



GROUNDTECH
CONSULTING

AFAN WAY, PORT TALBOT

SUPPLEMENTARY ENVIRONMENTAL
APPRAISAL

ALDI STORES LIMITED

JUNE 2024

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SUMMARY

Background	
Previous works	To Groundtech Consultings knowledge, a minimum of three phase of Ground Investigations have been undertaken at the site: • 2016 Quantum Geotechnical • 2017 Arcadis • 2021 Groundtech Consulting
Regulatory comments	The supplementary investigation in the vicinity of the former Petrol Filling Station (PFS) has been undertaken at the request of National Resource Wales (NRW) due to variations in the findings of the above investigations.
Ground Model	
Made Ground	Made Ground was encountered within all locations. This consisted of topsoil type Made Ground, asphalt and concrete at the surface or near surface, and a sandy gravel beneath. Made Ground was encountered to a maximum depth ranging from 0.7m to 2.6m begl.
Natural Soils	Underlying the Made Ground, cohesive alluvium was encountered, described as soft Clay. This was in all locations to a maximum depth of 4.0m bgl. Beneath the cohesive alluvium were granular Glaciofluvial Deposits in the form of sandy gravel. The depth of this was not proved but was encountered at depths of up to 7.0m bgl.
Groundwater	Groundwater was encountered in the Glaciofluvial Deposits only at depths ranging from 4.0m to 4.2m begl.
GQRA and Revised (PL) Assessment	
Human Health	Visual and olfactory evidence of contamination has been noted predominantly in the natural clay in the form of a faint to moderate, occasionally strong hydrocarbon odour. The testing results were consistent with initial phase of Ground Investigation by Groundtech Consulting. As such the conclusions of the 2021 site stand, and should be adopted for the proposed development.
Controlled Waters	No perched groundwater has been encountered during the investigation and subsequent monitoring. No visual or olfactory evidence of contamination was observed in the aquifer during the investigation, and the testing results were consistent with the initial phase of Ground Investigation – the confined aquifer has not been impacted beneath the former PFS and downgradient. As such the conclusions of the 2021 site stand, and should be used for the proposed development.

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Plans

<i>Plan Reference</i>	<i>Revision</i>	<i>Title</i>
<i>GRO-21252-P01</i>	<i>-</i>	<i>Project Location Plan</i>
<i>GRO-21252-P04</i>	<i>1.1</i>	<i>Exploratory Hole Location Plan</i>
<i>GRO-21252-P05</i>	<i>1.1</i>	<i>Olfactory Evidence of Contamination Plan</i>
<i>GRO-21252-P09</i>	<i>1.1</i>	<i>Revised Illustrative CSM</i>

1.0 INTRODUCTION

1.1 Project Objectives

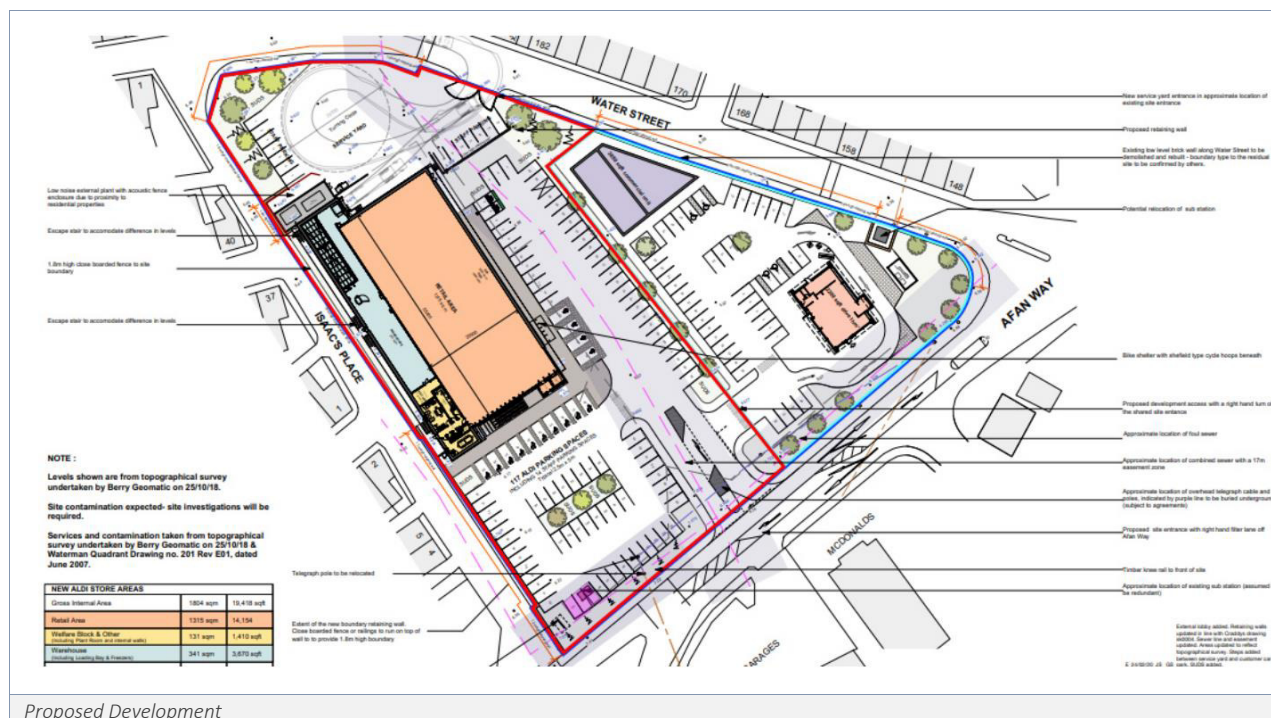
Groundtech Consulting Limited have been instructed by Craddys on behalf of Aldi Stores Ltd to undertake a Supplementary Ground Investigation for a site off Afan Way, in Port Talbot.

The objectives of the additional investigation were to address the comments presented in the appended NRW letter dated 23rd August 2023, the comments are outlined in Section 3.0.

A Supplementary Investigation was undertaken in accordance with BS 5930:2020, BS 10175:2017 and BS 8576:2013 to confirm the existing Generic Quantitative Risk Assessment (GQRA) and Conceptual Site Model (CSM), and further quantify the level of risk posed by the site. The Appraisal has been prepared in accordance with current UK Legislation and to discharge Land Quality pre-commencement planning conditions.

1.2 Proposed Development

The proposed development is commercial end-use comprising the construction of an Aldi retail store with service year and car parking. A separate drive thru unit and commercial unit will be constructed to the east of the Aldi Store.



The investigation was focused on the drive thru in the eastern section of site where the previous Petrol Filling Station (PFS) was situated.

1.3 Limitations

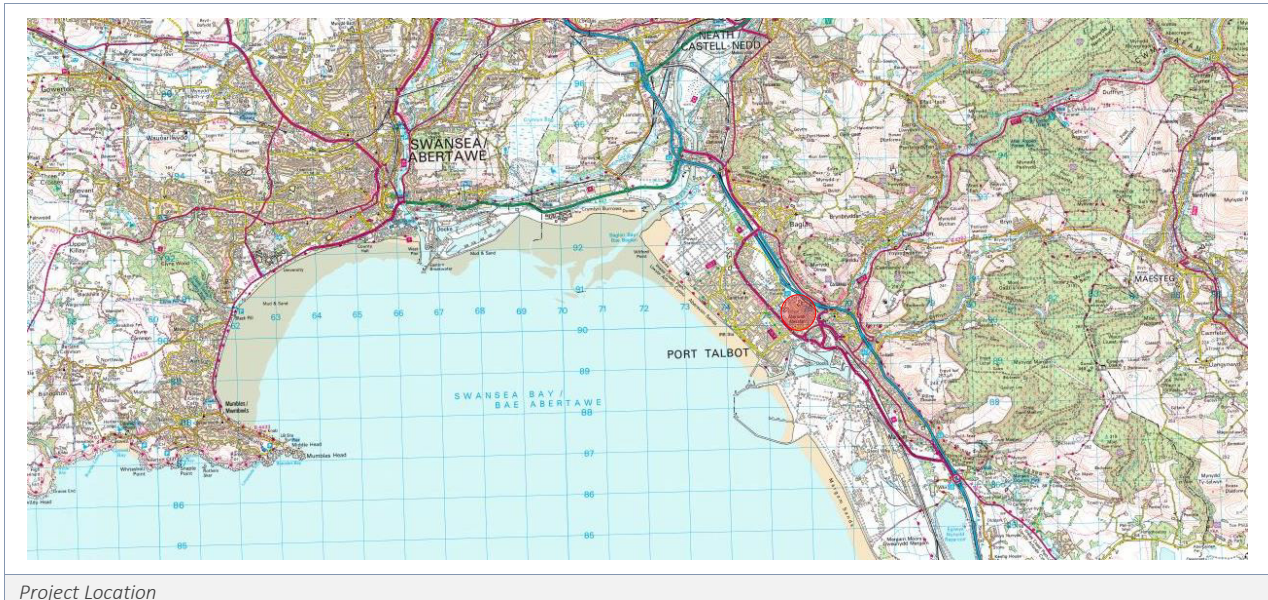
Other conditions may exist on the site that have not been taken into account in this assessment as they are outside the scope of works. Groundtech Consulting are not responsible for these circumstances that are not outlined in the report.

The assessment has been prepared for the exclusive use of the client. No third parties may rely on or reproduce the contents of the report without the written permission of Groundtech Consulting Limited. If any unauthorised third party comes into possession of the report they rely on it at their own risk and Groundtech Consulting Limited will not be obliged to provide a duty of care.

2.0 SITE SETTING

2.1 Location

The site is located circa 6.7 miles east of Swansea Town Centre, as shown on the Project Location Plan GRO-21252-P01 and is approximately centred on National Grid Reference 275907, 189837.



Access to the site is gained off Water Street to the north.

2.2 Site Description

The site is roughly triangular in shape covering an area of approximately 1.12 hectares, site elevations fall slightly from west to east.

Site Features

This investigation focuses on the area of the former PFS.

This area is located in the north eastern section of the site, which is currently unoccupied. At this position, soft landscaping is present at the surface comprising light vegetation including shrubbery and foliage.

Two small vegetated mounds exist in this area of site, with small trees, brambles and shrubbery present.

Remnants of a former development exists, with made Ground visible at the surface with several wooden sleepers identified.

Boundaries and Surrounding Area

The site boundary is delineated by a 2m high brick wall to the north east and 2m high metal hoarding around the remaining extents of the site. The site is bound by Water Street to the north, Afan Way to the east and Isaacs Place to the west.

The site is surrounded by following features/land uses:

- North - *Water Street and residential development*
- East - *Water Street and residential development*
- South - *River Afan and weir*
- West - *Isaacs Place and residential development*

Site photographs are presented in *Appendix 2*.

3.0 SUMMARY OF PREVIOUS WORK & REGULATORY LIASON

3.1 Introduction

Groundtech Consulting have prepared the Geo-Environmental Appraisal (Ref. *GRO-21252-3003*) issued December 2021. This report contains a detailed summary of the works undertaken by others (Quantum Geotechnical and Arcadis). A summary of the most prudent points as well as the most recent NRW comments is presented below.

3.2 Quantum and Arcadis Ground Investigations

Quantum Geotechnical carried out an investigation in 2016 and the following scope of works was undertaken:

- 6 No. cable percussive boreholes
- 19 No. windowless sampled boreholes
- 22 No. machine excavated trial pits
- 4 No. trial trenches

The investigation observed mild to very strong hydrocarbon odours, sheens, free phase hydrocarbons, and elevated TPH (Total Petroleum Hydrocarbons) and BTEX (benzene, toluene, ethylbenzene, xylene) in the tested soil samples and groundwater. Odours and sheens were noted both within the perched water, soils of the alluvial clay and in the water and soils of the underlying granular glaciofluvial materials. The locations with the highest occurrence of visual and olfactory contamination were associated with the former Petrol Filling Station (PFS).

Groundwater samples were obtained from the trial trenches during the investigation and reported significant concentrations of TPH and BTEX. Groundwater samples obtained during the post investigation monitoring reported elevated concentrations of BTEX and TPH in excess of the current Environmental Quality Standards (EQS), in the vicinity of the former PFS, but not in the location down water gradient of the former depot and its associated historic tanks.

Arcadis undertook a Ground Investigation in 2017. This investigation included 4 No. cable percussive boreholes, 18 No. machine excavated trial pits, and 20 No. laser induced fluorescence tests.

The investigation recorded strong hydrocarbon odours in the Made Ground and clay aquitard layer, but no notable odours within the underlying granular material. Groundwater testing recorded no TPH or BTEX exceeding the laboratory detection limits. Arcadis suggested that the findings of Quantum's 2015 investigation were false positives, representing water quality of shallow excavations, not that of the underlying granular glaciofluvial deposits. It should be noted that NRW have concerns with these findings as discussed in *Section 3.4*.

3.3 Groundtech Consulting Investigation

Groundtech Consulting completed an investigation in December 2021. The investigation comprised 4 No. cable percussive boreholes, 6 No. windowless sample boreholes, 15 No. machine excavated trial pits and in-situ geotechnical testing.

Moderate to strong odours were noted in locations across the site associated with both the former depot, and one location in the area of the former PFS. TPH and BTEX testing confirmed the presence of

hydrocarbons in some areas, and in other reporting results below the laboratory detection limit. None of the testing for TPH or BTEX was above the commercial screening value.

The report recommended the risk from contaminated soil to human health would be controlled by the proposed hardstanding, a cover system in areas of soft landscaping, and a vapour membrane in the vicinity of the former PFS.

Within the samples of groundwater collected and tested post investigation, there were no exceedances of the relevant EQS for TPH or BTEX.

It was concluded that the impermeable clay layer noted across the site was acting as an aquitard, preventing downward migration of contamination to the underlying granular materials. The perched water often associated with odours and sheens was not considered to be a concern due to its localised nature and discontinuity with the underlying aquifer and the River Afan. The proposed new site drainage would further mitigate any risk. It was noted that any free phase hydrocarbons should be removed if encountered.

3.4 National Resource Wales (NRW) Comments

NRW prepared a selection of comments in a letter dated 23rd August 2023. These are summarised below and the full letter is presented in *Appendix 3*.

It was noted that there were few details pertaining to the removal of the former PFS tanks on site. It was therefore suggested further sampling be undertaken in 'high risk' areas of the site, which includes the eastern area of site at the position of the former PFS. Only limited, localised evidence of hydrocarbon contamination was recorded in other parts of the site.

It was noted that Quantum had observed visual and olfactory evidence of contamination within the sandy clay and granular material underlying the site during their 2015 investigation. Very high concentrations of hydrocarbon were recorded within with samples collected from the 2015 works. It is suggested by Groundtech that the very high concentrations were generally associated with the samples of free phase hydrocarbons in the perched water in the Made Ground, collected from the trial trenches. All but one sample of soil (QTP09 at 3.0m begl) collected from locations with visual or olfactory evidence of contamination recorded levels of TPH and BTEX below the commercial screening value.

NRW raised their concerns that evidence of very strong odours has disappeared in two years (between the Quantum and Arcadis investigation) but notes Arcadis' comments relating to false positives. It is put forward by Groundtech that Arcadis didn't appear to refute the possibility of gross contamination, only that the elevated TPH and BTEX levels recorded in samples of groundwater from the granular glaciofluvial deposits were likely associated with the overlying perched water being introduced at the time of investigation.

It was highlighted that during the 2021 investigation, no boreholes were located within or down gradient of the former PFS, and that NRW had concerns regarding controlled waters. They suggested that further groundwater sampling be undertaken to demonstrate there is not a risk from the sites historical use to the River Afan.

4.0 SCOPE OF INVESTIGATION AND RATIONAL

4.1 Project Objectives

The aim of the fieldwork was to:

Provide further investigation in the area surrounding the former Petrol Filling Station (PFS)
Maintain watching brief for visual and olfactory evidence of contamination
Obtain samples using methodology in current guidance for contamination testing
Confirm pollution linkages to groundwater
Install monitoring standpipes for groundwater monitoring
Confirm groundwater pollution linkage CSM provided in the previous report.

4.2 Scope of Works

The following scope of works was completed between the dates of 15th April and 17th April 2024.

- 9 No. machine excavated trial pits (TP101 to TP109) were excavated by a JCB 3CX to a maximum depth of 3.0m begl
- 3 No. cable percussive boreholes (CP101, CP102 & CP103) were drilled to a maximum depth of 7.0m begl using a Dandon 2000 rig
- 5 No. windowless sample boreholes (WS101 to WS105) to a maximum depth of 3.0m begl with a Dando Terrier rig

The exploratory hole locations are presented on Groundtech Plan GRO-21252-P12 and the exploratory hole logs are in *Appendix 4*.

The exploratory holes were positioned to establish to investigate the ground in the area and down gradient of the former PFS, as summarised in the table below:

Location	Target Rationale
WS102, TP101, TP103	Tank A
WS103, TP101	Tank B
WS103	Tank C
CP101	Fuel Supply Lines
WS104, TP101, TP107	Former Pump Islands
CP103, TP104, TP108	Coverage
CP101 to CP102, WS101, WS102, WS104, WS105, TP101, TP102, TP106, TP109	Downgradient of PFS tanks

The exploratory holes were logged by a suitably experienced geo-environmental engineer in general accordance with the following current guidance:

- BS 5930 'Code of Practice for Site Investigations' 2020
- BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil'

4.3 Soil Sampling

During the intrusive investigation, representative samples were taken at regular intervals, changes of strata and where evidence of contamination existed. Laboratory analysis was scheduled on the samples obtained.

The samples obtained are summarised in the table below:

Soil Sample	Number
<i>Environmental Sample</i>	45
<i>Bulk Sample</i>	9

The samples have been obtained in accordance with current environmental and geotechnical guidance. The sampling plan has been designed obtain samples from all required strata using the correct methodology.

Disturbed samples of soil for geo-environmental testing were placed in the correct sampling containers as required by the laboratory in accordance with their MCERTS and UKAS Accreditation. Transportation was arranged in a timely manner and the samples were at the correct temperature.

The sample locations and depths are recorded on the exploratory logs.

4.4 Geo-Environmental Testing

To meet the requirements set out by NRW the following geo-environmental testing was scheduled to assess the risk from contamination on the site. The testing is based on the potential sources identified in the PRA and observations during the Ground Investigation.

Contaminant of Concern (CoC)	Matrix	Number
<i>Arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc, cyanide, phenol, sulphate and pH</i>	<i>Soil</i>	9
<i>Asbestos Screening</i>	<i>Soil</i>	9
<i>Total Petroleum Hydrocarbons inc BTEX (TPH CWG)</i>	<i>Soil</i>	9
<i>Speciated Polycyclic Aromatic Hydrocarbons (PAHs)</i>	<i>Soil</i>	9
<i>Volatile organic compounds (VOCs)</i>	<i>Soil</i>	4
<i>Arsenic, barium, beryllium, boron, cadmium, total chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, CaCO₃, chromium III, organic carbon, phenols, sulphate, cyanide, hexavalent chromium, pH</i>	<i>Groundwater</i>	3
<i>Volatile Organic Compounds (VOCs)</i>	<i>Groundwater</i>	3
<i>Total Petroleum Hydrocarbons inc BTEX (TPH CWG)</i>	<i>Groundwater</i>	3

The Geo-Environmental testing results for soils are presented in *Appendix 5* and the groundwater results are in *Appendix 6*.

4.5 Groundwater Monitoring

Groundwater monitoring installations were constructed in the boreholes. The standpipes consisted of high-density polyethylene (HDPE) pipe - a bentonite seal was placed around the plain pipe and a clean gravel pack was placed around the slotted pipe. A summary of the installation construction is presented in the table below:

Location	Depth (m begl)	Response Zone (m begl)	Targeted Strata	Reason
CP101	7.0	3.5 – 7.0	Granular natural	Groundwater
CP102	7.0	3.5 – 7.0	Granular natural	Groundwater
CP103	7.0	4.0 – 7.0	Granular natural	Groundwater
WS101	2.0	1.0 – 2.0	Made Ground	Groundwater
WS102	2.5	0.5 – 2.5	Made Ground	Groundwater
WS103	1.8	0.8 – 1.0	Made Ground	Groundwater
WS104	1.5	0.5 – 1.5	Made Ground	Groundwater
WS105	2.0	1.0 – 2.0	Made Ground	Groundwater

The groundwater levels are provided in *Appendix 7*.

4.6 Groundwater Sampling

Well development was carried out to ensure no cross contamination from the drilling activities remained in the water column in the well. During the return visit, the installations were purged to a minimum three times the volume of the water column in the borehole prior to sampling, samples were taken between 7 and 17 days after installation.

Purging was undertaken at a slower rate than the well development, and the sampling at a slower rate again.

The method of sampling selected was using low flow sampling due to the contamination identified during the previous ground investigations.

Where possible a water meter was used to test the pH, temperature and conductivity before sampling until equilibrium conditions were met in accordance with BS 10175 guidelines.

Samples were sent to the UKAS Accredited laboratory the same day, sampling was carried out in general accordance with BS 5930 and BS 5667.

4.7 Vapour Survey - Photo Ionisation Detector

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation. Soil was collected for onsite testing, a plastic bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested for Total Volatile Organic Compounds (TVOCs) using a Photo Ionisation Detector (PID).

Results of the PID readings are presented on the exploratory hole logs. The on-site monitoring was carried out in line CIRIA C665 to aid targeting samples for VOC laboratory analysis.

The results are summarised in *Section 5.0* below.

5.0 GROUND MODEL

5.1 Made Ground

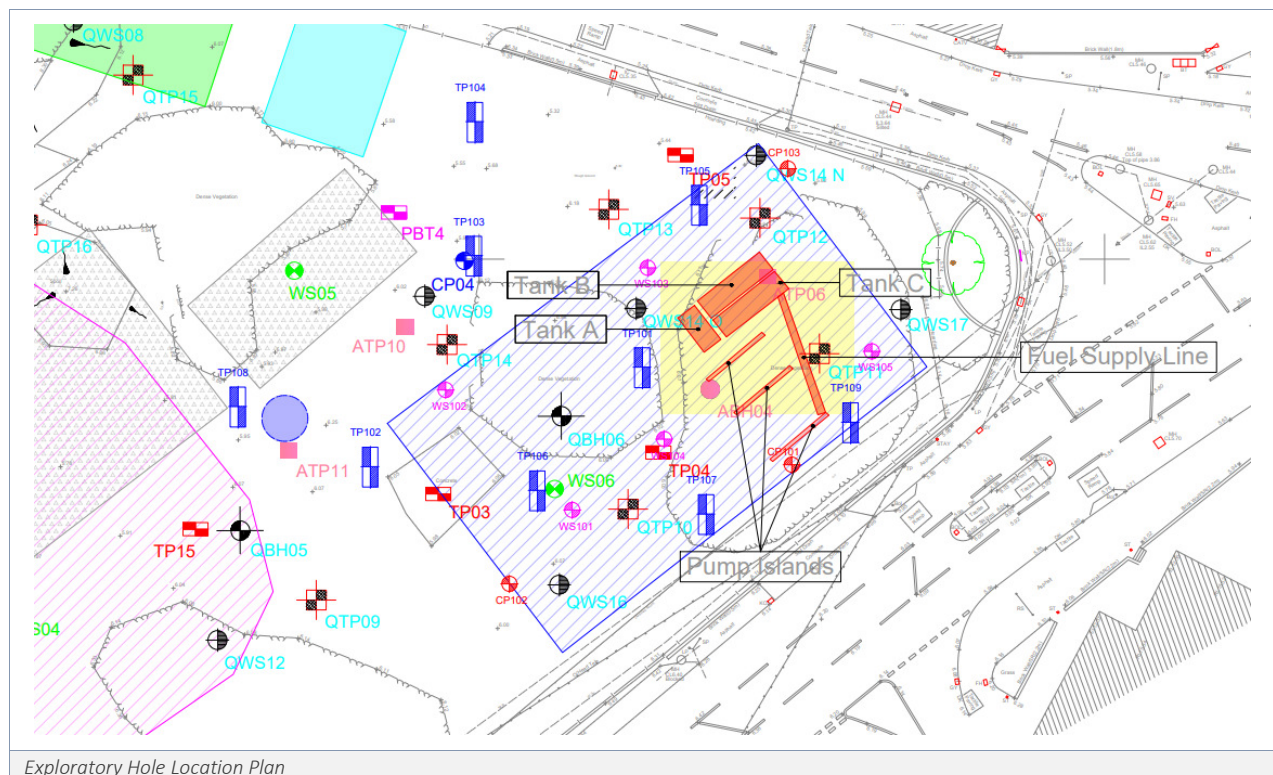
Made Ground was encountered in all exploratory hole locations to depths of between 0.7m and 2.6m begl. The surfacing of site generally comprised topsoil with minor constituents of concrete and brick to a maximum depth of 0.1m begl. In WS105 and TP107, asphalt was noted from ground level to 0.1m begl, the topsoil Made Ground was absent here.

Underlying the topsoil and asphalt surfacing, concrete was encountered in WS101, WS105, TP104, TP106, and TP108. The concrete was up to 0.2m thick achieving a maximum depth of 0.3m begl.

One main Made Ground population was encountered and is described below:

1. *Dark brown grey sandy angular to subangular fine to coarse ashy gravel of brick, coal, concrete and clinker in all exploratory holes to depths of between 0.7m and 2.6m begl and was between 0.6m and 2.5m in thickness. The base of this stratum was not proven in WS105 only.*

The above Made Ground population was encountered in all previous exploratory holes investigated by Quantum, Arcadis and Groundtech in the area of the former PFS tanks.



5.2 Superficial Deposits

In all locations where the base of the Made Ground was proven cohesive alluvium deposits were recorded. This stratum was described as a soft sandy Clay with lenses of fine to coarse sand to maximum depths of between 2.1m begl and 4.0m begl.

Granular Glaciofluvial Deposits comprising sandy Gravel were recorded in the cable percussive boreholes and WS101 underlying the cohesive alluvium. This was encountered to a depth of 7.0m bgl, with the thickness not being proven.

5.3 Groundwater

Details of groundwater encounters at the site are detail below:

- Strike within CP101 at 4.2m bgl rising to 3.0m bgl after 20 minutes
- Strike within CP102 at 4.0m bgl rising to 3.0m bgl after 20 minutes
- Strike within CP103 at 4.0m bgl rising to 3.1m bgl after 20 minutes.

During the monitoring following the investigation, groundwater levels ranged from 2.75m to 2.92m begl in the three standpipes installed in CP101, CP102 and CP103.

5.4 Watching Brief

A watching brief was maintained during the Ground Investigation for visual and olfactory evidence of contamination.

Visual evidence of contamination was commonly observed in the granular Made Ground population in the form of ash and clinker. A black hydrocarbon staining was also noted in the top 0.2m of natural clay in TP102 at 2.6m begl.

Olfactory evidence of contamination was noted in the base of the granular Made Ground and top of the soft natural Clay. A faint but occasionally moderate to strong hydrocarbon odour was recorded. A summary of the visual/olfactory evidence of contamination recorded is provided below.

Location	Depth (m bgl)	Strata	Evidence of Contamination
CP101	2.0	Natural Clay	Faint hydrocarbon odour
CP101	3.0	Natural Gravel	Moderate hydrocarbon odour
WS101	2.1	Natural Clay	Moderate hydrocarbon odour
WS102	2.0	Natural Clay	Moderate hydrocarbon odour
TP102	2.4	Made Ground: Granular	Faint hydrocarbon odour
TP102	2.7	Natural Clay	Faint hydrocarbon odour & black staining
TP106	2.1	Natural Clay	Strong hydrocarbon odour
TP107	2.2	Natural Clay	Moderate hydrocarbon odour
TP108	2.0	Natural Clay	Faint hydrocarbon odour

5.5 Excavation Stability

The trial pits were frequently unstable within the Made Ground.

6.0 LAND QUALITY

6.1 Geo-Environmental Testing Results - Soils

Samples of Made Ground and cohesive alluvium have been tested for a range of relevant Contaminants of Concern. In accordance with LCRM, a Generic Quantitative Risk Assessment (GQRA) has been undertaken to determine the significance of the concentrations as derived through Geo-Environmental testing.

The GQRA process comprises the comparison of the actual concentrations measured on site with Generic Assessment Criteria (GACs) for the protection of human health.

The GACs used for the assessment of soil concentrations have been derived using the CLEA model. The GACs used are listed below:

- *Soil Guideline Values (SGVs) which demonstrate minimal risk.*
- *LQM/CIEH S4ULs which use the same toxicological data as the SGVs but different exposure criteria.*
- *C4SLs which demonstrate low risk.*

In deriving the GACs for use on Brownfield sites we have assumed a 1% Soil Organic Matter.

The proposed end-use for the site is a commercial development, comprising a new supermarket, hardstanding and soft landscaping. We have therefore undertaken the GQRA on the basis that the proposed development site falls under the commercial land-use scenario as defined in SR3 (EA, 2009b).

The strata or sources of contamination targeted by the laboratory testing scheduled is summarised in the table below:

Strata	Number of Samples Tested	Locations
<i>Made Ground</i>	7	<i>CP101, CP102, TP101, TP102, TP103, WS103, WS105</i>
<i>Cohesive Alluvium</i>	2	<i>TP106, TP107</i>
<i>PFS</i>	3	<i>TP101, TP103, WS103</i>
<i>Downgradient of PFS</i>	9	<i>CP101 to CP102, TP102, TP106, TP107, TP109, WS101, WS104 & WS105</i>
<i>Fuel Supply Line</i>	1	<i>CP101</i>
<i>Pump Islands</i>	1	<i>TP107</i>

A summary of the Geo-Environmental Testing results is presented below and the GQRA screening values are presented in *Appendix 8*.

Contaminant	Range (mg/kg)	Metals		
		Screening value (mg/kg)	Exceedances	Locations
<i>Arsenic</i>	<i>4.8 – 60.9</i>	<i>640</i>	-	-
<i>Cadmium</i>	<i><0.1 – 3.1</i>	<i>230</i>	-	-
<i>Chromium (total)</i>	<i>38.5 – 110.8</i>	<i>8,600</i>	-	-
<i>Hexavalent Chromium</i>	<i><0.3 – 1.5</i>	<i>49</i>	-	-
<i>Copper</i>	<i>11 - 472</i>	<i>68,000</i>	-	-
<i>Lead</i>	<i>15 - 569</i>	<i>2,300</i>	-	-
<i>Mercury</i>	<i><0.1 – 1.5</i>	<i>1,100</i>	-	-

Nickel	21.3 – 60.7	980	-	-
Selenium	<1.0 – 2	13,000	-	-
Zinc	90 – 2,303	730,000	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)				
Contaminant	Range (mg/kg)	Screening value (mg/kg)	Exceedances	Locations
Naphthalene	<LoD – 11.8	190	-	-
Acenaphthylene	<LoD – 9.22	83,000	-	-
Acenaphthene	<LoD – 3.9	84,000	-	-
Fluorene	<LoD – 33.7	63,000	-	-
Phenanthrene	<LoD – 111.2	22,000	-	-
Anthracene	<LoD – 55.1	520,000	-	-
Fluoranthene	<0.03 – 107.1	23,000	-	-
Pyrene	<LoD – 78.8	54,000	-	-
Benzo(a)anthracene	<LoD – 59.2	170	-	-
Chrysene	<LoD – 51.9	350	-	-
Benzo(b)fluoranthene	<LoD – 57.7	44	1	WS105 @ 0.3m
Benzo(k)fluoranthene	<LoD – 22.4	1,200	-	-
Benzo(a)pyrene	<LoD – 41.9	35	1	WS105 @ 0.3m
Indeno(123cd)pyrene	<LoD – 25.8	500	-	-
Dibenzo(ah)anthracene	<LoD – 8.4	4	1	WS105 @ 0.3m
Benzo(ghi)perylene	<LoD – 23.4	3,900	-	-
TPH CWG - Aliphatics				
Contaminant	Range (mg/kg)	Screening value (mg/kg)	Exceedances	Locations
>C5-C6	<LoD	3,200	-	-
>C6-C8	<LoD – 5.8	7,800	-	-
>C8-C10	<LoD – 2.9	2,000	-	-
>C10-C12	<LoD – 5.9	9,700	-	-
>C12-C16	<LoD – 12	59,000	-	-
>C16-C21	<LoD – 57	1,600,000	-	-
>C21-C35	<LoD – 390	1,600,000	-	-
TPH CWG - Aromatics				
Contaminant	Range (mg/kg)	Screening value (mg/kg)	Exceedances	Locations
>C5-EC7	<LoD	26,000	-	-
>EC7-EC8	<LoD	56,000	-	-
>EC8-EC10	<LoD – 0.2	3,500	-	-
>EC10-EC12	<LoD – 7.6	16,000	-	-
>EC12-EC16	<LoD – 153	36,000	-	-
>EC16-EC21	<LoD – 952	28,000	-	-
>EC21-EC35	<LoD – 1,679	28,000	-	-
Volatile Organic Compounds (VOCs)				
Contaminant	Range (ug/kg)	Screening value (mg/kg)	Exceedances	Locations
MTBE	<LoD – 91	-	-	-
Benzene	<LoD – 23	-	-	-
Toluene	<LoD – 21	-	-	-

Ethylbenzene	LoD - 39	-	-	-
m/p-Xylene	<LoD - 215	-	-	-
o-Xylene	<LoD - 79	-	-	-
Chloromethane	<LoD - 6	-	-	-
Tetrachloroethene (PCE)	<LoD - 4	19	-	-
Isopropyl benzene	<LoD - 7	-	-	-
Propyl benzene	<LoD - 20	-	-	-
1,3,5-Trimethylebenzene	<LoD - 32	-	-	-
1,2,4-Trimethylbenzene	<LoD - 199	-	-	-
Others				
Organic Matter	1.3 – 53.3%			
Asbestos	ND			
pH	6.7 – 8.9			
Asbestos Screen				
Position	Depth (m begl)	Result	Quantification	
WS01	0.15	None Detected	n/a	
WS02	0.20	None Detected	n/a	
WS03	0.10	None Detected	n/a	

In addition to the lab testing PID testing was undertaken on site. The results are summarised below with the full results on the logs in *Appendix 4*.

Strata	Range of results (PPM)
Made Ground	0 - 12
Cohesive alluvium	2 - 10
Granular glaciofluvial	3 - 5

6.2 Generic Quantitative Risk Assessment - Soils

The additional testing in the area around the former PFS has not highlighted any visual or olfactory evidence of contamination or high PID readings, and the laboratory testing has returned results consistent with those recorded during the previous Groundtech investigation.

Metals

No elevated concentrations of heavy metals have been recorded based on the commercial development of site.

Speciated Polycyclic Aromatic Hydrocarbons (PAHs)

Elevated levels of Benzo(a)pyrene, Dibenzo(ah)anthracene and Benzo(b)fluoranthene have been recorded locally to WS105 at 0.3m begl in the granular ashy Made Ground population. No other elevated concentrations were detected in any of the other samples screened. The source of the PAHs is considered to be the ash content of the Made Ground, this is further demonstrated as no olfactory evidence of contamination was noted indicating ash source.

Total Petroleum Hydrocarbons (TPH CWG)

Detectable levels of Aliphatic (EC6 to EC35) and Aromatic (EC8 to EC35) have been recorded in samples of the Made Ground and natural cohesive ground screened. However, no elevated levels of TPH have been identified in any of the samples screened based on the site being developed commercially. The testing is consistent with previous investigations and indicates that the majority of the concentrations are heavier end hydrocarbon fractions. The detectable levels are indicated to be ash/clinker sourced based on all of the makeup generally being aromatic and heavier end, together with generally no high PID readings being noted.

BTEX

No elevated concentrations of BTEX have been recorded in any of the nine samples screened with the majority being below the stringent laboratory detection limits. This is with the exception of slight detectable levels of Ethylbenzene and mp Xylene in the granular Made Ground at CP101 (1.0m begl) and levels of BTEX in the natural cohesive of TP106 at 2.2m begl. The source of this is considered to be residual contamination present associated with the former PFS.

Asbestos

Asbestos has not been detected in any of the nine samples screened.

Other Contaminants

No elevated VOCs have been detected through the laboratory testing with the majority being recorded beneath the laboratory detection limits and no significantly high PID readings were noted during the investigation.

Given these findings the recommendations and conclusions present in the previous Groundtech report issued in December 2021 are still considered relevant for the commercial redevelopment of this site.

An updated evidence of contamination plan has been produced Referenced *GRO-21252-P05_1.1*.

6.3 Geo-Environmental Testing Results - Groundwater

Three samples of groundwater were taken from cable percussive borehole installations and were tested for a similar suite of Contaminants of Concern (CoC) as the soils. The results have been compared to a selection of guidance documents as detailed at the rear of this report.

The implementation of the Water Framework Directive (WFD) is to protect and enhance the quality of groundwater and groundwater-dependent ecosystems. The objective of the WFD requires all groundwater bodies (GWBs) to be of 'good' status in terms of water quality. This status is based on thresholds for the chemical constituents of groundwater and their impact on ecosystems. Preventing pollution is by far the most sustainable and cost-effective way of maintaining good groundwater quality. The EA are committed to the 'prevent or limit' approach reflected in EU and domestic legislation.

Priority is under the Water Framework Directive to protect water supplies intended for human consumption and ensure protection of groundwater quality that supplies dependent ecosystems. After first guidance in 1992 the following significant guidance has been introduced:

- *Water Framework Directive (2000/60/EC) and the Water Act 2003.*
- *The State of Groundwater in England and Wales 2006.*
- *Second phase of the environmental permitting regime in 2010 replacing the Groundwater Regulations (1999, 2009).*
- *Groundwater Daughter Directive.*

Pollutants can be divided into those that break down easily (degradable pollutants) and those that do not (non-degradable pollutants). The Water Framework Directive introduced the concept of 'hazardous substances' and 'non-hazardous pollutants', which replaced the previous List I and List II of substances considered to pose the greatest threat to the environment.

- *Hazardous substances* are the most toxic and must be prevented from entering groundwater. Substances in this list may be disposed of to the ground, under a permit, but must not reach groundwater. They include pesticides, sheep dip, solvents, hydrocarbons, mercury, cadmium and cyanide.
- *Non-hazardous pollutants* are less dangerous and can be discharged to groundwater under a permit but must not cause pollution. Examples include sewage, trade effluent and most wastes. Non-hazardous pollutants include any substance capable of causing pollution and the list is much wider than the previous List II of substances. For example, nitrate is now a non-hazardous pollutant whereas before it was not a List II substance.

Polluting substances in groundwater can occur as a gas (gaseous phase) or dissolved in water (aqueous phase), or as a non-aqueous phase liquid (NAPL). Some pollutants include substances that dissolve readily in water. These are said to have high solubility; an example is MTBE. Substances that have low solubility (such as oil) are referred to as non-aqueous phase liquids (NAPLs). NAPLs behave differently in groundwater depending on whether they are lighter or heavier than water. Light non-aqueous phase liquids (LNAPLs) may float on the water table whereas dense non-aqueous phase liquids (DNAPLs) may sink through the aquifer until they reach an impermeable layer. They may then generate plumes of contamination. In both cases, the slowly dissolving pollutant may form a plume of dissolved contamination which moves with the groundwater flow.

A table summarising the groundwater testing results is presented below.

Metals				
Contaminant	Range (ug/l)	EQS (ug/l)	Exceedances	Locations
<i>Dissolved arsenic</i>	<LoD	50	-	-
<i>Dissolved barium</i>	21 – 41	-	-	-
<i>Dissolved beryllium</i>	<LoD	-	-	-
<i>Dissolved boron</i>	137 – 222	5	-	-
<i>Dissolved cadmium</i>	<LoD	0.08 – 0.25	-	-
<i>Total dissolved chromium</i>	<LoD	4.7	-	-
<i>Dissolved copper</i>	<LoD	10 – 28	-	-
<i>Dissolved lead</i>	<LoD	1.2	-	-
<i>Dissolved mercury</i>	<LoD	0.07	-	-
<i>Dissolved nickel</i>	<LoD	20	-	-
<i>Dissolved selenium</i>	<LoD	10	-	-
<i>Dissolved vanadium</i>	<LoD	-	-	-
<i>Dissolved zinc</i>	<LoD	75 - 125	-	-
<i>Hexavalent chromium</i>	<LoD	3.4	-	-
Volatile Organic Compounds				
Contaminant	Range (ug/l)	EQS (ug/l)	Exceedances	Locations
<i>MTBE</i>	<LoD – 5.9	15	-	-

<i>Benzene</i>	<LoD	10	-	-
<i>Toluene</i>	<LoD	74	-	-
<i>Ethylbenzene</i>	<LoD	300	-	-
<i>m/p-Xylene</i>	<LoD	30	-	-
<i>o-Xylene</i>	<LoD	30	-	-
TPH CWG – Aliphatics				
Contaminant	Range (ug/l)	EQS (ug/l)	Exceedances	Locations
>C5-C6	<LoD – 51	15,000	-	-
>C6-C8	<LoD – 152	15,000	-	-
>C8-C10	<LoD – 42	300	-	-
>C10-C12	<LoD	300	-	-
>C12-C16	<LoD – 130	300	-	-
>C16-C35	<LoD – 90	-	-	-
TPH CWG – Aromatics				
Contaminant	Range (ug/l)	EQS (ug/l)	Exceedances	Locations
>C5-EC7	<LoD	10	-	-
>EC7-EC8	<LoD	74	-	-
>EC8-EC10	<LoD	300	-	-
>EC10-EC12	18 - 51	90	-	-
>EC12-EC16	<LoD – 80	90	-	-
>EC16-EC21	<LoD	90	-	-
>EC21-EC35	<LoD	90	-	-
Others				
<i>Total Hardness</i>	256 – 380mg/l			
<i>Total phenols</i>	<LoD			
<i>Total cyanide</i>	<LoD			
<i>Sulphate as SO4</i>	28.6 – 67.1mg/l			
<i>Dissolved organic carbon</i>	<LoD			
<i>pH</i>	7.48 – 7.84			

All of the VOCs tested for were recorded at concentrations below the laboratory limits of detection.

6.4 Generic Quantitative Risk Assessment - Groundwater

The groundwater flow direction is indicated to be south east towards the River Afan which lies circa 90m south of the site. The boreholes were positioned in the southern and eastern end of the PFS to target the potential contaminated groundwater based on a south/south east flow direction.

No visual or olfactory evidence of contamination has been noted in the aquifer during this phase of investigation and none of the tested CoC have been in excess of the relevant EQS. Previous testing undertaken by Goundtech in the PFS area have also indicated that no elevated CoCs are present, this is demonstrated as no elevated levels of metals, PAHs, TPHs or VOCs were recorded in CP04. Previous investigations in this area also demonstrated no elevated CoCs with the exception of the Quantum Investigation in 2015, which indicated elevated levels of TPHs were noted immediately west and north of the PFS. Negligible PID readings were noted during the groundwater sampling visits.

Evidence of hydrocarbon contamination was noted in the shallow natural soils in the form of a black staining and faint to moderate, occasionally strong hydrocarbon odour. The previous investigations undertaken by Quantum and Burrows Yard also indicated hydrocarbon odours and occasional discoloration/staining in the PFS area, the postulated extent is provided on *GRO-21252-P04*.

Perched water was not encountered during the monitoring and the groundwater samples were obtained from the underlying superficial aquifer. No evidence of LNAPL or DNAPL was recorded during the Ground Investigation or during the groundwater monitoring programme. However, the previous investigation undertaken by Quantum in 2015 had recorded evidence of free phase contamination in the top of the natural clay of QTT01, which is positioned south west of the PFS. The previous Groundtech investigation had also recorded a sheen on the perched groundwater in the Made Ground of TP06 beneath the former PFS.

The concerns of NRW relate to the possible pollutant release from the historic PFS in the eastern end of the site. The Ground Investigation confirms the Underground Storage Tanks and associated below ground apparatus have been removed. The investigation also indicates the secondary source in the soils has predominantly been removed, if leakages had occurred. Residual contamination was observed in the Made Ground and surface of the cohesive soils acting as an aquitard. The groundwater sampling results confirms there has been no impact of the groundwater in the aquifer from the PFS or associated fuel pumps and islands. Furthermore, there is no evidence that the perched groundwater which has previously recorded elevated contaminants of concern in previous investigations, has impacted the underlying aquifer.

In the PFS area, the clay aquitard is up to 2.3m in thickness preventing the migration of contaminants. Furthermore, no perched groundwater was recorded during this investigation and the groundwater monitoring. The previous perched water encountered is considered to be residual water associated with the past development and is no longer present.

The aquifer is confined and protected by the aquitard, during the investigation the groundwater was encountered at 4.0m to 4.2m and rose to circa 3m begl.

The NRW comments have suggested that there is inadequate coverage of the PFS and suggested further sampling in accordance with BS: 101075. The additional sampling has been undertaken. The supplementary investigation of the high risk area (PFS) has determined that the primary and secondary sources of contamination have been removed and no elevated contaminants are present in the underlying aquifer. It is likely the contamination encountered by Quantum in 2015 was the result of cross contamination or poor sampling protocols.

The supplementary PFS investigation indicates that there is no impactation of the aquifer and therefore no impactation of the River Afan, located circa 90m east/south east of site.

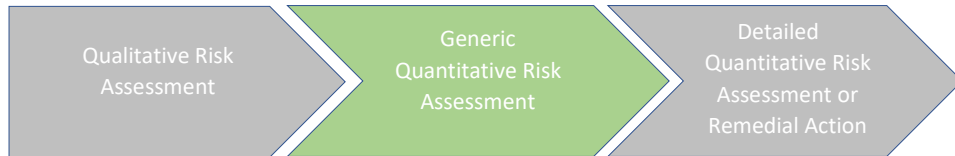
As such the GQRA for groundwater presented within the previous Groundtech Geo-Environmental Appraisal is considered relevant and should be referred to for the proposed development. The findings of the supplementary investigation also support the recommendations in the Piling Risk Assessment (Ref. *GRO-21252-4757*, dated June 2023).

All installation should be decommissioned in accordance with EA guidance.

6.5 Pollution Linkage Assessment

The CSM has been revised based on the Ground Investigation and testing using Source-Pathway-Receptor assessment criteria that is applicable in the UK, a risk assessment has been completed to determine if a plausible pollution linkage exists between the identified contaminants and receptors. The risk classification has been estimated in accordance with the CIRIA C552 assessment criteria outlined in *Appendix 9*.

Human Health Pollution Linkage Assessment



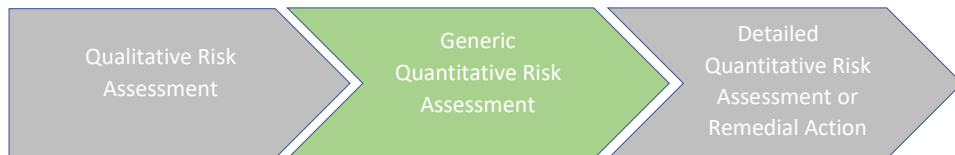
- The table below represents the second stage in the land quality risk assessment process - **the Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL1	Contaminated Soils	Ingestion of soil and dust. Dermal contact with soil.	Unlikely	Medium	Low	Pollution Linkage 1 refers to proposed site users encountering contaminated soils on the site. Made Ground was encountered to a maximum proven depth of 2.9m bgl through all phases of investigation. Evidence of contamination was noted locally across the site associated with the historical industrial uses, however laboratory analysis has indicated that the only minor exceedances when compared to the screening values for a commercial development relates to Dibenzo(ah)anthracene within TP02 at a depth of 0.3m bgl and Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenzo(ah)anthracene in TP105 at 0.3m bgl. No other elevated CoC were recorded including from the previous investigation when compared to commercial screening levels. Asbestos has not been detected in this investigation however previous investigations indicate that the asbestos is widespread. As the proposed development is to be predominantly covered with hardsurfacing, no plausible pollution linkage is considered to exist.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
						<i>In areas where soft landscaping will be present, a cover system will be required with a hard dig layer to prevent the disturbance of contaminated soils.</i>
PL2	Contaminated Soils	Inhalation of vapour.	Unlikely	Medium to Severe	Moderate	<i>Gross hydrocarbon contamination has not been identified beneath the site and generally the results of PID were low. In addition, the geo-environmental testing has not recorded any hydrocarbons in the volatile range.</i> <i>Based on the results of this investigation and previous Groundtech investigation, a viable pollution linkage has not been identified. However, volatile contamination was identified by the Quantum investigation.</i> <i>Based on the results of the Quantum investigation, a vapour resistant membrane is recommended in the vicinity of the former PFS and the gas assessment (GRO-21252-3237) should be referred to.</i>
PL3	Contaminated Soils	Inhalation of soil dust by adjacent site users.	Unlikely	Medium	Low	<i>Significant mobile contamination has not been detected by the Ground Investigation and the subject site is indicative of the wider area. Therefore, a realistic pollution is not considered to exist.</i>
PL4	Contaminated Soils	Attacking potable water supply pipe.	Low Likelihood	Medium	Moderate	<i>This pollution linkage 4 refers to the possible contaminants permeating potable water pipes and consumption by the future site end users of the tainted water supply. Made</i>

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
						Ground has been identified to a maximum depth of 2.9m begl. Evidence of organic contamination has been identified. New potable water supply pipes will be included as part of the development and a local water company risk assessment should be carried out prior to construction to advise on the level of protection required for the potable water supply. The pipes are likely to be upgraded from standard PE to Barrier Pipe.
PL5	Ground Gas	Migration and accumulation of ground gas in internal spaces.	Low Likelihood	Medium to Severe	Moderate	The previous gas assessment undertaken by Groundtech Consulting (Ref. GRO-21252-3237, dated April 2022) should be referred to for gas recommendations. CS2 conditions in the position of the former PFS area and a vapour membrane alongside gas protection measures is required for this area. The site is not in an area requiring radon precautions.

Controlled Waters Pollution Linkage Assessment



- The table below represents the second stage in the land quality risk assessment process – **Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL6	Contaminated Soils	Impaction of groundwater from soil contamination (diffuse and point). Impaction of groundwater from groundwater plume.	Unlikely	Medium	Low	Pollution Linkage 6 refers to the impaction of the Secondary A Aquifer beneath the site. The perched groundwater was highly localised and due to the proposed new drainage system is not considered to be a risk, there is also no pathway to the underlying confined aquifer. If free phase hydrocarbons are observed during the enabling and construction phase, it should be removed as a minimum. Water bearing Sand and Gravel was encountered beneath the Estuarine Clay Deposits. Groundwater sampling and testing confirmed that there was one slight exceedance in Chromium from four samples that were tested from previous investigation, when compared to the EQS levels. This is likely to be at least somewhat impaired by the numerous historical industrial land uses in the surrounding area. No elevated contaminants of concern have been recorded in the groundwater samples obtained in the supplementary investigation targeting the areas of concern (PFS).

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
						<i>The aquifer has not been impacted and a plausible pollution linkage to groundwater is not considered to exist.</i>
PL7	Contaminated Soils	Migration of soil and groundwater contamination impacting surface waters.	Unlikely	Medium	Low	<i>Pollution Linkage 7 refers to the impaction of River Afan circa 86m south of the site from contaminated soils and groundwater.</i> <i>The aquifer will be in hydraulic continuity with the River Afan, however the supplementary investigation has confirmed the aquifer has not been impacted. The supplementary investigation has indicated that there is no mobile contamination immediately downgradient of the PFS.</i> <i>Contamination from the previous investigations was found to be predominantly perched and immobile within the Made Ground.</i> <i>No migration pathway has been identified and a realistic pollution linkage does not exist.</i>

7.0 FINAL APPRAISAL

The further investigation and testing requested by NRW has been completed, with findings consistent with the findings of Groundtech Consultings initial phase on investigation. Visual and olfactory evidence of contamination in the form of a hydrocarbon odour and black staining was noted in the top of the natural clay deposits. The subsequent testing has recorded minor PAH exceedance within the Made Ground. No concentrations of contaminants of concern were present in the groundwater above the EQS levels and no remedial action is required with respect to controlled waters.

As a consequence of this investigation, the GQRA for soils and groundwater are unchanged, along with the remedial recommendations. A summary of the remedial recommendations is presented below:

- *Give the presence of minor PAH exceedances and asbestos within the Made Ground, a cover system will be required. The majority of the proposed development will be covered with hardstanding, which will provide a solid barrier between the Made Ground and end users. In areas of soft landscaping this should be in the form of a 600mm thickness of clean subsoil and topsoil, with a 100mm thick hard dig layer and a soil demarcation barrier. The depth of the cover system should be validated.*
- *Groundtech understand that the waste soil stockpiles will be removed from site. It may be cost effective to retain waste soils, however this should be confirmed by further testing.*
- *The testing has shown that the main groundwater body within the granular Glaciofluvial Deposits has not been impacted and no remedial work is required with respect to groundwater. A piling risk assessment (Ref. GRO-21252-4745, dated June 2023) has now been completed to ensure no contamination pathways are created. This is subject to approval from NRW.*
- *Localised perched groundwater has been encountered. If free phase hydrocarbons are encountered during the enabling groundworks this should be removed from site to a suitable waste facility.*
- *Based on findings of previous investigations there is potential for vapour emissions from pockets of contamination within the Made Ground and cohesive alluvium. A vapour resistant membrane should be installed in the vicinity of the former PFS and tanks.*
- *A watching brief should be maintained during the works, and if any grossly contaminated soils are encountered work should cease and Groundtech Consulting contacted. The historic removal of the underground fuel storage tanks should be confirmed during the enabling works.*
- *A local water company risk assessment is required to determine the potable water pipe materials.*
- *Regulatory approval should be obtained prior to the development to discharge any pre-commencement planning conditions.*

The supplementary investigation has been designed to address the queries provided by NRW and should be submitted for comment. The development should not be progressed before approval has been received from NRW.

8.0 RELEVANT INDUSTRY REFERENCES

British Standards Institution. *Investigation of Potentially Contaminated sites - code of practice*. BS 10175:2017.

British Standards Institution '*Code of Practice for Site Investigations*' BS 5930:2020.

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Department of the Environment. 1995. Industry Profiles - 48 separate publications available from The Stationery Office, London

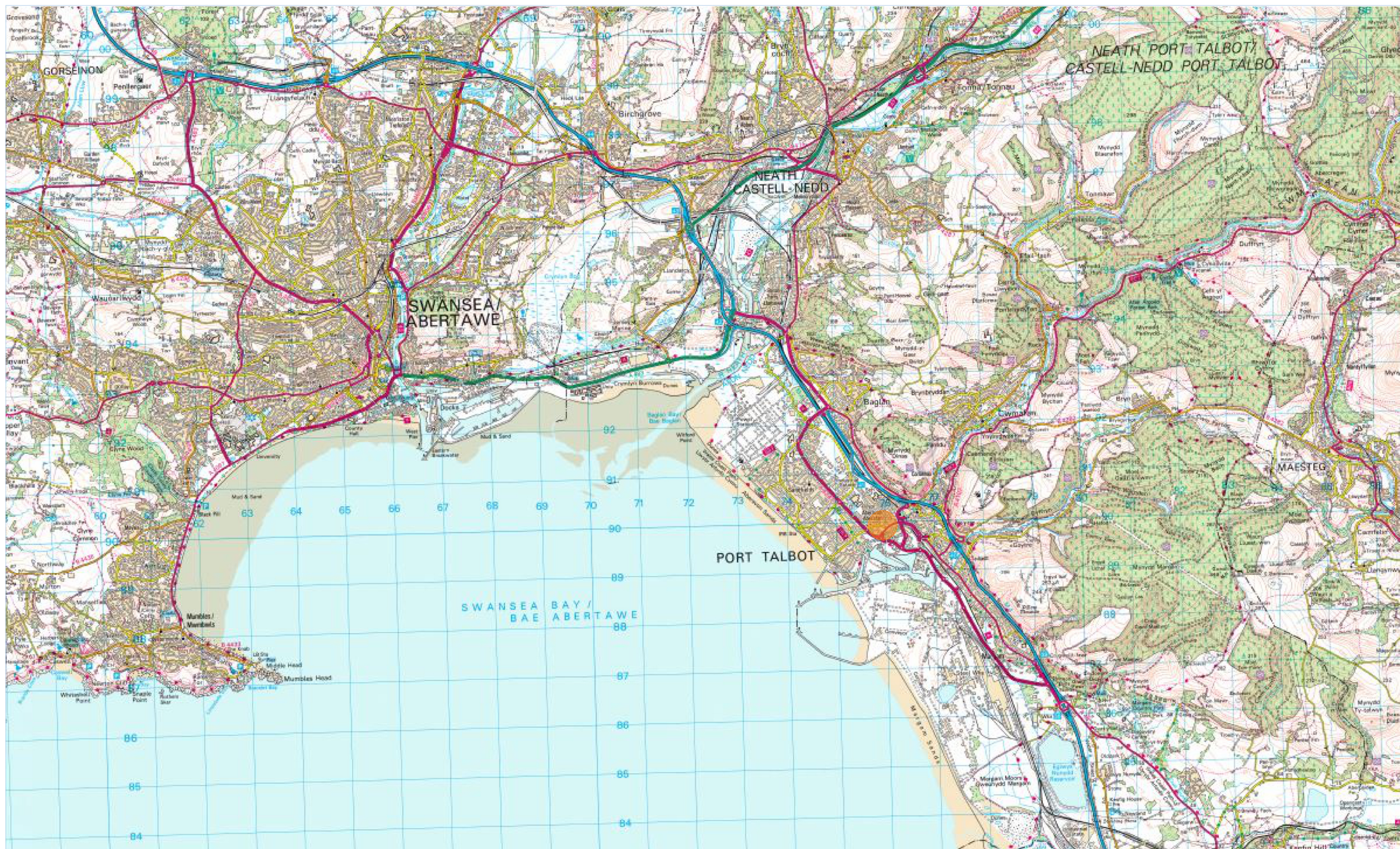
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Privett, K D, Matthews, S C, & Hodges, R, A, 'Barriers, liners and cover systems for containment and control of land contamination' 1996. CIRIA Special Publication 124.

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APPENDIX 1 - Plans



GROUNDTECH CONSULTING	CLIENT	DATE				Status		Notes
	ALDI STORES LTD	NOVEMBER 2021				Preliminary		
	PROJECT TITLE	SCALE				Draft		
	AFAN WAY, PORT TALBOT	NTS				Issued		
	PLAN TITLE	PLAN NUMBER				For Comment		
	PROJECT LOCATION PLAN	GRO-21252-P01				Approved		
			Rev.	Details		Date		

SITE LOCATION

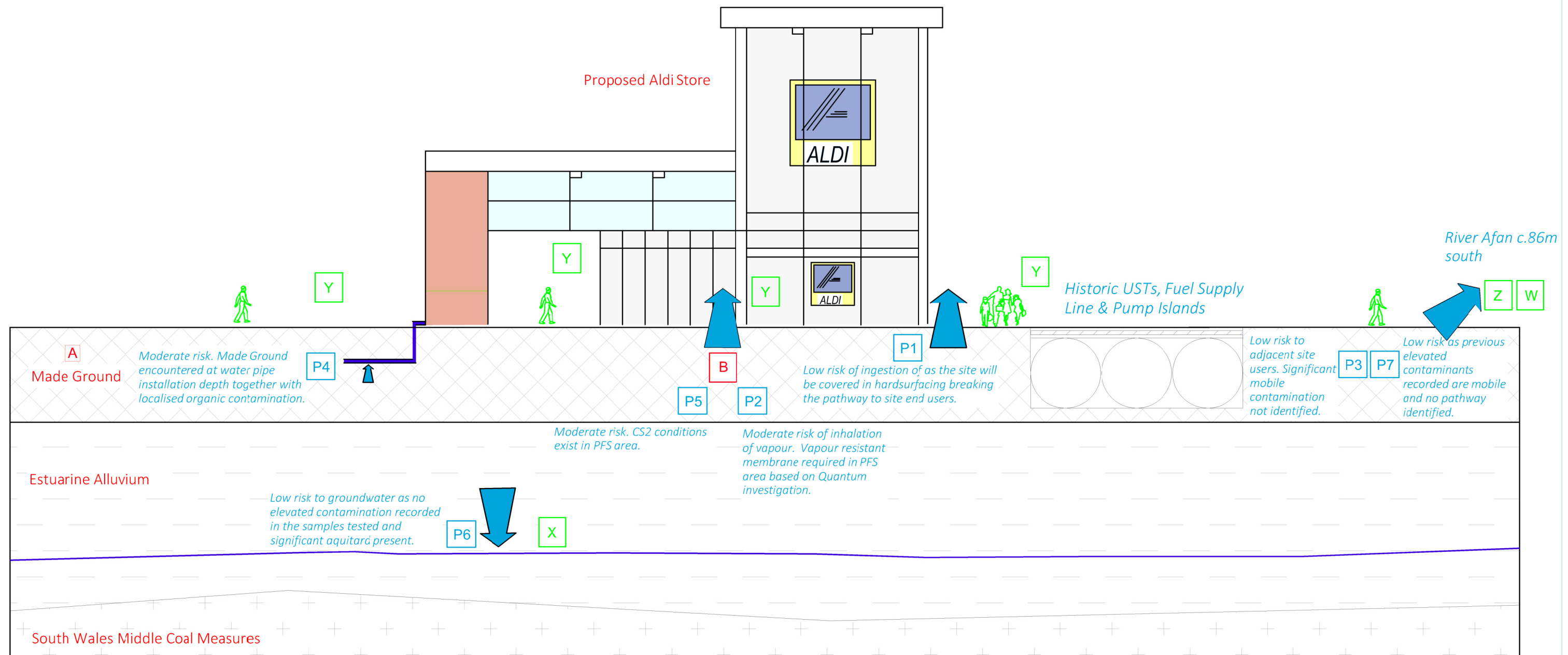
SOURCES

- A. Contaminated soils / Made Ground.
- B. Ground gas.

POLLUTION LINKAGES

- P1. Ingestion of soil and dust.
- P2. Inhalation of vapour.
- P3. Inhalation of soil dust by adjacent site users.
- P4. Attacking of potable water supply pipe.
- P5. Migration and accumulation of ground gas in internal places.
- P6. Impaction of groundwater from soil contamination.
- P7. Migration of soil and groundwater contamination impacting surface waters.

RECEPTORS
W. River Afan c.86m south. X. Groundwater within the underlying Secondary A Aquifers. Y. Site end users. Z. Adjacent site users.



APPENDIX 2 - Site Photographs



Photograph 1 – TP101



Photograph 2 – TP104



Photograph 3 - TP105



Photograph 4 - Granular Glaciofluvial deposits

APPENDIX 3 - Natural Resource Wales (NRW) Correspondence

Ein cyf/Our ref: CAS-234086-W6M7
Eich cyf/Your ref: Aldi PT

Aldi Stores Limited
c/o Cavendish Consulting
55 Colmore Row
Birmingham
B3 2AA

Dyddiad/Date: 23 August 2023

Annwyl Syr/Madam/Dear Sir/Madam,

STATUTORY PRE-APPLICATION CONSULTATION – TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (WALES) ORDER 2012 AS AMENDED

BWRIAD / PROPOSAL: FULL PLANNING PERMISSION FOR A PROPOSED MIXED-USE DEVELOPMENT COMPRISING OF AN ALDI FOOD STORE AND STARBUCKS COFFEE SHOP WITH DRIVE-THRU TOGETHER WITH ASSOCIATED ACCESS, CAR PARKING, DRAINAGE, LANDSCAPING AND OTHER ASSOCIATED SITE WORKS

LLEOLIAD / LOCATION: LAND AT BURROWS YARD, AFAN WAY, PORT TALBOT, SA12 6LL

Thank you for providing a requisite notice to us under Article 2D of the above Order. We received a copy of your proposed application on 28 July 2023.

We have concerns with the application as proposed because inadequate information has been provided. To overcome these concerns, you should provide further information in your planning application regarding flood risk, land contamination and pollution prevention.

If this information is not provided, we may object to the planning application when formally consulted by the planning authority. Further details are provided below.

Flood Risk

The planning application proposes less vulnerable development a mixed-use development comprising an Aldi food store and Starbucks coffee shop. Our Flood Risk Map confirms the site to be within Zone C1 of the Development Advice Map (DAM) contained in Technical Advice Note (TAN) 15: Development and Flood Risk (2004). The Flood Map for Planning identifies the application site to be at risk of flooding and falls into Flood Zone 2 and 3 (Rivers and Sea).

Section 6 of TAN15 requires the Local Planning Authority to determine whether the development at this location is justified. Therefore, we refer you to the tests set out in section 6.2 of TAN15. If you consider the proposal meets the tests set out in criteria (i) to (iii), then the final test (iv) is for the applicant to demonstrate through the submission of a Flood Consequences Assessment (FCA) that the potential consequences of flooding can be managed to an acceptable level.

We have reviewed the FCA undertaken by Craddy's, Flood Consequence Assessment, Aldi and Starbucks, Afan Way, Port Talbot dated 27 June 2023, Craddy's document reference 10985w0005a. Our advice to you is that the FCA fails to demonstrate that the risks and consequences of flooding can be managed to an acceptable level for the reasons explained below.

Section 5.3 – Reference is made to NRW Flood Risk Assessment Wales (FRAW) Maps, The Flood Risk Assessment Wales map has no official status for planning purposes. It should not be used to inform a Flood Consequences Assessment to support planning proposals. The [Flood Map for Planning / Development Advice Map](#) are the only maps that should be referred to for development planning purposes and informing a FCA.

Section 5.4 – There is no confirmation that 2017 tidal data is the most up to date information available, furthermore there is no mention of the impact of climate change when assessing tidal flood risk. It is however noted that Section 6 of the FCA refers to climate change and references Welsh Government guidance on climate change allowances for FCAs, dated September 2021, which should be used to assess climate change impacts over the lifetime of the proposed development. With regards to JBA's report which is referenced in the FCA it should be checked to ensure its findings are still appropriate.

Section 5.10 – Reference is made to the 0.5% flood when assessing the fluvial flood risk, 0.5% event relates to tidal flooding, for fluvial flooding the FCA should assess the 1%, 1%+climate change and 0.1%. Where the FCA states *"Site levels are generally to be raised across the majority of the site, in particular to form the platform for the ALDI. With respect to fluvial flooding, the areas where the greatest level build-ups are proposed are generally already higher than the threshold 0.5% probability flood level of 6.20m Above Ordnance Datum (AOD) therefore will not have any impact on flood storage in this scenario. In one area levels will be lowered significantly to form the service yard entrance from Water Street. Extensive use of permeable paving is proposed across the site, along with other below ground attenuation. Taken together, these features will provide compensation for the parts of the site that will be raised in at-risk areas."*

Even if the areas of the site where ground raising is proposed are above the 1% fluvial flood level the FCA needs to assess (modelling required) the impact in the 1%+climate change and 0.1% events and demonstrate any proposed mitigation in the post development scenario to ensure no 3rd party detriment to ensure compliance with A1.12 of TAN15.

The statement that *'In a tidal flooding scenario, flood volume compensation on site would have an immeasurably small effect on the flood level in the surrounding area...'* This needs further quantification. It cannot be assumed that the loss of flood storage and/or changes to conveyance routes will not increase flooding elsewhere in tidal flooding events. The tidal flood cell in which the site is located is not on the open coastline and therefore the effect of the development on flooding elsewhere needs to be assessed as it would be for fluvial flooding.

Section 5.11 (a) – *“Obstruction to the flow of water during a flood event – the flow of water during a flood event will not be significantly obstructed by the proposed buildings.”* There is no evidence within the FCA to support this claim.

Section 6.1 – *“For fluvial flood risk, the current guidance gives recommended allowances to be made for peak river flow increases from a 1961-1990 baseline. For the West Wales River basin district which includes the site, the guidance indicates that the appropriate change factor/central estimate to inform design levels is 30%. The detailed flood mapping for the 1.0% AEP + Climate Change event, extracted from the NRW Product 6 data and included in appendix F shows that food levels would be expected to reach a level of 5.50m AOD in this scenario and would not encroach on the site beyond the service yard entrance. In more extreme events flooding would occur within the site boundary, however mapping for these scenarios is not included in the Product 6 data.”* We would advise that just because information is not available from Natural Resources Wales, it is not justification for it not to be assessed and additional information provided.

Reliance is set on new tidal defences, which are not proposed as part of the development in order for the development to comply with Table A1.14 of TAN15. As the improvement of defences cannot be relied upon the FCA clearly indicates that, when assessing climate change over the lifetime of development as per Table 2, the flood free threshold required in Table A1.14 is not met however Table A1.15 flood depth tolerances would be satisfied.

Section 7 – There is no mention of A1.14 compliance when climate change is applied to the 1% fluvial flood. The FCA confirms that A1.15 compliance cannot be met in terms of depth of flooding, rate of rise or speed of inundation if new defences are not constructed.

Section 8 – The FCA states that raising development levels to comply with the requirements of TAN15 *‘is not considered practical due to the excessive gradients that would arise on access routes to meet the existing road network’*. If it is not deemed practical to enable the buildings to comply with the flood free threshold required by TAN15 then this must be highlighted as reason for refusal on the grounds of flood risk.

Section 11 (b) – Reference is made to 0.5% and 0.1% fluvial flooding, this should be 1%, 1%+climate change and 0.1%.

In summary the FCA clearly accepts that, over the lifetime of the development, the proposed development fails to demonstrate compliance with the flood free threshold required by Table A1.14 and the indicative guidance on acceptable flooding in Table A1.15 of TAN15. The FCA has also not provided appropriate evidence that the proposed development will not cause increased flooding elsewhere in all relevant flooding scenarios.

If no further information is submitted, or a revised FCA fails to demonstrate that the consequences of flooding can be acceptably managed over the lifetime of the development, then we object to this application.

Please inform us, in accordance with paragraph 11.7 of TAN15, if you are minded to grant permission for the application contrary to our advice.

As it is for your Authority to determine whether the risks and consequences of flooding can be managed in accordance with TAN15, we recommend you consider consulting other professional advisors on matters such as emergency plans, procedures, and measures to address structural damage that may result from flooding. Please note, we do not normally

comment on the adequacy of flood emergency response plans and procedures accompanying development proposals, as we do not carry out these roles during a flood. Our involvement during a flood emergency would be limited to delivering flood warnings to occupants/users.

Land Contamination

We have reviewed the Phase II Geo-Environmental Report, Aldi Stores Ltd, dated December 2021, Report Reference GRO-21252-3003.

We are aware that there are multiple previous contamination uses on the site and that the site is in close proximity to the river Afon.

We note that the report supplied is referenced as a Phase II report, although the elements of a Preliminary Risk Assessment (Phase 1 report) are within this report. For future reference these should be supplied as separate documents.

We note that there have been earlier investigations on site. There is very little details about the removal of tanks associated with both the petrol station and the fuel within the council depot. We would expect to see further sampling in line with BSI: 101075 to ensure that there is adequate coverage of the high-risk areas.

We also note the visual and olfactory observations from the Quantum 2015 report "Visual and olfactory evidence of contamination was noted within the soils across the site. All cases of contamination related to strong to very strong hydrocarbon odours within both the sandy clay and gravel at depths ranging between 0.9m and 4.3m bgl. Sheens were also noted within the Gravel at depths between 3.5m and 4.3m bgl. Groundwater sheens were also observed in a number of trial pits and window sample boreholes." And extremely high concentration of hydrocarbons were recorded from the samples taken.

Whilst we note the comments from the Quantum report of 2017, state that the results from 2015 were errors, it is concerning that the evidence of very strong odours and samples have disappeared within 2 years.

The samples that were taken in 2021, we note the boreholes are not located within, or down gradient of the petrol filling station and we have concerns about the risk to controlled waters. Further sampling of groundwater in the vicinity of the petrol filling station is required in order to be able to demonstrate that there is not a risk from this former activity to the river Afan.

Pollution Prevention

We have reviewed the Construction Environmental Management Plan (CEMP) produced by Arc Bauen for the New Aldi Store and Starbucks, Afan Way, Aberavon, Port Talbot, SA12 6LL. We would advise that prior to submission of the full planning application the CEMP needs be updated to ensure more detail is given on the site, including identification of pathways for silt pollution to leave site and enter the river. Also, more detail on where the silt protection methods will be placed.

Other Matters

Please note, if further information is prepared to support an application, it may be necessary for us to change our advice in line with the new information.

Our comments above only relate specifically to matters included on our checklist, *Development Planning Advisory Service: Consultation Topics* (September 2018), which is published on our [website](#). We have not considered potential effects on other matters and do not rule out the potential for the proposed development to affect other interests.

In addition to planning permission, you are advised to ensure all other permits/consents/licences relevant to the development are secured. Please refer to our [website](#) for further details.

Further advice on the above matters could be provided prior to your planning application being submitted, however there would be a charge for this service. Additional details are available on our [website](#).

If you have any queries on the above, please do not hesitate to contact us.

Yn gywir / Yours faithfully

Lisa Jones

Gynghorydd - Cynllunio Datblygu / Advisor - Development Planning

Ffôn/Phone: 0300 065 3264

E-bost/E-mail: swplanning@cyfoethnaturiolcymru.gov.uk

Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi. / Correspondence in Welsh is welcomed, and we will respond in Welsh without it leading to a delay.

APPENDIX 4 - Exploratory Hole Logs



GROUNDTECH
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Borehole Log

Borehole No.

CP101

Sheet 1 of 1

Project Name: AFAN WAY

Project No.
GRO-21252

Co-ords: -

Hole Type
CP

Location: PORT TALBOT

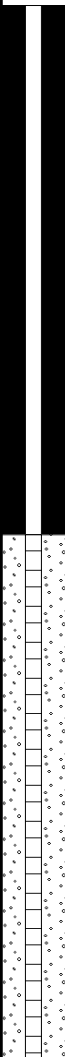
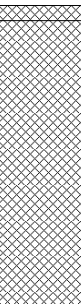
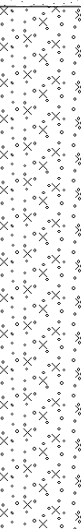
Level:

Scale
1:50

Client: ALDI STORES LIMITED

Dates: 15/04/2024 - 15/04/2024

Logged By
MB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES	PID=0	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse.	1
		0.50 - 1.00	B					MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.	
		1.00	ES						
		2.00 - 2.50	B	PID=2	2.00			Soft grey sandy CLAY with sand lenses. Sand is fine to coarse. Faint hydrocarbon odour.	2
		2.10	ES						
		3.50 - 4.00	B	PID=5	3.50			Brown sandy subangular to rounded fine to coarse GRAVEL of mixed lithologies including igneous and sandstone. Moderate hydrocarbon odour.	4
		3.60	ES						
					7.00			End of borehole at 7.00 m	7
									8
									9
									10

Remarks

1. Location cleared of services using handheld CAT scanner. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 4.20m bgl rising to 3.00m bgl after 20 minutes. 4. Borehole terminated at 7.00m bgl. 5. Monitoring well installed to 7.00m bgl (3.50m plain, 3.50m slotted).





GROUNDTECH
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Borehole Log

Borehole No.

CP102

Sheet 1 of 1

Project Name: AFAN WAY

Project No.
GRO-21252

Co-ords: -

Hole Type
CP

Location: PORT TALBOT

Level:

Scale
1:50

Client: ALDI STORES LIMITED

Dates: 16/04/2024 - 16/04/2024

Logged By
MB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES	PID=0	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse. MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.	1
		0.50 - 1.00	B						
		1.00	ES						
		2.00 - 2.50 2.10	B ES	PID=2	2.00			Soft grey sandy CLAY with sand lenses. Sand is fine to coarse.	2
		3.50 - 4.00 3.60	B ES						
				PID=3	3.50			Brown sandy subangular to rounded fine to coarse GRAVEL of mixed lithologies including igneous and sandstone.	4
					7.00			End of borehole at 7.00 m	7
									8
									9
									10

Remarks

1. Location cleared of services using handheld CAT scanner. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 4.00m bgl rising to 3.00m bgl after 20 minutes. 4. Borehole terminated at 7.00m bgl. 5. Monitoring well installed to 7.00m bgl (3.50m plain, 3.50m slotted).





GROUNDTECH
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Borehole Log

Borehole No.

CP103

Sheet 1 of 1

Project Name: AFAN WAY

Project No.
GRO-21252

Co-ords: -

Hole Type
CP

Location: PORT TALBOT

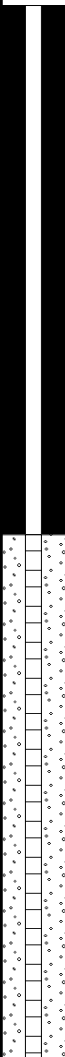
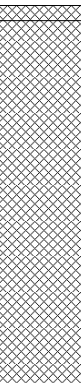
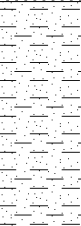
Level:

Scale
1:50

Client: ALDI STORES LIMITED

Dates: 17/04/2024 - 17/04/2024

Logged By
MB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES	PID=0	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse.	1
		0.50 - 1.00	B					MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.	
		1.00	ES						
		2.50 - 3.00 2.60	B ES	PID=2	2.50			Soft grey sandy CLAY with sand lenses. Sand is fine to coarse.	3
		4.00 - 4.50 4.10	B ES					Brown sandy subangular to rounded fine to coarse GRAVEL of mixed lithologies including igneous and sandstone.	
				PID=4	4.00				4
					7.00			End of borehole at 7.00 m	7
									8
									9
									10

Remarks

1. Location cleared of services using handheld CAT scanner. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 4.00m bgl rising to 3.10m bgl after 20 minutes. 4. Borehole terminated at 7.00m bgl. 5. Monitoring well installed to 7.00m bgl (3.50m plain, 3.50m slotted).



Borehole Log

Borehole No.

WS101

Sheet 1 of 1

Project Name: AFAN WAY

Project No.
GRO-21252

Co-ords: -

Hole Type
WS

Location: PORT TALBOT

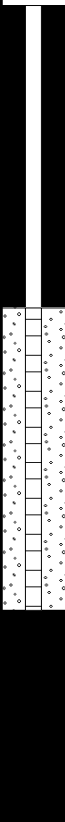
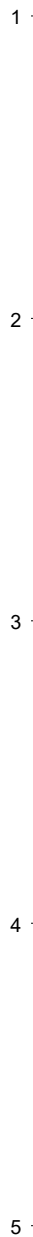
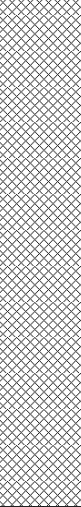
Level:

Scale
1:25

Client: ALDI STORES LIMITED

Dates: 16/04/2024 -

Logged By
MB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES	PID=10	0.10 0.20			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse.	
								MADE GROUND: Grey concrete.	
		1.00	ES	PID=10				MADE GROUND: Dark brown grey slightly sandy ash angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.	
		1.20		N=5 (1,2/2,1,1,1)					
		2.00		N=9 (2,2/9 for 235mm)	2.10				
		2.20	ES	PID=9				Soft grey sandy CLAY with sand lenses. Sand is fine to coarse. Moderate hydrocarbon odour.	
		2.70		N=50 (4,7/7,11,16,16)	2.65 2.70			Brown sandy subrounded to rounded fine to coarse GRAVEL of mixed lithologies including igneous and sandstone.	
								End of borehole at 2.70 m	

Remarks

1. Location cleared of services using handheld CAT scanner. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater not encountered 4. Borehole terminated at 2.70m bgl due to SPT refusal. 5. Monitoring well installed to 2.00m bgl (1.00m plain, 1.00m slotted).



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Borehole Log

Borehole No.

WS102

Sheet 1 of 1

Project Name: AFAN WAY

Project No.
GRO-21252

Co-ords: -

Hole Type
WS

Location: PORT TALBOT

Level:

Scale
1:25

Client: ALDI STORES LIMITED

Dates: 16/04/2024 -

Logged By
MB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES	PID=0	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse.	
		0.30			0.30			MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.	
		1.10	ES	PID=0 N=13 (3,3/3,2,4,4)	1.00			MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.	1
		1.20			1.20				
		2.00	ES	N=10 (1,2/2,3,2,3) PID=22	1.90			Soft grey sandy CLAY with sand lenses. Sand is fine to coarse. Moderate hydrocarbon odour.	2
		2.00			2.00				
		3.00		50 (7,12/50 for 225mm)	3.00			End of borehole at 3.00 m	3
									4
									5

Remarks

1. Location cleared of services using handheld CAT scanner. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater not encountered 4. Borehole terminated at 3.00m bgl due to SPT refusal. 5. Monitoring well installed to 2.50m bgl (0.50m plain, 2.00m slotted).



Borehole Log

Borehole No.

WS103

Sheet 1 of 1

Project Name: AFAN WAY

Project No.
GRO-21252

Co-ords: -

Hole Type
WS

Location: PORT TALBOT

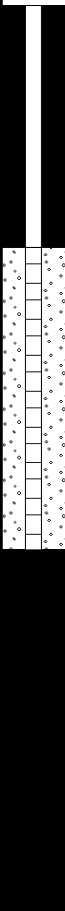
Level:

Scale
1:25

Client: ALDI STORES LIMITED

Dates: 16/04/2024 -

Logged By
MB

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse.	1
		0.30	ES	PID=0				MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.	
		1.20		N=4 (1,2/0,1,1,2)	1.20				2
		1.30	ES	PID=0				MADE GROUND: Soft brown slightly sandy slightly gravelly clay. Gravel is angular to subangular fine to coarse of brick. Sand is fine to coarse.	
		1.90			1.80			Soft grey sandy CLAY with sand lenses. Sand is fine to coarse.	3
		2.00	ES	PID=8 N=1 (1,0/0,1,0,0)					
		3.00		50 (3,6/50 for 225mm)	3.00			End of borehole at 3.00 m	4
									5

Remarks

1. Location cleared of services using handheld CAT scanner. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater not encountered 4. Borehole terminated at 3.00m bgl due to SPT refusal. 5. Monitoring well installed to 1.80m bgl (0.80m plain, 1.00m slotted).





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Borehole Log

Borehole No.

WS104

Sheet 1 of 1

Project Name: AFAN WAY

Project No.
GRO-21252

Co-ords: -

Hole Type
WS

Location: PORT TALBOT

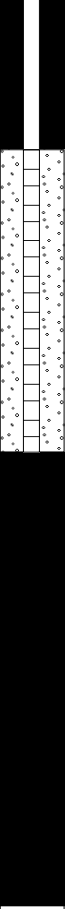
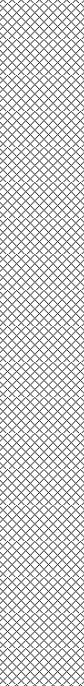
Level:

Scale
1:25

Client: ALDI STORES LIMITED

Dates: 16/04/2024 -

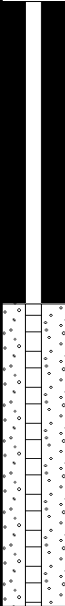
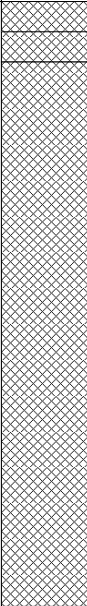
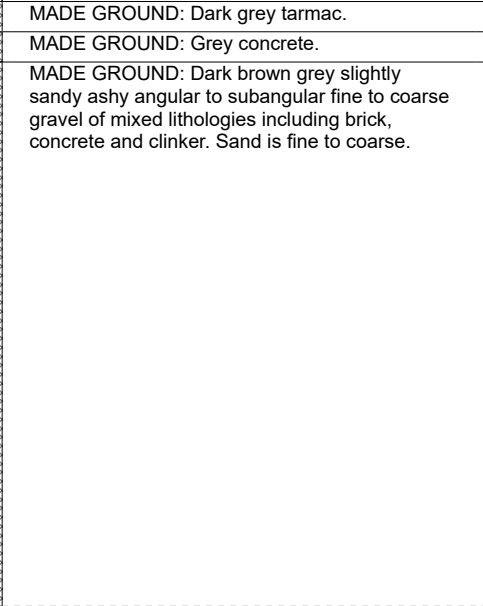
Logged By
MB

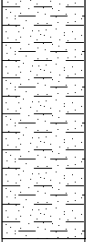
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES	PID=0	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse.	1
		1.00	ES	PID=0				MADE GROUND: Dark brown grey slightly sandy ash angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.	
		1.20		N=35 (6,9/7,6,12,10)					
		2.00		N=12 (3,3/3,3,3,3)					2
		2.60	ES	PID=10	2.50			Soft grey sandy CLAY with sand lenses. Sand is fine to coarse.	
		3.00		50 (25 for 10mm/50 for 225mm)	3.00			End of borehole at 3.00 m	3
									4
									5

Remarks

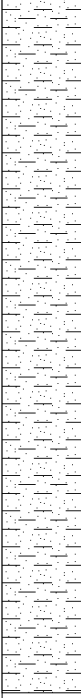
1. Location cleared of services using handheld CAT scanner. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater not encountered 4. Borehole terminated at 3.00m bgl due to SPT refusal. 5. Monitoring well installed to 1.50m bgl (0.50m plain, 1.00m slotted).

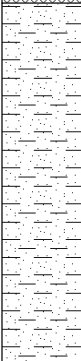


					Borehole Log			Borehole No. WS105 Sheet 1 of 1	
Project Name: AFAN WAY					Project No. GRO-21252		Co-ords: -		Hole Type WS
Location: PORT TALBOT					Level:			Scale 1:25	
Client: ALDI STORES LIMITED					Dates: 16/04/2024 -			Logged By MB	
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES	PID=0	0.10 0.20		MADE GROUND: Dark grey tarmac.		1
							MADE GROUND: Grey concrete.		
		1.20		PID=0 50 (25 for 75mm/50 for 75mm)	2.00		End of borehole at 2.00 m		2
									3
									4
									5
Remarks 1. Location cleared of services using handheld CAT scanner. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater not encountered 4. Borehole terminated at 2.00m bgl due to SPT refusal. 5. Monitoring well installed to 2.00m bgl (1.00m plain, 1.00m slotted).									

				Trial Pit Log			Trialpit No TP101 Sheet 1 of 1		
Project Name: AFAN WAY				Project No. GRO-21252		Co-ords: - Level:		Date 15/04/2024	
Location: PORT TALBOT				Dimensions (m): Depth 2.10		1.9 0.7		Scale 1:25 Logged MB	
Client: ALDI STORES LIMITED									
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.20	ES	PID=0	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse. MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker with low cobble content of brick and concrete. Sand is fine to coarse.		
	1.20	ES	PID=0	1.10					
	1.40	ES	HVP=35 PID=0	1.30			Soft low strength grey sandy CLAY with sand lenses. Sand is fine to coarse.		
				2.10					
							End of pit at 2.10 m		
Remarks: 1. Location cleared of services using handheld CAT scanner. 2. Groundwater not encountered. 3. Trial pit excavated to 2.10m bgl. 4. Trial pit backfilled with arisings.									
Stability: Unstable - pit side collapse at 1.0bgl.									



				Trial Pit Log			Trialpit No TP103 Sheet 1 of 1		
Project Name: AFAN WAY				Project No. GRO-21252		Co-ords: - Level:		Date 15/04/2024	
Location: PORT TALBOT				Dimensions (m): Depth 3.00		1.9		Scale 1:25	
Client: ALDI STORES LIMITED						0.7		Logged MB	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.20	ES	PID=0	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse. MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker with low cobble content of brick. Sand is fine to coarse.		
	1.00	ES	HVP=17 PID=0	0.70					
				3.00			Soft low strength grey sandy CLAY with sand lenses. Sand is fine to coarse.		
							End of pit at 3.00 m		
Remarks: 1. Location cleared of services using handheld CAT scanner. 2. Groundwater not encountered. 3. Trial pit excavated to 3.00m bgl. 4. Trial pit backfilled with arisings.									
Stability: Unstable - pit side collapse in Made Ground.									

				Trial Pit Log			Trialpit No TP104 Sheet 1 of 1		
Project Name: AFAN WAY				Project No. GRO-21252		Co-ords: - Level:		Date 15/04/2024	
Location: PORT TALBOT				Dimensions (m): Depth 2.70		2 0.7		Scale 1:25 Logged MB	
Client: ALDI STORES LIMITED									
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.40	ES	PID=0	0.10 0.20			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse.		
							MADE GROUND: Grey concrete.		
							MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.		
	1.60	ES	HVP=41	1.50			Soft low strength grey sandy CLAY with sand lenses. Sand is fine to coarse.		
				2.70			End of pit at 2.70 m		
Remarks: 1. Location cleared of services using handheld CAT scanner. 2. Groundwater not encountered. 3. Trial pit excavated to 2.70.m bgl. 4. Trial pit backfilled with arisings.									
Stability: Unstable - pit side collapse in Made Ground.									

Trial Pit Log

Trialpit No

TP105

Sheet 1 of 1

Project Name: AFAN WAY

Project No.	GRO-21252
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Co-ords:	-
Level:	

Date
15/04/2024

Location: PORT TALBOT

Dimensions (m): 2.1

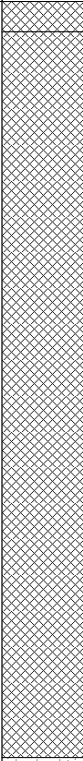
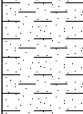
Scale
1:25

Client: ALDI STORES LIMITED

Depth
2.90

2.0

Logged
MB

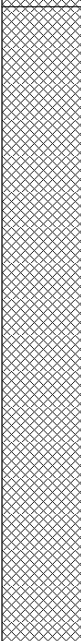
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES	PID=0	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse. MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.
	2.60	ES	HVP=23 PID=0	2.50			Soft low strength grey sandy CLAY with sand lenses. Sand is fine to coarse.
				2.90			End of pit at 2.90 m

Remarks:	1. Location cleared of services using handheld CAT scanner. 2. Groundwater not encountered. 3. Trial pit excavated to 2.90m bgl. 4. Trial pit backfilled with arisings.
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Stability: Unstable - pit side collapse in Made Ground.



				Trial Pit Log			Trialpit No TP106 Sheet 1 of 1		
Project Name: AFAN WAY				Project No. GRO-21252		Co-ords: - Level:		Date 15/04/2024	
Location: PORT TALBOT				Dimensions (m): Depth 2.60		1.8 0.7		Scale 1:25 Logged MB	
Client: ALDI STORES LIMITED									
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.40	ES		0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse.		
				0.30			MADE GROUND: Grey concrete. MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.		
	2.20	ES	HVP=20 PID=12	2.10			Soft low strength grey sandy CLAY with sand lenses. Sand is fine to coarse. Strong hydrocarbon odour.		
				2.60		No hydrocarbon odour from 2.30m bgl. End of pit at 2.60 m			
									1
									2
									3
									4
									5
Remarks: 1. Location cleared of services using handheld CAT scanner. 2. Groundwater not encountered. 3. Trial pit excavated to 2.60m bgl. 4. Trial pit backfilled with arisings.									
Stability: Unstable - pit side collapse in Made Ground.									

				Trial Pit Log			Trialpit No TP107 Sheet 1 of 1			
Project Name: AFAN WAY				Project No. GRO-21252		Co-ords: - Level:		Date 15/04/2024		
Location: PORT TALBOT				Dimensions (m):		2		Scale 1:25		
Client: ALDI STORES LIMITED				Depth 2.70		0.7		Logged MB		
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
	Depth	Type	Results							
	0.20	ES	HVP=21	0.10			MADE GROUND: Grey Tarmac.			
					MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.					
	2.30	ES		2.20		Soft low strength grey sandy CLAY with sand lenses. Sand is fine to coarse. Moderate hydrocarbon odour.				
				2.70			No hydrocarbon odour from 2.45m bgl.			
							End of pit at 2.70 m			
Remarks: 1. Location cleared of services using handheld CAT scanner. 2. Groundwater not encountered. 3. Trial pit excavated to 2.70m bgl. 4. Trial pit backfilled with arisings.										
Stability: Unstable - pit side collapse in Made Ground.										

Project Name: AFAN WAY

Project No.	GRO-21252
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Co-ords:	-
Level:	

Date
15/04/2024

Location: PORT TALBOT

Dimensions
(m):

1.9

Scale
1:25

Client: ALDI STORES LIMITED

Depth
2.80

2.0

Logged
MB

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	ES	HVP=22	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse.	1
				0.20			MADE GROUND: Grey concrete. MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.	
	2.10	ES		2.00			Soft low strength grey sandy CLAY with sand lenses. Sand is fine to coarse. Faint hydrocarbon odour.	2
				2.80			End of pit at 2.80 m	3
							5	

Remarks:	1. Location cleared of services using handheld CAT scanner. 2. Groundwater not encountered. 3. Trial pit excavated to 2.80m bgl. 4. Trial pit backfilled with arisings.
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Stability: Unstable - pit side collapse in Made Ground.



				Trial Pit Log			Trialpit No TP109 Sheet 1 of 1			
Project Name: AFAN WAY				Project No. GRO-21252		Co-ords: - Level:		Date 15/04/2024		
Location: PORT TALBOT				Dimensions (m): Depth 3.00		1.9 0.7		Scale 1:25 Logged MB		
Client: ALDI STORES LIMITED										
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
	Depth	Type	Results							
	0.30	ES	HVP=34	0.10			MADE GROUND: Grass over sandy gravelly topsoil. Gravel is angular fine to coarse of brick and concrete. Sand is fine to coarse. MADE GROUND: Dark brown grey slightly sandy ashy angular to subangular fine to coarse gravel of mixed lithologies including brick, concrete and clinker. Sand is fine to coarse.			
		2.10		ES	1.90			Soft low strength grey sandy CLAY with sand lenses. Sand is fine to coarse.		
			3.00			End of pit at 3.00 m				
									1	
									2	
									3	
									4	
									5	
Remarks: 1. Location cleared of services using handheld CAT scanner. 2. Groundwater not encountered. 3. Trial pit excavated to 3.00m bgl. 4. Trial pit backfilled with arisings.										
Stability: Unstable - pit side collapse in Made Ground.										

APPENDIX 5 - Geo-Environmental Testing Results (Soils)

Groundtech Consulting Limited
PO Box 499
Manchester
United Kingdom
M28 8EE



4225



Attention : Michael Berry
Date : 9th May, 2024
Your reference : GRO-21252
Our reference : Test Report 24/7385 Batch 1 Schedule A 24/7385 Batch 1 Schedule B
Location : Port Talbot
Date samples received : 1st May, 2024
Status : Final Report
Issue : 202405091143

Three samples were received for analysis on 1st May, 2024 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 9.122 kg of CO2

Scope 1&2&3 emissions - 21.559 kg of CO2

Authorised By:



Phil Sommerton BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name:	Groundtech Consulting Limited	Report : Solid
Reference:	GRO-21252	
Location:	Port Talbot	
Contact:	Michael Berry	Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub
EMT Job No:	24/7385	

Report : Solid

Solids: V=60g VOC jar. J=250g glass jar. T=plastic tub

EMT Sample No.	1-3	4-6	7-9								Please see attached notes for all abbreviations and acronyms		
Sample ID	CP101	CP102	TP107										
Depth	1.00	1.00	2.30										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	17/04/2024	17/04/2024	15/04/2024										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	01/05/2024	01/05/2024	01/05/2024								LOD/LOR	Units	Method No.
Arsenic #	38.4	26.2	10.5								<0.5	mg/kg	TM30/PM15
Cadmium #	0.4	0.3	<0.1								<0.1	mg/kg	TM30/PM15
Chromium #	110.8	78.0	38.5								<0.5	mg/kg	TM30/PM15
Copper #	179	153	11								<1	mg/kg	TM30/PM15
Lead #	343	247	17								<5	mg/kg	TM30/PM15
Mercury #	0.6	0.6	0.1								<0.1	mg/kg	TM30/PM15
Nickel #	33.6	21.3	26.1								<0.7	mg/kg	TM30/PM15
Selenium #	<1	1	<1								<1	mg/kg	TM30/PM15
Zinc #	1220	922	95								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	0.39	0.28	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.34	0.33	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #	0.15	0.12	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #	1.84	2.99	<0.03								<0.03	mg/kg	TM4/PM8
Anthracene #	0.50	0.78	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene #	4.72	5.95	<0.03								<0.03	mg/kg	TM4/PM8
Pyrene #	3.40	4.22	<0.03								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	2.54	2.65	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene #	3.08	2.93	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	5.12	4.86	<0.07								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	2.64	2.47	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	1.80	1.57	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.46	0.43	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	1.73	1.52	<0.04								<0.04	mg/kg	TM4/PM8
PAH 16 Total	28.7	31.1	<0.6								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	3.69	3.50	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	1.43	1.36	<0.02								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	104	100	106								<0	%	TM4/PM8
Methyl Tertiary Butyl Ether #	-	<2 ^{SV}	-								<2	ug/kg	TM15/PM10
Benzene #	-	<3 ^{SV}	-								<3	ug/kg	TM15/PM10
Toluene #	-	<3 ^{SV}	-								<3	ug/kg	TM15/PM10
Ethylbenzene #	-	39 ^{SV}	-								<3	ug/kg	TM15/PM10
m/p-Xylene #	-	28 ^{SV}	-								<5	ug/kg	TM15/PM10
o-Xylene #	-	<3 ^{SV}	-								<3	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	-	49 ^{SV}	-								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	-	5 ^{SV}	-								<0	%	TM15/PM10
									</				

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21252
Location: Port Talbot
Contact: Michael Berry
EMT Job No: 24/7385

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9								Please see attached notes for all abbreviations and acronyms		
Sample ID	CP101	CP102	TP107										
Depth	1.00	1.00	2.30										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	17/04/2024	17/04/2024	15/04/2024										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	01/05/2024	01/05/2024	01/05/2024								LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1								<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1 ^{SV}	0.1 ^{SV}	<0.1								<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1 ^{SV}	<0.1 ^{SV}	<0.1								<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4	<4								<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	33	167	<7								<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	33	167	<19								<19	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1								<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1								<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1								<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4	<4								<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	56	57	<7								<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	257	390	<7								<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	313	447	<19								<19	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total)	346	614	<38								<38	mg/kg	TM5/PM8/PM16
MTBE #	<5 ^{SV}	-	<5								<5	ug/kg	TM36/PM12
Benzene #	<5 ^{SV}	-	<5								<5	ug/kg	TM36/PM12
Toluene #	<5 ^{SV}	-	<5								<5	ug/kg	TM36/PM12
Ethylbenzene #	11 ^{SV}	-	<5								<5	ug/kg	TM36/PM12
m/p-Xylene #	10 ^{SV}	-	<5								<5	ug/kg	TM36/PM12
o-Xylene #	<5 ^{SV}	-	<5								<5	ug/kg	TM36/PM12
Natural Moisture Content	21.7	18.2	35.9								<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	1.5	<0.3								<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0622	0.2509	0.0918								<0.0015	g/l	TM38/PM20
Organic Matter	25.1	24.1	1.3								<0.2	%	TM21/PM24
pH #	7.99	8.00	8.17								<0.01	pH units	TM73/PM11
Asbestos Type*	NAD	NAD	NAD									None	Subcontracted

Client Name: Groundtech Consulting Limited
Reference: GRO-21252
Location: Port Talbot
Contact: Michael Berry
EMT Job No: 24/7385

Solid

Please see attached notes for all abbreviations and acronyms

Matrix : Solid

[illegible]

Element Materials Technology Notification of Deviating Samples

Client Name: Groundtech Consulting Limited **Matrix : Solid**

Reference: GRO-21252

Location: Port Talbot

Contact: Michael Berry

Notification of Deviating Samples

Matrix : Solid

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/7385

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitatively, with a matrix specific limit of detection.

Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/7385

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.			AD	Yes

EMT Job No: 24/7385

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
Subcontracted	See attached subcontractor report for accreditation status and provider.					AR	
TM15_A	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds, Vinyl Chloride & Styrene by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

Groundtech Consulting Limited
PO Box 499
Manchester
United Kingdom
M28 8EE



4225



Attention : Michael Berry
Date : 13th May, 2024
Your reference : GRO-21252
Our reference : Test Report 24/6925 Batch 1
Location : Port Talbot
Date samples received : 23rd April, 2024
Status : Final Report
Issue : 202405131257

Twenty three samples were received for analysis on 23rd April, 2024 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 22.444 kg of CO2

Scope 1&2&3 emissions - 53.041 kg of CO2

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21252
Location: Port Talbot
Contact: Michael Berry
EMT Job No: 24/6925

Report : Solid

Solids: V=60g VOC jar. J=250g glass jar. T=plastic tub

EMT Sample No.	4-6	10-12	19-21	32-34	53-55	65-67					Please see attached notes for all abbreviations and acronyms		
Sample ID	TP101	TP102	TP103	TP106	WS103	WS105							
Depth	1.20	0.20	0.20	2.20	1.30	0.30							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	15/04/2024	15/04/2024	15/04/2024	15/04/2024	16/04/2024	16/04/2024							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	23/04/2024	23/04/2024	23/04/2024	23/04/2024	23/04/2024	23/04/2024					LOD/LOR	Units	Method No.
Arsenic #	23.4	32.3	60.9	10.7	4.8	28.3					<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	0.4	3.1	<0.1	<0.1	1.2					<0.1	mg/kg	TM30/PM15
Chromium #	63.7	49.1	76.8	39.2	66.6	41.2					<0.5	mg/kg	TM30/PM15
Copper #	75	154	472 ^{AA}	14	17	108					<1	mg/kg	TM30/PM15
Lead #	57	79	569	20	15	327					<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	1.5	<0.1	0.1	0.2					<0.1	mg/kg	TM30/PM15
Nickel #	35.4	60.7	45.5	25.6	27.2	24.5					<0.7	mg/kg	TM30/PM15
Selenium #	1	<1	2	<1	1	2					<1	mg/kg	TM30/PM15
Zinc #	279	1443	2303	181	90	1242					<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	0.85	0.47	0.07	<0.04	11.76					<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	1.45	0.34	<0.03	<0.03	9.22					<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	0.10	<0.05	<0.05	<0.05	3.90					<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	0.69	0.08	<0.04	<0.04	33.71					<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.06	14.40	1.90	0.06	<0.03	111.22					<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	0.45	<0.04	<0.04	55.07					<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	19.08	4.15	<0.03	<0.03	107.07					<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	13.29	3.52	<0.03	<0.03	78.80					<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	1.91	2.38	<0.06	<0.06	59.19					<0.06	mg/kg	TM4/PM8
Chrysene #	0.05	6.95	3.20	<0.02	<0.02	51.94					<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.10	10.50	6.54	<0.07	<0.07	80.11					<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	4.25	3.26	<0.04	<0.04	41.88					<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	4.05	2.87	<0.04	<0.04	25.77					<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	0.65	0.69	<0.04	<0.04	8.42					<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	3.70	2.67	<0.04	<0.04	23.41					<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	81.9	32.5	<0.6	<0.6	701.5					<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.07	7.56	4.71	<0.05	<0.05	57.68					<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	2.94	1.83	<0.02	<0.02	22.43					<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	100	100	97	96	95	102					<0	%	TM4/PM8
Methyl Tertiary Butyl Ether #	<2	-	<2 ^{SV}	-	-	<2					<2	ug/kg	TM15/PM10
Benzene #	<3	-	<3 ^{SV}	-	-	23					<3	ug/kg	TM15/PM10
Toluene #	<3	-	5 ^{SV}	-	-	14					<3	ug/kg	TM15/PM10
Ethylbenzene #	<3	-	<3 ^{SV}	-	-	<3					<3	ug/kg	TM15/PM10
m/p-Xylene #	<5	-	8 ^{SV}	-	-	10					<5	ug/kg	TM15/PM10
o-Xylene #	<3	-	<3 ^{SV}	-	-	<3					<3	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	85	-	58 ^{SV}	-	-	79					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	74	-	47 ^{SV}	-	-	68					<0	%	TM15/PM10

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21252
Location: Port Talbot
Contact: Michael Berry
EMT Job No: 24/6925

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	4-6	10-12	19-21	32-34	53-55	65-67					Please see attached notes for all abbreviations and acronyms		
Sample ID	TP101	TP102	TP103	TP106	WS103	WS105							
Depth	1.20	0.20	0.20	2.20	1.30	0.30							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	15/04/2024	15/04/2024	15/04/2024	15/04/2024	16/04/2024	16/04/2024							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	23/04/2024	23/04/2024	23/04/2024	23/04/2024	23/04/2024	23/04/2024					LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	0.1	<0.1	<0.1 ^{SV}					<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	5.8	<0.1	<0.1 ^{SV}					<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	2.9	<0.1	<0.1 ^{SV}					<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2	<0.2	5.9	<0.2	<0.2					<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4	<4	12	6	<4					<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	10	<7	20	27	<7					<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	<7	86	60	<7	<7	<7					<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	<19	96	60	47	33	<19					<19	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1 ^{SV}					<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1 ^{SV}					<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	0.2	<0.1	<0.1 ^{SV}					<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2	<0.2	7.6	<0.2	7.2					<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	10	<4	<4	<4	153					<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	54	47	<7	<7	952					<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	141	298	<7	<7	1679					<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	<19	205	345	<19	<19	2791					<19	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics (C5-35) (EH_CU+HS_1D_Total)	<38	301	405	47	<38	2791					<38	mg/kg	TM5/PM8/PM16
MTBE #	-	<5 ^{SV}	-	91	<5	-					<5	ug/kg	TM36/PM12
Benzene #	-	<5 ^{SV}	-	18	<5	-					<5	ug/kg	TM36/PM12
Toluene #	-	<5 ^{SV}	-	21	<5	-					<5	ug/kg	TM36/PM12
Ethylbenzene #	-	<5 ^{SV}	-	<5	<5	-					<5	ug/kg	TM36/PM12
m/p-Xylene #	-	<5 ^{SV}	-	215	<5	-					<5	ug/kg	TM36/PM12
o-Xylene #	-	<5 ^{SV}	-	<5	<5	-					<5	ug/kg	TM36/PM12
Phenol #	<0.01	<0.01	<0.01	<0.01	<0.01	0.01					<0.01	mg/kg	TM26/PM21B
Natural Moisture Content	19.4	30.7	37.4	22.9	21.1	10.8					<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0157	1.1428	0.1059	0.0320	0.0112	0.2509					<0.0015	g/l	TM38/PM20
Total Cyanide #	<0.5	<0.5	1.0	<0.5	<0.5	<0.5					<0.5	mg/kg	TM89/PM45
Organic Matter	10.2	53.3	45.9	2.2	1.9	19.0					<0.2	%	TM21/PM24
pH #	8.32	6.73	7.98	6.84	8.41	8.91					<0.01	pH units	TM73/PM11
Asbestos Type*	NAD	NAD	NAD	NAD	NAD	NAD					None	Subcontracted	

Client Name: Groundtech Consulting Limited
Reference: GRO-21252
Location: Port Talbot
Contact: Michael Berry
EMT Job No: 24/6925

VOC Report : Solid

EMT Sample No.	4-6	19-21	65-67								Please see attached notes for all abbreviations and acronyms		
Sample ID	TP101	TP103	WS105										
Depth	1.20	0.20	0.30										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	15/04/2024	15/04/2024	16/04/2024										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	23/04/2024	23/04/2024	23/04/2024								LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2	<2 ^{SV}	<2								<2	ug/kg	TM15/PM10
Methyl Tertiary Butyl Ether #	<2	<2 ^{SV}	<2								<2	ug/kg	TM15/PM10
Chloromethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Vinyl Chloride	<2	<2 ^{SV}	<2								<2	ug/kg	TM15_A/PM10
Bromomethane	<1	<1 ^{SV}	<1								<1	ug/kg	TM15/PM10
Chloroethane #	<2	<2 ^{SV}	<2								<2	ug/kg	TM15/PM10
Trichlorofluoromethane #	<2	<2 ^{SV}	<2								<2	ug/kg	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<6	<6 ^{SV}	<6								<6	ug/kg	TM15/PM10
Dichloromethane (DCM) #	<7	<7 ^{SV}	<7								<7	ug/kg	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,1-Dichloroethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
2,2-Dichloropropane	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
Bromochloromethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Chloroform #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,1,1-Trichloroethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,1-Dichloropropene #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Carbon tetrachloride #	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
1,2-Dichloroethane #	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
Benzene #	<3	<3 ^{SV}	23								<3	ug/kg	TM15/PM10
Trichloroethene (TCE) #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,2-Dichloropropane #	<6	<6 ^{SV}	<6								<6	ug/kg	TM15/PM10
Dibromomethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Bromodichloromethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
cis-1-3-Dichloropropene	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
Toluene #	<3	5 ^{SV}	14								<3	ug/kg	TM15/PM10
trans-1-3-Dichloropropene	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,1,2-Trichloroethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,3-Dichloropropane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Dibromochloromethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,2-Dibromoethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Chlorobenzene #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,1,1,2-Tetrachloroethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Ethylbenzene #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
m/p-Xylene #	<5	8 ^{SV}	10								<5	ug/kg	TM15/PM10
o-Xylene #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Styrene	<3	<3 ^{SV}	<3								<3	ug/kg	TM15_A/PM10
Bromoform	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Isopropylbenzene #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,1,2,2-Tetrachloroethane #	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
Bromobenzene	<2	<2 ^{SV}	<2								<2	ug/kg	TM15/PM10
1,2,3-Trichloropropane #	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
Propylbenzene #	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
2-Chlorotoluene	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3 ^{SV}	4								<3	ug/kg	TM15/PM10
4-Chlorotoluene	<3	<3 ^{SV}	<3								<3	ug/kg	TM15/PM10
tert-Butylbenzene #	<5	<5 ^{SV}	<5								<5	ug/kg	TM15/PM10
1,2,4-Trimethylbenzene #	<6	<6 ^{SV}	<6								<6	ug/kg	TM15/PM10
sec-Butylbenzene #	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
4-Isopropyltoluene	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
1,3-Dichlorobenzene #	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
1,4-Dichlorobenzene #	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
n-Butylbenzene	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
1,2-Dichlorobenzene #	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
1,2-Dibromo-3-chloropropane	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
1,2,4-Trichlorobenzene	<7	<7 ^{SV}	<7								<7	ug/kg	TM15/PM10
Hexachlorobutadiene	<4	<4 ^{SV}	<4								<4	ug/kg	TM15/PM10
Naphthalene	<27	<27 ^{SV}	147								<27	ug/kg	TM15/PM10
1,2,3-Trichlorobenzene	<7	<7 ^{SV}	<7								<7	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	85	58 ^{SV}	79								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	74	47 ^{SV}	68								<0	%	TM15/PM10

Matrix : Solid

5 of 12

Element Materials Technology **Notification of Deviating Samples**

Client Name: Groundtech Consulting Limited **Matrix : Solid**

Reference: GRO-21252

Location: Port Talbot

Contact: Michael Berry

Notification of Deviating Samples

Matrix : Solid

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/6925

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitatively, with a matrix specific limit of detection.

Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/6925

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.			AD	Yes

EMT Job No: 24/6925

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.	Yes		AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
Subcontracted	See attached subcontractor report for accreditation status and provider.					AR	
TM15_A	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds, Vinyl Chloride & Styrene by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

APPENDIX 6 - Geo-Environmental Testing Results (Groundwater)

Groundtech Consulting Limited
PO Box 499
Manchester
United Kingdom
M28 8EE



4225



Attention : Michael Berry
Date : 8th May, 2024
Your reference : GRO-21252
Our reference : Test Report 24/7383 Batch 1
Location : Port Talbot
Date samples received : 1st May, 2024
Status : Final Report
Issue : 202405081541

Three samples were received for analysis on 1st May, 2024 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 6.299 kg of CO2

Scope 1&2&3 emissions - 14.886 kg of CO2

Authorised By:



Phil Sommerton BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21252
Location: Port Talbot
Contact: Michael Berry
EMT Job No: 24/7383

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

EMT Sample No.	1-7	8-14	15-21								Please see attached notes for all abbreviations and acronyms		
Sample ID	CP101	CP102	CP103										
Depth													
COC No / misc													
Containers	V H H N N P G	V H H N N P G	V H H N N P G										
Sample Date	25/04/2024	25/04/2024	25/04/2024										
Sample Type	Ground Water	Ground Water	Ground Water										
Batch Number	1	1	1										
Date of Receipt	01/05/2024	01/05/2024	01/05/2024								LOD/LOR	Units	Method No.
Dissolved Arsenic #	<2.5	<2.5	<2.5								<2.5	ug/l	TM30/PM14
Dissolved Barium #	21	21	41								<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5								<0.5	ug/l	TM30/PM14
Dissolved Boron	173	222	137								<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5								<0.5	ug/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	<1.5								<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7								<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5								<5	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1								<1	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2	<2								<2	ug/l	TM30/PM14
Dissolved Selenium #	<3	<3	<3								<3	ug/l	TM30/PM14
Dissolved Vanadium #	<1.5	<1.5	<1.5								<1.5	ug/l	TM30/PM14
Dissolved Zinc #	<3	6	42								<3	ug/l	TM30/PM14
Total Hardness Dissolved (as CaCO3)	256	306	380								<1	mg/l	TM30/PM14
VOC TICs	ND	ND	ND									None	TM15/PM10
Methyl Tertiary Butyl Ether #	1.2	5.9	<0.1								<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5								<0.5	ug/l	TM15/PM10
Toluene #	<5	<5	<5								<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1								<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2								<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1								<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	112	105	107								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	96	101	99								<0	%	TM15/PM10
EPH (C8-C40) (EH_1D_Total) #	60	230	520								<10	ug/l	TM5/PM30
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<10	51	<10								<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL) #	<10	152	<10								<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL) #	<10	42	21								<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<5	<5	<5								<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL) #	<10	<10	130								<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL) #	<10	<10	90								<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL) #	<10	<10	<10								<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL) #	<10	245	241								<10	ug/l	TM5/PM16/PM30

Client Name: Groundtech Consulting Limited
Reference: GRO-21252
Location: Port Talbot
Contact: Michael Berry
EMT Job No: 24/7383

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HN0₃

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: GRO-21252
Location: Port Talbot
Contact: Michael Berry
EMT Job No: 24/7383

VOC Report : Liquid

EMT Sample No.	1-7	8-14	15-21								Please see attached notes for all abbreviations and acronyms		
Sample ID	CP101	CP102	CP103										
Depth													
COC No / misc													
Containers	V H H N P G	V H H N P G	V H H N P G										
Sample Date	25/04/2024	25/04/2024	25/04/2024										
Sample Type	Ground Water	Ground Water	Ground Water										
Batch Number	1	1	1								LOD/LOR	Units	Method No.
Date of Receipt	01/05/2024	01/05/2024	01/05/2024										
VOC MS													
Dichlorodifluoromethane	<2	<2	<2								<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	1.2	5.9	<0.1								<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3								<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1								<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1								<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3								<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3								<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3								<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3								<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3								<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3								<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1								<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2								<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2								<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3								<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2								<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5								<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3								<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2								<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3								<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2								<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2								<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5								<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2								<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3								<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2								<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2								<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2								<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2								<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1								<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2								<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1								<1	ug/l	TM15/PM10
Styrene	<2	<2	<2								<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2								<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4								<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2								<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3								<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3								<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3								<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2								<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3								<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3								<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2								<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3								<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	112	105	107								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	96	101	99								<0	%	TM15/PM10

Client Name:	Groundtech Consulting Limited
Reference:	GRO-21252
Location:	Port Talbot
Contact:	Michael Berry

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/7383

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitatively, with a matrix specific limit of detection.

Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/7383

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			

EMT Job No: 24/7383

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			

APPENDIX 7 - Groundwater Monitoring Results

PERMANENT GROUND GAS MONITORING FORM



SITE NAME:	AFAN WAY, PORT TALBOT					ENGINEER:	William Sandiford Mitchell				
CLIENT:	ALDI STORES LIMITED					DATE:	24/04/2024				
JOB NO:	GRO-21252										
Pressure Trend:	Falling	Weather:	Overcast			Equipment:	GFM 436				
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)					
Start	20.7	0.0	0.0	0.0	0.0	0.0					
Finish	20.7	0.0	0.0	0.0	0.0	0.0					

BH Ref.	Sheen (Y/N)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
BH101	N	N	N	2.92
BH102	N	N	N	2.83
BH103	N	N	N	2.75
WS101	N	N	N	NGW
WS102	N	N	N	NGW
WS103	N	N	N	NGW
WS104	N	N	N	NGW
WS105	N	N	N	NGW

PERMANENT GROUND GAS MONITORING FORM



SITE NAME:	AFAN WAY, PORT TALBOT					ENGINEER:	William Sandiford Mitchell				
CLIENT:	ALDI STORES LIMITED					DATE:	08/04/2024				
JOB NO:	GRO-21252										
Pressure Trend:	Rising	Weather:	Overcast			Equipment:	GFM 436				
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)					
Start	20.7	0.0	0.0	0.0	0.0	0.0					
Finish	20.7	0.0	0.0	0.0	0.0	0.0					

BH Ref.	Sheen (Y/N)	LNAPL (Y/N)	DNAPL (Y/N)	Depth to Water (m bgl)
BH101	N	N	N	2.89
BH102	N	N	N	2.81
BH103	N	N	N	2.77
WS101	N	N	N	NGW
WS102	N	N	N	NGW
WS103	N	N	N	NGW
WS104	N	N	N	NGW
WS105	N	N	N	NGW

APPENDIX 8 - Commercial Screening Values (Soils)

Generic Assessment Criteria (GAC)							GROUNDTECH CONSULTING	
Proposed End Use	Unit	Residential with Plant Uptake			Commercial			Source
SOM	%	1	2.5	6	1	2.5	6	
Arsenic	mg/kg	37	37	37	640	640	640	LQM S4ULs
Beryllium	mg/kg	1.7	1.7	1.7	12	12	12	LQM S4ULs
Boron (water soluble)	mg/kg	290	290	290	240000	240000	240000	LQM S4ULs
Cadmium	mg/kg	11	11	11	190	190	190	LQM S4ULs
Chromium (Total)	mg/kg	910	910	910	8600	8600	8600	LQM S4ULs
Chromium (VI)	mg/kg	6	6	6	33	33	33	LQM S4ULs
Copper	mg/kg	2400	2400	2400	68000	68000	68000	LQM S4ULs
Lead	mg/kg	200	200	200	2300	2300	2300	DEFRA C4SLs
Organic Mercury	mg/kg	1.2	1.2	1.2	26	26	26	LQM S4ULs
Nickel	mg/kg	130	130	130	980	980	980	LQM S4ULs
Selenium	mg/kg	250	250	250	12000	12000	12000	LQM S4ULs
Vanadium	mg/kg	410	410	410	9000	9000	9000	LQM S4ULs
Zinc	mg/kg	3700	3700	3700	730000	730000	730000	LQM S4ULs
Aliphatic EC 5 - 6	mg/kg	42	78	160	3200 (304) ^{sol}	5900 (558) ^{sol}	12000 (1150)	LQM S4ULs
Aliphatic EC 6 - 8	mg/kg	100	230	530	7800 (144) ^{sol}	17000 (322) ^{sol}	40000 (736) ^{sol}	LQM S4ULs
Aliphatic EC 8 - 10	mg/kg	27	65	150	2000 (78) ^{sol}	4800 (190) ^{sol}	11000 (451) ^{vap}	LQM S4ULs
Aliphatic EC 10 - 12	mg/kg	130 (48) ^{vap}	330 (118) ^{vap}	760 (283) ^{vap}	9700 (48) ^{sol}	23000 (118) ^{vap}	47000 (283) ^{vap}	LQM S4ULs
Aliphatic EC 12 - 16	mg/kg	1100 (24) ^{sol}	2400 (59) ^{sol}	4300 (142) ^{sol}	59000 (24) ^{sol}	82000 (59) ^{sol}	90000 (142) ^{sol}	LQM S4ULs
Aliphatic EC 16 - 35	mg/kg	65000 (8.48)	92000 (21) ^{f,sol}	110000 ^f	1600000 ^f	1700000 ^f	1800000 ^f	LQM S4ULs
Aliphatic EC 35 - 44	mg/kg	65000 (8.48)	92000 (21) ^{f,sol}	110000 ^f	1600000 ^f	1700000 ^f	1800000 ^f	LQM S4ULs
Aromatic EC 5 - 7	mg/kg	70	140	300	26000 (1220)	46000 (2260)	86000 (4710)	LQM S4ULs
Aromatic EC 7 - 8	mg/kg	130	290	660	56000 (869) ^{vap}	110000 (1920)	180000 (4360)	LQM S4ULs
Aromatic EC 8 - 10	mg/kg	34	83	190	3500 (613) ^{vap}	8100 (1500) ^{vap}	17000 (3580)	LQM S4ULs
Aromatic EC 10 - 12	mg/kg	74	180	380	16000 (364) ^{sol}	28000 (899) ^{sol}	34000 (2150)	LQM S4ULs
Aromatic EC 12 -16	mg/kg	140	330	660	36000 (169) ^{sol}	37000	38000	LQM S4ULs
Aromatic EC 16 - 21	mg/kg	260 ^f	540 ^f	930 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs
Aromatic EC 21 - 35	mg/kg	1100 ^f	1500 ^f	1700 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs
Aromatic EC 35 - 44	mg/kg	1100 ^f	1500 ^f	1700 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs
Benzene	mg/kg	0.087	0.17	0.37	27	47	90	LQM S4ULs
Toluene	mg/kg	130	130	130	56000 (869)	110000 (1920)	180000	LQM S4ULs
Ethyl Benzene	mg/kg	47	110	260	5700	13000	27000	LQM S4ULs
Xylene - o	mg/kg	60	140	330	6600	15000	33000	LQM S4ULs
Xylene - m	mg/kg	59	140	320	6200	14000	31000	LQM S4ULs
Xylene - p	mg/kg	56	130	310	5900	14000	30000	LQM S4ULs
MTBE (methyl tert-butyl ether)	mg/kg	49	84	160	7900	13000	24000	CL:AIRE 2010
Acenaphthene	mg/kg	210	510	1100	84000 (57) ^{sol}	97000 (141) ^{sol}	100000	LQM SAULs
Acenaphthylene	mg/kg	170	420	920	83000 (86.1) ^{sol}	97000 (212) ^{sol}	100000	LQM S4ULs
Anthracene	mg/kg	2400	5400	11000	520000	540000	540000	LQM S4ULs
Benz(a)anthracene	mg/kg	7.2	11	13	170	170	180	LQM S4ULs
Benzo(a)pyrene	mg/kg	2.2	2.7	3	35	35	36	LQM S4ULs
Benzo(b)fluoranthene	mg/kg	2.6	3.3	3.7	44	44	45	LQM S4ULs
Benzo(ghi)perylene	mg/kg	320	340	350	3900	4000	4000	LQM S4ULs
Benzo(k)fluoranthene	mg/kg	77	93	100	1200	1200	1200	LQM S4ULs
Chrysene	mg/kg	15	22	27	350	350	350	LQM S4ULs
Dibenz(ah)anthracene	mg/kg	0.24	0.28	0.3	3.5	3.6	3.6	LQM S4ULs
Fluoranthene	mg/kg	280	560	890	23000	23000	23000	LQM S4ULs
Fluorene	mg/kg	170	400	860	63000 (30.9) ^{sol}	68000	71000	LQM S4ULs
Indeno(123-cd)pyrene	mg/kg	27	36	41	500	510	510	LQM S4ULs
Naphthalene	mg/kg	15 ^f	36 ^f	85 ^f	1600 ^f	3700 ^f	8400 ^f	LQM S4ULs
Phenanthrene	mg/kg	95	220	440	22000	22000	23000	LQM S4ULs
Pyrene	mg/kg	620	1200	2000	54000	54000	54000	LQM S4ULs

APPENDIX 9 - CIRIA C552 Risk Assessment Methodology

Contaminated Land Risk Assessment

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:

Hazard Identification ➡ Hazard Assessment ➡ Risk Estimation ➡ Risk Evaluation

LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process.

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552:

- **High likelihood:** There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;
- **Likely:** There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;
- **Low likelihood:** There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term;
- **Unlikely:** There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

The severity is also classified using a system based on CIRIA C552. The terms and definitions are:

- **Severe:** Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse;

- **Medium:** Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve;
- **Mild:** Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment;
Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.
- **Minor:** harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

- **Very high:** There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required;
- **High:** Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term;
- **Moderate:** It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term;
- **Low:** It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild;
- **Very Low:** There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

APPENDIX 10 - Contaminated Land Legislative Background

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act;
- The Contaminated Land (England) Regulations 2000;
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

- 1) Significant harm is being caused or there is a significant possibility of such harm being caused;
- 2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

- **Source** - substances that are potential contaminants or pollutants that may cause harm;
- **Pathway** - a potential route by which contaminants can move from the source to the receptor;
- **Receptor** - a receptor that may be harmed, for example the water environment, humans and water.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the SPR approach is 'suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below however the list is not exhaustive:

- LCRM – Model Procedures;
- Contamination and Environmental Matters - Their implications for Property Professionals (2nd Edition RICS Nov 2003);
- Brownfields – Managing the development of previously developed land – A client's guide, CIRIA 2002;
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides, dated March 2002;
- DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990;
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002;

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environment Act (1995);
- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
- The Environment Protection Act (1990);
- The Contaminated Land (England) Act (2000);
- Contaminated Land (England) Regulations (2012);
- The Water Resources Act (1991);
- The Pollution Prevention and Control (England and Wales) Regulations (2000);
- The Landfill Regulations (England and Wales) Regulations (2002);
- The Landfill (England and Wales) (Amendment) Regulations (2004);
- Health and Safety at Work Act;

APPENDIX 11 - Limitations

Limitations

This report (Report) forms part of the Services and if applicable Additional Services undertaken by Groundtech Consulting Ltd pursuant to a written contract (Agreement) which contains detailed provisions including express limitations of the liability of Groundtech Consulting Ltd.

This Report was prepared using reasonable skill and care as stated in the Agreement for the purpose including intended end use stated by the Client (Purpose) and the liability of Groundtech Consulting Ltd in respect of the form and content of this Report is no greater than its liability under the Agreement. All records, measurements notes, or any other data (Data) obtained by or for the benefit of the Consultant were obtained at a specific point in time and it may not be assumed by the Client or any person relying on this Report that the Data will remain unaffected by the passage of time, the seasons, weather conditions, changes in the water table or the carrying out and completion of works at the Site.

Unless otherwise agreed this Report has been prepared exclusively for the use and reliance of the Client and may not be relied upon, by any other party except as provided for in the Agreement. A third party who relies on this Report, does so at their own and sole risk and Groundtech Consulting Ltd has no liability to such parties.

Groundtech Consulting Ltd that this Report is to be used for the Purpose. The Purpose was instrumental in determining the scope and of the Services provided. If the Purpose should change, the Client may not be able to rely on the Report without the separate agreement of Groundtech Consulting Ltd.

Since the Report was written, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change (see below) and should be investigated if there is any significant delay in acting on the findings of this Report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the Report inaccurate or unreliable. The information and conclusions in this Report should not be relied upon in the future without written confirmation from Groundtech Consulting Ltd that it is safe to do so.

The observations and conclusions outlined in this Report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting Ltd.

Groundtech Consulting Ltd is not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The Report is based upon Groundtech Consulting Ltd's observations of existing physical conditions at the Site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the Client on the history and usage of the Site. The findings and recommendations contained in this Report are based in part upon information provided by third parties, and Groundtech Consulting Ltd have relied upon such information assuming it to be correct.

Groundtech Consulting Ltd accepts no responsibility for errors or inaccuracies in third party information presented in this Report. Groundtech Consulting Ltd was not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services or Additional Services. Groundtech Consulting Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting Ltd and forms the contract with the client.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions may also vary due to the ground's heterogeneous properties and because investigation exploratory locations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this Report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. If so stipulated in the Agreement, geo-environmental testing was carried out for a limited number of parameters based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

Any groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and groundwater levels may occur at other times of the year which are higher than were recorded during this investigation.

Any site drawings provided in this Report are preliminary and used to present the general relative locations of features on, and surrounding, the Site.

