact:** Ms Frances Bennett

**Customer Job Reference:** 2958  
**Customer Purchase Order:** 2958  
**Customer Site Reference:** Royd Edge  
**Date Job Received at SAL:** 25-Oct-2011  
**Date Analysis Started:** 27-Oct-2011  
**Date Analysis Completed:** 01-Nov-2011

The results reported relate to samples received in the laboratory  
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation  
This report should not be reproduced except in full without the written approval of the laboratory  
Tests covered by this certificate were conducted in accordance with SAL SOPs



Report checked  
and authorised by :  
Caroline Haworth  
Assistant Customer Service  
Manager

Issued by :  
Caroline Haworth  
Assistant Customer Service  
Manager

<b>SAL Reference:</b> 255309 <b>Project Site:</b> Royd Edge <b>Customer Reference:</b> 2958  <b>Soil</b> Analysed as Soil <b>MCERTS Preparation</b>									
<b>SAL Reference</b>					255309 001	255309 002	255309 003	255309 004	255309 005
<b>Customer Sample Reference</b>					1/2A	1/2B	1/2C	18A	18B
<b>Date Sampled</b>					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011
<b>Type</b>					Sand	Sand	Fill	Sand	Sand
<b>Determinand</b>	<b>Method</b>	<b>Test Sample</b>	<b>LOD</b>	<b>Units</b>					
Moisture	T277	AR	0.1	%	18	14	22	13	15
Moisture @ 105 C	T162	AR	0.1	%	22	18	29	17	16

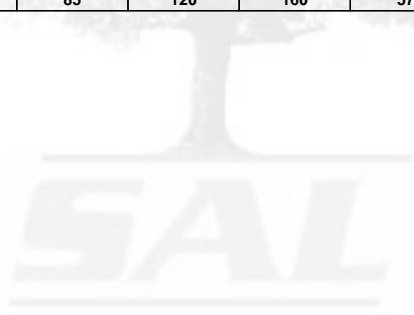
<b>SAL Reference:</b> 255309 <b>Project Site:</b> Royd Edge <b>Customer Reference:</b> 2958  <b>Soil</b> Analysed as Soil <b>MCERTS Preparation</b>									
<b>SAL Reference</b>					255309 006	255309 007	255309 008	255309 009	255309 010
<b>Customer Sample Reference</b>					18C	19A	19B	19C	14/15A
<b>Date Sampled</b>					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011
<b>Type</b>					Clay	Sand	Sand	Sand	Sand
<b>Determinand</b>	<b>Method</b>	<b>Test Sample</b>	<b>LOD</b>	<b>Units</b>					
Moisture	T277	AR	0.1	%	14	16	14	11	13
Moisture @ 105 C	T162	AR	0.1	%	20	17	16	15	13

<b>SAL Reference:</b> 255309 <b>Project Site:</b> Royd Edge <b>Customer Reference:</b> 2958  <b>Soil</b> Analysed as Soil <b>MCERTS Preparation</b>									
<b>SAL Reference</b>					255309 011	255309 012	255309 013	255309 014	255309 015
<b>Customer Sample Reference</b>					14/15B	14/15C	23A	23B	23C
<b>Date Sampled</b>					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011
<b>Type</b>					Sand	Sand	Clay	Sand	Clay
<b>Determinand</b>	<b>Method</b>	<b>Test Sample</b>	<b>LOD</b>	<b>Units</b>					
Moisture	T277	AR	0.1	%	13	12	18	11	18
Moisture @ 105 C	T162	AR	0.1	%	12	14	25	18	22

<b>SAL Reference:</b> 255309 <b>Project Site:</b> Royd Edge <b>Customer Reference:</b> 2958  <b>Soil</b> Analysed as Soil <b>Miscellaneous</b>									
<b>SAL Reference</b>					255309 001	255309 002	255309 003	255309 004	255309 005
<b>Customer Sample Reference</b>					1/2A	1/2B	1/2C	18A	18B
<b>Date Sampled</b>					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011
<b>Type</b>					Sand	Sand	Fill	Sand	Sand
<b>Determinand</b>	<b>Method</b>	<b>Test Sample</b>	<b>LOD</b>	<b>Units</b>					
Arsenic	T6	M40	2	mg/kg	9	5	7.6	7	7
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	M40	1	mg/kg	44	39	62	37	22
Copper	T6	M40	1	mg/kg	68	75	82	31	21
Lead	T6	M40	1	mg/kg	120	34	72	45	68
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Nickel	T6	M40	1	mg/kg	13	16	22	33	17
Zinc	T6	M40	1	mg/kg	72	54	63	81	54

<b>SAL Reference:</b> 255309										
<b>Project Site:</b> Royd Edge										
<b>Customer Reference:</b> 2958										
<b>Soil</b>					Analysed as Soil					
<b>Miscellaneous</b>										
<b>SAL Reference</b>					255309 006	255309 007	255309 008	255309 009	255309 010	
<b>Customer Sample Reference</b>					18C	19A	19B	19C	14/15A	
<b>Date Sampled</b>					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	
<b>Type</b>					Clay	Sand	Sand	Sand	Sand	
<b>Determinand</b>	<b>Method</b>	<b>Test Sample</b>	<b>LOD</b>	<b>Units</b>						
Arsenic	T6	M40	2	mg/kg	6	16	14	10	16	
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1	
Chromium	T6	M40	1	mg/kg	16	28	22	38	20	
Copper	T6	M40	1	mg/kg	14	53	42	33	34	
Lead	T6	M40	1	mg/kg	48	200	110	65	270	
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1	
Nickel	T6	M40	1	mg/kg	13	32	27	37	18	
Zinc	T6	M40	1	mg/kg	38	120	83	170	100	

<b>SAL Reference:</b> 255309										
<b>Project Site:</b> Royd Edge										
<b>Customer Reference:</b> 2958										
<b>Soil</b>					Analysed as Soil					
<b>Miscellaneous</b>										
<b>SAL Reference</b>					255309 011	255309 012	255309 013	255309 014	255309 015	
<b>Customer Sample Reference</b>					14/15B	14/15C	23A	23B	23C	
<b>Date Sampled</b>					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	
<b>Type</b>					Sand	Sand	Clay	Sand	Clay	
<b>Determinand</b>	<b>Method</b>	<b>Test Sample</b>	<b>LOD</b>	<b>Units</b>						
Arsenic	T6	M40	2	mg/kg	7	12	21	14	16	
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1	
Chromium	T6	M40	1	mg/kg	15	23	2000	420	590	
Copper	T6	M40	1	mg/kg	20	40	45	90	250	
Lead	T6	M40	1	mg/kg	83	140	55	54	170	
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1	
Nickel	T6	M40	1	mg/kg	11	27	28	16	32	
Zinc	T6	M40	1	mg/kg	85	120	160	57	140	



SAL Reference: 255309  
 Project Site: Royd Edge  
 Customer Reference: 2958

Soil  
 TPH UKCWG

Analysed as Soil

SAL Reference					255309 001	255309 002	255309 003	255309 004	255309 005
Customer Sample Reference					1/2A	1/2B	1/2C	18A	18B
Date Sampled					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011
Type					Sand	Sand	Fill	Sand	Sand
Determinand	Method	Test Sample	LOD	Units					
Benzene	T54	AR	1	µg/kg	(2,13) <2	(13) <1	(13,2) <2	(13) <1	(13) <1
Toluene	T54	AR	1	µg/kg	(2) <2	<1	(2) <2	<1	<1
EthylBenzene	T54	AR	1	µg/kg	(2) <2	<1	(2) <2	<1	<1
M/P Xylene	T54	AR	1	µg/kg	(2) <2	<1	(2) <2	<1	<1
O Xylene	T54	AR	1	µg/kg	(2) <2	<1	(2) <2	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	(2) <2	<1	(2) <2	<1	<1
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	(2) <0.020	<0.010	(2) <0.020	<0.010	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	(2) <0.020	<0.010	(2) <0.020	<0.010	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	(2) <0.020	<0.010	(2) <0.020	<0.010	<0.010
TPH (C10-C12 aliphatic)	T8	AR	1	mg/kg	<b>35</b>	<1	(9) <10	<1	<1
TPH (C12-C16 aliphatic)	T8	AR	1	mg/kg	<b>25</b>	<1	(9) <10	<1	<1
TPH (C16-C21 aliphatic)	T8	AR	1	mg/kg	<b>78</b>	<b>1</b>	<b>23</b>	<1	<1
TPH (C21-C35 aliphatic)	T8	AR	1	mg/kg	<b>30</b>	<b>1</b>	<b>10</b>	<1	<b>2</b>
TPH (C35-C44 aliphatic)	T8	AR	1	mg/kg	(9) <10	<1	(9) <10	<1	<1
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	(2) <0.020	<0.010	(2) <0.020	<0.010	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	(2) <0.020	<0.010	(2) <0.020	<0.010	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	(2) <0.020	<0.010	(2) <0.020	<0.010	<0.010
TPH (C10-C12 aromatic)	T8	AR	1	mg/kg	(9) <10	<1	(9) <10	<1	<1
TPH (C12-C16 aromatic)	T8	AR	1	mg/kg	<b>19</b>	<b>5</b>	<b>170</b>	<1	<1
TPH (C16-C21 aromatic)	T8	AR	1	mg/kg	<b>320</b>	<b>46</b>	<b>1100</b>	<1	<1
TPH (C21-C35 aromatic)	T8	AR	1	mg/kg	<b>400</b>	<b>47</b>	<b>850</b>	<b>2</b>	<1
TPH (C35-C44 aromatic)	T8	AR	1	mg/kg	<b>33</b>	<b>4</b>	<b>67</b>	<1	<1



SAL Reference: 255309  
 Project Site: Royd Edge  
 Customer Reference: 2958

Soil  
 Analyser as Soil  
 TPH UKCWG

SAL Reference					255309 006	255309 007	255309 008	255309 009	255309 010
Customer Sample Reference					18C	19A	19B	19C	14/15A
Date Sampled					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011
Type					Clay	Sand	Sand	Sand	Sand
Determinand	Method	Test Sample	LOD	Units					
Benzene	T54	AR	1	µg/kg	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1
Toluene	T54	AR	1	µg/kg	<1	1	<1	<1	<1
EthylBenzene	T54	AR	1	µg/kg	<1	<1	<1	<1	<1
M/P Xylene	T54	AR	1	µg/kg	<1	2	<1	<1	<1
O Xylene	T54	AR	1	µg/kg	<1	1	<1	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	<1	<1	<1	<1	<1
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C10-C12 aliphatic)	T8	AR	1	mg/kg	<1	(9) <10	(9) <10	1	(9) <10
TPH (C12-C16 aliphatic)	T8	AR	1	mg/kg	<1	(9) <10	(9) <10	1	(9) <10
TPH (C16-C21 aliphatic)	T8	AR	1	mg/kg	1	13	79	3	(9) <10
TPH (C21-C35 aliphatic)	T8	AR	1	mg/kg	4	17	120	4	(9) <10
TPH (C35-C44 aliphatic)	T8	AR	1	mg/kg	<1	(9) <10	(9) <10	<1	(9) <10
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C10-C12 aromatic)	T8	AR	1	mg/kg	<1	(9) <10	(9) <10	<1	(9) <10
TPH (C12-C16 aromatic)	T8	AR	1	mg/kg	<1	(9) <10	(9) <10	<1	(9) <10
TPH (C16-C21 aromatic)	T8	AR	1	mg/kg	<1	(9) <10	56	1	(9) <10
TPH (C21-C35 aromatic)	T8	AR	1	mg/kg	3	12	120	6	12
TPH (C35-C44 aromatic)	T8	AR	1	mg/kg	<1	(9) <10	10	<1	(9) <10



SAL Reference: 255309									
Project Site: Royd Edge									
Customer Reference: 2958									
Soil									
Analysed as Soil									
TPH UKCWG									
SAL Reference					255309 011	255309 012	255309 013	255309 014	255309 015
Customer Sample Reference					14/15B	14/15C	23A	23B	23C
Date Sampled					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011
Type					Sand	Sand	Clay	Sand	Clay
Determinand	Method	Test Sample	LOD	Units					
Benzene	T54	AR	1	µg/kg	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1
Toluene	T54	AR	1	µg/kg	<1	<1	<1	<1	<1
Ethylbenzene	T54	AR	1	µg/kg	<1	<1	<1	<1	<1
M/P Xylene	T54	AR	1	µg/kg	<1	<1	<1	<1	<1
O Xylene	T54	AR	1	µg/kg	<1	<1	<1	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	<1	<1	<1	<1	<1
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C10-C12 aliphatic)	T8	AR	1	mg/kg	(9) <10	<1	<1	<1	<1
TPH (C12-C16 aliphatic)	T8	AR	1	mg/kg	(9) <10	<1	<1	<1	<1
TPH (C16-C21 aliphatic)	T8	AR	1	mg/kg	(9) <10	<1	<1	<1	<1
TPH (C21-C35 aliphatic)	T8	AR	1	mg/kg	(9) <10	4	<1	<1	<1
TPH (C35-C44 aliphatic)	T8	AR	1	mg/kg	(9) <10	<1	<1	<1	<1
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
TPH (C10-C12 aromatic)	T8	AR	1	mg/kg	(9) <10	<1	<1	<1	<1
TPH (C12-C16 aromatic)	T8	AR	1	mg/kg	(9) <10	<1	<1	<1	<1
TPH (C16-C21 aromatic)	T8	AR	1	mg/kg	(9) <10	2	<1	<1	<1
TPH (C21-C35 aromatic)	T8	AR	1	mg/kg	15	4	<1	<1	1
TPH (C35-C44 aromatic)	T8	AR	1	mg/kg	(9) <10	<1	<1	<1	<1

SAL Reference: 255309									
Project Site: Royd Edge									
Customer Reference: 2958									
Soil									
Analysed as Soil									
Total and Speciated USEPA16 PAH									
SAL Reference					255309 001	255309 002	255309 003	255309 004	255309 005
Customer Sample Reference					1/2A	1/2B	1/2C	18A	18B
Date Sampled					22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011
Type					Sand	Sand	Fill	Sand	Sand
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	<0.1	1.4	0.4	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	1.2	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	0.9	32	1.9	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	1.2	43	2.3	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	11	240	13	<0.1	0.2
Anthracene	T207	M105	0.1	mg/kg	4.8	86	4.4	<0.1	<0.1
Fluoranthene	T207	M105	0.1	mg/kg	12	180	8.8	<0.1	0.3
Pyrene	T207	M105	0.1	mg/kg	10	160	6.9	<0.1	0.2
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	4.4	73	2.8	<0.1	0.1
Chrysene	T207	M105	0.1	mg/kg	4.4	72	2.8	<0.1	0.2
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	5.8	100	3.5	<0.1	0.3
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	3.3	57	1.9	<0.1	0.1
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	1.4	20	0.7	<0.1	<0.1
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	0.4	5.7	0.2	<0.1	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	1.4	21	0.8	<0.1	<0.1
PAH(total)	T207	M105	0.1	mg/kg	61	1100	50	<0.1	1.4

SAL Reference: 255309									
Project Site: Royd Edge									
Customer Reference: 2958									
Soil					Analysed as Soil				
Total and Speciated USEPA16 PAH									
SAL Reference		255309 006	255309 007	255309 008	255309 009	255309 010			
Customer Sample Reference		18C	19A	19B	19C	14/15A			
Date Sampled		22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011			
Type		Clay	Sand	Sand	Sand	Sand			
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	0.1	0.9	0.5	0.3	0.7
Anthracene	T207	M105	0.1	mg/kg	<0.1	0.2	<0.1	<0.1	0.1
Fluoranthene	T207	M105	0.1	mg/kg	0.3	1.1	0.8	0.5	0.7
Pyrene	T207	M105	0.1	mg/kg	0.2	0.9	0.7	0.4	0.6
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	0.1	0.4	0.3	0.3	0.3
Chrysene	T207	M105	0.1	mg/kg	0.2	0.5	0.3	0.3	0.4
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	0.2	0.7	0.7	0.5	0.5
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	<0.1	0.3	0.4	0.2	0.3
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	0.1	0.2	0.1	0.1
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	0.2	0.2	0.2	0.2
PAH(total)	T207	M105	0.1	mg/kg	1.1	5.3	4.2	2.8	3.9

SAL Reference: 255309									
Project Site: Royd Edge									
Customer Reference: 2958									
Soil					Analysed as Soil				
Total and Speciated USEPA16 PAH									
SAL Reference		255309 011	255309 012	255309 013	255309 014	255309 015			
Customer Sample Reference		14/15B	14/15C	23A	23B	23C			
Date Sampled		22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011	22-OCT-2011			
Type		Sand	Sand	Clay	Sand	Clay			
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	1.2	0.8	<0.1	<0.1	<0.1
Anthracene	T207	M105	0.1	mg/kg	0.2	0.2	<0.1	<0.1	<0.1
Fluoranthene	T207	M105	0.1	mg/kg	1.3	1.1	<0.1	<0.1	0.1
Pyrene	T207	M105	0.1	mg/kg	1.1	0.9	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	0.4	0.4	<0.1	<0.1	<0.1
Chrysene	T207	M105	0.1	mg/kg	0.5	0.5	<0.1	<0.1	<0.1
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	0.9	0.7	<0.1	<0.1	<0.1
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	0.4	0.4	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
PAH(total)	T207	M105	0.1	mg/kg	6.0	5.4	<0.1	<0.1	0.1

### Index to symbols used in 255309-1

Value	Description
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
AR	As Received
2	LOD Raised Due to Matrix Interference

13	Results have been blank corrected.
9	LOD raised due to dilution of sample
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

## Notes

"Fill" samples are outside the scope of our MCERTS accreditation. Results are UKAS only

## Method Index

Value	Description
T162	Grav (1 Dec) (105 C)
T8	GC/FID
T207	GC/MS(MCERTS)
T277	Grav (1 Dec) (40 C)
T54	GC/MS (Headspace)
T6	ICP/OES

## Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Benzene	T54	AR	1	µg/kg	U	001-015
Toluene	T54	AR	1	µg/kg	U	001-015
EthylBenzene	T54	AR	1	µg/kg	U	001-015
M/P Xylene	T54	AR	1	µg/kg	U	001-015
O Xylene	T54	AR	1	µg/kg	U	001-015
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	U	001-015
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	N	001-015
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	N	001-015
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	N	001-015
TPH (C10-C12 aliphatic)	T8	AR	1	mg/kg	N	001-015
TPH (C12-C16 aliphatic)	T8	AR	1	mg/kg	N	001-015
TPH (C16-C21 aliphatic)	T8	AR	1	mg/kg	N	001-015
TPH (C21-C35 aliphatic)	T8	AR	1	mg/kg	N	001-015
TPH (C35-C44 aliphatic)	T8	AR	1	mg/kg	N	001-015
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	N	001-015
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	N	001-015
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	N	001-015
TPH (C10-C12 aromatic)	T8	AR	1	mg/kg	N	001-015
TPH (C12-C16 aromatic)	T8	AR	1	mg/kg	N	001-015
TPH (C16-C21 aromatic)	T8	AR	1	mg/kg	N	001-015
TPH (C21-C35 aromatic)	T8	AR	1	mg/kg	N	001-015
TPH (C35-C44 aromatic)	T8	AR	1	mg/kg	N	001-015
Arsenic	T6	M40	2.0	mg/kg	U	003
Arsenic	T6	M40	2	mg/kg	M	001-002,004-015
Cadmium	T6	M40	1.0	mg/kg	U	003
Cadmium	T6	M40	1	mg/kg	M	001-002,004-015
Chromium	T6	M40	1	mg/kg	M	001-002,004-015
Chromium	T6	M40	1.0	mg/kg	U	003
Copper	T6	M40	1.0	mg/kg	U	003
Copper	T6	M40	1	mg/kg	M	001-002,004-015
Lead	T6	M40	1	mg/kg	M	001-002,004-015
Lead	T6	M40	1.0	mg/kg	U	003
Mercury	T6	M40	1	mg/kg	M	001-002,004-015
Mercury	T6	M40	1.0	mg/kg	U	003
Nickel	T6	M40	1	mg/kg	M	001-002,004-015
Nickel	T6	M40	1.0	mg/kg	U	003
Zinc	T6	M40	1.0	mg/kg	U	003
Zinc	T6	M40	1	mg/kg	M	001-002,004-015
Naphthalene	T207	M105	0.1	mg/kg	M	001-002,004-015
Naphthalene	T207	M105	0.1	mg/kg	U	003
Acenaphthylene	T207	M105	0.1	mg/kg	U	001-015
Acenaphthene	T207	M105	0.1	mg/kg	M	001-002,004-015
Acenaphthene	T207	M105	0.1	mg/kg	U	003
Fluorene	T207	M105	0.1	mg/kg	M	001-002,004-015
Fluorene	T207	M105	0.1	mg/kg	U	003

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Phenanthrene	T207	M105	0.1	mg/kg	M	001-002,004-015
Phenanthrene	T207	M105	0.1	mg/kg	U	003
Anthracene	T207	M105	0.1	mg/kg	U	001-015
Fluoranthene	T207	M105	0.1	mg/kg	M	001-002,004-015
Fluoranthene	T207	M105	0.1	mg/kg	U	003
Pyrene	T207	M105	0.1	mg/kg	M	001-002,004-015
Pyrene	T207	M105	0.1	mg/kg	U	003
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001-002,004-015
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	U	003
Chrysene	T207	M105	0.1	mg/kg	M	001-002,004-015
Chrysene	T207	M105	0.1	mg/kg	U	003
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	M	001-002,004-015
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	U	003
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001-002,004-015
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	U	003
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001-002,004-015
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	U	003
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001-002,004-015
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	U	003
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001-002,004-015
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	U	003
PAH(total)	T207	M105	0.1	mg/kg	U	001-015
Moisture	T277	AR	0.1	%	N	001-015
Moisture @ 105 C	T162	AR	0.1	%	N	001-015





# Scientific Analysis Laboratories Ltd

## Certificate of Analysis

Hadfield House  
Hadfield Street  
Cornbrook  
Manchester  
M16 9FE  
Tel : 0161 874 2400  
Fax : 0161 874 2468

Scientific Analysis Laboratories is a  
limited company registered in England and  
Wales (No 2514788) whose address is at  
Hadfield House, Hadfield Street, Manchester M16 9FE

**Report Number:** 260570-1

**Date of Report:** 20-Dec-2011

**Customer:** Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Customer Contact:** Ms Frances Bennett

**Customer Job Reference:** 2958  
**Customer Purchase Order:** 2958  
**Customer Site Reference:** Royd  
**Date Job Received at SAL:** 07-Dec-2011  
**Date Analysis Started:** 09-Dec-2011  
**Date Analysis Completed:** 16-Dec-2011

The results reported relate to samples received in the laboratory  
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Tests covered by this certificate were conducted in accordance with SAL SOPs



Report checked  
and authorised by :  
Caroline Haworth  
Assistant Customer Service  
Manager

Issued by :  
Caroline Haworth  
Assistant Customer Service  
Manager





# Scientific Analysis Laboratories Ltd

## Certificate of Analysis

Hadfield House  
Hadfield Street  
Cornbrook  
Manchester  
M16 9FE  
Tel : 0161 874 2400  
Fax : 0161 874 2468

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limited company registered in England and  
Wales (No 2514788) whose address is at  
Hadfield House, Hadfield Street, Manchester M16 9FE

**Report Number:** 254021-1

**Date of Report:** 25-Oct-2011

**Customer:** Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Customer Contact:** Ms Frances Bennett

**Customer Job Reference:** 2958

**Customer Purchase Order:** 2958

**Date Job Received at SAL:** 14-Oct-2011

**Date Analysis Started:** 14-Oct-2011

**Date Analysis Completed:** 24-Oct-2011

The results reported relate to samples received in the laboratory  
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation  
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Tests covered by this certificate were conducted in accordance with SAL SOPs



Report checked  
and authorised by :  
Caroline Haworth  
Assistant Customer Service  
Manager

Issued by :  
Caroline Haworth  
Assistant Customer Service  
Manager

SAL Reference: 254021										
Customer Reference: 2958										
Soil Analysed as Soil										
MCERTS Preparation										
SAL Reference					254021 001	254021 002	254021 003	254021 004	254021 005	254021 006
Customer Sample Reference					R1	R2	R3	R4	R5	R6
Date Sampled					Deviating	Deviating	Deviating	Deviating	Deviating	Deviating
Type					Sand	Sand	Sand	Sand	Topsoil	Topsoil
Determinand	Method	Test Sample	LOD	Units						
Moisture	T277	AR	0.1	%	15	13	12	13	14	17
Moisture @ 105 C	T162	AR	0.1	%	18	19	16	17	24	22

SAL Reference: 254021										
Customer Reference: 2958										
Soil Analysed as Soil										
Miscellaneous										
SAL Reference					254021 001	254021 002	254021 003	254021 004	254021 005	254021 006
Customer Sample Reference					R1	R2	R3	R4	R5	R6
Date Sampled					Deviating	Deviating	Deviating	Deviating	Deviating	Deviating
Type					Sand	Sand	Sand	Sand	Topsoil	Topsoil
Determinand	Method	Test Sample	LOD	Units						
Arsenic	T6	M40	2	mg/kg	10	11	12	6	27	15
Chromium	T6	M40	1	mg/kg	38	30	27	18	45	36
Lead	T6	M40	1	mg/kg	140	94	59	37	85	140
Total Petroleum Hydrocarbons	T8	M105	1	mg/kg	38	450	710	11	78	35

SAL Reference: 254021										
Customer Reference: 2958										
Soil Analysed as Soil										
Total and Speciated USEPA16 PAH										
SAL Reference					254021 001	254021 002	254021 003	254021 004	254021 005	254021 006
Customer Sample Reference					R1	R2	R3	R4	R5	R6
Date Sampled					Deviating	Deviating	Deviating	Deviating	Deviating	Deviating
Type					Sand	Sand	Sand	Sand	Topsoil	Topsoil
Determinand	Method	Test Sample	LOD	Units						
Naphthalene	T207	M105	0.1	mg/kg	0.1	0.3	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	0.1	<0.1	0.1	<0.1	0.2	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	0.3	0.8	0.5	<0.1	4.9	<0.1
Fluorene	T207	M105	0.1	mg/kg	0.3	1.0	0.5	<0.1	4.9	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	3.6	14	11	1.1	42	0.4
Anthracene	T207	M105	0.1	mg/kg	1.2	7.1	5.6	0.4	17	0.3
Fluoranthene	T207	M105	0.1	mg/kg	5.2	23	25	1.4	38	1.0
Pyrene	T207	M105	0.1	mg/kg	4.4	18	20	1.2	29	0.8
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	1.8	6.8	5.8	0.4	8.1	0.4
Chrysene	T207	M105	0.1	mg/kg	1.5	5.5	5.9	0.4	7.6	0.4
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	2.2	7.6	6.7	0.5	8.4	0.5
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	1.1	3.8	3.5	0.3	4.4	0.2
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	0.6	2.0	1.9	0.2	2.0	0.1
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	0.3	0.6	0.8	<0.1	0.6	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	0.8	2.4	2.2	0.2	2.6	0.2
PAH(total)	T207	M105	0.1	mg/kg	24	93	90	6.1	170	4.3

### Index to symbols used in 254021-1

Value	Description
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
AR	As Received

M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

## Notes

The date of sampling has not been provided and therefore the time from sampling to analysis is unknown. It is possible therefore that the results provided may be compromised

## Method Index

Value	Description
T162	Grav (1 Dec) (105 C)
T8	GC/FID
T277	Grav (1 Dec) (40 C)
T6	ICP/OES
T207	GC/MS(MCERTS)

## Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Naphthalene	T207	M105	0.1	mg/kg	M	001-006
Acenaphthylene	T207	M105	0.1	mg/kg	U	001-006
Acenaphthene	T207	M105	0.1	mg/kg	M	001-006
Fluorene	T207	M105	0.1	mg/kg	M	001-006
Phenanthrene	T207	M105	0.1	mg/kg	M	001-006
Anthracene	T207	M105	0.1	mg/kg	U	001-006
Fluoranthene	T207	M105	0.1	mg/kg	M	001-006
Pyrene	T207	M105	0.1	mg/kg	M	001-006
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001-006
Chrysene	T207	M105	0.1	mg/kg	M	001-006
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	M	001-006
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001-006
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001-006
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001-006
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001-006
PAH(total)	T207	M105	0.1	mg/kg	U	001-006
Arsenic	T6	M40	2	mg/kg	M	001-006
Chromium	T6	M40	1	mg/kg	M	001-006
Lead	T6	M40	1	mg/kg	M	001-006
Total Petroleum Hydrocarbons	T8	M105	1	mg/kg	M	001-006
Moisture	T277	AR	0.1	%	N	001-006
Moisture @ 105 C	T162	AR	0.1	%	N	001-006

**SAL**

# Appendix C



# J.W. HINCHLIFFE (TANKS) LTD

Registered in England 3244006 VAT No. 734 686405

WEAVER STREET  
LEEDS  
LS4 2AU  
Phone: 0113 2635163  
Fax: 0113 2635164

JAMES WIMPENNY HOMES LTD  
SHEPLEY CARR HOUSE  
SHEPLEY  
HUDDERSFIELD  
HD8 8BR

30<sup>TH</sup> JANUARY 2009

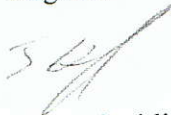
Dear Mr Wimpenny,

ROYD EDGE DYE WORKS, MELTHAM.

Please find enclosed the Gas Free Certificates and Hazardous Waste Consignment Notes for the work on the heavy fuel oil tanks at the above address.

I hope you are satisfied with the work we carried out and look forward to hearing from you in the near future

Regards



John Hinchliffe.

# HAZARDOUS WASTE CONSIGNMENT NOTE

## A. CONSIGNMENT DETAILS

Consignor Buck Group LTD EA Registration Number AKF 619 Sic Code 45.11  
(Premises Code)

Date of Journey 30/1/09

Address of Consignor

ROYD EDGE DYE WORKS  
MELTHAM  
HD9 4BT

Name & Address of Consignee

S. W. HINCHLIFFE LTD  
WEAVER ST  
LEEDS

**CONSIGNORS CERTIFICATE** I certify that the information in section B and C are correct and the carrier has been advised of the appropriate precautionary measures.

Name ..... Signature .....

## B. DESCRIPTION OF WASTE

Waste Description HEAVY FUEL OIL

Container Type, Number & Size 10 x 1000 litre IBC's

Physical Form Liquid  Powder ..... Sludge ..... Solid .....

Concentrations (% or mg/kg) .....

EWC Code 130703 Colour BLACK Hazard Code(s) H7

The process giving rise to the waste TANK CLEANING

Total Quantity for Removal 9200 Kgs/Tonnes/Gallons/Litres

If Waste is Transportable Under ADR Regs

UN No. .... Proper Shipping Name .....

UN Class ..... Packing Group ..... Points .....

Any Special Handling Instructions .....

## C. CARRIERS CERTIFICATE

Waste Carrier

J. W. HINCHLIFFE LTD

WEAVER STREET, LEEDS LS4 2AU

Carrier's Registration Number: **YRI/446774**

Licence Number : **951**

Transport Authorised by S. W. HINCHLIFFE

Telephone Number of Carrier: **0113 263 5163**

I Certify that I today collected the above consignment

Quantity 9200 Kgs/Tonnes/Gallons/Litres Name S. W. HINCHLIFFE

Container Type IBC Size 1000LITRE Reg No Y304 HAN

Signature S. W. HINCHLIFFE Date 30/1/09 Time 16:00

## D. CONSIGNEE'S CERTIFICATE

I Received this Waste at the address given in A above on 30/1/09 at 16.45 Hrs

Quantity Received 9200 Kgs/Tonnes/Gallons/Litres Vehicle Reg Y304 HAN

Name S. W. HINCHLIFFE Signature S. W. HINCHLIFFE

I certify that Waste management Licences/Authorisations Authorises the Management of the waste described in B above.

**J. W. HINCHLIFFE (TANKS) LTD**

Registered in England 3244006

V.A.T. No 734 6864 05

WEAVER STREET  
LEEDS LS4 2AU  
Phone 0113 2635163  
Fax 0113 2635164

**GAS FREE CERTIFICATE**

DATE & TIME 30/1/09 16.30hrs  
 CUSTOMER Brook Group (Holdings) LTD  
 LOCATION Royal Edge Dye Works  
Meltham, HD9 4BH  
 INSTALLATION 1 x 20000 gallon Heavy fuel oil tank

WE HEREBY CERTIFY THAT AT THE DATE AND TIME SHOWN WE EXAMINED THE ATMOSPHERE IN THE ABOVE-MENTIONED INSTALLATION FOR PRESENCE OF FLAMMABLE GAS OR VAPOUR AND FOUND IT TO BE FREE FROM FLAMMABLE GAS OR VAPOUR AND, SUBJECT TO THE CONDITIONS STATED BELOW, SAFE FOR WORK REQUIRING THE USE OF HOT WORK.

SIGNED

*[Signature]*

**CONDITIONS**

1. This certificate is valid until ..... hours on ..... provided that the conditions observed at the time of testing do not change.
2. For the duration of the work the installation specified on this certificate must remain isolated. Should the conditions observed at the time of examination change then this certificate is cancelled.
3. It is the responsibility of the above named customer to ensure that entry into the installation is in accordance with Health and Safety Executive Guidance Note GS5 'Entry Into Confined Space' (June 1980).

I acknowledge receipt of this certificate and undertake to ensure that it is properly displayed.

Signed ..... for .....

**J. W. HINCHLIFFE (TANKS) LTD**

Registered in England 3244006

V.A.T. No 734 6864 05

WEAVER STREET  
LEEDS LS4 2AU  
Phone 0113 2635163  
Fax 0113 2635164

**GAS FREE CERTIFICATE**

DATE & TIME 30/1/09 16.30hrs  
 CUSTOMER Brook Group (Holdings) Ltd  
 LOCATION Prayd Edge Dye Works  
Meltham, HD9 4BH  
 INSTALLATION 1x 20000 gallon Heavy fuel oil tank

WE HEREBY CERTIFY THAT AT THE DATE AND TIME SHOWN WE EXAMINED THE ATMOSPHERE IN THE ABOVE-MENTIONED INSTALLATION FOR PRESENCE OF FLAMMABLE GAS OR VAPOUR AND FOUND IT TO BE FREE FROM FLAMMABLE GAS OR VAPOUR AND, SUBJECT TO THE CONDITIONS STATED BELOW, SAFE FOR WORK REQUIRING THE USE OF HOT WORK.

SIGNED *S J*

**CONDITIONS**

1. This certificate is valid until ..... hours on ..... provided that the conditions observed at the time of testing do not change.
2. For the duration of the work the installation specified on this certificate must remain isolated. Should the conditions observed at the time of examination change then this certificate is cancelled.
3. It is the responsibility of the above named customer to ensure that entry into the installation is in accordance with Health and Safety Executive Guidance Note GS5 'Entry Into Confined Space' (June 1980).

I acknowledge receipt of this certificate and undertake to ensure that it is properly displayed.

Signed ..... for .....

**PART A CONSIGNEE'S DETAILS**The waste will be taken to site code  
(refer to list on rear of Annexe Consignment note) **F****PART B CARRIER'S DETAILS**ECO-OIL Ltd, Clarence House, Clarence Place, Newport.  
South Wales. NP19 7AA. Carrier Reg. KEN/470148/CBName ..... **C. SMITH** .....Signed ..... **C. Smith** .....Vehicle Reg. mark ..... **BA51VWC** .....**PART C SUMMARY OF MULTIPLE CONSIGNMENTS**Job No. **1** Date **280109** TimeConsignment note code  
**A K F 6 5 9 1 0 0 7 5 5 M**

Consignments listed below are described in detail on corresponding Annexe

EWC Code	Qty (kg)	Rejected	R / D code
<b>130205</b>	<b>9800</b>		<b>G</b>

**CONSIGNMENT DETAILS**

This is part of a 'Multiple collection' and is the

1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>
X								

collection in this round.

(Insert a X in the appropriate box on right)

**PART A NOTIFICATION DETAILS**

1. Consignment note code: 

6 DIGIT PREMISE CODE						M		
A	K	F	6	1	9	1	C 0755	M

NB. If a Producer provides their own Consignment code, the pre-printed one must be struck out on all copies of this document and the Producer's code number inserted in the boxes above.

2. The waste described in Part B below, is to be removed from:

Name: ROBINSONS MILL

Address: MELTHOME  
HUDDERSFIELD

Postcode: H09 4B4

Tel no. \_\_\_\_\_ Fax no. \_\_\_\_\_

E-mail: \_\_\_\_\_

3. Premise code appears as the first six digits of the Consignment note code

4. The waste producer (if different from Part A.2) was:

**PART B DESCRIPTION OF THE WASTE**

1. The process giving rise to the waste(s) 2. SIC code for the process 3. Waste details appear below:

PROCESS TYPE	SIC CODE	X	PROCESS TYPE	SIC CODE	X	PROCESS TYPE (Manual entry)	SIC CODE	X
Maintenance & repair of motor vehicles	50.20	X	Freight transport by road, not elsewhere stated	60.24/9				

**WASTE DETAILS** (Table below must be completed for every waste type collected. Refer overleaf for further data)

DESCRIPTION OF THE WASTE	EWC CODE	QUANTITY (Kg)	CHEMICAL / BIOLOGICAL %CONC. OF THE WASTE		PHYSICAL FORM	HAZARD CODE(S)	CONTAINER, TYPE, NUMBER & SIZE
			Component	% conc.			
Waste engine oils	1 3 0 2 0 5	49500	Used oil	> 1%	Liquid	H7 H14	Bulk road tank
Oily water from oil / water interceptors	1 3 0 5 0 7		Used oil	>1%	Liquid	H7 H14	Bulk road tank

**ADDITIONAL INFORMATION** (The information given below relates to each EWC identified in table above. Refer overleaf for further data)

EWC CODE	PACKING GROUP(S)	UN IDENTIFICATION NUMBER(S)	PROPER SHIPPING NAME	UN CLASS(ES)	SPECIAL HANDLING REQUIREMENTS
1 3 0 2 0 5	N/A	N/A	Mineral-based non-chlorinated engine, gear and lubricating oils	N/A	See overleaf under H7 and H14
1 3 0 5 0 7	N/A	N/A	Oily water from oil / water separators	N/A	See overleaf under H7 and H14

**PART C CARRIER'S DECLARATION**

I certify that today I collected the quantity of waste detailed in Part B above, from the address given in Part A above and will take it to the address given in part A of the Multiple Collection Consignment note.

Carrier's Name: C. SMITH

Signature: [Signature]

**PART D CONSIGNOR'S DECLARATION**

I certify that the information provided by the Consignee is correct, that the Carrier is registered (or exempt) and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the Carrier has been informed of any specific handling requirements. I understand annual premise registration is a requirement of the Hazardous Waste Regulations and I certify the premise code given at Part A Section 1 is both current and applicable to the premise address at Part A Section 2.

Consignor's name: [Signature]

Signature: [Signature]

DATE	D	D	M	M	Y	Y	TIME	H	H	M	M	DATE	D	D	M	M	Y	Y	TIME	H	H	M	M
	9	5	1	1	0	0							9	5	1	1	0	0					

# WIMPENNY

BUILDING SINCE 1884

Ms Frances Bennett  
Ashton Bennett  
Unit K  
Bridge Mills  
Huddersfield Rd  
Holmfirth  
HD9 3TW

Tuesday, April 07, 2009

Dear Frances,

**Ref: Royd Edge Dyeworks**

I enclose for your file copies of controlled waste notes from Pennine Demolition.

Yours sincerely,



**James Wimpenny**  
**Managing Director**

Stuart McCannick SAM.  
Amthor's COSG.

James Wimpenny Homes Ltd  
Shepley Carr House  
Shepley  
Huddersfield  
HD8 8BR

01484 607234  
07515 671862

[james.wimpenny@wimpenny.co.uk](mailto:james.wimpenny@wimpenny.co.uk)

Company Registered in England & Wales 3659542  
VAT Registration 883294977

Belfast Yard, Geldard Road, Birstall  
West Yorkshire WF17 9PY

T: (01924) 479366  
F: (01924) 423123

E: sales@bdpltd.co.uk  
W: www.bdpltd.co.uk

### PART A Notification details

1 Consignment note code: NP919F/160001

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):  
BROOK FOOT WALKS ROAD EDGE  
ALSTHAM H07 2JX

3 Premises code (where applicable): WY6198

4 The waste will be taken to (name, address and postcode):  
PILSWORTH QUARRY AND LANDFILL SITE  
BURY BL9 9QZ

5 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):  
PERMIVE DEMOLITIONS  
UNIT 2 WOODLANDS  
H03 4T9

### PART B Description of the waste

1 The process giving rise to the waste(s) was: DEMOLITION 2 SIC for the process giving rise to the waste: 45.251

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code) (6 digits)	Quantity (kg)	The chemical/biological components of the waste and their concentrations are:		Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
			Component	Concentration (% or mg/kg)			
<u>CEMENT SHEET</u>	<u>170605</u>	<u>10T</u>	<u>CHRYSTAL</u>	<u>12</u>	<u>SOLID</u>	<u>H7</u>	<u>25Y</u>

The information given below is to be completed for each EWC identified

EWC code	Packing group(s)	UN identification number(s)	Proper shipping name(s)	UN class(es)	Special handling requirements

### PART C Carrier's certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If a schedule of carriers is attached tick here )

I certify that I today collected the consignment and that the details in A2, A4 and B3 are correct and I have been advised of any specific handling requirements.

1 Carrier name: BDP LTD  
On behalf of (name, address, postcode, telephone, e-mail, facsimile):  
PERMIVE DEMOLITIONS

2 Carrier registration no./reason for exemption:  
YAL446310

3 Vehicle registration no. (or mode of transport, if not road):  
Y556WR

Signature: [Signature]  
Date: 06/02/2009 Time: 9:00 AM

### PART D Consignor's certificate

I certify that the information in A, B and C above is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

1 Consignor name: [Signature]  
On behalf of (name, address, postcode, telephone, e-mail, facsimile):

PERMIVE DEMOLITIONS  
UNIT 2 WOODLANDS  
H03 4T9

Signature: [Signature]  
Date: 06/02/2009 Time: 7:00 AM

### PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
<u>170605</u>	<u>17500</u>	<u>ACC</u>	<u>D05</u>

1 I received this waste at the address given in A4 on: Date 06/02/2009 Time 09:46

2 Vehicle registration no. (or mode of transport if not road):

3 Where waste is rejected please provide details:

I certify that waste management licence/permit/authorised exemption no(s):

BS7951

authorises the management of the waste described in B at the address given in A4.

Name: HENDERSON

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

WIDOR WASTE MANAGEMENT  
PILSWORTH QUARRY AND LANDFILL  
PILSWORTH ROAD  
BURY  
BL9 9QZ  
PERMIT NO BS7951

Signature: [Signature]  
Date: 06/02/2009 Time: 09:46

BIRSTALL DEMOLITION & PLANT SERVICES LTD

Belfast Yard, Geldard Road, Birstall  
West Yorkshire WF17 9PY

T: (01924) 479366  
F: (01924) 423123

E: sales@bdpltd.co.uk  
W: www.bdpltd.co.uk

### PART A Notification details

1 Consignment note code:

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):  
 BROOK FOOT MILLS ROYAL EDGE  
 MELTHAM HD7 2XX

3 Premises code (where applicable):

4 The waste will be taken to (name, address and postcode):  
 PILSWORTH LANDFILL SITE  
 BURY BL9 8QZ

5 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):  
 PEWITWE DEMOLITIONS  
 UNIT 2 WOODLANDS  
 HD3 4TG

### PART B Description of the waste

1 The process giving rise to the waste(s) was:  2 SIC for the process giving rise to the waste:

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code) (6 digits)	Quantity (kg)	The chemical/biological components of the waste and their concentrations are:		Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
			Component	Concentration (% or mg/kg)			
CEMENT	170605	107	CHARACTER	1K	SOLID	H7	35Y

The information given below is to be completed for each EWC identified

EWC code	Packing group(s)	UN identification number(s)	Proper shipping name(s)	UN class(es)	Special handling requirements

### PART C Carrier's certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If a schedule of carriers is attached tick here )

I certify that I today collected the consignment and that the details in A2, A4 and B3 are correct and I have been advised of any specific handling requirements.

1 Carrier name:   
 On behalf of (name, address, postcode, telephone, e-mail, facsimile):  
 PEWITWE DEMOLITIONS  
 UNIT 2 WOODLANDS  
 HD3 4TG

2 Carrier registration no./reason for exemption:

3 Vehicle registration no. (or mode of transport, if not road):

Signature:   
 Date:  Time:

### PART D Consignor's certificate

I certify that the information in A, B and C above is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

1 Consignor name:   
 On behalf of (name, address, postcode, telephone, e-mail, facsimile):  
 PEWITWE DEMOLITIONS  
 UNIT 2 WOODLANDS  
 HD3 4TG

Signature:   
 Date:  Time:

### PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
170605	12260	ACC	D05

1 I received this waste at the address given in A4 on: Date  Time

2 Vehicle registration no. (or mode of transport if not road):

3 Where waste is rejected please provide details:  
 Name:   
 On behalf of (name, address, postcode, telephone, e-mail, facsimile):  
 HENDERSON WASTE MANAGEMENT  
 PILSWORTH QUARRY AND LANDFILL  
 PILSWORTH ROAD  
 BURY  
 BL9 8QZ  
 PERMIT No BS7951

I certify that waste management licence/permit/authorised exemption no(s):

authorises the management of the waste described in B at the address given in A4.  
 Signature:   
 Date:  Time:

**DUTY OF CARE**

**CONTROLLED WASTE TRANSFER NOTE**

TICKET

Nº 2195

**NDB TIPPER & PLANT HIRE LTD**

71 Thorpe Green Drive  
Golcar  
Huddersfield  
HD7 4QT

Tel/Fax: 01484 645785  
Mobile: 07770 636659

WEIGHTS

1111

GROSS  
TARE  
NETT

4 x 8w Loads

**SECTION A - DESCRIPTION**

Type of Waste: Spoil  
Source: PENNINE DEMO MEZTAM.  
Waste Contained In: 8w  
Waste Quantity: 4 x 8w Loads

Signed by Contractor: .....  
Print: .....

**SECTION B - DELIVERED BY:**

Company Name: N.D.B.  
Registered Waste Carrier No.: YDD7 5x4  
Vehicle Registration No.: YDD7 5x4  
Date: 1.4.09  
Time: .....

Signed by Carrier: C. Smith  
Print: .....

**SECTION C - TRANSFER / DISPOSAL**

Address of Place of Transfer / Disposal: CABBY'S  
Date: 1.4.09  
Time: 3x  
Waste Disposal Licence No.: ~~KITBENTON~~ BACKLUND  
Signed by Receiver: PHOENIX CABBY'S  
Print: KILMERTON

**DUTY OF CARE**  
**CONTROLLED WASTE TRANSFER NOTE**

TICKET

Nº 2193

**NDB TIPPER & PLANT HIRE LTD**

71 Thorpe Green Drive  
Golcar  
Huddersfield  
HD7 4QT

Tel/Fax: 01484 645785  
Mobile: 07770 636659

WEIGHTS

1111

GROSS  
TARE  
NETT

6 x 8w Load

**SECTION A - DESCRIPTION**

Type of Waste: Spoil  
Source: PENNINE DEMO MEZTAM.  
Waste Contained In: 8w  
Waste Quantity: 6 x 8w Load

Signed by Contractor: .....  
Print: .....

**SECTION B - DELIVERED BY:**

Company Name: N.D.B.  
Registered Waste Carrier No.: YDD7 5x4  
Vehicle Registration No.: YDD7 5x4  
Date: 31.3.09  
Time: .....

Signed by Carrier: C. Smith  
Print: .....

**SECTION C - TRANSFER / DISPOSAL**

Address of Place of Transfer / Disposal: CABBY'S  
Date: 31.3.09  
Time: BACKLUND  
Waste Disposal Licence No.:  
Signed by Receiver: PHOENIX CABBY'S  
Print: R. HAYLON

**DUTY OF CARE  
CONTROLLED WASTE TRANSFER NOTE**

TICKET  
N<sup>o</sup> 2199

**NDB TIPPER &  
PLANT HIRE LTD**

71 Thorpe Green Drive  
Golcar  
Huddersfield  
HD7 4QT  
Tel/Fax: 01484 645785  
Mobile: 07770 636659

WEIGHT  
WORKING ON SITE

##1

GROSS  
TARE  
NETT

3.00pm - 4.30pm

**SECTION A - DESCRIPTION**

Type of Waste: SPOLK  
Source: PENNINE DEMO MELIMAN  
Waste Contained In: 8W  
Waste Quantity: 6 x 8W LOADS

Signed by Contractor: ..... Print: .....

**SECTION B - DELIVERED BY:**

Company Name: N.D.B  
Registered Waste Carrier No.: YD7 624  
Vehicle Registration No.: YD7 624  
Date: 30.3.09 Time: .....

Signed by Carrier: ..... Print: .....

**SECTION C - TRANSFER / DISPOSAL**

Address of Place of Transfer / Disposal: WORKING ON SITE  
Date: 30.3.09 Time: SITE  
Waste Disposal Licence No.: .....  
Signed by Receiver: PHOTON Print: R. HODGKIN

**DUTY OF CARE  
CONTROLLED WASTE TRANSFER NOTE**

TICKET  
N<sup>o</sup> 2196

**NDB TIPPER &  
PLANT HIRE LTD**

71 Thorpe Green Drive  
Golcar  
Huddersfield  
HD7 4QT  
Tel/Fax: 01484 645785  
Mobile: 07770 636659

WEIGHTS

WORKING ON SITE

##1111

GROSS  
TARE  
NETT

2 HOURS 30 MINS

**SECTION A - DESCRIPTION**

Type of Waste: SPOLK  
Source: PENNINE DEMO MELIMAN  
Waste Contained In: 14  
Waste Quantity: 8W x 8W LOADS

Signed by Contractor: ..... Print: .....

**SECTION B - DELIVERED BY:**

Company Name: N.D.B  
Registered Waste Carrier No.: YD7 624  
Vehicle Registration No.: YD7 624  
Date: 1-4-09 Time: .....

Signed by Carrier: ..... Print: .....

**SECTION C - TRANSFER / DISPOSAL**

Address of Place of Transfer / Disposal: WORKING ON SITE  
Date: 1-4-09 Time: SITE  
Waste Disposal Licence No.: .....  
Signed by Receiver: PHOTON Print: R. HODGKIN

