



Neath Port Talbot County Borough Council

PORT TALBOT HARBOURSIDE GENERIC QUANTITATIVE RISK ASSESSMENT

Supplementary Site Investigation Report





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VERSION 1, CONFIDENTIAL

PROJECT NO. 62253048

OUR REF. NO. 62253048_001

DATE: MARCH 2020

Neath Port Talbot County Borough Council

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Supplementary Site Investigation Report

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2
Remarks	Version 1	Previous reports updated	
Date	September 2019	March 2020	
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Authorised by	Katie Rawlins	Katie Rawlins	
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Project number	62253048	62253048	
Report number	62253048_001	62253048_001	

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1 INTRODUCTION

1.1 INSTRUCTION

WSP UK Limited (WSP) was commissioned by Neath Port Talbot County Borough Council (the Client) to undertake a supplementary site investigation and Generic Quantitative Risk Assessment (GQRA) for a site off Old Dock Road and Harbour Way, Port Talbot (the site), as detailed within the water quality monitoring strategy (WSP 62253048_Port Talbot Harbourside_MEMO_GI scope_14062019) approved by Natural Resources Wales (NRW). This report details the findings of the intrusive works.

1.2 BACKGROUND

The site, formerly utilised as part of the Port Talbot steel works and later as a chemical works, is now an area of derelict land with proposed commercial redevelopment. Previous investigations, most recently by Opus International Consultants (UK) Ltd (Opus), were commissioned by the Client to assess ground conditions on site and highlight any contamination present that could pose a risk to future development. The previous assessments identified heavy metal and benzene contamination within the Made Ground on site. Light Non-Aqueous Phase Liquid (LNAPL) was also noted in one of the trial pits.

Further assessment of the potential contamination risks within the superficial deposits and groundwater is required to confirm potential contaminated land constraints associated with the redevelopment.

This report has been prepared taking into account information obtained during investigations undertaken by Opus; however, the Generic Quantitative Risk Assessment has been based on the most recent WSP site investigation results from 2019.

1.3 AIMS AND OBJECTIVES

The main objectives of this assessment were:

- § To obtain additional soil and groundwater quality data to fill gaps within the existing conceptual understanding of the ground and contamination conditions at the site;
- § Determine the ground conditions and contamination at the site and develop a detailed conceptual site model;
- § Identify potential contamination constraints to the proposed development;
- § Advise on mitigation works required to address potential constraints identified.

1.4 PREVIOUS REPORTS

The following previous reports should be read in conjunction with this report. Data contained within these reports has been utilised in this assessment, where appropriate:

- § Opus Phase I Desk Study Report, Ref: V-C8602.01-OIC-00-XX-RP-01, Dated July 2017.

- § Opus International Consultants (UK) Ltd, NPT Harbourside Interpretative Geoenvironmental Ground Investigation Report, Ref: V-C8602.01/OIC/00/XX/RP/02, Dated September 2017;
- § Opus International Consultants (UK) Ltd, NPT Harbourside – Addendum Ground Gas Letter Report, Ref: V-C8602.01-OIC-20171012-NPTCBC-01, dated October 2017; and

1.5 LIMITATIONS

A copy of our General Limitations is included within Appendix A. This assessment has been prepared for the sole use of the above-named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of WSP. No responsibility will be accepted where this report is used in its entirety or in part, by any other party. Information provided by others has been taken in good faith as being accurate. WSP cannot accept liability for any deficiencies in third party information.

2 THE SITE

2.1 LOCATION AND ACCESS

The site is located adjacent to the Cramic Way to Port Talbot Parkway Railway Station on the northern boundary and Old Dock Road and Harbour Way (A4241) on the southern boundary. The site comprises a roughly rectangular parcel of land which is approximately 2.8 Ha in area. The western portion of the site is bounded with earth bunds whilst the northern and eastern boundaries are open. The southern boundary is fenced.

The location of the site is at an approximate National Grid Reference (NGR) 276570(E), 189509(N) as displayed on Figure 1.

The main access to the site is off Oakwood Road.

2.2 SITE DESCRIPTION

The site is generally flat, except for a raised embankment approximately 2m in height in the western area of the site. All buildings known to have been previously occupying the site have been demolished, but areas of concrete, macadam and hardstanding associated with these buildings remain. The site is heavily vegetated in areas, especially to the north east and south west.

To the north, the site boundary is comprised of a public footpath beyond which lies Port Talbot Parkway Railway Station and associated car parking. There is no fencing or other means of segregation to prevent public access to the site from this direction. To the east, the site is bound to the Port Talbot Magistrates Court and associated parking. The magistrates court is currently undergoing refurbishment, a contractor's compound and carpark is directly adjacent to the eastern boundary of the site. To the south, the site is bound to Dock Road, beyond which lies Harbour Way and to the west, the site is bound by newly developed commercial buildings.

2.3 SITE HISTORY

The historical mapping of the site showed it predominantly comprised marshland and agricultural land from 1876 (earliest available map), with a building considered to have been associated with a farm located within the northern boundary of the site.

By 1917, the western portion of the site became largely developed with buildings and tanks, and the railway to the south and north.

The site was shown to form Port Talbot Steel Works by 1921 and from 1939 onwards, further development in the form of buildings and railways was noted. Reconfiguration of the buildings occurred until around 1964, when they were then mostly replaced by roadways and the eastern portion of the site was developed as a chemical works.

By 1993, the chemical works was noted to be disused and the site shown to form part of the surrounding industrial estate. Little change in land use of the site or the general area was recorded until the buildings in the vicinity were demolished and generally levelled at an undetermined date between 1997 and 2007.

A full account of the site history is provided in the Opus Phase I Desk Study Report (Ref: V-C8602.01-OIC-00-XX-RP-01), dated July 2017.

2.4 PROPOSED DEVELOPMENT

It is understood that the site is proposed for redevelopment into a number of commercial units with associated car parking and access roadways.

2.5 GROUND CONDITIONS

The geology of the area in its regional context is shown on British Geological Survey 1:50,000 scale plan Sheet 247, Swansea and in more detail on 1:10,560 scale sheet SS 78 NE. The site lies just within the southern outcrop of the South Wales Coalfield.

Solid strata of the Llynfi Beds comprising sandstones with interbedded coal seams and minor siltstone and mudstone layers of the Lower Pennant Measures of Carboniferous age underlie Estuarine Alluvium in the immediate area. Alluvial Fan deposits and Glacial Sand and Gravel are also indicated in close proximity to the site.

2.6 HYDROGEOLOGY AND HYDROLOGY

The groundwater vulnerability map provided by Envirocheck included in the Opus Phase 1 Desk Study Report (Ref: V-C8602.01_OIC_00_XX_RP_01) for the site indicates it is underlain by a Secondary aquifer (undifferentiated) of high permeability. The site bedrock aquifer designation is a Secondary A aquifer associated with the Hughes Member of the Upper Pennant Sandstone (or Upper Coal Measures). The aquifer designation for the superficial deposits is shown to be Secondary Undifferentiated.

Groundwater Vulnerability Flood maps produced by Envirocheck indicate the whole site has a potential for groundwater flooding to occur to property situated below ground level. The Groundwater Vulnerability Flood maps also indicate that there is the potential for groundwater flooding to occur at the surface across the site, with the exception of the north-west corner of the site where there is a raised embankment.

The nearest surface water features to the site are the Port Talbot Docks which lie approximately 60m to the south of the site and the River Afan some 370m to the north-west of the site. A small pond lies approximately 80m south-east of the site.

The River Afan flows in a general north-east to south-west direction and is classified by the Environment Agency as River Quality Objective Grade 1, with a Chemistry General Quality Assessment Grade A, i.e. of very good quality that is suitable for salmonid fishery.

There are no licensed water abstractions within 500m of the site.

3 CONCEPTUAL SITE MODEL

3.1 GROUND CONDITIONS

Previous investigations undertaken indicate the following ground conditions are present on site.

Table 3-1 - Ground Conditions on Site, Opus 2017

Strata	Max Depth (mbgl)	Max Thickness (m)	Description
Made Ground	1.00 – 3.40	3.40	Sands and Gravels including ash, slag, brick, concrete and clinker. Fragments of metal, glass and wood.
Alluvial Sand Deposits	1.90 – 4.20	1.00	Greenish grey mottled black silty slightly gravelly SAND.
Alluvial Clay/Silt Deposits	1.80 – 3.00	1.00	Black silty sandy gravelly CLAY.
Alluvial Gravel Deposits	>10.00	>9.00	Brown sandy GRAVEL.
Bedrock	>10.00	>1.50	Strong fine grained highly weathered SANDSTONE and grey weak highly weathered MUDSTONE.

3.2 HYDROGEOLOGY

Based on historical data, the groundwater regime on site was observed to be flowing in a south westerly direction towards the docks and the hydraulic gradient was found to vary between 0.0176 and 0.0137 during high and low tides, respectively, with a mean of 0.0157.

Two of the borehole positions were installed with multi-level monitoring standpipes, with slotted response zones in the Made Ground and drift deposits. The subsequent groundwater level monitoring generally observed little difference in water level between the groundwater in the Made Ground and drift deposits, suggesting that these strata represent a single continuous water body, rather than two distinct water tables.

3.3 CONTAMINATION

Previous ground investigations observed elevated concentrations of benzene in the shallow Made Ground across the site, at levels above the generic Soil Screening Values used in the risk assessment produced by Opus (2017).

Asbestos fibres have been identified in the Made Ground spatially distributed across the site in a non-specific manner, thus it is to be assumed that the majority of the Made Ground is impacted by asbestos.

Concentrations of inorganic compounds (chromium (VI), copper and zinc) have been identified within the shallow groundwater at levels above the relevant water quality standards.

An area in the south-west of the site (TP5) was noted to have elevated hydrocarbon concentrations within the soil, all of which were below the Tier I Soil Screening Values (with the exception of benzene), but at concentrations which might pose a potential risk to controlled waters.

3.4 POTENTIAL SOURCE PATHWAY RECEPTOR LINKAGES

POTENTIAL SOURCES

The site was once occupied by steel works, and later the eastern margins were occupied by a chemical works, both of which were associated with above and (assumed) underground storage tanks.

Contamination associated with steel works:

§ Petroleum Range Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH), Inorganic heavy Metals, Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), Acids, Asbestos and Polychlorinated Biphenyl's (PCBs).

Contamination associated with chemical works:

§ Petroleum Range Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH), Inorganic Heavy Metals, Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs) and asbestos.

Petroleum hydrocarbons were identified within the soils in the south-west of the site during the Opus ground investigations. This contamination was considered to have resulted from product leakage from above-ground storage tanks (ASTs) associated with the former tank farm in this area of site. It is unclear whether there were any underground storage tanks (USTs) historically present on site.

Dissolved-phase heavy metal and metalloids were observed within shallow groundwater beneath the site within the Secondary (Undifferentiated) Aquifer of the superficial deposits. This contamination could act as secondary source with the potential to impact off-site controlled water receptors.

During historical ground investigations, elevated levels of benzene were identified within the shallow Made Ground across the site.

Asbestos fibres were identified in the Made Ground spatially distributed across the site in a non-specific manner, thus it is to be assumed that the majority of the Made Ground is impacted by asbestos.

POTENTIAL OFF-SITE SOURCES

The surrounding area has a long-standing industrial history, and the following potential off-site sources have been identified. The land to the east has a history of, and continued use as steel works, and railway land is present to the north of the site.

PATHWAYS

The following migration pathways have been identified assuming the proposed commercial end use of the site:

§ The potential pathways with respect to controlled waters include:

- Lateral and vertical downward migration via the unsaturated and saturated zones within both Made Ground and Alluvium;
- Leaching of soluble contaminants in soils into the groundwater.

§ The potential pathways with respect to human health include:

- Inhalation of dust, fibres and vapours from contaminated soils and/or groundwater;
- Ingestion of and dermal contact with contaminated soils;
- Aggressive attack of contaminants on building and materials;
- Ground gases or volatile hydrocarbon vapours may migrate laterally or vertically through permeable or voided ground and accumulate within unprotected buildings.

RECEPTORS

The following potential human health, property and environmental receptors have been identified assuming the proposed future redevelopment as commercial use:

§ Future site users;

§ Site construction and maintenance workers (acute exposure only);

§ Groundwater associated with the underlying Secondary A Aquifer; and

§ Marine life within Swansea Bay/Bristol Channel.

3.5 PRELIMINARY RISK ASSESSMENT

Contaminants consistent with the historical industrial operations on-site (petroleum hydrocarbons, benzene, metals and metalloid), identified in soils (Made Ground and Alluvium) and shallow groundwater, pose a potential risk to the human health receptors (site users and workers), groundwater aquifer (Secondary A Aquifer) and Swansea Bay/Bristol Channel (including marine life) to the south-west of the site.

Table 3-2 summarises plausible Human Health and Controlled Waters source pathway receptor linkages and provides a qualitative risk level based on severity and probability (UK CIRIA 552). Plausible contaminant linkages with risk levels low / moderate or higher are taken forward into the generic quantitative risk assessment.

Table 3-2 - Risk Matrix Based on Plausible Source Pathway Receptor Linkages

Source	Pathway	Receptor	Risk Level (CIRIA 552 ⁽¹⁾)	Comment
Soils and groundwater (Made Ground and Alluvium) containing heavy metals, PAH, VOCs, BTEX and TPH	Leachate from soils (Made Ground) followed by vertical migration to shallow groundwater.	Shallow groundwater beneath the site (Alluvium, Secondary Undifferentiated Aquifer)	Moderate / Low Risk	(Severity-Minor, Probability-High) . Impacted soil and shallow groundwater identified across the site during previous investigations. Receptor has no known potable water resource potential (reducing potential severity).
	Vertical migration to shallow groundwater followed by lateral migration and discharge to surface watercourse	Sea (Swansea Bay/Bristol Channel)	Moderate / Low Risk	(Severity-Medium, Probability – Low Likelihood) . Impacted shallow groundwater identified across the site and close to downgradient site boundary. Probability of harm associated with elevated metal and TPH concentrations from the site is considered to be low based on the contaminant attenuation potential prior to reaching surface waters (high soil water partition coefficient) as well as the large Bristol Channel catchment area.
	Vertical migration and recharge into bedrock aquifer	Deep groundwater beneath the site (Upper Coal Measures, Secondary A Aquifer)	Low Risk	(Severity-Mild, Probability –Low Likelihood) . No confirmed impact to deep groundwater within Upper Coal Measures. The aquifer is not known to be utilised as potable water resource. Based on the naturally poor water quality of groundwater within the Upper Coal Measures with elevated heavy metal background concentrations (reducing potential severity) the overall risk is low.
	Dermal contact, soil ingestion and inhalation (indoor air)	Future occupants	Moderate / Low Risk	(Severity-Medium, Probability –Low Likelihood) . Proposed development is commercial buildings with associated carparking. It is assumed that most of the site will be covered

Source	Pathway	Receptor	Risk Level (CIRIA 552 ⁽¹⁾)	Comment
				in a layer of hardstanding. Therefore, removing the potential contaminant linkage. It is unknown if there are any proposed areas of softstanding on site, if there are then this contaminant linkage may need to be reassessed.
Asbestos in Made Ground	Inhalation (indoor and outdoor air)	Future occupants, construction workers, maintenance workers and site neighbours.	Moderate / Low Risk	(Severity-Medium, Probability – Low Likelihood). The risk of asbestos to construction workers is considered to be low as appropriate PPE and RPE will be adopted during ground works reducing the likelihood of inhaling asbestos fibres. The future commercial use of the site will have a layer of hardstanding capping any made ground bearing asbestos fibre. Therefore, eliminating the pathway to future receptors using the building.
Volatile hydrocarbon vapours Ground gases: methane and carbon dioxide	Inhalation (indoor air)	Future occupants	Moderate Risk	(Severity-Medium, Probability – Likely). Ground gas has previously been assessed under a separate cover, with recommendations for future protection measures. Potential risk associated with volatile hydrocarbon vapours exist given the elevated concentrations of VOCs encountered in soils beneath the site during previous investigations.

(1) D J Rudland, R M Lancefield, and P N Mayell, 2011, Contaminated Land Risk Assessment. A guide to good practice (CIRIA 552).

4 SITE WORKS

4.1 SCOPE OF WORKS

The supplementary investigation was carried out between 5th and 18th August 2019. Midland Survey Ltd. carried out utility clearance on 5th August and recorded grid references and elevation for each borehole location (including pre-existing boreholes). The drilling works were carried out by Apex Drilling Ltd. under full time supervision of WSP.

Six boreholes (BH101_2019 and BH103_2019 – BH107_2019) were advanced to a maximum of 8.00m below ground level (bgl), one borehole (BH102_2019) was advanced to a maximum of 10.00m bgl. The borehole locations are shown on Figure 2.

The boreholes were machine dug to 1.5m bgl using a JCB 3CX and then advanced using cable percussion to either the target depth, as stated above, or refusal on obstructions at 6m bgl (BH103_2019 and BH107_2019). The boreholes were logged in accordance with BS5930:2015 and soil samples were collected from the arisings by a WSP engineer and dispatched to a UKAS and MCERTS accredited laboratory.

Groundwater water sampling was undertaken on 21st August and 18th September 2019 by WSP, using low flow techniques including the use of a water quality meter and flow through cell to obtain in-situ water quality parameters. During the ground investigation, all pre-existing and new wells were developed with purged water collected in drums for off-site disposal.

Photographs from the works are displayed in Appendix B.

4.2 INSTALLATIONS

All seven boreholes were installed as groundwater wells, the details of which are displayed in Table 4-1:

Table 4-1 - Installation Details WSP Site Investigation, 2019

Borehole ID	Response Zone (mbgl)	Installation Elevation (mAOD)	Strata Installed In
BH101_2019	2.30 – 8.00	4.70 – -1.00	Alluvial Gravel
BH102_2019	5.00 – 10.00	3.89 – -1.11	Alluvial Gravel
BH103_2019	1.80 – 6.00	4.69 – 0.49	Alluvial Gravel
BH104_2019	2.00 – 4.80	5.02 – 2.22	Made Ground/Alluvial Silt
BH105A_2019	2.00 – 8.00	4.73 – 1.27	Alluvial Gravel
BH106_2019	2.30 – 8.00	4.00 – -1.70	Alluvial Gravel
BH107_2019	1.80 – 8.00	4.28 – 0.08	Alluvial Gravel

4.3 SAMPLING

Soil and water samples were collected by the WSP engineer and stored in containers provided by the UKAS and MCERTS accredited laboratory, ALS Ltd. The samples collected were labelled accordingly and stored in cool boxes, before they were transported to ALS for subsequent chemical analysis. Soil samples were headspace tested using a Photoionization Detector (PID).

Two soil samples were scheduled from each borehole, one in the Made Ground above the saturated zone and one in the superficial deposits below the saturated zone. One groundwater sample from each well was analysed. One product sample (taken from BH104_2019) was also analysed.

The analysis is detailed in Table 4-2:

Table 4-2 - Laboratory Analysis, WSP 2019

Analysis	Soil Samples	Groundwater Samples	Product Sample
Asbestos Identification	7	-	-
Metals	14	15	-
Hexavalent Chromium (CrVI)	14	15	-
Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG)	14	15	1
Speciated Polycyclic Aromatic Hydrocarbons (PAH)	14	15	-
Phenol	14	15	-
pH	14	15	-
Benzene, Toluene, Ethylbenzene and Xylenes (BTEX)	14	15	-
Methyl Tert-Butyl Ether (MTBE)	14	15	-
Volatile Organic Carbons (VOCs)	7	15	-
Total Organic Carbon (TOC)	6	15	-
Sulphate	-	15	-
Nitrate	-	15	-
Chloride	-	15	-
Product Density	-	-	1
Product Viscosity	-	-	1
Whole oil age and Chemical fingerprint	-	-	1

5 INVESTIGATION FINDINGS

5.1 GEOLOGY

Borehole logs are provided in Appendix C. The geology encountered was consistent with previous investigations at the site.

BH103_2019 and BH107_2019 were both terminated at 6m bgl due to refusals. BH103_2019 was terminated due to the shoe of the shell buckling on dense gravel, preventing further progression. BH107_2019 was terminated when the drill rig had a refusal following at least 1 hour of chiselling on likely sandstone bedrock, or possible boulders, encountered at 5.80m bgl.

The sequence of strata encountered beneath the site is summarised in Table 5-1:

Table 5-1 - Ground Conditions on Site, WSP 2019

Strata		Depth Base (mbgl)	Max Thickness (m)	Description	BHs Encountered In
Topsoil		0.10 – 0.30	0.30	Soft brown slightly sandy slightly gravelly SILT.	BH102_2019 and BH107_2019
Hardstanding		0.10 – 0.50	0.10	Concrete/Macadam	BH105A_2019, BH106_2019 and BH107_2019
Made Ground		1.00 – 3.00	3.50	Black/dark grey sandy GRAVEL of slag, clinker, brick and concrete. Sand is fine to coarse.	All positions
Alluvium	Silt	1.60 – 4.00	1.80	Soft dark grey slightly sandy gravelly SILT.	BH102_2019, BH103_2019, BH104_2019, BH105A_2019 and BH107_2019
	Gravel	>10.00	>6.20	Dark grey/brown sandy slightly silty GRAVEL of sandstone and mudstone. Or dark grey gravelly SAND.	All positions

5.2 HYDROGEOLOGY

During the investigation, groundwater strikes were encountered between 2.00m and 4.30m bgl within the Alluvial Deposits, as displayed in the borehole logs (Appendix C). After 20mins the water levels rose typically by up to 0.5m bgl.

The data recorded during the groundwater monitoring on 21st August 2019 is summarised in Table 5-2. All WSP 2019 monitoring wells and available historical monitoring wells were monitored. Further

groundwater monitoring is to be completed and the results will be discussed in the subsequent DQRA.

Table 5-2 – Groundwater Monitoring Results 21st August 2019

Borehole ID	Response Zone (mbgl)	Product Level (mbgl)	Groundwater Level (mbgl)	Groundwater Elevation (mAOD)	Depth to Base (mbgl)	Screened Stratum
BH101_2019	2.30 – 8.00	-	1.77	5.23	8.00	Alluvial Gravel
BH102_2019	5.00 – 10.00	-	4.13	4.76	10.30	Alluvial Gravel
BH103_2019	1.80 - 6.00	-	1.59	4.90	6.24	Alluvial Gravel
BH104_2019	2.00 – 4.80	2.13	-	4.89*	5.17	Made Ground / Alluvium
BH105A_2019	2.00 – 8.00	-	1.73	5.00	8.00	Alluvial Gravel
BH106_2019	2.30 – 8.00	-	1.34	4.96	8.25	Alluvial Gravel
BH107_2019	1.80 – 6.00	-	1.81	4.27	6.00	Alluvial Gravel
BHH01	N/A	-	Dry	N/A	4.00	Made Ground
BHH02(S)	0.50 – 3.00	-	1.93	4.80	2.43	Made Ground
BHH02(D)	5.00 – 8.00	-	1.93	4.80	8.82	Alluvial Gravel
BHH03	0.50 – 2.50	-	1.47	4.76	2.85	Made Ground
BHH04	0.00 – 1.00	-	1.26	5.67	1.51	Made Ground
BHH05	1.00 – 2.00	-	1.79	5.14	2.56	Made Ground
BHH07 (S)	1.00 – 3.00	-	2.31	4.71	3.65	Made Ground
BHH07 (D)	5.00 – 8.00	-	2.31	4.71	8.92	Alluvial Gravel
MW1	5.00 – 10.00	-	1.60	5.32	9.85	Alluvial Gravel
BHC5	1.00 – 2.00	2.10	2.13	4.68	2.54	Made Ground

* Product elevation (mAOD)

5.3 EVIDENCE OF CONTAMINATION

Both visual and olfactory evidence of contamination was encountered during the ground investigation at a number of boreholes, as summarised in Table 5-3.

Table 5-3 - Evidence of Contamination, WSP 2019

Borehole	Depth (mbgl)	Visual Evidence	Olfactory Evidence	PID Reading (ppm)
BH101_2019	0.80 – 2.00	Clinker		0.2
BH102_2019	3.00	Pockets of black ash		39.7
	4.30 – 4.50		Hydrocarbon odour	45.1
	4.50 – 10.00		Slight / faint hydrocarbon odour	2.8, 6.7, 4.5, 5.2, 3.7 and 2.2
BH103_2019	0.70 – 1.40	Clinker		N/A
	1.60 – 5.00		Slight hydrocarbon odour	N/A
BH104_2019	0.6 – 1.40	Clinker	Strong hydrocarbon odour	25.4
	1.40 – 3.80	LNAPL, Clinker	Very strong hydrocarbon odour	4431, >5000 and >5000
	4.00 – 6.00		Faint tar odour and faint hydrocarbon odour	74, 77.4 and 60.7
BH105A_2019	1.80 – 5.50		Strong hydrocarbon odour	N/A
	2.40 – 3.00	LNAPL sheen on arisings		N/A
BH106_2019	0.20 – 1.10	Clinker		0.0
	1.10 – 2.00	Clinker	Hydrocarbon odour	23.7
BH107_2019	0.10 – 0.40	Clinker		N/A

Borehole	Depth (mbgl)	Visual Evidence	Olfactory Evidence	PID Reading (ppm)
	3.00	N/A	Slight hydrocarbon odour	13.8

5.4 LABORATORY ANALYSIS RESULTS

SOIL

Soil quality data have been summarised below and are presented in full in Appendix D. All concentrations are presented in mg/kg unless otherwise reported.

Borehole Arisings

- § Loose asbestos fibres (chrysotile and amosite) were identified in BH107_2019 at 0.10 – 0.30m bgl. Asbestos fibres were not detected in any other samples.
- § pH ranged from pH6.51 (BH106_2019) to pH9.95 (BH104_2019) in the boreholes, indicating neutral to moderately alkaline conditions.
- § Phenol concentrations above the laboratory limit of detection (LOD) were detected in BH102_2019 (0.0114 mg/kg) and BH104_2019 (0.0112 mg/kg and 0.518 mg/kg).
- § MTBE was not detected above the LOD in any samples.
- § Concentrations of BTEX compounds were detected above the LOD in seven samples. The sum of BTEX in 6 of the samples ranged from 0.46 mg/kg (BH106_2019) to 3.37 mg/kg (BH103_2019). However, in BH104_2019 at 3m bgl the total sum of BTEX was 1,720 mg/kg, the individual compound concentrations of which are; 704 mg/kg (toluene), 553 mg/kg (p/m-xylene), 195 mg/kg (benzene), 181 mg/kg (ethylbenzene) and 91.2 mg/kg (o-xylene).
- § Metal concentrations were low and broadly consistent across all samples and are considered likely to represent background concentrations. The only noteworthy results were the concentrations of lead in BH103_2019 at 1.00 – 1.10m bgl (7,370 mg/kg) and BH102_2019 at 0.70 – 0.80m bgl (3,350 mg/kg). Hexavalent chromium was recorded at less than the LOD in all samples.
- § Total petroleum hydrocarbon concentrations were recorded above the LOD in thirteen of the fourteen samples, with the exception being BH101_2019 at 3.00 – 3.20m bgl.
- § The total aliphatic and aromatic (>C5-C44) concentrations in eleven of the samples ranged from 2.52 mg/kg (BH105A_2019 at 4.10 – 4.20m bgl) to 253 mg/kg (BH102_2019 at 0.70 – 0.80m bgl). These concentrations predominantly consisted of mid to heavy end aliphatics (>C21-C35) and aromatics (>C21-C35 and >C35-C44).
- § Two samples (both BH104_2019) recorded significantly higher total aliphatic and aromatic (>C5-C44) concentrations; 1,310 mg/kg at 0.85 – 0.90m bgl and 15,300 mg/kg at 3.00 – 3.10m bgl.
 - The petroleum hydrocarbon concentrations in BH104_2019 at 0.85 – 0.90m bgl predominantly consisted of aliphatic >C10-C12 (245 mg/kg) and >C21-C35 (333 mg/kg) chains and aromatic >C10-C12 (163 mg/kg) and >C21-C35 (279 mg/kg) chains.
 - The petroleum hydrocarbon concentrations in BH104_2019 at 3.00 – 3.10m bgl predominantly consisted of light end aliphatics (>C6-C8: 878 mg/kg, >C8-C10: 5,120 mg/kg)

and >C10-C12: 2490 mg/kg) and light end aromatics (>C5-C7: 1,270 mg/kg, >C8-C10: 3,410 mg/kg and >C10-C12: 1,660 mg/kg).

- § Total PAH concentrations above the LOD were recorded in twelve of the fourteen samples, the exceptions being BH101_2019 at 3.00 – 3.20m bgl and BH107_2019 at 2.90 – 3.00m bgl. The total PAH concentrations in the twelve samples ranged from 0.146 mg/kg (BH105A_2019 at 4.10 – 4.20m bgl) to 75.8 mg/kg (BH104_2019 at 3.00 – 3.10m bgl). All individual PAHs were recorded marginally above their respective LODs in at least one sample, with naphthalene being the highest individual PAH concentration in most samples. The highest concentration of naphthalene was recorded in BH104_2019 at 3.00 – 3.10m bgl (69.2 mg/kg).
- § Seven samples were analysed for VOCs, however only one sample (BH104_2019 at 3.00 – 3.10mbgl) recorded concentrations above the LOD.
 - The following VOCs recorded concentrations above the LOD in BH104_2019 at 3.00 – 3.10mbgl: styrene (19.7 mg/kg), isopropylbenzene (1.46 mg/kg), propylbenzene (1.15 mg/kg), 1,3,5-Trimethylbenzene (29.2 mg/kg), 1,2,4-Trimethylbenzene (73.8 mg/kg) and 4-Isopropyltoluene (0.817 mg/kg).
- § Six samples (one from each borehole, excluding BH104_2019) were analysed for TOC, of which, TOC concentrations in five of the samples were above the LOD. TOC ranged from 0.209 % (BH105A_2019) to 0.38 % (BH102_2019).

GROUNDWATER

Groundwater quality data have been summarised below and are presented in full in Appendix D. All concentrations are presented in µg/l unless otherwise reported.

- § Metal concentrations were low and broadly similar across all samples and are considered likely to represent background concentrations, with the exception of a high concentrations of arsenic in BH105A_2019 (11.3 µg/l), BHC5 (31.7 µg/l) and BHH04 (18.6 µg/l), and of chromium in BHH05 (182 µg/l) and BHH02(S) (50.3 µg/l).
- § Phenol concentrations were recorded above the LOD in BH105A_2019 (30 µg/l) and BHC5 (50 µg/l).
- § Chloride concentrations were above the LOD in all samples. Concentrations ranged from 10,400 µg/l (BHH04) to 91,500 µg/l (BH101_2019).
- § Nitrate concentrations were detected above the LOD in nine of fifteen samples. Concentrations ranged from 24.5 µg/l (BH103_2019) to 4790 µg/l (MW1).
- § Sulphate concentrations were above the LOD in all samples. Concentrations ranged from 7,730 µg/l (BHH05) to 45,000 µg/l (BHH04).
- § MTBE was not detected above the LOD in any samples.
- § Concentrations of BTEX compounds were detected above the LOD in two samples, BH105A_2019 and BHC5. The total concentrations of BTEX compounds were 4,290 µg/l (BH105A_2019) and 131,000 µg/l (BHC5). Benzene was the primary constituent in BH105A_2019 at 3,410 µg/l. Benzene (58,300 µg/l), Toluene (54,500 µg/l) and m/p-Xylene (12,100 µg/l) were the main constituents in BHC5.
- § TPH concentrations were detected above the LOD in two samples. Concentrations of total aliphatics and aromatics (>C5-C35) were 5,080 µg/l (BH105A_2019) and 180,000 µg/l (BHC5).

- TPH concentrations in BH105A_2019 consists of predominantly light end aromatic chains (>C7-C12) and to a lesser extent light end aliphatic chains (>C5-C12). The highest concentration is that of aromatics >C5-C7 at 3,410 µg/l.
 - TPH concentrations in BHC5 consists of predominantly light end aromatic chains (>C5-C12) and to a lesser extent light end aliphatic chains (>C8-C12). The highest concentrations are that of aromatics >C5-C7 (58,300 µg/l), >C7-C8 (54,500 µg/l), >C8-C10 (21,400 µg/l) and >C10-C12 (15,800 µg/l), and aliphatics >C10-C12 (23,700 µg/l).
- § In general, total PAH concentrations were recorded below the LOD in most samples, with the exception of BH105A_2019, BHC5 and BHH05. Where detected, most PAH concentrations were only marginally over the LOD, with the exception of acenaphthene in BH105A_2019 (4.68 µg/l) and BHC5 (2.1 µg/l), and naphthalene in BHC5 (675 µg/l).
- § All fifteen samples were analysed for VOCs, however only two samples (BH105A_2019 and BHC5) recorded concentrations above the LOD.
- The following VOCs recorded concentrations above the LOD in BH105A_2019: isopropylbenzene (2.91 µg/l), 1,3,5-Trimethylbenzene (17 µg/l) and 1,2,4-Trimethylbenzene (24.7 µg/l).
 - The following VOCs recorded concentrations above the LOD in BHC5: carbon disulphide (2.37 µg/l), trichloroethene (1.18 µg/l), chlorobenzene (1.17 µg/l), isopropylbenzene (56.9 µg/l), propylbenzene (32.3 µg/l), 1,3,5-Trimethylbenzene (1130 µg/l), 1,2,4-Trimethylbenzene (1310 µg/l), sec-butylbenzene (2.02 µg/l) and n-butylbenzene (23.2 µg/l).

PRODUCT

One product sample was taken from BH104_2019 and sent to an accredited laboratory for the testing specified in Table 4-2 above. Product quality data have been summarised below and are presented in full in Appendix D. All concentrations are presented in µg/l unless otherwise reported.

- § Chemical oil fingerprint identified the product sample as carbon range C6-C8 with a boiling point range of 69 - 317°C and a calculated age of 1-5 years.
- § The product sample has a viscosity (at 40°C) of 3.7 mm²/s.
- § The product sample has a density (volume weight) of 0.887 g/mL.
- § TPH CWG testing indicated that the product sample consists of 75 % light end aromatic (>C6-C12) chains and 25 % light end aliphatic (>C6-C12) chains. These TPH ranges are indicative of gasoline range hydrocarbons.

6 GENERIC QUANTITATIVE RISK ASSESSMENT

6.1 RATIONALE

The risk assessment has been undertaken in general accordance with the United Kingdom approach and guidance issued by the relevant statutory bodies and comprises a Generic Quantitative Risk Assessment (GQRA). Future development plans for the site involve the potential for the construction of commercial premises with associated parking. As such, soil laboratory test results have been compared to generic assessment criteria (GAC) for a commercial end use.

The generic controlled waters risk assessment was conducted in accordance with the principles of the EA 'Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination' 2006 (EA 2006) and the 'prevent and limit' approach of the Water Framework Directive (2000/60/EC). Generic controlled waters risk assessments compare directly measured concentrations with standard assessment criteria.

In the event that representative soil or groundwater concentrations at the site exceed their associated GAC for a determinand, it does not automatically mean that a contaminant linkage exists. In the event that exceedances are identified, further evaluation and assessment may be required to establish the extent of any potential environmental liabilities associated with the site. Such an assessment would need to account for sampling uncertainty, analytical uncertainty and hydrological and hydrogeological conditions at the site.

Screening tables are presented in Appendix E.

6.2 HUMAN HEALTH

SELECTION OF ASSESSMENT CRITERIA

The future most sensitive land use for the site is commercial. As a result, the dataset has been screened against end-use criteria protective of the future site users. GAC have been developed assuming a SOM value of 1%, the most conservative criteria available

The results of the laboratory analyses from the recent ground investigation carried out on the site have been screened against these GAC, in accordance with best practice. The objective of the assessment is to establish the presence or absence of potential contaminant linkages associated with soils beneath the site.

SOIL ASSESSMENT HUMAN HEALTH RESULTS

There were five exceedances of the respective GAC for four analytes in three of the boreholes, as shown in Table 6-1.

Table 6-1 - Soil Exceedances of for Commercial End-Use

Borehole	Depth (m)	Analyte	Result (mg/kg)	Commercial GAC (mg/kg)
BH104_2019	3.00 – 3.10	Aliphatic (>C8-C10)	5,120	2,000
		TPH Hazard Index	4.08	1.00
		Benzene	195	27.0
		Naphthalene	450	193
BH102_2019	0.70 – 0.80	Lead	3,350	1,390
BH103_2019	1.00 – 1.10		7,370	

It should also be noted that although loose asbestos fibres were detected in only one sample, due to the history of the site, it is possible that asbestos fibres or ACMs could be present in other areas of the site.

GROUNDWATER VAPOUR ASSESSMENT HUMAN HEALTH RESULTS

There was one exceedance of the respective GAC for benzene, as shown in Table 6-2.

Table 6-2 – Groundwater Vapour Exceedances of for Commercial End-Use (Sandy Soil)

Determinand	Commercial GAC (µg/l)	Standard Reference	Maximum Concentration (µg/l)	Location of Exceedance
Benzene	57,540	WSP	64,100	BHC5

6.3 CONTROLLED WATERS

SELECTION OF ASSESSMENT CRITERIA

Appropriate Water Quality Standards (WQS) are selected based on both a hierarchy of relevance to England and Wales and the receptor. In this case, the controlled water receptors identified in the conceptual site model was the Bristol Channel approximately 60m south. The Bristol Channel is considered to be a transitional water body. The following hierarchies of WQS were considered to be appropriate:

SURFACE WATERS

- § Environmental Quality Standards (EQS) for Transitional, Coastal and Territorial Waters from The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015;
- § Contaminated Land: Applications in Real Environments (CL:AIRE), Guidance on Assessing Petroleum Hydrocarbons using Existing Hydrogeological Risk Assessment Methodologies (2017).

AQUIFERS

- § UK Drinking Water Quality Standards (DWS) from The Water Supply (Water Quality) Regulations 2000 (amended 2004);
- § World Health Organisation (WHO) Guidelines for Drinking Water Quality, Fourth Edition, Volume 1, (2011);
- § World Health Organisation (WHO) Petroleum Products in Drinking Water (2008).

WATER ENVIRONMENT RISK ASSESSMENT RESULTS

Tables 6-3 and 6-4 presents the screening of the available 2019 WSP analytical data, for surface water and groundwater (aquifer) receptors respectively. Laboratory certificates of the chemical analysis are provided in Appendix E.

Exceedances of the selected WQS within the 2019 dataset are summarised in Tables 6-3 and 6-4. Groundwater exceedances of WQS were identified for multiple determinands.

Table 6-3 - Groundwater Exceedances for the Protection of the Water Environment

Determinand	GAC (µg/l)	Standard Reference	Maximum Concentration (µg/l)	Location of Exceedance
Aromatic >EC6-EC7*	8	CL:AIRE 2017	58,300	BHC5, BH105A_2019
Aromatic >EC7-EC8	74	CL:AIRE 2017	54,500	BHC5, BH105A_2019
Aromatic >EC8-EC10	20	CL:AIRE 2017	21,400	BHC5, BH105A_2019
Aromatic >EC10-EC12*	2	CL:AIRE 2017	15,800	BHC5, BH105A_2019
Aromatic >EC12-EC16*	2	CL:AIRE 2017	758	BHC5
Aromatic >EC16-EC21*	0.1	CL:AIRE 2017	61	BHC5
Aromatic >EC21-EC35*	0.0002	CL:AIRE 2017	45	BHC5
Benzene	8	EQS 2015 - Trans	64,100	BHC5, BH105A_2019

Determinand	GAC (µg/l)	Standard Reference	Maximum Concentration (µg/l)	Location of Exceedance
Ethylbenzene	20	Proposed EQS	7,060	BHC5, BH105A_2019
Toluene	74	EQS 2015 - Trans	61,100	BHC5, BH105A_2019
Arsenic	25	EQS 2015 - Trans	31.7	BHC5
Hexavalent Chromium*	0.6	EQS 2015 - Trans	178	BHH02(S), BHH05, BHH07(S)
Lead	1.3	EQS 2015 - Trans	1.42	BHH05
Hexachlorobutadiene	0.6	EQS 2015 - Trans MAC	<1	All locations*
Benzo(a)pyrene*	0.0002	EQS 2015 - Trans	0.02	BHH04, BHH05
Fluoranthene	0.006	EQS 2015 - Trans	0.23	BH105A_2019, BH106_2019, BHH04, BHH05, BHC5*
Naphthalene	2	EQS 2015 - Trans	13,300	BHC5, BH105A_2019
Phenol	7.7	EQS 2015 - Trans	50	BHC5, BH105A_2019
Anthracene	0.1	EQS 2015 - Trans	<0.5	BHC5*

*Concentration laboratory limits of detection (LOD). WQS greater than LOD.

Identified exceedances were distributed across the site. TPH, PAH, BTEX and phenol exceedances were predominantly limited to BHC5 and BH105A_2019 in the south-west and centre of site respectively. Metals exceedances were distributed across all areas of the site.

Table 6-4 - Groundwater Exceedances for the Protection of the Aquifer

Determinand	GAC (µg/l)	Standard Reference	Maximum Concentration (µg/l)	Location of Exceedance
Aliphatic >C8-C10	300	WHO 2008	4,650	BHC5
Aliphatic >C10-C12	300	WHO 2008	23,700	BHC5, BH105A_2019
Aromatic >EC8-EC10	300	WHO 2008	21,400	BHC5, BH105A_2019
Aromatic >EC10-EC12	90	WHO 2008	15,800	BHC5, BH105A_2019
Aromatic >EC12-EC16	90	WHO 2008	758	BHC5
Benzene	1	UK DWS	64,100	BHC5, BH105A_2019
Ethylbenzene	300	WHO 2017	7,060	BHC5
Toluene	700	WHO 2017	61,100	BHC5
Arsenic	10	UK DWS	31.7	BH105A_2019, BHC5, BHH04
Chromium	50	UK DWS	182	BHH02(S), BHH05
Benzo(a)pyrene	0.010	UK DWS	0.020	BHH05, BHC5*
Hexachlorobutadiene	0.60	WHO 2017	<1	All locations*
Vinyl Chloride	0.50	UK DWS	<1	All locations*
1,2-Dibromoethane	0.40	WHO 2017	<1	All locations*

*Concentration laboratory limits of detection (LOD). WQS greater than LOD.

Identified exceedances were distributed predominantly in the south west and centre of the site. TPH and BTEX exceedances were limited to BHC5 and BH105A_2019 in the south-west and centre of site respectively. Metals exceedances were distributed predominantly in the centre of site.

7 REVISED CONCEPTUAL SITE MODEL

7.1 PLAUSIBLE CONTAMINANT LINKAGES

A revised CSM has been developed based on the ground investigation data collected to date and is presented in Table 7-1, below.

In summary, the ground conditions encountered across the site were largely as anticipated, evidence of contamination was observed across the site in the form of hydrocarbon odours and high PID readings.

Gross contamination (LNAPL) was observed during the drilling of BH104_2019 and at BH105A_2019 and BHC5 during the groundwater monitoring. These areas of site (south west and central) are associated with historical tanks farms, however the analysis of the product sample collected from BH104_2019 indicates a more recent product source. A previously unknown UST or underground pipeline leak could be the potential source of this product contamination. However, currently there is no evidence to support this.

HUMAN HEALTH

There were five exceedances of the commercial human health assessment criteria for soils:

- § aliphatic >C8-C10, benzene and naphthalene in BH104_2019;
- § lead in BH102_2019 and BH103_2019.
- § Asbestos loose fibres were also identified within the Made Ground in BH107_2019.

The groundwater vapour assessment detected an exceedance of the commercial GAC screening value for benzene in BHC5.

The presence of light end hydrocarbons and BTEX compounds in the soil surrounding BH104_2019, identifies that a contamination linkage exists and that it is considered that a localised inhalation pathway (particularly of volatiles) is possible.

LNAPL observed in both BHC5 and BH104_2019 present a potential localised vapour risk to human health.

The product in both wells is located at over 2m bgl and therefore, there is at least a 1m unsaturated zone into which vapours can disperse before reaching receptors, though vapours also have the potential to accumulate beneath hardstanding or an exposure pathway created during construction (e.g. piling).

Owing to the prevalence of hardstanding cover across much of the site, the potential likelihood for soil/dust/particulates to become mobile is reduced and will be managed during development by the implementation of appropriate control measures and capping of Made Ground. The proposed end use as commercial premises with associated parking will also predominantly consist of a hardstanding capping layer, therefore limiting mobility of soil/dust/particulates further.

CONTROLLED WATERS

In terms of risk to controlled waters a number of significant exceedances have been recorded with regards to the protection of both surface water and groundwater receptors.

Surface Waters

- § Significant exceedances of the GAC screening values protective of surface water receptors were predominantly limited to BHC5 and BH105A_2019. Exceedances of light end aromatic (C6-C12) chains, BTEX compounds (benzene, ethylbenzene and toluene), naphthalene and phenol were recorded in BH105A_2019 and BHC5. BHC5 also recorded exceedances of medium to heavy end aromatic chains (C12-C35).
- § Exceedances of metals including hexavalent chromium, lead and arsenic were recorded in a number of the pre-existing shallow monitoring wells installed within the Made Ground;
- § Minor PAH exceedances (benzo(a)pyrene and fluoranthene) were also recorded in a number of the pre-existing and newly installed wells (BHH04, BHH05, BH105A_2019 and BH106_2019).

Groundwater

- § Exceedances of TPH compounds were recorded in BHC5 and BH105A_2019 and limited to light end aliphatic (C8-C12) and aromatic (C8-C16) chains;
- § Several BTEX compounds also recorded exceedances within BH105A_2019 (benzene) and BHC5 (benzene, ethylbenzene and toluene);
- § Minor exceedances to arsenic and chromium were recorded in a number of wells across the site;
- § A minor exceedance to benzo(a)pyrene was recorded in BHH05.

Neither the shallow superficial aquifer (Secondary Undifferentiated) or deeper bedrock aquifer (Secondary A) are thought to be utilised as a potable water resource reducing the severity of any impacted groundwaters.

In terms of the nearby surface water receptor (Swansea Bay/Bristol Channel), the borehole located towards the downgradient boundary (BHC5) is impacted with hydrocarbons. The impacted groundwater plume has potential to migrate off-site to the southwest towards Swansea Bay/Bristol Channel via groundwater flow or other preferential pathways (i.e. buried infrastructure).

Further assessment of the risks associated with the identified contamination will be undertaken in a DQRA to be reported under a separate cover.

Table 7-1 – Revised Conceptual Site Model

Source	Pathway	Receptor	Risk Level (CIRIA 552)	Comment
Soils and groundwater (Made Ground and Alluvium) containing heavy metals, PAH, VOCs, BTEX and TPH	Leachate from soils (Made Ground) followed by vertical migration to shallow groundwater.	Shallow groundwater beneath the site (Alluvium, Secondary Undifferentiated Aquifer)	Moderate / Low Risk	(Severity-Minor, Probability-High). Impacted soil and shallow groundwater identified across the site. High concentrations of light end TPH, BTEX, PAH, metals and VOCs detected within the shallow groundwater on site, including LNAPL in BHC5 and BH104_2019. Receptor has no known water resource potential (reducing potential severity).
	Vertical migration to shallow groundwater followed by lateral migration and discharge to surface watercourse	Sea (Bristol Channel)	Moderate	(Severity-Medium, Probability – Likely). Impacted shallow groundwater identified across the site and close to the inferred downgradient boundary of the groundwater flow direction (BHC5 and BH104_2019). However, there are no further monitoring wells on the downgradient south west boundary of site beyond the most severely impacted wells. Therefore, it is currently unknown whether the contaminated groundwater plume is migrating offsite towards the Bristol Channel. Probability of harm associated with elevated metal and TPH concentrations from the site is considered to be moderate based on the lack of information regarding off-site migration of the groundwater contamination plume. However, the contaminant attenuation potential prior to reaching surface waters (high soil water partition coefficient) as well as the large Swansea Bay/Bristol Channel catchment area could lower the risk associated with the migration of contamination depending on extent and concentration of contaminants. Further modelling and detailed risk assessment will be required to further assess this contaminant linkage.
	Vertical migration and recharge into bedrock aquifer	Deep groundwater beneath the site (Upper Coal Measures, Secondary A Aquifer)	Low Risk	(Severity-Mild, Probability –Low Likelihood). No confirmed impact to deep groundwater within Upper Coal Measures, though groundwater monitoring has been undertaken within the bedrock to date. It is considered that vertical groundwater migration of LNAPL in the shallow superficial deposits will be less significant than the lateral

Source	Pathway	Receptor	Risk Level (CIRIA 552)	Comment
				migration. The aquifer is not known to be utilised as portable water resource. Based on the naturally poor water quality of groundwater within the Upper Coal Measures with elevated heavy metal background concentrations (reducing potential severity of impact), the overall risk is low.
	Dermal contact, soil ingestion and inhalation of dust	Construction workers and future occupants	Low Risk	(Severity-Medium, Probability – Unlikely). Proposed development is commercial buildings with associated carparking. It is therefore assumed that most of the site will be covered in a layer of hardstanding. Therefore, removing the potential contaminant linkage to future site users. It is unknown if there are any proposed areas of softstanding on site, if there are then this contaminant linkage may need to be reassessed. Appropriate assessment and implementation of contamination control measures will be required during any future ground disturbance works.
Asbestos in Made Ground	Inhalation (indoor and outdoor air)	Future occupants, construction workers, maintenance workers and site neighbours.	Low Risk	(Severity-Medium, Probability – Low Likelihood). Loose asbestos fibres were only detected in one sample, however there remains the potential for asbestos to be present in other areas of made ground on site. The risk of asbestos to construction workers is considered to be low as appropriate PPE and RPE will be available for use during ground works reducing the likelihood of inhaling asbestos fibres. The future commercial end-use of the site will have a layer of hardstanding capping any made ground bearing asbestos fibres. Therefore, eliminating the pathway to future receptors using the premises.
Product (LNAPL) in BH104_2019 and BHC5	Inhalation of vapours (indoor air)	Future occupants	Moderate Risk	(Severity-Medium, Probability – Likely). Exceedance of benzene concentrations in groundwater against the commercial groundwater vapour GAC in BHC5 and LNAPL observed in BH104_2019 and BHC5 suggest that locally (south west area of site) there is a potential risk to human health from the inhalation of groundwater and/or product vapour. Laboratory analysis aged the product sample from

Source	Pathway	Receptor	Risk Level (CIRIA 552)	Comment
				BH104_2019 at 1-5 years old, this is much younger than anticipated as the site has been demolished to slab level for significantly longer than that. There could be the potential that a pipe or unknown UST leak is the source of the product. However, at this time this cannot be proven. Further vapour and groundwater monitoring and product / groundwater sampling may be necessary to further categorise the contamination in this area. Remedial action may be necessary to remove the LNAPL prior to commencing construction work.
Ground gases: methane and carbon dioxide,	Inhalation of ground gas	Future occupants	Low Risk	(Severity-Medium, Probability – Unlikely). Based on previously completed assessment works, the site has been classed as Characteristic Situation 2. The incorporation of suitable protection measures below each building will mitigate the inhalation route.

8 CONCLUSIONS

8.1 SUMMARY

WSP was commissioned by Neath and Port Talbot County Borough Council to install monitoring locations to assess the groundwater quality on site and associated potential contamination risks as per the agreed Water Quality Monitoring Strategy.

Seven cable percussive boreholes were drilled and installed as groundwater monitoring wells to a maximum of 10m bgl, between 5th and 18th August 2019. Soil samples were collected from borehole arisings and analysed for characterisation and assessment for potential risks to human health. Groundwater sampling was undertaken on 21st August and 18th September 2019. During each groundwater sampling round, along with the seven new wells, a further nine pre-existing wells were also monitored and sampled.

8.2 GROUND CONDITIONS

In general, the ground conditions encountered across the Site concur with the published geology, previous ground investigation information and anticipated findings. In summary, the supplementary investigation encountered a hardstanding surface cover underlain by a sequence of variable depth Made Ground and Alluvial superficial deposits. Bedrock was not encountered during the ground investigation.

The Site is characterised by weathered hardstanding surface cover across most of the Site comprising of either concrete or asphalt which is typically 100mm thick. Where hardstanding was not present, the top surface was either a layer of topsoil or compacted Made Ground, usually 100mm to 200mm thick.

Made Ground was recorded within all exploratory hole locations and is of variable composition, depth and strength with frequent anthropogenic inclusions. It is typically between 0.5m and 1.5m thick across the Site, generally becoming deeper to the west.

The Made Ground was underlain by the cohesive Alluvial silt in the majority of exploratory holes, it was absent in two boreholes. Where encountered, the top of the Alluvial silt was encountered at between 0.5m and 1.5m bgl and is generally 0.50m to 1.00m thick.

The Alluvial Gravels were observed in all positions to the base of each borehole with a maximum recorded thickness of 6.20m. The composition of the Alluvial Gravel encountered was of sand or gravel with variable secondary constituents (predominantly cobbles and silt or clay).

8.3 GROUNDWATER

Groundwater was recorded within sixteen of the seventeen installed monitoring wells, including the pre-existing wells. The recorded groundwater levels are between 1.26m and 4.13m bgl (in the range of 5.67m AOD to 4.27m AOD) across the Site.

8.4 CONTAMINATION

Visual and olfactory evidence of contamination was noted in the exploratory hole locations during the ground investigation, in both the Made Ground and superficial deposits. Evidence of contamination predominantly consisting of oily sheens and hydrocarbon odours and locally in the south west of site, LNAPL was noted on borehole arisings of BH104_2019. LNAPL was also recorded during the monitoring round in two boreholes (BH104_2019 and BHC5).

Loose fibres of asbestos (chrysotile and amosite) were detected in one sample of Made Ground from BH107_2019.

There were five exceedances of the commercial human health assessment criteria:

- § Aliphatic >C8-C10, benzene and naphthalene in BH104_2019 (superficial deposits); and
- § Lead in BH102_2019 and BH103_2019 (Made Ground).

The groundwater vapour assessment detected an exceedance of the commercial GAC screening value for benzene in BHC5.

In terms of risk to controlled waters, a number of significant exceedances have been recorded. Exceedances of low end aromatic and some aliphatic hydrocarbon chains, BTEX compounds, naphthalene and phenol were recorded in BH105A_2019 and BHC5.

Exceedances of metals including: hexavalent chromium, lead, arsenic and chromium were recorded in a number of the pre-existing shallow monitoring wells installed within the made ground (BHH02(S), BHH04, BHH05, BHH07(S) and BHC5).

8.5 RISK ASSESSMENT

Human Health

The primary risk to human health on site is considered to be the inhalation of vapours from impacted groundwater and LNAPL by future users of the commercial premises. The groundwater vapour GAC screening value for benzene was exceeded in BHC5, combined with the LNAPL recorded in this area of the site (BHC5 and BH104_2019) creates a localised source zone. The location of which is shown on Figure 3.

This area, and to a lesser extent the area surrounding BH105A_2019, were historically tank farms from which the LNAPL could have originated. As it stands without further monitoring and characterisation, the risk to human health associated with vapours derived from impacted groundwater/product is considered to be moderate.

The proposed future use as a commercial premise with associated carparking will include a capping layer of hardstanding, limiting the potential for direct dermal contact, ingestion or inhalation of contaminated soil particles. Future construction works will be controlled and undertaken in accordance with Health and Safety legislation. The human health risks associated with direct contact/ soil ingestion and inhalation contaminant linkage is considered to be low post construction.

Controlled Waters

The risk to surface water is considered at this stage to be moderate. This is primarily due to the presence of LNAPL. There are no downgradient groundwater monitoring wells beyond the area of

impact in borehole BHC5. Therefore, it is currently unknown whether impacted groundwater plume is migrating off-site to the south west.

The risks to both the shallow and deep aquifers on site are considered to be moderate / low to low. Neither aquifer is currently utilised as a potable water resource and as such the current assessment is conservative with respect to the water quality within the aquifer. In the event that, the aquifer use changes to a more sensitive potable use, then this assessment would need revising. The deeper bedrock groundwater is also considered to be of poor quality with heavy metal contamination due to the nature of the surrounding bedrock (South Wales Lower Coal Measure Formation). It is considered that any vertical migration of identified LNAPL impact would be limited compared to the lateral migration.

RECOMMENDATIONS

Recommendations for further works on site are as follows:

- § Further investigation and assessment to delineate and determine the risks posed by the identified contamination plume (LNAPL) and identify any remedial actions necessary.
- § Vapour assessment to determine if additional vapour protection measures are needed for the proposed commercial development;
- § Completion of a controlled waters DQRA after the second round of groundwater monitoring to derive site-specific assessment criteria and assess the potential risks to surface water associated with the identified impact and further refinement of the CSM; and
- § Development of a remediation strategy, if required to mitigated confirmed contamination risks.

If the proposed land use were to change, the risks associated with the site would have to reassessed.

Appendix A

LIMITATIONS **wsp**

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

GENERAL

1. WSP UK Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under WSP UK Limited standard Terms and Conditions as included within our proposal to the Client.
3. Project specific appointment documents may be agreed at our discretion and a charge may be levied for both the time to review and finalise appointments documents and also for associated changes to the appointment terms. WSP UK Limited reserves the right to amend the fee should any changes to the appointment terms create an increase risk to WSP UK Limited.
4. The report needs to be considered in the light of the WSP UK Limited proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

PHASE 1 GEO ENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

Coverage: *This section covers reports with the following titles or combination of titles: phase 1; desk top study; geo environmental assessment; development appraisal; preliminary environmental risk assessment; constraints report; due diligence report; geotechnical development review; environmental statement; environmental chapter; project scope summary report (PSSR), program environmental impact report (PEIR), geotechnical development risk register; and, baseline environmental assessment.*

5. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. WSP UK Limited cannot be held responsible for any disclosures that are provided post production of our report and will not automatically update our report.
6. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP UK Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.
7. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.
8. WSP UK Limited does not warrant work / data undertaken / provided by others.

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

INTRUSIVE INVESTIGATION REPORTS

Coverage: *The following report titles (or combination) may cover this category of work: geo environmental site investigation; geotechnical assessment; GIR (Ground Investigation reports); preliminary environmental and geotechnical risk assessment; and, geotechnical risk register.*

9. The investigation has been undertaken to provide information concerning either:
 - i. The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
 - ii. Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.
10. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.
11. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.
12. For geotechnical investigations the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.
13. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.
14. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.
15. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, WSP UK Limited has used reasonable skill and care to extrapolate conditions between these points based upon assumptions to develop our interpretation and conclusions. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation. Conditions can change between investigation points and these interpretations should be considered indicative.
16. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

with the WSP UK Limited risk assessment process have been outlined within the body or associated appendix of the report.

17. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.
18. Where soil contamination concentrations recorded as part of this investigation are used for commentary on potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed.
19. The results of the asbestos testing are factually reported and interpretation given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and / or trace loose asbestos fibres within the soil matrix at the site.
20. If costs have been included in relation to additional site works, and / or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN

21. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.
22. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIAL STRATEGY REPORTS

23. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected on the basis of the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.



REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

- 24. The outputs of the Detailed Quantitative Risk Assessments are based upon WSP UK Limited manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.
- 25. Prior to adoption on site they will need discussing and agreeing with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of WSP UK Limited. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

GEOTECHNICAL DESIGN REPORT (GDR)

- 26. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

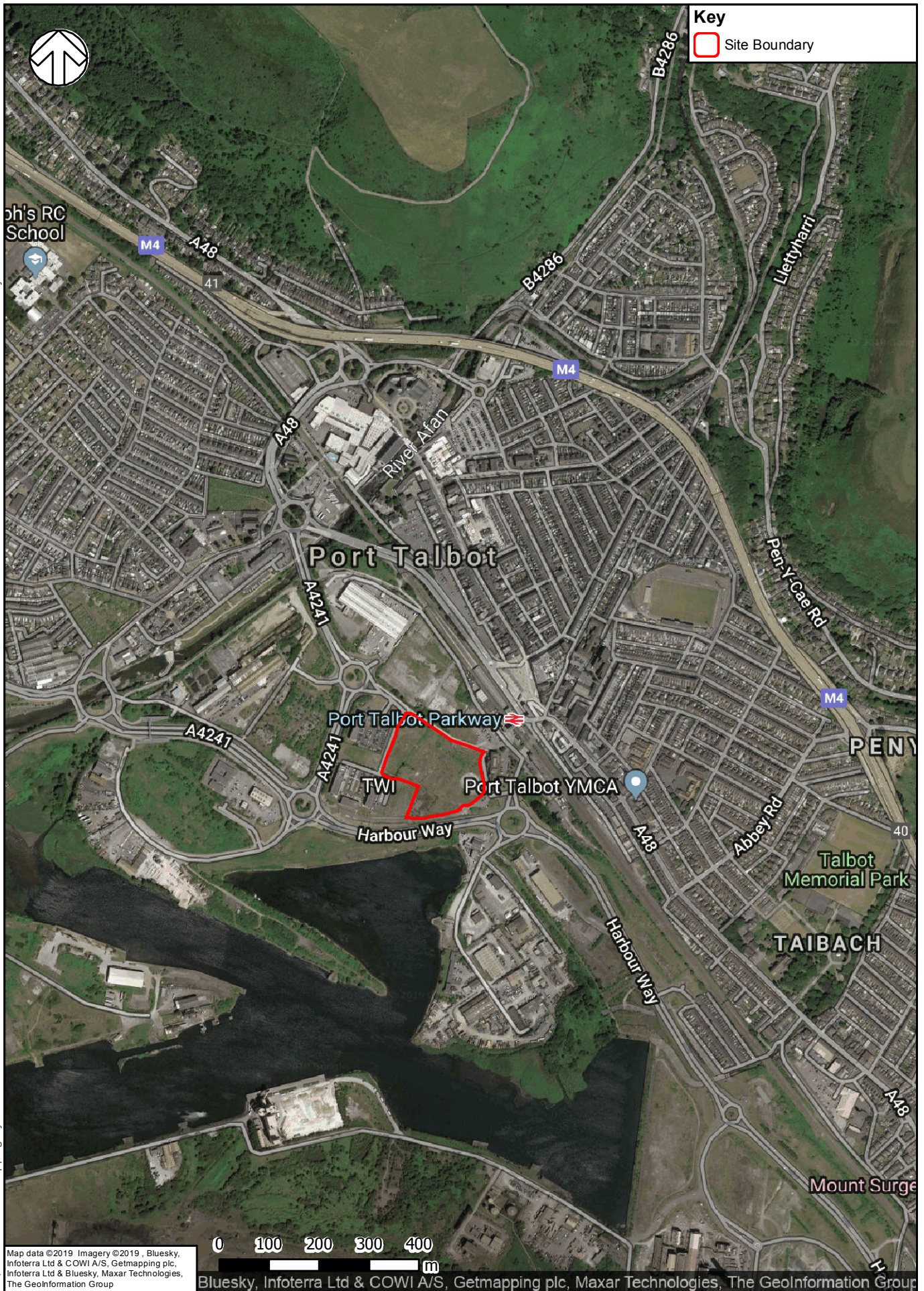
MONITORING (INCLUDING REMEDIATION MONITORING REPORTS)

- 27. These reports are factual in nature and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of an earthworks or remedial works.
- 28. The data is presented and will be compared with assessment criteria.

Appendix B

FIGURES





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Rev	Date	Description	By	Chk	App	Notes
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Kings Orchard
1 Queen Street
Bristol BS2 0HQ

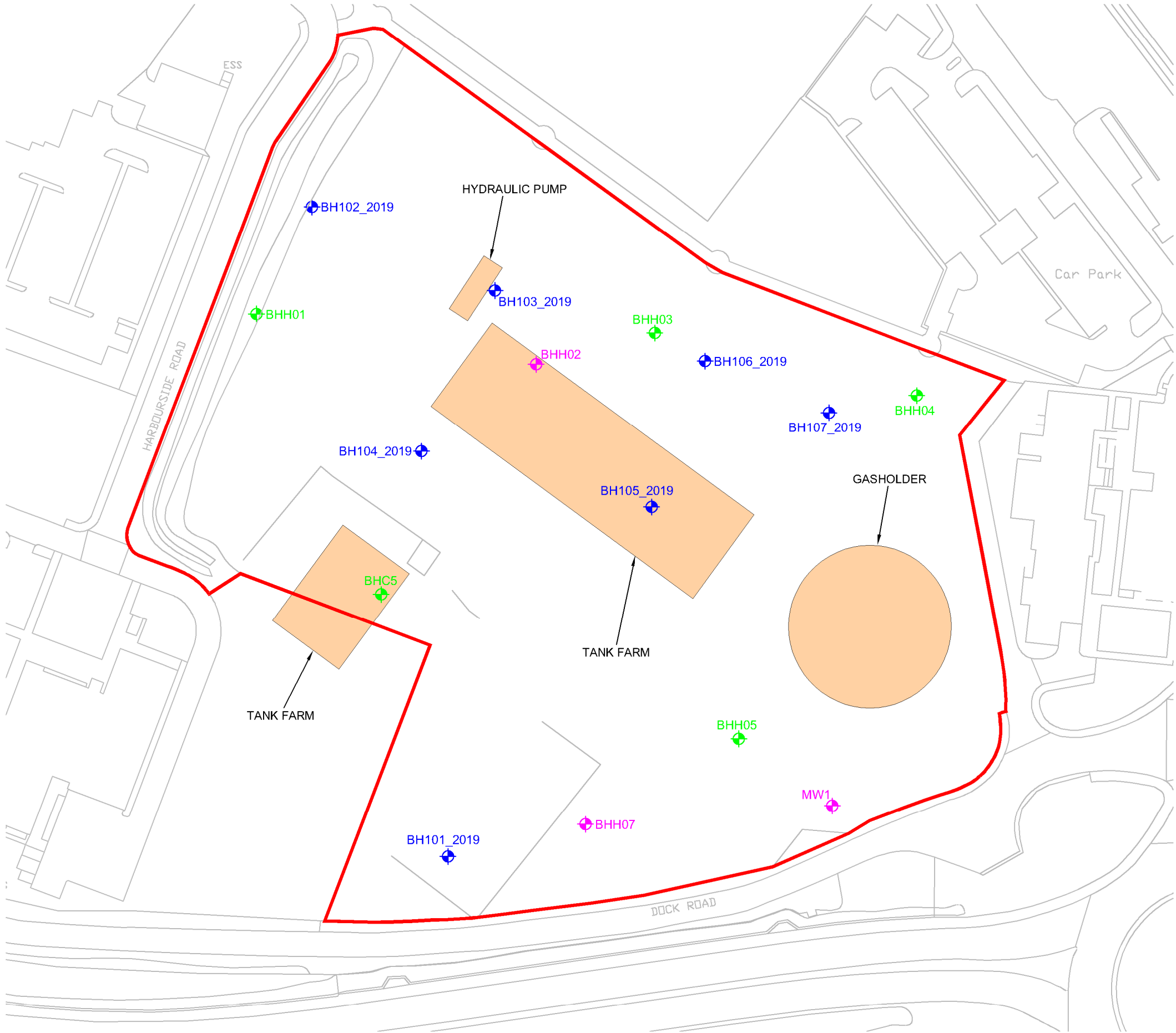


Tel: 44-(0)1179-306200

Client:
**NEATH PORT TALBOT COUNTY
BOROUGH COUNCIL**
Project:
PORT TALBOT HARBOURSIDE

Title:
**EXPLORATORY HOLE
LOCATIONS**

Drawn: CEW	Checked: RE		
Designed: RE	Approved:		
Date: 20/08/2019	Scale: 1:1000	A3	Sheet
Project Number:		Drawing Number:	Revision:
62253048		FIGURE 2	
© Copyright WSP			



KEY

SITE BOUNDARY

BOREHOLE (MG)

BOREHOLE (DUAL MG & SF)

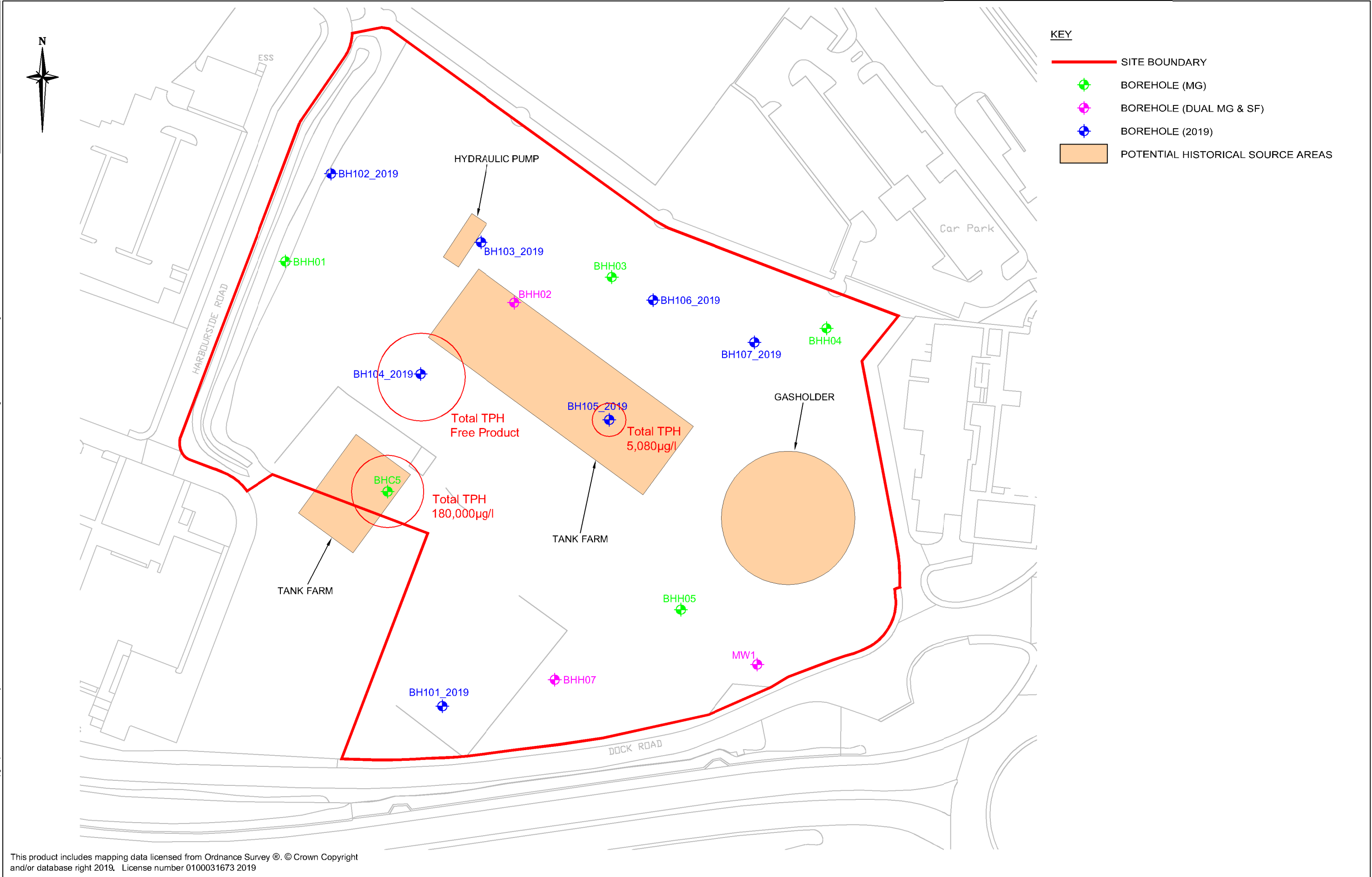
BOREHOLE (2019)

POTENTIAL HISTORICAL SOURCE AREAS

Revision
Drawn Number
Project Number

File Name: \\luk.wspgroup.com\central data\Projects\62253xxx\62253048 - Port Talbot Harbourside - GI Works - V-C8602.01\03 WPD\Drawings\62253048-FIGURE 4.dwg

Login: Burrows, Corinne
Plot Date: 19/09/2019 17:47:27



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Rev	Date	Description	By	Chk	App	Notes	 Kings Orchard 1 Queen Street Bristol BS2 0HQ Tel: 44-(0)1179-306200	Client: NEATH PORT TALBOT COUNTY BOROUGH COUNCIL Project: PORT TALBOT HARBOURSIDE	Title: TOTAL TPH CONCENTRATIONS IN GROUNDWATER (ABOVE LOD)	Drawn: CEW		Checked: RE	
						Designed: RE				Approved:			
Date: 19/09/2019		Scale: 1:1000		A3	Sheet:								
Project Number:				Drawing Number:						Revision:			
62253048				FIGURE 3									
										© Copyright WSP			

Appendix C

BOREHOLE LOGS



 WSP Telephone:	BOREHOLE LOG		Hole No. BH101
	Project Port Talbot Harbourside		Sheet 1 of 2
Job No 62253048	Client Neath Port Talbot Council		Date 14-08-19 15-08-19
Contractor / Driller Apex	Method/Plant Used Dando 3000	Logged By JL/JT	Co-Ordinates (NGR) E 276541.645 N 189427.592
		Ground Level (m AOD) 7.002	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
1.70-1.80	ES		0.1				6.70	0.30	Grey sandy angular to subangular fine to coarse GRAVEL of slag and concrete. Sand is fine to coarse. Occasional wood fragments (up to 150mm diameter). (MADE GROUND) Brown slightly gravelly medium to coarse SAND. Gravel is angular to subangular fine to coarse of slag. (MADE GROUND) Black gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of slag. (MADE GROUND) Layer of brick. (MADE GROUND) Light brown slightly gravelly Sand. (MADE GROUND) Dark brown gravelly slightly clayey fine to coarse SAND with low cobble and boulder content. Gravel is angular to subangular fine to coarse of slag, brick and clinker. Cobbles and boulders are angular to subangular of brick and slag. (MADE GROUND)		MG	
							6.60	0.40				
							6.40	0.60				
							6.30	0.70				
							6.20	0.80				
3.00-3.20	ES		0.0				(1.20)				MG	
							5.00	2.00				
							(0.50)	2.50				
			0.0				4.50		Dark grey sandy silty subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone. Sand is fine to coarse. (ALLUVIUM) Dark brownish grey sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with medium cobble content. Sand is fine to coarse. Cobbles are subrounded to rounded of sandstone. (ALLUVIUM)		ALV	
			0.1				(5.50)				ALV	
			0.0									
							-1.00	8.00				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
								2.50	20	2.00	
Chiselling				Water Added		General Remarks					
From	To	Hours	Tool	From	To						
						Borehole terminated at 8.00mbgl on engineer's instruction.					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. BH102
	Project Port Talbot Harbourside		Sheet 1 of 2
Job No 62253048	Client Neath Port Talbot Council		Date 08-08-19 09-08-19
Contractor / Driller Apex	Method/Plant Used Dando 3000	Logged By JL/JT	Co-Ordinates (NGR) E 276509.272 N 189427.592
		Ground Level (m AOD) 8.890	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
0.70-0.80	ES						8.59	0.30	Soft brown slightly sandy slightly gravelly SILT. Sand is fine to medium. Gravel is subangular to subrounded fine to medium of sandstone and mudstone. (TOPSOIL)		TS	
							(0.70)		Black/dark grey sandy angular to subangular fine to coarse GRAVEL of slag, clinker, brick and concrete. Sand is fine to coarse. (MADE GROUND)		MG	
							7.89	1.00	Soft brown slightly sandy slightly gravelly SILT. Sand is fine to medium. Gravel is subangular to rounded fine to medium of brick, sandstone and mudstone. (MADE GROUND)		MG	
3.50-3.80	ES						(1.50)					
							6.39	2.50				
							(0.50)		Brown gravelly slightly clayey medium to coarse SAND with low cobble content. Gravel is subangular to rounded fine to coarse of brick, mudstone and sandstone. Cobbles are subangular to subrounded of sandstone and brick. (MADE GROUND)		MG	
							5.89	3.00				
							(0.50)		Light brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is subrounded to rounded medium to coarse of mudstone and sandstone. Occasional gravel sized fragments of brick. Occasional pockets of black ash. (MADE GROUND)		MG	
							5.39	3.50				
6.50-6.70	ES						(0.50)					
							4.89	4.00				
							(0.50)		Brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is rounded fine to medium of sandstone and mudstone. (ALLUVIUM)		ALV	
							4.39	4.50				
							(2.90)		Dark grey gravelly clayey fine to coarse SAND. Gravel is subrounded to rounded fine to coarse of sandstone and mudstone. Slight hydrocarbon odour from 4.30m bgl. (ALLUVIUM)		ALV	
							2.8		Dark grey sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with low cobble content. Sand is medium to coarse. Cobbles are subrounded of sandstone. Slight hydrocarbon odour. (ALLUVIUM)		ALV	
							(2.90)					
							6.7					
							4.5					
							1.49	7.40				
							1.29	7.60				
							(2.40)		Dark grey gravelly medium to coarse SAND with low cobble content. Gravel is subrounded to rounded fine to coarse of sandstone and mudstone. Cobbles are subrounded of sandstone. Faint hydrocarbon odour. (ALLUVIUM)		ALV	
									Dark grey sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. Faint hydrocarbon odour. (ALLUVIUM)		ALV	
							-1.11	10.00				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
								4.30	20	4.00	
Chiselling					Water Added						
From	To	Hours	Tool	From	To	General Remarks Borehole terminated at 10.00mbgl on engineer's instruction.					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. BH103
	Project Port Talbot Harbourside		Sheet 1 of 2
Job No 62253048	Client Neath Port Talbot Council		Date 07-08-19 08-08-19
Contractor / Driller Apex	Method/Plant Used Dando 3000	Logged By JT/JL	Co-Ordinates (NGR) E 276552.862 N 189562.356
		Ground Level (m AOD) 6.491	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. 50 mm
1.00-1.10	ES						5.79	0.70	Dark brown sandy angular to subangular fine to coarse GRAVEL of limestone, concrete, brick and slag. Sand is fine to coarse. (MADE GROUND)		MG	
							5.09	1.40	Black sandy angular to subangular fine to coarse GRAVEL of clinker, slag, brick and concrete with low cobble content. Sand is fine to coarse. Cobbles are angular of slag and clinker. (MADE GROUND)		MG	
							4.89	1.60	Soft brownish grey slightly gravelly sandy SILT. Sand is fine to medium. Gravel is subrounded to rounded fine to medium of sandstone and mudstone. (ALLUVIUM)		ALV	
3.80-3.90	ES								Dark grey sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with low cobble content. Sand is fine to coarse. Slight hydrocarbon odour. (ALLUVIUM)		ALV	
							1.49	5.00	Dark grey very sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. (ALLUVIUM)		ALV	
							0.49	6.00				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
								3.50	20	3.00	
Chiselling				Water Added		General Remarks Borehole terminated at 6.00mbgl on engineer's instruction due to refusal. Cohesive soil strengths based on engineer's observations.					
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. BH104	
	Project Port Talbot Harbourside		Sheet 1 of 2	
Job No 62253048	Client Neath Port Talbot Council		Date 05-08-19 06-08-19	
Contractor / Driller Apex	Method/Plant Used Danda 3000	Logged By JL/JT	Co-Ordinates (NGR) E 276535.341 N 189524.076	Ground Level (m AOD) 7.016

SAMPLES & TESTS						STRATA							Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. 50 mm	
0.85-0.90	ES		12.4				6.82	0.20	Light grey gravelly medium to coarse SAND. Gravel is subangular to subrounded fine to coarse of limestone, concrete and macadam. (MADE GROUND)		MG		
							6.72	0.30					
							6.42	0.60					
			25.4					(0.80)	Very dark brown gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium of brick, concrete, macadam and clinker. (MADE GROUND)		MG		
							5.62	1.40					
								(0.80)					
			4431					(0.80)	Black gravelly medium to coarse SAND. Gravel is angular to subangular fine to medium of brick, concrete, clinker and macadam. Strong hydrocarbon odour. (MADE GROUND)		MG		
							4.82	2.20					
								(0.80)					
			>5000					(0.80)	Soft very dark brown slightly gravelly sandy CLAY. Sand is medium to coarse. Gravel is angular to subangular fine to coarse of slag, macadam and clinker. Strong hydrocarbon odour. (MADE GROUND)		MG		
								(0.80)					
								(0.80)					
								(0.80)					
3.00-3.10	ES		>5000				4.02	3.00	Soft black slightly sandy gravelly CLAY. Sand is medium to coarse. Gravel is angular to subangular fine to coarse of slag and clinker. Very strong hydrocarbon odour. Tar/oil staining visible. (MADE GROUND)		ALV		
								(0.80)	Soft black slightly sandy slightly gravelly CLAY with low cobble content. Sand is medium to coarse. Gravel is subrounded fine to coarse of sandstone. Cobbles are subrounded of sandstone. (ALLUVIUM)				
							3.22	3.80					
								(1.00)					
			74						Black sandy subangular to subrounded fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. Faint tar odour. (Alluvium)		ALV		
							2.22	4.80					
								(0.50)					
							4.90-5.00	ES		77.4			
	(0.70)	Dark grey sandy subrounded fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. Faint hydrocarbon odour. (ALLUVIUM)											
1.02	6.00												
	(1.70)												
			60.7						Dark grey slightly sandy subrounded to rounded fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded of sandstone. (ALLUVIUM)		ALV		
								(1.70)					
										3.4			
-0.68	7.70												
-0.98	8.00												

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
								3.50	20	3.00	
Chiselling				Water Added		General Remarks					
From	To	Hours	Tool	From	To						
						Borehole terminated at 8.00mbgl on engineer's instruction. Cohesive soil strengths based on engineer's observations.					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. BH106
	Project Port Talbot Harbourside		Sheet 1 of 2
Job No 62253048	Client Neath Port Talbot Council		Date 12-08-19 13-08-19
Contractor / Driller Apex	Method/Plant Used Dando 3000	Logged By JL/JT	Co-Ordinates (NGR) E 276602.871 N 189545.566
		Ground Level (m AOD) 6.304	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. 50 mm
							6.10	0.20	CONCRETE. (MADE GROUND)		MG	
							(0.90)		Dark brown sandy angular to subangular fine to coarse GRAVEL of slag, ballast, clinker and brick with low cobble content. Sand is fine to coarse. Cobbles are angular of slag. (MADE GROUND)		MG	
1.50-1.60	ES		0.0				5.20	1.10	Dark grey and black slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subangular to subrounded medium to coarse of brick, slag and clinker. Hydrocarbon odour. (MADE GROUND)		MG	
			23.7				4.30	2.00	Dark grey sandy silty subrounded to rounded fine to coarse GRAVEL of mudstone and sandstone. Sand is fine to coarse. (ALLUVIUM)		ALV	
2.40-2.50	ES						3.80	2.50	Dark grey sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone. Sand is fine to coarse. (ALLUVIUM)		ALV	
			2.1				(2.00)				ALV	
			0.0				1.80	4.50	Dark brown sandy subrounded to rounded fine to coarse GRAVEL of mudstone and sandstone with low cobble content. Sand is fine to coarse. Cobbles are subrounded to rounded of sandstone and mudstone. (ALLUVIUM)		ALV	
			0.0				(3.50)				ALV	
			0.0				-1.70	8.00				

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
								2.00	20	2.00	
Chiselling					Water Added		General Remarks Borehole terminated at 8.00mbgl on engineer's instruction.				
From	To	Hours	Tool	From	To						
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. BH107
	Project Port Talbot Harbourside		Sheet 1 of 2
Job No 62253048	Client Neath Port Talbot Council		Date 13-08-19 14-08-19
Contractor / Driller Apex	Method/Plant Used Dando 3000	Logged By JL/JT	Co-Ordinates (NGR) E 276632.376 N 189533.265
		Ground Level (m AOD) 6.079	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
0.10-0.30	ES						5.98	0.10	TOPSOIL.		TS	
							5.68	0.40	Brown slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of slag, brick, concrete and clinker. (MADE GROUND)		MG	
							5.58	0.50			CONC	
							5.48	0.60	CONCRETE. (MADE GROUND)		MG	
			0.2					(0.90)	Black sandy CLAY. Sand is fine to medium. (MADE GROUND)		MG	
							4.58	1.50	Dark grey slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is angular to subangular fine of mixed lithologies. (MADE GROUND)			
							4.08	(0.50) 2.00	Soft dark grey slightly sandy gravelly SILT with low cobble content. Sand is fine to medium. Gravel is subrounded to rounded fine to coarse of sandstone and mudstone. Cobbles are subrounded to rounded of sandstone and mudstone. (ALLUVIUM)		ALV	
			13.8					(1.10)	Dark grey sandy locally very sandy subrounded to rounded fine to coarse GRAVEL of mudstone and sandstone. Sand is fine to coarse. Hydrocarbon odour. (ALLUVIUM)		ALV	
2.90-3.00	ES						2.98	3.10	Dark greyish brown sandy subrounded to rounded fine to coarse GRAVEL of sandstone and mudstone with medium cobble content. Sand is fine to coarse. Cobbles are subrounded to rounded of sandstone. (ALLUVIUM)			
			0.5								ALV	
			0.0					(2.70)			ALV	
							0.28	5.80				
			0.0				0.08	6.00	Sandstone BOULDER (Drillers Description). (ALLUVIUM)		ALV	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Dpt	Dia. (mm)	Water Dpt	Date	Time	Strike	Minutes	Standing	Casing
								2.00	20	1.80	
Chiselling				Water Added		General Remarks					
From	To	Hours	Tool	From	To						
5.8	6	01:00	Chisel			Borehole terminated at 6.00mbgl on engineer's instruction due to obstruction. Cohesive soil strengths based on engineer's observations.					
Scale 1:62.5		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

Appendix D

LABORATORY CERTIFICATES





Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

WSP PB BBC
3rd Floor, Kings Orchard,
1 Queen Street
Bristol
Gloucestershire
BS2 0HQ

Attention: Jack Lott

CERTIFICATE OF ANALYSIS

Date of report Generation:	15 August 2019
Customer:	WSP PB BBC
Sample Delivery Group (SDG):	190810-23
Your Reference:	62253048-GI2
Location:	Port Talbot Harbourside
Report No:	518104

We received 3 samples on Saturday August 10, 2019 and 2 of these samples were scheduled for analysis which was completed on Thursday August 15, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23 **Client Reference:** 62253048-GI2 **Report Number:** 518104
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
20496663	BH105A ES2	ES	4.10 - 4.20	09/08/2019
20496652	BH102 ES2	ES	3.50 - 3.80	08/08/2019
20496657	BH102 ES3	ES	6.50 - 6.70	08/08/2019

Maximum Sample/Coolbox Temperature (°C) : 13.0

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518104
Superseded Report:

Results Legend



Test


No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

Customer
Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

20496663

20496657

BH105A ES2

BH102 ES3

ES

ES

4.10 - 4.20

6.50 - 6.70

250g Amber Jar
(ALE210)
S

60g VOC
(ALE215)
S

250g Amber Jar
(ALE210)
S

60g VOC
(ALE215)
S

EPH CWG (Aliphatic) GC (S)

All

NDPs: 0
Tests: 2

X

X

EPH CWG (Aromatic) GC (S)

All

NDPs: 0
Tests: 2

X

X

GRO by GC-FID (S)

All

NDPs: 0
Tests: 2

X

X

Hexavalent Chromium (s)

All

NDPs: 0
Tests: 2

X

X

Metals in solid samples by OES

All

NDPs: 0
Tests: 2

X

X

PAH by GCMS

All

NDPs: 0
Tests: 2

X

X

pH

All

NDPs: 0
Tests: 2

X

X

Phenols by HPLC (S)

All

NDPs: 0
Tests: 2

X

X

Sample description

All

NDPs: 0
Tests: 2

X

X

Total Organic Carbon

All

NDPs: 0
Tests: 2

X

X

TPH CWG GC (S)

All

NDPs: 0
Tests: 2

X

X

VOC MS (S)

All

NDPs: 0
Tests: 2

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23 **Client Reference:** 62253048-GI2 **Report Number:** 518104
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
Lab Sample No(s)	Customer Sample Ref.		Depth (m)	Colour	Description	Inclusions	Inclusions 2		
20496657	BH102 ES3		6.50 - 6.70	Dark Brown	Stone/Soil	Stones	None		
20496663	BH105A ES2		4.10 - 4.20	Dark Brown	Stone/Soil	Stones	None		

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

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

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518104
Superseded Report:

VOC MS (S)

Results Legend			Customer Sample Ref.		BH105A ES2		BH102 ES3					
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	4.10 - 4.20 Soil/Solid (S) 09/08/2019 10/08/2019 190810-23 20496663 ES	6.50 - 6.70 Soil/Solid (S) 08/08/2019 10/08/2019 190810-23 20496657 ES							
M	mCERIS accredited.											
aq	Aqueous / settled sample.											
diss.filt	Dissolved / filtered sample.											
tot.unfilt	Total / unfiltered sample.											
*	Subcontracted - refer to subcontractor report for accreditation status.											
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery											
(F)	Trigger breach confirmed											
1-3+5@	Sample deviation (see appendix)											
Component	LOD/Units	Method										
Dibromofluoromethane**	%	TM116		108	110							
Toluene-d8**	%	TM116		98.1	94.6							
4-Bromofluorobenzene**	%	TM116		103	96.9							
Dichlorodifluoromethane	<0.006 mg/kg	TM116		<0.06 #	<0.06 #							
Chloromethane	<0.007 mg/kg	TM116		<0.07 #	<0.07 #							
Vinyl Chloride	<0.006 mg/kg	TM116		<0.06 #	<0.06 #							
Bromomethane	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Chloroethane	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Trichlorofluoromethane	<0.006 mg/kg	TM116		<0.06 #	<0.06 #							
1,1-Dichloroethene	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Carbon Disulphide	<0.007 mg/kg	TM116		<0.07 #	<0.07 #							
Dichloromethane	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Methyl Tertiary Butyl Ether	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
trans-1,2-Dichloroethene	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
1,1-Dichloroethane	<0.008 mg/kg	TM116		<0.08 #	<0.08 #							
cis-1,2-Dichloroethene	<0.006 mg/kg	TM116		<0.06 #	<0.06 #							
2,2-Dichloropropane	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Bromochloromethane	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Chloroform	<0.008 mg/kg	TM116		<0.08 #	<0.08 #							
1,1,1-Trichloroethane	<0.007 mg/kg	TM116		<0.07 #	<0.07 #							
1,1-Dichloropropene	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Carbontetrachloride	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
1,2-Dichloroethane	<0.005 mg/kg	TM116		<0.05 #	<0.05 #							
Benzene	<0.009 mg/kg	TM116		0.659 #	0.114 #							
Trichloroethene	<0.009 mg/kg	TM116		<0.09 #	<0.09 #							
1,2-Dichloropropane	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Dibromomethane	<0.009 mg/kg	TM116		<0.09 #	<0.09 #							
Bromodichloromethane	<0.007 mg/kg	TM116		<0.07 #	<0.07 #							
cis-1,3-Dichloropropene	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Toluene	<0.007 mg/kg	TM116		0.504 #	<0.07 #							
trans-1,3-Dichloropropene	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
1,1,2-Trichloroethane	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							



CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518104
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.		BH105A ES2	BH102 ES3			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	BH105A ES2	BH102 ES3				
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
1,3-Dichloropropane	<0.007 mg/kg	TM116	<0.07 #	<0.07 #				
Tetrachloroethene	<0.005 mg/kg	TM116	<0.05 #	<0.05 #				
Dibromochloromethane	<0.01 mg/kg	TM116	<0.1 3 #	<0.1 3 #				
1,2-Dibromoethane	<0.01 mg/kg	TM116	<0.1 3 #	<0.1 3 #				
Chlorobenzene	<0.005 mg/kg	TM116	<0.05 #	<0.05 #				
1,1,1,2-Tetrachloroethane	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
Ethylbenzene	<0.004 mg/kg	TM116	0.0543 #	<0.04 #				
p/m-Xylene	<0.01 mg/kg	TM116	0.3 #	<0.1 #				
o-Xylene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
Styrene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
Bromoform	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
Isopropylbenzene	<0.005 mg/kg	TM116	<0.05 #	<0.05 #				
1,1,2,2-Tetrachloroethane	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
1,2,3-Trichloropropane	<0.016 mg/kg	TM116	<0.16 #	<0.16 #				
Bromobenzene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
Propylbenzene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
2-Chlorotoluene	<0.009 mg/kg	TM116	<0.09 #	<0.09 #				
1,3,5-Trimethylbenzene	<0.008 mg/kg	TM116	<0.08 #	<0.08 #				
4-Chlorotoluene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
tert-Butylbenzene	<0.014 mg/kg	TM116	<0.14 #	<0.14 #				
1,2,4-Trimethylbenzene	<0.009 mg/kg	TM116	<0.09 #	<0.09 #				
sec-Butylbenzene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
4-Isopropyltoluene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
1,3-Dichlorobenzene	<0.008 mg/kg	TM116	<0.08 #	<0.08 #				
1,4-Dichlorobenzene	<0.005 mg/kg	TM116	<0.05 #	<0.05 #				
n-Butylbenzene	<0.011 mg/kg	TM116	<0.11 #	<0.11 #				
1,2-Dichlorobenzene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
1,2-Dibromo-3-chloropropane	<0.014 mg/kg	TM116	<0.14 #	<0.14 #				
Tert-amyl methyl ether	<0.01 mg/kg	TM116	<0.1 #	<0.1 #				
1,2,4-Trichlorobenzene	<0.02 mg/kg	TM116	<0.2 #	<0.2 #				
Hexachlorobutadiene	<0.02 mg/kg	TM116	<0.2 #	<0.2 #				
Naphthalene	<0.013 mg/kg	TM116	0.606 #	<0.13 #				



CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23 **Client Reference:** 62253048-GI2 **Report Number:** 518104
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518104
Superseded Report:

Test Completion Dates

Lab Sample No(s)	20496657	20496663
Customer Sample Ref.	BH102 ES3	BH105A ES2
AGS Ref.	ES	ES
Depth	6.50 - 6.70	4.10 - 4.20
Type	Soil/Solid (S)	Soil/Solid (S)
EPH CWG (Aliphatic) GC (S)	13-Aug-2019	13-Aug-2019
EPH CWG (Aromatic) GC (S)	13-Aug-2019	13-Aug-2019
GRO by GC-FID (S)	13-Aug-2019	13-Aug-2019
Hexavalent Chromium (s)	13-Aug-2019	13-Aug-2019
Metals in solid samples by OES	15-Aug-2019	15-Aug-2019
PAH by GCMS	15-Aug-2019	15-Aug-2019
pH	14-Aug-2019	14-Aug-2019
Phenols by HPLC (S)	14-Aug-2019	13-Aug-2019
Sample description	10-Aug-2019	10-Aug-2019
Total Organic Carbon	15-Aug-2019	13-Aug-2019
TPH CWG GC (S)	13-Aug-2019	13-Aug-2019
VOC MS (S)	12-Aug-2019	12-Aug-2019



CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518104
Superseded Report:

Chromatogram

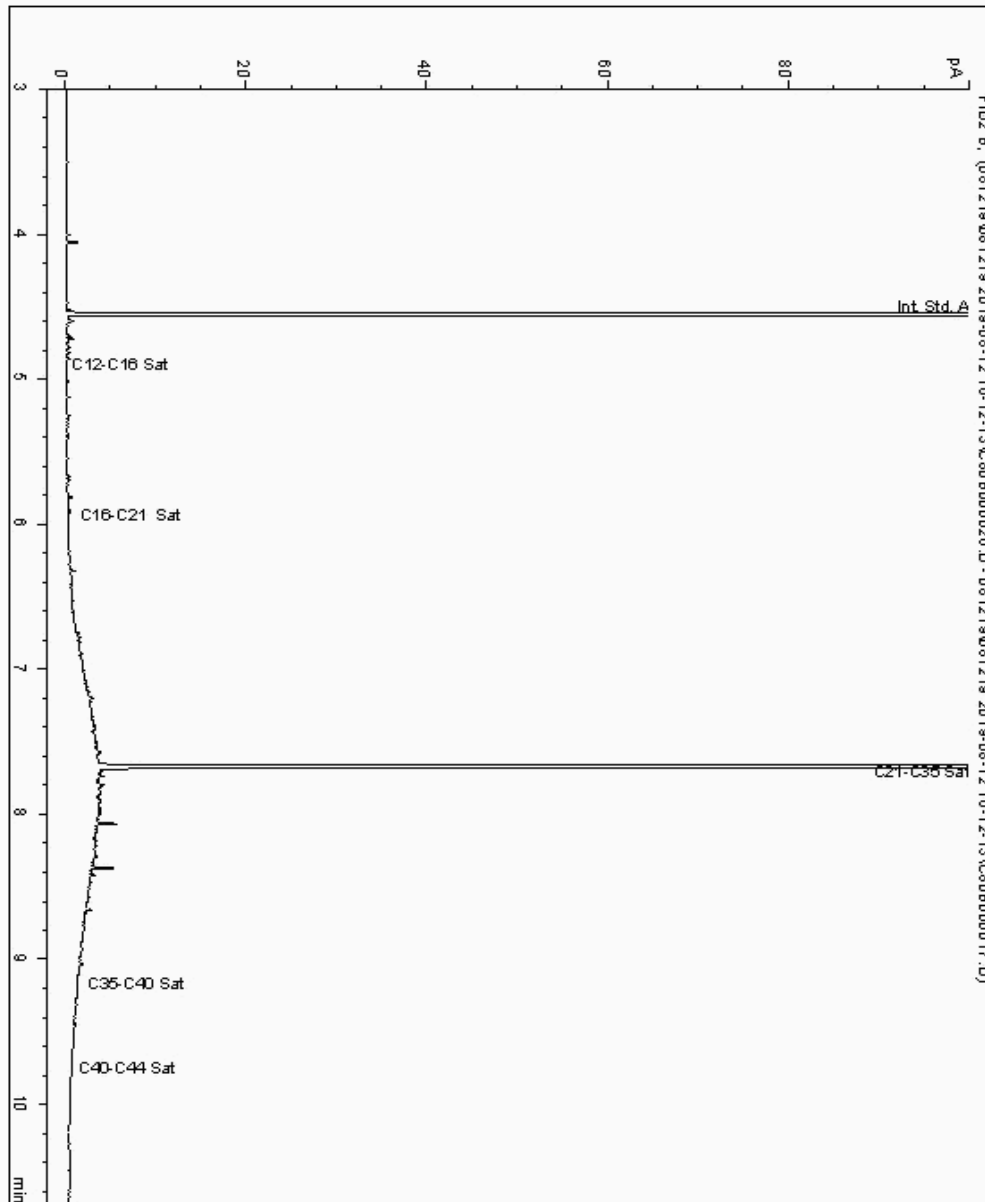
Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 20497120
Sample ID : BH102 ES3

Depth : 6.50 - 6.70

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19245027-
Date Acquired : 13/08/19 00:38:41
Units : ppb
Dilution :
CF : 1
Multiplier : 1.000





CERTIFICATE OF ANALYSIS

Validated

SDG:	190810-23	Client Reference:	62253048-GI2	Report Number:	518104
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

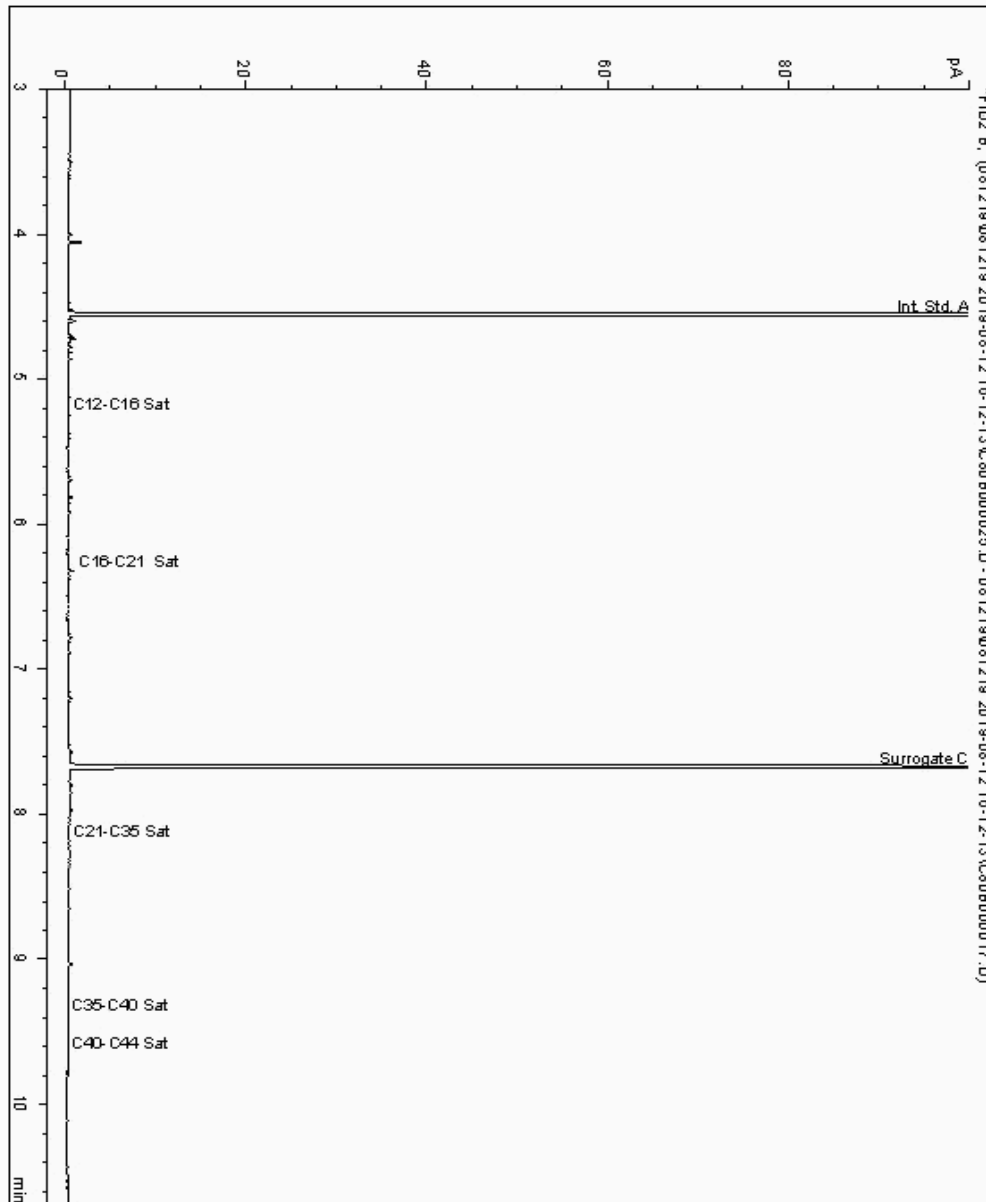
Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 20497151
Sample ID : BH105A ES2

Depth : 4.10 - 4.20

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19245096-
Date Acquired : 13/08/19 00:18:14
Units : ppb
Dilution :
CF : 1
Multiplier : 0.990





CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518104
Superseded Report:

Chromatogram

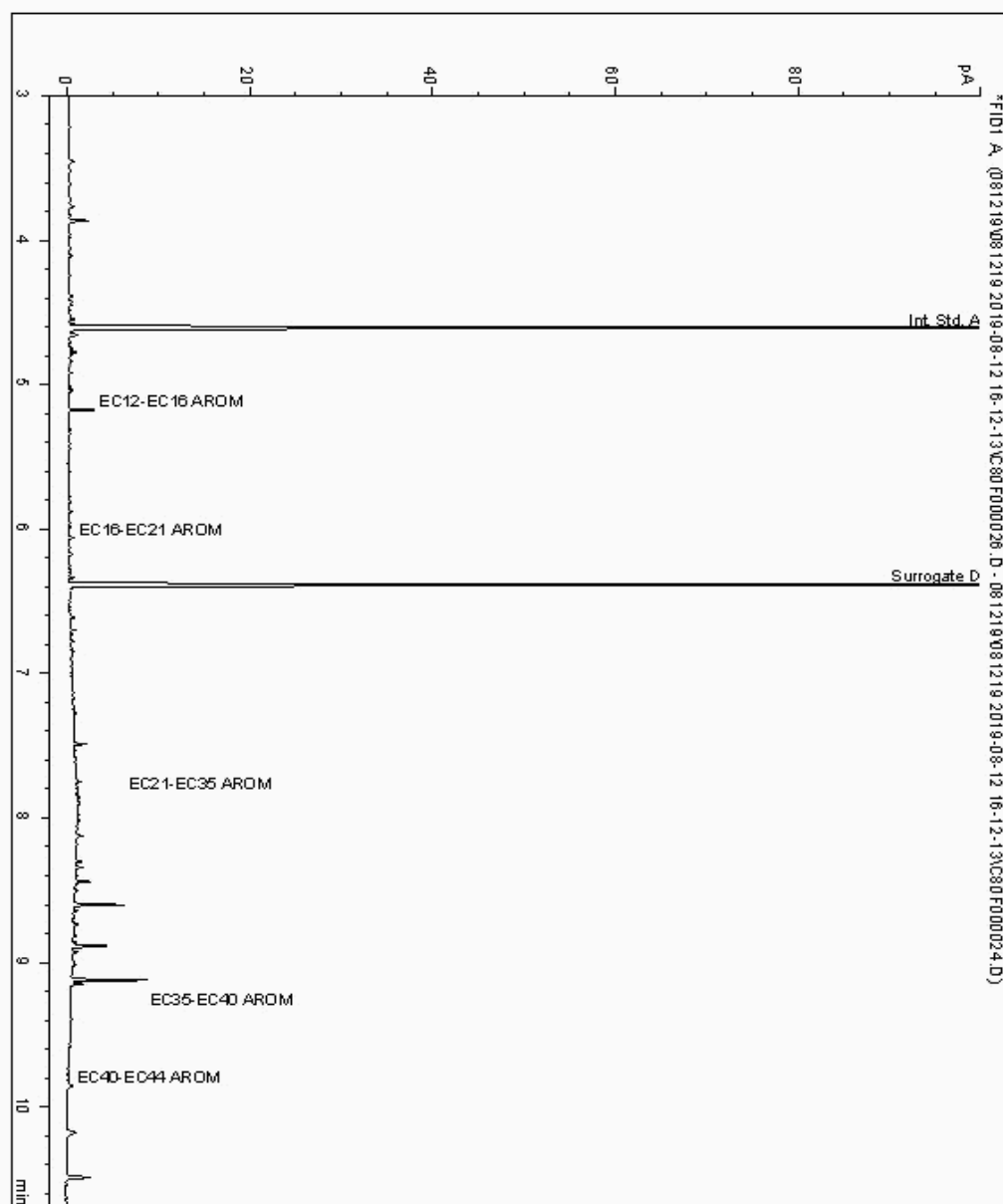
Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 20497120
Sample ID : BH102 ES3

Depth : 6.50 - 6.70

Speciated TPH - AROMS (C12 - C44)

Sample Identity: 19245028-
Date Acquired : 13/08/19 00:38:41
Units : ppb
Dilution :
CF : 1
Multiplier : 1.000





CERTIFICATE OF ANALYSIS

Validated

SDG: 190810-23
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518104
Superseded Report:

Chromatogram

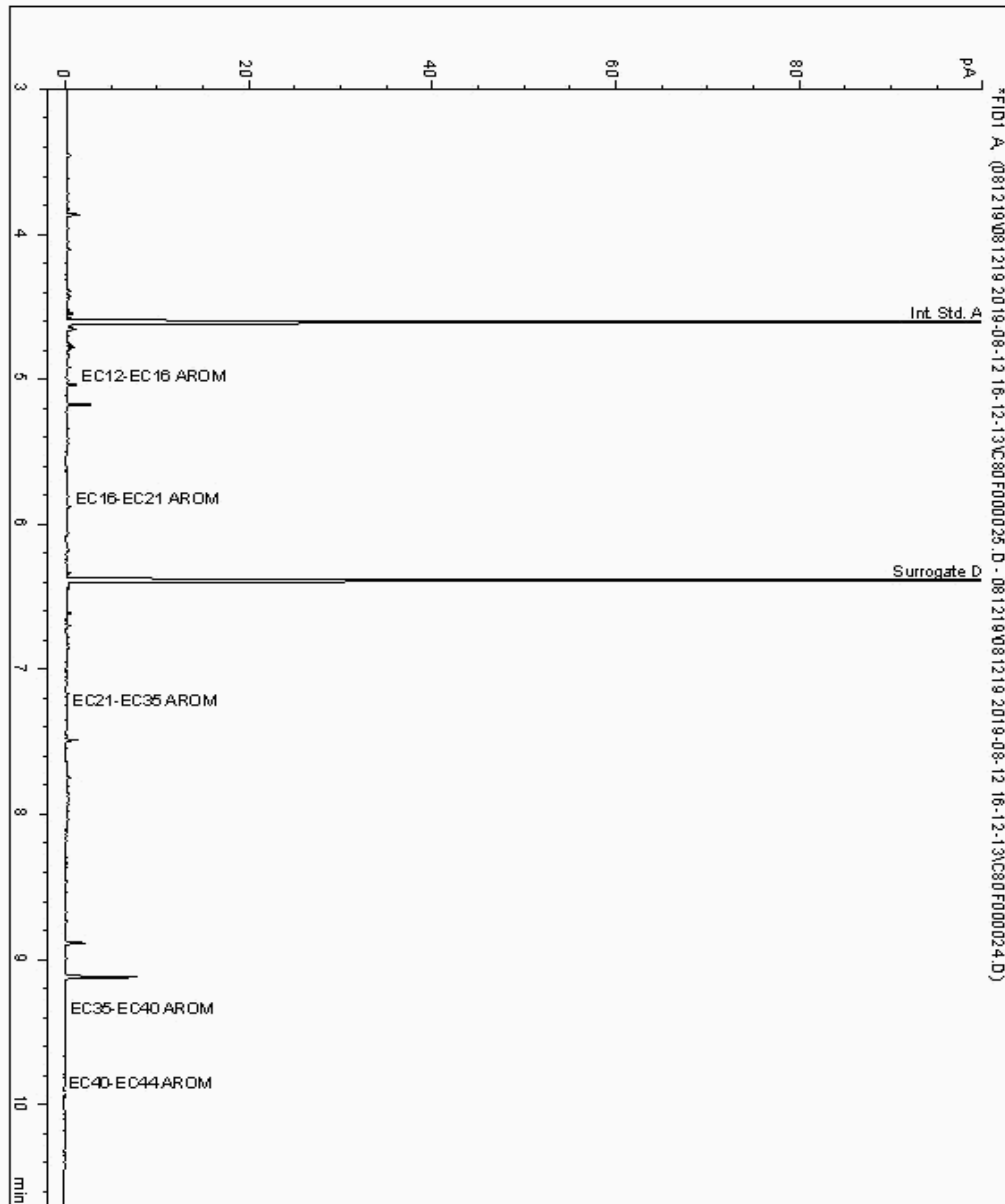
Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 20497151
Sample ID : BH105A ES2

Depth : 4.10 - 4.20

Speciated TPH - AROMS (C12 - C44)

Sample Identity: 19245097-
Date Acquired : 13/08/19 00:18:14
Units : ppb
Dilution :
CF : 1
Multiplier : 0.990





CERTIFICATE OF ANALYSIS

Validated

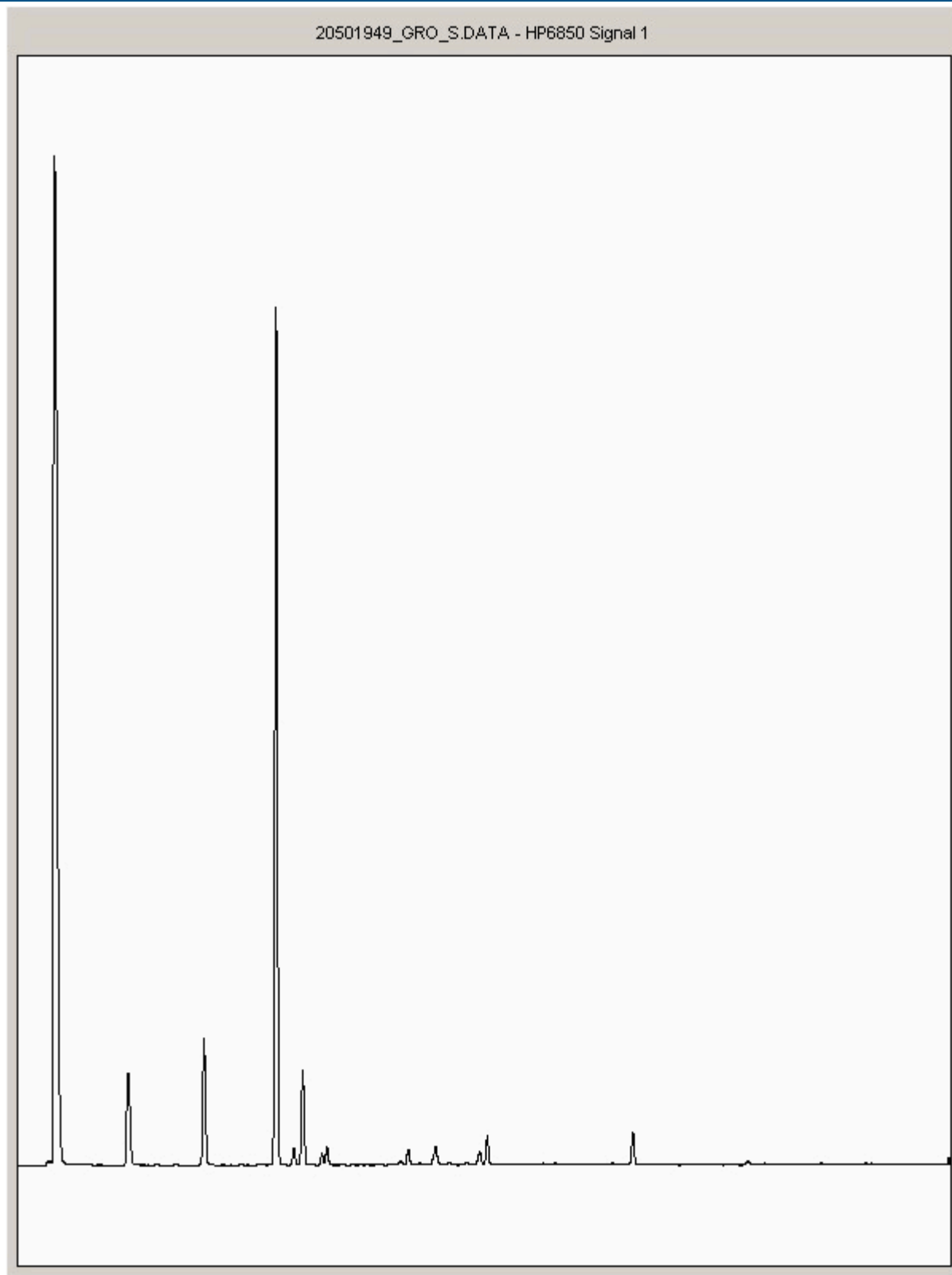
SDG:	190810-23	Client Reference:	62253048-GI2	Report Number:	518104
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20501949
Sample ID : BH105A ES2

Depth : 4.10 - 4.20





CERTIFICATE OF ANALYSIS

Validated

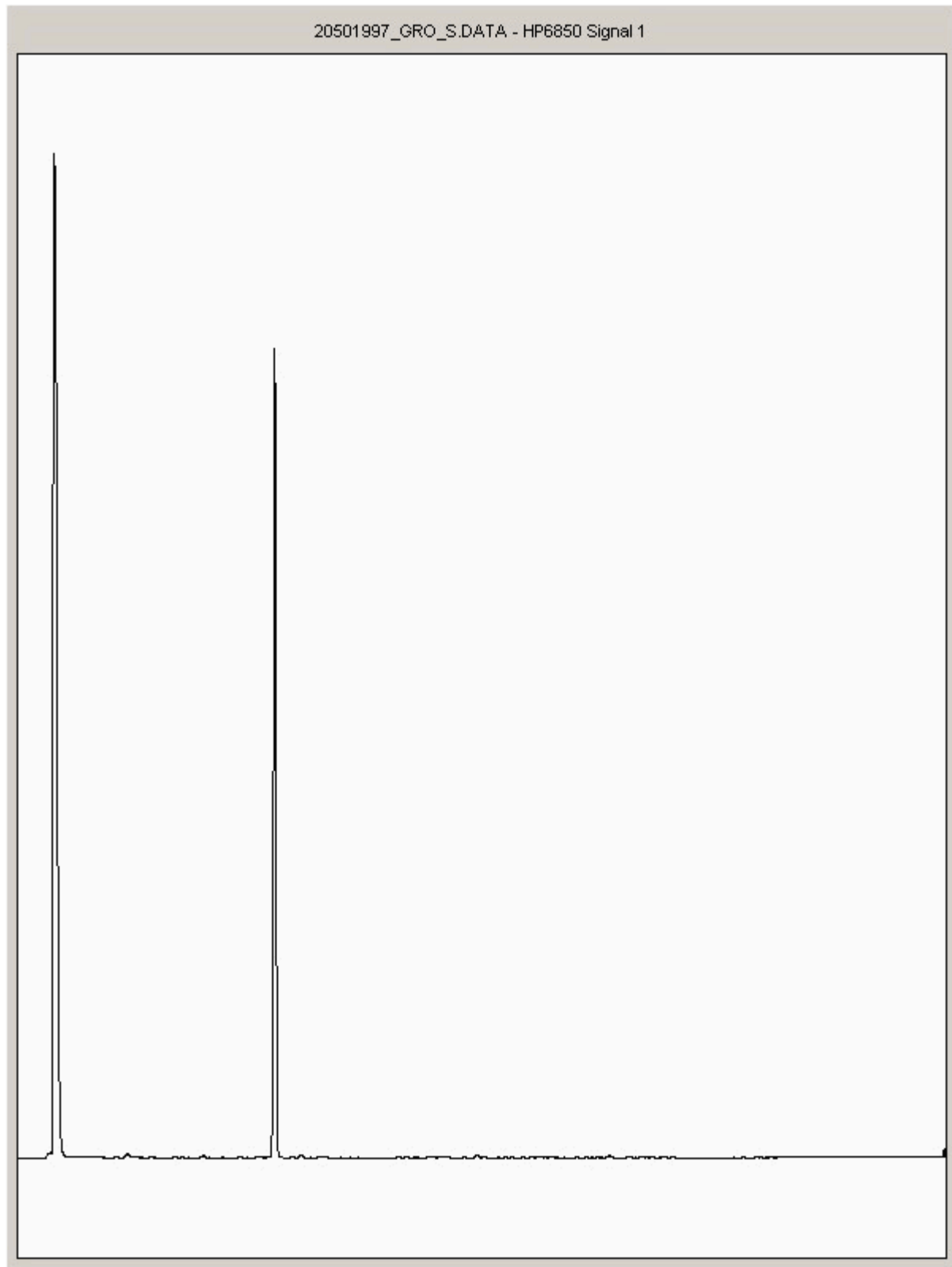
SDG:	190810-23	Client Reference:	62253048-GI2	Report Number:	518104
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20501997
Sample ID : BH102 ES3

Depth : 6.50 - 6.70





CERTIFICATE OF ANALYSIS

SDG:	190810-23	Client Reference:	62253048-GI2	Report Number:	518104
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Appendix

General

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

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

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

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

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

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

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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

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

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

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

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

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

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

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

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

Visual Estimation Of Fibre Content

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

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2107).

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

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



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Website: www.alsenvironmental.co.uk

WSP PB BBC
3rd Floor, Kings Orchard,
1 Queen Street
Bristol
Gloucestershire
BS2 0HQ

Attention: Jack Lott

CERTIFICATE OF ANALYSIS

Date of report Generation:	21 August 2019
Customer:	WSP PB BBC
Sample Delivery Group (SDG):	190814-3
Your Reference:	62253048
Location:	Port Talbot Harbourside
Report No:	518707

We received 2 samples on Wednesday August 14, 2019 and 2 of these samples were scheduled for analysis which was completed on Wednesday August 21, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG:	190814-3	Client Reference:	62253048	Report Number:	518707
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
20512569	BH106 ES2	ES	2.40 - 2.50	13/08/2019
20512577	BH107 ES2	ES	2.90 - 3.00	13/08/2019

Maximum Sample/Coolbox Temperature (°C) : 16.2

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190814-3
Location: Port Talbot Harbourside

Client Reference: 62253048
Order Number: 62253048-GI2

Report Number: 518707
Superseded Report:

Results Legend

- X** Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

	Lab Sample No(s)		20512569		20512577	
	Customer Sample Reference		BH106 ES2		BH107 ES2	
	AGS Reference		ES		ES	
	Depth (m)		2.40 - 2.50		2.90 - 3.00	
	Container		250g Amber Jar (ALE210)		250g Amber Jar (ALE215)	
	Sample Type		S		S	
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 2	X		X	
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 2	X		X	
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2		X		X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 2	X		X	
Metals in solid samples by OES	All	NDPs: 0 Tests: 2	X		X	
PAH by GCMS	All	NDPs: 0 Tests: 2	X		X	
pH	All	NDPs: 0 Tests: 2	X		X	
Phenols by HPLC (S)	All	NDPs: 0 Tests: 2	X		X	
Sample description	All	NDPs: 0 Tests: 1			X	
Total Organic Carbon	All	NDPs: 0 Tests: 2	X		X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 2	X		X	
VOC MS (S)	All	NDPs: 0 Tests: 2		X		X



CERTIFICATE OF ANALYSIS

Validated

SDG: 190814-3 **Client Reference:** 62253048 **Report Number:** 518707
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
Lab Sample No(s)	Customer Sample Ref.		Depth (m)	Colour	Description	Inclusions	Inclusions 2		
20512569	BH106 ES2		2.40 - 2.50	Dark Brown	Sandy Silt Loam	Stones	None		
20512577	BH107 ES2		2.90 - 3.00	Dark Brown	Sand	Stones	None		

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

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

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190814-3
Location: Port Talbot Harbourside

Client Reference: 62253048
Order Number: 62253048-GI2

Report Number: 518707
Superseded Report:

VOC MS (S)

Results Legend			Customer Sample Ref.		BH106 ES2		BH107 ES2					
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	2.40 - 2.50 Soil/Solid (S) 13/08/2019 13/08/2019 14/08/2019 190814-3 20512569 ES	2.90 - 3.00 Soil/Solid (S) 13/08/2019 13/08/2019 14/08/2019 190814-3 20512577 ES							
M	mCERIS accredited.											
aq	Aqueous / settled sample.											
diss.filt	Dissolved / filtered sample.											
tot.unfilt	Total / unfiltered sample.											
*	Subcontracted - refer to subcontractor report for accreditation status.											
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery											
(F)	Trigger breach confirmed											
1.3+5@	Sample deviation (see appendix)											
Component	LOD/Units	Method										
Dibromofluoromethane**	%	TM116		100	101							
Toluene-d8**	%	TM116		99.7	99.8							
4-Bromofluorobenzene**	%	TM116		93.9	97							
Dichlorodifluoromethane	<0.006 mg/kg	TM116		<0.06 M	<0.06 M							
Chloromethane	<0.007 mg/kg	TM116		<0.07 #	<0.07 #							
Vinyl Chloride	<0.006 mg/kg	TM116		<0.06 M	<0.06 M							
Bromomethane	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							
Chloroethane	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							
Trichlorofluoromethane	<0.006 mg/kg	TM116		<0.06 M	<0.06 M							
1,1-Dichloroethene	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Carbon Disulphide	<0.007 mg/kg	TM116		<0.07 M	<0.07 M							
Dichloromethane	<0.01 mg/kg	TM116		<0.1 #	<0.1 #							
Methyl Tertiary Butyl Ether	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							
trans-1,2-Dichloroethene	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							
1,1-Dichloroethane	<0.008 mg/kg	TM116		<0.08 M	<0.08 M							
cis-1,2-Dichloroethene	<0.006 mg/kg	TM116		<0.06 M	<0.06 M							
2,2-Dichloropropane	<0.01 mg/kg	TM116		<0.1	<0.1							
Bromochloromethane	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							
Chloroform	<0.008 mg/kg	TM116		<0.08 M	<0.08 M							
1,1,1-Trichloroethane	<0.007 mg/kg	TM116		<0.07 M	<0.07 M							
1,1-Dichloropropene	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							
Carbontetrachloride	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							
1,2-Dichloroethane	<0.005 mg/kg	TM116		<0.05 M	<0.05 M							
Benzene	<0.009 mg/kg	TM116		0.223 M	<0.09 M							
Trichloroethene	<0.009 mg/kg	TM116		<0.09 #	<0.09 #							
1,2-Dichloropropane	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							
Dibromomethane	<0.009 mg/kg	TM116		<0.09 M	<0.09 M							
Bromodichloromethane	<0.007 mg/kg	TM116		<0.07 M	<0.07 M							
cis-1,3-Dichloropropene	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							
Toluene	<0.007 mg/kg	TM116		0.109 M	<0.07 M							
trans-1,3-Dichloropropene	<0.01 mg/kg	TM116		<0.1	<0.1							
1,1,2-Trichloroethane	<0.01 mg/kg	TM116		<0.1 M	<0.1 M							



CERTIFICATE OF ANALYSIS

Validated

SDG: 190814-3
Location: Port Talbot Harbourside

Client Reference: 62253048
Order Number: 62253048-GI2

Report Number: 518707
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	BH106 ES2	BH107 ES2			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference					
M	mCERTS accredited.						
aq	Aqueous / settled sample.		2.40 - 2.50	2.90 - 3.00			
diss.filt	Dissolved / filtered sample.		Soil/Solid (S)	Soil/Solid (S)			
tot.unfilt	Total / unfiltered sample.		13/08/2019	13/08/2019			
*	Subcontracted - refer to subcontractor report for accreditation status.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		14/08/2019	14/08/2019			
(F)	Trigger breach confirmed		190814-3	190814-3			
1-3+5@	Sample deviation (see appendix)		20512569	20512577			
			ES	ES			
Component	LOD/Units	Method					
1,3-Dichloropropane	<0.007 mg/kg	TM116	<0.07 M	<0.07 M			
Tetrachloroethene	<0.005 mg/kg	TM116	<0.05 M	<0.05 M			
Dibromochloromethane	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
1,2-Dibromoethane	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
Chlorobenzene	<0.005 mg/kg	TM116	<0.05 M	<0.05 M			
1,1,1,2-Tetrachloroethane	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
Ethylbenzene	<0.004 mg/kg	TM116	<0.04 M	<0.04 M			
p/m-Xylene	<0.01 mg/kg	TM116	0.128 #	<0.1 #			
o-Xylene	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
Styrene	<0.01 mg/kg	TM116	<0.1 #	<0.1 #			
Bromoform	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
Isopropylbenzene	<0.005 mg/kg	TM116	<0.05 #	<0.05 #			
1,1,2,2-Tetrachloroethane	<0.01 mg/kg	TM116	<0.1 #	<0.1 #			
1,2,3-Trichloropropane	<0.016 mg/kg	TM116	<0.16 M	<0.16 M			
Bromobenzene	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
Propylbenzene	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
2-Chlorotoluene	<0.009 mg/kg	TM116	<0.09 M	<0.09 M			
1,3,5-Trimethylbenzene	<0.008 mg/kg	TM116	<0.08 M	<0.08 M			
4-Chlorotoluene	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
tert-Butylbenzene	<0.014 mg/kg	TM116	<0.14 M	<0.14 M			
1,2,4-Trimethylbenzene	<0.009 mg/kg	TM116	<0.09 #	<0.09 #			
sec-Butylbenzene	<0.01 mg/kg	TM116	<0.1	<0.1			
4-Isopropyltoluene	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
1,3-Dichlorobenzene	<0.008 mg/kg	TM116	<0.08 M	<0.08 M			
1,4-Dichlorobenzene	<0.005 mg/kg	TM116	<0.05 M	<0.05 M			
n-Butylbenzene	<0.011 mg/kg	TM116	<0.11	<0.11			
1,2-Dichlorobenzene	<0.01 mg/kg	TM116	<0.1 M	<0.1 M			
1,2-Dibromo-3-chloropropane	<0.014 mg/kg	TM116	<0.14 M	<0.14 M			
Tert-amyl methyl ether	<0.01 mg/kg	TM116	<0.1 #	<0.1 #			
1,2,4-Trichlorobenzene	<0.02 mg/kg	TM116	<0.2	<0.2			
Hexachlorobutadiene	<0.02 mg/kg	TM116	<0.2	<0.2			
Naphthalene	<0.013 mg/kg	TM116	0.506 M	<0.13 M			



CERTIFICATE OF ANALYSIS

Validated

SDG: 190814-3 **Client Reference:** 62253048 **Report Number:** 518707
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG:	190814-3	Client Reference:	62253048	Report Number:	518707
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	20512569	20512577
Customer Sample Ref.	BH106 ES2	BH107 ES2
AGS Ref.	ES	ES
Depth	2.40 - 2.50	2.90 - 3.00
Type	Soil/Solid (S)	Soil/Solid (S)

EPH CWG (Aliphatic) GC (S)	19-Aug-2019	19-Aug-2019
EPH CWG (Aromatic) GC (S)	19-Aug-2019	19-Aug-2019
GRO by GC-FID (S)	20-Aug-2019	20-Aug-2019
Hexavalent Chromium (s)	15-Aug-2019	15-Aug-2019
Metals in solid samples by OES	21-Aug-2019	21-Aug-2019
PAH by GCMS	19-Aug-2019	19-Aug-2019
pH	16-Aug-2019	16-Aug-2019
Phenols by HPLC (S)	16-Aug-2019	16-Aug-2019
Sample description	14-Aug-2019	14-Aug-2019
Total Organic Carbon	20-Aug-2019	20-Aug-2019
TPH CWG GC (S)	20-Aug-2019	20-Aug-2019
VOC MS (S)	19-Aug-2019	19-Aug-2019



CERTIFICATE OF ANALYSIS

Validated

SDG: 190814-3
Location: Port Talbot Harbourside

Client Reference: 62253048
Order Number: 62253048-GI2

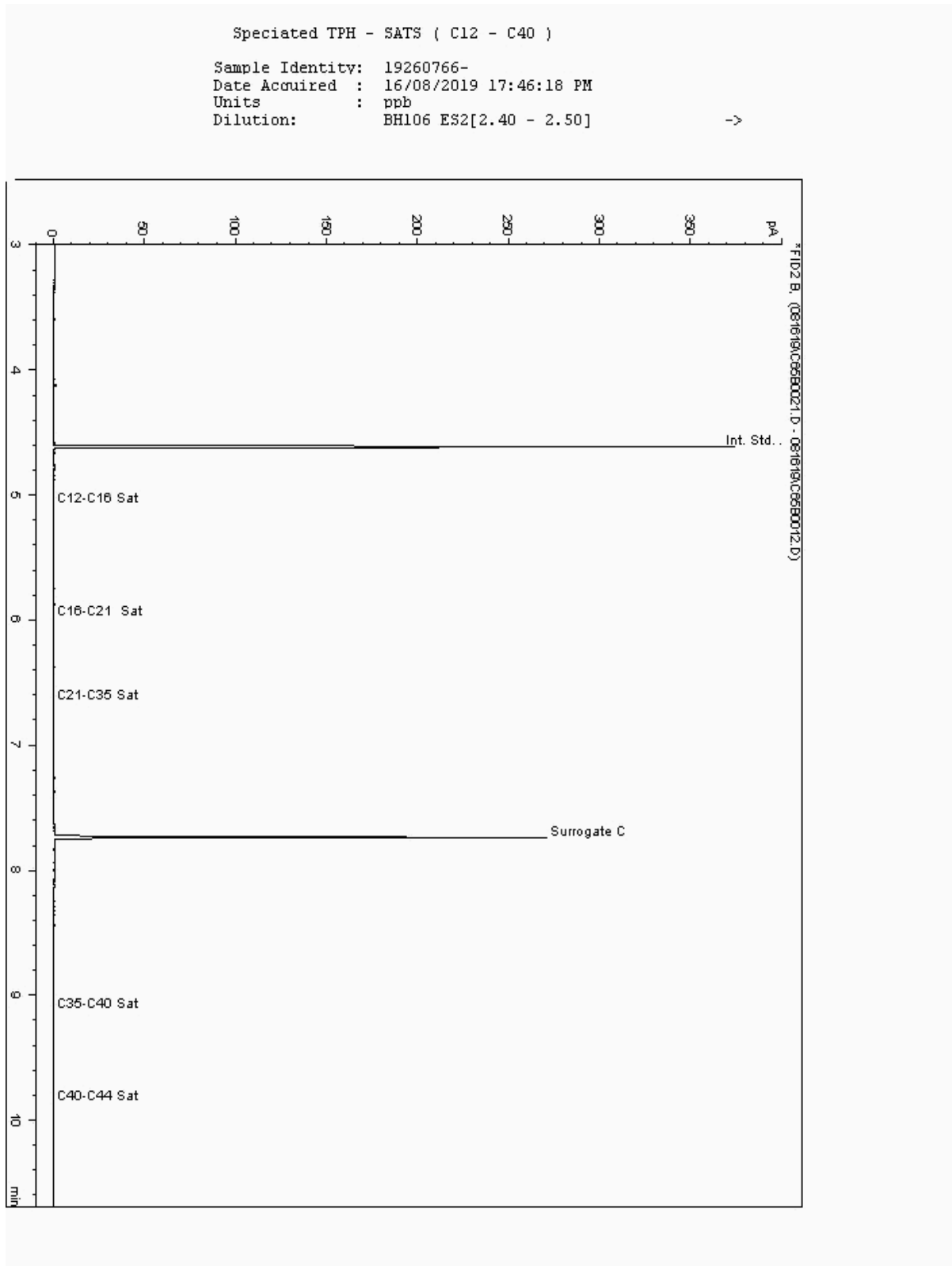
Report Number: 518707
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 20513133
Sample ID : BH106 ES2

Depth : 2.40 - 2.50





CERTIFICATE OF ANALYSIS

Validated

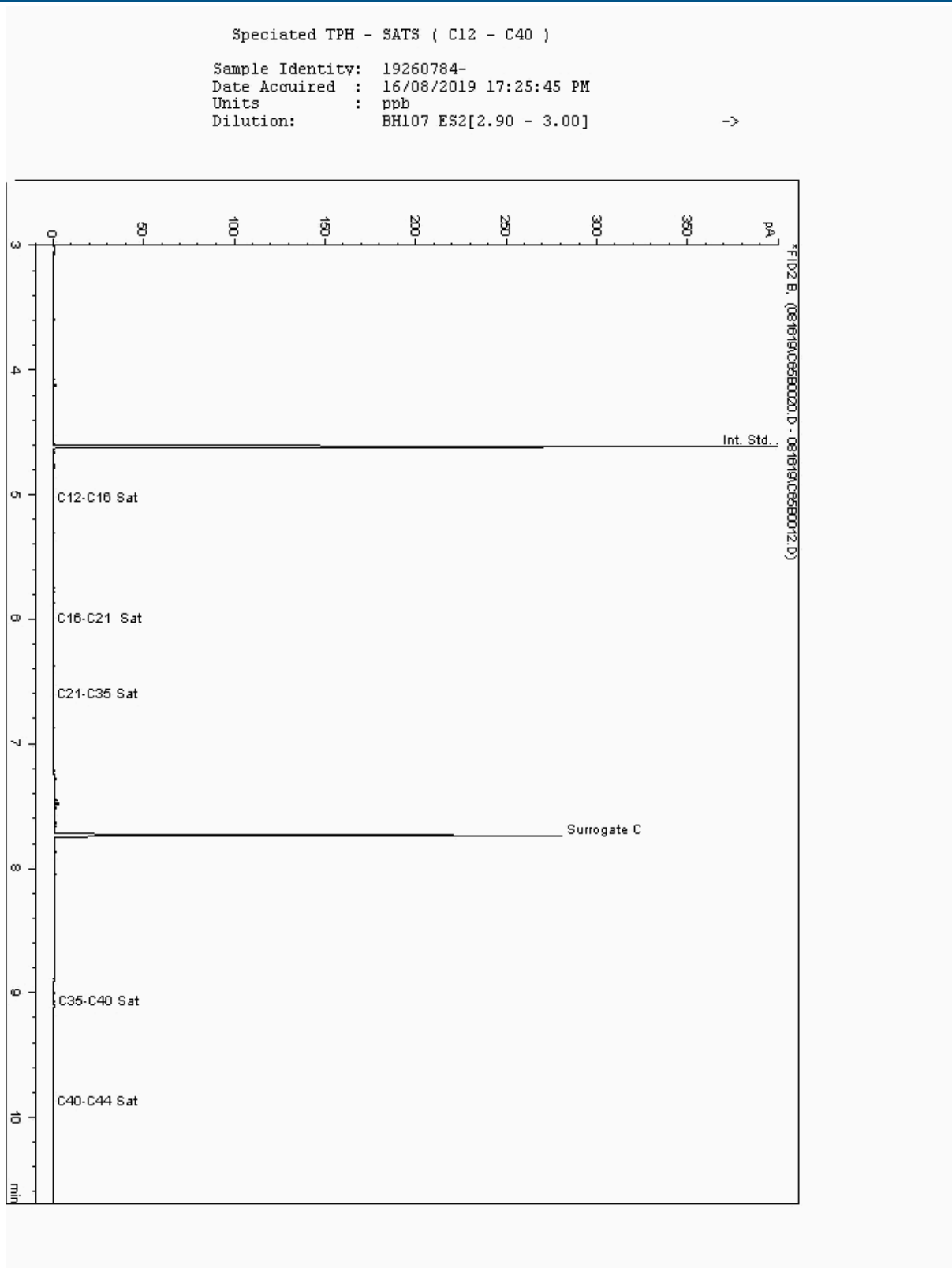
SDG:	190814-3	Client Reference:	62253048	Report Number:	518707
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 20513143
Sample ID : BH107 ES2

Depth : 2.90 - 3.00





CERTIFICATE OF ANALYSIS

Validated

SDG: 190814-3
Location: Port Talbot Harbourside

Client Reference: 62253048
Order Number: 62253048-G12

Report Number: 518707
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

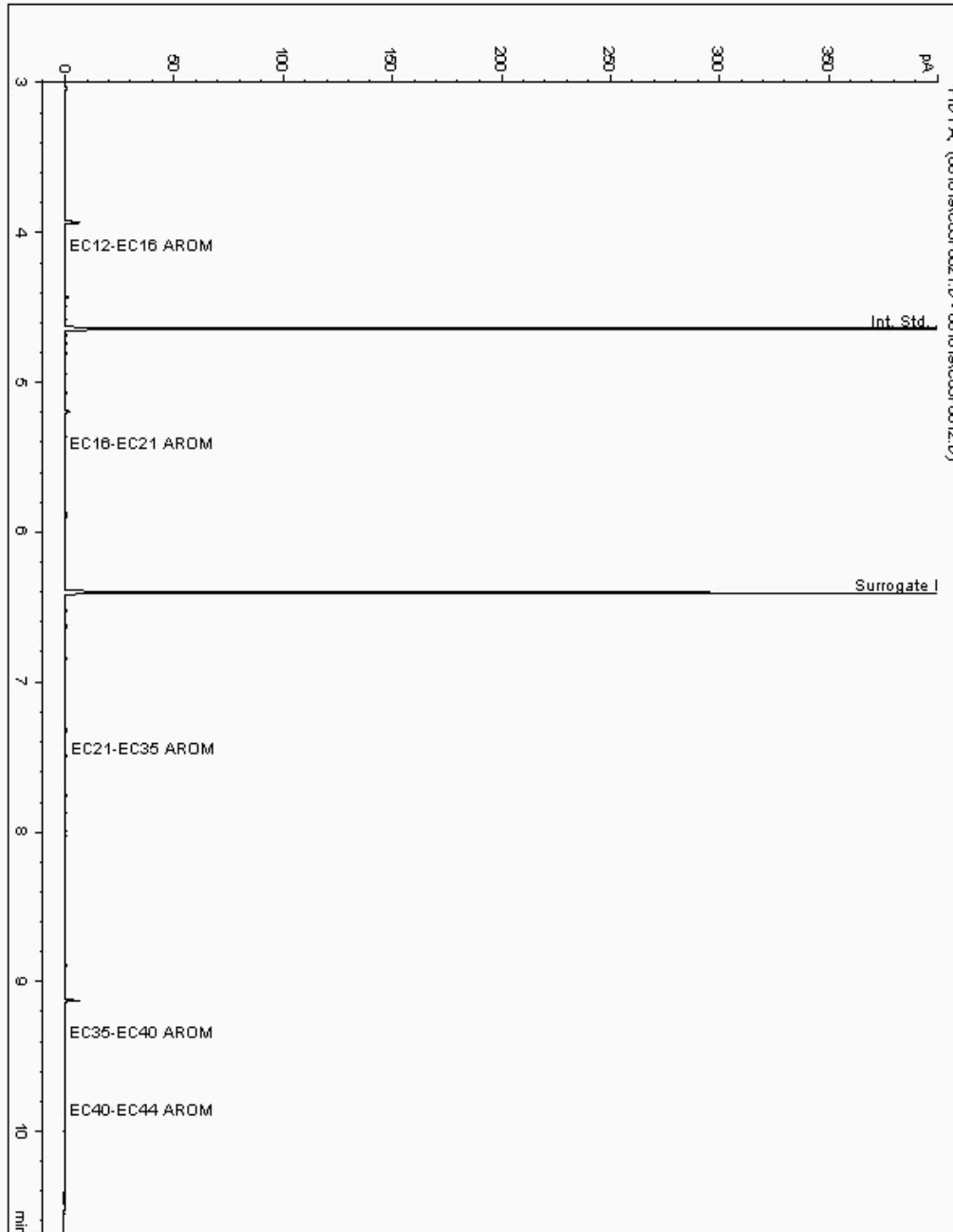
Sample No : 20513133
Sample ID : BH106 ES2

Depth : 2.40 - 2.50

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19260767-
Date Acquired : 16/08/2019 17:46:18 PM
Units : ppb
Dilution: BH106 ES2[2.40 - 2.50]

->





CERTIFICATE OF ANALYSIS

Validated

SDG: 190814-3
Location: Port Talbot Harbourside

Client Reference: 62253048
Order Number: 62253048-G12

Report Number: 518707
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

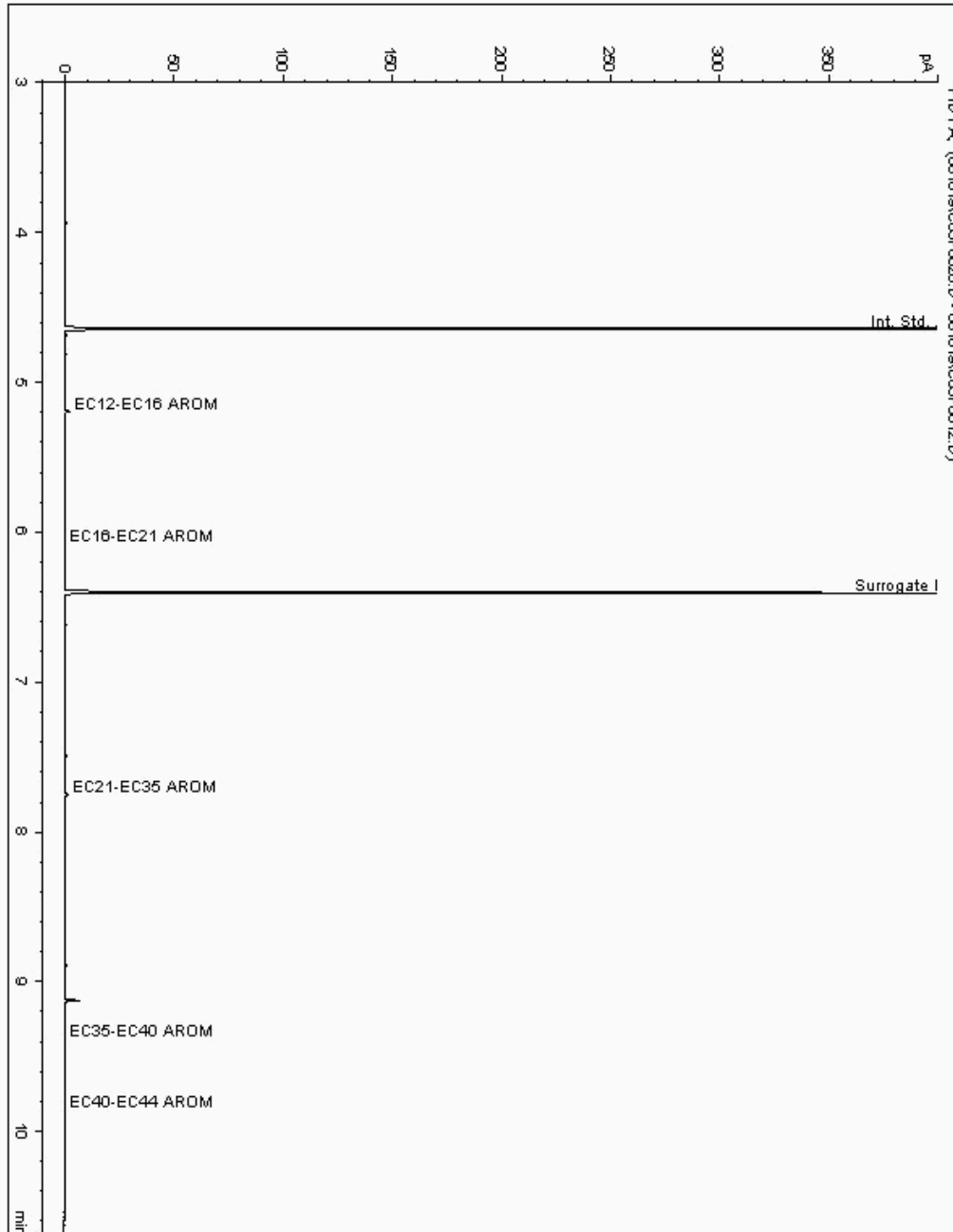
Sample No : 20513143
Sample ID : BH107 ES2

Depth : 2.90 - 3.00

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19260785-
Date Acquired : 16/08/2019 17:25:45 PM
Units : ppb
Dilution: BH107 ES2[2.90 - 3.00]

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CERTIFICATE OF ANALYSIS

Validated

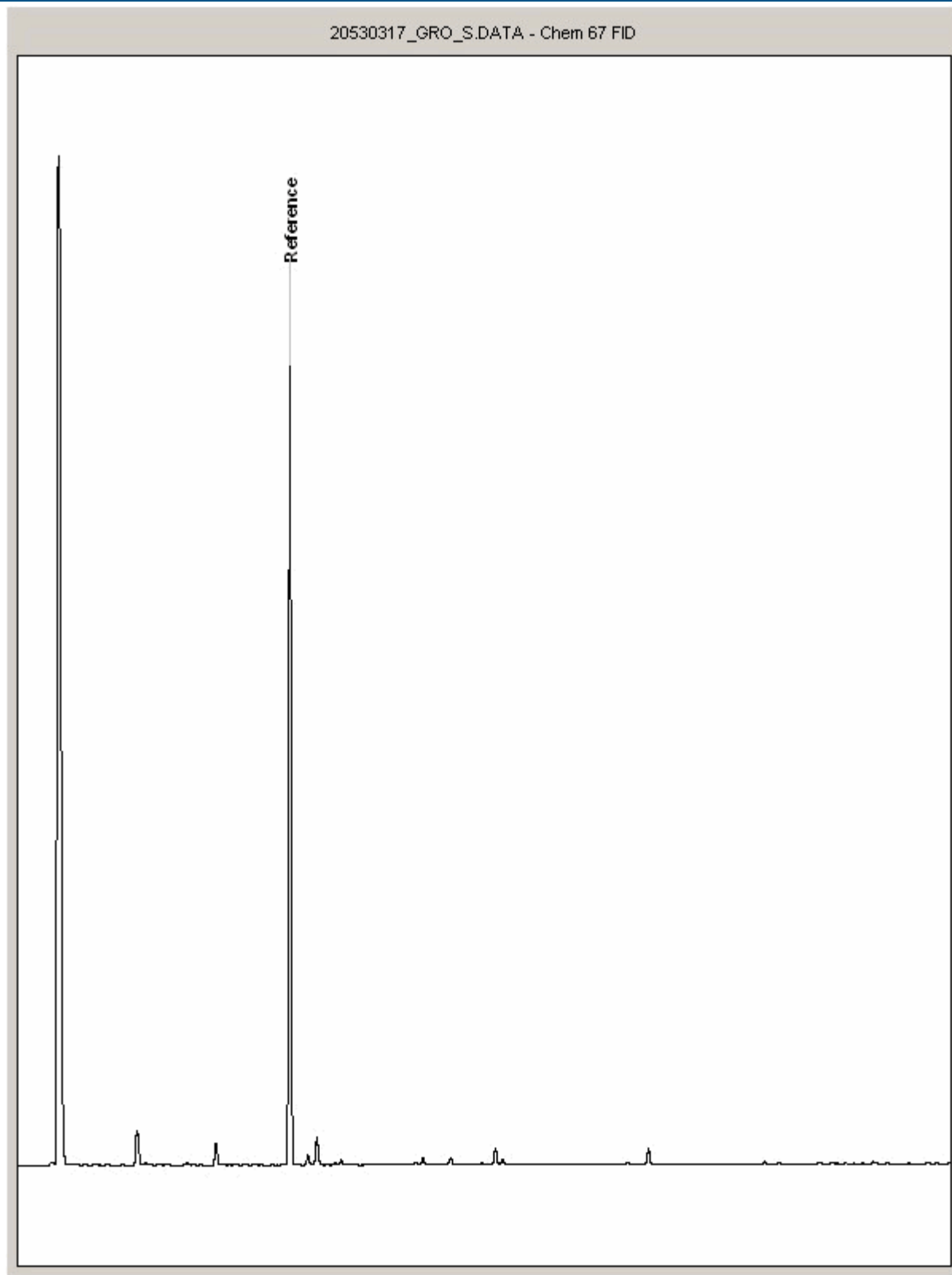
SDG:	190814-3	Client Reference:	62253048	Report Number:	518707
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20530317
Sample ID : BH106 ES2

Depth : 2.40 - 2.50





CERTIFICATE OF ANALYSIS

Validated

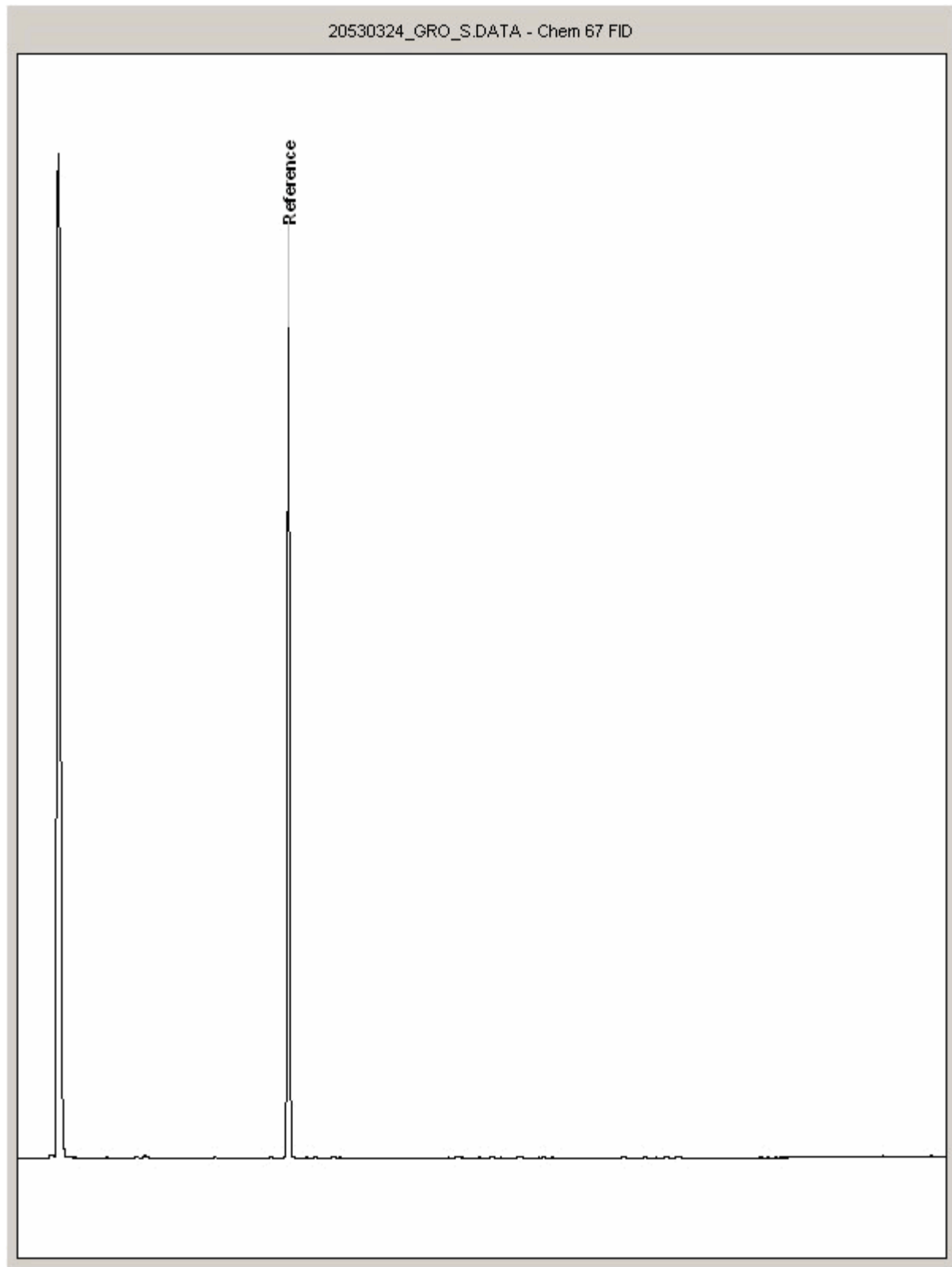
SDG:	190814-3	Client Reference:	62253048	Report Number:	518707
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20530324
Sample ID : BH107 ES2

Depth : 2.90 - 3.00





CERTIFICATE OF ANALYSIS

SDG:	190814-3	Client Reference:	62253048	Report Number:	518707
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Appendix

General

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

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

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

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

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

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

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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

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

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

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

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

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

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

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

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

Visual Estimation Of Fibre Content

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

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2107).

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

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



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Website: www.alsenvironmental.co.uk

WSP PB BBC
3rd Floor, Kings Orchard,
1 Queen Street
Bristol
Gloucestershire
BS2 0HQ

Attention: Jack Lott

CERTIFICATE OF ANALYSIS

Date of report Generation:	23 August 2019
Customer:	WSP PB BBC
Sample Delivery Group (SDG):	190817-1
Your Reference:	62253048-GI2
Location:	Port Talbot Harbourside
Report No:	519042

We received 1 sample on Saturday August 17, 2019 and 1 of these samples were scheduled for analysis which was completed on Friday August 23, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG:	190817-1	Client Reference:	62253048-GI2	Report Number:	519042
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
20536549	BH101 ES2	ES	3.00 - 3.20	15/08/2019

Maximum Sample/Coolbox Temperature (°C) :

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190817-1
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 519042
Superseded Report:

Results Legend

- X** Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

20536549

Customer Sample Reference

BH101 ES2

AGS Reference

ES

Depth (m)

3.00 - 3.20

Container

250g Amber Jar (ALE210)

60g VOC (ALE215)

Sample Type

S

S

EPH CWG (Aliphatic) GC (S)

All

NDPs: 0
Tests: 1

X

EPH CWG (Aromatic) GC (S)

All

NDPs: 0
Tests: 1

X

GRO by GC-FID (S)

All

NDPs: 0
Tests: 1

X

Hexavalent Chromium (s)

All

NDPs: 0
Tests: 1

X

Metals in solid samples by OES

All

NDPs: 0
Tests: 1

X

PAH by GCMS

All

NDPs: 0
Tests: 1

X

pH

All

NDPs: 0
Tests: 1

X

Phenols by HPLC (S)

All

NDPs: 0
Tests: 1

X

Sample description

All

NDPs: 0
Tests: 1

X

Total Organic Carbon

All

NDPs: 0
Tests: 1

X

TPH CWG GC (S)

All

NDPs: 0
Tests: 1

X

VOC MS (S)

All

NDPs: 0
Tests: 1

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 190817-1
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 519042
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
Lab Sample No(s)	Customer Sample Ref.		Depth (m)	Colour	Description	Inclusions	Inclusions 2		
20536549	BH101 ES2		3.00 - 3.20	Light Brown	Sand	Stones	None		

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

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

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190817-1
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 519042
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	BH101 ES2				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	3.00 - 3.20 Soil/Solid (S) 15/08/2019 17/08/2019 190817-1 20536549 ES				
M	m/CERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted - refer to subcontractor report for accreditation status.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1-3+5@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM116	108				
Toluene-d8**	%	TM116	100				
4-Bromofluorobenzene**	%	TM116	101				
Dichlorodifluoromethane	<0.006 mg/kg	TM116	<0.06 M				
Chloromethane	<0.007 mg/kg	TM116	<0.07 #				
Vinyl Chloride	<0.006 mg/kg	TM116	<0.06 M				
Bromomethane	<0.01 mg/kg	TM116	<0.1 M				
Chloroethane	<0.01 mg/kg	TM116	<0.1 M				
Trichlorofluoromethane	<0.006 mg/kg	TM116	<0.06 M				
1,1-Dichloroethene	<0.01 mg/kg	TM116	<0.1 #				
Carbon Disulphide	<0.007 mg/kg	TM116	<0.07 M				
Dichloromethane	<0.01 mg/kg	TM116	<0.1 #				
Methyl Tertiary Butyl Ether	<0.01 mg/kg	TM116	<0.1 M				
trans-1,2-Dichloroethene	<0.01 mg/kg	TM116	<0.1 M				
1,1-Dichloroethane	<0.008 mg/kg	TM116	<0.08 M				
cis-1,2-Dichloroethene	<0.006 mg/kg	TM116	<0.06 M				
2,2-Dichloropropane	<0.01 mg/kg	TM116	<0.1				
Bromochloromethane	<0.01 mg/kg	TM116	<0.1 M				
Chloroform	<0.008 mg/kg	TM116	<0.08 M				
1,1,1-Trichloroethane	<0.007 mg/kg	TM116	<0.07 M				
1,1-Dichloropropene	<0.01 mg/kg	TM116	<0.1 M				
Carbontetrachloride	<0.01 mg/kg	TM116	<0.1 M				
1,2-Dichloroethane	<0.005 mg/kg	TM116	<0.05 M				
Benzene	<0.009 mg/kg	TM116	<0.09 M				
Trichloroethene	<0.009 mg/kg	TM116	<0.09 #				
1,2-Dichloropropane	<0.01 mg/kg	TM116	<0.1 M				
Dibromomethane	<0.009 mg/kg	TM116	<0.09 M				
Bromodichloromethane	<0.007 mg/kg	TM116	<0.07 M				
cis-1,3-Dichloropropene	<0.01 mg/kg	TM116	<0.1 M				
Toluene	<0.007 mg/kg	TM116	<0.07 M				
trans-1,3-Dichloropropene	<0.01 mg/kg	TM116	<0.1				
1,1,2-Trichloroethane	<0.01 mg/kg	TM116	<0.1 M				



CERTIFICATE OF ANALYSIS

Validated

SDG: 190817-1
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 519042
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	BH101 ES2					
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
1,3-Dichloropropane	<0.007 mg/kg	TM116	<0.07 M					
Tetrachloroethene	<0.005 mg/kg	TM116	<0.05 M					
Dibromochloromethane	<0.01 mg/kg	TM116	<0.1 M					
1,2-Dibromoethane	<0.01 mg/kg	TM116	<0.1 M					
Chlorobenzene	<0.005 mg/kg	TM116	<0.05 M					
1,1,1,2-Tetrachloroethane	<0.01 mg/kg	TM116	<0.1 M					
Ethylbenzene	<0.004 mg/kg	TM116	<0.04 M					
p/m-Xylene	<0.01 mg/kg	TM116	<0.1 #					
o-Xylene	<0.01 mg/kg	TM116	<0.1 M					
Styrene	<0.01 mg/kg	TM116	<0.1 #					
Bromoform	<0.01 mg/kg	TM116	<0.1 M					
Isopropylbenzene	<0.005 mg/kg	TM116	<0.05 #					
1,1,2,2-Tetrachloroethane	<0.01 mg/kg	TM116	<0.1 #					
1,2,3-Trichloropropane	<0.016 mg/kg	TM116	<0.16 M					
Bromobenzene	<0.01 mg/kg	TM116	<0.1 M					
Propylbenzene	<0.01 mg/kg	TM116	<0.1 M					
2-Chlorotoluene	<0.009 mg/kg	TM116	<0.09 M					
1,3,5-Trimethylbenzene	<0.008 mg/kg	TM116	<0.08 M					
4-Chlorotoluene	<0.01 mg/kg	TM116	<0.1 M					
tert-Butylbenzene	<0.014 mg/kg	TM116	<0.14 M					
1,2,4-Trimethylbenzene	<0.009 mg/kg	TM116	<0.09 #					
sec-Butylbenzene	<0.01 mg/kg	TM116	<0.1					
4-Isopropyltoluene	<0.01 mg/kg	TM116	<0.1 M					
1,3-Dichlorobenzene	<0.008 mg/kg	TM116	<0.08 M					
1,4-Dichlorobenzene	<0.005 mg/kg	TM116	<0.05 M					
n-Butylbenzene	<0.011 mg/kg	TM116	<0.11					
1,2-Dichlorobenzene	<0.01 mg/kg	TM116	<0.1 M					
1,2-Dibromo-3-chloropropane	<0.014 mg/kg	TM116	<0.14 M					
Tert-amyl methyl ether	<0.01 mg/kg	TM116	<0.1 #					
1,2,4-Trichlorobenzene	<0.02 mg/kg	TM116	<0.2					
Hexachlorobutadiene	<0.02 mg/kg	TM116	<0.2					
Naphthalene	<0.013 mg/kg	TM116	<0.13 M					



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SDG: 190817-1 **Client Reference:** 62253048-GI2 **Report Number:** 519042
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



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SDG:	190817-1	Client Reference:	62253048-GI2	Report Number:	519042
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	20536549
Customer Sample Ref.	BH101 ES2
AGS Ref.	ES
Depth	3.00 - 3.20
Type	Soil/Solid (S)

EPH CWG (Aliphatic) GC (S)	23-Aug-2019
EPH CWG (Aromatic) GC (S)	23-Aug-2019
GRO by GC-FID (S)	21-Aug-2019
Hexavalent Chromium (s)	21-Aug-2019
Metals in solid samples by OES	22-Aug-2019
PAH by GCMS	21-Aug-2019
pH	22-Aug-2019
Phenols by HPLC (S)	22-Aug-2019
Sample description	17-Aug-2019
Total Organic Carbon	22-Aug-2019
TPH CWG GC (S)	23-Aug-2019
VOC MS (S)	21-Aug-2019



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SDG:	190817-1	Client Reference:	62253048-GI2	Report Number:	519042
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

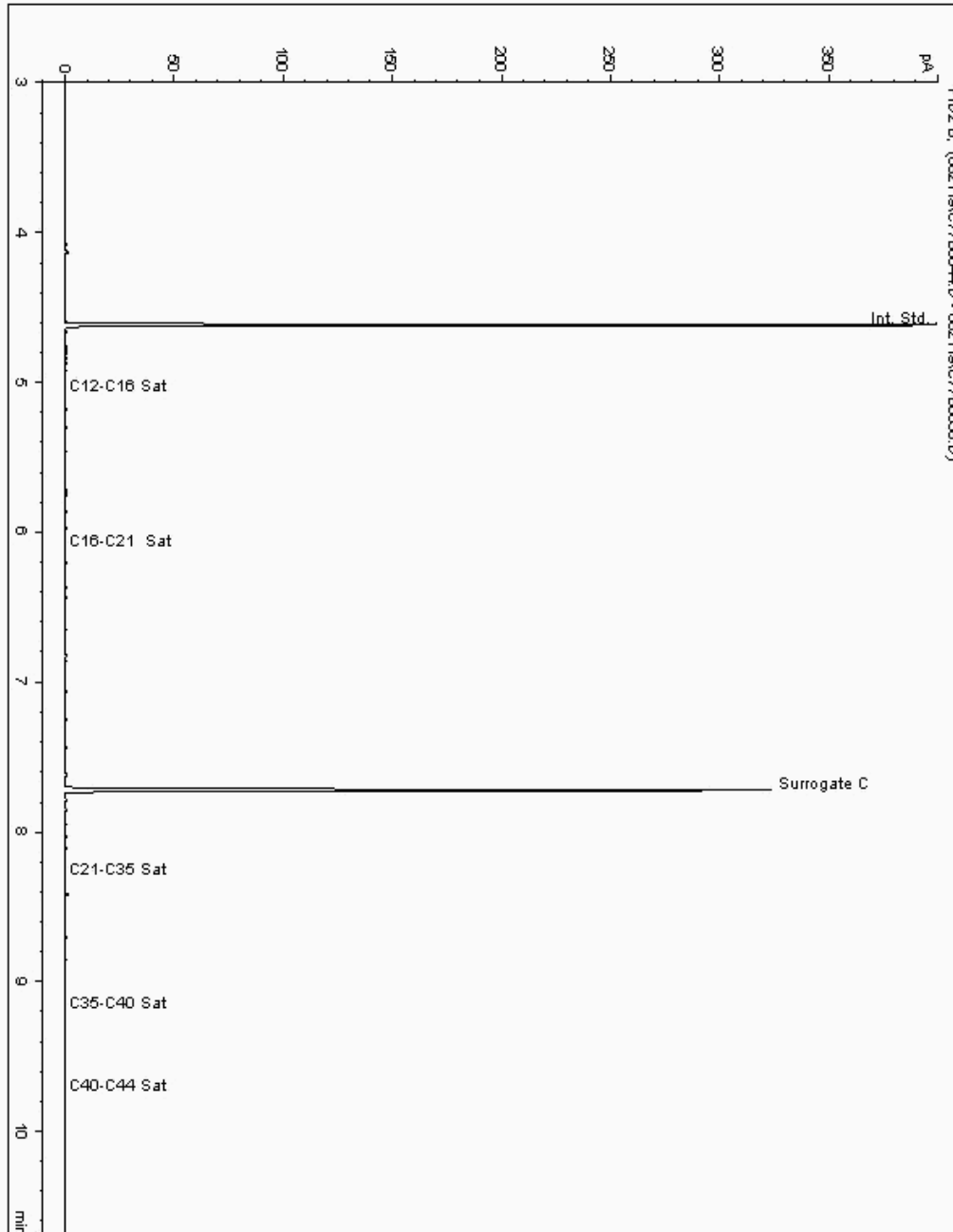
Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 20540854
Sample ID : BH101 ES2

Depth : 3.00 - 3.20

Speciated TPH - SATS (C12 - C40)

Sample Identity: 19287699-
Date Acquired : 22/08/2019 03:05:27 PM
Units : ppb
Dilution:





CERTIFICATE OF ANALYSIS

Validated

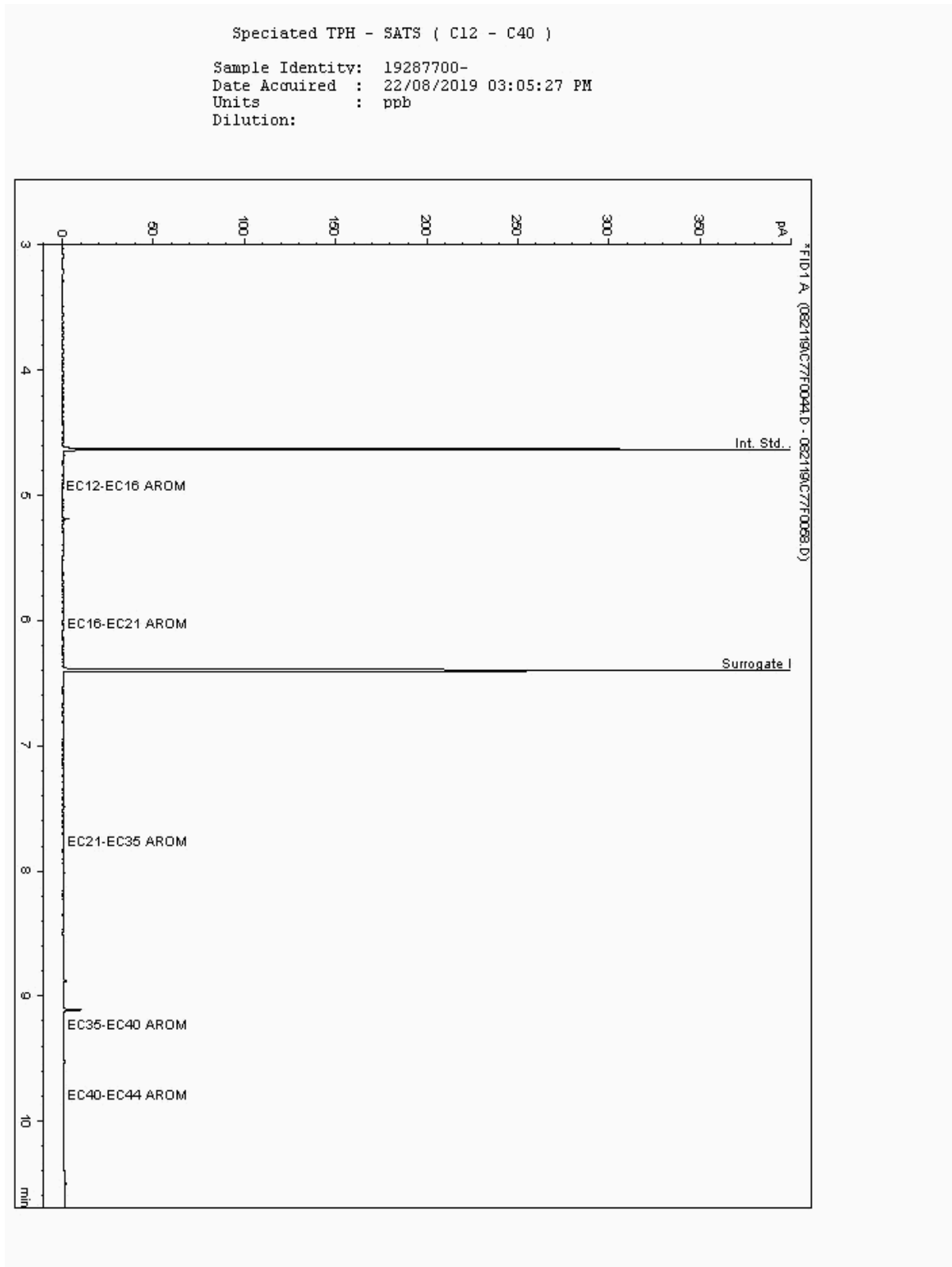
SDG:	190817-1	Client Reference:	62253048-GI2	Report Number:	519042
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 20540854
Sample ID : BH101 ES2

Depth : 3.00 - 3.20





CERTIFICATE OF ANALYSIS

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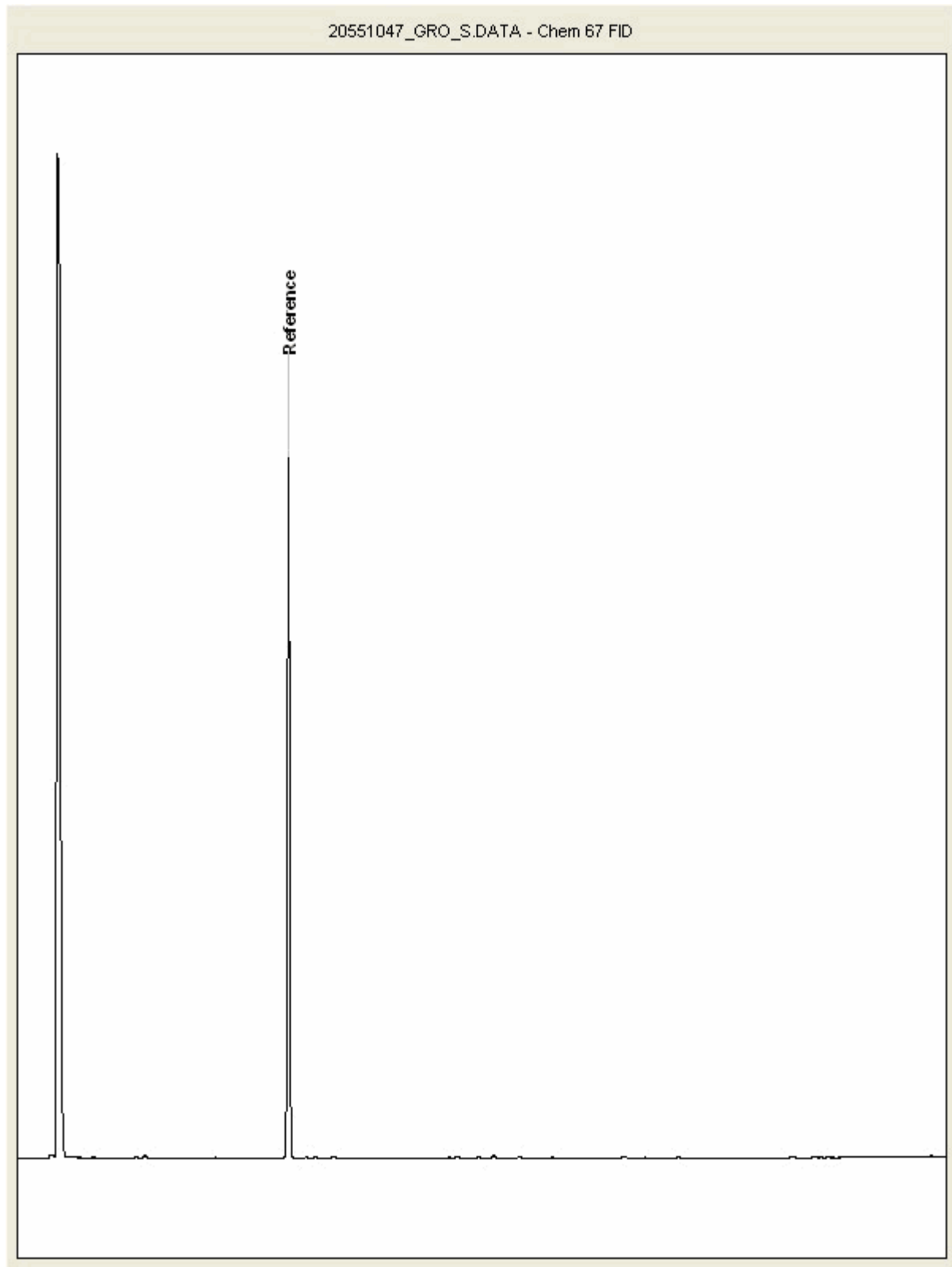
SDG:	190817-1	Client Reference:	62253048-GI2	Report Number:	519042
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20551047
Sample ID : BH101 ES2

Depth : 3.00 - 3.20





CERTIFICATE OF ANALYSIS

SDG:	190817-1	Client Reference:	62253048-GI2	Report Number:	519042
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Appendix

General

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

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

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

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

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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

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

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

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

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

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

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

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

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

Visual Estimation Of Fibre Content

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

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2107).

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

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



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Website: www.alsenvironmental.co.uk

WSP PB BBC
3rd Floor, Kings Orchard,
1 Queen Street
Bristol
Gloucestershire
BS2 0HQ

Attention: Jack Lott

CERTIFICATE OF ANALYSIS

Date of report Generation:	14 August 2019
Customer:	WSP PB BBC
Sample Delivery Group (SDG):	190807-14
Your Reference:	62253048-GI2
Location:	Port Talbot Harbourside
Report No:	517834

We received 3 samples on Wednesday August 07, 2019 and 2 of these samples were scheduled for analysis which was completed on Wednesday August 14, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14 **Client Reference:** 62253048-GI2 **Report Number:** 517834
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
20470871	BH104 ES1	ES	0.85 - 0.90	05/08/2019
20470877	BH104 ES2	ES	3.00 - 3.10	06/08/2019
20470883	BH104 ES3	ES	4.90 - 5.00	06/08/2019

Maximum Sample/Coolbox Temperature (°C) : 11.4

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 517834
Superseded Report:

Results Legend

- X** Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)	20470871	20470877
Customer Sample Reference	BH104 ES1	BH104 ES2
AGS Reference	ES	ES
Depth (m)	0.85 - 0.90	3.00 - 3.10
Container	250g Amber Jar (ALE210)	60g VOC (ALE215)
Sample Type	S	S
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 1
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 2
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 2
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 2
Metals in solid samples by OES	All	NDPs: 0 Tests: 2
PAH by GCMS	All	NDPs: 0 Tests: 2
pH	All	NDPs: 0 Tests: 2
Phenols by HPLC (S)	All	NDPs: 0 Tests: 2
Sample description	All	NDPs: 0 Tests: 2
TPH CWG GC (S)	All	NDPs: 0 Tests: 2
VOC MS (S)	All	NDPs: 0 Tests: 2



CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14 **Client Reference:** 62253048-GI2 **Report Number:** 517834
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
Lab Sample No(s)	Customer Sample Ref.		Depth (m)	Colour	Description	Inclusions	Inclusions 2		
20470871	BH104 ES1		0.85 - 0.90	Dark Brown	Loamy Sand	Stones	Oil/Petroleum		
20470877	BH104 ES2		3.00 - 3.10	Dark Brown	Loamy Sand	Stones	Oil/Petroleum		

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

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

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14
Location: Port Talbot HarboursideClient Reference: 62253048-GI2
Order Number: 62253048-GI2Report Number: 517834
Superseded Report:

Results Legend			Customer Sample Ref.	BH104 ES1	BH104 ES2			
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-3+5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Moisture Content Ratio (% of as received sample)	%	PM024	11	13				
Phenol	<0.01 mg/kg	TM062 (S)	0.0112 M	0.518 M				
pH	1 pH Units	TM133	9.57 M	9.95 M				
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6 #	<0.6 #				
Arsenic	<0.6 mg/kg	TM181	49.9 M	11.1 M				
Cadmium	<0.02 mg/kg	TM181	<0.2 M	<0.02 M				
Chromium	<0.9 mg/kg	TM181	362 M	86.5 M				
Copper	<1.4 mg/kg	TM181	541 M	47.9 M				
Lead	<0.7 mg/kg	TM181	223 M	24.2 M				
Mercury	<0.14 mg/kg	TM181	<1.4 M	<0.14 M				
Nickel	<0.2 mg/kg	TM181	66 M	21.8 M				
Selenium	<1 mg/kg	TM181	<10 #	<1 #				
Zinc	<1.9 mg/kg	TM181	125 M	74.1 M				



CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 517834
Superseded Report:

VOC MS (S)

Results Legend			Customer Sample Ref.				
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	BH104 ES1	BH104 ES2		
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted - refer to subcontractor report for accreditation status.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1.3+5@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM116		117	112		
Toluene-d8**	%	TM116		95.5	95.4		
4-Bromofluorobenzene**	%	TM116		93	97.7		
Dichlorodifluoromethane	<0.006 mg/kg	TM116			<0.06 M		
Chloromethane	<0.007 mg/kg	TM116			<0.07 #		
Vinyl Chloride	<0.006 mg/kg	TM116			<0.06 M		
Bromomethane	<0.01 mg/kg	TM116			<0.1 M		
Chloroethane	<0.01 mg/kg	TM116			<0.1 M		
Trichlorofluoromethane	<0.006 mg/kg	TM116			<0.06 M		
1,1-Dichloroethene	<0.01 mg/kg	TM116			<0.1 #		
Carbon Disulphide	<0.007 mg/kg	TM116			<0.07 M		
Dichloromethane	<0.01 mg/kg	TM116			<0.1 #		
Methyl Tertiary Butyl Ether	<0.01 mg/kg	TM116		<0.1 M	<0.1 M		
trans-1,2-Dichloroethene	<0.01 mg/kg	TM116			<0.1 M		
1,1-Dichloroethane	<0.008 mg/kg	TM116			<0.08 M		
cis-1,2-Dichloroethene	<0.006 mg/kg	TM116			<0.06 M		
2,2-Dichloropropane	<0.01 mg/kg	TM116			<0.1		
Bromochloromethane	<0.01 mg/kg	TM116			<0.1 M		
Chloroform	<0.008 mg/kg	TM116			<0.08 M		
1,1,1-Trichloroethane	<0.007 mg/kg	TM116			<0.07 M		
1,1-Dichloropropene	<0.01 mg/kg	TM116			<0.1 M		
Carbontetrachloride	<0.01 mg/kg	TM116			<0.1 M		
1,2-Dichloroethane	<0.005 mg/kg	TM116			<0.05 M		
Benzene	<0.009 mg/kg	TM116		0.621 M	195 M		
Trichloroethene	<0.009 mg/kg	TM116			<0.09 #		
1,2-Dichloropropane	<0.01 mg/kg	TM116			<0.1 M		
Dibromomethane	<0.009 mg/kg	TM116			<0.09 M		
Bromodichloromethane	<0.007 mg/kg	TM116			<0.07 M		
cis-1,3-Dichloropropene	<0.01 mg/kg	TM116			<0.1 M		
Toluene	<0.007 mg/kg	TM116		0.582 M	704 3 M		
trans-1,3-Dichloropropene	<0.01 mg/kg	TM116			<0.1		
1,1,2-Trichloroethane	<0.01 mg/kg	TM116			<0.1 M		



CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 517834
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample Ref.	BH104 ES1	BH104 ES2			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference					
M	mCERTS accredited.		0.85 - 0.90	3.00 - 3.10			
aq	Aqueous / settled sample.		Soil/Solid (S)	Soil/Solid (S)			
diss.filt	Dissolved / filtered sample.		05/08/2019	06/08/2019			
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted - refer to subcontractor report for accreditation status.		07/08/2019	07/08/2019			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		190807-14	190807-14			
(F)	Trigger breach confirmed		20470871	20470877			
1-3*5@	Sample deviation (see appendix)		ES	ES			
Component	LOD/Units	Method					
1,3-Dichloropropane	<0.007 mg/kg	TM116		<0.07 M			
Tetrachloroethene	<0.005 mg/kg	TM116		<0.05 M			
Dibromochloromethane	<0.01 mg/kg	TM116		<0.1 M			
1,2-Dibromoethane	<0.01 mg/kg	TM116		<0.1 M			
Chlorobenzene	<0.005 mg/kg	TM116		<0.05 M			
1,1,1,2-Tetrachloroethane	<0.01 mg/kg	TM116		<0.1 M			
Ethylbenzene	<0.004 mg/kg	TM116	0.119 M	181 M			
p/m-Xylene	<0.01 mg/kg	TM116	0.619 #	553 #			
o-Xylene	<0.01 mg/kg	TM116	0.598 M	91.2 M			
Styrene	<0.01 mg/kg	TM116		19.7 #			
Bromoform	<0.01 mg/kg	TM116		<0.1 M			
Isopropylbenzene	<0.005 mg/kg	TM116		1.46 #			
1,1,2,2-Tetrachloroethane	<0.01 mg/kg	TM116		<0.1 #			
1,2,3-Trichloropropane	<0.016 mg/kg	TM116		<0.16 M			
Bromobenzene	<0.01 mg/kg	TM116		<0.1 M			
Propylbenzene	<0.01 mg/kg	TM116		1.15 M			
2-Chlorotoluene	<0.009 mg/kg	TM116		<0.09 M			
1,3,5-Trimethylbenzene	<0.008 mg/kg	TM116		29.2 M			
4-Chlorotoluene	<0.01 mg/kg	TM116		<0.1 M			
tert-Butylbenzene	<0.014 mg/kg	TM116		<0.14 M			
1,2,4-Trimethylbenzene	<0.009 mg/kg	TM116		73.8 #			
sec-Butylbenzene	<0.01 mg/kg	TM116		<0.1			
4-Isopropyltoluene	<0.01 mg/kg	TM116		0.817 M			
1,3-Dichlorobenzene	<0.008 mg/kg	TM116		<0.08 M			
1,4-Dichlorobenzene	<0.005 mg/kg	TM116		<0.05 M			
n-Butylbenzene	<0.011 mg/kg	TM116		<0.11			
1,2-Dichlorobenzene	<0.01 mg/kg	TM116		<0.1 M			
1,2-Dibromo-3-chloropropane	<0.014 mg/kg	TM116		<0.14 M			
Tert-amyl methyl ether	<0.01 mg/kg	TM116		<0.1 #			
1,2,4-Trichlorobenzene	<0.02 mg/kg	TM116		<0.2			
Hexachlorobutadiene	<0.02 mg/kg	TM116		<0.2			
Naphthalene	<0.013 mg/kg	TM116		450 M			



CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14 Client Reference: 62253048-GI2 Report Number: 517834
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report:

Asbestos Identification - Solid Samples

Results Legend

ISO17025 accredited.
M mCERTS accredited.
* Subcontracted test.
(F) Trigger breach confirmed
1-5&*&@ Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref.	BH104 ESIES	08/08/2019	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Depth (m)	0.85 - 0.90										
Sample Type	SOLID										
Date Sampled	05/08/2019 00:00:00										
Date Received	07/08/2019 03:43:00										
SDG	190807-14										
Original Sample	20470871										
Method Number	TM048										



CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14 **Client Reference:** 62253048-GI2 **Report Number:** 517834
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG:	190807-14	Client Reference:	62253048-GI2	Report Number:	517834
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	20470871	20470877
Customer Sample Ref.	BH104 ES1	BH104 ES2
AGS Ref.	ES	ES
Depth	0.85 - 0.90	3.00 - 3.10
Type	Soil/Solid (S)	Soil/Solid (S)

Asbestos ID in Solid Samples	08-Aug-2019	
EPH CWG (Aliphatic) GC (S)	09-Aug-2019	09-Aug-2019
EPH CWG (Aromatic) GC (S)	09-Aug-2019	09-Aug-2019
GRO by GC-FID (S)	09-Aug-2019	09-Aug-2019
Hexavalent Chromium (s)	12-Aug-2019	12-Aug-2019
Metals in solid samples by OES	12-Aug-2019	12-Aug-2019
PAH by GCMS	14-Aug-2019	12-Aug-2019
pH	13-Aug-2019	12-Aug-2019
Phenols by HPLC (S)	12-Aug-2019	12-Aug-2019
Sample description	07-Aug-2019	07-Aug-2019
TPH CWG GC (S)	09-Aug-2019	09-Aug-2019
VOC MS (S)	08-Aug-2019	09-Aug-2019



CERTIFICATE OF ANALYSIS

Validated

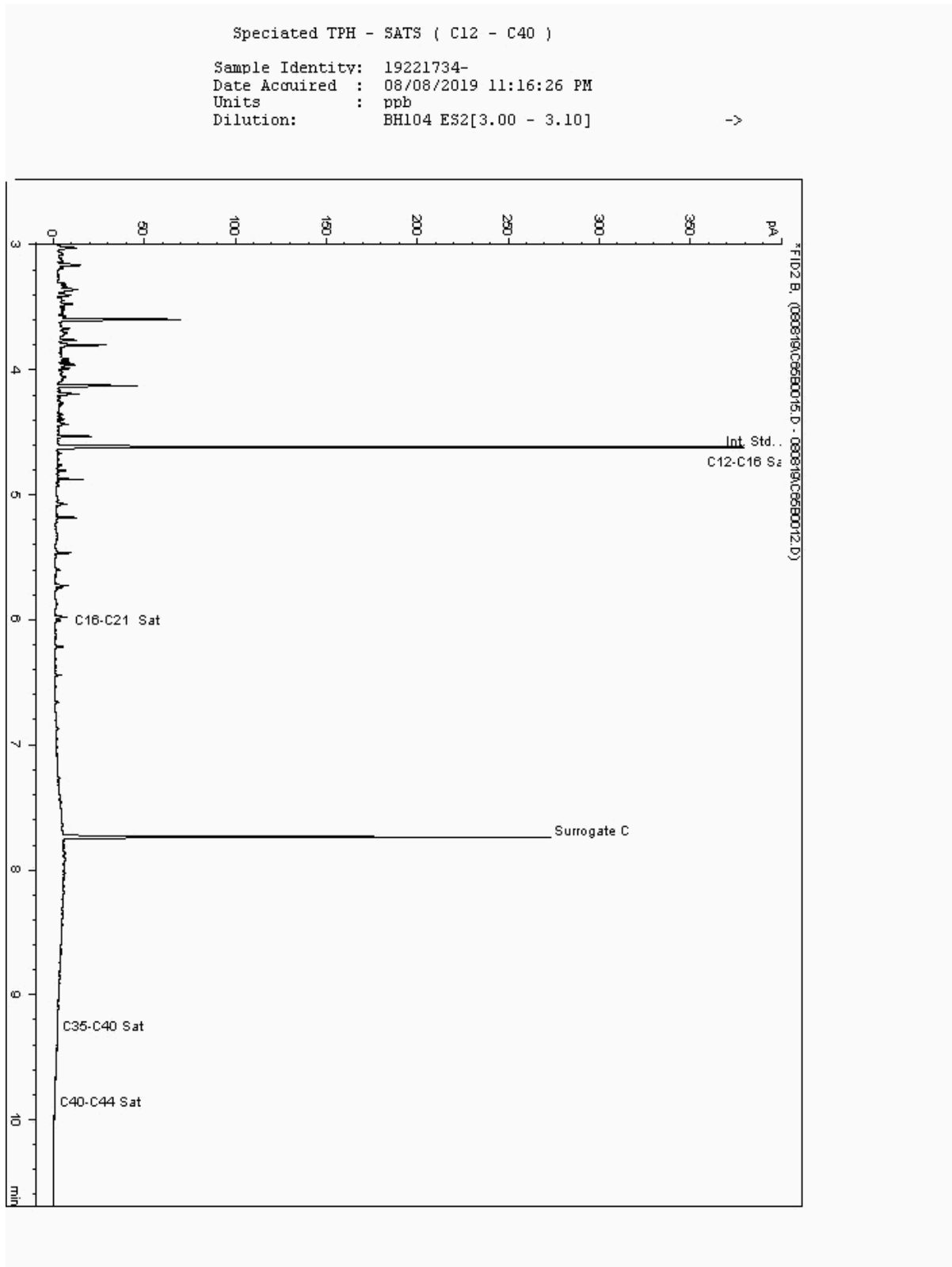
SDG:	190807-14	Client Reference:	62253048-GI2	Report Number:	517834
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 20471764
Sample ID : BH104 ES2

Depth : 3.00 - 3.10





CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

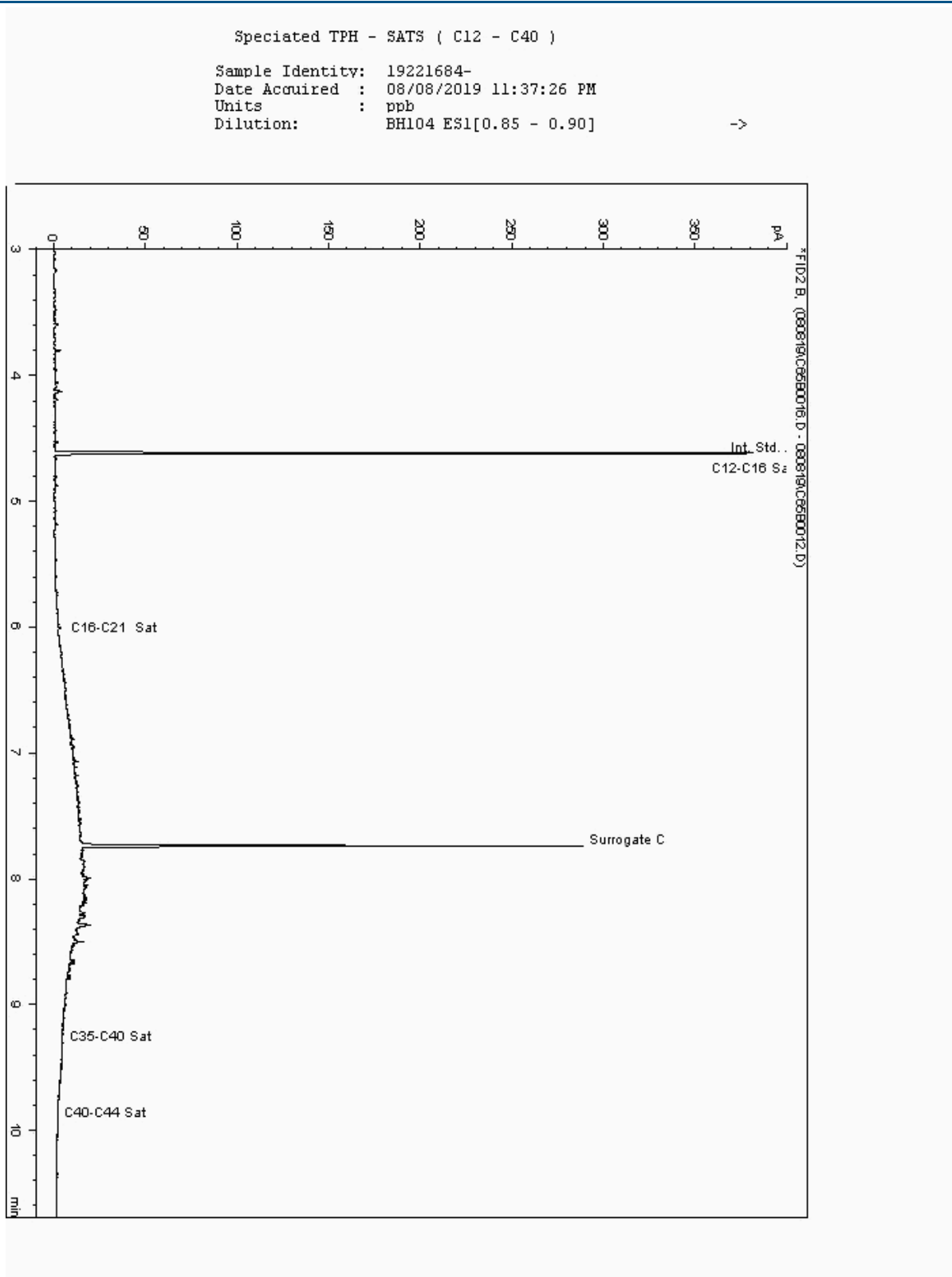
Report Number: 517834
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 20471798
Sample ID : BH104 ES1

Depth : 0.85 - 0.90





CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

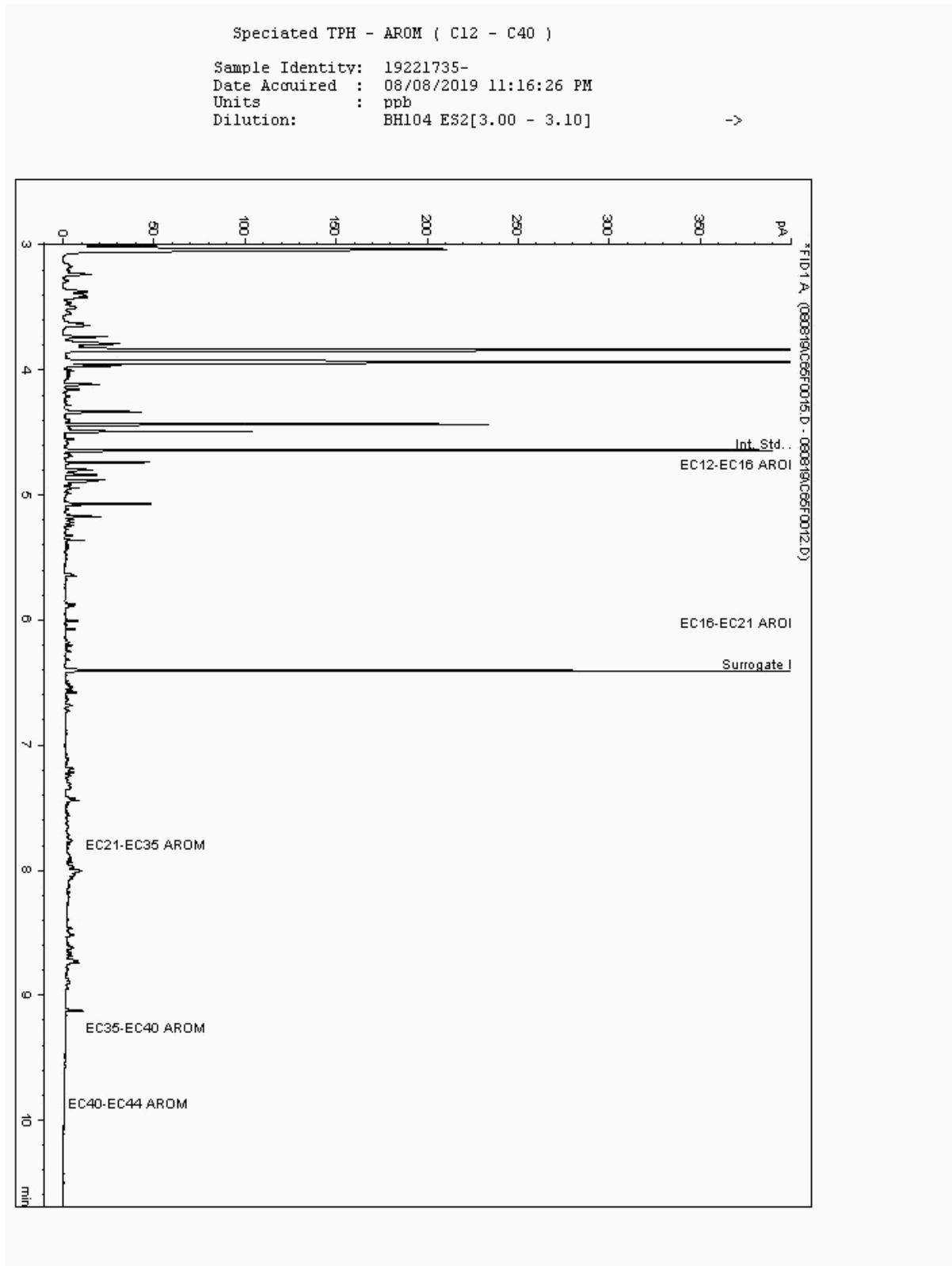
Report Number: 517834
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 20471764
Sample ID : BH104 ES2

Depth : 3.00 - 3.10





CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

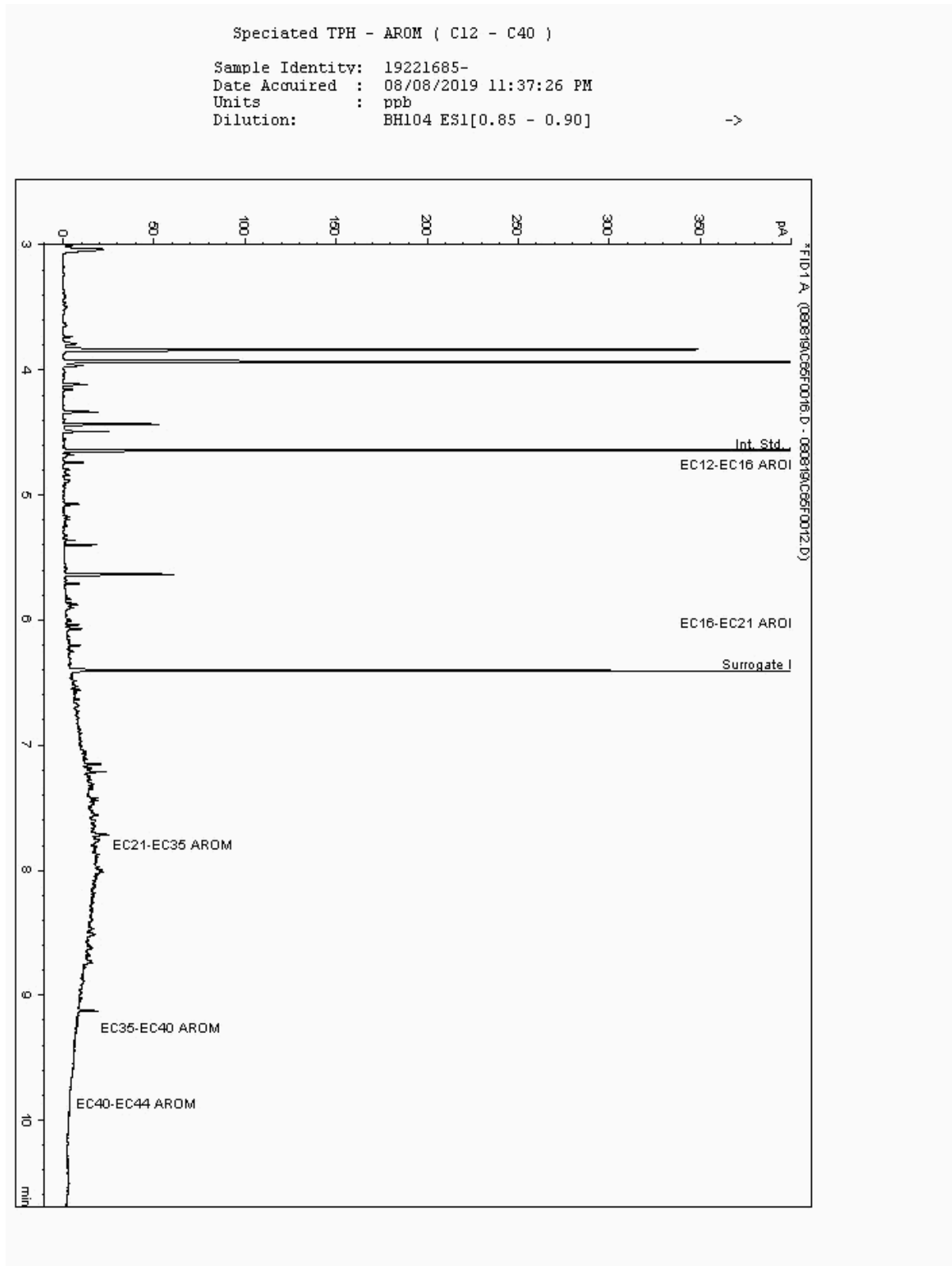
Report Number: 517834
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 20471798
Sample ID : BH104 ES1

Depth : 0.85 - 0.90





CERTIFICATE OF ANALYSIS

Validated

SDG: 190807-14
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

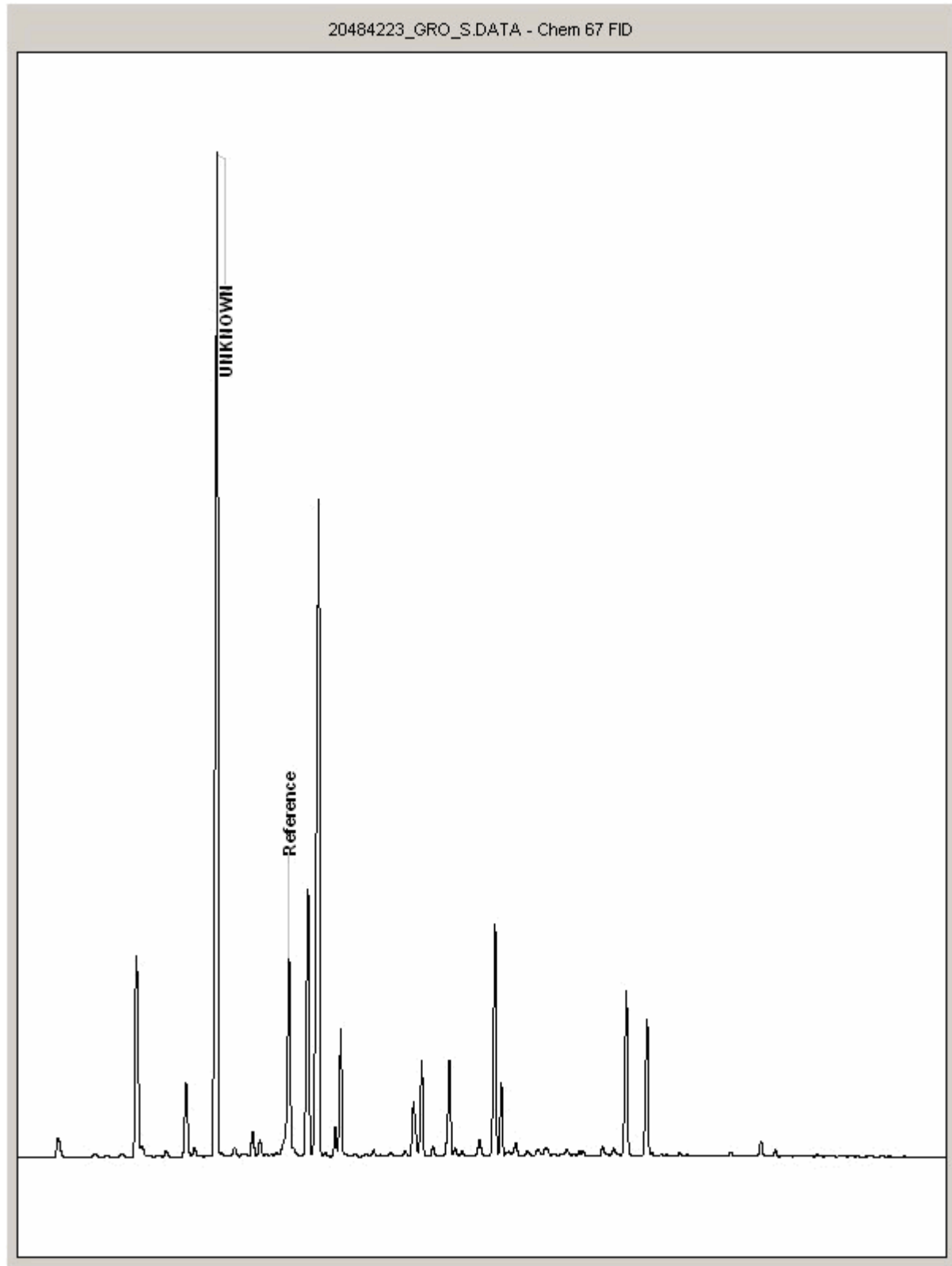
Report Number: 517834
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20484223
Sample ID : BH104 ES2

Depth : 3.00 - 3.10





CERTIFICATE OF ANALYSIS

Validated

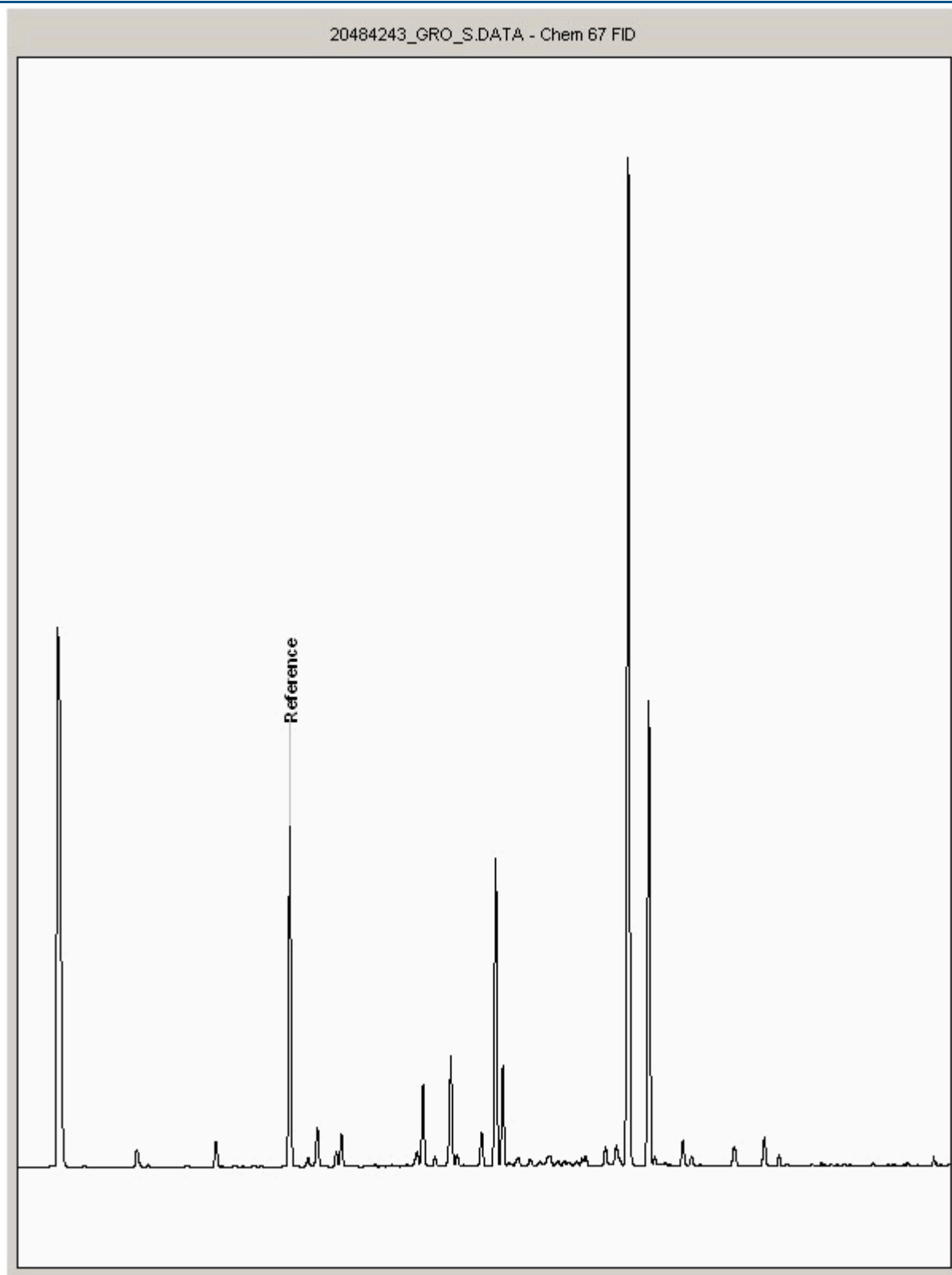
SDG:	190807-14	Client Reference:	62253048-GI2	Report Number:	517834
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20484243
Sample ID : BH104 ES1

Depth : 0.85 - 0.90





CERTIFICATE OF ANALYSIS

SDG:	190807-14	Client Reference:	62253048-GI2	Report Number:	517834
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Appendix

General

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

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

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

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

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

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

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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

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

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

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

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

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

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

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

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

Visual Estimation Of Fibre Content

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

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2107).

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

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



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Website: www.alsenvironmental.co.uk

WSP PB BBC
3rd Floor, Kings Orchard,
1 Queen Street
Bristol
Gloucestershire
BS2 0HQ

Attention: Jack Lott

CERTIFICATE OF ANALYSIS

Date of report Generation:	16 August 2019
Customer:	WSP PB BBC
Sample Delivery Group (SDG):	190809-8
Your Reference:	62253048-GI2
Location:	Port Talbot Harbourside
Report No:	518271

We received 7 samples on Friday August 09, 2019 and 7 of these samples were scheduled for analysis which was completed on Friday August 16, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8 Client Reference: 62253048-GI2 Report Number: 518271
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
20486300	BH105A ES1	ES	1.30 - 1.40	08/08/2019
20486290	BH101 ES1	ES	1.70 - 1.80	08/08/2019
20486295	BH102 ES1	ES	0.70 - 0.80	08/08/2019
20486280	BH103 ES1	ES	1.00 - 1.10	08/08/2019
20486285	BH103 ES2	ES	3.80 - 3.90	08/08/2019
20486305	BH106 ES1	ES	1.50 - 1.60	08/08/2019
20486310	BH107 ES1	ES	0.10 - 0.30	08/08/2019

Maximum Sample/Coolbox Temperature (°C) : 16.4

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

Sample Descriptions

Grain Sizes

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

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
20486290	BH101 ES1	1.70 - 1.80	Dark Brown	Loamy Sand	Stones	None
20486295	BH102 ES1	0.70 - 0.80	Dark Brown	Loamy Sand	Stones	Vegetation
20486280	BH103 ES1	1.00 - 1.10	Dark Brown	Loamy Sand	Stones	None
20486285	BH103 ES2	3.80 - 3.90	Dark Brown	Loamy Sand	Stones	None
20486305	BH106 ES1	1.50 - 1.60	Grey	Silt Loam	Stones	None
20486310	BH107 ES1	0.10 - 0.30	Dark Brown	Loamy Sand	Stones	Vegetation
20486300	BH105A ES1	1.30 - 1.40	Dark Brown	Loamy Sand	Stones	None

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

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

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

VOC MS (S)

Results Legend			Customer Sample Ref.	BH105A ES1	BH101 ES1	BH102 ES1	BH103 ES1	BH103 ES2	BH106 ES1
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	1.30 - 1.40	1.70 - 1.80	0.70 - 0.80	1.00 - 1.10	3.80 - 3.90	1.50 - 1.60
M	mCERTS accredited.			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / settled sample.			08/08/2019	08/08/2019	08/08/2019	08/08/2019	08/08/2019	08/08/2019
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			09/08/2019	09/08/2019	09/08/2019	09/08/2019	09/08/2019	09/08/2019
(F)	Trigger breach confirmed			190809-8	190809-8	190809-8	190809-8	190809-8	190809-8
1.3+5@	Sample deviation (see appendix)			20486300	20486290	20486295	20486280	20486285	20486305
				ES	ES	ES	ES	ES	ES
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM116		111	105	111	111	108	111
Toluene-d8**	%	TM116		104	95.8	97.5	88.8	97.5	90.1
4-Bromofluorobenzene**	%	TM116		74	95.5	86.1	72.4	102	89.6
Dichlorodifluoromethane	<0.006 mg/kg	TM116						<0.06	
Chloromethane	<0.007 mg/kg	TM116						<0.07	
Vinyl Chloride	<0.006 mg/kg	TM116						<0.06	
Bromomethane	<0.01 mg/kg	TM116						<0.1	
Chloroethane	<0.01 mg/kg	TM116						<0.1	
Trichlorofluoromethane	<0.006 mg/kg	TM116						<0.06	
1,1-Dichloroethene	<0.01 mg/kg	TM116						<0.1	
Carbon Disulphide	<0.007 mg/kg	TM116						<0.07	
Dichloromethane	<0.01 mg/kg	TM116						<0.1	
Methyl Tertiary Butyl Ether	<0.01 mg/kg	TM116		<0.1	<0.1	<0.1	<0.2	<0.1	<0.1
trans-1,2-Dichloroethene	<0.01 mg/kg	TM116						<0.1	
1,1-Dichloroethane	<0.008 mg/kg	TM116						<0.08	
cis-1,2-Dichloroethene	<0.006 mg/kg	TM116						<0.06	
2,2-Dichloropropane	<0.01 mg/kg	TM116						<0.1	
Bromochloromethane	<0.01 mg/kg	TM116						<0.1	
Chloroform	<0.008 mg/kg	TM116						<0.08	
1,1,1-Trichloroethane	<0.007 mg/kg	TM116						<0.07	
1,1-Dichloropropene	<0.01 mg/kg	TM116						<0.1	
Carbontetrachloride	<0.01 mg/kg	TM116						<0.1	
1,2-Dichloroethane	<0.005 mg/kg	TM116						<0.05	
Benzene	<0.009 mg/kg	TM116		0.391	<0.09	<0.09	2.14	0.0984	0.828
Trichloroethene	<0.009 mg/kg	TM116						<0.09	
1,2-Dichloropropane	<0.01 mg/kg	TM116						<0.1	
Dibromomethane	<0.009 mg/kg	TM116						<0.09	
Bromodichloromethane	<0.007 mg/kg	TM116						<0.07	
cis-1,3-Dichloropropene	<0.01 mg/kg	TM116						<0.1	
Toluene	<0.007 mg/kg	TM116		0.198	<0.07	<0.07	0.435	<0.07	<0.07
trans-1,3-Dichloropropene	<0.01 mg/kg	TM116						<0.1	
1,1,2-Trichloroethane	<0.01 mg/kg	TM116						<0.1	



CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

VOC MS (S)

Results Legend			Customer Sample Ref.		BH105A ES1	BH101 ES1	BH102 ES1	BH103 ES1	BH103 ES2	BH106 ES1
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		1.30 - 1.40	1.70 - 1.80	0.70 - 0.80	1.00 - 1.10	3.80 - 3.90	1.50 - 1.60
M	mCERTS accredited.				Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / settled sample.				08/08/2019	08/08/2019	08/08/2019	08/08/2019	08/08/2019	08/08/2019
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
Subcontracted - refer to subcontractor report for accreditation status.					09/08/2019	09/08/2019	09/08/2019	09/08/2019	09/08/2019	09/08/2019
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery					190809-8	190809-8	190809-8	190809-8	190809-8	190809-8
(F) Trigger breach confirmed					20486300	20486290	20486295	20486280	20486285	20486305
1-3*5@ Sample deviation (see appendix)					ES	ES	ES	ES	ES	ES
Component	LOD/Units	Method								
1,3-Dichloropropane	<0.007 mg/kg	TM116							<0.07 M	
Tetrachloroethene	<0.005 mg/kg	TM116							<0.05 M	
Dibromochloromethane	<0.01 mg/kg	TM116							<0.1 3 M	
1,2-Dibromoethane	<0.01 mg/kg	TM116							<0.1 3 M	
Chlorobenzene	<0.005 mg/kg	TM116							<0.05 M	
1,1,1,2-Tetrachloroethane	<0.01 mg/kg	TM116							<0.1 M	
Ethylbenzene	<0.004 mg/kg	TM116			<0.04 M	<0.04 M	<0.04 M	0.171 M	<0.04 M	<0.04 M
p/m-Xylene	<0.01 mg/kg	TM116			<0.1 #	<0.1 #	<0.1 #	0.625 #	<0.1 #	<0.1 #
o-Xylene	<0.01 mg/kg	TM116			<0.1 M	<0.1 M	<0.1 M	<0.2 M	<0.1 M	<0.1 M
Styrene	<0.01 mg/kg	TM116							<0.1 #	
Bromoform	<0.01 mg/kg	TM116							<0.1 M	
Isopropylbenzene	<0.005 mg/kg	TM116							<0.05 #	
1,1,2,2-Tetrachloroethane	<0.01 mg/kg	TM116							<0.1 #	
1,2,3-Trichloropropane	<0.016 mg/kg	TM116							<0.16 M	
Bromobenzene	<0.01 mg/kg	TM116							<0.1 M	
Propylbenzene	<0.01 mg/kg	TM116							<0.1 M	
2-Chlorotoluene	<0.009 mg/kg	TM116							<0.09 M	
1,3,5-Trimethylbenzene	<0.008 mg/kg	TM116							<0.08 M	
4-Chlorotoluene	<0.01 mg/kg	TM116							<0.1 M	
tert-Butylbenzene	<0.014 mg/kg	TM116							<0.14 M	
1,2,4-Trimethylbenzene	<0.009 mg/kg	TM116							<0.09 #	
sec-Butylbenzene	<0.01 mg/kg	TM116							<0.1	
4-Isopropyltoluene	<0.01 mg/kg	TM116							<0.1 M	
1,3-Dichlorobenzene	<0.008 mg/kg	TM116							<0.08 M	
1,4-Dichlorobenzene	<0.005 mg/kg	TM116							<0.05 M	
n-Butylbenzene	<0.011 mg/kg	TM116							<0.11	
1,2-Dichlorobenzene	<0.01 mg/kg	TM116							<0.1 M	
1,2-Dibromo-3-chloropropane	<0.014 mg/kg	TM116							<0.14 M	
Tert-amyl methyl ether	<0.01 mg/kg	TM116							<0.1 #	
1,2,4-Trichlorobenzene	<0.02 mg/kg	TM116							<0.2	
Hexachlorobutadiene	<0.02 mg/kg	TM116							<0.2	
Naphthalene	<0.013 mg/kg	TM116							0.238 M	



CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8 Client Reference: 62253048-GI2 Report Number: 518271
 Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report:

Asbestos Identification - Solid Samples

Results Legend

ISO17025 accredited.
 M mCERTS accredited.
 * Subcontracted test.
 (F) Trigger breach confirmed
 1-5&#@ Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BH105A ES1ES 1.30 - 1.40 SOLID 08/08/2019 00:00:00 09/08/2019 03:25:00 190809-8 20486300 TM048	12/08/19	Andrzej Ferfecki	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BH101 ES1ES 1.70 - 1.80 SOLID 08/08/2019 00:00:00 09/08/2019 03:25:00 190809-8 20486290 TM048	12/08/2019	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BH102 ES1ES 0.70 - 0.80 SOLID 08/08/2019 00:00:00 09/08/2019 03:25:00 190809-8 20486295 TM048	12/08/2019	Barbara Urbanek-Walsh	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BH103 ES1ES 1.00 - 1.10 SOLID 08/08/2019 00:00:00 09/08/2019 03:25:00 190809-8 20486280 TM048	12/08/2019	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BH106 ES1ES 1.50 - 1.60 SOLID 08/08/2019 00:00:00 09/08/2019 03:25:00 190809-8 20486305 TM048	12/08/2019	Agnieszka Chelmonska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	BH107 ES1ES 0.10 - 0.30 SOLID 08/08/2019 00:00:00 09/08/2019 03:25:00 190809-8 20486310 TM048	12/08/2019	Barbara Urbanek-Walsh	Loose fibres in soil.	Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8 **Client Reference:** 62253048-GI2 **Report Number:** 518271
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:**

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside**Client Reference:** 62253048-GI2
Order Number: 62253048-GI2**Report Number:** 518271
Superseded Report:

Test Completion Dates

Lab Sample No(s)	20486290	20486295	20486280	20486285	20486305	20486310	20486300
Customer Sample Ref.	BH101 ES1	BH102 ES1	BH103 ES1	BH103 ES2	BH106 ES1	BH107 ES1	BH105A ES1
AGS Ref.	ES	ES	ES	ES	ES	ES	ES
Depth	1.70 - 1.80	0.70 - 0.80	1.00 - 1.10	3.80 - 3.90	1.50 - 1.60	0.10 - 0.30	1.30 - 1.40
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	12-Aug-2019	12-Aug-2019	12-Aug-2019		12-Aug-2019	12-Aug-2019	12-Aug-2019
EPH CWG (Aliphatic) GC (S)	13-Aug-2019	13-Aug-2019	13-Aug-2019	14-Aug-2019	13-Aug-2019	13-Aug-2019	13-Aug-2019
EPH CWG (Aromatic) GC (S)	13-Aug-2019	13-Aug-2019	13-Aug-2019	14-Aug-2019	13-Aug-2019	13-Aug-2019	13-Aug-2019
GRO by GC-FID (S)	13-Aug-2019	14-Aug-2019	15-Aug-2019	13-Aug-2019	12-Aug-2019	12-Aug-2019	12-Aug-2019
Hexavalent Chromium (s)	13-Aug-2019	13-Aug-2019	13-Aug-2019	13-Aug-2019	13-Aug-2019	13-Aug-2019	13-Aug-2019
Metals in solid samples by OES	13-Aug-2019	16-Aug-2019	16-Aug-2019	15-Aug-2019	16-Aug-2019	13-Aug-2019	16-Aug-2019
PAH by GCMS	15-Aug-2019	16-Aug-2019	13-Aug-2019	15-Aug-2019	15-Aug-2019	16-Aug-2019	13-Aug-2019
pH	14-Aug-2019	15-Aug-2019	14-Aug-2019	15-Aug-2019	14-Aug-2019	14-Aug-2019	14-Aug-2019
Phenols by HPLC (S)	13-Aug-2019	14-Aug-2019	13-Aug-2019	14-Aug-2019	14-Aug-2019	13-Aug-2019	13-Aug-2019
Sample description	09-Aug-2019	09-Aug-2019	09-Aug-2019	09-Aug-2019	09-Aug-2019	09-Aug-2019	09-Aug-2019
Total Organic Carbon				13-Aug-2019			
TPH CWG GC (S)	13-Aug-2019	14-Aug-2019	15-Aug-2019	14-Aug-2019	13-Aug-2019	13-Aug-2019	13-Aug-2019
VOC MS (S)	12-Aug-2019	12-Aug-2019	13-Aug-2019	12-Aug-2019	12-Aug-2019	12-Aug-2019	12-Aug-2019



CERTIFICATE OF ANALYSIS

Validated

SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

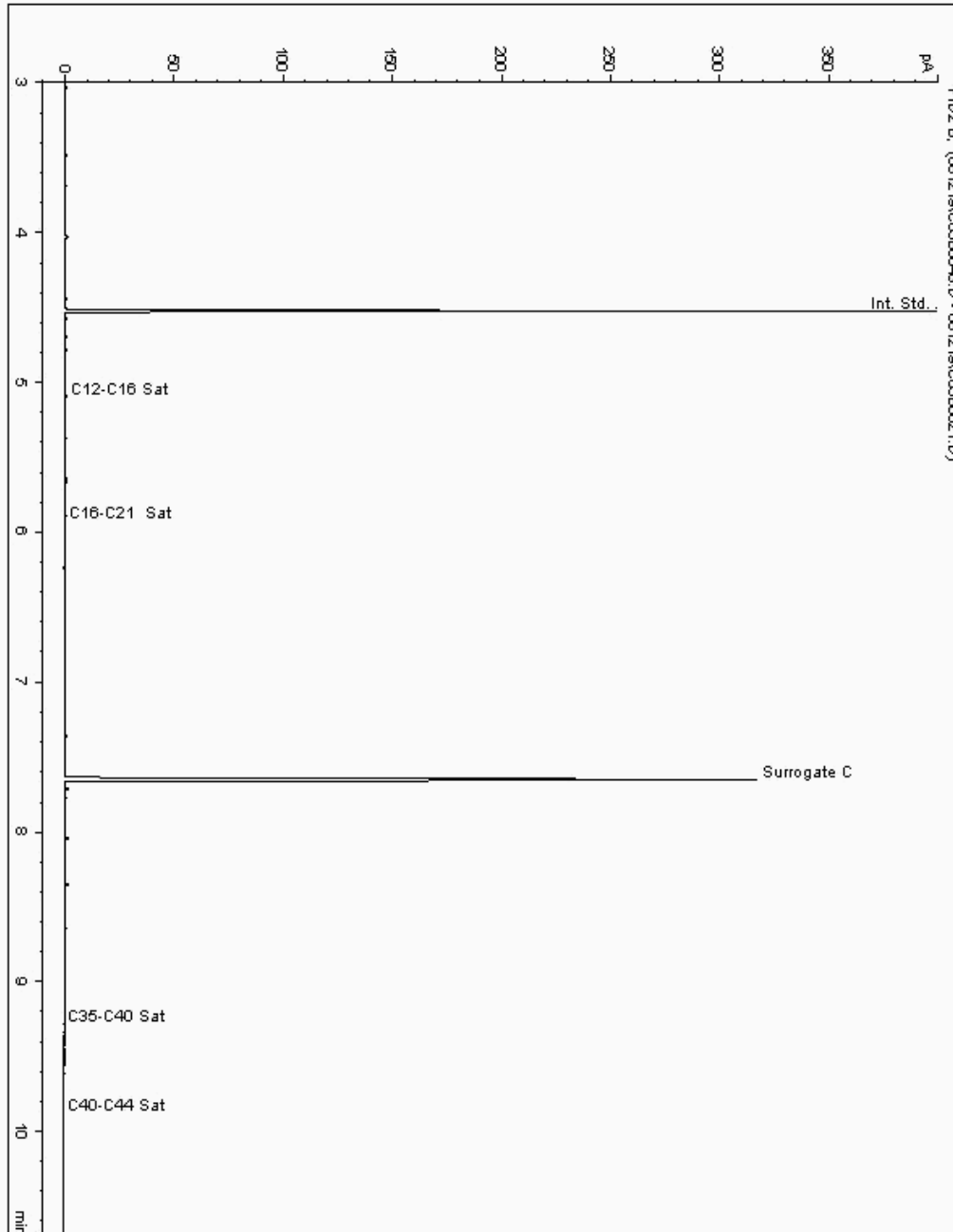
Sample No : 20487948
Sample ID : BH103 ES1

Depth : 1.00 - 1.10

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236452-
Date Acquired : 13/08/2019 05:02:53 PM
Units : ppb
Dilution: BH103 ES1[1.00 - 1.10]

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CERTIFICATE OF ANALYSIS

Validated

SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

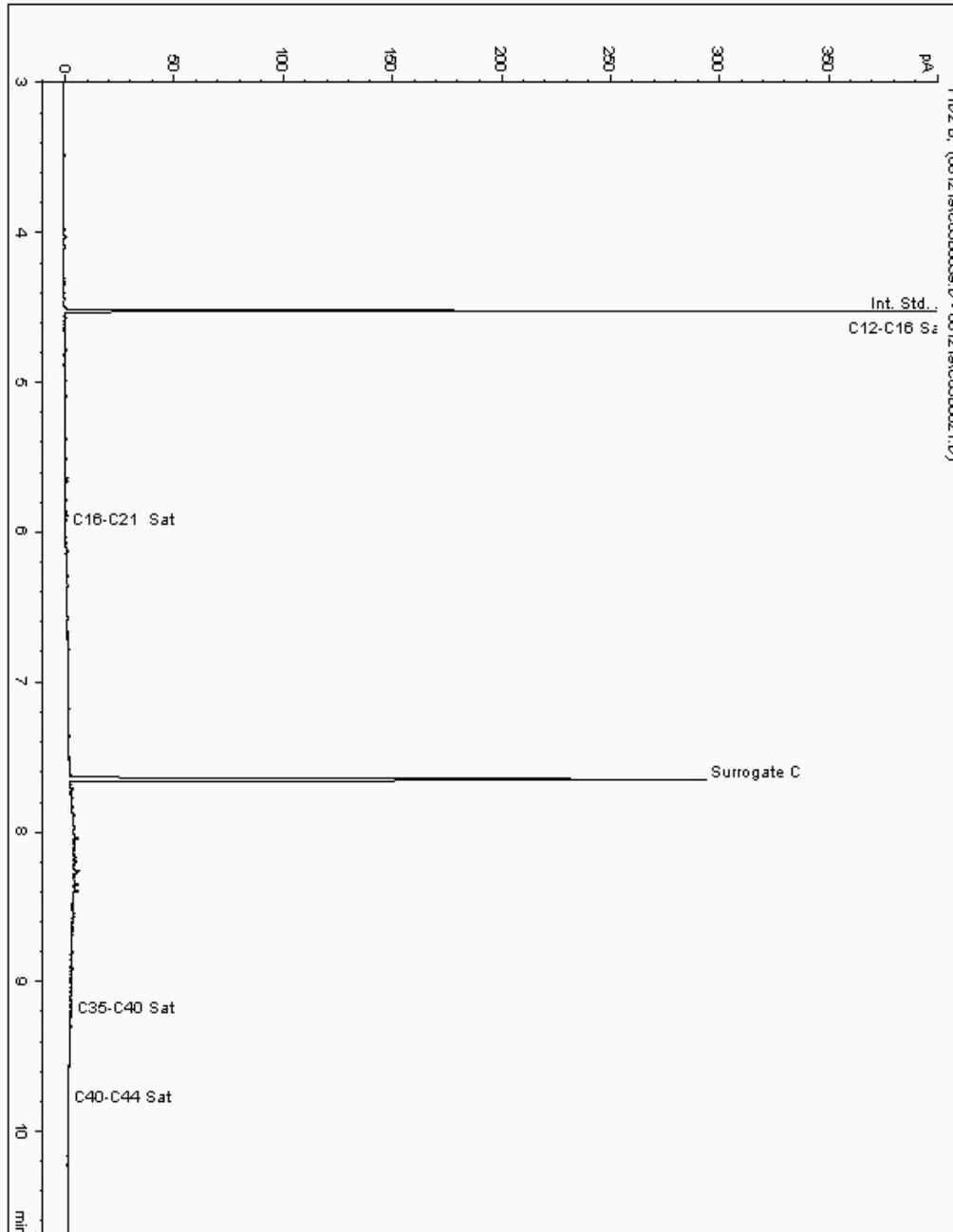
Sample No : 20487987
Sample ID : BH102 ES1

Depth : 0.70 - 0.80

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236516-
Date Acquired : 13/08/2019 03:58:19 PM
Units : ppb
Dilution: BH102 ES1[0.70 - 0.80]

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

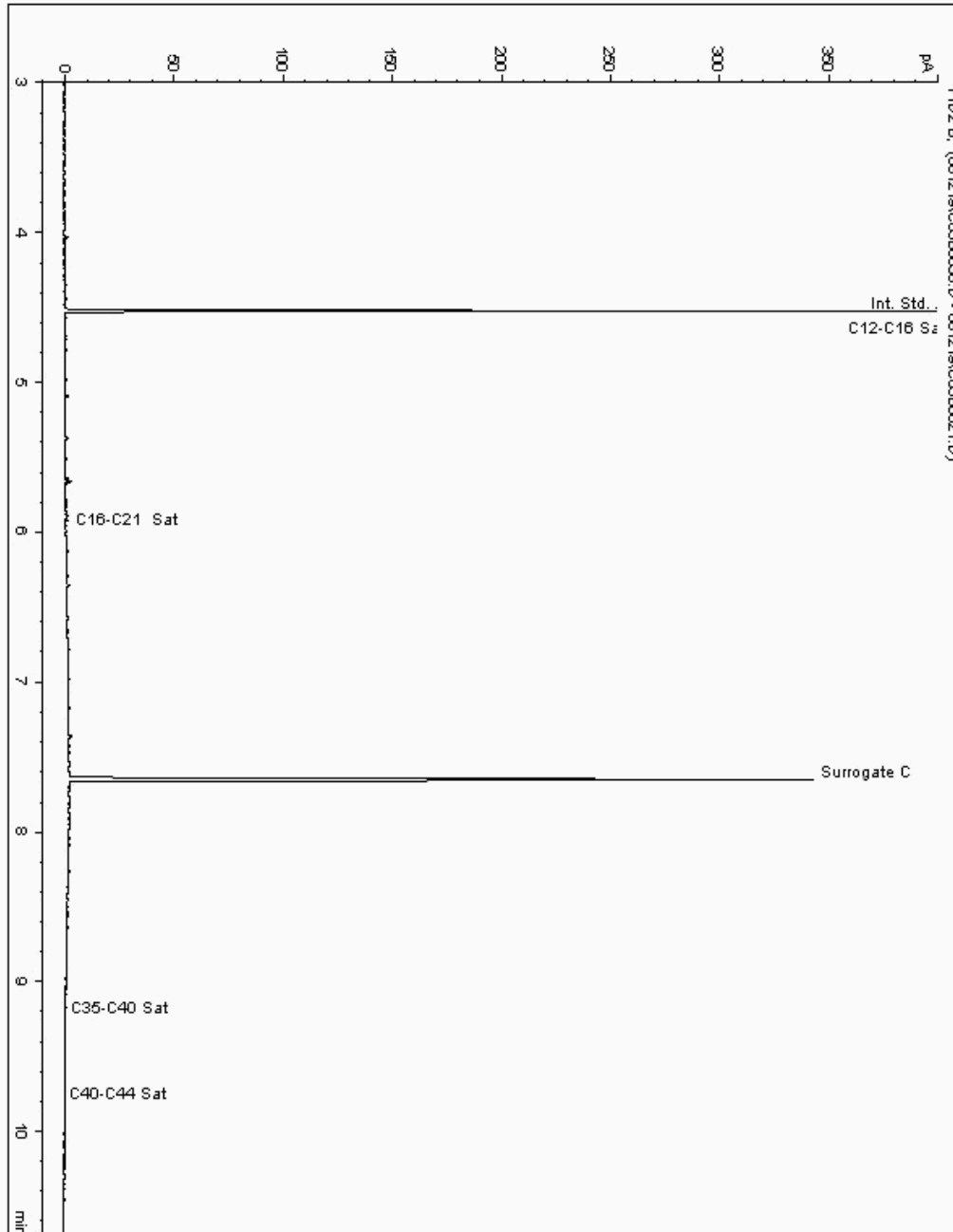
Sample No : 20488021
Sample ID : BH101 ES1

Depth : 1.70 - 1.80

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236498-
Date Acquired : 13/08/2019 03:38:00 PM
Units : ppb
Dilution: BH101 ES1[1.70 - 1.80]

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

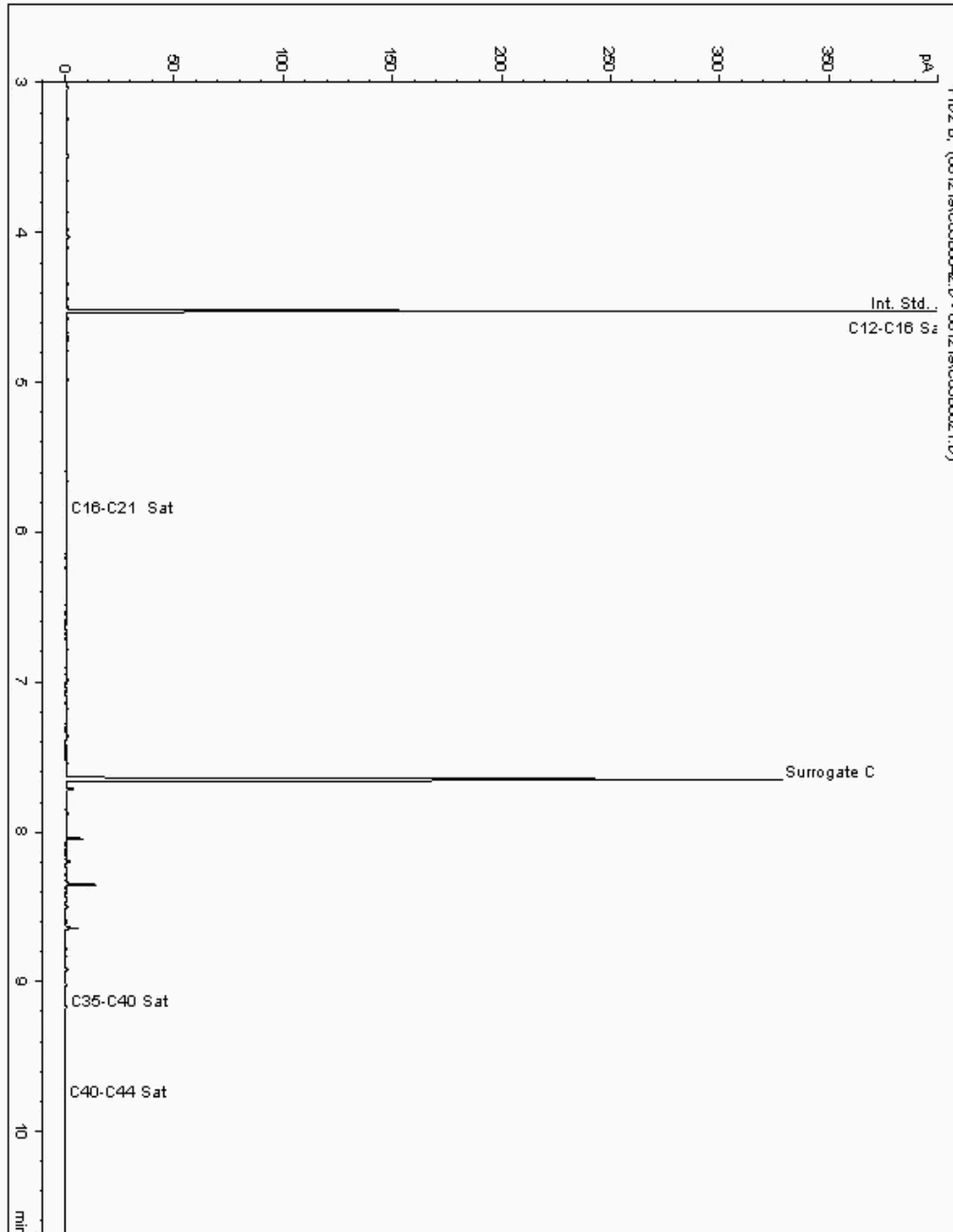
Sample No : 20488058
Sample ID : BH106 ES1

Depth : 1.50 - 1.60

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236553-
Date Acquired : 13/08/2019 04:42:14 PM
Units : ppb
Dilution: BH106 ES1[1.50 - 1.60]

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CERTIFICATE OF ANALYSIS

Validated

SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

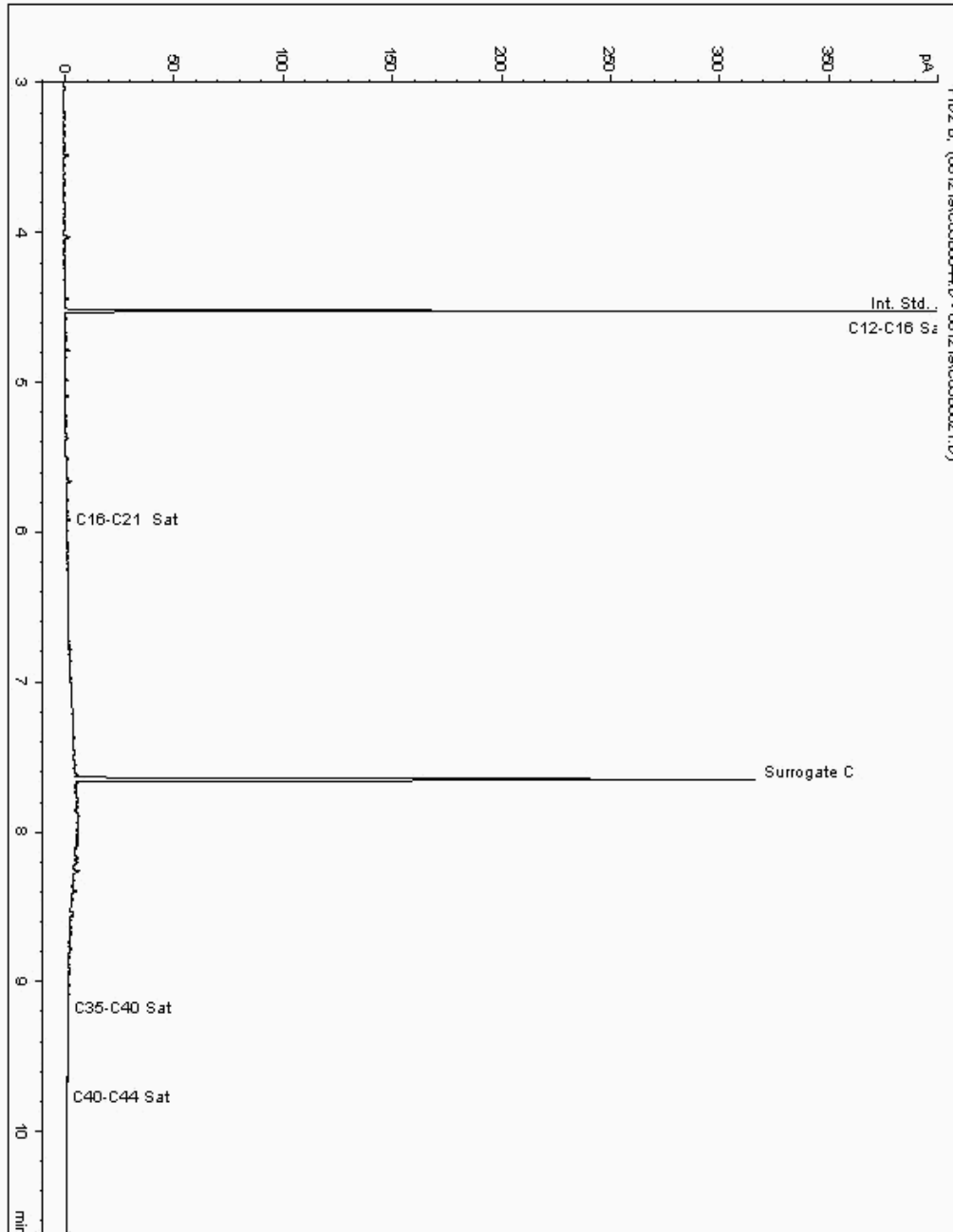
Analysis: EPH CWG (Aliphatic) GC (S)

Sample No : 20488101
Sample ID : BH105A ES1

Depth : 1.30 - 1.40

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236535-
Date Acquired : 13/08/2019 05:23:12 PM
Units : ppb
Dilution: BH105A ES1[1.30 - 1.40] ->





CERTIFICATE OF ANALYSIS

Validated

SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

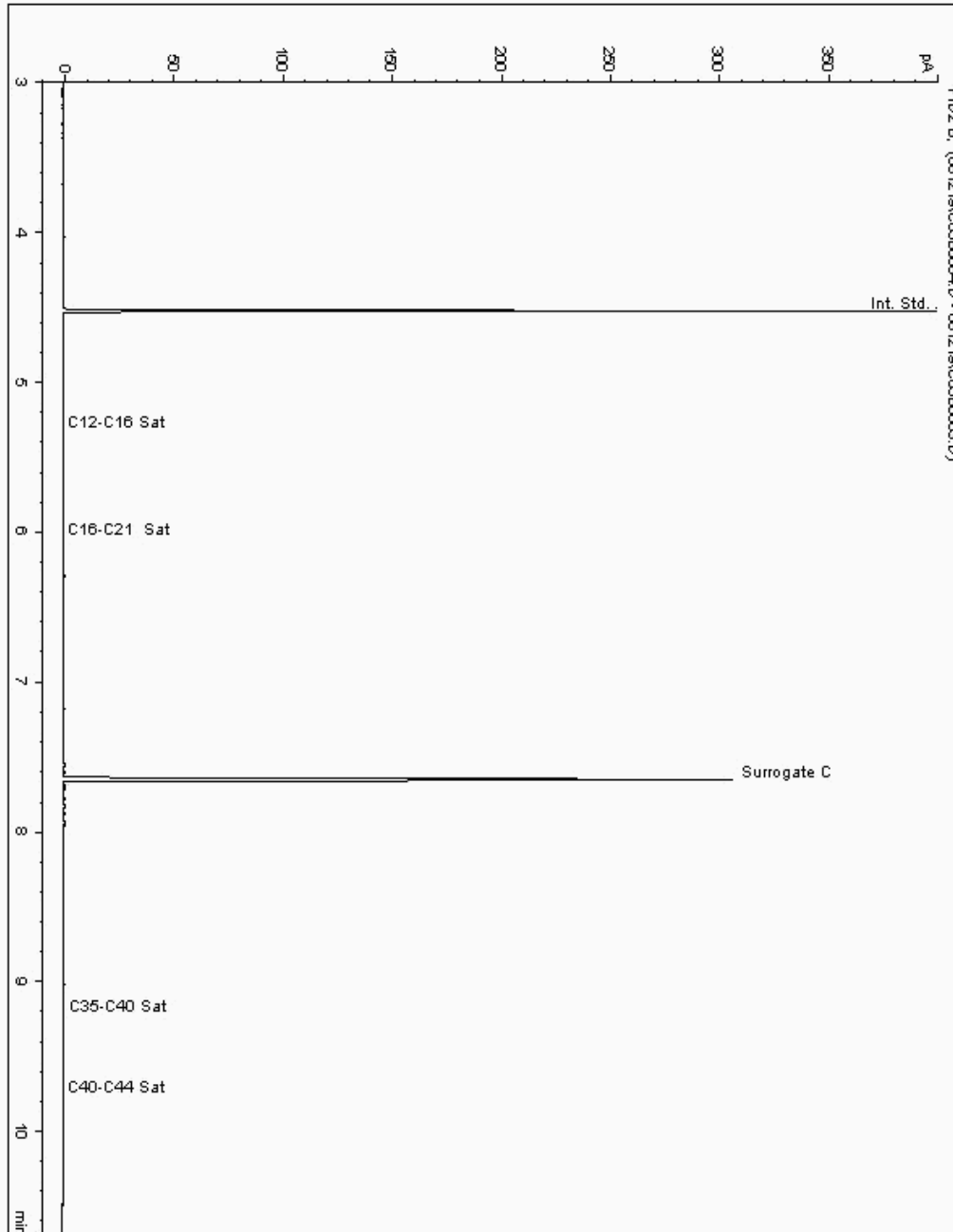
Sample No : 20488266
Sample ID : BH103 ES2

Depth : 3.80 - 3.90

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236481-
Date Acquired : 13/08/2019 17:54:06 PM
Units : ppb
Dilution: BH103 ES2[3.80 - 3.90]

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aliphatic) GC (S)

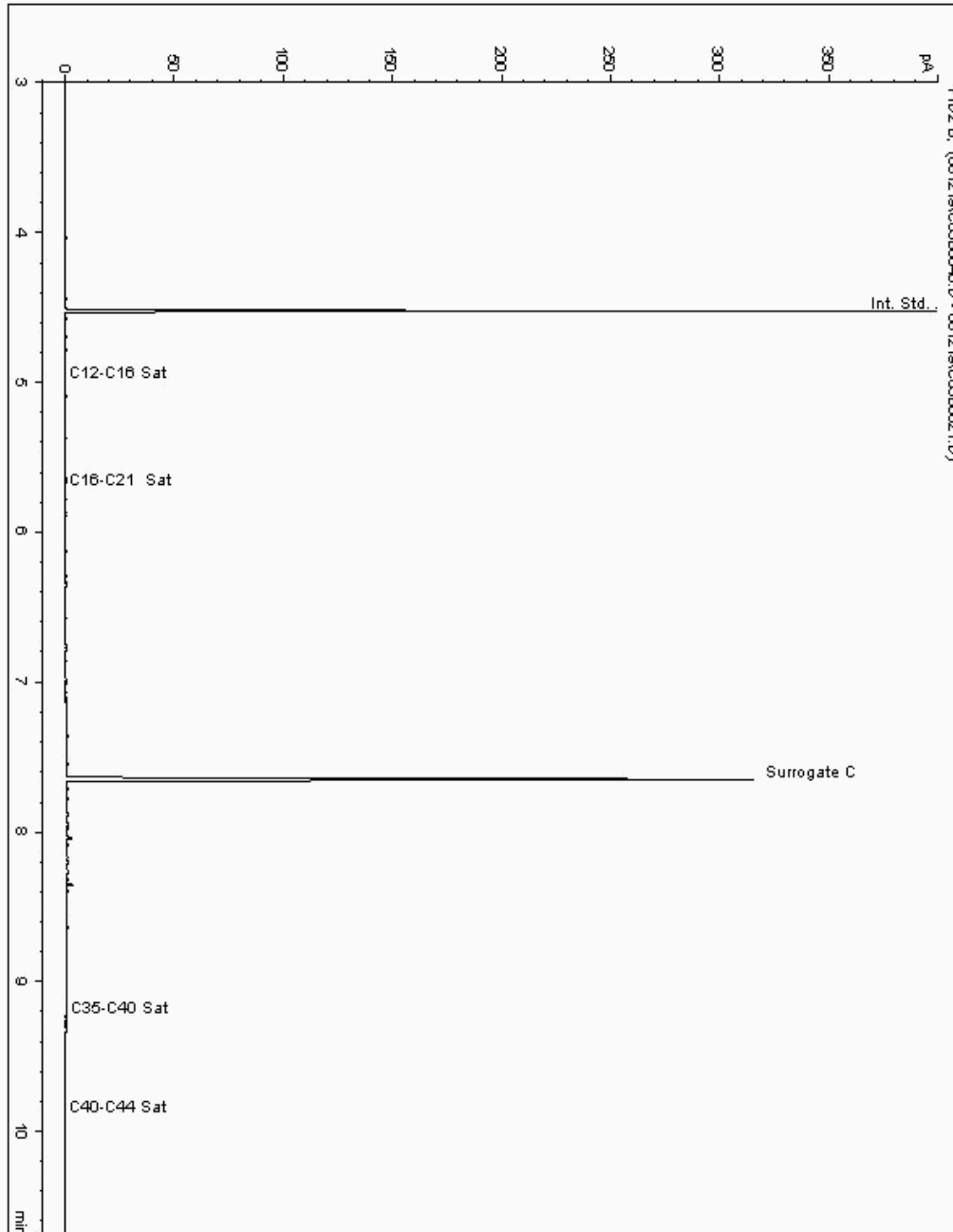
Sample No : 20488272
Sample ID : BH107 ES1

Depth : 0.10 - 0.30

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236572-
Date Acquired : 13/08/2019 05:55:27 PM
Units : ppb
Dilution: BH107 ES1[0.10 - 0.30]

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

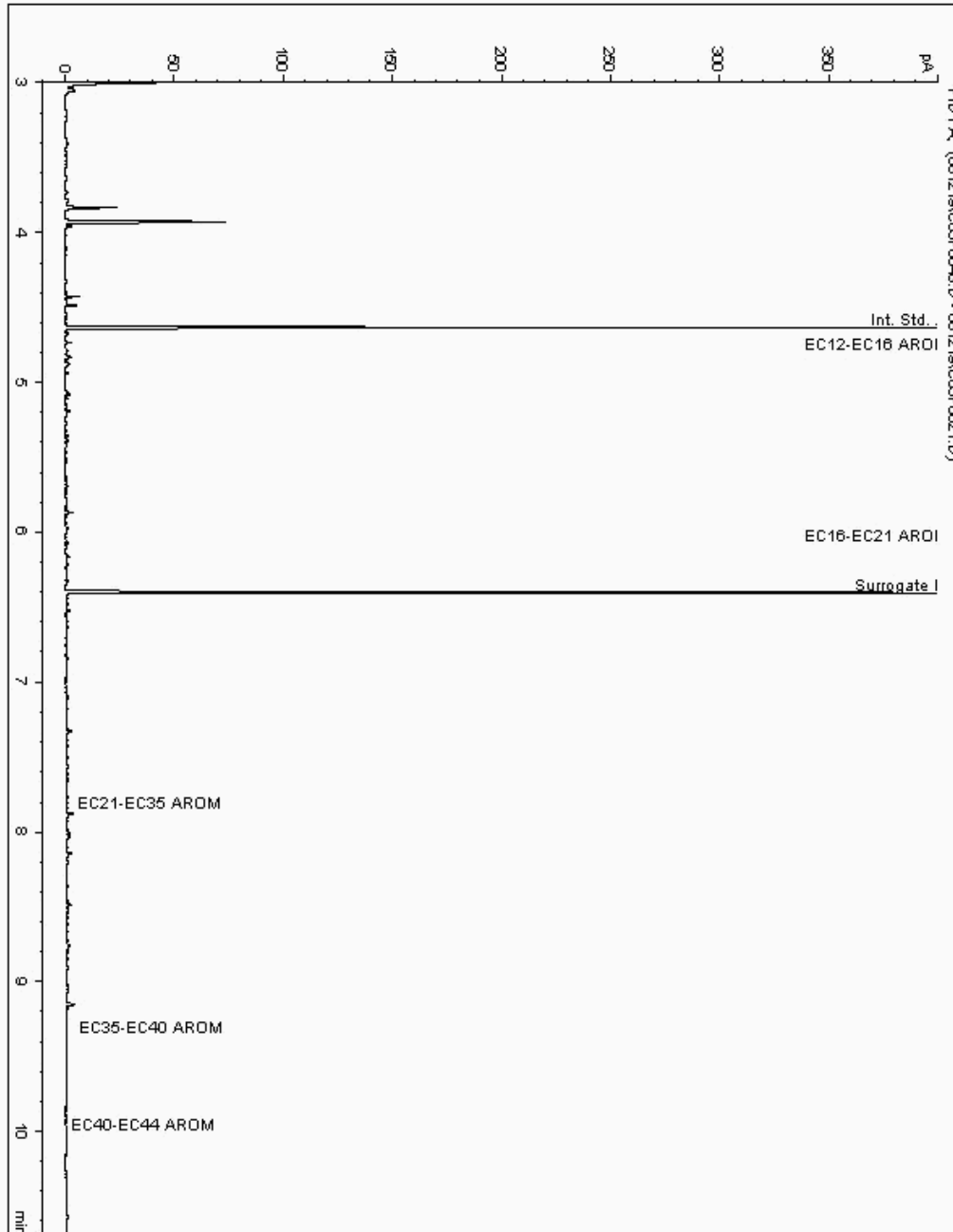
Sample No : 20487948
Sample ID : BH103 ES1

Depth : 1.00 - 1.10

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236453-
Date Acquired : 13/08/2019 05:02:53 PM
Units : ppb
Dilution: BH103 ES1[1.00 - 1.10]

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

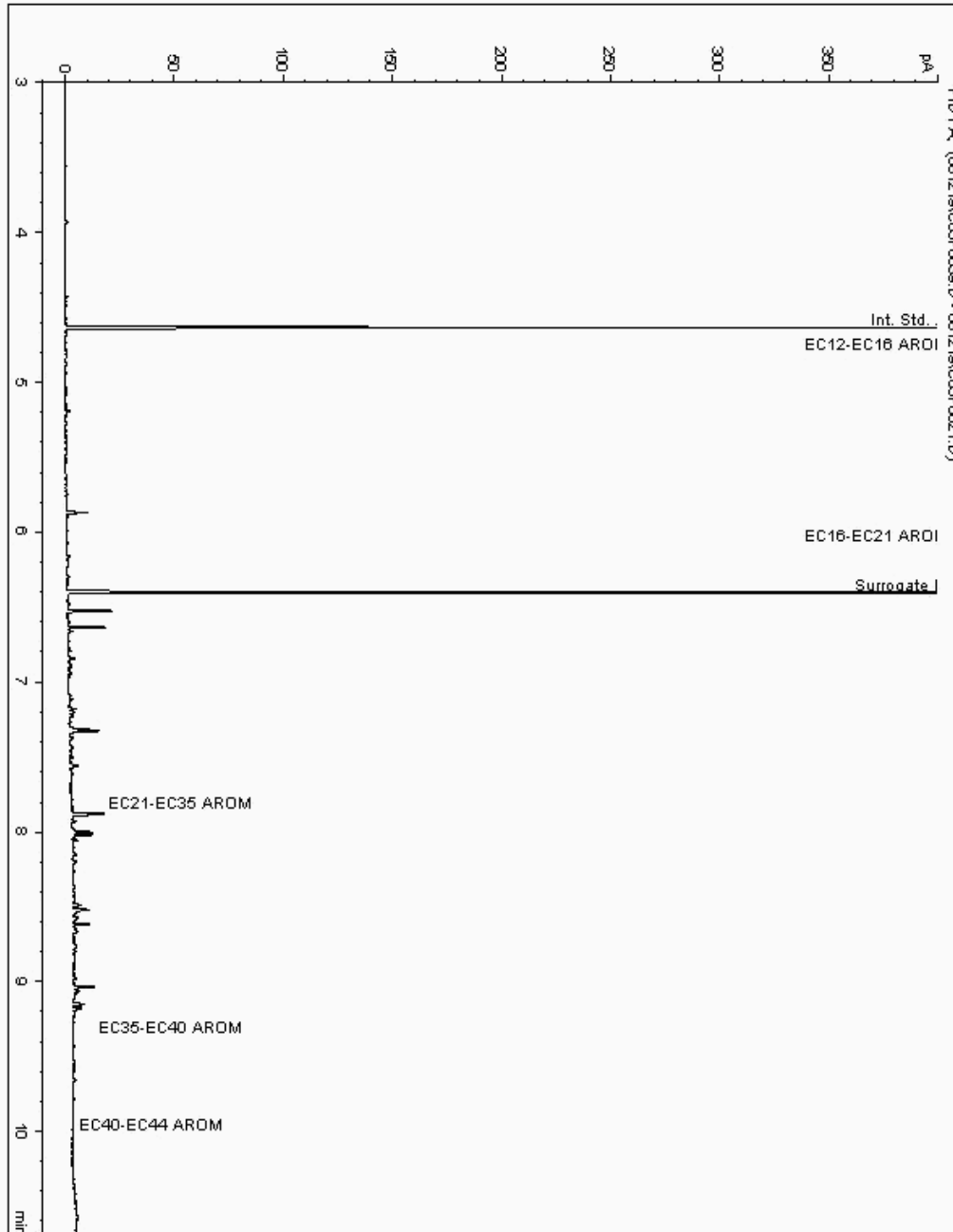
Sample No : 20487987
Sample ID : BH102 ES1

Depth : 0.70 - 0.80

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236517-
Date Acquired : 13/08/2019 03:58:20 PM
Units : ppb
Dilution: BH102 ES1[0.70 - 0.80]

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

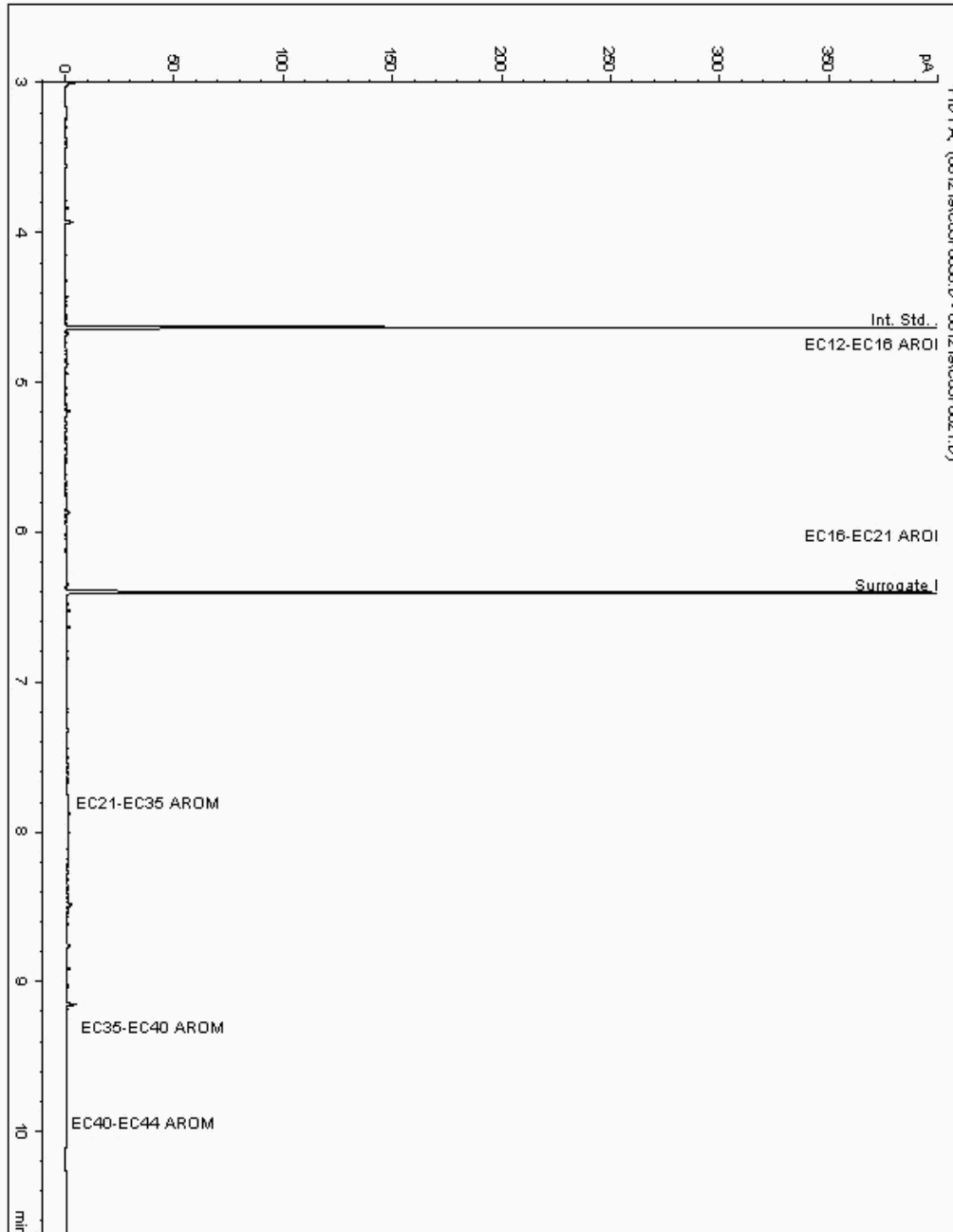
Sample No : 20488021
Sample ID : BH101 ES1

Depth : 1.70 - 1.80

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236499-
Date Acquired : 13/08/2019 03:38:00 PM
Units : ppb
Dilution: BH101 ES1[1.70 - 1.80]

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

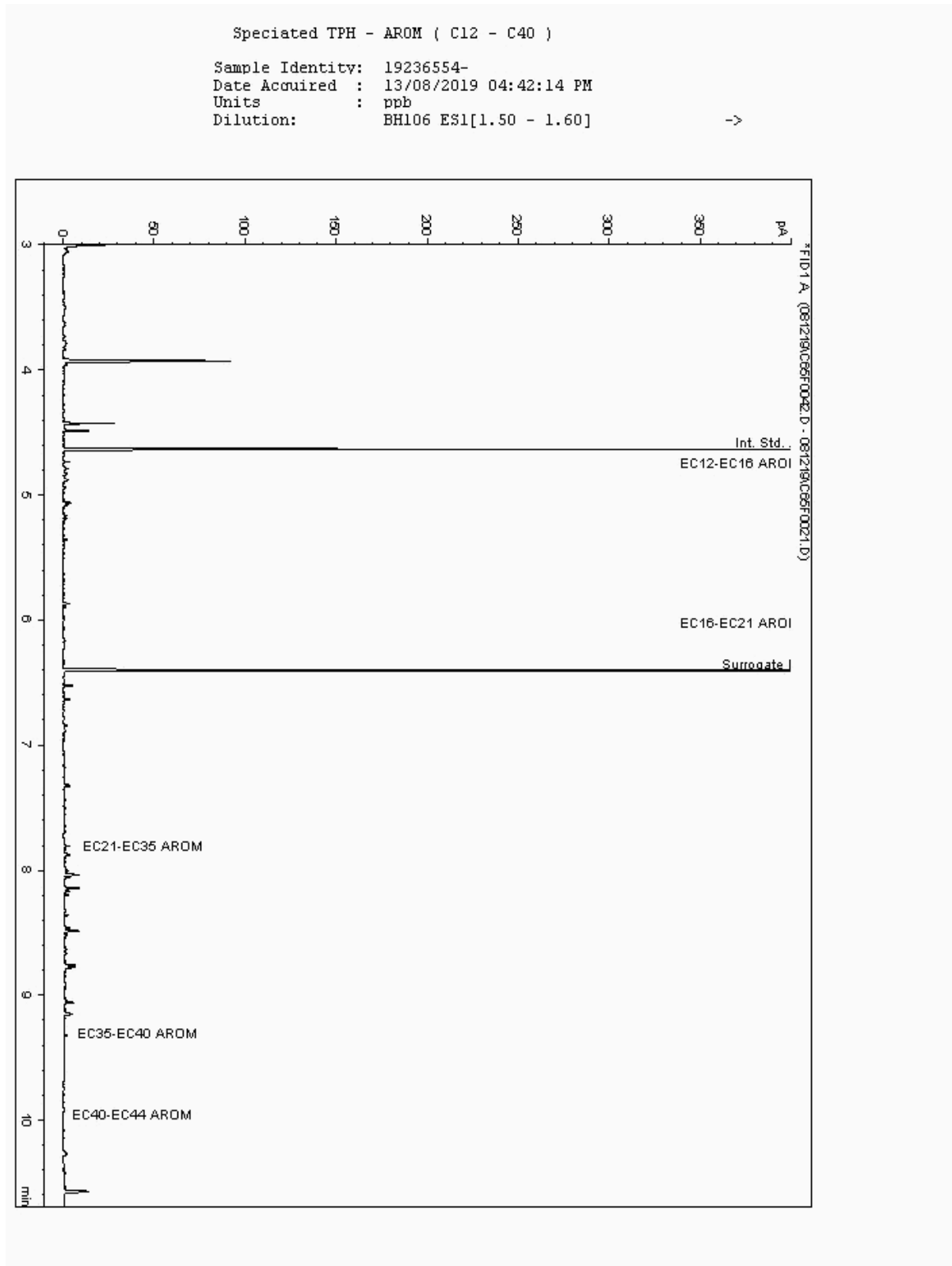
Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 20488058
Sample ID : BH106 ES1

Depth : 1.50 - 1.60





CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

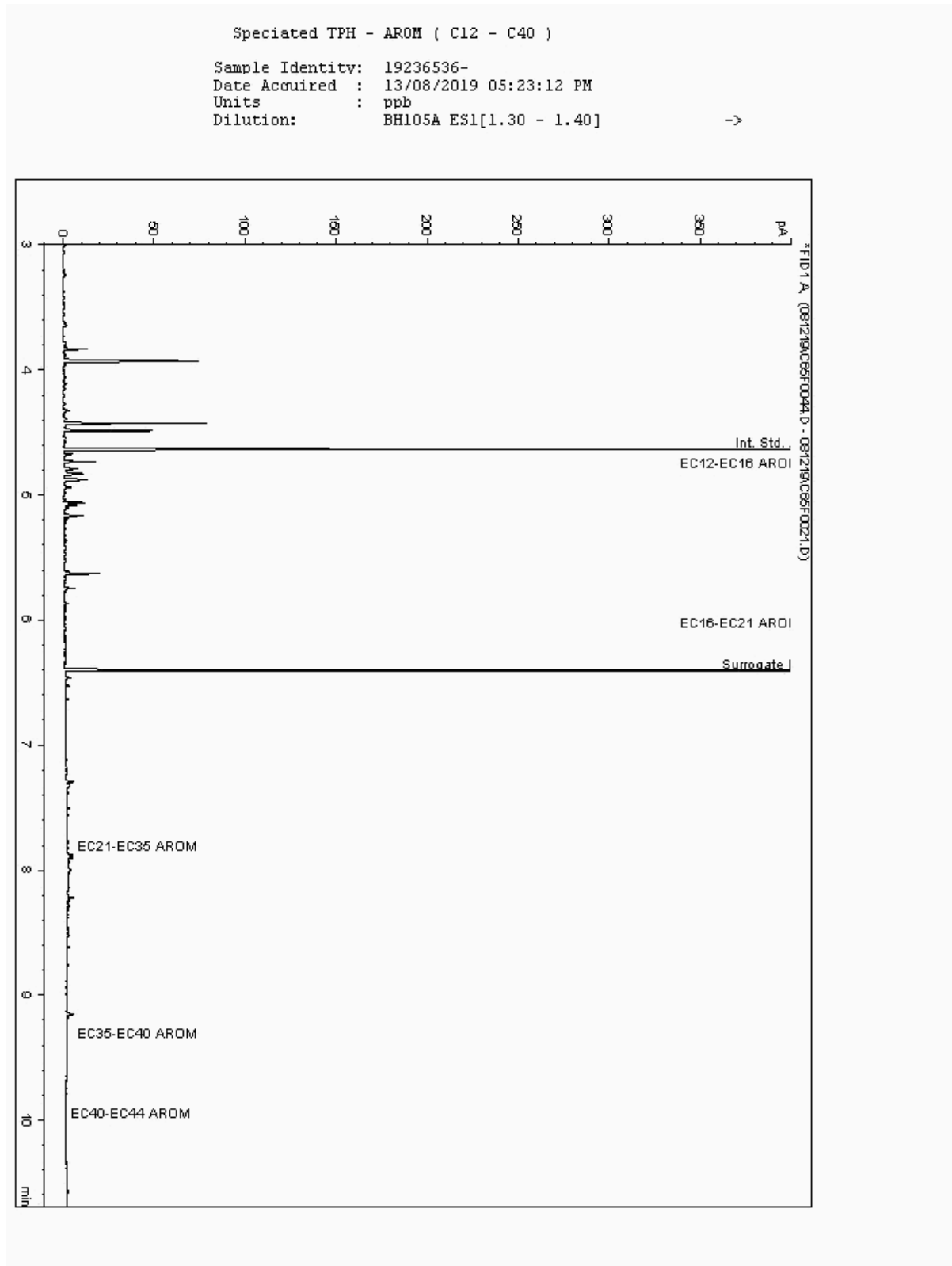
Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 20488101
Sample ID : BH105A ES1

Depth : 1.30 - 1.40





CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

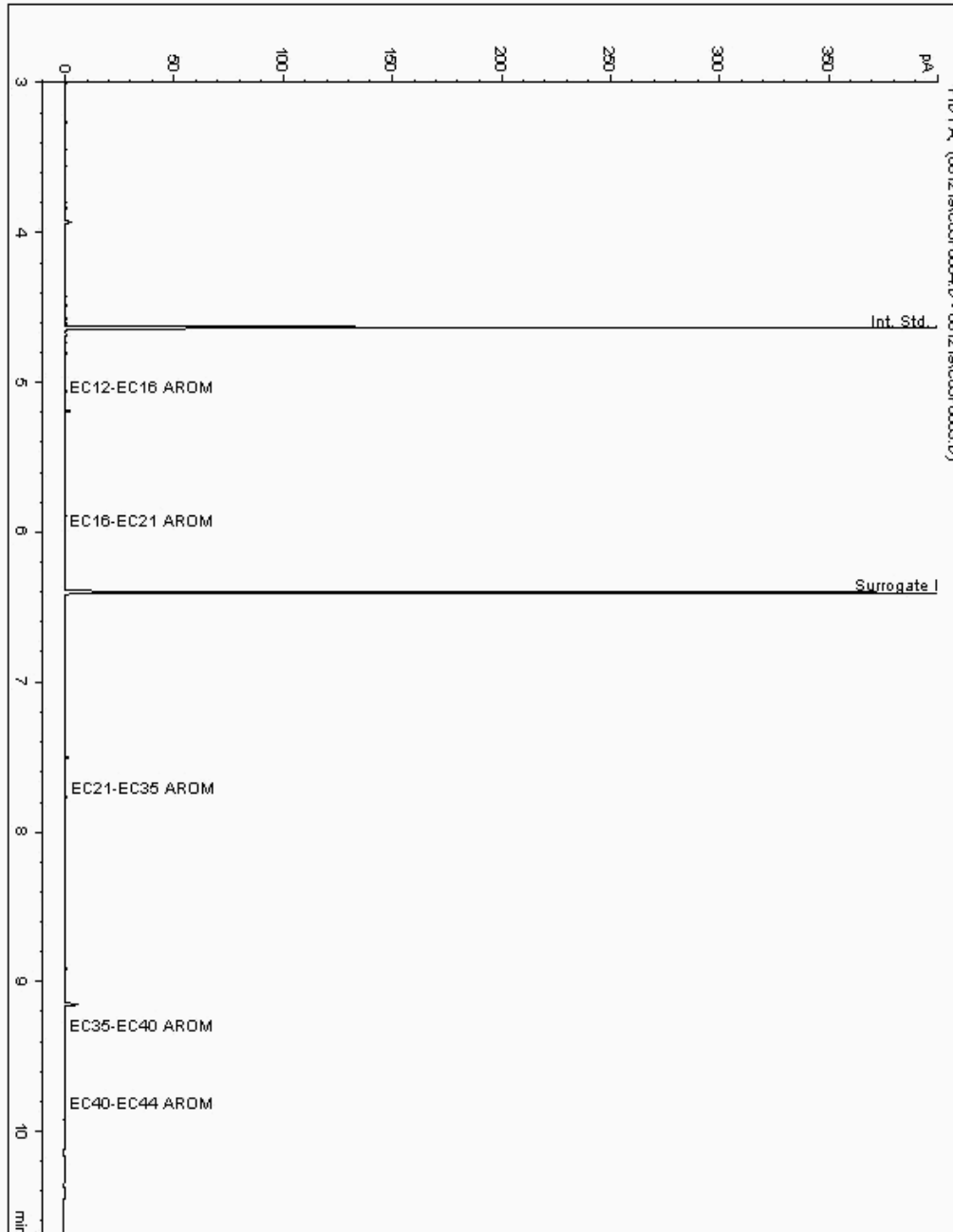
Sample No : 20488266
Sample ID : BH103 ES2

Depth : 3.80 - 3.90

Speciated TPH - AROM (C12 - C40)

Sample Identity: 19236482-
Date Acquired : 13/08/2019 17:54:05 PM
Units : ppb
Dilution: BH103 ES2[3.80 - 3.90]

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190809-8
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

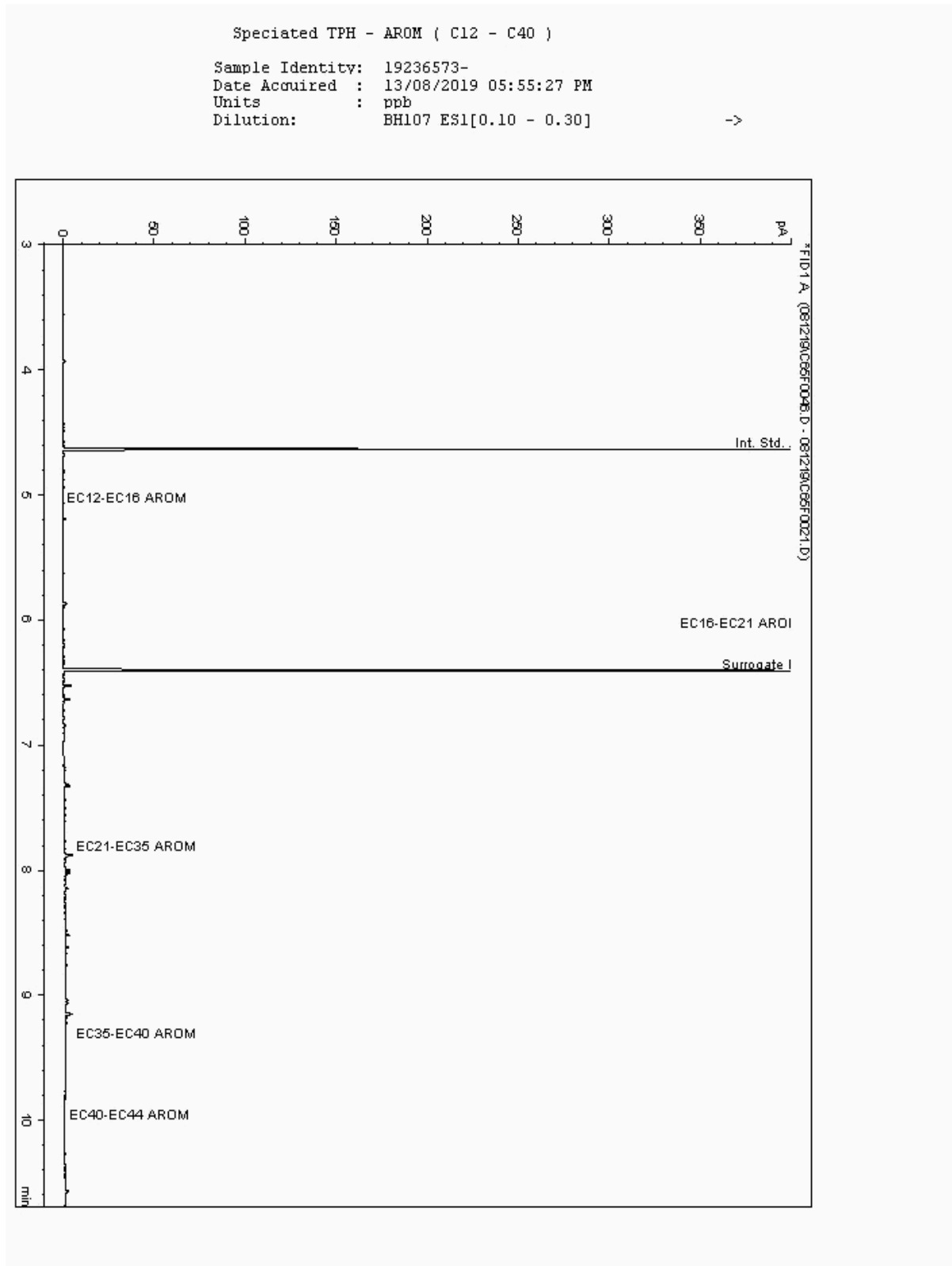
Report Number: 518271
Superseded Report:

Chromatogram

Analysis: EPH CWG (Aromatic) GC (S)

Sample No : 20488272
Sample ID : BH107 ES1

Depth : 0.10 - 0.30





CERTIFICATE OF ANALYSIS

Validated

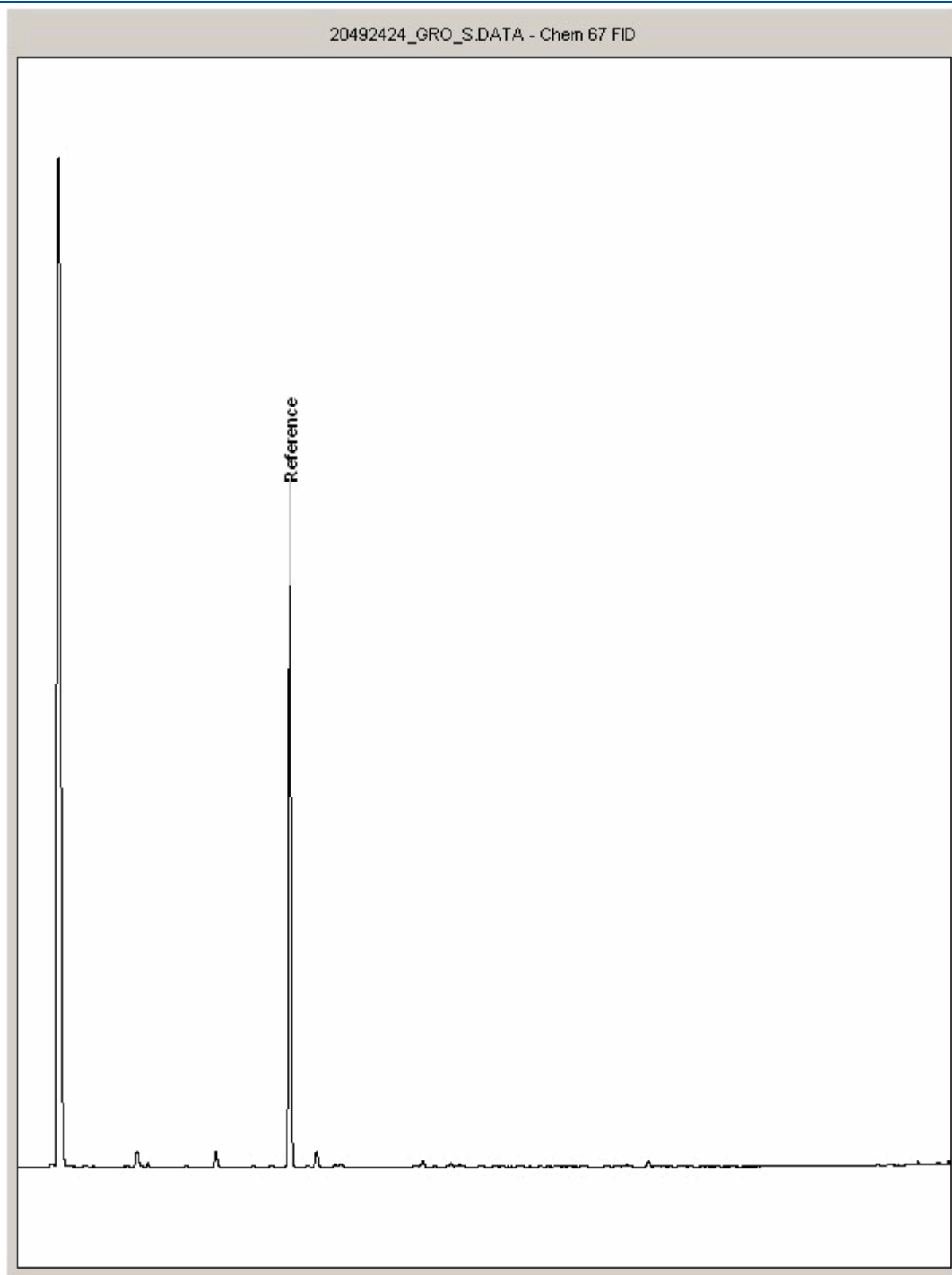
SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20492424
Sample ID : BH105A ES1

Depth : 1.30 - 1.40





CERTIFICATE OF ANALYSIS

Validated

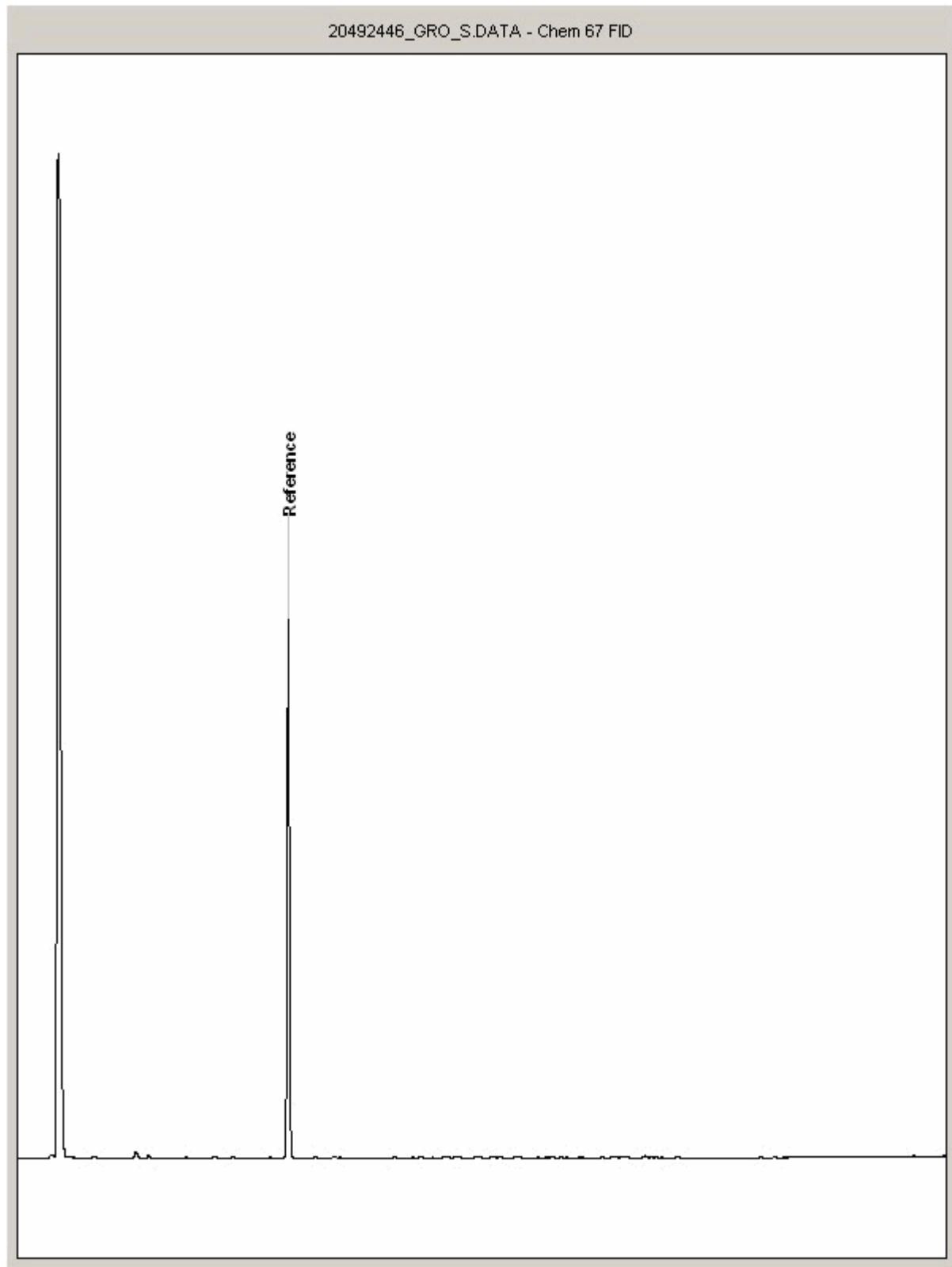
SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20492446
Sample ID : BH107 ES1

Depth : 0.10 - 0.30





CERTIFICATE OF ANALYSIS

Validated

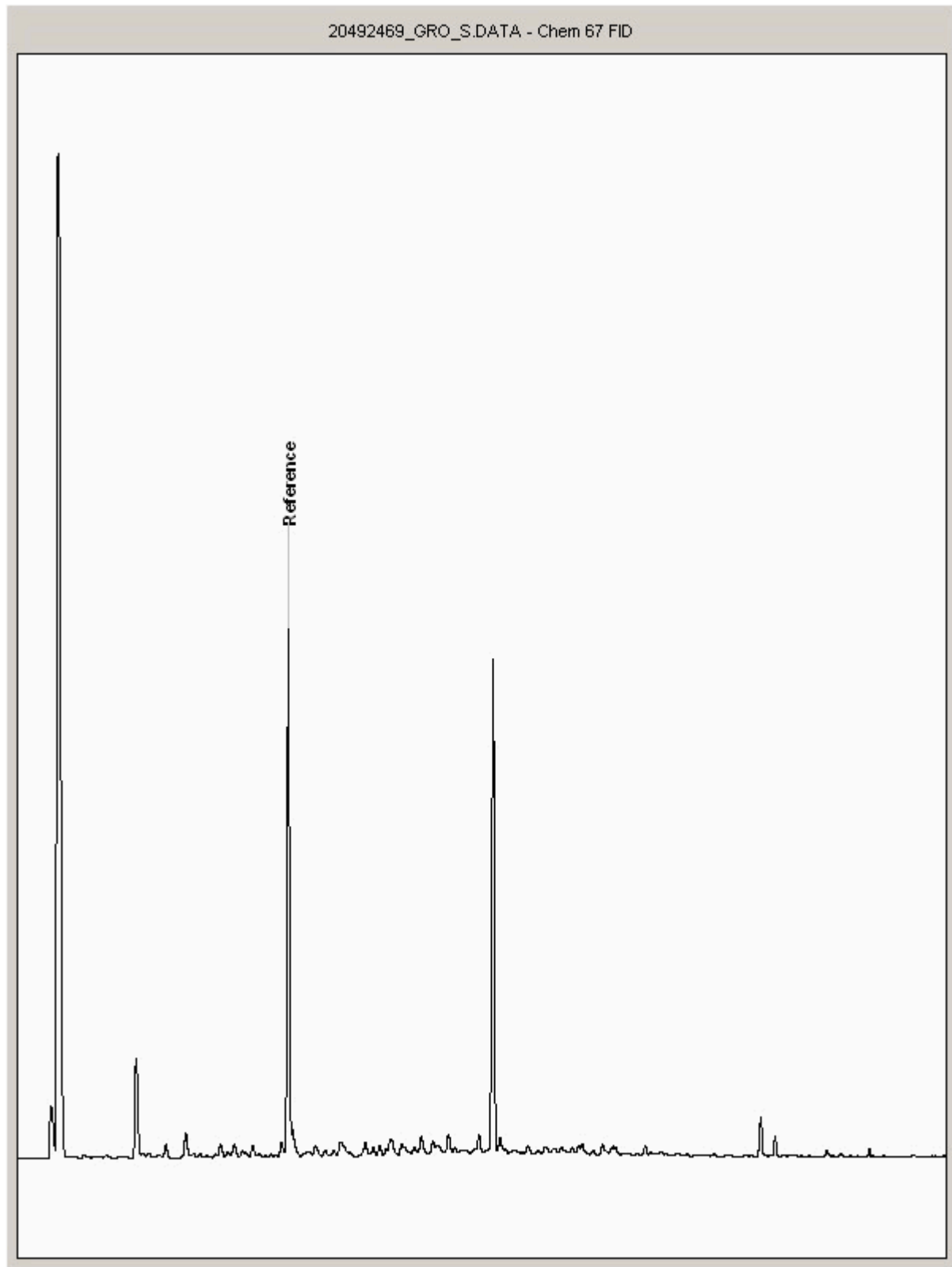
SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20492469
Sample ID : BH106 ES1

Depth : 1.50 - 1.60





CERTIFICATE OF ANALYSIS

Validated

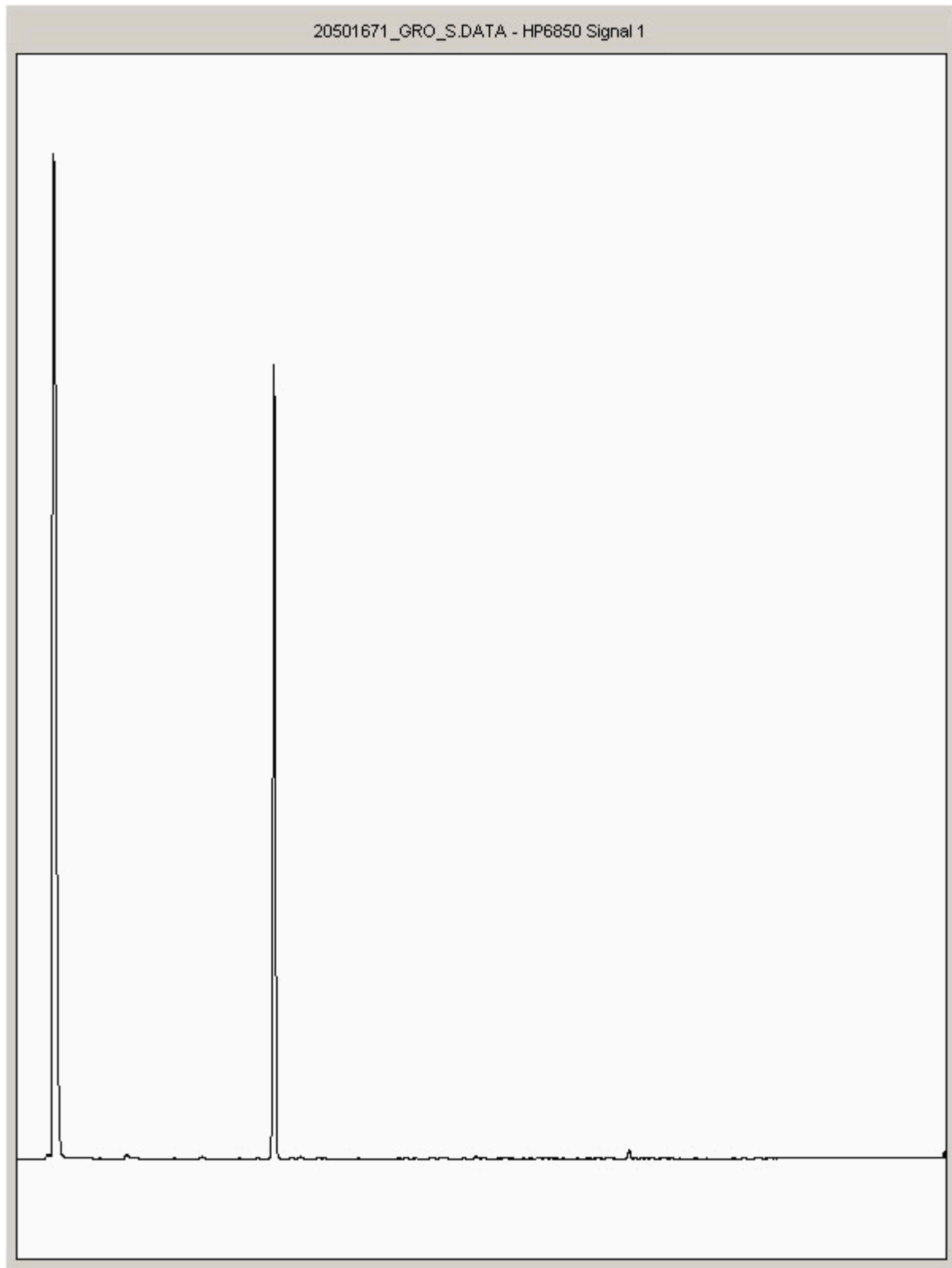
SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20501671
Sample ID : BH103 ES2

Depth : 3.80 - 3.90





CERTIFICATE OF ANALYSIS

Validated

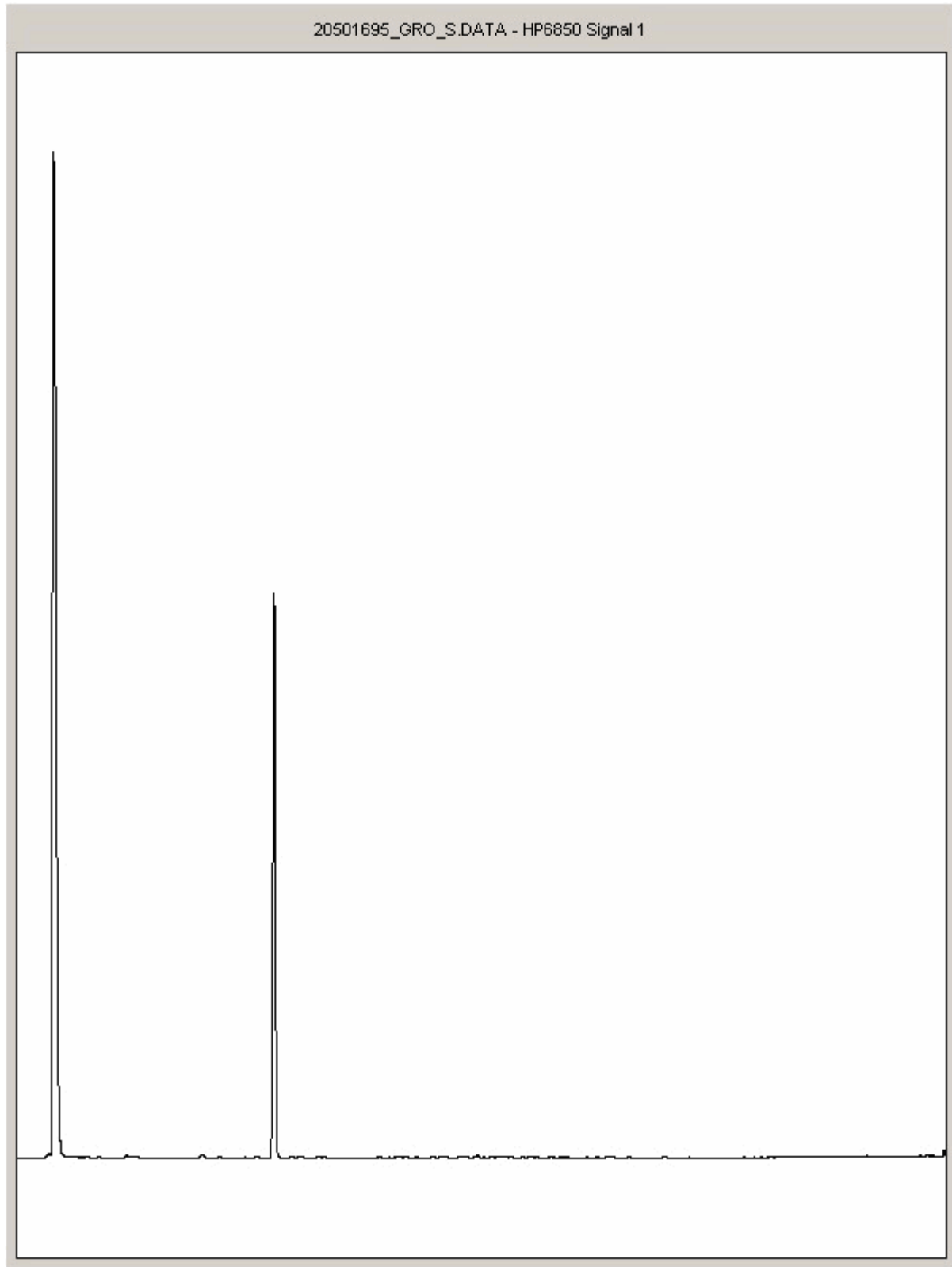
SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20501695
Sample ID : BH101 ES1

Depth : 1.70 - 1.80





CERTIFICATE OF ANALYSIS

Validated

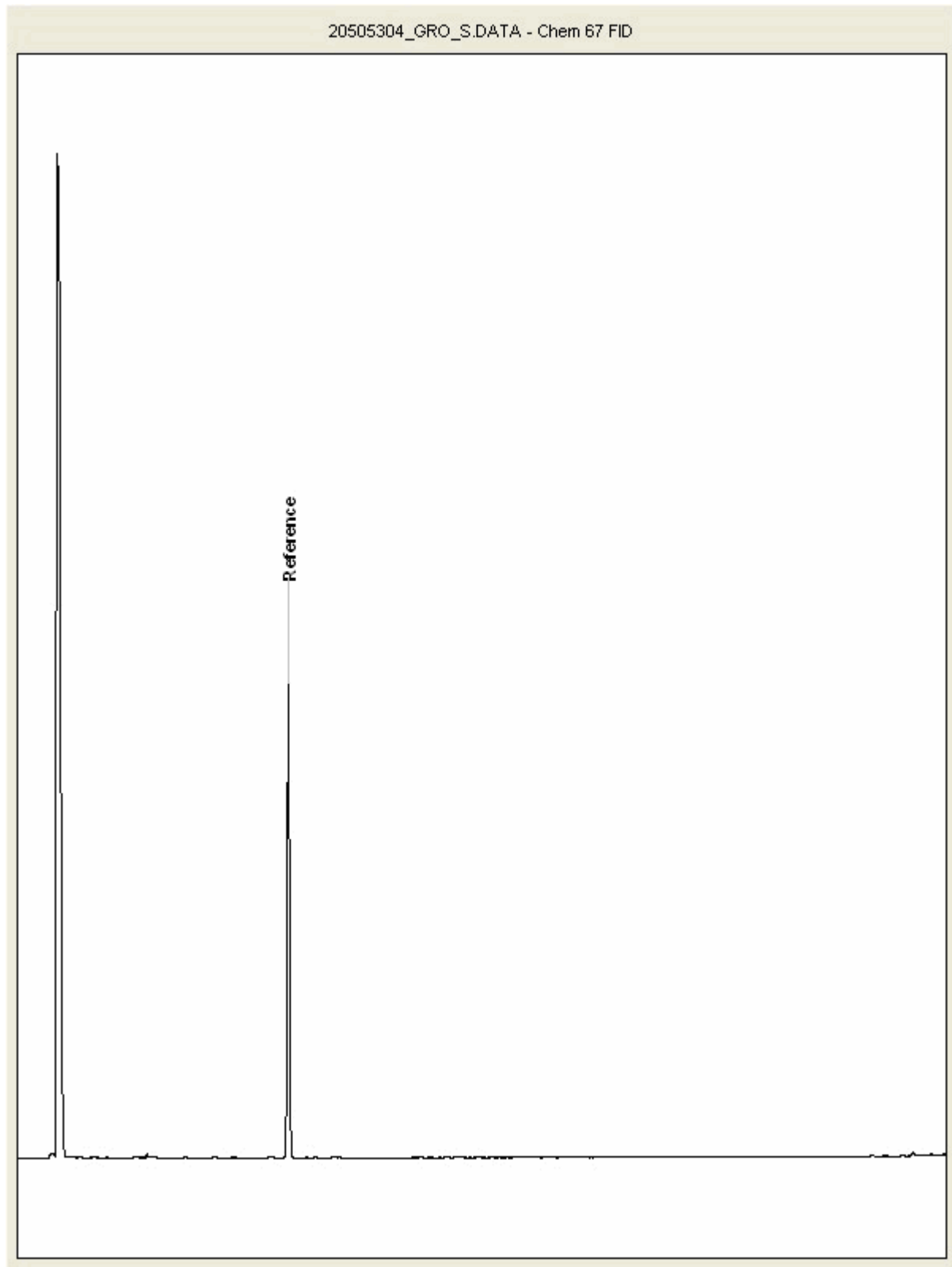
SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 20505304
Sample ID : BH102 ES1

Depth : 0.70 - 0.80





CERTIFICATE OF ANALYSIS

SDG:	190809-8	Client Reference:	62253048-GI2	Report Number:	518271
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	

Appendix

General

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

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

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

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

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

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

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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

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

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

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

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

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

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

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

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

Visual Estimation Of Fibre Content

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

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2107).

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

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



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Website: www.alsenvironmental.co.uk

WSP PB BBC
3rd Floor, Kings Orchard,
1 Queen Street
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Gloucestershire
BS2 0HQ

Attention: Jack Lott

CERTIFICATE OF ANALYSIS

Date of report Generation:	06 September 2019
Customer:	WSP PB BBC
Sample Delivery Group (SDG):	190824-7
Your Reference:	62253048-GI2
Location:	Port Talbot Harbourside
Report No:	520495

This report has been revised and directly supersedes 520458 in its entirety.

We received 16 samples on Saturday August 24, 2019 and 16 of these samples were scheduled for analysis which was completed on Friday September 06, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7 Client Reference: 62253048-GI2 Report Number: 520495
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report: 520458

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
20584165	BH101	EW	0.00 - 0.00	23/08/2019
20584133	BH102	EW	0.00 - 0.00	21/08/2019
20584197	BH103	EW	0.00 - 0.00	21/08/2019
20584242	BH104	EW	0.00 - 0.00	21/08/2019
20584181	BH105	EW	0.00 - 0.00	23/08/2019
20584233	BH106	EW	0.00 - 0.00	21/08/2019
20584189	BH107	EW	0.00 - 0.00	23/08/2019
20584249	BHC5	EW	0.00 - 0.00	21/08/2019
20584225	BHH03	EW	0.00 - 0.00	21/08/2019
20584260	BHH04	EW	0.00 - 0.00	23/08/2019
20584141	BHH05	EW	0.00 - 0.00	23/08/2019
20584205	BHH02 (D)	EW	0.00 - 0.00	21/08/2019
20584157	BHH07(D)	EW	0.00 - 0.00	23/08/2019
20584214	BHH02 (S)	EW	0.00 - 0.00	21/08/2019
20584149	BHH07(S)	EW	0.00 - 0.00	23/08/2019
20584173	MW1	EW	0.00 - 0.00	23/08/2019

Maximum Sample/Coolbox Temperature (°C) : 12.8

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

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



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SDG: 190824-7 Client Reference: 62253048-GI2 Report Number: 520495
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report: 520458

Results Legend

X Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
20584157	BHH07(D)	EW	0.00 - 0.00	HN03 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227) Vial (ALE297)	GW
20584205	BHH02 (D)	EW	0.00 - 0.00	HN03 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227) Vial (ALE297)	GW
20584141	BHH05	EW	0.00 - 0.00	HN03 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227) Vial (ALE297)	GW
20584260	BHH04	EW	0.00 - 0.00	HN03 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227) Vial (ALE297)	GW
20584225	BHH03	EW	0.00 - 0.00	HN03 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227) Vial (ALE297)	GW
Anions by Ion Chromatography	All	NDPs: 0 Tests: 15			
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 15			
EPH CWG (Aliphatic) Filtered GC (W)	All	NDPs: 0 Tests: 15			
EPH CWG (Aromatic) Filtered GC (W)	All	NDPs: 0 Tests: 15			
GRO by GC-FID (W)	All	NDPs: 0 Tests: 15			
Low Level Hexavalent Chromium (w)	All	NDPs: 0 Tests: 15			
Mercury Dissolved	All	NDPs: 0 Tests: 15			
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 15			
Phenols by HPLC (W)	All	NDPs: 0 Tests: 15			
TPH CWG Filtered (W)	All	NDPs: 0 Tests: 15			
VOC MS (W)	All	NDPs: 0 Tests: 15			

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7
Location: Port Talbot HarboursideClient Reference: 62253048-GI2
Order Number: 62253048-GI2Report Number: 520495
Superseded Report: 520458

TPH CWG (W)

Results Legend			Customer Sample Ref.	BH101	BH102	BH103	BH105	BH106	BH107
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.			Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.			23/08/2019	21/08/2019	21/08/2019	23/08/2019	21/08/2019	23/08/2019
diss.filt	Dissolved / filtered sample.			.	.	.	.	.	.
tot.unfilt	Total / unfiltered sample.			24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019
*	Subcontracted - refer to subcontractor report for accreditation status.			190824-7	190824-7	190824-7	190824-7	190824-7	190824-7
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			20584165	20584133	20584197	20584181	20584233	20584189
(F)	Trigger breach confirmed			EW	EW	EW	EW	EW	EW
1-3+5@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM245		109	107	79	92	95	113
GRO >C5-C12	<50 µg/l	TM245		<50	<50	<50	5080	<50	<50
Methyl tertiary butyl ether (MTBE)	<3 µg/l	TM245		<3	<3	<3	<3	<3	<3
Benzene	<7 µg/l	TM245		<7	<7	<7	3410	<7	<7
Toluene	<4 µg/l	TM245		<4	<4	<4	519	<4	<4
Ethylbenzene	<5 µg/l	TM245		<5	<5	<5	51	<5	<5
m,p-Xylene	<8 µg/l	TM245		<8	<8	<8	251	<8	<8
o-Xylene	<3 µg/l	TM245		<3	<3	<3	59	<3	<3
Sum of detected Xylenes	<11 µg/l	TM245		<11	<11	<11	310	<11	<11
Sum of detected BTEX	<28 µg/l	TM245		<28	<28	<28	4290	<28	<28
Aliphatics >C5-C6	<10 µg/l	TM245		<10	<10	<10	10	<10	<10
Aliphatics >C6-C8	<10 µg/l	TM245		<10	<10	<10	30	<10	<10
Aliphatics >C8-C10	<10 µg/l	TM245		<10	<10	<10	89	<10	<10
Aliphatics >C10-C12	<10 µg/l	TM245		<10	<10	<10	365	<10	<10
Aliphatics >C12-C16 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Aliphatics >C16-C21 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Aliphatics >C21-C35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Total Aliphatics >C12-C35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Aromatics >EC5-EC7	<10 µg/l	TM245		<10	<10	<10	3410	<10	<10
Aromatics >EC7-EC8	<10 µg/l	TM245		<10	<10	<10	519	<10	<10
Aromatics >EC8-EC10	<10 µg/l	TM245		<10	<10	<10	421	<10	<10
Aromatics >EC10-EC12	<10 µg/l	TM245		<10	<10	<10	243	<10	<10
Aromatics >EC12-EC16 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Aromatics >EC16-EC21 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Aromatics >EC21-EC35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Aromatics >EC16-EC35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Total Aromatics >EC12-EC35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Total Aliphatics & Aromatics >C5-35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	5080	<10	<10



CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7
Location: Port Talbot HarboursideClient Reference: 62253048-GI2
Order Number: 62253048-GI2Report Number: 520495
Superseded Report: 520458

TPH CWG (W)

Results Legend			Customer Sample Ref.	BHC5	BHH03	BHH04	BHH05	BHH02 (D)	BHH07(D)
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.			Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.			21/08/2019	21/08/2019	23/08/2019	23/08/2019	21/08/2019	23/08/2019
diss.filt	Dissolved / filtered sample.			.	.	.	.	.	.
tot.unfilt	Total / unfiltered sample.			24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019
*	Subcontracted - refer to subcontractor report for accreditation status.			190824-7	190824-7	190824-7	190824-7	190824-7	190824-7
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			20584249	20584225	20584260	20584141	20584205	20584157
(F)	Trigger breach confirmed			EW	EW	EW	EW	EW	EW
1-3+5@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM245		68	96	111	98	92	108
GRO >C5-C12	<50 µg/l	TM245		179000	<50	<50	<50	<50	<50
Methyl tertiary butyl ether (MTBE)	<3 µg/l	TM245		<150	<3	<3	<3	<3	<3
Benzene	<7 µg/l	TM245		58300	<7	<7	<7	<7	<7
Toluene	<4 µg/l	TM245		54500	<4	<4	<4	<4	<4
Ethylbenzene	<5 µg/l	TM245		3810	<5	<5	<5	<5	<5
m,p-Xylene	<8 µg/l	TM245		12100	<8	<8	<8	<8	<8
o-Xylene	<3 µg/l	TM245		2440	<3	<3	<3	<3	<3
Sum of detected Xylenes	<11 µg/l	TM245		14500	<11	<11	<11	<11	<11
Sum of detected BTEX	<28 µg/l	TM245		131000	<28	<28	<28	<28	<28
Aliphatics >C5-C6	<10 µg/l	TM245		<500	<10	<10	<10	<10	<10
Aliphatics >C6-C8	<10 µg/l	TM245		<500	<10	<10	<10	<10	<10
Aliphatics >C8-C10	<10 µg/l	TM245		4650	<10	<10	<10	<10	<10
Aliphatics >C10-C12	<10 µg/l	TM245		23700	<10	<10	<10	<10	<10
Aliphatics >C12-C16 (diss.filt)	<10 µg/l	TM174		50	<10	<10	<10	<10	<10
Aliphatics >C16-C21 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Aliphatics >C21-C35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10	<10	<10	<10
Total Aliphatics >C12-C35 (diss.filt)	<10 µg/l	TM174		50	<10	<10	<10	<10	<10
Aromatics >EC5-EC7	<10 µg/l	TM245		58300	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/l	TM245		54500	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/l	TM245		21400	<10	<10	<10	<10	<10
Aromatics >EC10-EC12	<10 µg/l	TM245		15800	<10	<10	<10	<10	<10
Aromatics >EC12-EC16 (diss.filt)	<10 µg/l	TM174		758	<10	<10	<10	<10	<10
Aromatics >EC16-EC21 (diss.filt)	<10 µg/l	TM174		61	<10	<10	<10	<10	<10
Aromatics >EC21-EC35 (diss.filt)	<10 µg/l	TM174		45	<10	<10	<10	<10	<10
Aromatics >EC16-EC35 (diss.filt)	<10 µg/l	TM174		106	<10	<10	<10	<10	<10
Total Aromatics >EC12-EC35 (diss.filt)	<10 µg/l	TM174		864	<10	<10	<10	<10	<10
Total Aliphatics & Aromatics >C5-35 (diss.filt)	<10 µg/l	TM174		180000	<10	<10	<10	<10	<10



CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7
Location: Port Talbot Harbourside**Client Reference:** 62253048-GI2
Order Number: 62253048-GI2**Report Number:** 520495
Superseded Report: 520458

TPH CWG (W)

Results Legend			Customer Sample Ref.	BHH02 (S)	BHH07(S)	MW1			
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.			0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
aq	Aqueous / settled sample.			Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
diss.filt	Dissolved / filtered sample.			21/08/2019	23/08/2019	23/08/2019			
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			24/08/2019	24/08/2019	24/08/2019			
(F)	Trigger breach confirmed			190824-7	190824-7	190824-7			
1-3+5@	Sample deviation (see appendix)			20584214	20584149	20584173			
				EW	EW	EW			
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM245		89	93	109			
GRO >C5-C12	<50 µg/l	TM245		<50 #	<50 #	<50 #			
Methyl tertiary butyl ether (MTBE)	<3 µg/l	TM245		<3	<3	<3			
Benzene	<7 µg/l	TM245		<7	<7	<7			
Toluene	<4 µg/l	TM245		<4	<4	<4			
Ethylbenzene	<5 µg/l	TM245		<5	<5	<5			
m,p-Xylene	<8 µg/l	TM245		<8	<8	<8			
o-Xylene	<3 µg/l	TM245		<3	<3	<3			
Sum of detected Xylenes	<11 µg/l	TM245		<11	<11	<11			
Sum of detected BTEX	<28 µg/l	TM245		<28	<28	<28			
Aliphatics >C5-C6	<10 µg/l	TM245		<10	<10	<10			
Aliphatics >C6-C8	<10 µg/l	TM245		<10	<10	<10			
Aliphatics >C8-C10	<10 µg/l	TM245		<10	<10	<10			
Aliphatics >C10-C12	<10 µg/l	TM245		<10	<10	<10			
Aliphatics >C12-C16 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			
Aliphatics >C16-C21 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			
Aliphatics >C21-C35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			
Total Aliphatics >C12-C35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			
Aromatics >EC5-EC7	<10 µg/l	TM245		<10	<10	<10			
Aromatics >EC7-EC8	<10 µg/l	TM245		<10	<10	<10			
Aromatics >EC8-EC10	<10 µg/l	TM245		<10	<10	<10			
Aromatics >EC10-EC12	<10 µg/l	TM245		<10	<10	<10			
Aromatics >EC12-EC16 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			
Aromatics >EC16-EC21 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			
Aromatics >EC21-EC35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			
Aromatics >EC16-EC35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			
Total Aromatics >EC12-EC35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			
Total Aliphatics & Aromatics >C5-35 (diss.filt)	<10 µg/l	TM174		<10	<10	<10			



CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7 Client Reference: 62253048-GI2 Report Number: 520495
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report: 520458

VOC MS (W)

Results Legend			Customer Sample Ref.	BH101	BH102	BH103	BH105	BH106	BH107
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.			Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.			23/08/2019	21/08/2019	21/08/2019	23/08/2019	21/08/2019	23/08/2019
diss.filt	Dissolved / filtered sample.			-	-	-	-	-	-
tot.unfilt	Total / unfiltered sample.			24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019
*	Subcontracted - refer to subcontractor report for accreditation status.			190824-7	190824-7	190824-7	190824-7	190824-7	190824-7
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			20584165	20584133	20584197	20584181	20584233	20584189
(F)	Trigger breach confirmed			EW	EW	EW	EW	EW	EW
1-3+5@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208	109	107	120	108	114	114	
Toluene-d8**	%	TM208	102	98.8	97.4	91.7	96.3	99.2	
4-Bromofluorobenzene**	%	TM208	102	99.4	99.7	105	98.9	99.2	
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Chloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Vinyl chloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Bromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Chloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Carbon disulphide	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Dichloromethane	<3 µg/l	TM208	<3	<3	<3	<3	<3	<3	
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Bromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Chloroform	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Carbontetrachloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Benzene	<1 µg/l	TM208	<1	<1	<1	3430	<1	<1	
Trichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Dibromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Bromodichloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Toluene	<1 µg/l	TM208	<1	<1	<1	488	<1	<1	
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	



CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

VOC MS (W)

Results Legend			Customer Sample Ref.		BH101	BH102	BH103	BH105	BH106	BH107
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.				Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.				23/08/2019	21/08/2019	21/08/2019	23/08/2019	21/08/2019	23/08/2019
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
+	Subcontracted - refer to subcontractor report for accreditation status.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery				24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019
(F)	Trigger breach confirmed				190824-7	190824-7	190824-7	190824-7	190824-7	190824-7
1-3+5@	Sample deviation (see appendix)				20584165	20584133	20584197	20584181	20584233	20584189
					EW	EW	EW	EW	EW	EW
Component	LOD/Units	Method								
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Tetrachloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromoethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Ethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	38.8 #	<1 #	<1 #	<1 #	<1 #
m,p-Xylene	<1 µg/l	TM208	<1 #	<1 #	<1 #	275 #	<1 #	<1 #	<1 #	<1 #
o-Xylene	<1 µg/l	TM208	<1 #	<1 #	<1 #	70.6 #	<1 #	<1 #	<1 #	<1 #
Styrene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromoform	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isopropylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	2.91 #	<1 #	<1 #	<1 #	<1 #
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Propylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	17 #	<1 #	<1 #	<1 #	<1 #
4-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	24.7 #	<1 #	<1 #	<1 #	<1 #
sec-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-iso-Propyltoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,4-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene	<1 µg/l	TM208	<1 #	<1 #	<1 #	94.8 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7
Location: Port Talbot HarboursideClient Reference: 62253048-GI2
Order Number: 62253048-GI2Report Number: 520495
Superseded Report: 520458

VOC MS (W)

Results Legend			Customer Sample Ref.		BHC5	BHH03	BHH04	BHH05	BHH02 (D)	BHH07(D)
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERIS accredited.				Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.				21/08/2019	21/08/2019	23/08/2019	23/08/2019	21/08/2019	23/08/2019
diss.filt	Dissolved / filtered sample.				.	.	.	.	.	.
tot.unfilt	Total / unfiltered sample.				24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019
*	Subcontracted - refer to subcontractor report for accreditation status.				190824-7	190824-7	190824-7	190824-7	190824-7	190824-7
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery				20584225	20584225	20584260	20584141	20584205	20584157
(F)	Trigger breach confirmed				EW	EW	EW	EW	EW	EW
1-3+5@	Sample deviation (see appendix)									
Component	LOD/Units	Method								
Dibromofluoromethane**	%	TM208			17.8	115	106	24.6	114	114
Toluene-d8**	%	TM208			93.6	97.3	97.1	96.5	97.6	97.6
4-Bromofluorobenzene**	%	TM208			78.8	98.2	98.1	98.5	97.9	98.1
Dichlorodifluoromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Vinyl chloride	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromomethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Carbon disulphide	<1 µg/l	TM208			2.37	<1	<1	<1	<1	<1
Dichloromethane	<3 µg/l	TM208			<3	<3	<3	<3	<3	<3
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromochloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloroform	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Carbontetrachloride	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Benzene	<1 µg/l	TM208			64100	<1	<1	<1	<1	<1
Trichloroethene	<1 µg/l	TM208			1.18	<1	<1	<1	<1	<1
1,2-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Dibromomethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromodichloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Toluene	<1 µg/l	TM208			61100	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7 Client Reference: 62253048-GI2 Report Number: 520495
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report: 520458

VOC MS (W)

Results Legend			Customer Sample Ref.		BHC5	BHH03	BHH04	BHH05	BHH02 (D)	BHH07(D)
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.				Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.				21/08/2019	21/08/2019	23/08/2019	23/08/2019	21/08/2019	23/08/2019
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
+	Subcontracted - refer to subcontractor report for accreditation status.				24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019	24/08/2019
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery				190824-7	190824-7	190824-7	190824-7	190824-7	190824-7
(F)	Trigger breach confirmed				20584249	20584225	20584260	20584141	20584205	20584157
1-3+5@	Sample deviation (see appendix)				EW	EW	EW	EW	EW	EW
Component	LOD/Units	Method								
1,3-Dichloropropane	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Tetrachloroethene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Dibromochloromethane	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
1,2-Dibromoethane	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Chlorobenzene	<1 µg/l	TM208	1.17	#	<1	#	<1	#	<1	#
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Ethylbenzene	<1 µg/l	TM208	7060	#	<1	#	<1	#	<1	#
m,p-Xylene	<1 µg/l	TM208	21800	#	<1	#	<1	#	<1	#
o-Xylene	<1 µg/l	TM208	3960	#	<1	#	<1	#	<1	#
Styrene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Bromoform	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Isopropylbenzene	<1 µg/l	TM208	56.9	#	<1	#	<1	#	<1	#
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Bromobenzene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Propylbenzene	<1 µg/l	TM208	32.3	#	<1	#	<1	#	<1	#
2-Chlorotoluene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
1,3,5-Trimethylbenzene	<1 µg/l	TM208	1130	#	<1	#	<1	#	<1	#
4-Chlorotoluene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
tert-Butylbenzene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
1,2,4-Trimethylbenzene	<1 µg/l	TM208	1310	#	<1	#	<1	#	<1	#
sec-Butylbenzene	<1 µg/l	TM208	2.02	#	<1	#	<1	#	<1	#
4-iso-Propyltoluene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
n-Butylbenzene	<1 µg/l	TM208	23.2	#	<1	#	<1	#	<1	#
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Hexachlorobutadiene	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	#	<1	#	<1	#	<1	#
Naphthalene	<1 µg/l	TM208	13300	#	<1	#	<1	#	<1	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7 Client Reference: 62253048-GI2 Report Number: 520495
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report: 520458

VOC MS (W)

Results Legend			Customer Sample Ref.	BHH02 (S)	BHH07(S)	MW1			
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
M	mCERTS accredited.			Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
aq	Aqueous / settled sample.			21/08/2019	23/08/2019	23/08/2019			
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			24/08/2019	24/08/2019	24/08/2019			
(F)	Trigger breach confirmed			190824-7	190824-7	190824-7			
1-3+5@	Sample deviation (see appendix)			20584214	20584149	20584173			
				EW	EW	EW			
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208		114	107	105			
Toluene-d8**	%	TM208		97	97.5	102			
4-Bromofluorobenzene**	%	TM208		98.5	97.6	103			
Dichlorodifluoromethane	<1 µg/l	TM208		<1	<1	<1			
Chloromethane	<1 µg/l	TM208		<1	<1	<1			
Vinyl chloride	<1 µg/l	TM208		<1	<1	<1			
Bromomethane	<1 µg/l	TM208		<1	<1	<1			
Chloroethane	<1 µg/l	TM208		<1	<1	<1			
Trichlorofluoromethane	<1 µg/l	TM208		<1	<1	<1			
1,1-Dichloroethene	<1 µg/l	TM208		<1	<1	<1			
Carbon disulphide	<1 µg/l	TM208		<1	<1	<1			
Dichloromethane	<3 µg/l	TM208		<3	<3	<3			
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1	<1	<1			
trans-1,2-Dichloroethene	<1 µg/l	TM208		<1	<1	<1			
1,1-Dichloroethane	<1 µg/l	TM208		<1	<1	<1			
cis-1,2-Dichloroethene	<1 µg/l	TM208		<1	<1	<1			
2,2-Dichloropropane	<1 µg/l	TM208		<1	<1	<1			
Bromochloromethane	<1 µg/l	TM208		<1	<1	<1			
Chloroform	<1 µg/l	TM208		<1	<1	<1			
1,1,1-Trichloroethane	<1 µg/l	TM208		<1	<1	<1			
1,1-Dichloropropene	<1 µg/l	TM208		<1	<1	<1			
Carbontetrachloride	<1 µg/l	TM208		<1	<1	<1			
1,2-Dichloroethane	<1 µg/l	TM208		<1	<1	<1			
Benzene	<1 µg/l	TM208		<1	<1	<1			
Trichloroethene	<1 µg/l	TM208		<1	<1	<1			
1,2-Dichloropropane	<1 µg/l	TM208		<1	<1	<1			
Dibromomethane	<1 µg/l	TM208		<1	<1	<1			
Bromodichloromethane	<1 µg/l	TM208		<1	<1	<1			
cis-1,3-Dichloropropene	<1 µg/l	TM208		<1	<1	<1			
Toluene	<1 µg/l	TM208		<1	<1	<1			
trans-1,3-Dichloropropene	<1 µg/l	TM208		<1	<1	<1			
1,1,2-Trichloroethane	<1 µg/l	TM208		<1	<1	<1			



CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7 Client Reference: 62253048-GI2 Report Number: 520495
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report: 520458

VOC MS (W)

Results Legend		Customer Sample Ref.	BHH02 (S)	BHH07(S)	MW1			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
M	mCERTS accredited.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
aq	Aqueous / settled sample.		21/08/2019	23/08/2019	23/08/2019			
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		24/08/2019	24/08/2019	24/08/2019			
(F)	Trigger breach confirmed		190824-7	190824-7	190824-7			
1-3+5@	Sample deviation (see appendix)		20584214	20584149	20584173			
			EW	EW	EW			
Component	LOD/Units	Method						
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Tetrachloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Dibromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,2-Dibromoethane	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Chlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Ethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
m,p-Xylene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
o-Xylene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Styrene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Bromoform	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Isopropylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,2,3-Trichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Bromobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Propylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
2-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
4-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
tert-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
sec-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
4-iso-Propyltoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,4-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
n-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #			
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Hexachlorobutadiene	<1 µg/l	TM208	<1 #	<1 #	<1 #			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1 #	<1 #	<1 #			
Naphthalene	<1 µg/l	TM208	<1 #	<1 #	<1 #			



CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

VOC MS (W)

Results Legend		Customer Sample Ref.	BHH02 (S)	BHH07(S)	MW1			
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-3*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1			
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1			
								</



CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7 **Client Reference:** 62253048-GI2 **Report Number:** 520495
Location: Port Talbot Harbourside **Order Number:** 62253048-GI2 **Superseded Report:** 520458

Table of Results - Appendix

Method No	Reference	Description
SUB		Subcontracted Test
TM059	In - house Method	Determination of whole oil by gas chromatography (C4-C40)
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM226	In-House Method	Determination of Anions in Waters using Ion Chromatography
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC
TM331		Low Level Hexavalent Chromium

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7 Client Reference: 62253048-GI2 Report Number: 520495
Location: Port Talbot Harbourside Order Number: 62253048-GI2 Superseded Report: 520458

Test Completion Dates

Lab Sample No(s)	20584165	20584133	20584197	20584242	20584181	20584233	20584189	20584249	20584225	20584260
Customer Sample Ref.	BH101	BH102	BH103	BH104	BH105	BH106	BH107	BHC5	BHH03	BHH04
AGS Ref.	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Ground Water	Ground Water	Ground Water	Product (P)	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Anions by ion Chromatography	29-Aug-2019	30-Aug-2019	29-Aug-2019		29-Aug-2019	30-Aug-2019	29-Aug-2019	30-Aug-2019	30-Aug-2019	30-Aug-2019
Character of hydrocarbon samples				05-Sep-2019						
Density in Product*				06-Sep-2019						
Dissolved Metals by ICP-MS	02-Sep-2019	02-Sep-2019	02-Sep-2019		02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019	03-Sep-2019	02-Sep-2019
EPH CWG (Aliphatic) Filtered GC (W)	03-Sep-2019	03-Sep-2019	03-Sep-2019		03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019
EPH CWG (Aromatic) Filtered GC (W)	03-Sep-2019	03-Sep-2019	03-Sep-2019		03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019
GRO by GC-FID (W)	29-Aug-2019	29-Aug-2019	30-Aug-2019		30-Aug-2019	30-Aug-2019	29-Aug-2019	02-Sep-2019	30-Aug-2019	02-Sep-2019
Kinematic viscosity at 40°C*				30-Aug-2019						
Low Level Hexavalent Chromium (w)	29-Aug-2019	29-Aug-2019	29-Aug-2019		29-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019
Mercury Dissolved	02-Sep-2019	02-Sep-2019	02-Sep-2019		02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019
PAH Spec MS - Aqueous (W)	02-Sep-2019	02-Sep-2019	02-Sep-2019		02-Sep-2019	02-Sep-2019	02-Sep-2019	03-Sep-2019	02-Sep-2019	02-Sep-2019
Phenols by HPLC (W)	30-Aug-2019	30-Aug-2019	30-Aug-2019		30-Aug-2019	30-Aug-2019	30-Aug-2019	30-Aug-2019	31-Aug-2019	30-Aug-2019
TPH CWG Filtered (W)	03-Sep-2019	03-Sep-2019	03-Sep-2019		03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019
VOC MS (W)	29-Aug-2019	29-Aug-2019	29-Aug-2019		30-Aug-2019	29-Aug-2019	29-Aug-2019	02-Sep-2019	29-Aug-2019	29-Aug-2019

Lab Sample No(s)	20584141	20584205	20584214	20584157	20584149	20584173
Customer Sample Ref.	BHH05	BHH02 (D)	BHH02 (S)	BHH07(D)	BHH07(S)	MW1
AGS Ref.	EW	EW	EW	EW	EW	EW
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Anions by ion Chromatography	30-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019	30-Aug-2019	29-Aug-2019
Dissolved Metals by ICP-MS	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019
EPH CWG (Aliphatic) Filtered GC (W)	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019
EPH CWG (Aromatic) Filtered GC (W)	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019
GRO by GC-FID (W)	30-Aug-2019	30-Aug-2019	30-Aug-2019	02-Sep-2019	30-Aug-2019	29-Aug-2019
Low Level Hexavalent Chromium (w)	29-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019
Mercury Dissolved	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019
PAH Spec MS - Aqueous (W)	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019	02-Sep-2019
Phenols by HPLC (W)	30-Aug-2019	30-Aug-2019	30-Aug-2019	30-Aug-2019	30-Aug-2019	30-Aug-2019
TPH CWG Filtered (W)	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019	03-Sep-2019
VOC MS (W)	29-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019	29-Aug-2019



CERTIFICATE OF ANALYSIS

Validated

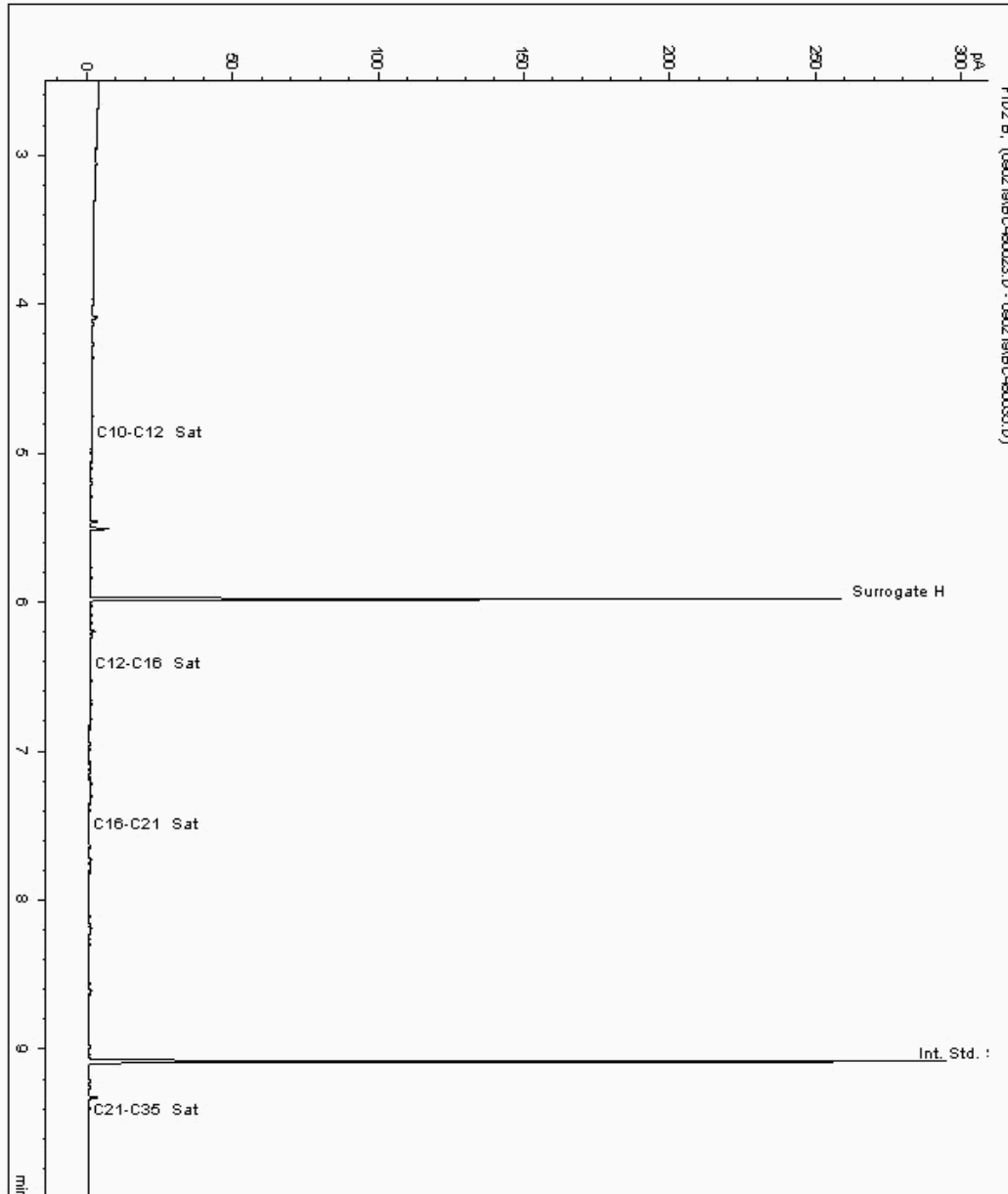
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis:	EPH CWG (Aliphatic) Filtered GC (W)	Sample No :	20593721	Depth :	0.00 - 0.00
		Sample ID :	BHH07(D)		

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337198-
Date Acquired : 03/09/2019 00:09:45 PM
Units : ppb
Dilution : SE BHH07(D)[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

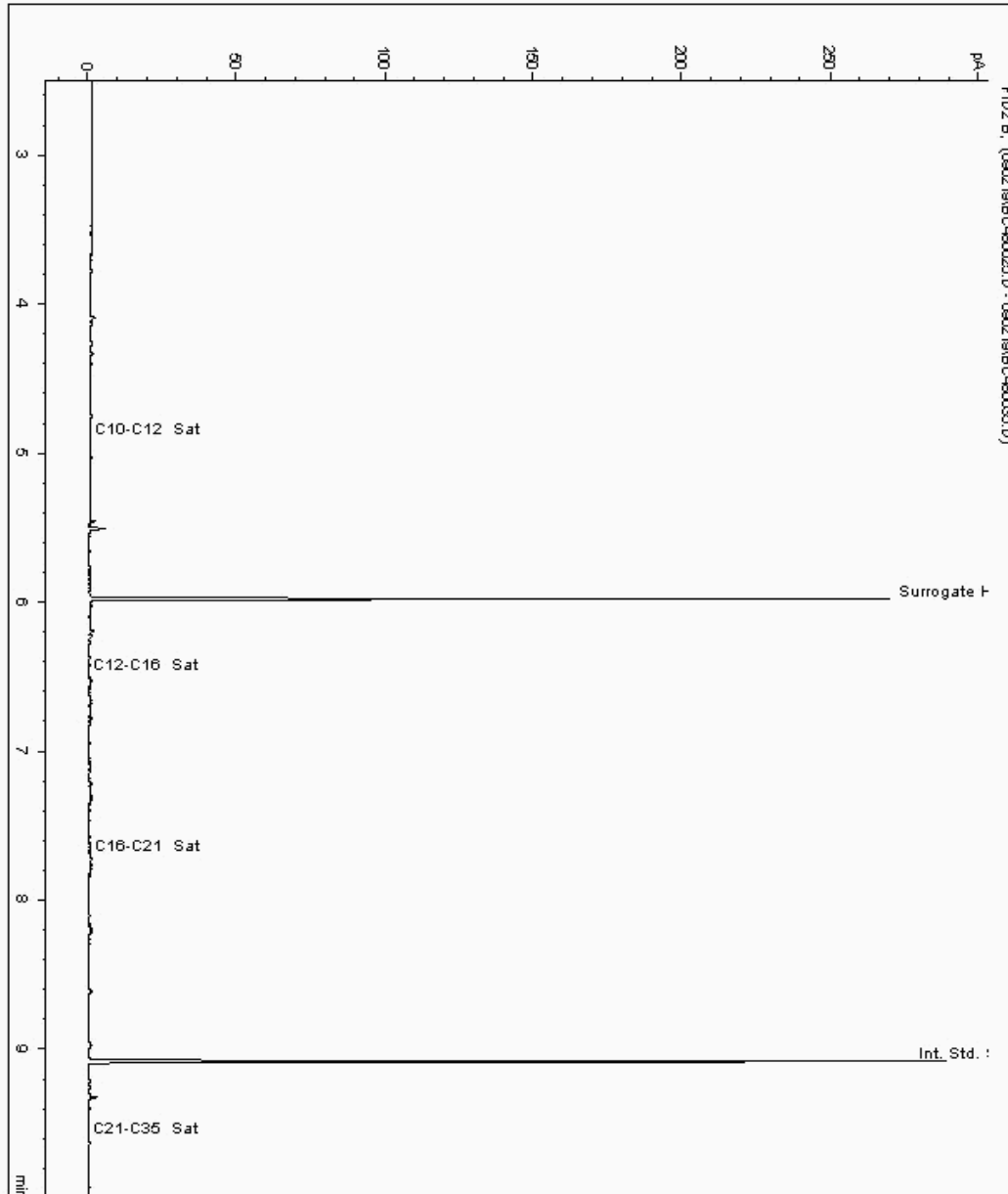
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20593729 Depth : 0.00 - 0.00
Sample ID : MW1

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337239-
Date Acquired : 03/09/2019 07:42:24 PM
Units : ppb
Dilution : SE MW1[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

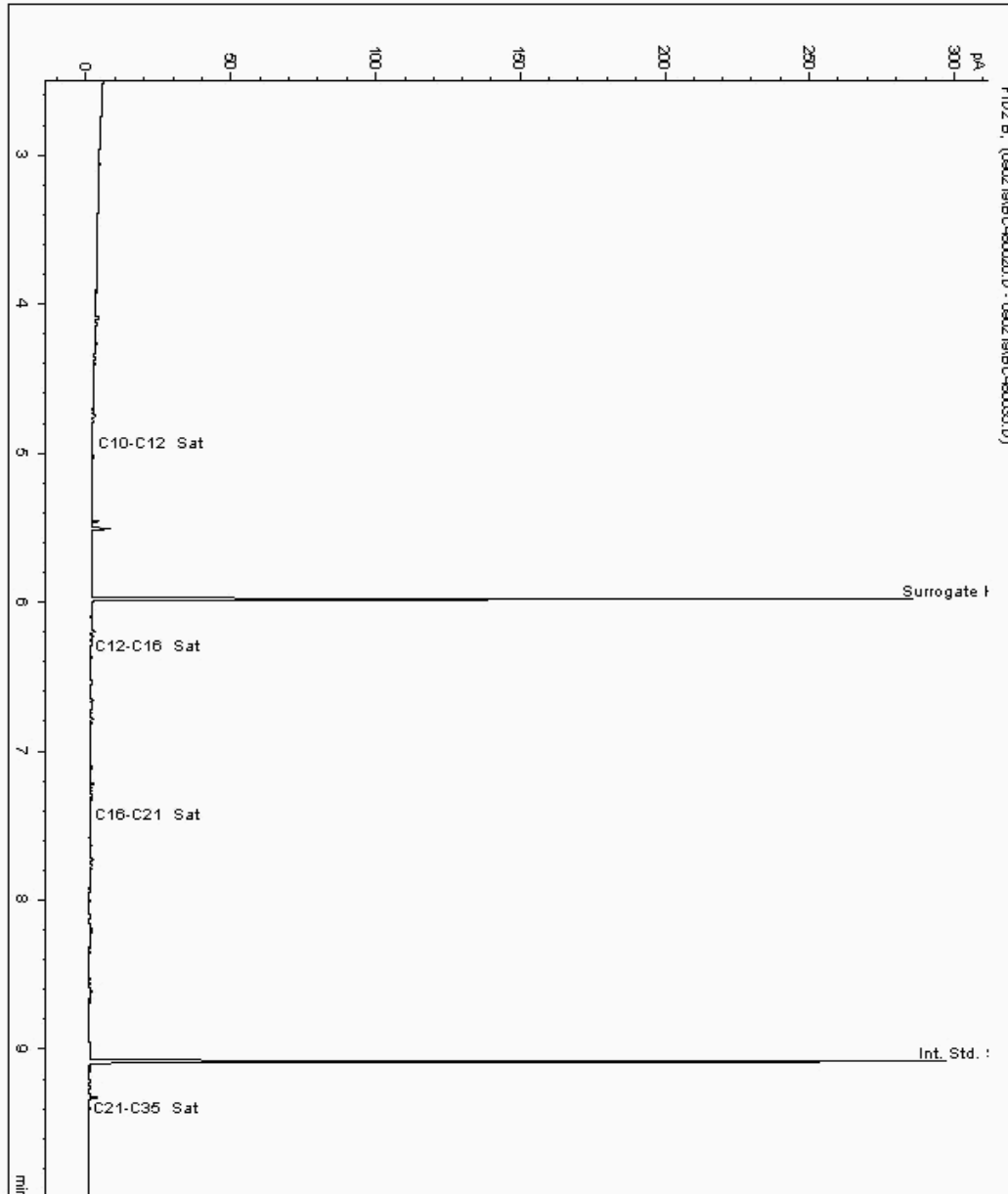
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20593737 Depth : 0.00 - 0.00
Sample ID : BH101

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337211-
Date Acquired : 02/09/2019 23:01:10 PM
Units : ppb
Dilution : SE BH101[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

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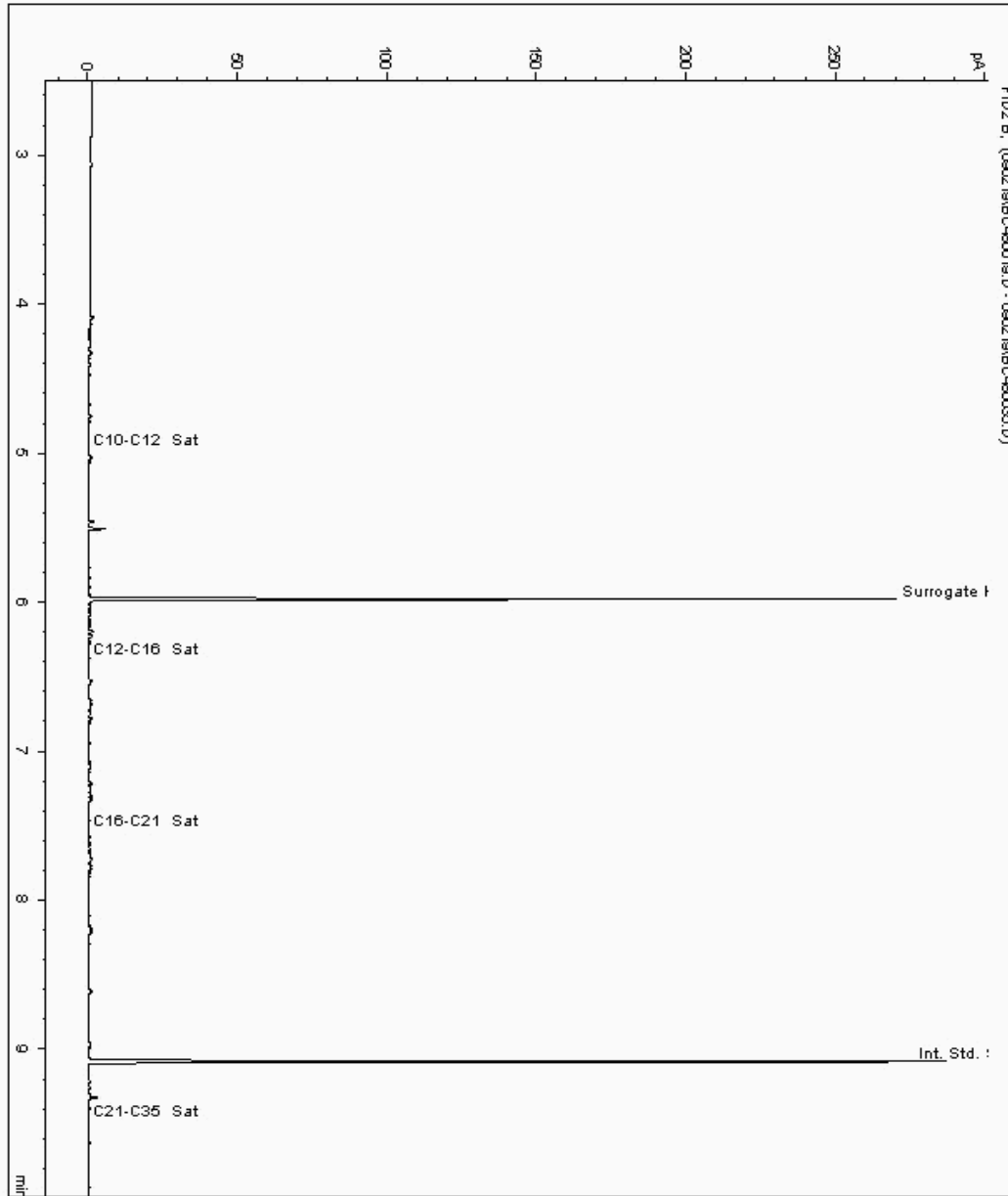
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis:	EPH CWG (Aliphatic) Filtered GC (W)	Sample No :	20593746	Depth :	0.00 - 0.00
		Sample ID :	BH105		

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337264-
Date Acquired : 02/09/2019 22:38:25 PM
Units : ppb
Dilution : SE BH105[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

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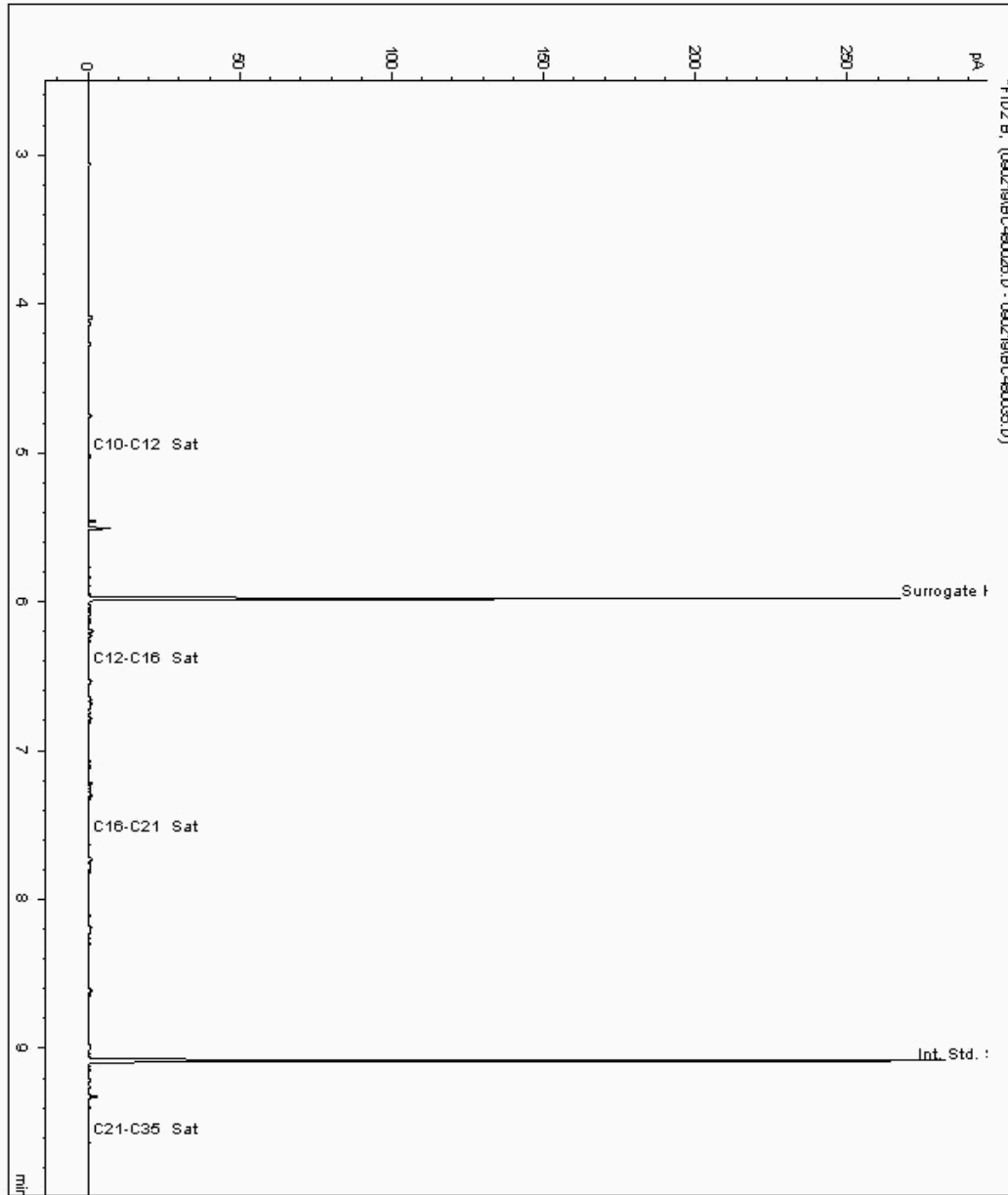
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20593753 Depth : 0.00 - 0.00
Sample ID : BH107

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337280-
Date Acquired : 03/09/2019 01:19:15 PM
Units : ppb
Dilution : SE BH107[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

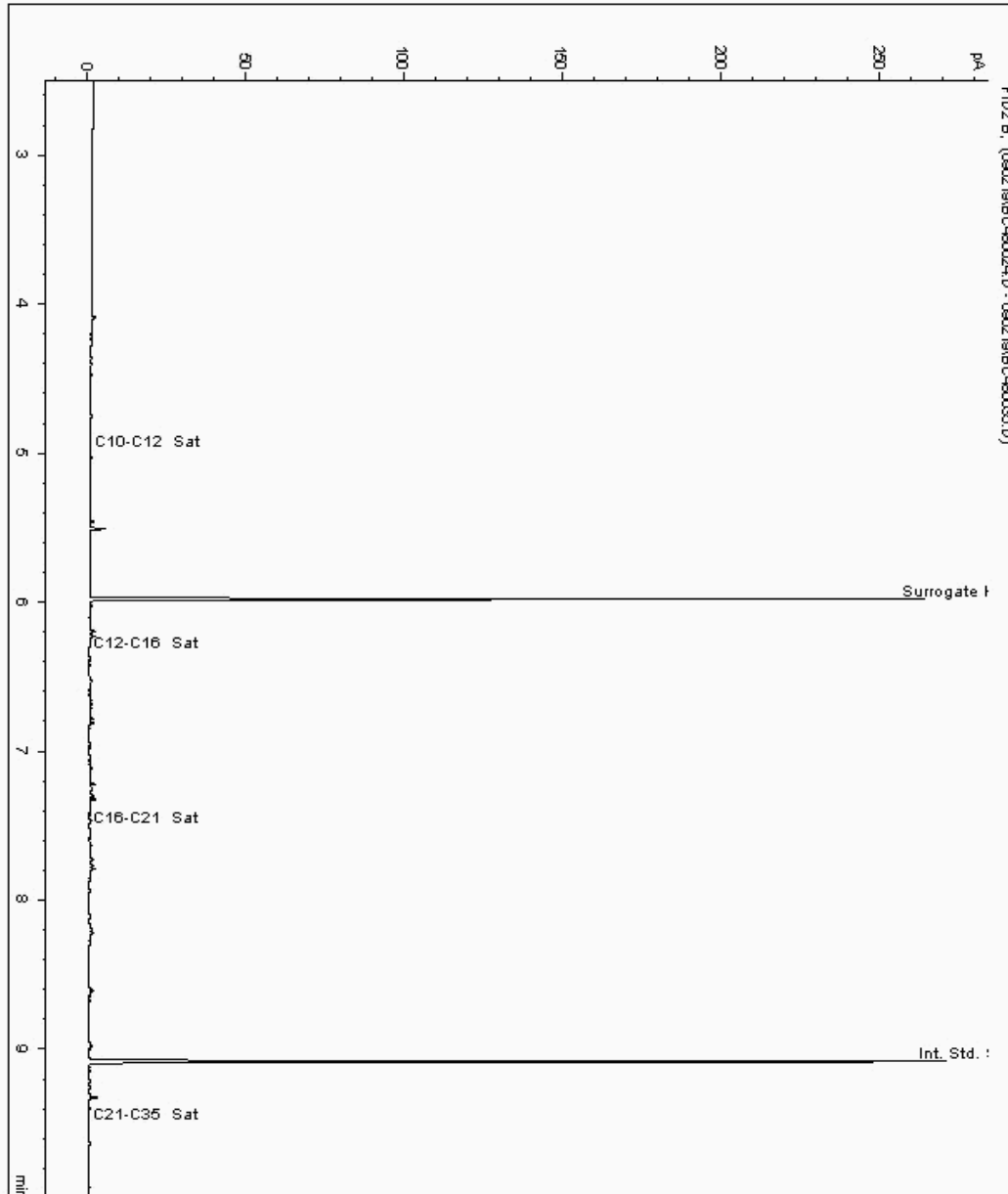
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20594371 Depth : 0.00 - 0.00
Sample ID : BHH02 (S)

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337319-
Date Acquired : 03/09/2019 00:33:16 PM
Units : ppb
Dilution : SE BHH02 (S)[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

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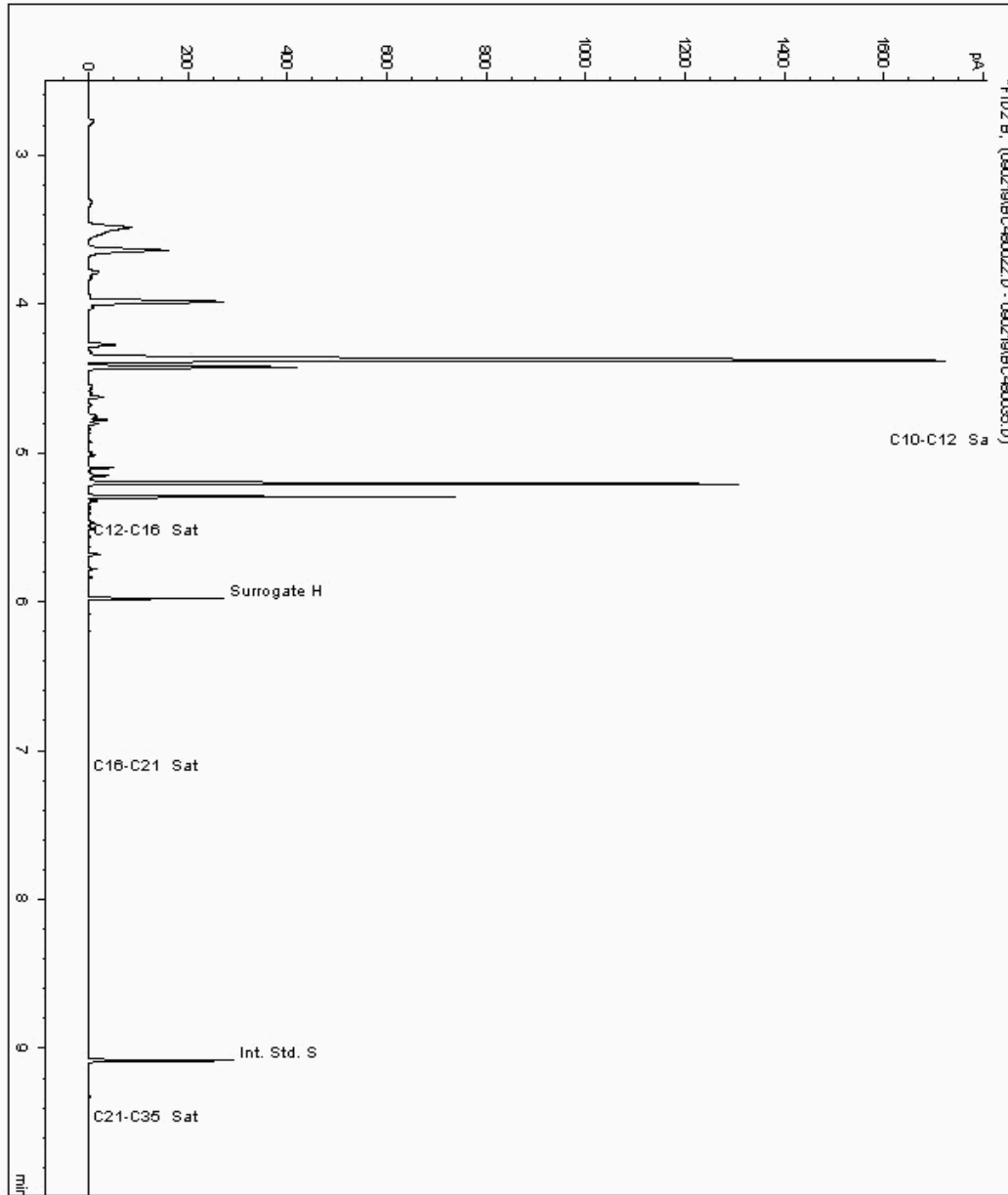
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20594381 Depth : 0.00 - 0.00
Sample ID : BHC5

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337362-
Date Acquired : 02/09/2019 23:46:57 PM
Units : ppb
Dilution : SE BHC5[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

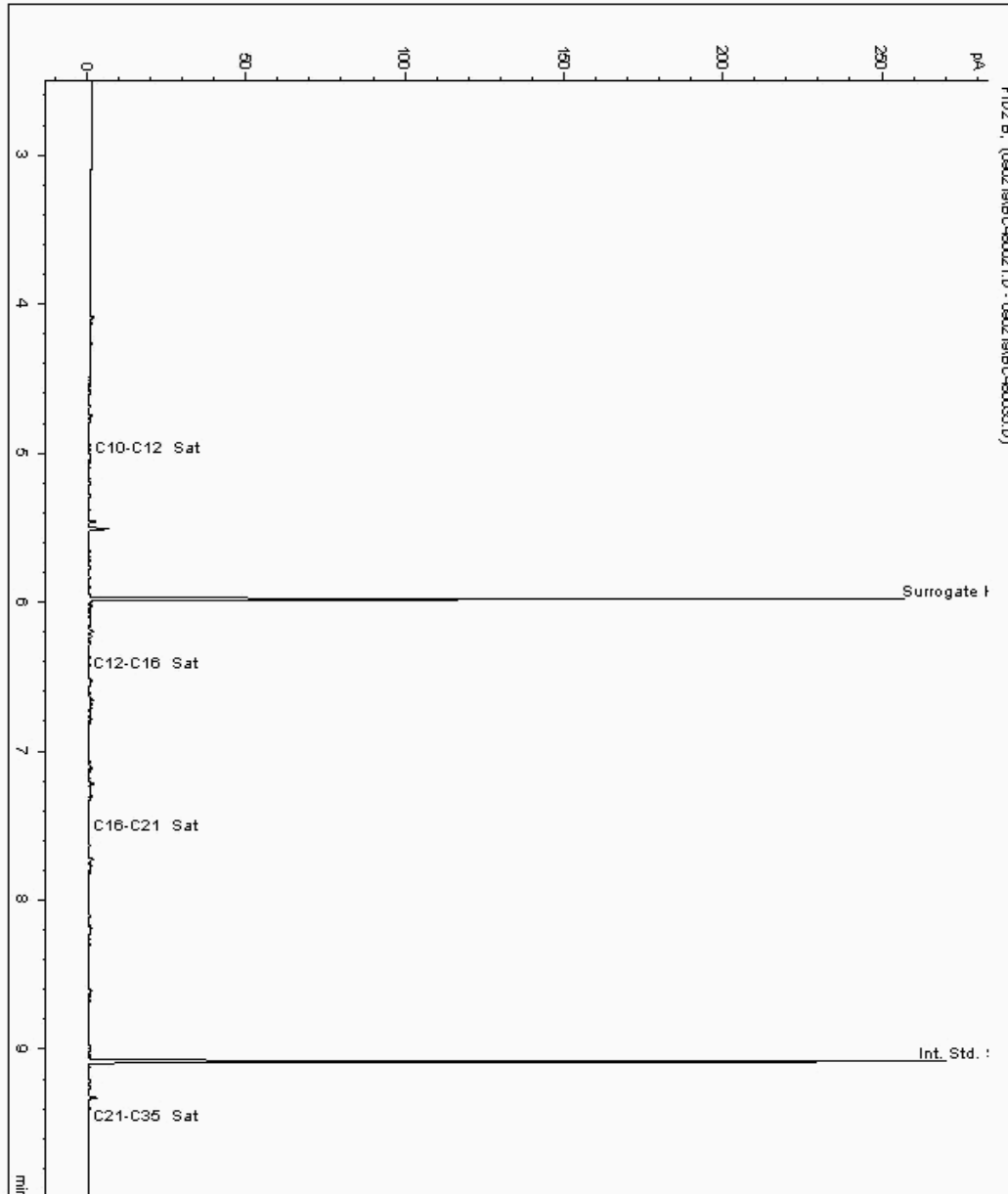
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20594393 Depth : 0.00 - 0.00
Sample ID : BH103

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337293-
Date Acquired : 02/09/2019 23:24:10 PM
Units : ppb
Dilution : SE BH103[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

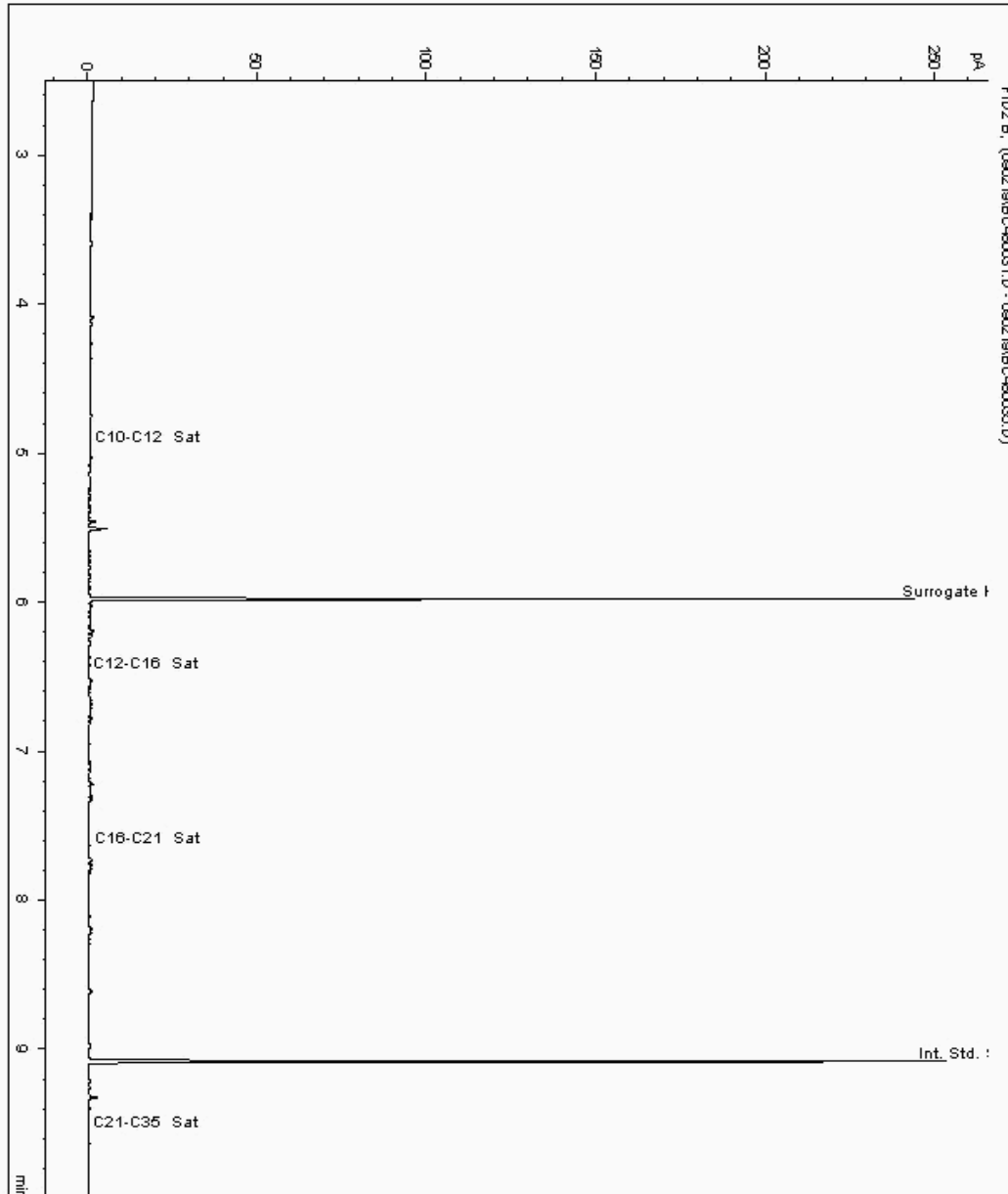
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20594415 Depth : 0.00 - 0.00
Sample ID : BH102

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337159-
Date Acquired : 03/09/2019 03:14:21 PM
Units : ppb
Dilution : SE BH102[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

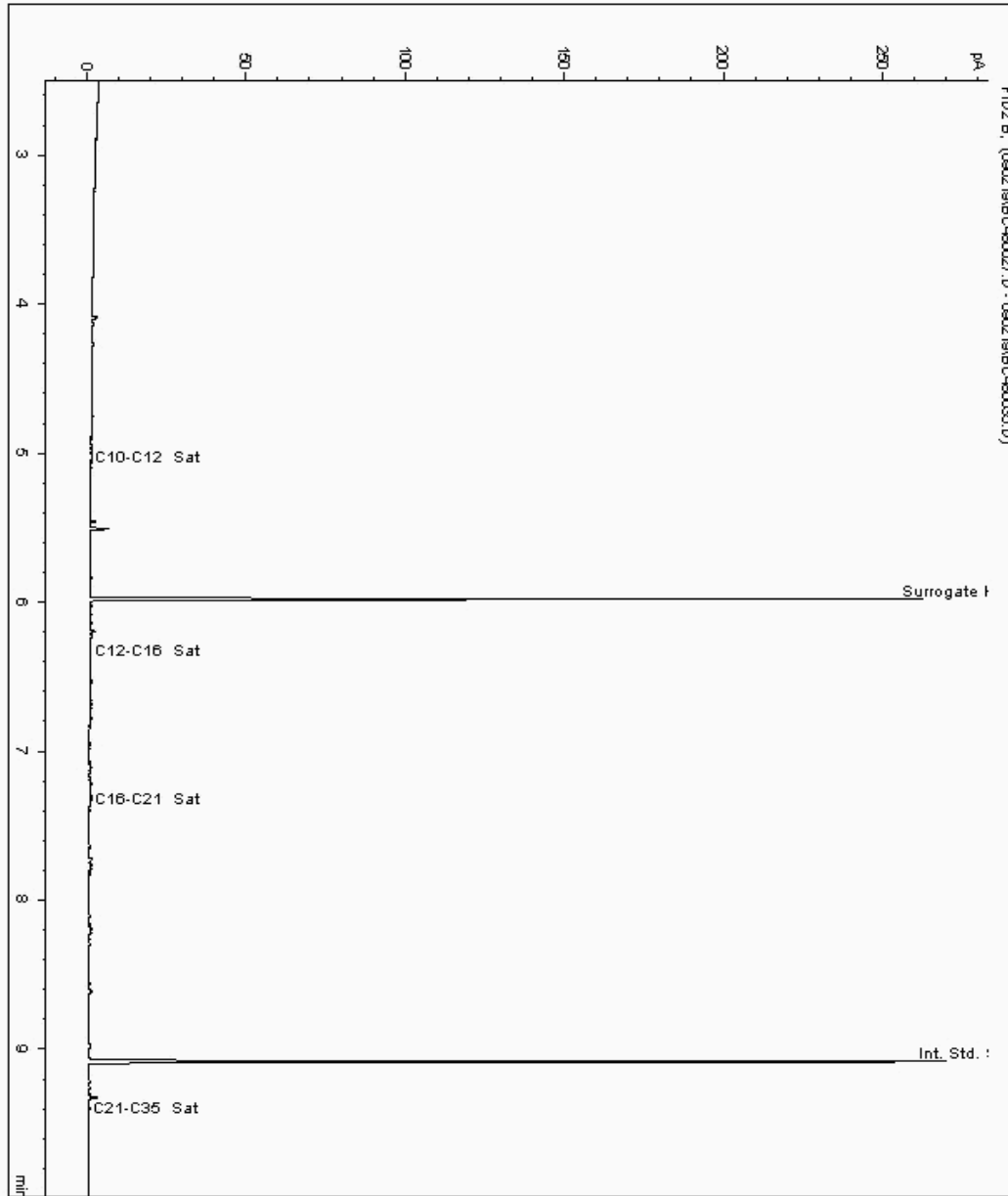
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20594428 Depth : 0.00 - 0.00
Sample ID : BHH02 (D)

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337306-
Date Acquired : 03/09/2019 01:42:14 PM
Units : ppb
Dilution : SE BHH02 (D)[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

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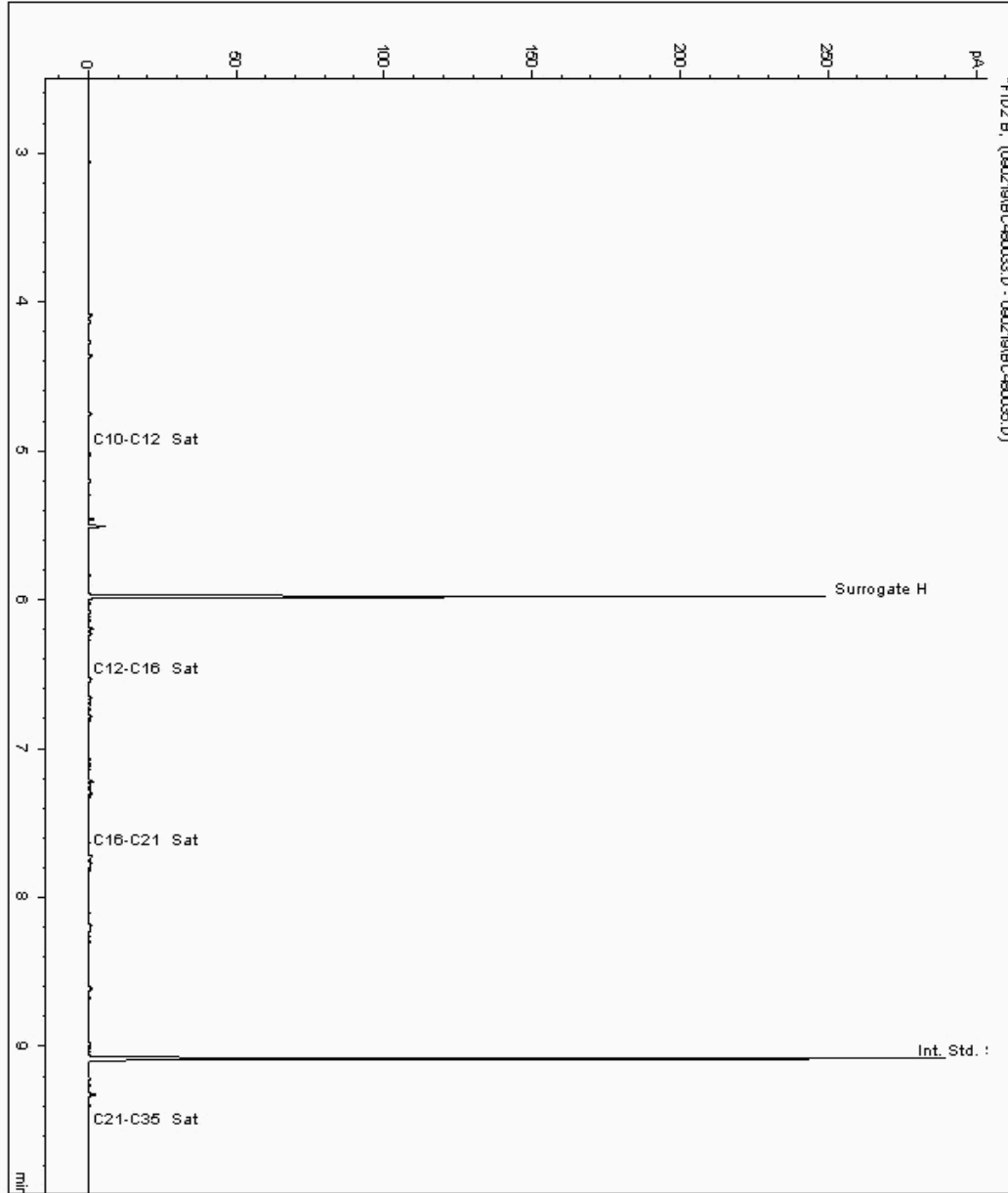
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20600207 Depth : 0.00 - 0.00
Sample ID : BHH03

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337333-
Date Acquired : 03/09/2019 04:01:00 PM
Units : ppb
Dilution : SE BHH03[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

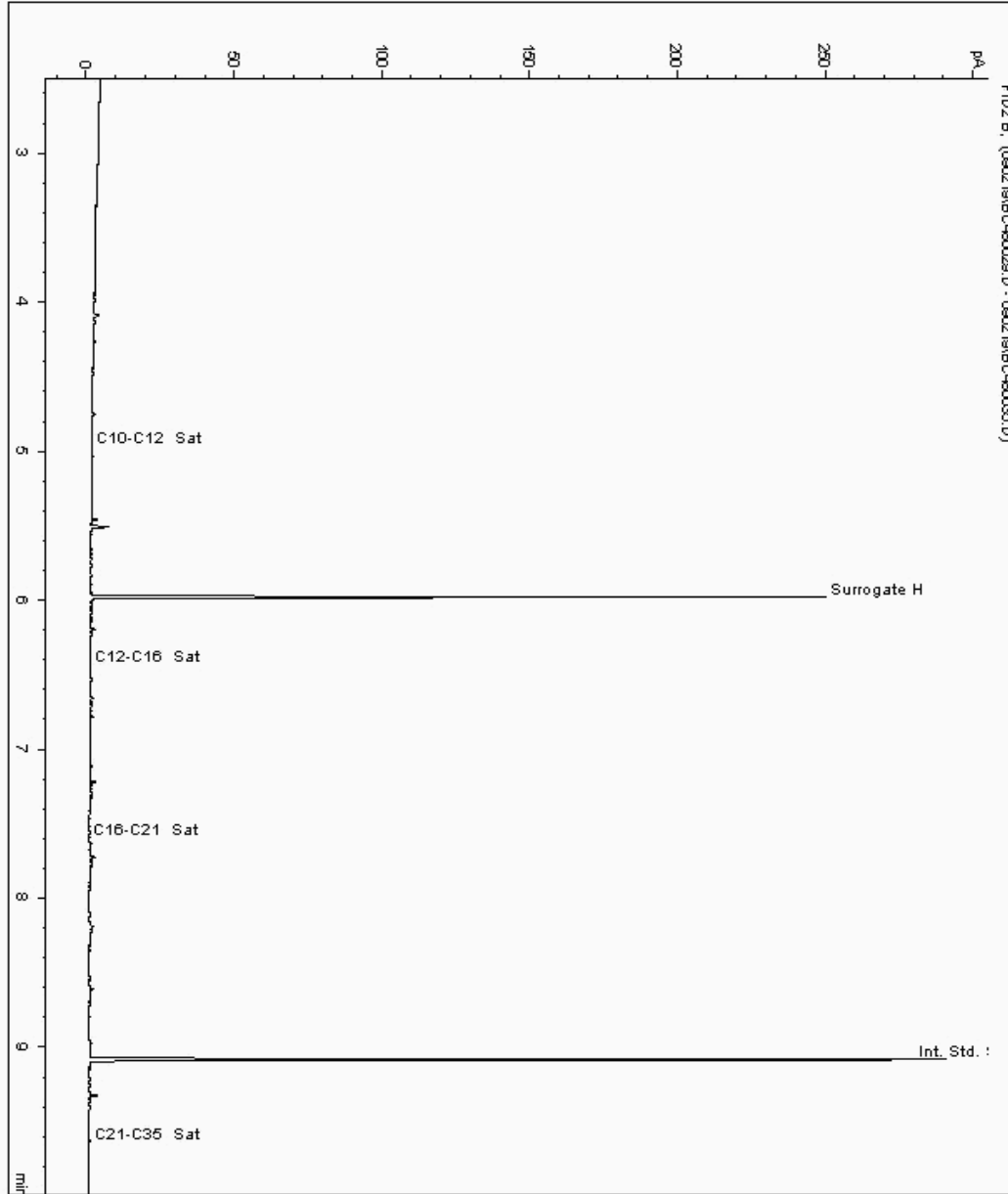
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis:	EPH CWG (Aliphatic) Filtered GC (W)	Sample No :	20600219	Depth :	0.00 - 0.00
		Sample ID :	BH106		

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337347-
Date Acquired : 03/09/2019 02:28:11 PM
Units : ppb
Dilution : SE BH106[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

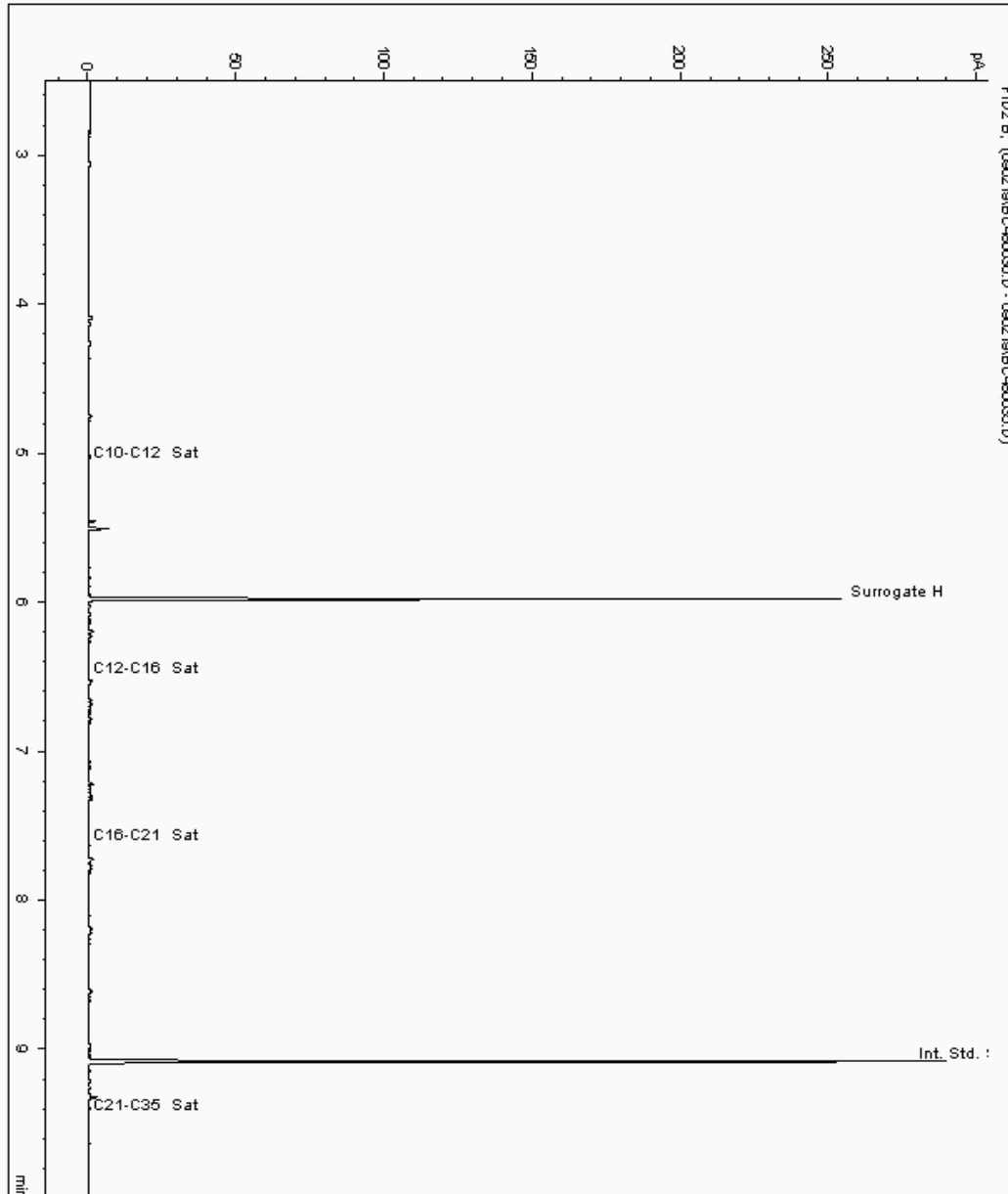
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis:	EPH CWG (Aliphatic) Filtered GC (W)	Sample No :	20600229	Depth :	0.00 - 0.00
		Sample ID :	BHH05		

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337172-
Date Acquired : 03/09/2019 02:51:07 PM
Units : ppb
Dilution : SE BHH05[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

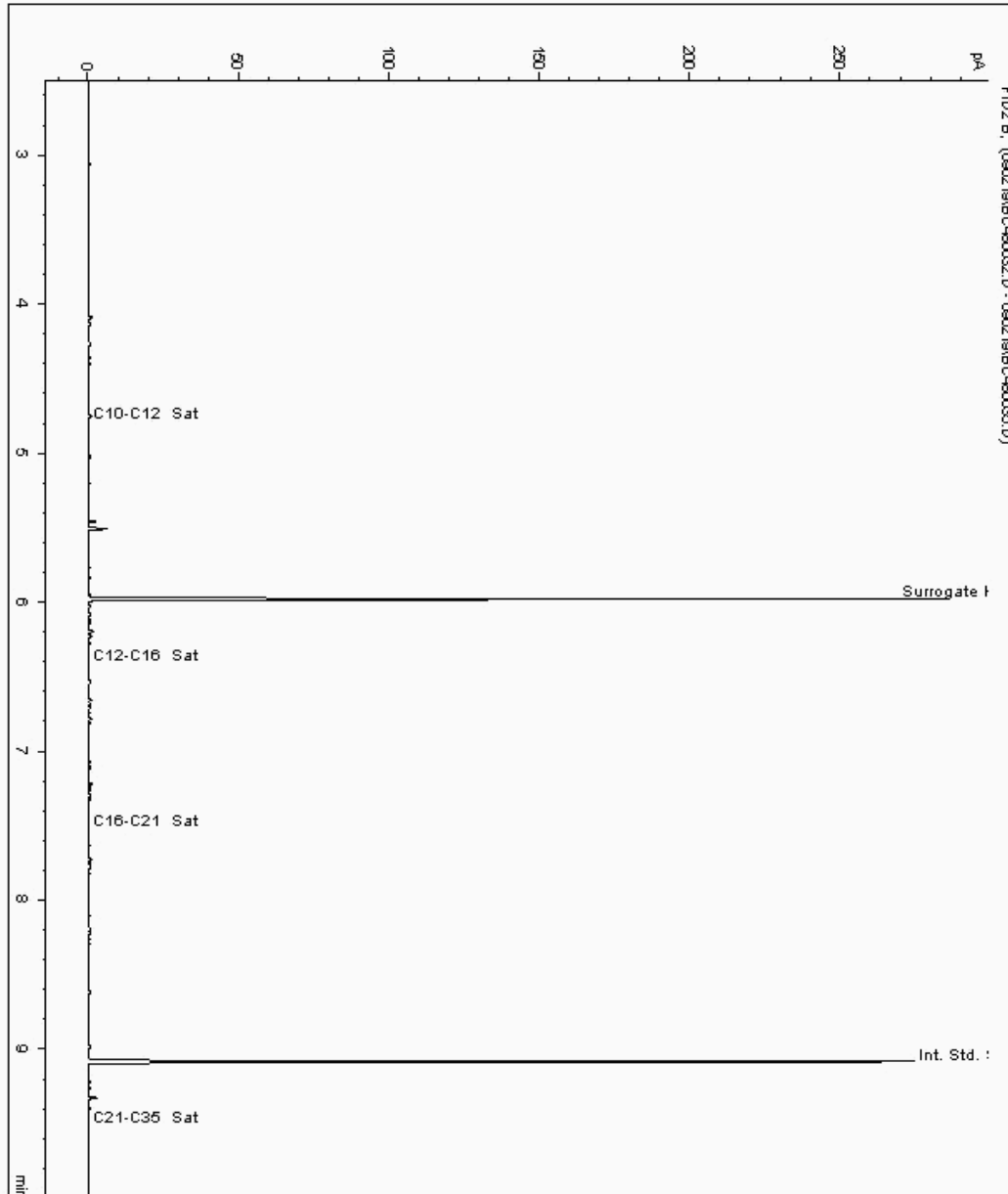
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20600252 Depth : 0.00 - 0.00
Sample ID : BHH04

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337375-
Date Acquired : 03/09/2019 03:37:34 PM
Units : ppb
Dilution : SE BHH04[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

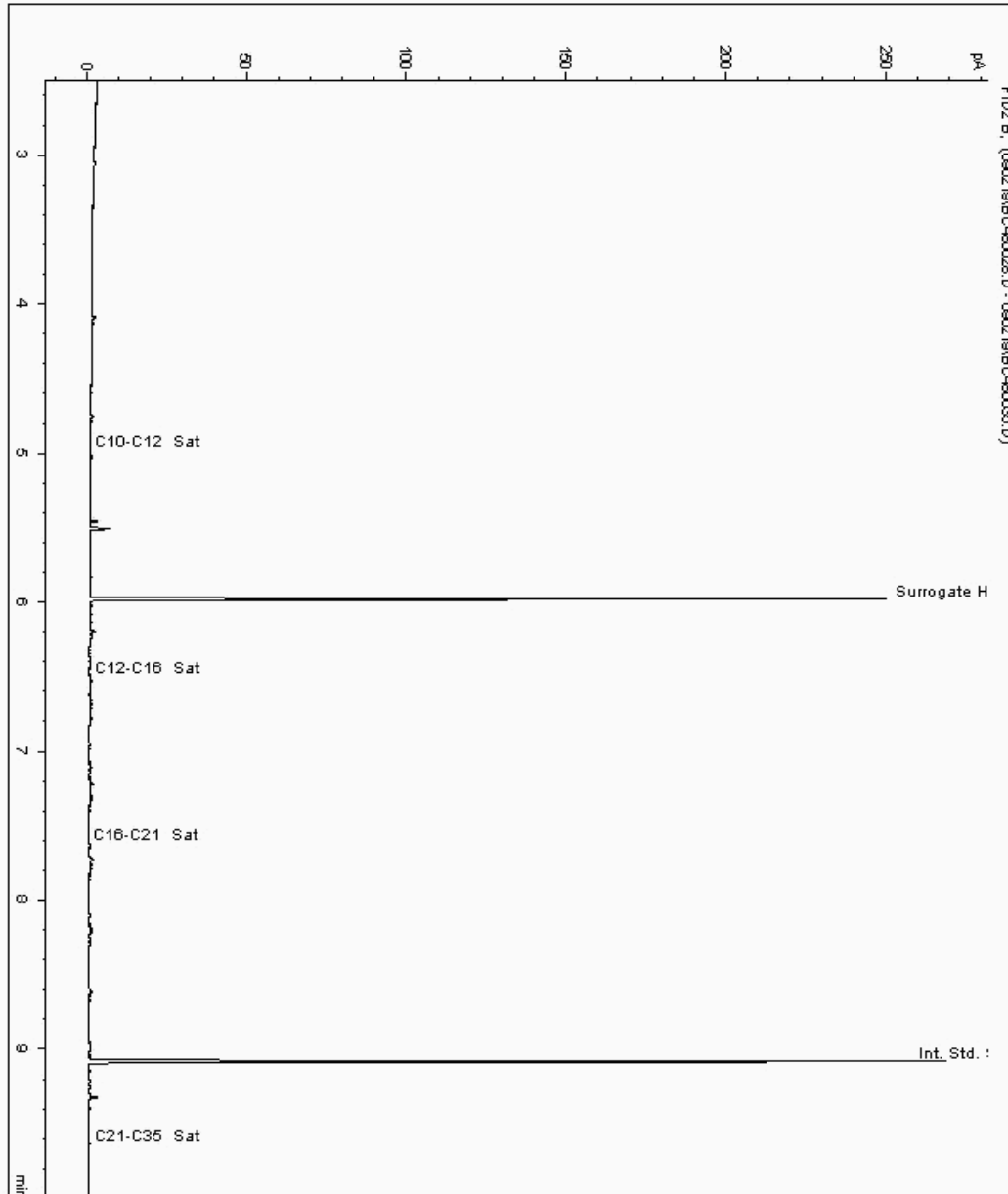
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aliphatic) Filtered GC (W) Sample No : 20600261 Depth : 0.00 - 0.00
Sample ID : BHH07(S)

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 19337185-
Date Acquired : 03/09/2019 02:04:58 PM
Units : ppb
Dilution : SE BHH07(S)[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

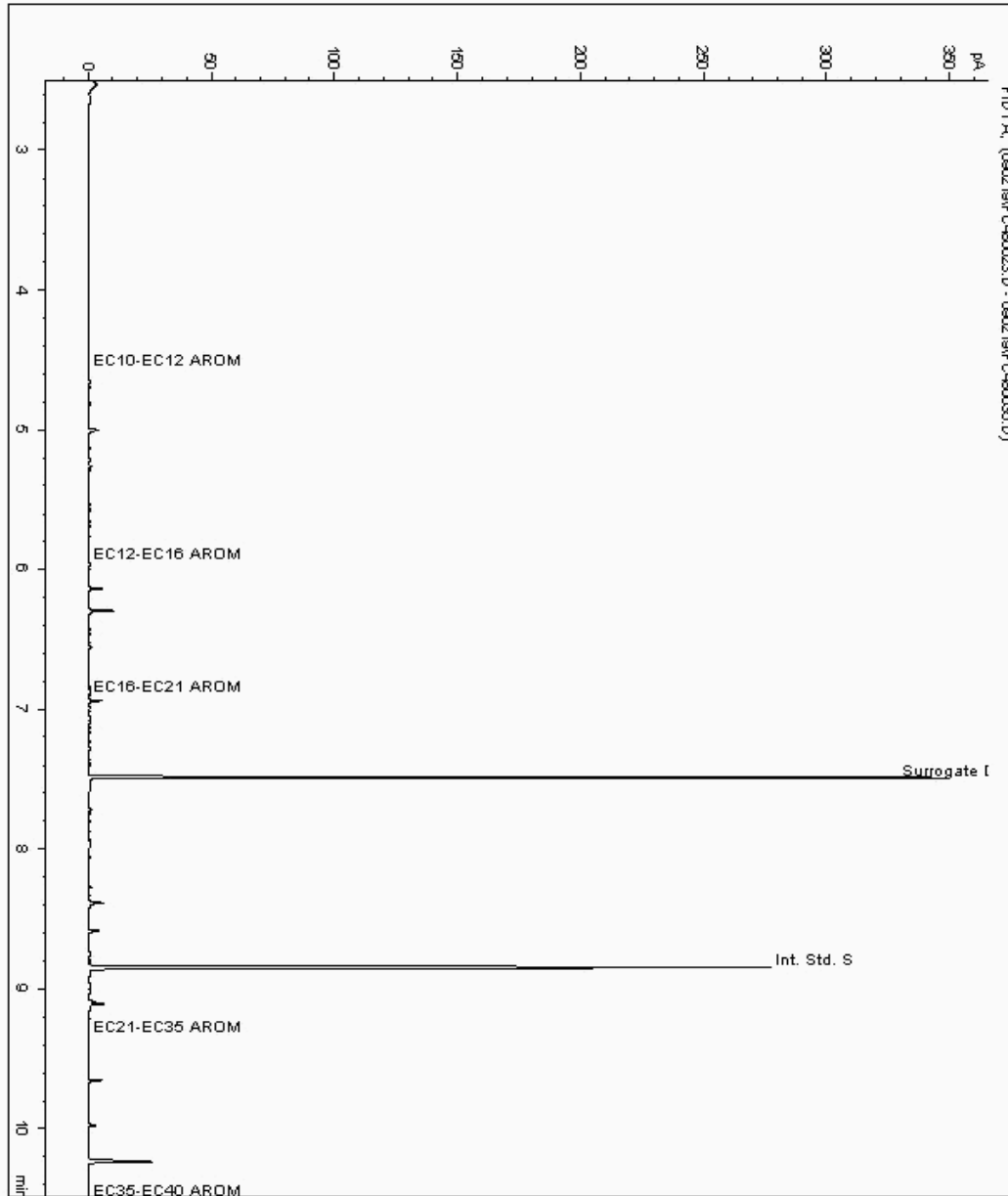
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Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aromatic) Filtered GC (W) Sample No : 20593721 Depth : 0.00 - 0.00
Sample ID : BHH07(D)

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337199-
Date Acquired : 03/09/2019 00:09:45 PM
Units : ppb
Dilution : SE BHH07(D)[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

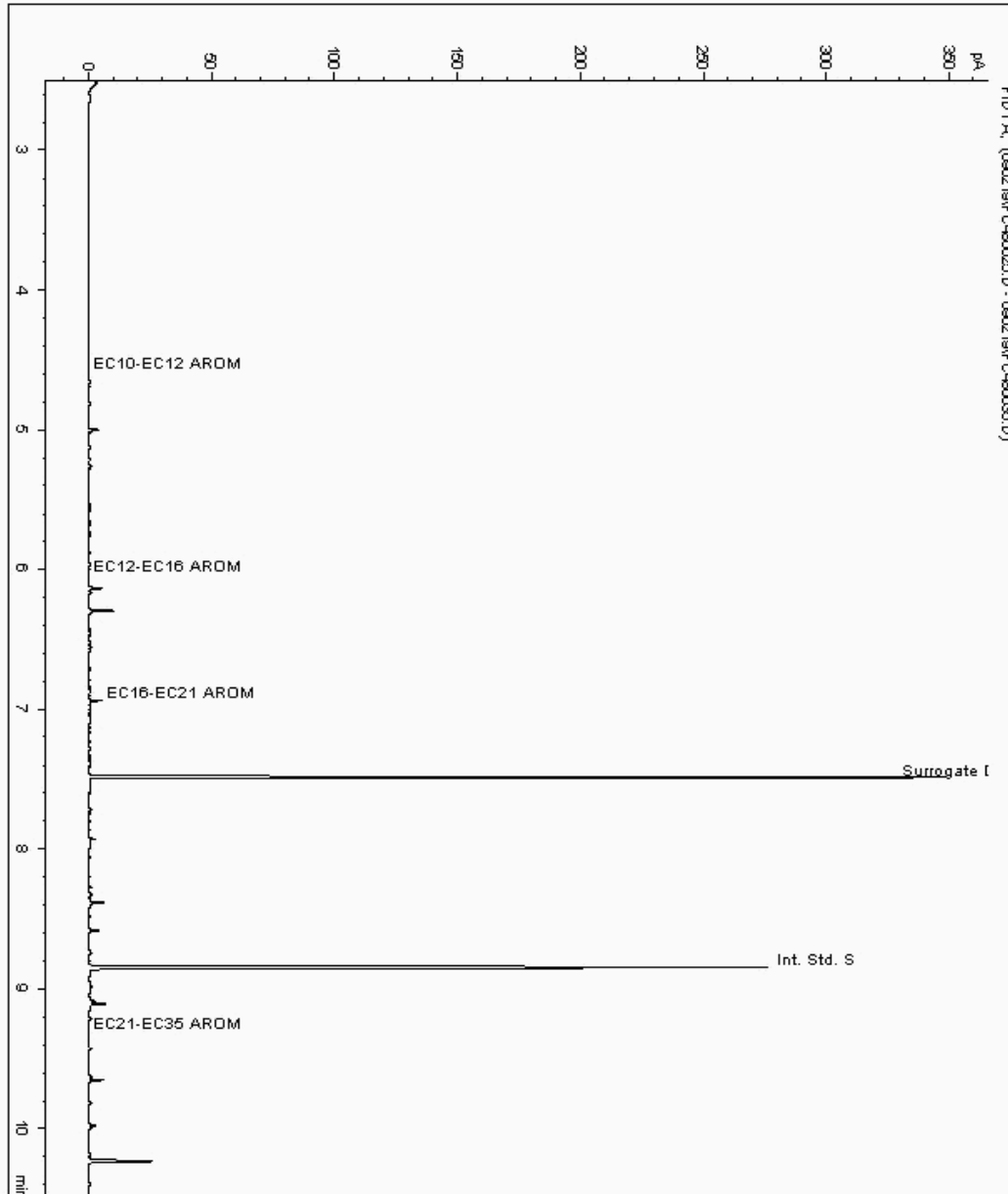
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20593729
Sample ID : MW1

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337240-
Date Acquired : 03/09/2019 07:42:25 PM
Units : ppb
Dilution : SE MW1[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

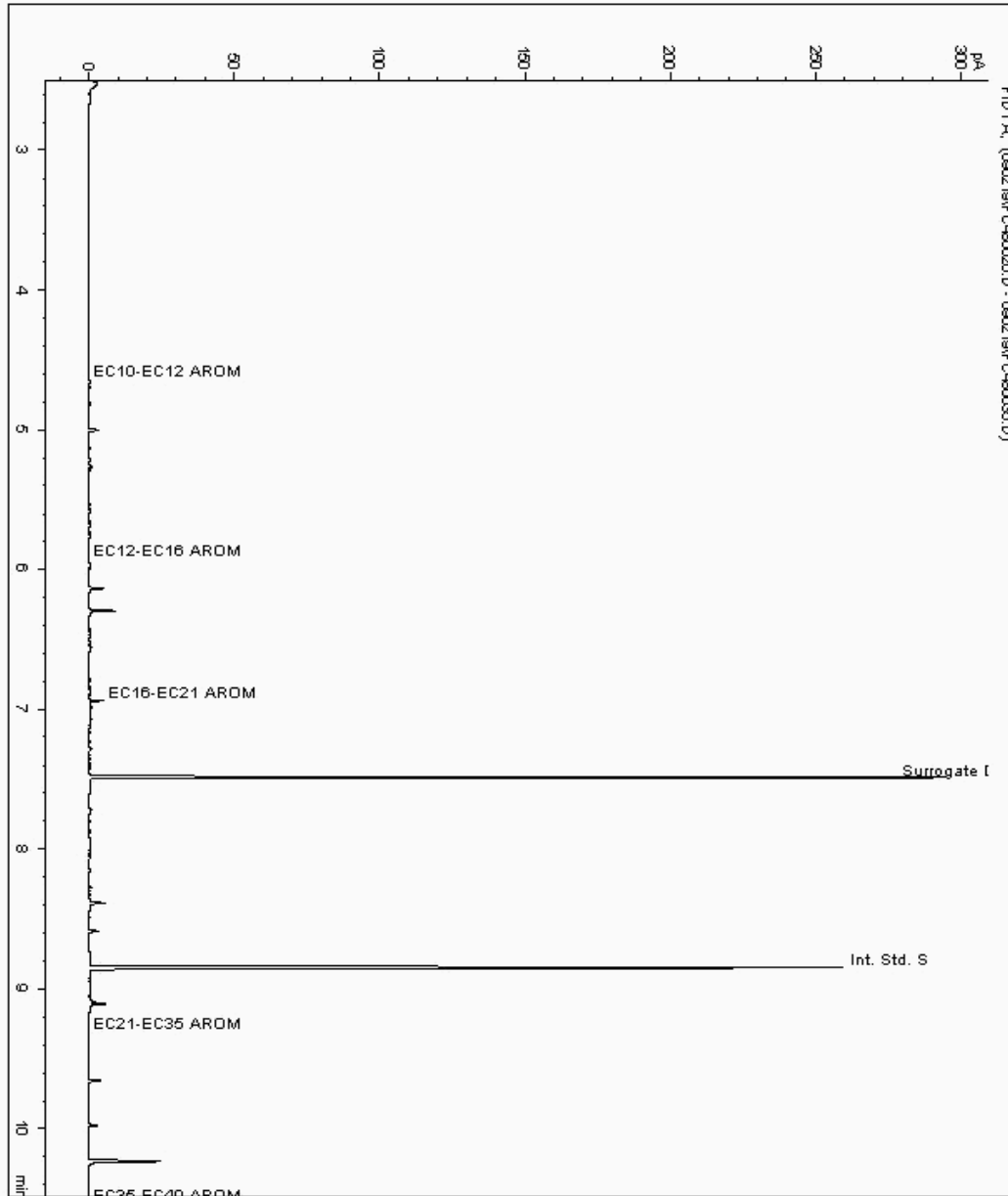
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20593737
Sample ID : BH101

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337212-
Date Acquired : 02/09/2019 23:01:10 PM
Units : ppb
Dilution : SE BH101[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

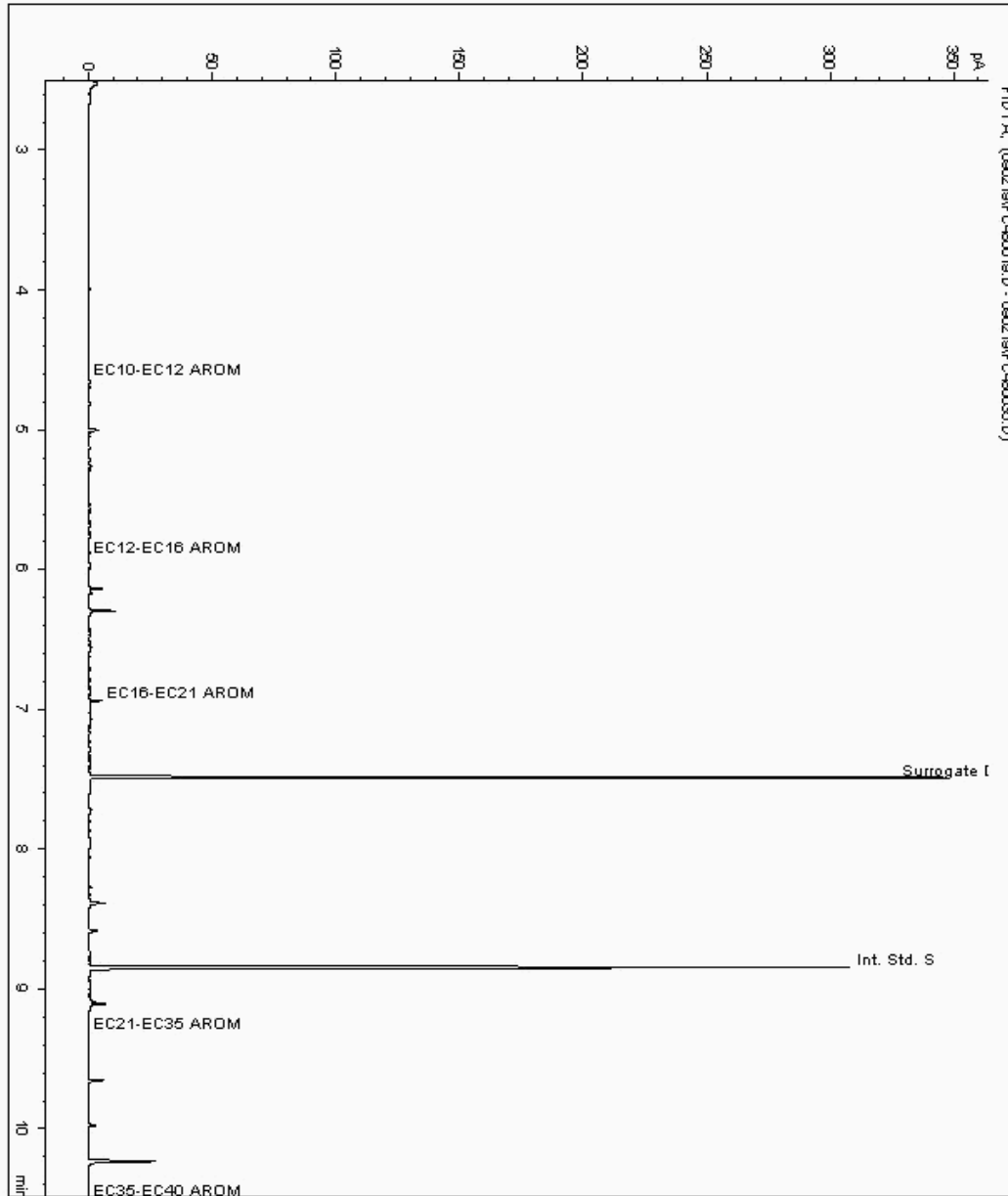
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20593746
Sample ID : BH105

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337265-
Date Acquired : 02/09/2019 22:38:25 PM
Units : ppb
Dilution : SE BH105[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

Report Number: 520495
Superseded Report: 520458

Chromatogram

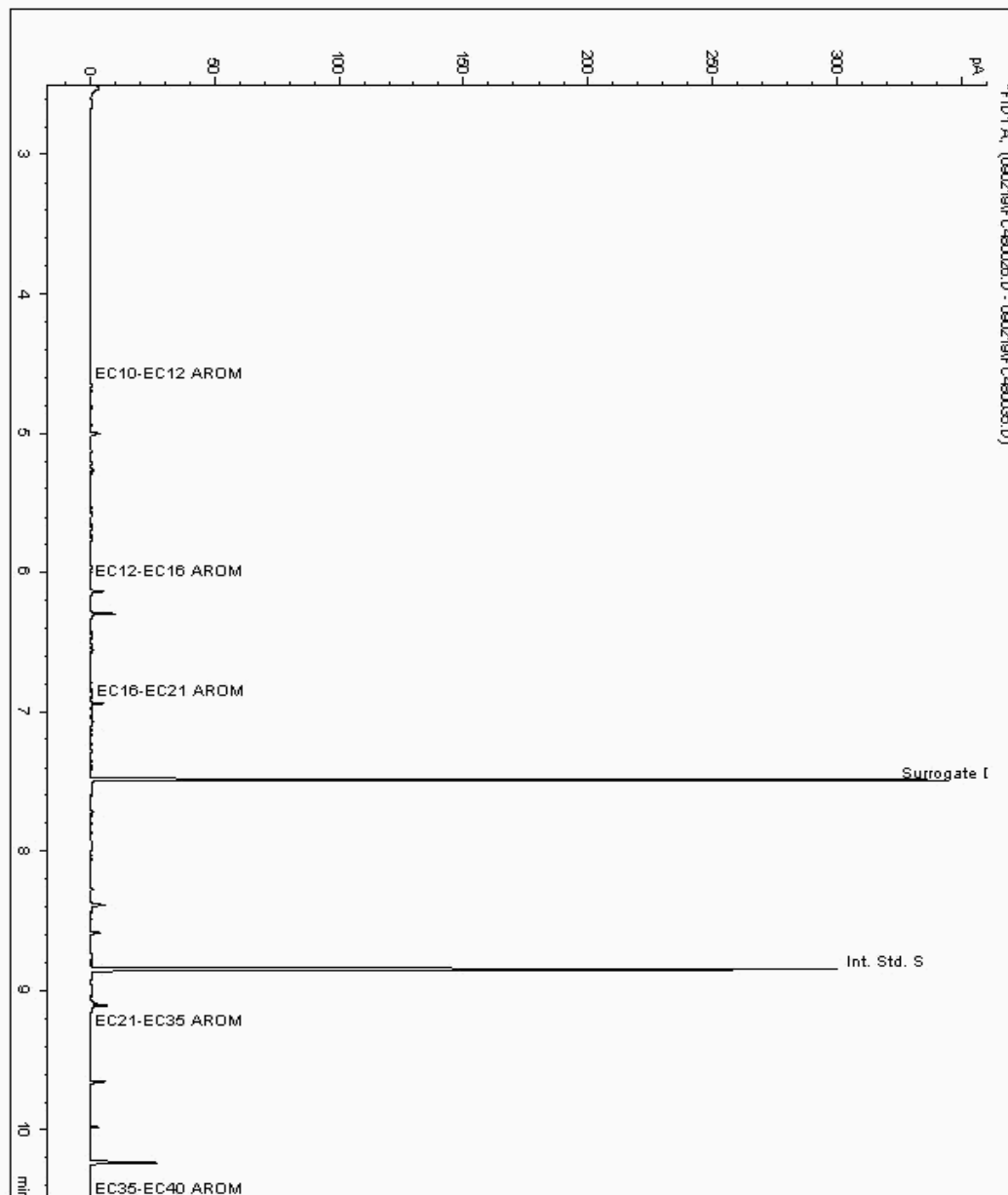
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20593753
Sample ID : BH107

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337281-
Date Acquired : 03/09/2019 01:19:16 PM
Units : ppb
Dilution : SE BH107[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

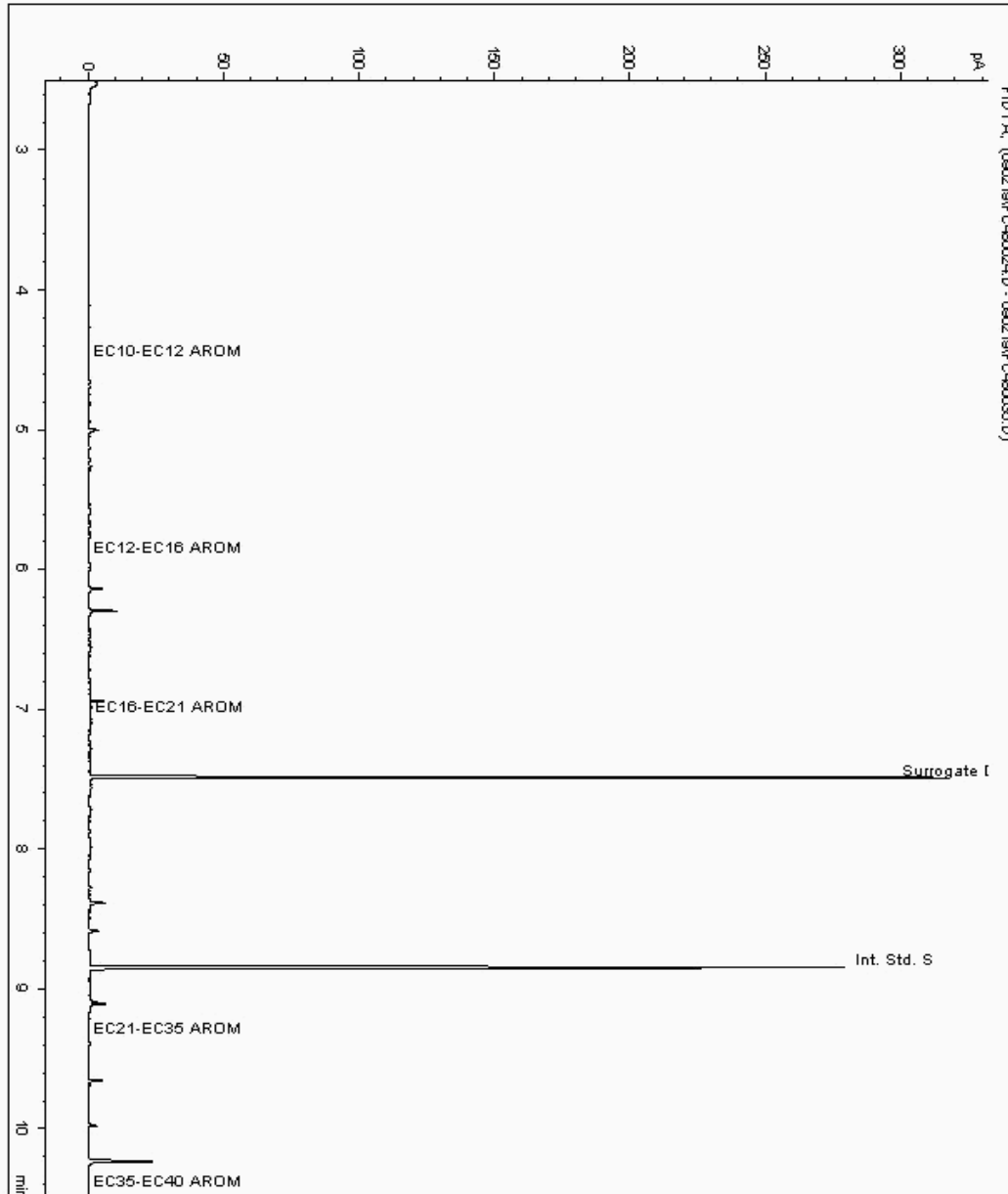
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20594371
Sample ID : BHH02 (S)

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337320-
Date Acquired : 03/09/2019 00:33:17 PM
Units : ppb
Dilution : SE BHH02 (S)[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

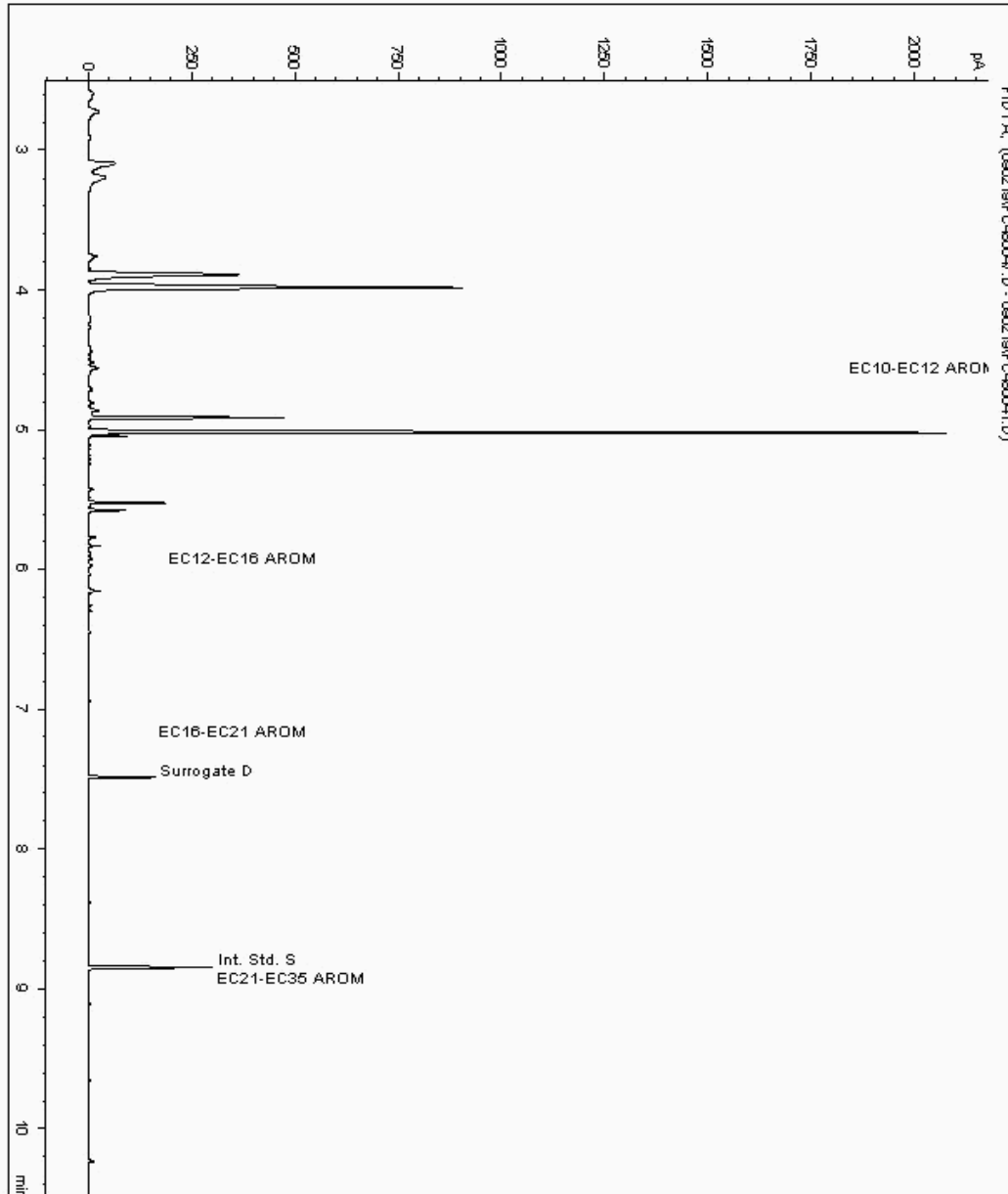
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aromatic) Filtered GC (W) Sample No : 20594381 Depth : 0.00 - 0.00
Sample ID : BHC5

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337363-
Date Acquired : 03/09/2019 09:32:00 PM
Units : ppb
Dilution : SE BHC5[0.00 - 0.00] ->
CF : 1
Multiplier : 0.050





CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

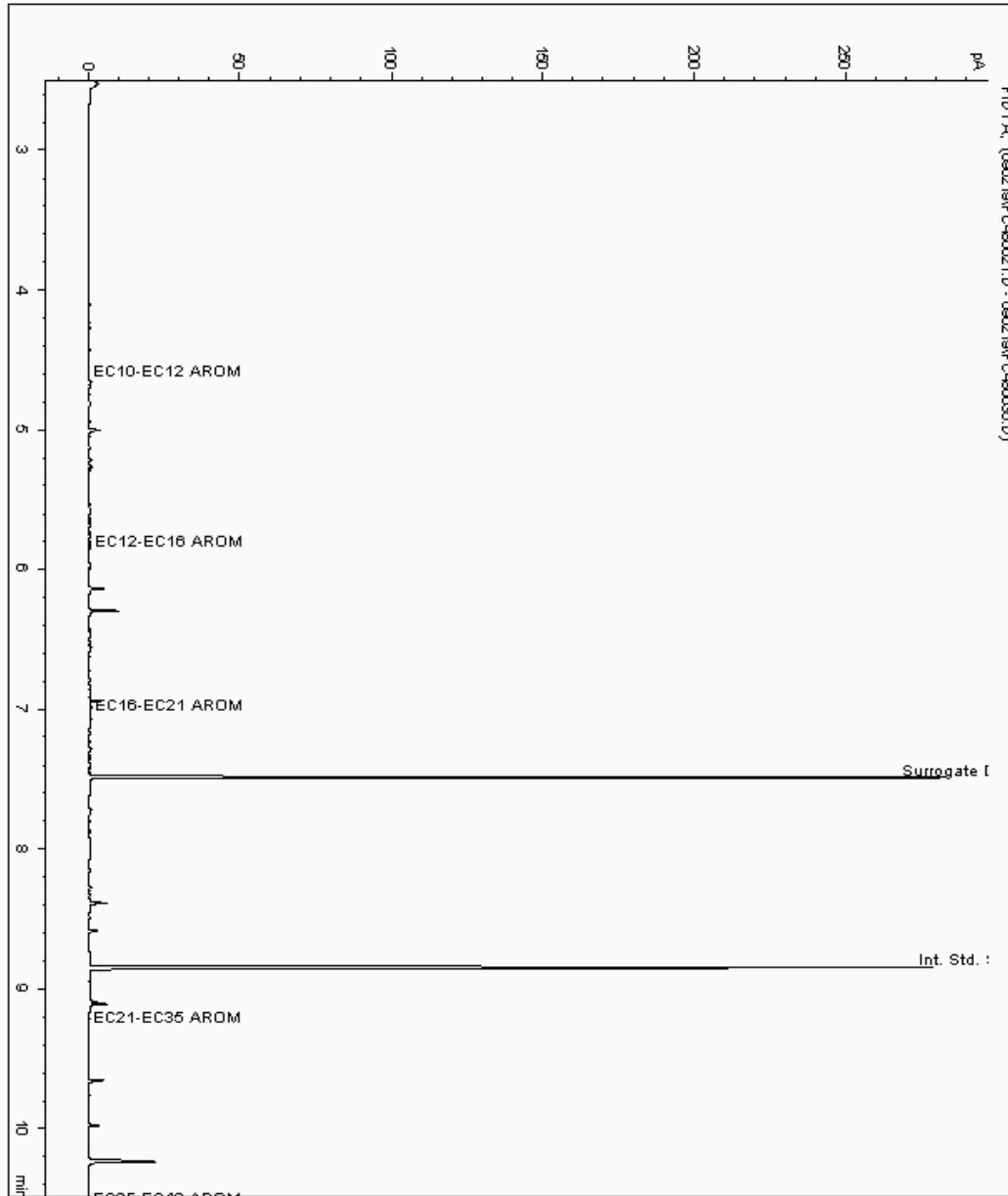
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20594393
Sample ID : BH103

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337294-
Date Acquired : 02/09/2019 23:24:10 PM
Units : ppb
Dilution : SE BH103[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

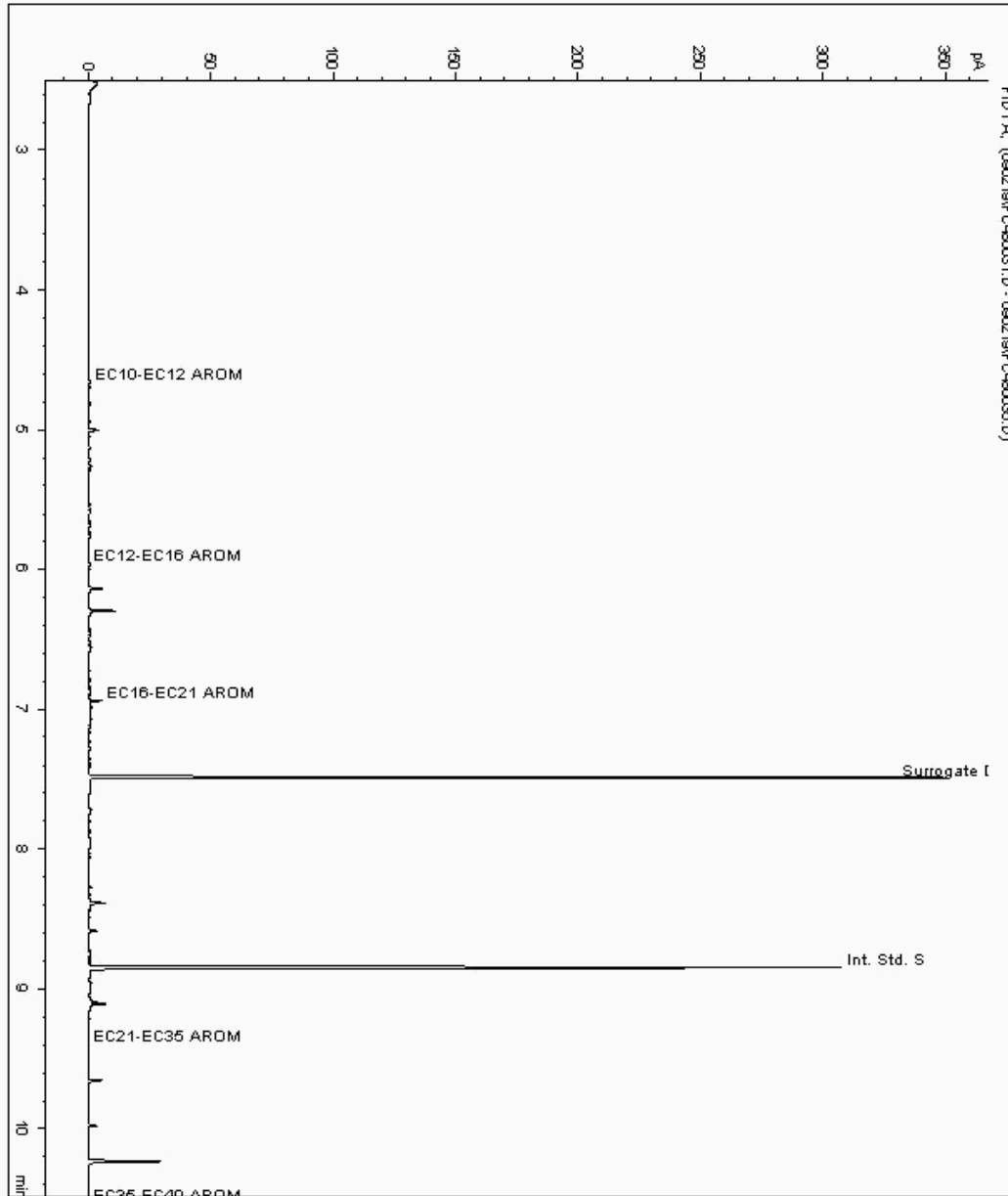
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20594415
Sample ID : BH102

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337160-
Date Acquired : 03/09/2019 03:14:20 PM
Units : ppb
Dilution : SE BH102[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

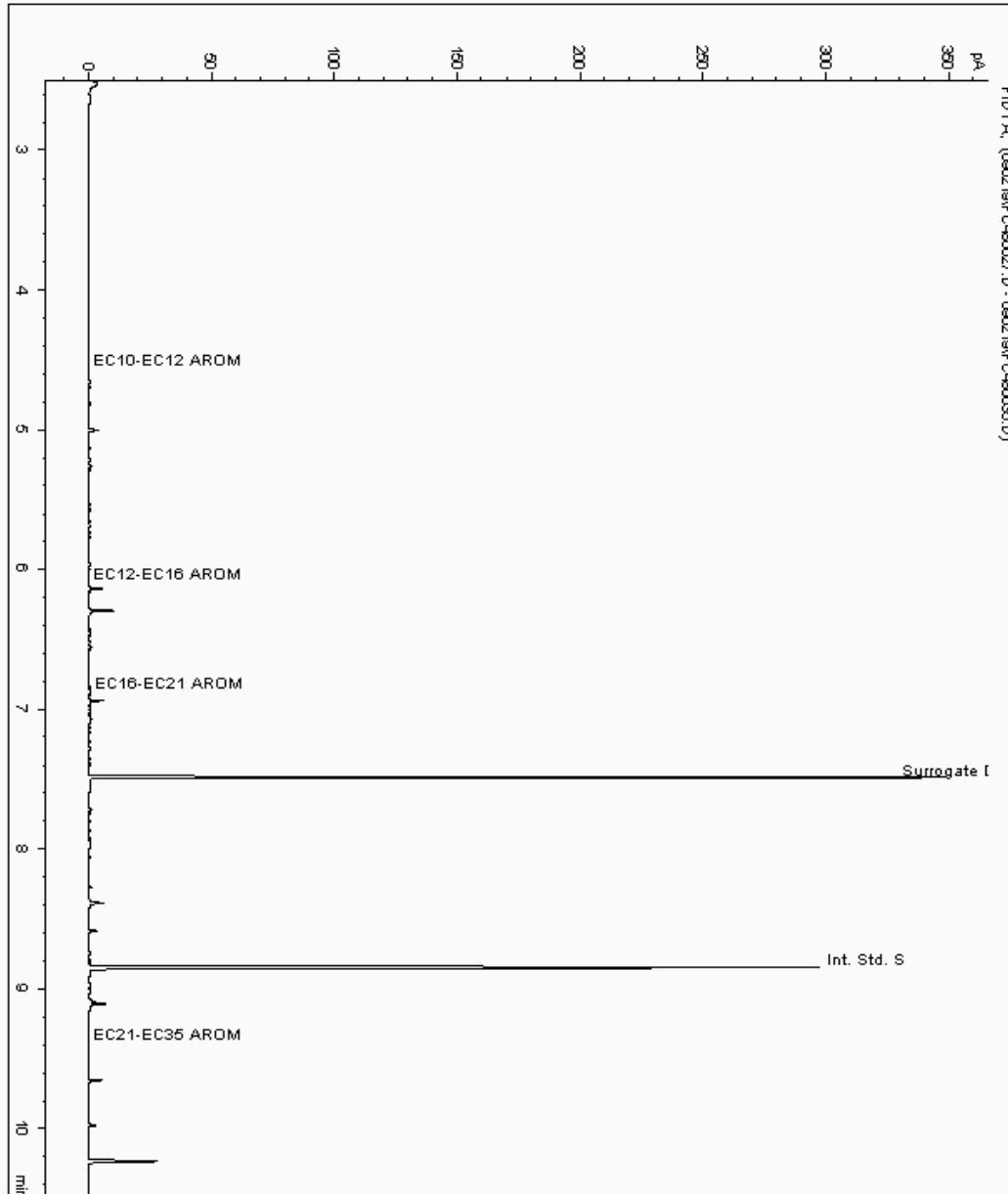
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aromatic) Filtered GC (W) Sample No : 20594428 Depth : 0.00 - 0.00
Sample ID : BHH02 (D)

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337307-
Date Acquired : 03/09/2019 01:42:14 PM
Units : ppb
Dilution : SE BHH02 (D)[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

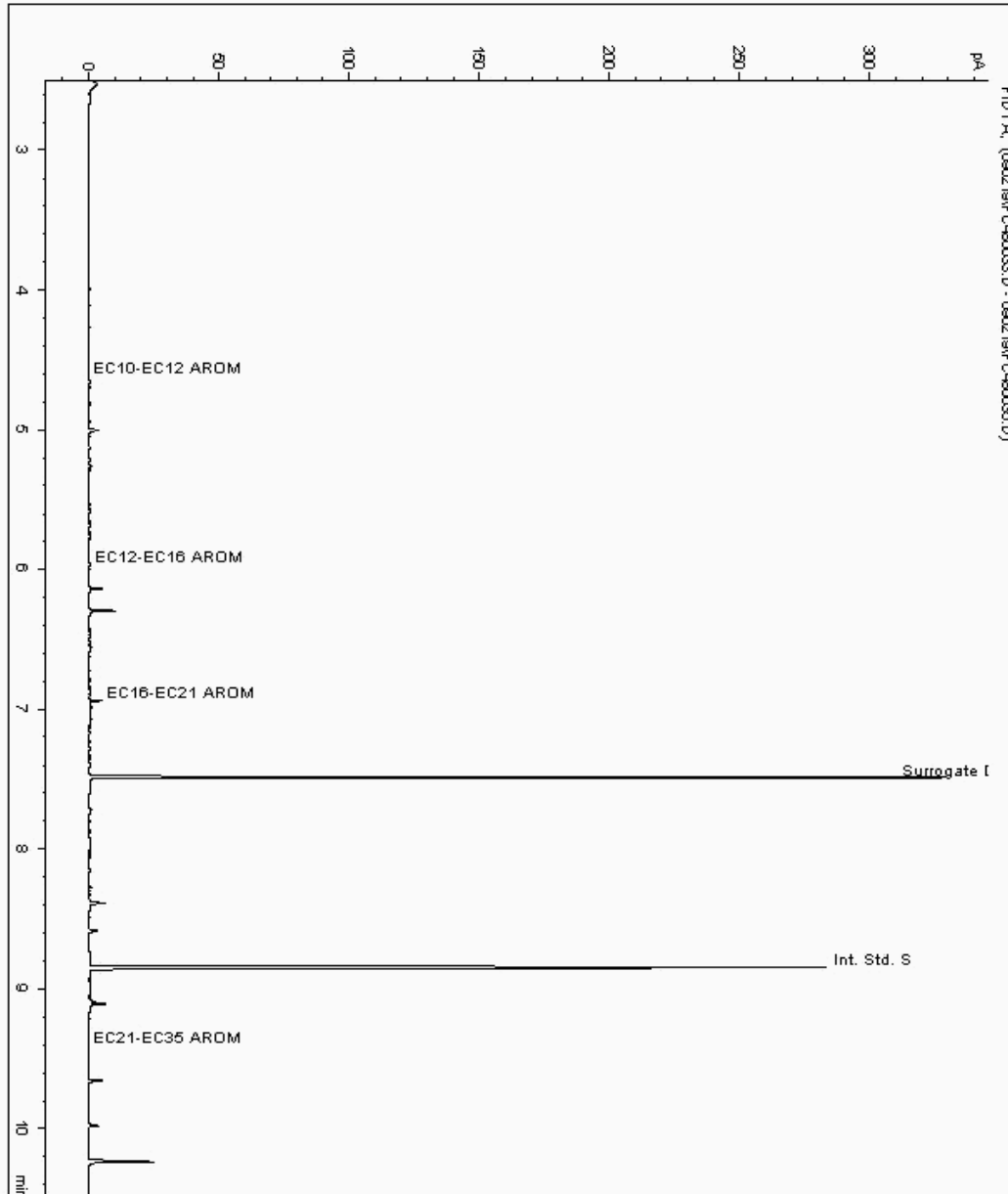
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20600207
Sample ID : BHH03

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337334-
Date Acquired : 03/09/2019 04:01:01 PM
Units : ppb
Dilution : SE BHH03[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

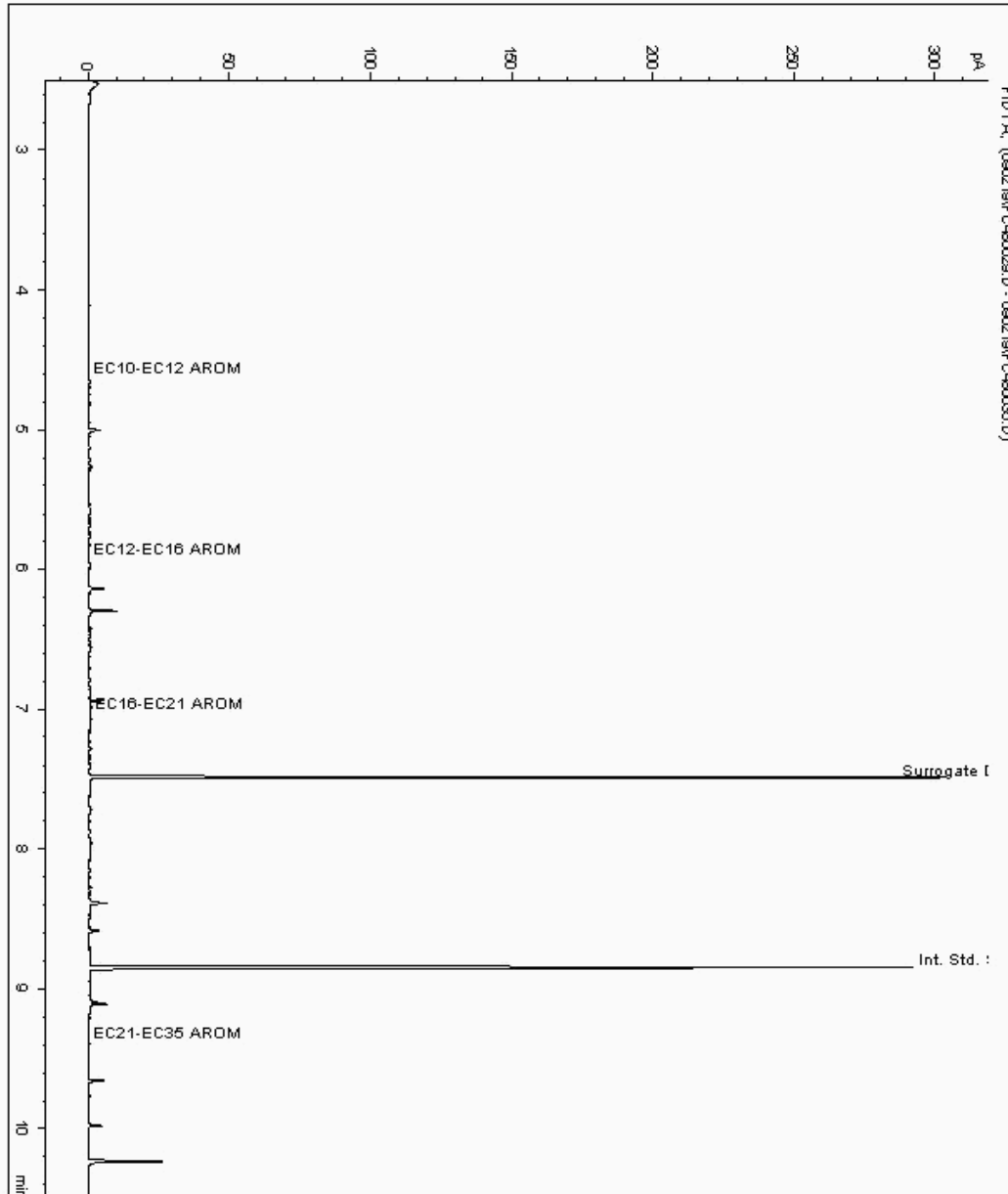
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aromatic) Filtered GC (W) Sample No : 20600219 Depth : 0.00 - 0.00
Sample ID : BH106

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337348-
Date Acquired : 03/09/2019 02:28:12 PM
Units : ppb
Dilution : SE BH106[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

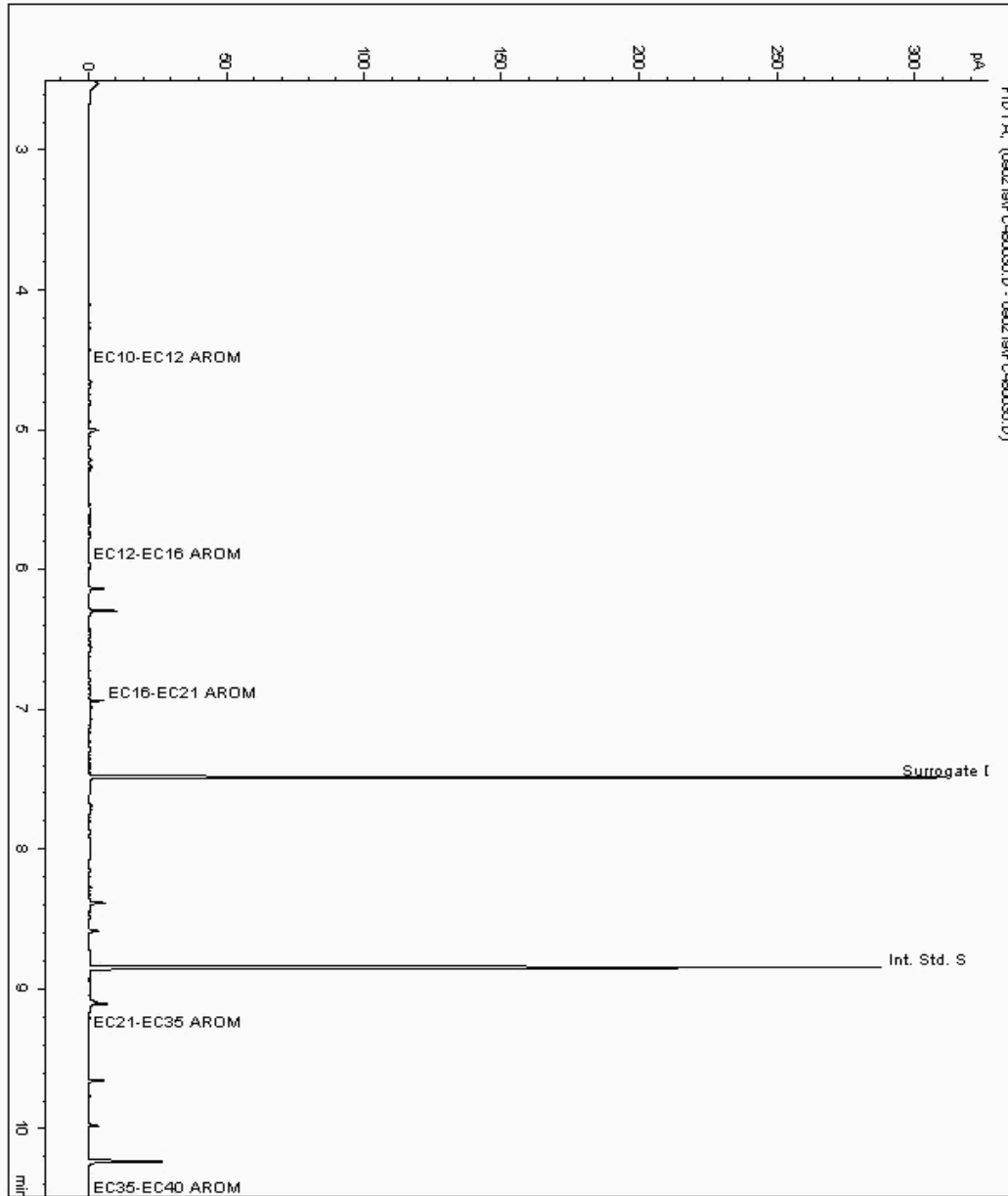
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20600229
Sample ID : BHH05

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337173-
Date Acquired : 03/09/2019 02:51:07 PM
Units : ppb
Dilution : SE BHH05[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

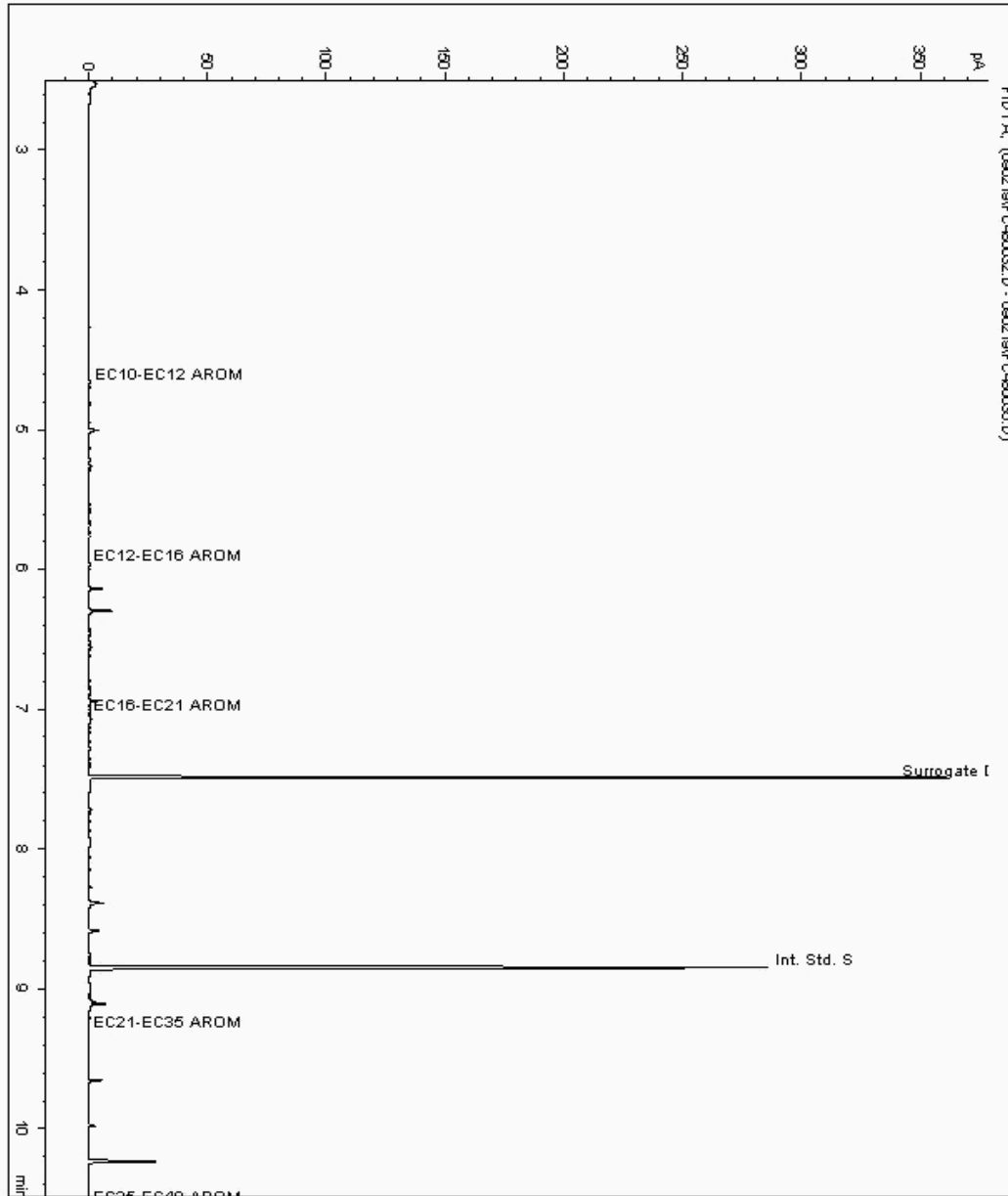
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: EPH CWG (Aromatic) Filtered GC (W) Sample No : 20600252 Depth : 0.00 - 0.00
Sample ID : BHH04

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337376-
Date Acquired : 03/09/2019 03:37:33 PM
Units : ppb
Dilution : SE BHH04[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

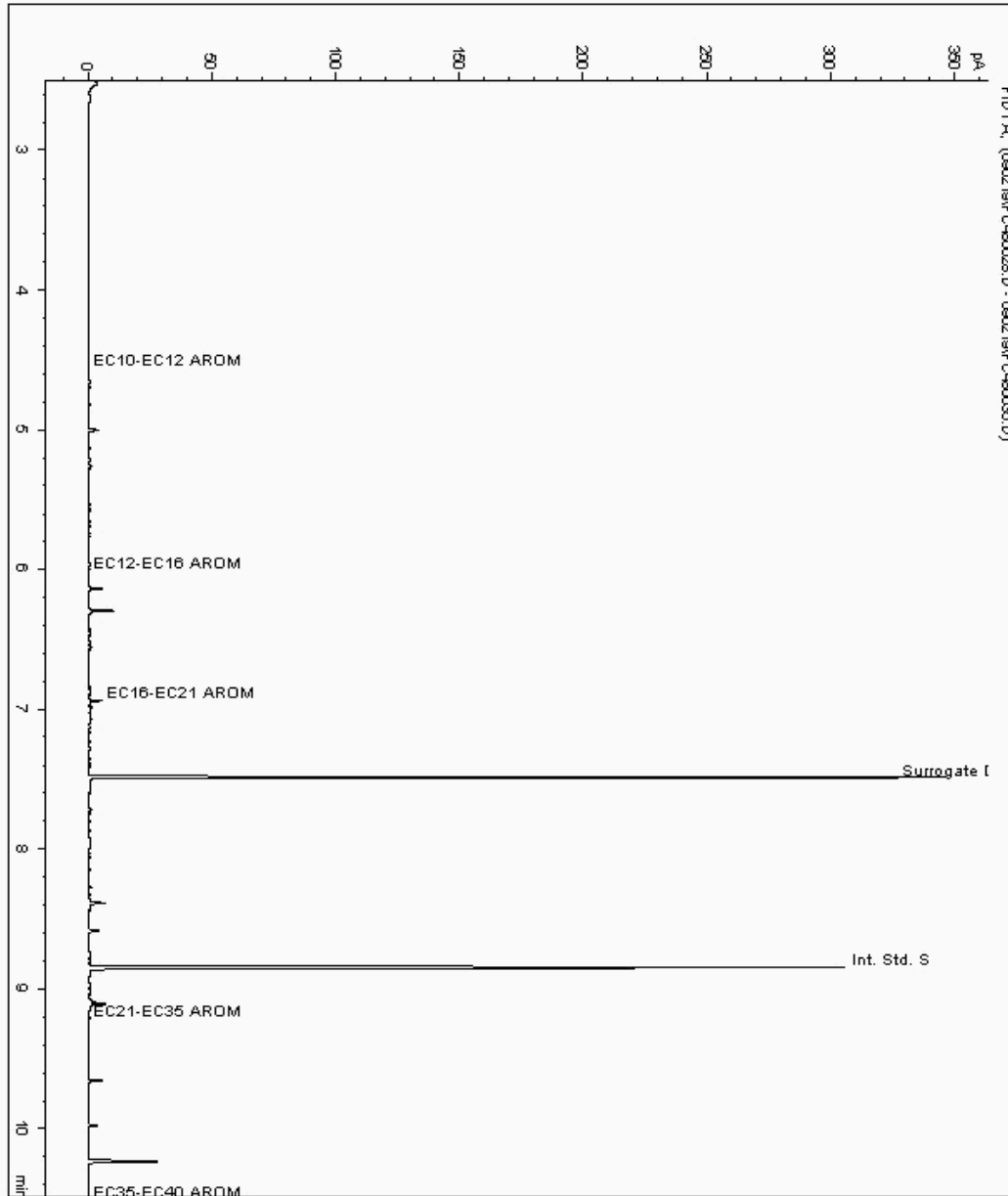
Analysis: EPH CWG (Aromatic) Filtered GC (W)

Sample No : 20600261
Sample ID : BHH07(S)

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 19337186-
Date Acquired : 03/09/2019 02:04:57 PM
Units : ppb
Dilution : SE BHH07(S)[0.00 - 0.00] ->
CF : 1
Multiplier : 0.025





CERTIFICATE OF ANALYSIS

Validated

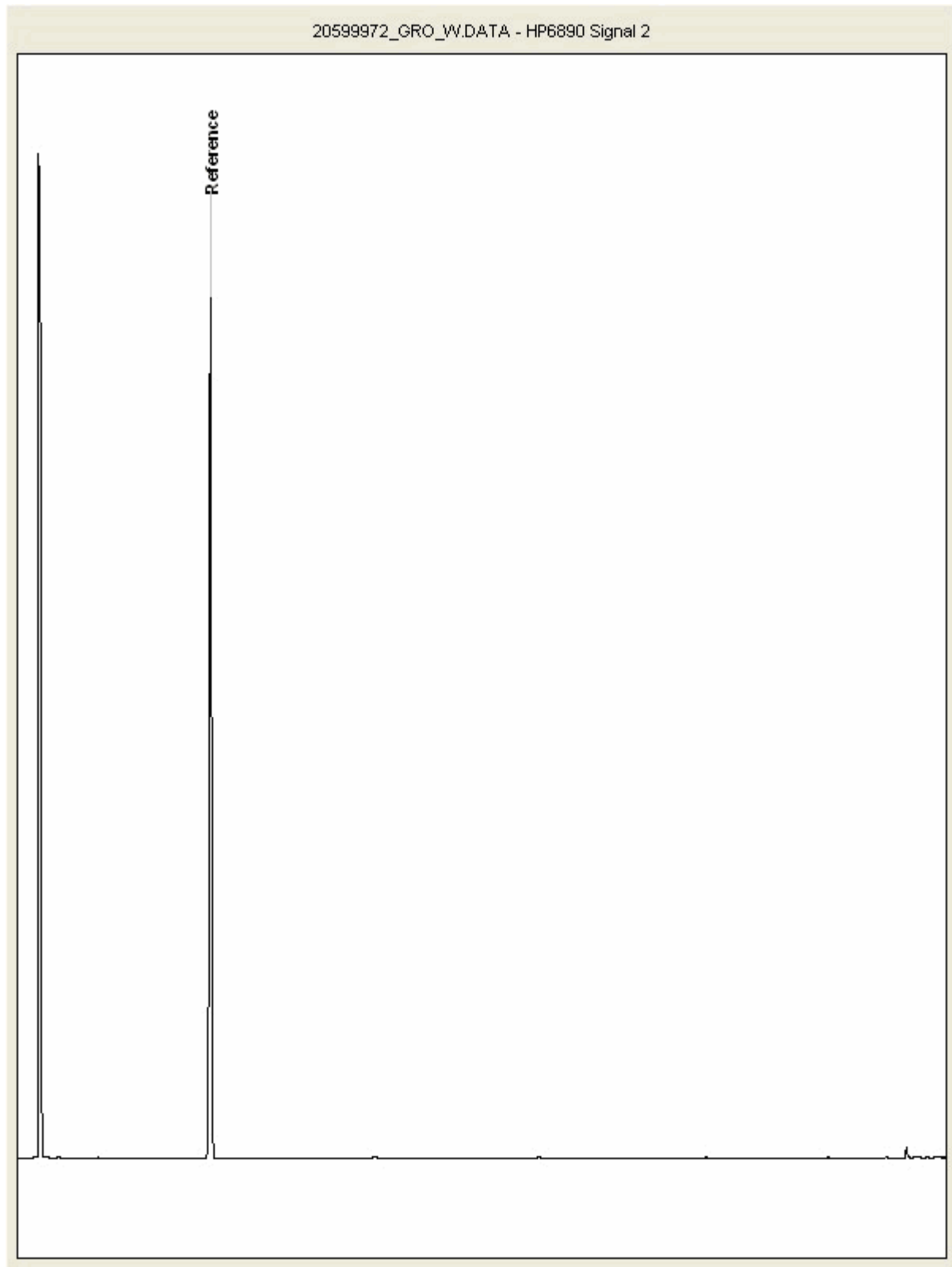
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20599972
Sample ID : BHH02 (S)

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

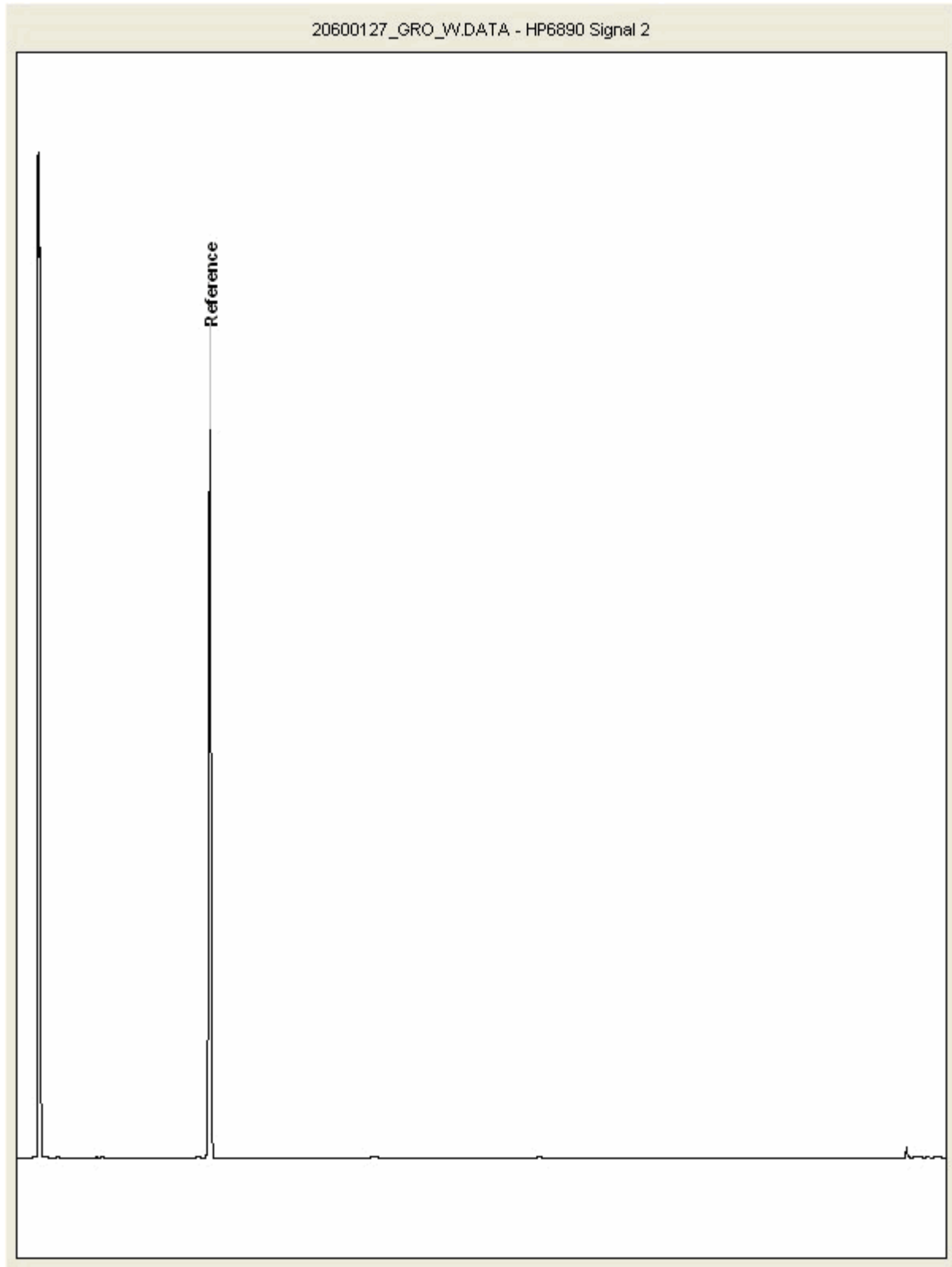
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20600127
Sample ID : BH103

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

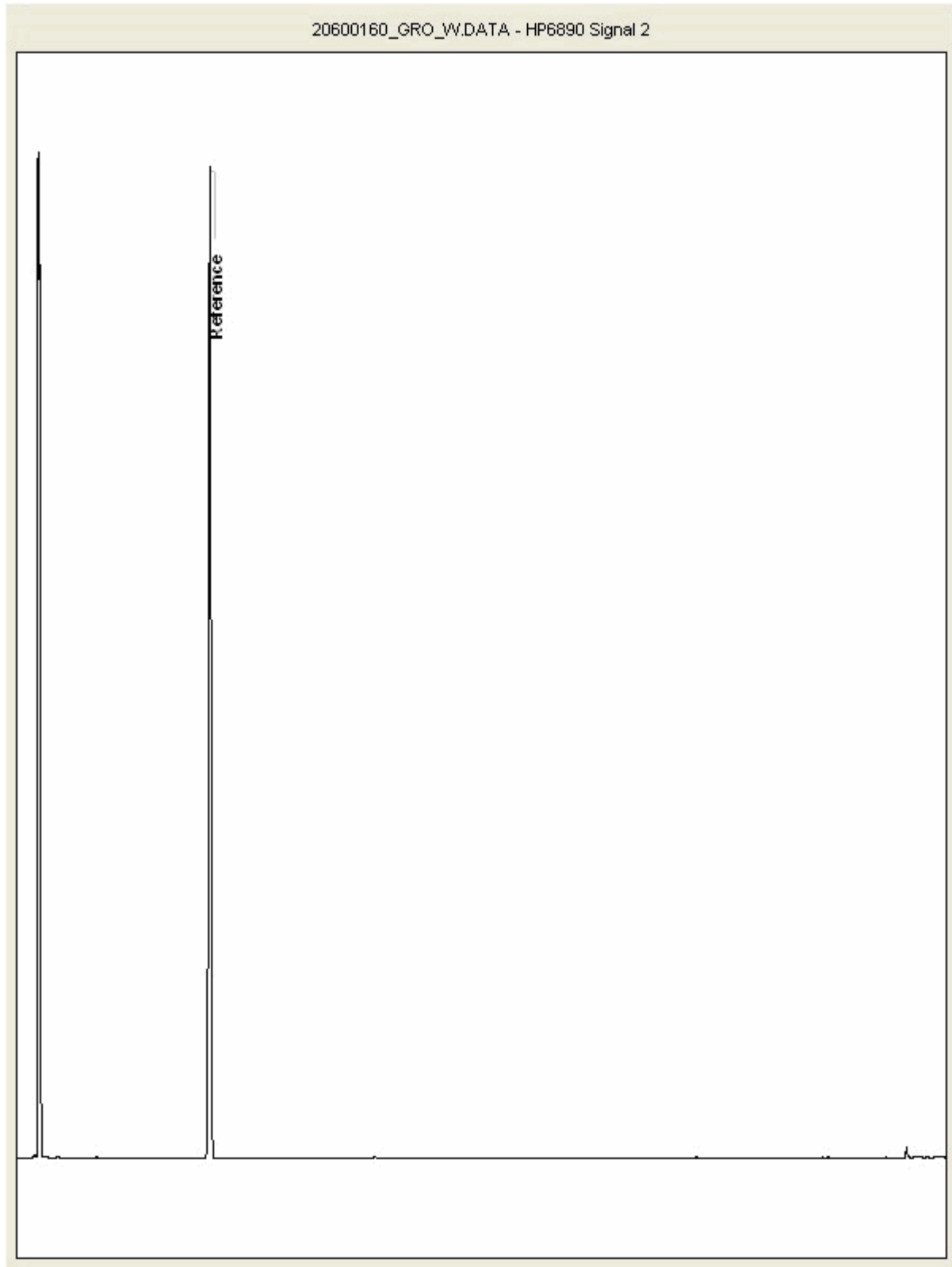
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20600160
Sample ID : BHH05

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

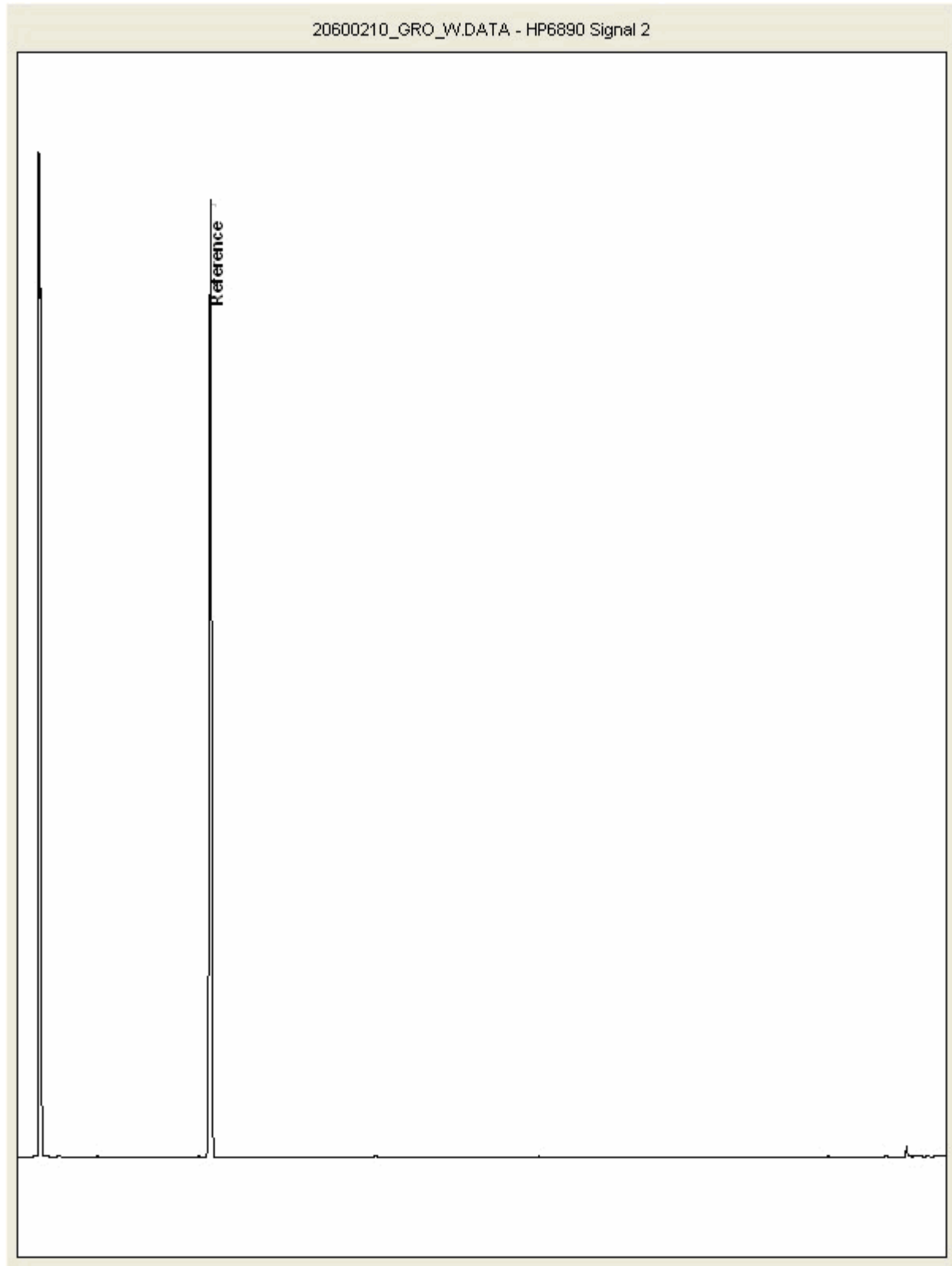
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20600210
Sample ID : BHH03

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

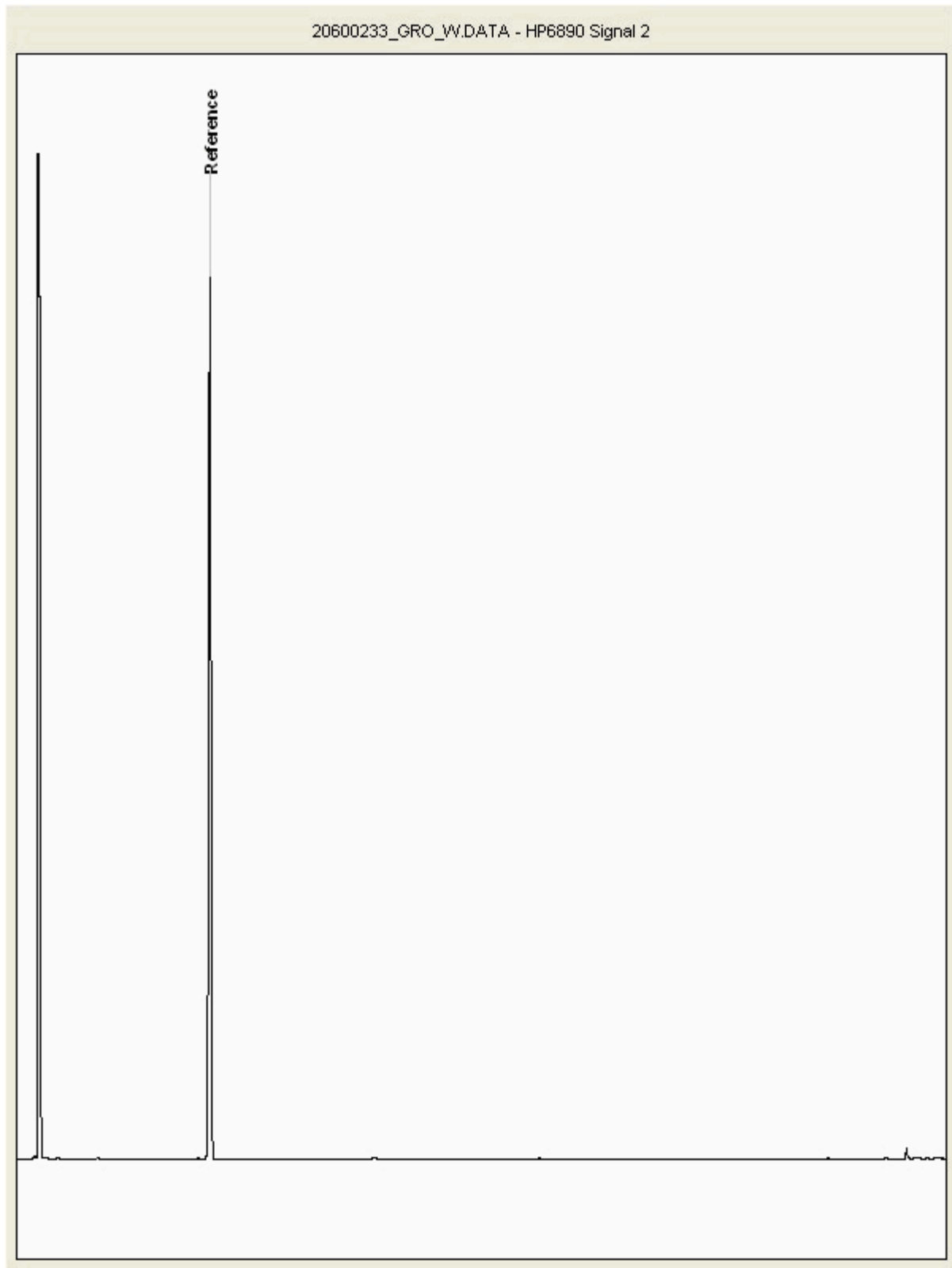
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20600233
Sample ID : BHH02 (D)

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

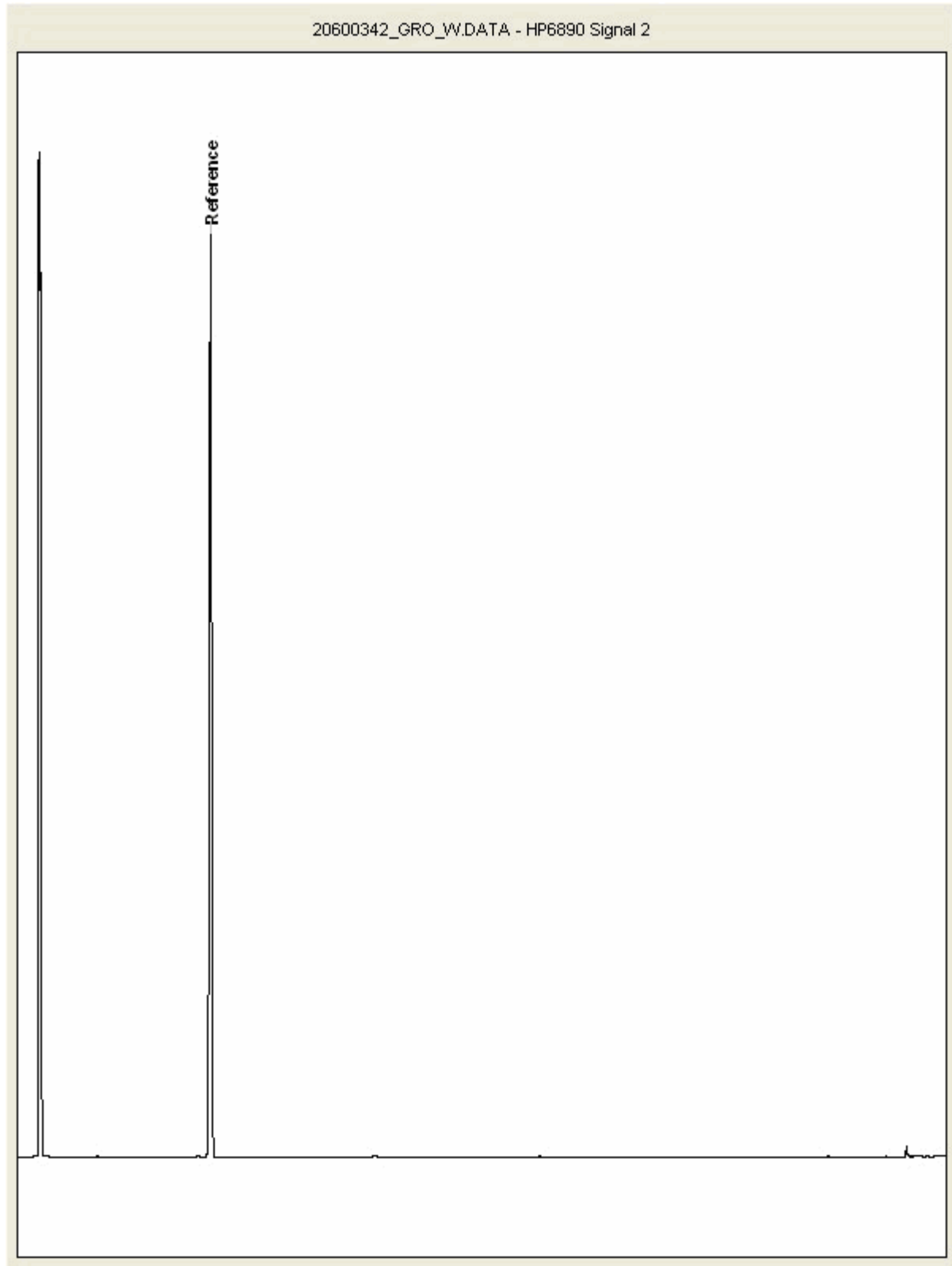
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20600342
Sample ID : BH106

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

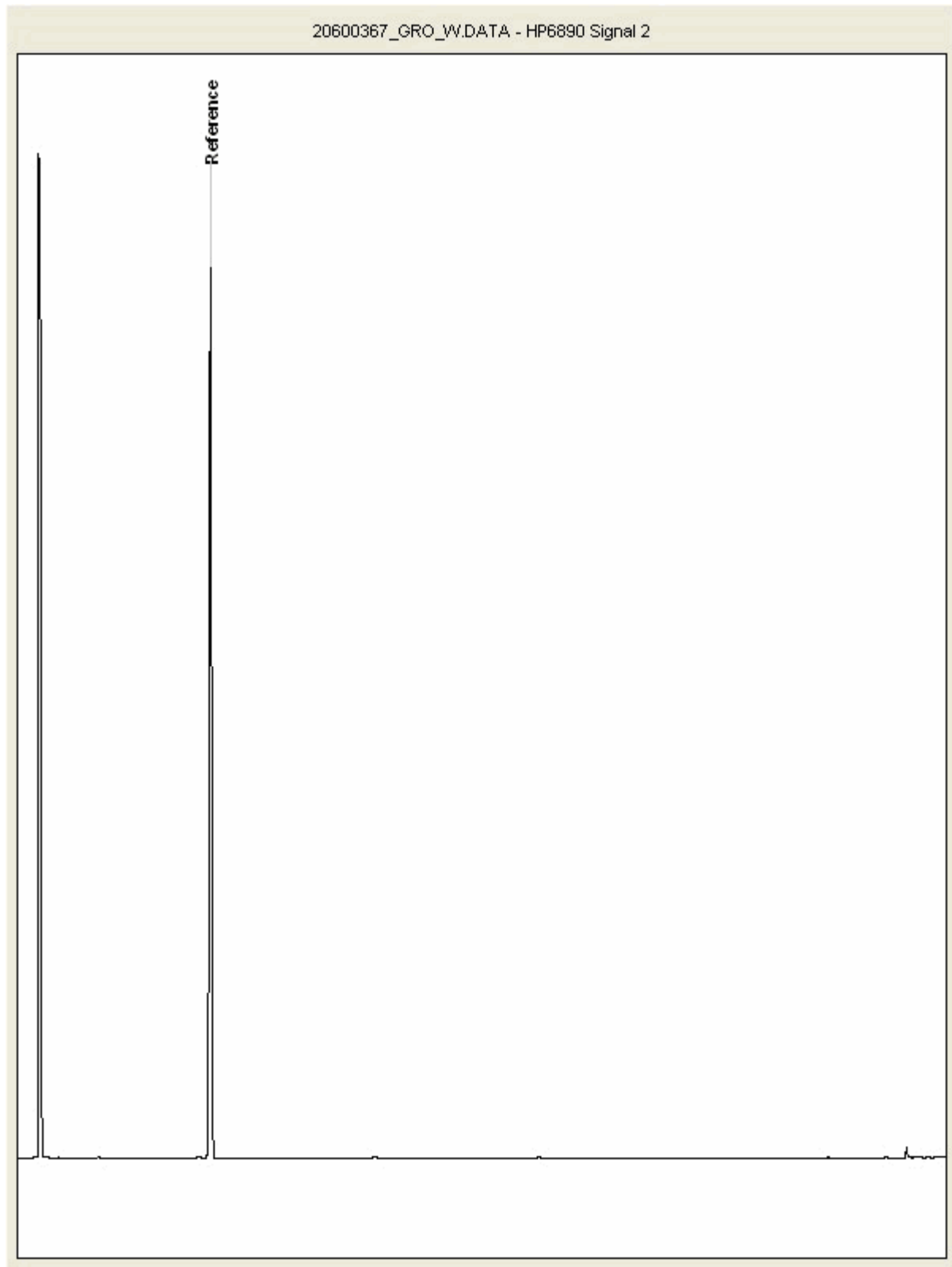
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20600367
Sample ID : BHH07(S)

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

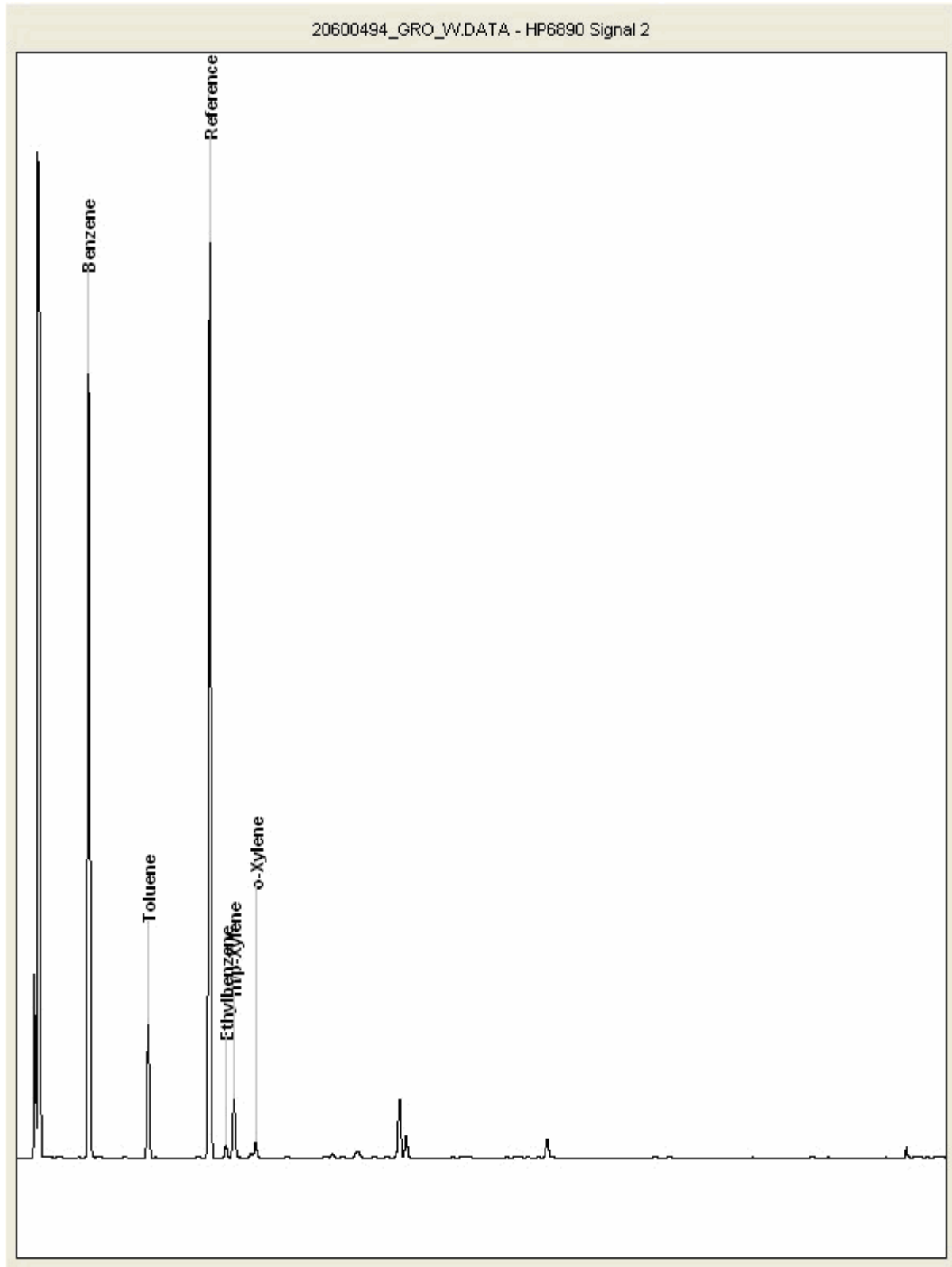
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20600494
Sample ID : BH105

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

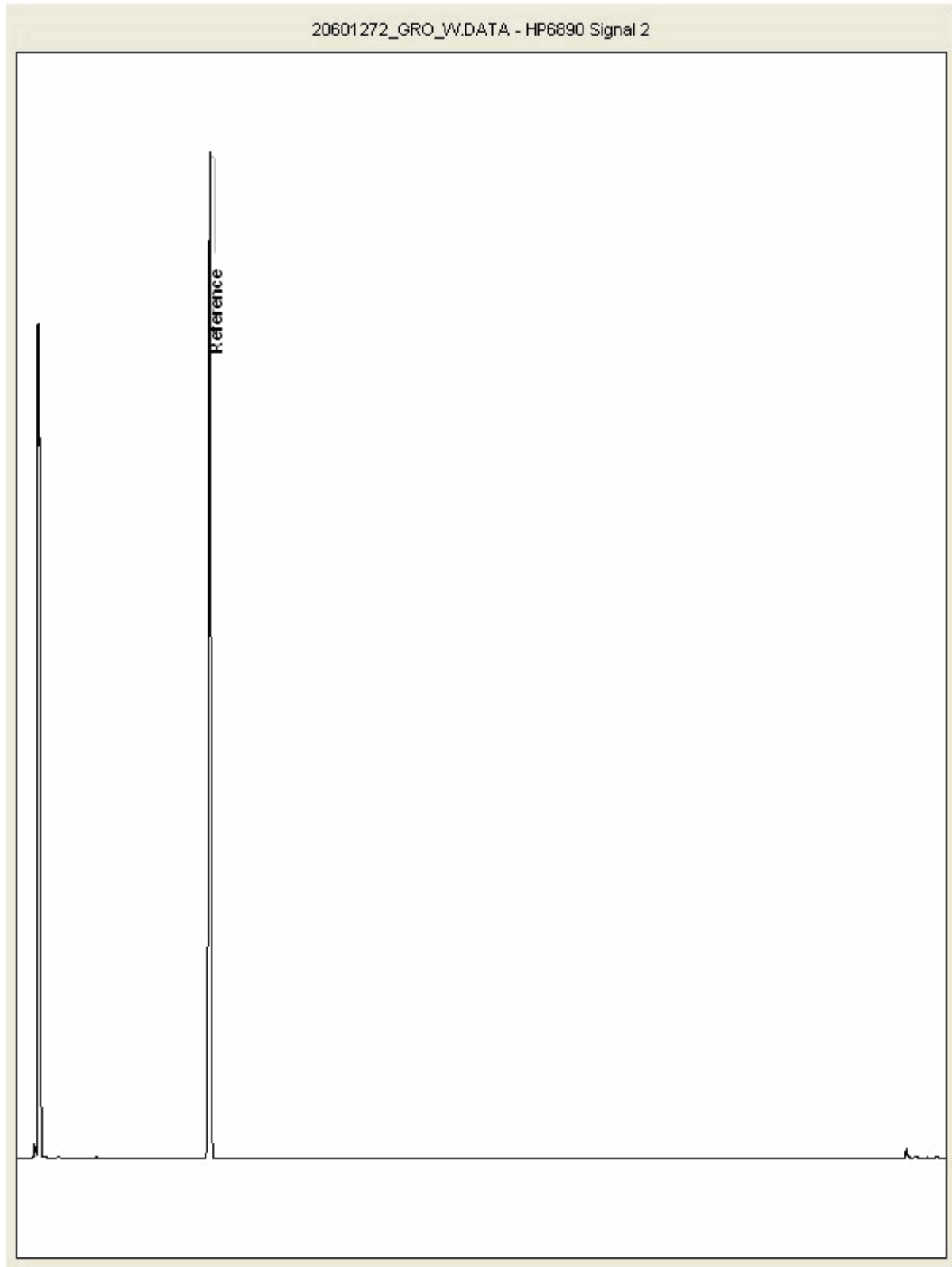
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20601272
Sample ID : BH102

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

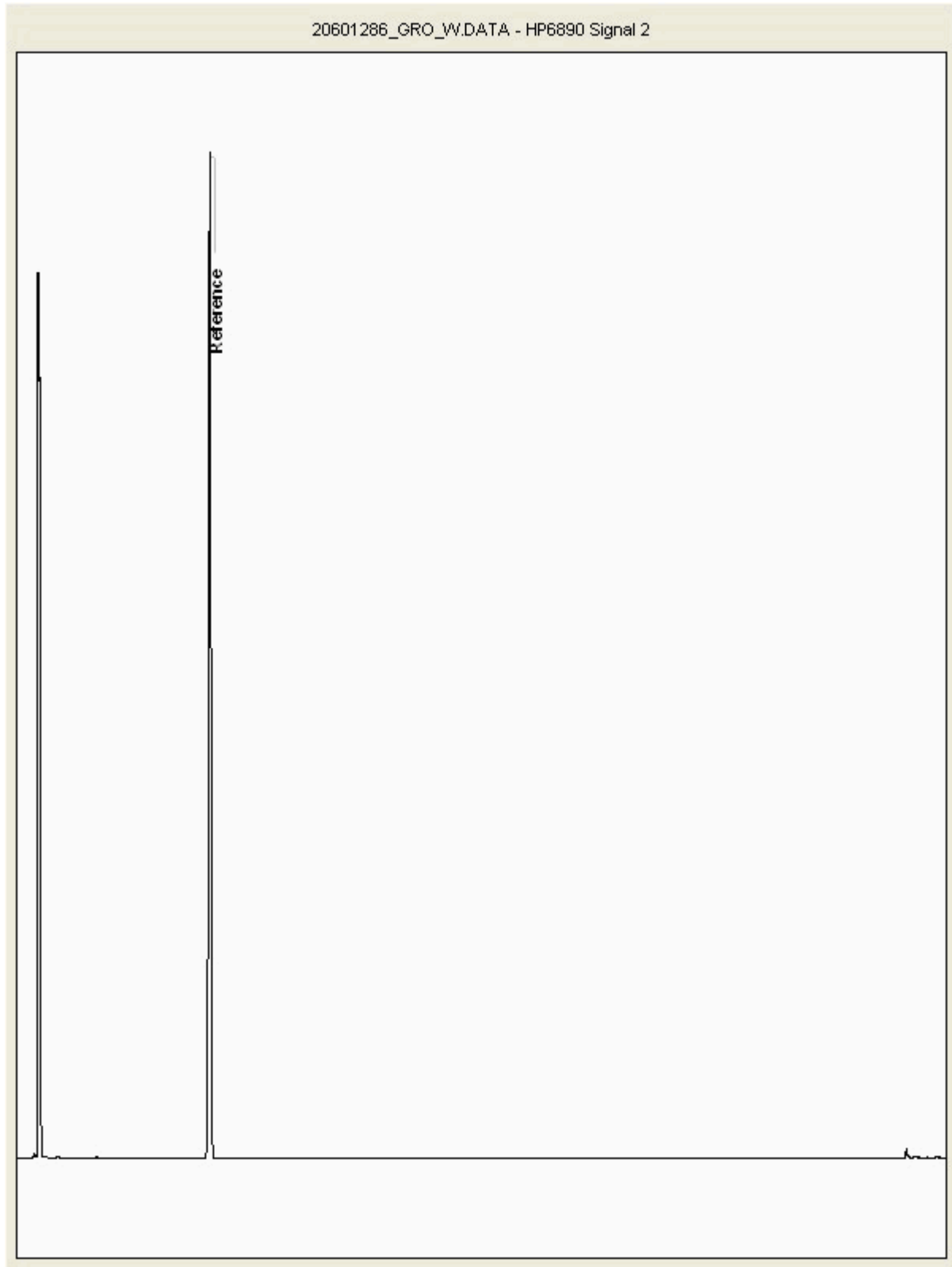
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20601286
Sample ID : BH107

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

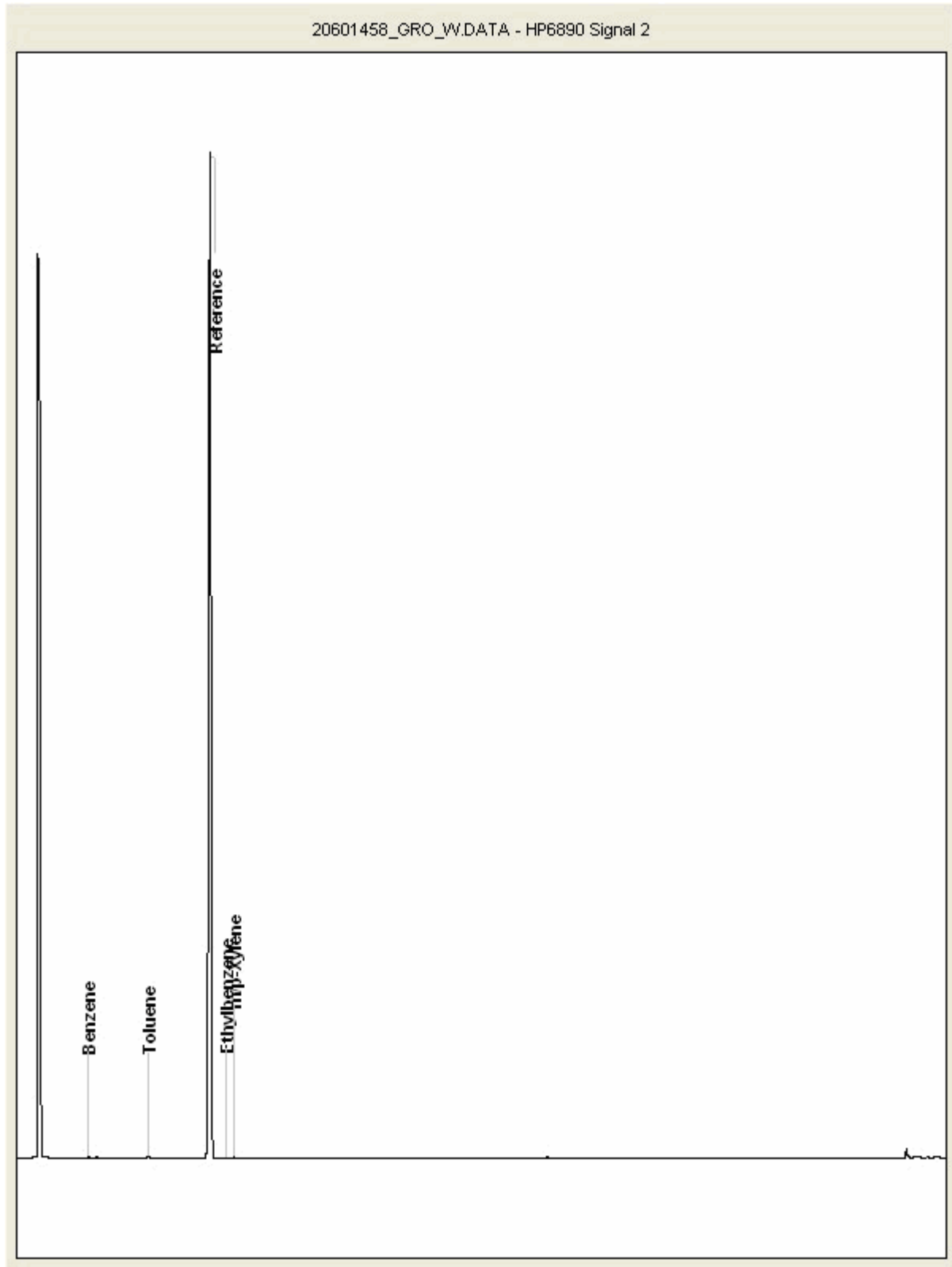
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20601458
Sample ID : MW1

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

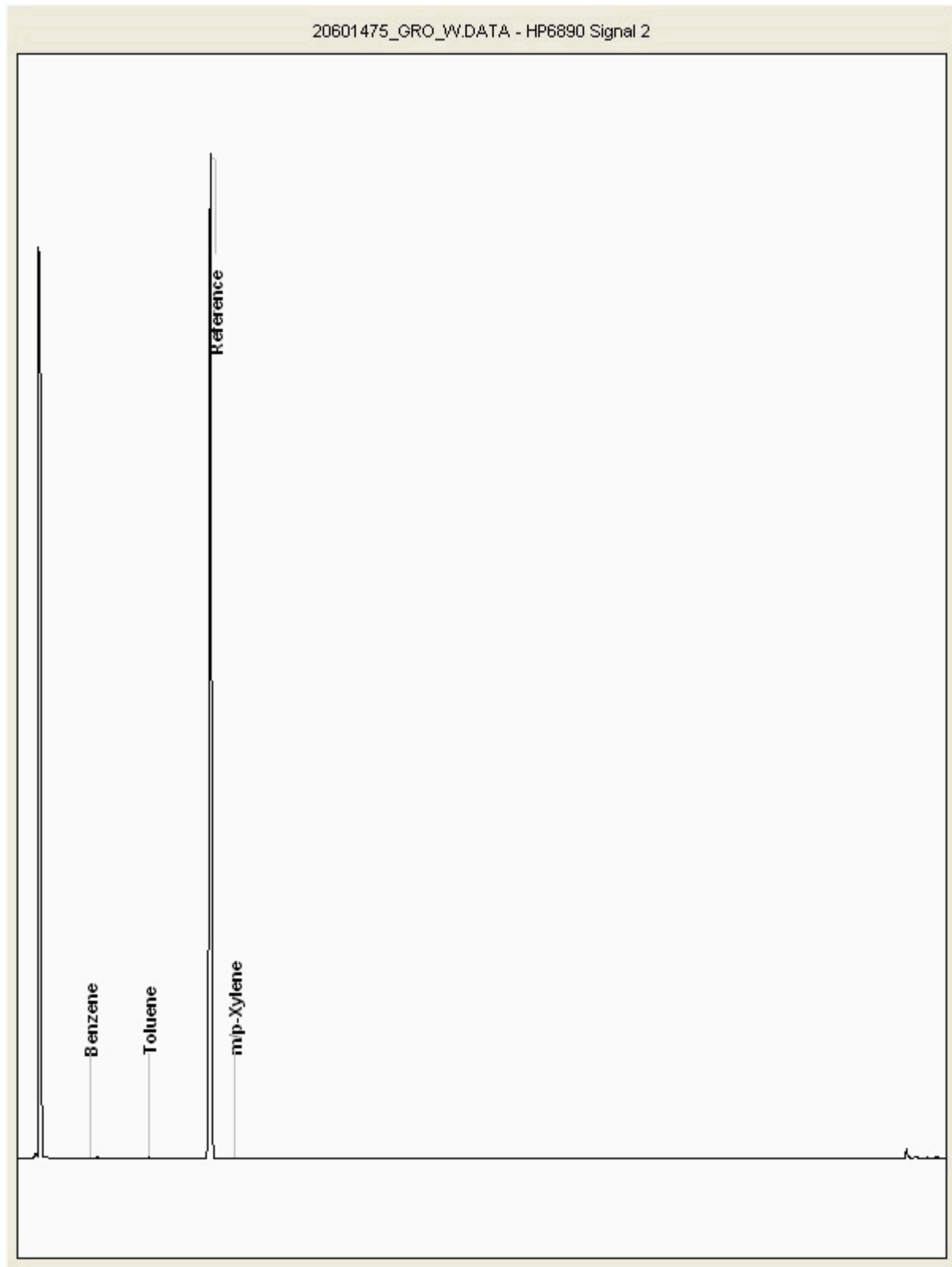
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20601475
Sample ID : BH101

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

SDG: 190824-7
Location: Port Talbot Harbourside

Client Reference: 62253048-GI2
Order Number: 62253048-GI2

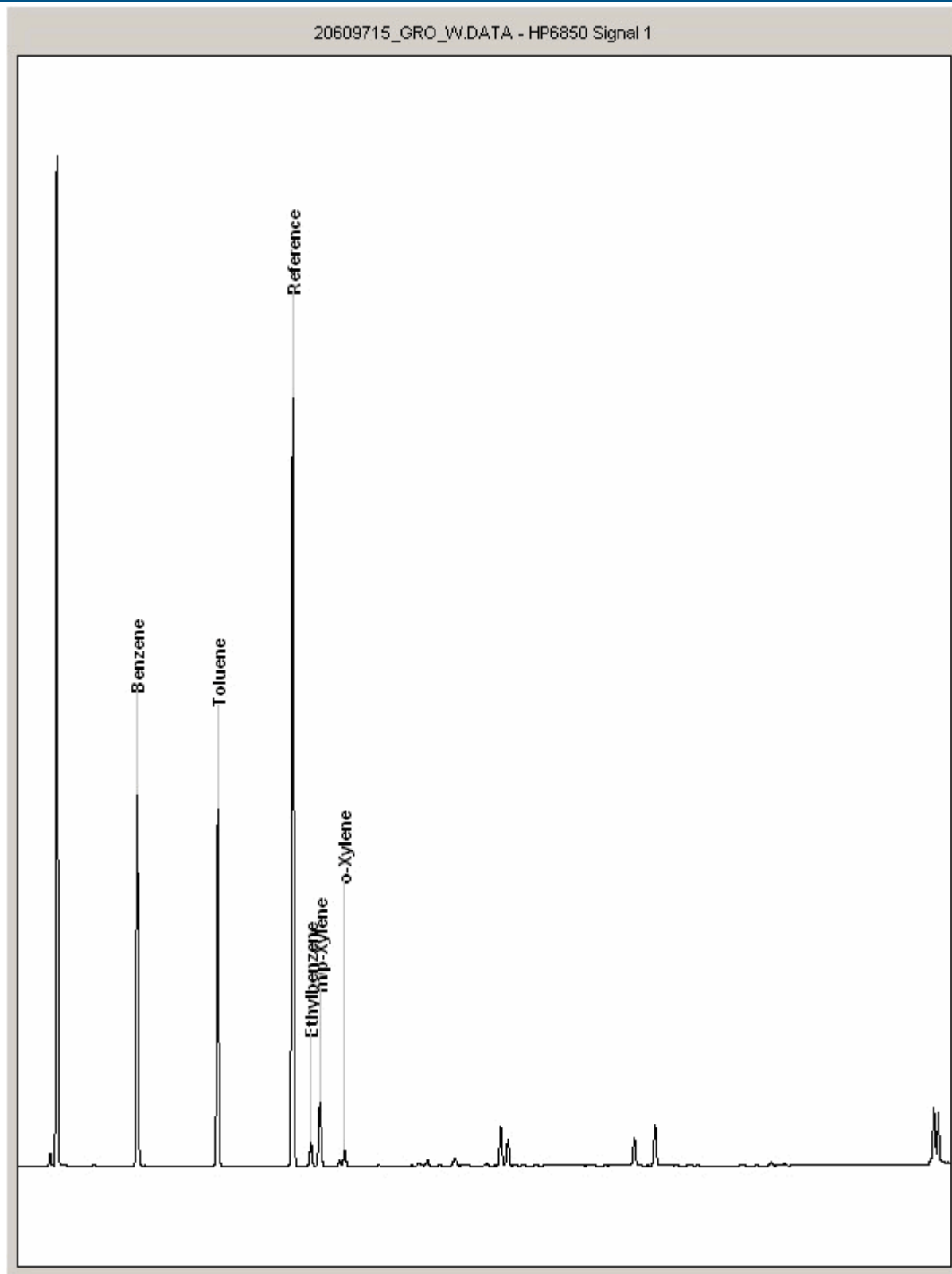
Report Number: 520495
Superseded Report: 520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20609715
Sample ID : BHC5

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

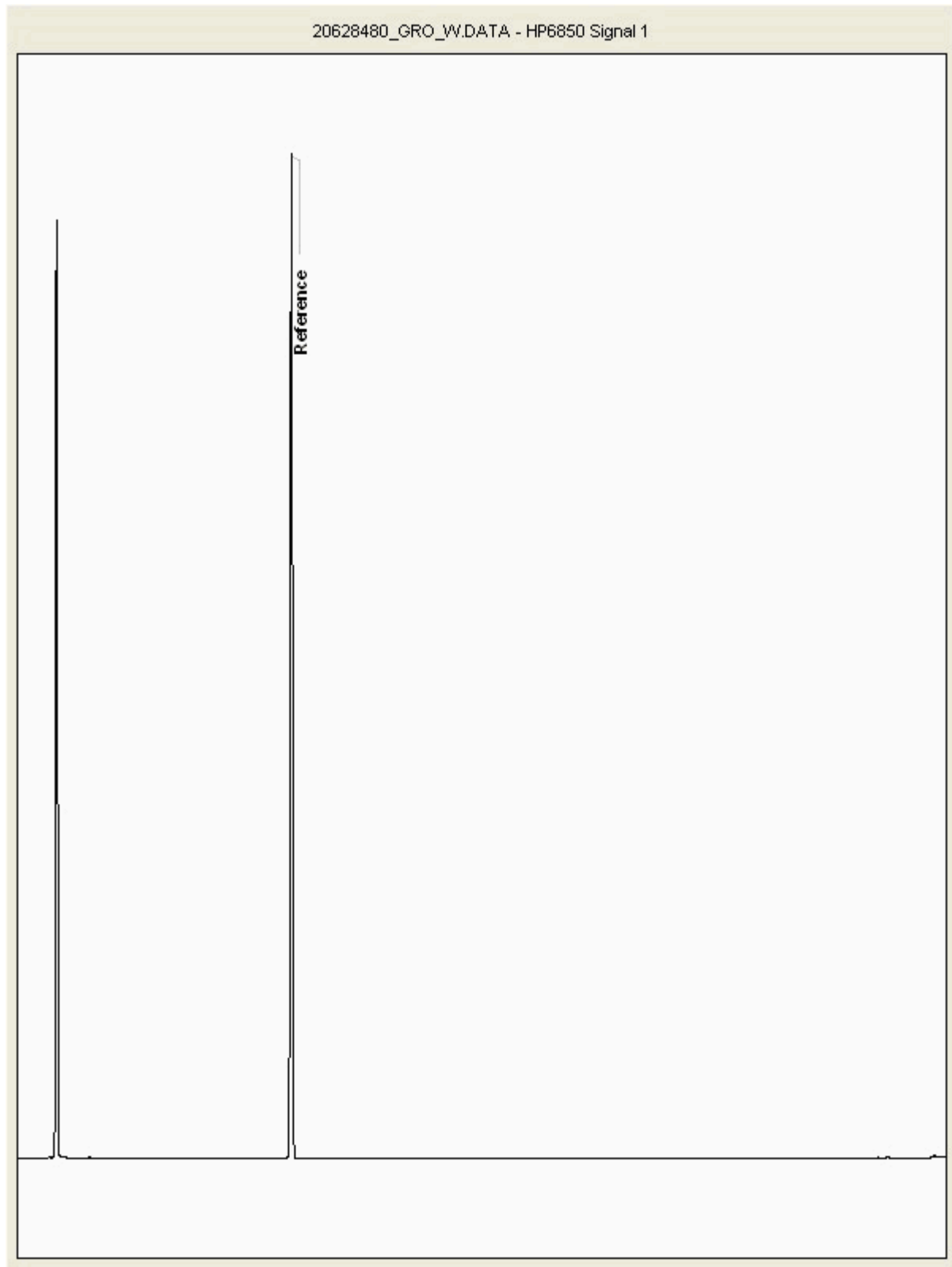
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20628480
Sample ID : BHH07(D)

Depth : 0.00 - 0.00





CERTIFICATE OF ANALYSIS

Validated

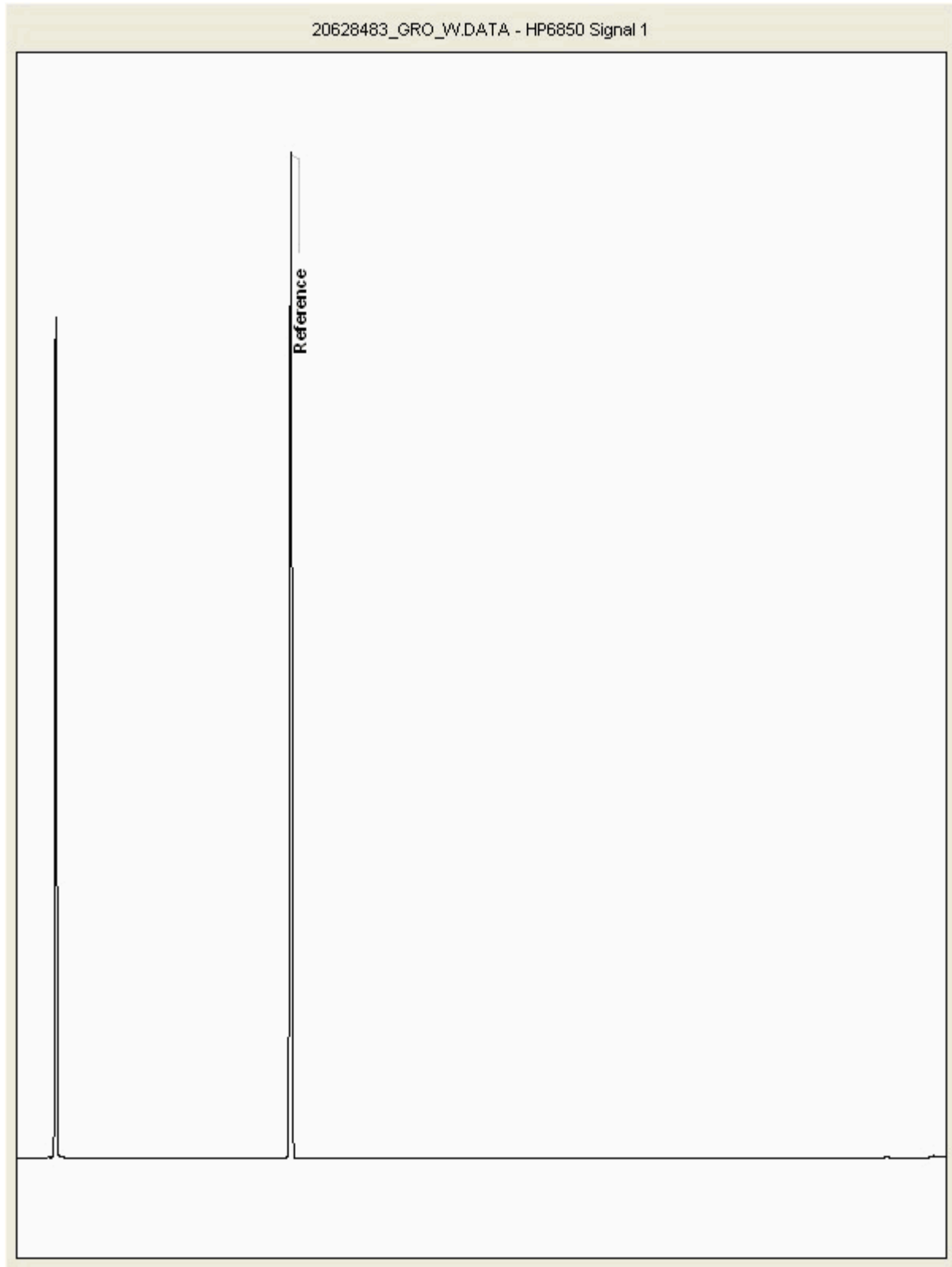
SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 20628483
Sample ID : BHH04

Depth : 0.00 - 0.00



Make:		Sample No:	6713333
Model:		Location:	ALS LIFE SCIENCES
Serial No:	20591251	Client:	ALS LIFE SCIENCES
System:	OTHER	Kit Ref/Bottle No:	BH104/WE4275151
Brand:	NOT GIVEN	Job No.:	190824-7
Grade:		Sampled:	
Unique No.:	4887153	Received:	29/08/19

Diagnosis	Key:	Normal	Caution	Serious	Diagnostician: Peter Foy
------------------	------	---------------	----------------	----------------	--------------------------

Analysis on sample as received. No diagnosis provided.



Results	Current Sample	Historical Samples
Sample No	6713333	
Status	✓	
Sampled		
Fluid Age		
Unit Age		
Received	29/08/19	
Fluid Condition		
KV40	mm ² /s	3.7

Chemical Oil Fingerprint

Client: H_WSP_BRI

Job number: 190824-7 20584245

Identity: BH104

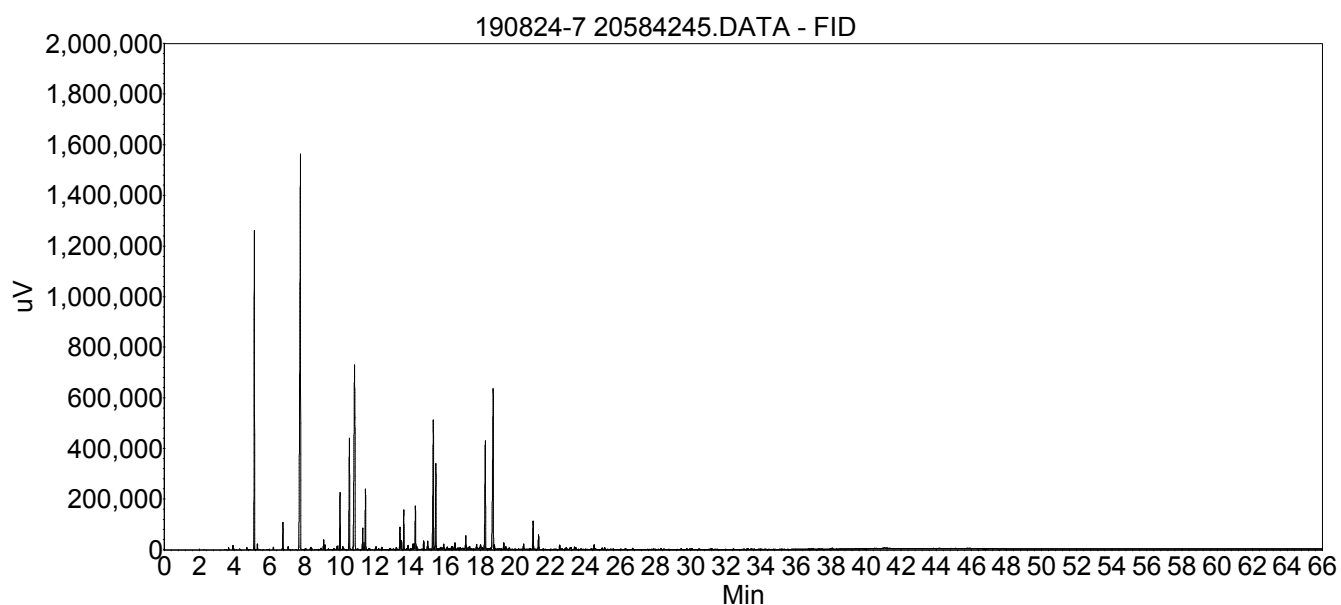
Description: Dark Product

Carbon Range: C6 - C18

Boiling Point Range: 69 - 317°C

Fingerprint: Petrol range Hydrocarbons

Comments: N/A



ALS Hawarden**Forensic Chemical Fingerprint Summary Report**

Client : H_WSP_BRI
Job Number : 190824-7
Location: Port Talbot Harbourside

Sample Number	Sample Identity	Visual Interpretation	Carbon Range	Boiling point Range °C	Age*
20584245	BH104	Dark Product	C6 - C18	69 - 317	1 - 5 Years

* (Kaplan et al. 1997) It must be noted that this calculation is only really applicable to a gasoline layer on water.
The age must be used as a guidance figure only as there could be several other factors that could affect the ageing process such as environment, climatic conditions etc.



CERTIFICATE OF ANALYSIS

Work Order	: PR1990000	Issue Date	: 06-Sep-2019
Customer	: ALS Life Sciences Ltd	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: Reporting	Contact	: Client Service
Address	: Unit 7-8 Hawarden Business Park Manor Road, Hawarden CH5 3US Deeside United Kingdom	Address	: Na Harfe 336/9 Prague 9 - Vysocany 190 00 Czech Republic
E-mail	: euhdsubconresults@ALSGlobal.com	E-mail	: customer.support@alsglobal.com
Telephone	: ----	Telephone	: +420 226 226 228
Project	: 190824-7	Page	: 1 of 2
Order number	: ----	Date Samples	: 28-Aug-2019
		Received	
		Quote number	: PR2018ALSAL-GB0004 (CZ-256-18-0022)
Site	: ----	Date of test	: 04-Sep-2019 - 06-Sep-2019
Sampled by	: Client	QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.

The laboratory declares that the test results relate only to the listed samples. If the section "Sampled by" of the Certificate of analysis states: "Sampled by Customer" then the results relate to the sample as received.

Responsible for accuracy

Signatories

Zdeněk Jiráček

Position

Environmental Business Unit
Manager

ALS Czech Republic, s.r.o.

Na Harfe 336/9

190 00 Praha 9

DIČ: CZ 27407551





Analytical Results

Sub-Matrix: **PRODUCT**

Client sample ID

20591233
BH104

Laboratory sample ID

PR1990000-001

Client sampling date / time

21-Aug-2019 00:00

Parameter	Method	LOR	Unit	Result	MU	Result	MU	Result	MU
Physical Parameters									
Density (volume weight)	I-DENS-GR	0.010	g/mL	0.887	± 5.0%	----	---	----	---

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, delivery date in brackets without a time component will be displayed instead. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.

Key: LOR = Limit of reporting; MU = Measurement Uncertainty. The MU does not include sampling uncertainty.

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	Method Descriptions
Location of test performance: Bendlova 1687/7 Ceska Lipa Czech Republic 470 01	
*I-DENS-GR	Density determination of liquid sample by weighing of the volume.

A "*" symbol preceding any method indicates laboratory or subcontractor non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information. If the report contains subcontracted analysis, those are made in a subcontracted laboratory outside the laboratories ALS Czech Republic, s.r.o.

The calculation methods of summation parameters are available on request in the client service.



CERTIFICATE OF ANALYSIS

SDG:	190824-7	Client Reference:	62253048-GI2	Report Number:	520495
Location:	Port Talbot Harbourside	Order Number:	62253048-GI2	Superseded Report:	520458

Appendix

General

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

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

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

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

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

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

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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

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

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

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

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

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

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

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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

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

Visual Estimation Of Fibre Content

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

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2107).

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

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



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Non-routine Analysis Report

19 SEPTEMBER 2019

Our Reference:	SDG: 190824-7
Your Reference:	62253048-GI2
Location:	Port Talbot Harbourside

One product sample was received on the 24th August with a request to carry out whole oil with CWG.

We are pleased to enclose our non-routine analysis report.

SIGNED:

ADAM GOWER

TECHNICAL SPECIALIST



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1. Introduction

One product sample was received for whole oil analysis with CWG fractionation. The whole oil was carried out routinely, however a large proportion of the sample was in the C6 – C12 range, which is not suitable for routine fractionation.

The samples were prepared by carrying out a solvent dilution and running for both GRO and EPHCWG.

Client Sample ID	SDG	Sample Event Number
BH104	190824-7	20584242

Table 1: Sample References

All analyses within this report are outside our accreditation status and were conducted on the 'As Received' sample.



2. Results

The sample was analysed using gas chromatography with flame ionisation detection for the EPHCWG portion and by headspace gas chromatography with flame ionisation detection for the GRO portion. The results in % form from the analysed sample are reported in Table 2.

	BH104
Aliphatic >C6-C8	3.40
Aliphatic >C8-C10	6.63
Aliphatic >C10-C12	14.97
Aliphatic >C12-C16	n.d.
Aliphatic >C16-C21	n.d.
Aliphatic >C21-C35	n.d.
Aliphatic >C35-C40	n.d.
Aromatic >EC6-EC8	38.53
Aromatic >EC8-EC10	26.48
Aromatic >EC10-EC12	9.97
Aromatic >EC12-EC16	n.d.
Aromatic >EC16-EC21	n.d.
Aromatic >EC21-EC35	n.d.
Aromatic >EC35-EC40	n.d.

Table 2: Results in %

Appendix E

RISK ASSESSMENT SCREENING TABLES



Aliphatics and Aromatics

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample) Analyte Units LOD GAC				BH101		BH102		BH103		BH104		BH105A		BH106		BH107	
				1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0
				08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20
				Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium
Aliphatic C05-C06	mg/kg	0.010 - 0.20	3,190	<0.01	<0.01	<0.01	0.0103	0.058	<0.01	0.221	31.6	0.0102	0.0105	0.0826	0.0146	<0.01	<0.01
Aliphatic C06-C08	mg/kg	0.010 - 0.20	7,780	<0.01	<0.01	<0.01	0.0171	0.136	<0.01	10.5	878	0.026	0.0324	1.37	0.0851	0.0244	<0.01
Aliphatic C08-C10	mg/kg	0.010 - 0.20	2,000	<0.01	<0.01	<0.01	0.0228	0.595	0.0142	42.8	5120	0.0859	0.542	2.64	0.237	0.0344	<0.01
Aliphatic C10-C12	mg/kg	0.010 - 0.20	9,690	<0.01	<0.01	<0.01	0.0228	0.501	0.0243	245	2490	0.0542	0.319	4.87	0.27	0.0511	<0.01
Aliphatic C12-C16	mg/kg	0.10	58,800	2.27	<0.1	3.12	<0.1	<0.1	<0.1	5.34	57.1	5.26	<0.1	1.44	<0.1	<0.1	<0.1
Aliphatic C16-C21	mg/kg	0.10		9.63	<0.1	9.67	2.46	<0.1	<0.1	42	21	15.8	<0.1	<0.1	<0.1	<0.1	<0.1
Aliphatic C21-C35	mg/kg	0.10		44.3	<0.1	79.1	56.4	2.74	9.71	333	112	97.1	<0.1	4.63	7.22	13.6	14.4
Aliphatic C35-C44	mg/kg	0.10	1,910,000	3.41	<0.1	33.3	9.38	<0.1	1.53	45.6	21.9	19.9	<0.1	<0.1	<0.1	2.47	1.47
Aliphatics C12-C44	mg/kg	0.10		59.6	<0.1	125	68.3	2.74	11.2	426	212	138	<0.1	6.07	7.22	16	15.8
Aromatic C06-C07	mg/kg	0.010 - 0.20		<0.01	<0.01	<0.01	0.0103	0.663	<0.01	<0.2	1270	0.0599	0.496	0.986	0.169	0.0278	<0.01
Aromatic C07-C08	mg/kg	0.010 - 0.20	56,100	<0.01	<0.01	<0.01	<0.01	0.166	<0.01	<0.2	<0.2	0.0486	0.543	<0.01	0.0862	<0.01	<0.01
Aromatic C08-C10	mg/kg	0.010 - 0.20	3,460	<0.01	<0.01	<0.01	0.016	0.397	<0.01	28.5	3410	0.0565	0.361	1.76	0.158	0.0233	<0.01
Aromatic C10-C12	mg/kg	0.010 - 0.20	16,200	<0.01	<0.01	<0.01	0.0148	0.335	0.0162	163	1660	0.0362	0.212	3.24	0.18	0.0344	<0.01
Aromatic C12-C16	mg/kg	0.10	36,200	1.61	<0.1	1.62	<0.1	4.33	<0.1	22.2	89.5	28	<0.1	8.47	0.515	<0.1	<0.1
Aromatic C12-C44	mg/kg	0.10		25.9	<0.1	128	10.8	28.6	<0.1	398	189	104	<0.1	32.6	0.79	30.1	<0.1
Aromatic C16-C21	mg/kg	0.10	28,600	3.8	<0.1	11.6	<0.1	4.06	<0.1	40.6	22.9	11.9	<0.1	2.12	0.274	1.57	<0.1



Aliphatics and Aromatics

Result > Assessment Criteria Limit of detection > Assessment Criteria	PointID	BH101		BH102		BH103		BH104		BH105A		BH106		BH107			
		1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0		
		08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20		
		Sample Date															
Geology (at top depth of sample)	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium			
Analyte	Units	LOD	GAC														
Aromatic C21-C35	mg/kg	0.10	28,600	15.8	<0.1	70.5	9.49	14.7	<0.1	279	64.9	43.5	<0.1	17.3	<0.1	16.9	<0.1
Aromatic C35-C44	mg/kg	0.10	28,600	4.68	<0.1	44.1	1.34	5.51	<0.1	56.2	12.1	20.6	<0.1	4.7	<0.1	11.6	<0.1
Aromatic C40-C44	mg/kg	0.10		1.73	<0.1	18.9	<0.1	2.03	<0.1	19.6	3.97	9.25	<0.1	1.27	<0.1	4.34	<0.1
Total Aliphatics and Aromatics (C5-C44)	mg/kg	0.10		85.5	<0.1	253	79.2	34.2	11.3	1310	15300	243	2.52	53.6	9.21	46.3	15.8

BTEX and Fuel Additives

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample) Analyte Units LOD GAC				BH101		BH102		BH103		BH104		BH105A		BH106		BH107	
				1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0
				08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20
				Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium
1,2,4-Trimethylbenzene	mg/kg	0.090 - 1.80	611		<0.09		<0.09		<0.09		73.8		<0.09		<0.09		<0.09
1,3,5-Trimethylbenzene	mg/kg	0.080	611		<0.08		<0.08		<0.08		29.2		<0.08		<0.08		<0.08
Benzene	mg/kg	0.090 - 1.80	27.0	<0.09	<0.09	<0.09	0.114	2.14	0.0984	0.621	195	0.391	0.659	0.828	0.223	<0.09	<0.09
BTEX	mg/kg	0.40 - 8.00		<0.4	<0.4	<0.4	<0.4	3.37	<0.4	2.54	1720	0.589	1.52	0.828	0.46	<0.4	<0.4
Ethylbenzene	mg/kg	0.040 - 0.80	5,710	<0.04	<0.04	<0.04	<0.04	0.171	<0.04	0.119	181	<0.04	0.0543	<0.04	<0.04	<0.04	<0.04
Methyl t-butylether (MTBE)	mg/kg	0.10 - 0.20	7,480	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tertiary Amyl Methyl Ether (TAME)	mg/kg	0.10			<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1
Toluene	mg/kg	0.070 - 1.40	56,300	<0.07	<0.07	<0.07	<0.07	0.435	<0.07	0.582	704	0.198	0.504	<0.07	0.109	<0.07	<0.07
Xylene	mg/kg	0.20 - 4.00	5,920	<0.2	<0.2	<0.2	<0.2	0.625	<0.2	1.22	645	<0.2	0.3	<0.2	<0.2	<0.2	<0.2
Xylene - Total (Summed)	mg/kg	-999	5,920	0.1	0.1	0.1	0.1	0.625	0.1	1.217	644.2	0.1	0.3	0.1	0.128	0.1	0.1
Xylene-m & p	mg/kg	0.10 - 2.00	5,920	<0.1	<0.1	<0.1	<0.1	0.625	<0.1	0.619	553	<0.1	0.3	<0.1	0.128	<0.1	<0.1
Xylene-o	mg/kg	0.10 - 2.00	5,920	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	0.598	91.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Chlorinated Aliphatics

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BH101	BH102	BH103	BH104	BH105A	BH106	BH107
					3.0-3.2	6.5-6.7	3.8-3.9	3.0-3.1	4.1-4.2	2.4-2.5	2.9-3.0
				Depth (m bgl)	08/03/20	08/08/19	08/08/19	08/06/19	08/09/19	08/01/20	08/01/20
				Sample Date							
				Geology (at top depth of sample)	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium
Analyte	Units	LOD	GAC								
1,1,1,2-Tetrachloroethane	mg/kg	0.10	108		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,1,1-Trichloroethane	mg/kg	0.070	1,580		<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
1,1,2,2-Tetrachloroethane	mg/kg	0.10	274		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,1,2-Trichloroethane	mg/kg	0.10	89.0		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,1-Dichloroethane	mg/kg	0.080	263		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
1,1-Dichloroethene	mg/kg	0.10	24.0		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,1-Dichloropropene	mg/kg	0.10			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,2,3-Trichloropropane	mg/kg	0.16			<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16
1,2-Dichloroethane	mg/kg	0.050	0.67		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	mg/kg	0.10	3.10		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,3-Dichloropropane	mg/kg	0.070			<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
2,2-Dichloropropane	mg/kg	0.10			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carbon tetrachloride	mg/kg	0.10	31.0		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chloroethane	mg/kg	0.10	904		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chloroform	mg/kg	0.080	99.0		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chloromethane	mg/kg	0.070	0.96		<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07

Chlorinated Aliphatics

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BH101	BH102	BH103	BH104	BH105A	BH106	BH107
					3.0-3.2	6.5-6.7	3.8-3.9	3.0-3.1	4.1-4.2	2.4-2.5	2.9-3.0
				Depth (m bgl)	08/03/20	08/08/19	08/08/19	08/06/19	08/09/19	08/01/20	08/01/20
				Sample Date							
				Geology (at top depth of sample)	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium
Analyte	Units	LOD	GAC								
Cis 1,2-Dichloroethene	mg/kg	0.060	14.0		<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Cis 1,3-Dichloropropene	mg/kg	0.10			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichloromethane	mg/kg	0.10	257		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobutadiene	mg/kg	0.20	31.0		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Tetrachloroethene (PCE)	mg/kg	0.050	19.0		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans-1,2-Dichloroethene	mg/kg	0.10	21.0		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Trans-1,3-Dichloropropene	mg/kg	0.10			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Trichloroethene (TCE)	mg/kg	0.090	1.20		<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Vinyl chloride	mg/kg	0.060	0.059		<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06

Chlorinated Aromatics

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample)				BH101	BH102	BH103	BH104	BH105A	BH106	BH107	
				3.0-3.2	6.5-6.7	3.8-3.9	3.0-3.1	4.1-4.2	2.4-2.5	2.9-3.0	
				08/03/20	08/08/19	08/08/19	08/06/19	08/09/19	08/01/20	08/01/20	
				Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	
Analyte	Units	LOD	GAC								
1,2,3-Trichlorobenzene	mg/kg	0.20	102	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,2,4-Trichlorobenzene	mg/kg	0.20	265	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	mg/kg	0.10	2,020	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,3-Dichlorobenzene	mg/kg	0.080	30.0	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
1,4-Dichlorobenzene	mg/kg	0.050	584	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Chlorotoluene	mg/kg	0.090		<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
4-Chlorotoluene	mg/kg	0.10		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorobenzene	mg/kg	0.050	58.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05



General Chemistry

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample) Analyte Units LOD GAC				BH101		BH102		BH103		BH104		BH105A		BH106		BH107	
				1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0
				08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20
				Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium
pH	pH Units	1.00		9.61	8.5	9.16	6.6	7.17	6.56	9.57	9.95	9.09	7.03	6.51	9.42	9.81	8.44

Halogenated Hydrocarbons

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BH101	BH102	BH103	BH104	BH105A	BH106	BH107
					3.0-3.2	6.5-6.7	3.8-3.9	3.0-3.1	4.1-4.2	2.4-2.5	2.9-3.0
				Depth (m bgl)	08/03/20	08/08/19	08/08/19	08/06/19	08/09/19	08/01/20	08/01/20
				Sample Date							
				Geology (at top depth of sample)	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium
Analyte	Units	LOD	GAC								
1,2-Dibromo-3-Chloropropane	mg/kg	0.14			<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
1,2-Dibromoethane	mg/kg	0.10			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bromobenzene	mg/kg	0.10	91.0		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bromochloromethane	mg/kg	0.10			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bromodichloromethane	mg/kg	0.070	2.00		<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Bromoform	mg/kg	0.10	714		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bromomethane	mg/kg	0.10			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibromochloromethane	mg/kg	0.10			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibromomethane	mg/kg	0.090			<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Dichlorodifluoromethane	mg/kg	0.060			<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Trichlorofluoromethane	mg/kg	0.060			<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06

Metals

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample)				BH101		BH102		BH103		BH104		BH105A		BH106		BH107	
				1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0
				08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20
				Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium
Analyte	Units	LOD	GAC														
Arsenic	mg/kg	0.60 - 6.00	635	30	6.49	23.4	7.8	44.1	9.49	49.9	11.1	30.2	7.45	12.6	8.66	20.4	8.43
Cadmium	mg/kg	0.020 - 0.20	223	0.384	<0.02	0.506	0.0543	0.364	<0.02	<0.2	<0.02	0.0634	<0.02	0.0212	<0.02	<0.2	<0.02
Chromium	mg/kg	0.90 - 9.00		137	43.5	332	7.54	82.5	10.2	362	86.5	460	7.86	8.78	7.01	611	14
Copper	mg/kg	1.40 - 14.0	69,800	67	5.13	71	8.88	128	8.83	541	47.9	262	6.08	9.48	5.38	42.8	8.01
Hexavalent Chromium	mg/kg	0.60	24.0	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Lead	mg/kg	0.70 - 70.0	1,390	113	14.8	3350	4.82	7370	4.94	223	24.2	106	4.43	15.1	9.33	67.4	13.1
Mercury	mg/kg	0.14 - 1.40	1,110	<1.4	<0.14	<0.14	<0.14	<0.14	<0.14	<1.4	<0.14	<0.14	<0.14	<0.14	<0.14	<1.4	<0.14
Nickel	mg/kg	0.20 - 2.00	1,710	52.1	22	38.8	22.8	35.9	27.2	66	21.8	28.8	23.7	10.9	21.9	32.1	26.2
Selenium	mg/kg	1.00 - 10.0	12,300	<10	<1	2.5	<1	2.17	<1	<10	<1	6.7	<1	<1	<1	<10	<1
Zinc	mg/kg	1.90 - 19.0	1,050,000	203	57	463	64.2	181	83.6	125	74.1	192	61.9	39	56.8	110	70.6

Other

Result > Assessment Criteria Limit of detection > Assessment Criteria	PointID			BH101	BH102	BH103	BH104	BH105A	BH106	BH107
				3.0-3.2	6.5-6.7	3.8-3.9	3.0-3.1	4.1-4.2	2.4-2.5	2.9-3.0
				08/03/20	08/08/19	08/08/19	08/06/19	08/09/19	08/01/20	08/01/20
				Sample Date						
				Geology (at top depth of sample)	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium
Analyte	Units	LOD	GAC							
Carbon Disulphide	mg/kg	0.070	11.0	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Styrene	mg/kg	0.10	3,170	<0.1	<0.1	<0.1	19.7	<0.1	<0.1	<0.1
Total organic carbon (TOC)	%	0.20		<0.2	0.38	0.277		0.209	0.288	0.314

PAHs

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample) Analyte Units LOD GAC				BH101		BH102		BH103		BH104		BH105A		BH106		BH107	
				1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0
				08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20
				Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium
Acenaphthene	mg/kg	0.008 - 0.040		<0.008	<0.008	0.0832	0.0297	0.0811	0.0232	0.823	4.3	0.525	0.0337	0.197	0.0599	0.0922	<0.008
Acenaphthylene	mg/kg	0.012 - 0.060		<0.012	<0.012	0.0736	<0.012	<0.012	<0.012	0.0252	0.114	0.0635	<0.012	0.0255	<0.012	0.0402	<0.012
Anthracene	mg/kg	0.016 - 0.080		0.0208	<0.016	0.295	<0.016	0.029	<0.016	0.0344	0.0999	0.0238	<0.016	0.0409	0.0202	0.188	<0.016
Benzo (a) anthracene	mg/kg	0.014 - 0.070		0.0793	<0.014	1.57	<0.014	0.153	<0.014	0.103	0.0469	0.112	<0.014	0.117	0.0426	0.389	<0.014
Benzo (a) pyrene	mg/kg	0.015 - 0.075	38.0	0.0718	<0.015	1.35	<0.015	0.127	<0.015	0.104	0.0355	0.0789	<0.015	0.0659	0.0227	0.413	<0.015
Benzo (b) fluoranthene	mg/kg	0.015 - 0.075		0.124	<0.015	2.34	<0.015	0.296	<0.015	0.292	0.0643	0.217	<0.015	0.131	0.0195	0.67	<0.015
Benzo (ghi) perylene	mg/kg	0.024 - 0.12		0.0605	<0.024	1.05	<0.024	0.0946	<0.024	0.164	0.0534	0.103	<0.024	0.043	<0.024	0.427	<0.024
Benzo (k) fluoranthene	mg/kg	0.014 - 0.070		0.0442	<0.014	0.986	<0.014	0.0887	<0.014	0.112	0.0239	0.0733	<0.014	0.0575	0.0184	0.264	<0.014
Chrysene	mg/kg	0.010 - 0.050		0.089	<0.01	1.9	<0.01	0.269	<0.01	0.182	0.0507	0.129	<0.01	0.125	0.0551	0.44	<0.01
Dibenzo (ah) anthracene	mg/kg	0.023 - 0.12		<0.023	<0.023	0.27	<0.023	0.052	<0.023	0.0371	<0.023	<0.023	<0.023	<0.023	<0.023	0.1	<0.023
Fluoranthene	mg/kg	0.017 - 0.085		0.186	<0.017	3.22	<0.017	0.189	<0.017	0.226	0.183	0.223	<0.017	0.177	0.0855	0.835	<0.017
Fluorene	mg/kg	0.010 - 0.050		<0.01	<0.01	0.0928	<0.01	0.125	0.0194	0.187	1.02	0.155	<0.01	0.0754	0.0277	0.0875	<0.01
Indeno (1,2,3-cd) pyrene	mg/kg	0.018 - 0.090		0.0699	<0.018	1.09	<0.018	0.13	<0.018	0.188	0.0489	0.137	<0.018	0.0556	<0.018	0.442	<0.018
Naphthalene	mg/kg	0.009 - 2.60	193	0.25	0.0151	0.141	0.163	9.23	0.238	41.6	450	4.47	0.606	2.07	0.792	0.163	0.0347
PAH Total (EPA 16)	mg/kg	0.12 - 0.59		1.34	<0.118	18.2	0.193	11.4	0.191	44.5	75.8	6.69	0.146	3.43	1.29	5.79	<0.118
Phenanthrene	mg/kg	0.015 - 0.075		0.144	<0.015	1.28	<0.015	0.403	<0.015	0.248	0.455	0.202	<0.015	0.133	0.0657	0.643	<0.015



PAHs

Result > Assessment Criteria Limit of detection > Assessment Criteria	PointID			BH101		BH102		BH103		BH104		BH105A		BH106		BH107	
				1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0
	Depth (m bgl)			08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20
	Sample Date																
	Geology (at top depth of sample)			Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium
Analyte	Units	LOD	GAC														
Pyrene	mg/kg	0.015 - 0.075		0.201	<0.015	2.5	<0.015	0.107	<0.015	0.192	0.13	0.178	<0.015	0.117	0.0759	0.598	<0.015



Phenols

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample) Analyte Units LOD GAC				BH101		BH102		BH103		BH104		BH105A		BH106		BH107	
				1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0
				08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20
				Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium
Phenol	mg/kg	0.010	760	<0.01	<0.01	<0.01	0.0114	<0.01	<0.01	0.0112	0.518	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

QA Standard

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample) Analyte Units LOD GAC				BH101		BH102		BH103		BH104		BH105A		BH106		BH107	
				1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0
				08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20
				Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium
4-Bromofluorobenzene	%			95.5	101	86.1	96.9	72.4	102	93	97.7	74	103	89.6	93.9	95.2	97
Acenaphthene-d10	%			93	85.4	87	96.1	86	94.6	92	93.9	91.1	97	97.2	87.9	95.8	84.9
Chrysene-d12	%			87.5	79.2	79.4	87.8	78.7	94.7	83.2	79.3	90.9	84.6	97.6	82.2	88	79.9
Dibromofluoromethane	%			105	108	111	110	111	108	117	112	111	108	111	100	108	101
Naphthalene-d8	%			93.8	92.1	87.3	99.7	81.4	95.9	82.1	73.6	86.9	101	96.6	90.1	95	89.3
Perylene-d12**	%			78.4	80	69.7	84	70.1	86.9	77.6	71.8	86.3	81.8	88.7	81.2	77.9	81.7
Phenanthrene-d10 IS	%			91.5	86.7	86	92.1	87.7	95.3	91.3	96.1	94.3	92.1	101	84.1	99	82.2
Toluene-d8 Surrogate	%			95.8	100	97.5	94.6	88.8	97.5	95.5	95.4	104	98.1	90.1	99.7	107	99.8



TPH/EPH

	Result > Assessment Criteria	PointID	BH101		BH102		BH103		BH104		BH105A		BH106		BH107		
	Limit of detection > Assessment Criteria		1.7-1.8	3.0-3.2	0.7-0.8	6.5-6.7	1.0-1.1	3.8-3.9	0.9-0.9	3.0-3.1	1.3-1.4	4.1-4.2	1.5-1.6	2.4-2.5	0.1-0.3	2.9-3.0	
			Depth (m bgl)	08/08/19	08/03/20	08/08/19	08/08/19	08/08/19	08/08/19	08/05/19	08/06/19	08/08/19	08/09/19	08/08/19	08/01/20	08/08/19	08/01/20
			Sample Date														
			Geology (at top depth of sample)	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium	Made Ground	Alluvium
Analyte	Units	LOD	GAC														
GRO Surrogate	%			74	93.7	63.2	102	45	102	91.1	1630	78.6	107	106	104	125	105
PRO (C5-C12)	mg/kg	0.10 - 2.00		<0.1	<0.1	<0.1	0.117	2.85	<0.1	490	14900	0.376	2.52	15	1.2	0.206	<0.1

VOCs

Result > Assessment Criteria Limit of detection > Assessment Criteria PointID Depth (m bgl) Sample Date Geology (at top depth of sample)				BH101	BH102	BH103	BH104	BH105A	BH106	BH107	
				3.0-3.2	6.5-6.7	3.8-3.9	3.0-3.1	4.1-4.2	2.4-2.5	2.9-3.0	
				08/03/20	08/08/19	08/08/19	08/06/19	08/09/19	08/01/20	08/01/20	
				Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	Alluvium	
Analyte	Units	LOD	GAC								
4-Isopropyltoluene	mg/kg	0.10		<0.1	<0.1	<0.1	0.817	<0.1	<0.1	<0.1	
iso-Propylbenzene	mg/kg	0.050	1,300	<0.05	<0.05	<0.05	1.46	<0.05	<0.05	<0.05	
n-Butylbenzene	mg/kg	0.11		<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	
n-Propylbenzene	mg/kg	0.10	3,860	<0.1	<0.1	<0.1	1.15	<0.1	<0.1	<0.1	
Sec-Butylbenzene	mg/kg	0.10		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Tert-Butylbenzene	mg/kg	0.14		<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	

Aliphatics and Aromatics

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
Response Zone				Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
Sample Date					23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	GAC																
Aliphatic C05-C06	ug/l	10.0 - 500	GAC > Sol		<10	<10	<10	10	<10	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C06-C08	ug/l	10.0 - 500	GAC > Sol		<10	<10	<10	30	<10	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C08-C10	ug/l	10.0 - 500	GAC > Sol		<10	<10	<10	89	<10	<10	4650	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C10-C12	ug/l	10.0 - 500	GAC > Sol		<10	<10	<10	365	<10	<10	23700	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C12-C16	ug/l	10.0	GAC > Sol		<10	<10	<10	<10	<10	<10	50	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C07-C08	ug/l	10.0 - 500	GAC > Sol		<10	<10	<10	519	<10	<10	54500	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C08-C10	ug/l	10.0 - 500	GAC > Sol		<10	<10	<10	421	<10	<10	21400	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C10-C12	ug/l	10.0 - 500	GAC > Sol		<10	<10	<10	243	<10	<10	15800	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C12-C16	ug/l	10.0 - 20.0	GAC > Sol		<10	<10	<10	<10	<10	<10	758	<10	<10	<10	<10	<10	<10	<10	<10

BTEX and Fuel Additives

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
Response Zone Depth (m bgl)					2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
Sample Date					23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	GAC																
1,2,4-Trimethylbenzene	ug/l	1.00 - 10.0	34,060		<1	<1	<1	24.7	<1	<1	1310	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	1.00 - 10.0	34,060		<1	<1	<1	17	<1	<1	1130	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	ug/l	1.00 - 1,000	19,300		<1	<1	<1	3430	<1	<1	64100	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	1.00 - 100	GAC > Sol		<1	<1	<1	51	<1	<1	7060	<1	<1	<1	<1	<1	<1	<1	<1
Methyl t-butylether (MTBE)	ug/l	1.00	7,530,000		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	1.00 - 1,000	GAC > Sol		<1	<1	<1	519	<1	<1	61100	<1	<1	<1	<1	<1	<1	<1	<1
Xylene - Total (Summed)	ug/l	-999	GAC > Sol		1	1	1	345.6	1	1	25760	1	1	1	1	1	1	1	1

Chlorinated Aliphatics

				PointID													
				Response Zone Depth (m bgl)													
				Sample Date													
Analyte	Units	LOD	GAC														
1,1,1,2-Tetrachloroethane	ug/l	1.00	21,355		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/l	1.00	666,102		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/l	1.00	145,067		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/l	1.00	46,947		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/l	1.00	15,052		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/l	1.00	811		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/l	1.00	2,496		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/l	1.00	8,090		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l	1.00	955,412		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	ug/l	1.00	1,317		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ug/l	3.00	347,378		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Hexachlorobutadiene	ug/l	1.00	237		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene (PCE)	ug/l	1.00	4,520		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,2-Dichloroethene	ug/l	1.00	15,030		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/l	1.00	509		<1	<1	<1	<1	<1	1.18	<1	<1	<1	<1	<1	<1	<1
Vinyl chloride	ug/l	1.00	58.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Chlorinated Aromatics

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
				Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
				Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	GAC																
1,2,3-Trichlorobenzene	ug/l	1.00	3,058		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/l	1.00	8,995		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/l	1.00	GAC > Sol		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trichlorobenzene	ug/l	1.00	651		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/l	1.00	2,712		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/l	1.00	GAC > Sol		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/l	1.00	15,457		<1	<1	<1	<1	<1	<1	1.17	<1	<1	<1	<1	<1	<1	<1	<1

Halogenated Hydrocarbons

				PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
				Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
				Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	GAC																
Bromobenzene	ug/l	1.00	19,244		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Other

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
				Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
				Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
				Analyte	Units	LOD	GAC												
Carbon Disulphide	ug/l	1.00	5,230		<1	<1	<1	<1	<1	<1	2.37	<1	<1	<1	<1	<1	<1	<1	
Styrene	ug/l	1.00	GAC > Sol		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	



PAHs

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
Response Zone Depth (m bgl)					2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
Sample Date					23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	GAC																
Naphthalene	ug/l	0.010 - 100	GAC > Sol		<0.01	<0.01	<0.01	94.8	<0.01	0.0145	13300	0.0107	<0.01	<0.01	<0.01	0.0296	<0.01	<0.01	<0.01



VOCs

Result > Assessment Criteria Limit of detection > Assessment Criteria				PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
Response Zone Depth (m bgl)					2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
Sample Date					23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	GAC																
iso-Propylbenzene	ug/l	1.00	GAC > Sol		<1	<1	<1	2.91	<1	<1	56.9	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/l	1.00	GAC > Sol		<1	<1	<1	<1	<1	<1	32.3	<1	<1	<1	<1	<1	<1	<1	<1

Region	Wales and England	Hardness	NA
Water Body	Surface water	Recieving surface water status	NA
Water Body Type	Coastal		
Surface Water Type	NA	Altitude	NA



WATER

Site Area(s) selected: Whole site
Event selected: All events

Aquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH104	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 4.8	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3
					Sample Date	23/08/19	21/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
(Unrecognised code)	mm²/s								3.7											
Sulphate as S (Unrecognised code)	ug/l	40.0 - 80.0				31600	25500	31300		30500	34700	41700	10000	29500	18400	27900	45000	7730	17200	11400

WATER

Site Area(s) selected: Whole site
Event selected: All events

Aquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	MW1
					Response Zone Depth (m bgl)	5 - 10
					Sample Date	23/08/19
Analyte	Units	LOD	Reference	GAC		
(Unrecognised code)	mm²/s					
Sulphate as S (Unrecognised code)	ug/l	40.0 - 80.0			10400	



WATER

Site Area(s) selected: Whole site
Event selected: All events

Aliphatics and AromaticsAquifer: 0

					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Aliphatic C05-C06	ug/l	10.0 - 500				<10	<10	<10	10	<10	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C06-C08	ug/l	10.0 - 500				<10	<10	<10	30	<10	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C08-C10	ug/l	10.0 - 500				<10	<10	<10	89	<10	<10	4650	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C10-C12	ug/l	10.0 - 500				<10	<10	<10	365	<10	<10	23700	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C12-C16	ug/l	10.0				<10	<10	<10	<10	<10	<10	50	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C16-C21	ug/l	10.0				<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C21-C35	ug/l	10.0				<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatics C12-C35	ug/l	10.0				<10	<10	<10	<10	<10	<10	50	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C06-C07	ug/l	10.0 - 500	CL:AIRE 2017	8.00		<10	<10	<10	3410	<10	<10	58300	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C07-C08	ug/l	10.0 - 500	CL:AIRE 2017	74.0		<10	<10	<10	519	<10	<10	54500	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C08-C10	ug/l	10.0 - 500	CL:AIRE 2017	20.0		<10	<10	<10	421	<10	<10	21400	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C10-C12	ug/l	10.0 - 500	CL:AIRE 2017	2.00		<10	<10	<10	243	<10	<10	15800	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C12-C16	ug/l	10.0 - 20.0	CL:AIRE 2017	2.00		<10	<10	<10	<10	<10	<10	758	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C12-C35	ug/l	10.0 - 20.0				<10	<10	<10	<10	<10	<10	864	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C16-C21	ug/l	10.0 - 20.0	CL:AIRE 2017	0.10		<10	<10	<10	<10	<10	<10	61	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C16-C35	ug/l	10.0 - 20.0				<10	<10	<10	<10	<10	<10	106	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C21-C35	ug/l	10.0 - 20.0	CL:AIRE 2017	0.0002		<10	<10	<10	<10	<10	<10	45	<10	<10	<10	<10	<10	<10	<10	<10
Total Aliphatics and Aromatics (C5-C35)	ug/l	10.0				<10	<10	<10	5080	<10	<10	180000	<10	<10	<10	<10	<10	<10	<10	<10



WATER

Site Area(s) selected: Whole site
Event selected: All events

BTEX and Fuel Additives

Aquifer: 0

					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
1,2,4-Trimethylbenzene	ug/l	1.00 - 10.0				<1	<1	<1	24.7	<1	<1	1310	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	1.00 - 10.0				<1	<1	<1	17	<1	<1	1130	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	ug/l	1.00 - 1,000	EQS 2015 - Trans	8.00		<1	<1	<1	3430	<1	<1	64100	<1	<1	<1	<1	<1	<1	<1	<1
BTEX	ug/l	28.0				<28	<28	<28	4290	<28	<28	131000	<28	<28	<28	<28	<28	<28	<28	<28
Ethylbenzene	ug/l	1.00 - 100	Proposed EQS	20.0		<1	<1	<1	51	<1	<1	7060	<1	<1	<1	<1	<1	<1	<1	<1
Methyl t-butylether (MTBE)	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tertiary Amyl Methyl Ether (TAME)	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	1.00 - 1,000	EQS 2015 - Trans	74.0		<1	<1	<1	519	<1	<1	61100	<1	<1	<1	<1	<1	<1	<1	<1
Xylene-m & p	ug/l	1.00 - 100				<1	<1	<1	275	<1	<1	21800	<1	<1	<1	<1	<1	<1	<1	<1
Xylene-o	ug/l	1.00 - 10.0				<1	<1	<1	70.6	<1	<1	3960	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

Chlorinated AliphaticsAquifer: 0

					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
1,1,1,2-Tetrachloroethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/l	1.00	EQS 2015 - Trans	10.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/l	1.00	EQS 2015 - Trans	12.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	1.00	EQS 2015 - Trans	2.50		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cis 1,2-Dichloroethene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cis 1,3-Dichloropropene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ug/l	3.00	EQS 2015 - Trans	20.0		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Hexachlorobutadiene	ug/l	1.00	EQS 2015 - Trans MAC	0.60		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene (PCE)	ug/l	1.00	EQS 2015 - Trans	10.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

WATER

Site Area(s) selected: Whole site
Event selected: All events

Chlorinated Aliphatics

Aquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Trans-1,2-Dichloroethene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,3-Dichloropropene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/l	1.00	EQS 2015 - Trans	10.0		<1	<1	<1	<1	<1	<1	1.18	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl chloride	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Chlorinated Aromatics

Aquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
1,2,3-Trichlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trichlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Chlorotoluene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	1.17	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

Halogenated Hydrocarbons

Aquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
1,2-Dibromo-3-Chloropropane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

Inorganics					Aquifer: 0														
Result > Assessment Criteria	PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1			
		2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10			
		23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19			
Analyte	Units	LOD	Reference	GAC															
Nitrate	ug/l	20.0 - 40.0			706	<40	24.5	<20	<20	<20	36.2	<20	2480	<20	1590	853	107	1220	4790

WATER

Site Area(s) selected: Whole site
Event selected: All events

MetalsAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Arsenic	ug/l	0.50	EQS 2015 - Trans	25.0		5.6	8.68	9.14	11.3	6.66	5.25	31.7	3.05	2.63	2.67	18.6	5.55	<0.5	2.67	<0.5
Cadmium	ug/l	0.080	EQS 2015 - Trans	0.20		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.0963
Copper	ug/l	0.30	EQS 2015 - Trans	3.76		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	1.27	<0.3	2.94	<0.3	<0.3	<0.3
Hexavalent Chromium	ug/l	3.00 - 15.0	EQS 2015 - Trans	0.60		<3	<3	<3	<3	<3	<3	<3	<3	41	<3	<3	178	<3	25.5	<3
Lead	ug/l	0.20	EQS 2015 - Trans	1.30		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.32	<0.2	<0.2	<0.2	<0.2	1.42	<0.2	<0.2	<0.2
Mercury	ug/l	0.010	EQS 2015 - Trans MAC	0.070		0.0146	<0.01	<0.01	0.0167	<0.01	0.0152	0.0281	<0.01	<0.01	<0.01	<0.01	<0.01	0.0112	0.0119	0.0106
Nickel	ug/l	0.40	EQS 2015 - Trans	8.60		0.519	<0.4	<0.4	<0.4	0.704	1.31	1.37	0.546	<0.4	1.23	2.11	1.34	0.679	<0.4	0.884
Selenium	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	7.15	<1	2.19	3.03	<1	2.83	2.51
Zinc	ug/l	1.00	EQS 2015 - Trans	6.80		<1	<1	<1	3.82	<1	3.73	<1	1.01	<1	2.35	<1	5.76	<1	2.79	6.73



WATER

Site Area(s) selected: Whole site
Event selected: All events

OtherAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Carbon Disulphide	ug/l	1.00				<1	<1	<1	<1	<1	<1	2.37	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

PAHsAquifer: 0

					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Acenaphthene	ug/l	0.005 - 0.50				<0.005	0.021	<0.005	4.68	<0.005	<0.005	2.1	<0.005	<0.005	<0.005	<0.005	0.0112	<0.005	<0.005	0.057
Acenaphthylene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	0.0547	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.00508	<0.005	<0.005	<0.005
Anthracene	ug/l	0.005 - 0.50	EQS 2015 - Trans	0.10		<0.005	<0.005	<0.005	0.058	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.00635	<0.005	<0.005	<0.005
Benzo (a) anthracene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	0.0159	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.0104	<0.005	<0.005	<0.005
Benzo (a) pyrene	ug/l	0.002 - 0.20	EQS 2015 - Trans	0.0002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.2	<0.002	<0.002	<0.002	0.00461	0.0204	<0.002	<0.002	<0.002
Benzo (b) fluoranthene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	0.00732	0.0366	<0.005	<0.005	<0.005
Benzo (ghi) perylene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo (k) fluoranthene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.013	<0.005	<0.005	<0.005
Chrysene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	0.00744	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.0171	<0.005	<0.005	<0.005
Dibenzo (ah) anthracene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluoranthene	ug/l	0.005 - 0.50	EQS 2015 - Trans	0.006		<0.005	<0.005	<0.005	0.225	0.0276	<0.005	<0.5	<0.005	<0.005	<0.005	0.0108	0.0479	<0.005	<0.005	<0.005
Fluorene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	0.352	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00661
Indeno (1,2,3-cd) pyrene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Naphthalene	ug/l	0.010 - 100	EQS 2015 - Trans	2.00		<0.01	<0.01	<0.01	94.8	<0.01	0.0145	13300	0.0107	<0.01	<0.01	<0.01	0.0296	<0.01	<0.01	<0.01
PAH (Total)	ug/l	0.082 - 8.20				<0.082	<0.082	<0.082	6.09	<0.082	<0.082	678	<0.082	<0.082	<0.082	<0.082	0.27	<0.082	<0.082	<0.082
Phenanthrene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	0.523	<0.005	<0.005	0.784	<0.005	<0.005	<0.005	0.0051	0.0288	<0.005	<0.005	<0.005
Pyrene	ug/l	0.005 - 0.50				<0.005	<0.005	<0.005	0.168	0.021	<0.005	<0.5	<0.005	<0.005	<0.005	0.00901	0.0433	<0.005	<0.005	<0.005



WATER

Site Area(s) selected: Whole site
Event selected: All events

PhenolsAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Phenol	ug/l	2.00	EQS 2015 - Trans	7.70		<2	<2	<2	30	<2	<2	50	<2	<2	<2	<2	<2	<2	<2	<2
Xylenols	ug/l	11.0				<11	<11	<11	310	<11	<11	14500	<11	<11	<11	<11	<11	<11	<11	<11



WATER

Site Area(s) selected: Whole site
Event selected: All events

QA StandardAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
4-Bromofluorobenzene	%					102	99.4	99.7	105	98.9	99.2	78.8	97.9	98.5	98.2	98.1	98.5	98.1	97.6	103
Dibromofluoromethane	%					109	107	120	108	114	114	17.8	114	114	115	106	24.6	114	107	105
Toluene-d8 Surrogate	%					102	98.8	97.4	91.7	96.3	99.2	93.6	97.6	97	97.3	97.1	96.5	97.6	97.5	102



WATER

Site Area(s) selected: Whole site
Event selected: All events

TPH/EPH

Aquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
GRO Surrogate	%					109	107	79	92	95	113	68	92	89	96	111	98	108	93	109
PRO (C5-C12)	ug/l	50.0 - 2,500				<50	<50	<50	5080	<50	<50	179000	<50	<50	<50	<50	<50	<50	<50	<50



WATER

Site Area(s) selected: Whole site
Event selected: All events

VOCsAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
4-Isopropyltoluene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
iso-Propylbenzene	ug/l	1.00				<1	<1	<1	2.91	<1	<1	56.9	<1	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	23.2	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	32.3	<1	<1	<1	<1	<1	<1	<1	<1
Sec-Butylbenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	2.02	<1	<1	<1	<1	<1	<1	<1	<1
Tert-Butylbenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

BTEX and Fuel Additives

Aquifer: N/A

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Xylene - Total (Summed)	ug/l	-999				1	1	1	345.6	1	1	25760	1	1	1	1	1	1	1	1

Region	Wales and England	Hardness	NA
Water Body	Groundwater	Recieving surface water status	NA
Water Body Type	NA		
Surface Water Type	NA	Altitude	NA

WATER

Site Area(s) selected: Whole site
Event selected: All events

Aquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH104	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 4.8	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3
					Sample Date	23/08/19	21/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
(Unrecognised code)	mm²/s								3.7											
Sulphate as S (Unrecognised code)	ug/l	40.0 - 80.0				31600	25500	31300		30500	34700	41700	10000	29500	18400	27900	45000	7730	17200	11400

WATER

Site Area(s) selected: Whole site
Event selected: All events

Aquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	MW1
					Response Zone Depth (m bgl)	5 - 10
					Sample Date	23/08/19
Analyte	Units	LOD	Reference	GAC		
(Unrecognised code)	mm²/s					
Sulphate as S (Unrecognised code)	ug/l	40.0 - 80.0			10400	



WATER

Site Area(s) selected: Whole site
Event selected: All events

Aliphatics and Aromatics

Aquifer: 0

					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Aliphatic C05-C06	ug/l	10.0 - 500	WHO 2008	15,000		<10	<10	<10	10	<10	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C06-C08	ug/l	10.0 - 500	WHO 2008	15,000		<10	<10	<10	30	<10	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C08-C10	ug/l	10.0 - 500	WHO 2008	300		<10	<10	<10	89	<10	<10	4650	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C10-C12	ug/l	10.0 - 500	WHO 2008	300		<10	<10	<10	365	<10	<10	23700	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C12-C16	ug/l	10.0	WHO 2008	300		<10	<10	<10	<10	<10	<10	50	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C16-C21	ug/l	10.0				<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatic C21-C35	ug/l	10.0				<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aliphatics C12-C35	ug/l	10.0				<10	<10	<10	<10	<10	<10	50	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C06-C07	ug/l	10.0 - 500				<10	<10	<10	3410	<10	<10	58300	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C07-C08	ug/l	10.0 - 500				<10	<10	<10	519	<10	<10	54500	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C08-C10	ug/l	10.0 - 500	WHO 2008	300		<10	<10	<10	421	<10	<10	21400	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C10-C12	ug/l	10.0 - 500	WHO 2008	90.0		<10	<10	<10	243	<10	<10	15800	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C12-C16	ug/l	10.0 - 20.0	WHO 2008	90.0		<10	<10	<10	<10	<10	<10	758	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C12-C35	ug/l	10.0 - 20.0				<10	<10	<10	<10	<10	<10	864	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C16-C21	ug/l	10.0 - 20.0	WHO 2008	90.0		<10	<10	<10	<10	<10	<10	61	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C16-C35	ug/l	10.0 - 20.0				<10	<10	<10	<10	<10	<10	106	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic C21-C35	ug/l	10.0 - 20.0	WHO 2008	90.0		<10	<10	<10	<10	<10	<10	45	<10	<10	<10	<10	<10	<10	<10	<10
Total Aliphatics and Aromatics (C5-C35)	ug/l	10.0				<10	<10	<10	5080	<10	<10	180000	<10	<10	<10	<10	<10	<10	<10	<10



WATER

Site Area(s) selected: Whole site
Event selected: All events

BTEX and Fuel Additives

Aquifer: 0

					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
1,2,4-Trimethylbenzene	ug/l	1.00 - 10.0				<1	<1	<1	24.7	<1	<1	1310	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	1.00 - 10.0				<1	<1	<1	17	<1	<1	1130	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	ug/l	1.00 - 1,000	UK DWS	1.00		<1	<1	<1	3430	<1	<1	64100	<1	<1	<1	<1	<1	<1	<1	<1
BTEX	ug/l	28.0				<28	<28	<28	4290	<28	<28	131000	<28	<28	<28	<28	<28	<28	<28	<28
Ethylbenzene	ug/l	1.00 - 100	WHO 2017	300		<1	<1	<1	51	<1	<1	7060	<1	<1	<1	<1	<1	<1	<1	<1
Methyl t-butylether (MTBE)	ug/l	1.00	WHO 2017	15.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tertiary Amyl Methyl Ether (TAME)	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	1.00 - 1,000	WHO 2017	700		<1	<1	<1	519	<1	<1	61100	<1	<1	<1	<1	<1	<1	<1	<1
Xylene-m & p	ug/l	1.00 - 100				<1	<1	<1	275	<1	<1	21800	<1	<1	<1	<1	<1	<1	<1	<1
Xylene-o	ug/l	1.00 - 10.0				<1	<1	<1	70.6	<1	<1	3960	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

Chlorinated AliphaticsAquifer: 0

					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
1,1,1,2-Tetrachloroethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/l	1.00	WHO 2017	2,000		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/l	1.00	WHO 2017	140		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/l	1.00	WHO 2017	20.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/l	1.00	UK DWS	3.00		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/l	1.00	WHO 2017	40.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/l	1.00	UK DWS	3.00		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cis 1,2-Dichloroethene	ug/l	1.00	WHO 2017	50.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cis 1,3-Dichloropropene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ug/l	3.00	WHO 2017	20.0		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Hexachlorobutadiene	ug/l	1.00	WHO 2017	0.60		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

Chlorinated AliphaticsAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Tetrachloroethene (PCE)	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,2-Dichloroethene	ug/l	1.00	WHO 2017	50.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,3-Dichloropropene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl chloride	ug/l	1.00	UK DWS	0.50		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Chlorinated AromaticsAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
1,2,3-Trichlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/l	1.00	WHO 2017	1,000		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trichlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	ug/l	1.00	WHO 2017	300		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Chlorotoluene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/l	1.00	WHO 2017	300		<1	<1	<1	<1	<1	<1	1.17	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

Halogenated Hydrocarbons

Aquifer: 0

					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
1,2-Dibromo-3-Chloropropane	ug/l	1.00	WHO 2017	1.00		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	ug/l	1.00	WHO 2017	0.40		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	ug/l	1.00	WHO 2017	100		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

WATER

Site Area(s) selected: Whole site
Event selected: All events

InorganicsAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Chloride	ug/l	80.0	UK DWS	250,000		91500	30800	26800	43700	39900	54800	17700	32900	17200	34300	10400	20100	39900	19500	29900
Nitrate	ug/l	20.0 - 40.0	UK DWS	50,000		706	<40	24.5	<20	<20	<20	36.2	<20	2480	<20	1590	853	107	1220	4790



WATER

Site Area(s) selected: Whole site
Event selected: All events

MetalsAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Arsenic	ug/l	0.50	UK DWS	10.0		5.6	8.68	9.14	11.3	6.66	5.25	31.7	3.05	2.63	2.67	18.6	5.55	<0.5	2.67	<0.5
Cadmium	ug/l	0.080	UK DWS	5.00		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.0963
Chromium	ug/l	1.00	UK DWS	50.0		<1	<1	<1	<1	2.13	<1	<1	<1	50.3	8.54	<1	182	<1	24.9	<1
Copper	ug/l	0.30	UK DWS	2,000		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	1.27	<0.3	2.94	<0.3	<0.3	<0.3
Hexavalent Chromium	ug/l	3.00 - 15.0				<3	<3	<3	<3	<3	<3	<3	<3	41	<3	<3	178	<3	25.5	<3
Lead	ug/l	0.20	UK DWS	10.0		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.32	<0.2	<0.2	<0.2	<0.2	1.42	<0.2	<0.2	<0.2
Mercury	ug/l	0.010	UK DWS	1.00		0.0146	<0.01	<0.01	0.0167	<0.01	0.0152	0.0281	<0.01	<0.01	<0.01	<0.01	<0.01	0.0112	0.0119	0.0106
Nickel	ug/l	0.40	UK DWS	20.0		0.519	<0.4	<0.4	<0.4	0.704	1.31	1.37	0.546	<0.4	1.23	2.11	1.34	0.679	<0.4	0.884
Selenium	ug/l	1.00	UK DWS	10.0		<1	<1	<1	<1	<1	<1	<1	<1	7.15	<1	2.19	3.03	<1	2.83	2.51
Zinc	ug/l	1.00				<1	<1	<1	3.82	<1	3.73	<1	1.01	<1	2.35	<1	5.76	<1	2.79	6.73



WATER

Site Area(s) selected: Whole site
Event selected: All events

OtherAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Carbon Disulphide	ug/l	1.00				<1	<1	<1	<1	<1	<1	2.37	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/l	1.00	WHO 2017	20.0		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

PAHsAquifer: 0

Result > Assessment Criteria

Limit of detection > Assessment Criteria

	PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1			
	Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10			
	Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19			
Analyte	Units	LOD	Reference	GAC															
Acenaphthene	ug/l	0.005 - 0.50			<0.005	0.021	<0.005	4.68	<0.005	<0.005	2.1	<0.005	<0.005	<0.005	<0.005	0.0112	<0.005	<0.005	0.057
Acenaphthylene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	0.0547	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.00508	<0.005	<0.005	<0.005
Anthracene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	0.058	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.00635	<0.005	<0.005	<0.005
Benzo (a) anthracene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	0.0159	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.0104	<0.005	<0.005	<0.005
Benzo (a) pyrene	ug/l	0.002 - 0.20	UK DWS	0.010	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.2	<0.002	<0.002	<0.002	0.00461	0.0204	<0.002	<0.002	<0.002
Benzo (b) fluoranthene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	0.00732	0.0366	<0.005	<0.005	<0.005
Benzo (ghi) perylene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo (k) fluoranthene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.013	<0.005	<0.005	<0.005
Chrysene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	0.00744	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	0.0171	<0.005	<0.005	<0.005
Dibenzo (ah) anthracene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluoranthene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	0.225	0.0276	<0.005	<0.5	<0.005	<0.005	<0.005	0.0108	0.0479	<0.005	<0.005	<0.005
Fluorene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	0.352	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00661
Indeno (1,2,3-cd) pyrene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Naphthalene	ug/l	0.010 - 100			<0.01	<0.01	<0.01	94.8	<0.01	0.0145	13300	0.0107	<0.01	<0.01	<0.01	0.0296	<0.01	<0.01	<0.01
PAH (Total)	ug/l	0.082 - 8.20			<0.082	<0.082	<0.082	6.09	<0.082	<0.082	678	<0.082	<0.082	<0.082	<0.082	0.27	<0.082	<0.082	<0.082
Phenanthrene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	0.523	<0.005	<0.005	0.784	<0.005	<0.005	<0.005	0.0051	0.0288	<0.005	<0.005	<0.005
Pyrene	ug/l	0.005 - 0.50			<0.005	<0.005	<0.005	0.168	0.021	<0.005	<0.5	<0.005	<0.005	<0.005	0.00901	0.0433	<0.005	<0.005	<0.005



WATER

Site Area(s) selected: Whole site
Event selected: All events

PhenolsAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Phenol	ug/l	2.00				<2	<2	<2	30	<2	<2	50	<2	<2	<2	<2	<2	<2	<2	<2
Xylenols	ug/l	11.0				<11	<11	<11	310	<11	<11	14500	<11	<11	<11	<11	<11	<11	<11	<11



WATER

Site Area(s) selected: Whole site
Event selected: All events

QA StandardAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
4-Bromofluorobenzene	%					102	99.4	99.7	105	98.9	99.2	78.8	97.9	98.5	98.2	98.1	98.5	98.1	97.6	103
Dibromofluoromethane	%					109	107	120	108	114	114	17.8	114	114	115	106	24.6	114	107	105
Toluene-d8 Surrogate	%					102	98.8	97.4	91.7	96.3	99.2	93.6	97.6	97	97.3	97.1	96.5	97.6	97.5	102



WATER

Site Area(s) selected: Whole site
Event selected: All events

TPH/EPH

Aquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
GRO Surrogate	%					109	107	79	92	95	113	68	92	89	96	111	98	108	93	109
PRO (C5-C12)	ug/l	50.0 - 2,500				<50	<50	<50	5080	<50	<50	179000	<50	<50	<50	<50	<50	<50	<50	<50



WATER

Site Area(s) selected: Whole site
Event selected: All events

VOCsAquifer: 0

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
4-Isopropyltoluene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
iso-Propylbenzene	ug/l	1.00				<1	<1	<1	2.91	<1	<1	56.9	<1	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	23.2	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	32.3	<1	<1	<1	<1	<1	<1	<1	<1
Sec-Butylbenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	2.02	<1	<1	<1	<1	<1	<1	<1	<1
Tert-Butylbenzene	ug/l	1.00				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1



WATER

Site Area(s) selected: Whole site
Event selected: All events

BTEX and Fuel Additives

Aquifer: N/A

Result > Assessment Criteria Limit of detection > Assessment Criteria					PointID	BH101	BH102	BH103	BH105A	BH106	BH107	BHC5	BHH02 (D)	BHH02 (S)	BHH03	BHH04	BHH05	BHH07(D)	BHH07(S)	MW1
					Response Zone Depth (m bgl)	2.3 - 8	5 - 10	1.8 - 6	2 - 8	2.3 - 8	1.8 - 6	1 - 2	5 - 8	0.5 - 3	0.5 - 2.5	0 - 1	1 - 2	5 - 8	1 - 3	5 - 10
					Sample Date	23/08/19	21/08/19	21/08/19	23/08/19	21/08/19	23/08/19	21/08/19	21/08/19	21/08/19	21/08/19	23/08/19	23/08/19	23/08/19	23/08/19	23/08/19
Analyte	Units	LOD	Reference	GAC																
Xylene - Total (Summed)	ug/l	-999				1	1	1	345.6	1	1	25760	1	1	1	1	1	1	1	1

Appendix F

SCREENING METHODOLOGIES



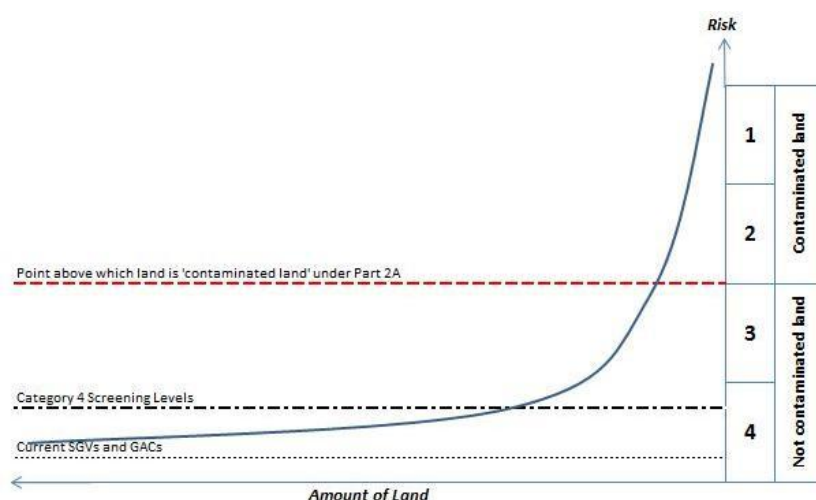
METHODOLOGY FOR THE DERIVATION OF GENERIC QUANTITATIVE ASSESSMENT CRITERIA TO EVALUATE RISKS TO HUMAN HEALTH FROM SOIL & GROUNDWATER CONTAMINATION

UK APPROACH

In the UK, the potential risks to human health from contamination in the ground are usually evaluated through a generic quantitative risk assessment (GQRA) approach. This allows generic and conservative exposure assumptions to be readily applied to risk assessments, and can be a useful tool for rapidly screening data and to identify those contaminants or scenarios that could benefit from further investigation and/or site-specific detailed quantitative risk assessment (DQRA). Current industry good practice is to use the approach presented in the Environment Agency (EA) publications SR2¹ and SR3². This approach allows the derivation of Generic Assessment Criteria (GACs), primarily for chronic exposure.

In April 2012, the Department of Environment, Food and Rural Affairs (Defra) published updated statutory guidance³ which introduced a four category approach to determining whether land in England and Wales is contaminated or not on the grounds of significant possibility of significant harm (SPOSH). **Figure 1** presents a graphical representation of the categories.

Figure 1: Four Categories for Determining if Land Represent a SPOSH



Cases classified as Category 1 are considered to be SPOSH based on actual evidence or an unacceptably high probability of harm existing. Category 4 cases are those where there is no risk, or a low risk of SPOSH.

¹ Environment Agency 'Human Health Toxicological Assessment of Contaminants in Soil', Report SC050021/SR2. January 2009.

² Environment Agency 'Updated Technical Background to the CLEA Model,' Report SC050021/SR3. January 2009.

³ Defra 'Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance'. April 2012.

GACs represent a minimal risk level, well within Category 4. A 2014 publication by Contaminated Land: Applications in Real Environments (CL:AIRE), SP1010⁴ and endorsed by Defra⁵ provided an approach to determine Category 4 Screening Levels (C4SLs) which are higher than the GACs whilst being “more pragmatic but still strongly precautionary”. It also provided C4SLs for six contaminants of concern. Although the C4SLs were designed to support Part 2A assessments to determine ‘contaminated land’ they are specifically mentioned, along with reference to the Part 2A statutory guidance, by the Department for Communities and Local Government (DCLG) for use in a planning context⁶.

An updated version the Contaminated Land Exposure Assessment (CLEA) Workbook (v1.071) was released by the EA in September 2015 to take into account the publication of SP1010. The updates comprised: additional toxicity data for the six chemicals for which C4SLs were derived; two new public open space land use scenarios; updated exposure parameters; options to run the model using C4SL exposure assumptions; and increased functionality. There were no changes to algorithms, so it is still possible to replicate the withdrawn SGVs using the input parameters held within v1.071.

It should be noted that the four category approach has not been adopted in Scotland under Part 2A or the planning regime. The Part 2A statutory guidance applicable in Scotland (Paper SE/2006/44 dated May 2006) does not reflect the changes introduced by Defra in April 2012 which allow for the use of C4SLs within Part 2A risk assessments. Additionally, it is considered that the principal of ‘minimal risk’ should still apply under planning in Scotland, based on current guidance.

WSP APPROACH

Following the withdrawal of the SGVs, and in the absence of an industry-wide, accepted set of GACs it is down to individual practitioners to derive their own soil assessment criteria. WSP has used the approach provided within SR2, SR3, SP1010, CLEA Workbook v1.071 and SR4⁷ to produce a set of minimal risk GACs. The chemical-specific data within two key publications were considered during their production: CL:AIRE 2010⁸ and LQM 2015⁹. Both documents provide comprehensive sets of GACs for different contaminants of concern.

The LQM Suitable For Use Levels (S4ULs) have selected exposure parameters consistent with the C4SL exposure scenarios. This approach was rejected by WSP as not representing minimal risk. However, the LQM S4UL document was critically reviewed and the approach and chemical input parameters were utilised where considered to be appropriate.

An industry-led C4SL Working Group is in the process of deriving a larger set of C4SLs in the near future, for approximately 20 contaminants. This will include a critical review of the chemical input data for all selected substances, and may therefore lead to further amendments to the chemical input data used in the WSP in-house screening values. It is considered likely that the contaminant list will

⁴ CL:AIRE ‘Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination’ SP1010, Final Project Report (Revision 2). September 2014.

⁵ Defra ‘SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document’. December 2014.

⁶ DCLG Planning Practice Guidance ‘Land Affected by Contamination’, particularly Paragraphs 001 and 007. Ref IDs: 33-001-20140306 & 33-007-20140612.

⁷ Environment Agency ‘CLEA Software (Version 1.05) Handbook (and Software)’, Report SC050021/SR4. September 2009.

⁸ CL:AIRE ‘The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment’. ISBN 978-1-05046-20-1. January 2010.

⁹ Nathanail et al ‘The LQM/CIEH S4ULs for Human Health Risk Assessment’, Land Quality Press, ISBN 978-0-9931084-0-2. 2015.

crossover with the 2009 EIC/AGS/CL:AIRE GACs. As such, this document was not critically reviewed by WSP.

WSP's current approach to the assessment of risks to human health is to continue to evaluate minimal risk through the use of in-house derived GACs, and to use the published C4SLs as a secondary tier of assessment until such time as additional C4SLs are published and/or in-house values are derived.

EXPOSURE MODELS

LAND USES

WSP has largely adopted the exposure assumptions of the generic land use scenarios included within SR3, with two additional public open space scenarios included from within SP1010:

- à Residential with homegrown produce consumption;
- à Residential without homegrown produce consumption;
- à Allotments;
- à Commercial;
- à Public open space near residential housing (POS_{resi}); and
- à Public park (POS_{park}).

Exceptions are described in the following Sections.

SOIL PROPERTIES

SR3 assumes a sandy loam soil with a pH of 7 and a Soil Organic Matter (SOM) content of 6% for its generic land uses, based on the geographical spread of topsoils in the UK. WSP has adopted these default values. In addition, GACs based on an SOM of 1% and 2.5% have been derived, based on common experience of the nature of Made Ground and lack of topsoil on many brownfield sites.

RECEPTOR CHARACTERISTICS AND BEHAVIOURS

SP1010 provides some updated exposure parameters for long-term inhalation rates¹⁰ and the consumption rates for homegrown produce¹¹ compared to those provided in SR3. This data was used to derived WSP's GACs.

The changes in inhalation rates do not apply to the allotment generic land use scenario, as these are based on the breathing rates for short-term exposure of light to moderate intensity activity which were derived from a study that was not updated in USEPA 2011, so the SR3 rates were retained.

¹⁰ USEPA, National Centre for Environmental Assessment 'Exposure Factors Handbook: 2011 Edition' EPA/600/R-09/052F. September 2011.

¹¹ National Diet and Nutrition Survey 2008/2009 to 2010/2011.

CHEMICAL DATA

PHYSICO-CHEMICAL PARAMETERS

Physico-chemical properties for the contaminants for which GACs have been derived have been obtained following critical review of the following hierarchy of data sources:

1. Environment Agency/Defra SGV reports where available;
2. Environment Agency '*Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values*', Report SC050021/SR7, November 2008; and
3. Published fate and transport reviews within Nathanail et. al 2015 and CL:AIRE 2010.

Where appropriate, and where sufficient data is available, values were adjusted to reflect a UK soil temperature of 10°C (e.g. K_{aw}).

TOXICOLOGICAL DATA

Toxicological data for the derivation of minimal risk Health Criteria Values (HCV) for each contaminant was selected with due regard to the approach presented in SR2. Where appropriate, the following hierarchy of data sources was used:

1. UK toxicity reviews published by authoritative bodies including:
 - < EA;
 - < Public Health England (PHE);
 - < Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT); and
 - < Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC).
2. Authoritative European sources such as European Food Standards Agency (EFSA)
3. International organisations including:
 - < World Health Organisation (WHO); and
 - < Joint FAO/WHO Expert Committee on Food Additives (JECFA).
4. Authoritative country-specific sources including:
 - < United States Environmental Protection Agency (USEPA);
 - < US Agency for Toxic Substances and Disease Registry (ATSDR);
 - < US Integrated Risk Information System (IRIS); and
 - < Netherlands National Institute for Public Health and the Environment (RIVM).

Factors such as the applicability of the data to human health (e.g. epidemiological vs. animal studies), the quality of the data, the level of uncertainty in the results and the age of the data were also taken into account in the final selection. Details for specific substances are available on request.

MEAN DAILY INTAKES

Estimations of background exposure for each threshold substance have been updated. In line with the SR2 approach, the exposure from non-threshold substances in the soil does not take into account exposure from other sources, and as such GACs were derived without consideration of the Mean Daily Intake (MDI) for those substances.

The data published by the EA in its series of TOX reports between 2002 and 2009 was evaluated to determine whether the values were considered to remain valid today. Values from these current UK published sources were not amended unless they were considered to be significantly different so that the GACs remained as comparable as possible with the revoked SGVs.

ORAL MEAN DAILY INTAKES

Oral MDI were generally estimated as the sum of exposure via the ingestion of food and drinking water using the default adult physiological parameters presented in Table 3.3 of SR2.

Data on the exposure of substances from food ingestion was generally obtained from UK Total Diet Studies (TDS) published by the Food Standards Agency (FSA) and its predecessor the Ministry of Agriculture, Fisheries and Food (MAFF) and from studies commissioned by COT. Where no UK-specific data was available, MDI were derived from the European Food Safety Authority (EFSA), Health Canada and US sources. This was a rare occurrence, and in these instances, the data was evaluated to determine its applicability to the UK.

Data on the concentrations of substances in tap water was obtained from a variety of sources. UK data was used where available, with preference given to Drinking Water Inspectorate (DWI) 2014 data from water company tap water testing (LOD, 1st and 99th percentile data is available). Where the substance was not included in tap water testing, other UK sources of information were considered including:

- à DWI data from water company tap water testing from previous years;
- à COT; and
- à FSA.

Where UK data was not available, a number of other data sources were considered, largely WHO International Programme on Chemical Safety (IPCS) Concise International Chemical Assessment Documents (CICADs) and background documents for the development of Guidelines for Drinking Water Quality, using professional judgement on the relevance of the data to the UK. The final decision on the MDI from drinking water was made using professional judgement on the balance of relevance and probability, taking into account the detection limit where not detected, Koc and solubility, reduction in use of the substance, banned substances, tight controls (e.g. on explosives) and with due consideration to the SR2 instruction that “if no data or information in background exposure are available, background exposure should be assumed to be negligible and the MDI set to zero....”.

Data from other countries was generally not used because it was considered that the hydrogeology of these countries along with industrial practices were unlikely to be reflective of the UK.

INHALATION MEAN DAILY INTAKES

Inhalation MDIs were based on estimates of average daily exposure by the inhalation pathway and calculated using the default adult physiological parameters presented in Table 3.3 of SR2.

The inhalation MDIs were generally estimated using background exposure data from the UK, derived from Defra's UK-AIR: Air Information Resource¹², which provides ambient air quality data from a number of sites forming a UK-wide monitoring network. The MDIs for heavy metals were based on rolling annual average metal mass concentration data from Defra's UK Heavy Metals Monitoring Network from the period October 2009 to September 2010¹³.

Information for some substances was obtained from UK sources including Environment Agency TOX reports and data from the UK Expert Panel on Air Quality Standards (EPAQS). Where recent UK data was not available, data was sourced from the International Programme on Chemical Safety (IPCS), the World Health Organisation (WHO), the Agency for Toxic Substances and Diseases Registry (ATSDR), Health Canada, and various other peer-reviewed sources summarised by LQM/CIEH¹⁴.

For other substances, where no data or information on background exposure was available, background exposure was assumed to be negligible and the MDI set at 0.5*TDI in accordance with guidance in SR2.

PLANT UPTAKE

Soil to plant concentration factors are available in CLEA v1.071 for arsenic, cadmium, hexavalent chromium, lead, mercury, nickel and selenium. For all remaining inorganic chemicals, concentration factors were obtained using the PRISM model. Substance-specific correction factors have been selected in accordance with the guidance established within SR3. This is consistent to the approach utilised in the derivation of the LQM S4UL and the EIC/AGS/CL:AIRE GAC.

Where there is a lack of appropriate data to enable the derivation of specific soil to plant concentrations factors for organic chemicals, plant uptake was modelled within CLEA v1.071 using the generic equations recommended within SR3, as follows:

- à Green Vegetables – Ryan et al. (1988);
- à Root Vegetables – Trapp (2002);
- à Tuber Vegetables – Trapp et al. (2007); and
- à Tree Fruit – Trapp et al. (2003).

There are no suitable models available for modelling uptake for herbaceous fruit or shrub fruit. Exposure is considered negligible.

¹² Crown 2016 copyright Defra via uk-air.defra.gov.uk, licenced under the Open Government Licence (OGL).

¹³ Defra, 2013 Spreadsheet of historic data for multiple years for the Metals network. Available online at: <http://uk-air.defra.gov.uk/data/metals-data>. [Accessed 13/03/2016].

¹⁴ LQM/CIEH, 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment.

SOIL SATURATION LIMITS

GACs are not limited to their theoretical soil saturation within CLEA, although where either the aqueous or the vapour-based saturation is exceeded, this is highlighted within the Workbook (compared with the lower of the two values). This affects pathways which depend on partitioning calculations so in reality this only affects the vapour pathways and is relevant to organic substances and other substances, such as elemental mercury, that have a significant volatile component. However, the Workbook highlights saturation for direct contact pathways to indicate to the user where further qualitative consideration of free phase contamination at the surface may be required.

Where the lower of the two saturation limits is exceeded and the vapour pathway is the only exposure route being considered, the chronic risks to human health are likely to be negligible. Further evaluation could be undertaken using an alternative model suitable for evaluating non-aqueous phase liquids (NAPLs), such as the Johnson & Ettinger (J&E) approach described in USEPA 2003. However, WSP considers that if NAPLs are suspected, given the known limitations and over-simplifications of J&E, soil vapour monitoring is a more accurate way of assessing potential risks.

Where the lower saturation limit is exceeded for the vapour pathway and a number of exposure routes are being considered, then the contribution from the NAPL via vapour inhalation to the overall exposure can be evaluated using the procedure provided in SR4. WSP would evaluate this as part of a DQRA process or through soil vapour monitoring on-site to determine site-specific soil vapour concentrations.

CHEMICAL SPECIFIC ASSUMPTIONS

CYANIDES

Cyanide has high acute toxicity, and short term exposure is an important consideration when assessing the risks from soils contaminated with cyanide. The primary risk to human receptors from free cyanide in soils is an acute risk.

There is no current UK guidance available for calculating acute risks from free cyanide. Consequently, GAC for acute exposure were derived using the algorithms presented in MADEP 1992¹⁵ and assuming a one-off ingestion of 10g of soil (this conservative value has been taken as an upper bound estimate for a one-off soil ingestion rate amongst children). Receptor body weights have been selected according to the critical receptor for each exposure scenario. The lowest of the chronic and acute GAC for each land use scenario were adopted by WSP. Brinckerhoff.

LEAD

The SGV for lead was withdrawn by the EA in 2009, and in 2011 the EA withdrew their published TOX report in light of new scientific evidence. The C4SL for lead was derived using the latest scientific evidence from a large human dataset. As such, no chemical-specific margin was applied in the derivation of the C4SL for lead. It may be possible for WSP to derive a GAC for lead using the same dataset and applying a chemical-specific margin, but the value is likely to be lower than UK natural background concentrations. Therefore, WSP has adopted the toxicological data used to derive the C4SLs in deriving the GAC for lead until such time as alternative GACs are published by an authoritative body. The relative bioavailability was set at 100% in line with the approach taken for other GACs, whereas the C4SL assumes 60% for soil and 64% for airborne dust. Thus, the WSP GAC are lower than the C4SLs.

¹⁵ MADEP 'Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration' 1992. http://www.mass.gov/dep/toxics/cn_soil.htm

POLYCYCLIC AROMATIC HYDROCARBONS

WSP's approach to the assessment of polycyclic aromatic hydrocarbons (PAHs) uses the surrogate marker approach. BaP was used as a surrogate marker for all genotoxic PAHs in line with the Health Protection Agency 2010¹⁶ recommendations and SP1010. This assumes that the PAH profile of the data is similar to that of the coal tars used in the Culp *et al* oral carcinogenicity study from which the toxicity data for BaP was produced. In reality, this profile has been shown by HPA to be applicable on the majority of contaminated sites based on assessment of sites across the country.

The alternative is the Toxic Equivalency Factor (TEF) approach which uses a reference compound and assigns TEFs for other compounds based on estimates of potency. Key uncertainties with this approach include the assumption that all compounds have the same toxic mechanism of action within the body and that no compounds with a greater potency than the reference compound are present. It is considered by the HPA that the TEF approach is likely to under predict the true carcinogenicity of PAHs and therefore favours the surrogate marker approach.

For these reasons, WSP considers that the adoption of BaP as a surrogate marker for genotoxic PAHs, as opposed to the TEF approach, is reasonable. In rare cases where the PAH profile may differ from the wide definitions of the Culp *et al* study the user should discuss their project with an experienced risk assessor. In addition, WSP has derived a GAC for naphthalene, which is commonly a risk driver due to its high volatility, relative to other PAH compounds.

TRIMETHYLBENZENES

The GAC for trimethylbenzenes can be used for the assessment of any individual isomer (1,2,3-trimethylbenzene, 1,2,4-trimethylbenzene or 1,3,5-trimethylbenzene), or a mixture of the three isomers.

CHEMICAL GROUPS

For a number of chemical groups, the available toxicity data is for combinations of chemicals. Given that the physico-chemical parameters may differ between the chemicals, the GACs for the chemicals within the groups have been calculated and then the lowest GAC selected to represent the entire group. This was the approach taken by the EA for m-, o- and p-xylenes, and has also been adopted by WSP for:

- à 2-chlorophenol, 2,4-dichlorophenol, 2,4,6-trichlorophenol and 2,3,4,6-tetrachlorophenol;
- à 2-, 3- and 4-methylphenol (total cresols);
- à aldrin and dieldrin; and
- à α - and β -endosulphan.

¹⁶ HPA Contaminated Land Information Sheet 'Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs) 2010

EXPOSURE TO VAPOURS

INHALATION OF MEASURED VAPOURS

WSP has derived a set of soil vapour GACs (GAC_{sv}) that allow for the assessment of measured site soil vapour concentrations, using J&E, in order to establish potential risks via indoor inhalation of vapours. This methodology enables a more robust assessment of exposure via the inhalation of soil vapours indoors than using CLEA-derived soil GAC, as it is based upon measured soil vapour concentrations beneath the site. It also allows for the assessment of vapours from all source terms (i.e. groundwater, soil or NAPL). Outdoor inhalation was not included. WSP considers that the indoor inhalation pathway is the significantly dominant risk-driver.

The generic land use scenarios within CLEA (residential and commercial) that were used to derive the soil GAC were used to define the receptor and building characteristics for the soil vapour GAC. Only residential and commercial generic land use scenarios include the indoor inhalation of vapours pathway.

The GAC_{sv} were derived for three different soil types; sand, sandy loam and clay, reflecting the importance of this parameter within the J&E model. A depth to contamination of 0.85 m below the base of the building foundation was assumed (i.e. 1 m below ground level). This differs from the depth assumed for the soil GAC (0.5 m bgl), but was selected by WSP as a reasonable worst case scenario.

It is acknowledged that the J&E commonly over-predicts indoor vapour concentrations. In particular, it will significantly over-predict vapour concentrations for suspended floor slabs, which many new builds are constructed with, it does not take into account lateral migration and assumes an infinite source of contamination at steady state conditions. In addition, it is common for soil gas/vapour wells to be installed with at least 1 m of plain riser at the surface and this equates to a total depth of 0.85 m below the building foundation plus a 0.15 m thick foundation, and so is more representative of the depth that samples will be taken from.

The TDSIs and IDs for each substance were converted from $\mu g kg^{-1} bw day^{-1}$ to $\mu g m^{-3}$ using the standard conversions quoted in Table 3.3 of SR2, thereby replacing the need to model C_{air} in the equation:

$$C_{air} = \alpha \cdot C_{vap} \cdot 1,000,000 cm^3 m^{-3}$$

Where:

C_{air} is the concentration of vapours within the building, $mg m^{-3}$

α is the steady state attenuation coefficient between soil and indoor air, dimensionless

C_{vap} is the soil vapour concentration, $mg cm^{-3}$

The target concentrations within indoor air for each substance (C_{air}) are a function of receptor inhalation rates and occupancy periods, as defined by the site conceptual exposure model (assuming standard CLEA occupancy periods and receptors).

The attenuation factor was calculated using J&E (Equation 10.4 in SR3) and the resulting C_{vap} is equivalent to the GAC_{sv} for the modelled exposure scenario.

Where reported soil vapour concentrations exceed the relevant saturated vapour concentration, free product may occur, and the user should discuss their project with an experienced risk assessor.

INHALATION OF GROUNDWATER-DERIVED VAPOURS

WSP has derived a set of groundwater GACs (GAC_{gw}) to evaluate the potential risks through the indoor inhalation of groundwater-derived vapours by first applying the approach described above for the derivation of the WSP GAC_{sv} to determine the acceptable concentration in soil vapour directly above the water table.

The depth to groundwater was assumed to be 1 m bgl (i.e. 0.85 m below the base of the building foundation). This depth was considered to be more representative of commonly encountered groundwater conditions than the 0.5 m below the base of the building foundation (i.e. 0.65 m bgl) that is used by CLEA for an unsaturated source present in the overlying soil.

The GAC_{gw} was then back-calculated from the GAC_{sv} using the air-water partition coefficient (K_{aw}) for each substance.

The WSP Groundwater Vapour GAC are protective against a dissolved phase contaminant source only. If the presence of NAPL is suspected, the risks from this source will need to be assessed. Where reported groundwater concentrations exceed the relevant solubility limit, free product may occur, and the user should discuss their project with an experienced risk assessor.

Appendix G

RISK APPRAISAL METHODOLOGY



RISK APPRAISAL

RISK APPRAISAL

Using the information detailed above, WSP has refined the conceptual site model (CSM). The CSM identifies potential pollutants, receptors and exposure pathways that may be present based on a commercial end use.

The identification of potential “pollutant linkages” is a key aspect of the evaluation of potentially contaminated land. An approach based on the UK CIRIA report C552 (Contaminated Land Risk Assessment: A Guide to Good Practice, 2001) has been adopted within this report. For each of the pollutant linkages, an estimate is made of;

- The potential severity of the risk; and
- The likelihood of the risk occurring.

Table C.1 presents the classification of the severity of the risk:

TABLE C.1 SEVERITY OF RISK

Severe	Acute risks to human health; Major pollution of controlled waters (watercourses or groundwater)
Medium	Chronic (long-term) risk to human health; Pollution of sensitive controlled waters (surface waters or aquifers)
Mild	Pollution of non-sensitive water resources.
Minor	Requirement for protective equipment during site works to mitigate health effects; Damage to non-sensitive ecosystems or species

The probability of the risk occurring is classified by criteria given in Table C.2.

TABLE C.2 PROBABILITY OF RISK OCCURRING

High Likelihood	Pollutant linkage may be present, and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor.
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term.
Low Likelihood	Pollutant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	Pollutant linkage may be present but the circumstances under which harm would occur are improbable.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability as presented in Table C.3.

TABLE C.3 COMPARISON OF SEVERITY AND PROBABILITY

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

Table C.4 then provides a description of the typical consequences and potential actions required following each risk definition.

TABLE C.4 QUALITATIVE RISK ASSESSMENT - CLASSIFICATION OF CONSEQUENCE

Classification	Definition
Very High Risk	Severe harm to a receptor may already be occurring, or a high likelihood severe harm will arise to a receptor, unless immediate remedial works / mitigation measures are undertaken.
High Risk	Harm is likely to arise to a receptor, and is likely to be severe, unless appropriate remedial actions / mitigation measures are undertaken. Remedial works may be required in the short-term, but likely to be required over the long-term.
Moderate Risk	Possible that harm could arise to a receptor, but low likelihood that such harm would be severe. Harm is likely to be mild. Some remedial works may be required in the long-term.
Moderate / Low Risk	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low, but is not of sufficient concern to be classified as mild. Limited further investigation may be required to clarify the risk. If necessary, remediation works are likely to be limited in extent.
Low Risk	Possible that harm could arise to a receptor. Such harm, at worst, would normally be mild.
Very Low Risk	Low likelihood that harm could arise to a receptor. Such harm is unlikely to be any worse than mild.



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