

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 22/138

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			

EMT Job No: 22/138

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma –Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) –Al anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) –Al anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			

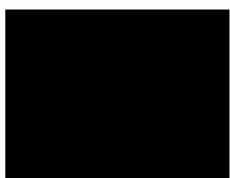
EPS Ltd
10-12 East Parade
Leeds
LS1 2BH



Attention :	Paul O'Connor
Date :	21st February, 2022
Your reference :	UK21.5634
Our reference :	Test Report 22/1809 Batch 1
Location :	32, New Lane, Havant (Pfizer), PO9 2NG
Date samples received :	5th February, 2022
Status :	Final Report
Issue :	1

Six samples were received for analysis on 5th February, 2022 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

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



Phil Sommerton BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5634
Location: 32, New Lane, Havant (Pfizer), PO9 2NG
Contact: Paul O'Connor
EMT Job No: 22/1809

Report : Liquid

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

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36					Please see attached notes for all abbreviations and acronyms		
Sample ID	BH01	BH03	BH07	BH12	BH17	BHGA 07A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P G	V H N P G	V H N P G							
Sample Date	02/02/2022	02/02/2022	02/02/2022	02/02/2022	02/02/2022	02/02/2022							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	05/02/2022	05/02/2022	05/02/2022	05/02/2022	05/02/2022	05/02/2022							
TPH CWG													
Aliphatics													
>C5-C6 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C6-C8 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C8-C10 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C10-C12 [#]	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Aromatics													
>C5-EC7 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12 [#]	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics and aromatics(C5-35) [#]	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15					<0.15	mg/l	TM26/PM0
Sulphate as SO ₄ [#]	20.4	186.8	99.9	43.5	197.7	80.4					<0.5	mg/l	TM38/PM0
Total Cyanide [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as N [#]	<0.03	<0.03	0.03	<0.03	<0.03	<0.03					<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<6	<6	<6	<6	<6	<6					<6	ug/l	TM38/PM0
Total Dissolved Chromium III	<6	<6	<6	<6	<6	<6					<6	ug/l	TM0/PM0
pH [#]	7.80	7.80	7.95	7.82	7.41	7.76					<0.01	pH units	TM73/PM0
Total Organic Carbon [#]	2	<2	<2	2	3	<2					<2	mg/l	TM60/PM0

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5634
Location: 32, New Lane, Havant (Pfizer), PO9 2NG
Contact: Paul O'Connor
EMT Job No: 22/1809

VOC Report : Liquid

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36					Please see attached notes for all abbreviations and acronyms		
Sample ID	BH01	BH03	BH07	BH12	BH17	BHGA 07A							
Depth													
COC No / misc													
Containers	VHNP G	VHNP G	VHNP G	VHNP G	VHNP G	VHNP G							
Sample Date	02/02/2022	02/02/2022	02/02/2022	02/02/2022	02/02/2022	02/02/2022							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water					LOD/LOR	Units	Method No.
Batch Number	1	1	1	1	1	1							
Date of Receipt	05/02/2022	05/02/2022	05/02/2022	05/02/2022	05/02/2022	05/02/2022							
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
trans-1,2-Dichloroethene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
cis-1,2-Dichloroethene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Chloroform #	3	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
cis-1,3-Dichloropropene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM15/PM10
trans-1,3-Dichloropropene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	<2	12	<2					<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4	<4					<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	101	104	105	105	103	100					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	99	98	97	96	97	93					<0	%	TM15/PM10

Matrix : Liquid

6 of 13

Client Name: EPS Ltd
Reference: UK21.5634
Location: 32, New Lane, Havant (Pfizer), PO9 2NG
Contact: Paul O'Connor

[illegible]

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/1809

SOILS and ASH

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

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

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

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

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

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

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

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

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

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

WATERS

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

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

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

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

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

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 22/1809

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			

EMT Job No: 22/1809

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma –Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) –Al anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) –Al anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			

EPS Ltd
7B Caxton House
Broad Street
Cambourne
Cambridgeshire
CB23 6JN



Attention : Marcus Bell
Date : 13th December, 2021
Your reference : UK21.5634
Our reference : Test Report 21/19084 Batch 1
Location : 32 New Lane Havant (Pfizer)
Date samples received : 2nd December, 2021
Status : Final Report
Issue : 1

Five samples were received for analysis on 2nd December, 2021 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

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



Phil Sommerton BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Client Name: EPS Ltd
Reference: UK21.5634
Location: 32 New Lane Havant (Pfizer)
Contact: Marcus Bell
EMT Job No: 21/19084

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

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5634
Location: 32 New Lane Havant (Pfizer)
Contact: Marcus Bell
EMT Job No: 21/19084

Report : Liquid

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

EMT Sample No.	1-6	7-12	13-18	19-24	25-30						Please see attached notes for all abbreviations and acronyms		
Sample ID	BH01	BH03	BH07	BH12	BHGA 07A								
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P G	V H N P G								
Sample Date	29/11/2021 14:40	29/11/2021 13:00	29/11/2021 13:55	29/11/2021 15:40	29/11/2021 09:40								
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water								
Batch Number	1	1	1	1	1								
Date of Receipt	02/12/2021	02/12/2021	02/12/2021	02/12/2021	02/12/2021						LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>C6-C8 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>C8-C10 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>C10-C12 #	<5	<5	<5	<5	<5						<5	ug/l	TM5/PM16/PM30
>C12-C16 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
>C16-C21 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
>C21-C35 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
Aromatics													
>C5-EC7 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>EC7-EC8 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>EC8-EC10 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>EC10-EC12 #	<5	<5	<5	<5	<5						<5	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
Total aliphatics and aromatics(C5-35) #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15						<0.15	mg/l	TM26/PM0
Sulphate as SO4 #	24.9	112.4	60.5	44.9	44.1						<0.5	mg/l	TM38/PM0
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	<0.01						<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as N #	<0.03	<0.03	0.05	<0.03	<0.03						<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<6	<6	<6	<6	<6						<6	ug/l	TM38/PM0
Total Dissolved Chromium III	<6	<6	<6	<6	<6						<6	ug/l	TM0/PM0
pH #	7.66	7.93	7.98	7.85	7.83						<0.01	pH units	TM73/PM0
Total Organic Carbon #	<2	<2	<2	<2	<2						<2	mg/l	TM60/PM0

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5634
Location: 32 New Lane Havant (Pfizer)
Contact: Marcus Bell
EMT Job No: 21/19084

SVOC Report : Liquid

EMT Sample No.	1-6	7-12	13-18	19-24	25-30						Please see attached notes for all abbreviations and acronyms		
Sample ID	BH01	BH03	BH07	BH12	BHGA 07A								
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P G	V H N P G								
Sample Date	29/11/2021 14:40	29/11/2021 13:00	29/11/2021 13:55	29/11/2021 15:40	29/11/2021 09:40								
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water								
Batch Number	1	1	1	1	1								
Date of Receipt	02/12/2021	02/12/2021	02/12/2021	02/12/2021	02/12/2021						LOD/LOR	Units	Method No.
SVOC MS													
Phenols													
2-Chlorophenol #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
2-Methylphenol #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
4-Methylphenol	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
4-Nitrophenol	<10	<10	<10	<10	<10						<10	ug/l	TM16/PM30
Pentachlorophenol	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Phenol	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5	<5	<5	<5	<5						<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5	<1.5	<1.5	<1.5						<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Diethyl phthalate #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Dimethyl phthalate	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Other SVOCs													
1,2-Dichlorobenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
2-Nitroaniline	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
3-Nitroaniline	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
4-Chloroaniline	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Carbazole #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
Hexachlorobenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Hexachloroethane #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Isophorone #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM16/PM30
Nitrobenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	124	125	121	123	126						<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	125	132 ^{SV}	130	125	131 ^{SV}						<0	%	TM16/PM30

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5634
Location: 32 New Lane Havant (Pfizer)
Contact: Marcus Bell
EMT Job No: 21/19084

VOC Report : Liquid

EMT Sample No.	1-6	7-12	13-18	19-24	25-30						Please see attached notes for all abbreviations and acronyms		
Sample ID	BH01	BH03	BH07	BH12	BHGA 07A								
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P G	V H N P G								
Sample Date	29/11/2021 14:40	29/11/2021 13:00	29/11/2021 13:55	29/11/2021 15:40	29/11/2021 09:40								
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water								
Batch Number	1	1	1	1	1								
Date of Receipt	02/12/2021	02/12/2021	02/12/2021	02/12/2021	02/12/2021						LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5						<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4						<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	92	92	89	102	100						<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	96	93	89	100	97						<0	%	TM15/PM10

Matrix : Liquid

QF-PM 3.1.8 v10 Please include all sections of this report if it is reproduced 6 of 12

Client Name: EPS Ltd
Reference: UK21.5634
Location: 32 New Lane Havant (Pfizer)
Contact: Marcus Bell

[illegible]

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/19084

SOILS

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

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

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

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

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

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

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

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

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

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

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

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

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

WATERS

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

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

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

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

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

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 21/19084

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			

EMT Job No: 21/19084

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			

APPENDIX H

Geotechnical Records

Russell Peters
Quartz Project Services
2nd Floor
34 Dover Street
London
W1S 4NG

18th March 2022

C200810

Dear Russell,

New Lane, Havant - DP01 AMZL + MSVP – Phase 1 Earthworks Verification

Please accept this letter as confirmation of our satisfactory review of the following document:

CGL Phase 1 Earthworks Interim Verification Report ref. CGK/00218 dated March 2022

The CGL report scope is described on page 7, under Section 3.3 Specification and is in accordance with our understanding of the report requirement, referencing the correct site documentation. CGL report extract, for reference, as follows:

“The Contractor shall carry out the works in accordance with the requirements of the Highways Agency Manual of Contract Documents for Highway Works Volume 1: Specification for Highway Works, dated March 1998 with all current amendments (November 2021), herein referred to as the SHW, together with the Appendices to the Specification included in Pinnacle’s [Earthwork] Specification for the site.”

Pinnacle note the following key findings from the report as follows:

Page 4:

“...Appendix C. Phase 2 of the earthworks will entail ground improvement of the platform by cement stabilisation sufficient to carry the piling rig loads. Earthworks acceptability testing for placement and compaction of site won fill material was to be implemented in accordance with Pinnacle’s Earthworks Specification for the site (PCE Spec).

Cont/...

The objective of this interim report is to verify that Phase 1 of the earthworks completed to date are in accordance with Pinnacle's specification to allow commencement of the ground improvement stabilisation works under Phase 2."

Pinnacle are in agreement of the above and have no adverse comments.

- PAGE 8:

"Hand Shear Vane tests and Mexe Cone testing were specified to compare and corroborate the results obtained from laboratory triaxial undrained shear strength testing and plate load equivalent CBR tests. However, owing to the high gravel content, it was not possible to perform either the Mexe Cone or Hand Shear Vane tests. Dynamic Cone Penetrometer (DCP) tests were attempted to obtain an estimation for CBR, in lieu of Mexe Cone, however, it was considered these too gave spurious and misleading results due to the gravel content of the fill."

No adverse comments, all as discussed / noted previously when meeting January 19th 2022 with TSL & Anne Curtis (CGL).

- PAGE 8

"The thickness of the concrete slabs and foundations encountered were in excess of those anticipated prior to excavation. The foundations were up to 1.5m thick, in the southwestern area of the site. In the same area, concrete piles were encountered, and were removed. Excavations to a depth of around 2.0mbgl were required to remove the buried concrete. The excavations were backfilled with well compacted site won fill material. The concrete was processed on site, using up to three crushers, to Class 6F5 and Type 1 recycled aggregate. This material was stockpiled along the southern edge of the earthworks area, ready for reuse in Phase 2 of the works, or removal off site"

No adverse comments, possible site unknowns caveated on Tender ground works drawings, demolition arisings volumes based on TSL initial site-based estimates.

- Page 16

"No instability or unusual ground conditions were encountered during the works."

No adverse comments.

- Page 18

[relating to CBR test carried out on site]

"The results confirm that the materials passed the acceptability criteria on completion of placement and compaction."

Cont/...

No adverse comments

- Page 20

“No subgrade has been prepared or pavement placed to date. “

No adverse comments. All part of Phase 2 works to follow.

The CGL Report confirms that the groundworks specifications and documentation have been satisfied.

For any questions or design related need for additional information, please do not hesitate to contact us.

Kind Regards



Zuzanna Towarek

Project Leader
Pinnacle Consulting Engineers Limited
zuzanna.t@ukpinnacle.com
M: +44 (0) 7587 860 400



TSL Limited

32 New Lane, Havant

Phase 1 Earthworks Interim Verification Report

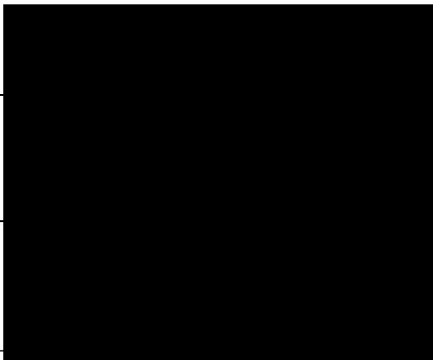
March, 2022



Card Geotechnics Limited
Northdown House, Ashford Road
Harrietsham, Maidstone
Kent, ME17 1QW
Telephone: 01622 858545
cgl-uk.com

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Card Geotechnics Limited ("CGL") has prepared this report in accordance with the instructions of TSL Limited ("the Client") under the terms of its appointment for consulting engineering services by the Client dated 10 December 2021. The report is for the sole and specific use of the Client, and CGL shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared and provided. Should the Client require to pass copies of the report to other parties for information, the whole of the report should be so copied, but no professional liability or warranty shall be extended to other parties by CGL in this connection without the explicit written agreement thereto by CGL.

Author	Anne Curtis, Senior Engineer <i>BEng (Hons)</i>		
Checked/ Approved	Phil West, Regional Director BSc (Hons) MSc CEng MICE		
Reference	CGK/00218	Revision	0
		Issue Date	March 2022

Contents

1.	INTRODUCTION	4
2.	SITE LOCATION AND DESCRIPTION	5
2.1	Site Location	5
2.2	Site Description	5
2.3	Proposed Development	6
2.4	Ground Conditions	6
3.	WORKS INFORMATION	7
3.1	Definitions	7
3.2	Summary of works undertaken	7
3.3	Specification	7
4.	EARTHWORKS	9
4.1	Outline Design	9
4.2	As-dug Ground Conditions	9
4.3	Problems Not Envisaged at Design Stage and Their Solutions	9
4.4	Materials Management and Haul Conditions	10
5.	MATERIALS CLASSIFICATION AND ACCEPTABILITY TESTING	11
5.1	Classification Procedure	11
5.2	Site Won Fill	11
5.3	Recycled Aggregate 6F2 and Type 1	13
6.	FILL CONSTRUCTION	15
6.1	Excavation and Formation Preparation	15
6.2	Source of Material Placed	15
6.3	Locations of Material Placed	15
6.4	Weather Conditions	16
6.5	Plant Used and Details of Problems Encountered	16
6.6	Instability Problems and Unusual Ground Conditions	16
6.7	Drainage and Treatment of Soft Areas	16
7.	EARTHWORKS ACCEPTABILITY TESTING	17
7.1	Application of the Acceptability Criteria	17
7.2	Earthwork Acceptability Testing	17
7.3	Results Summary	18
7.4	Outstanding Phase 1 Earthworks	19
8.	SUBGRADE/CAPPING/PAVEMENTS	20
9.	DRAINAGE	21

9.1 Details of Temporary Drainage

21

APPENDICES

Appendix A	Pre-Existing Development Plan
Appendix B	Testing Grid and Regime Plan (showing proposed building footprint)
Appendix C	TSL Cut/Fill Isopachyte Plan
Appendix D	CGL Site Visit Records
Appendix E	Site Won Fill Material Acceptability Testing
Appendix F	Recycled Aggregate Material Acceptability Testing
Appendix G	Moisture Content and Field Dry Density NDG and Sand Replacement Tests
Appendix H	Hand Shear Vane, Mexe Cone and Dynamic Cone Penetrometer Tests
Appendix I	CBR Plate Load Tests

1. INTRODUCTION

The site is located at 32 New Lane Havant PO9 2NG in an area of mixed industrial and residential low rise housing in Havant Borough Council. By reference to documents on the borough's planning portal under planning application APP/21/00200 it is understood the site was formerly occupied by Wyeth and Pfizer pharmaceutical companies. The former development included laboratories and a cold chain packaging, storage, and distribution facility predominantly situated towards the rear of the site with car parking at the front alongside New Lane.

The proposed redevelopment of the site is a new warehouse unit, loading bay area, multi-storey car park, ancillary offices and facilities, landscaping and associated infrastructure and a new access from New Lane.

As part of the scope of works to remediate this site, an earthworks program was devised to form a level working piling platform for the new development. Phase 1 of the earthworks required levelling of the site won soils across the site by cut and fill, and infilling of the extensive excavations formed by removal of the existing slab foundations, which were up to 1.5m thick, and reinforced concrete piles. A plan showing the layout of the pre-existing buildings, where foundations were removed, is included in Appendix A, and the plan in Appendix B shows the location of the proposed warehouse building footprint.

The site was levelled to design formation level plus a 100mm sacrificial protection layer by cutting and filling site won material across the site, as shown in the isopachyte cut and fill drawing included in Appendix C. Phase 2 of the earthworks will entail ground improvement of the platform by cement stabilisation sufficient to carry the piling rig loads. Earthworks acceptability testing for placement and compaction of site won fill material was to be implemented in accordance with Pinnacle's Earthworks Specification for the site¹.

The objective of this interim report is to verify that Phase 1 of the earthworks completed to date are in accordance with Pinnacle's specification to allow commencement of the ground improvement stabilisation works under Phase 2.

¹ Pinnacle Consulting Engineers (December 2021). Earthworks Specification, Havant 32 New Lane. Version 2.0. Ref. C200810-PIN-XX-XX-SP-C-003.

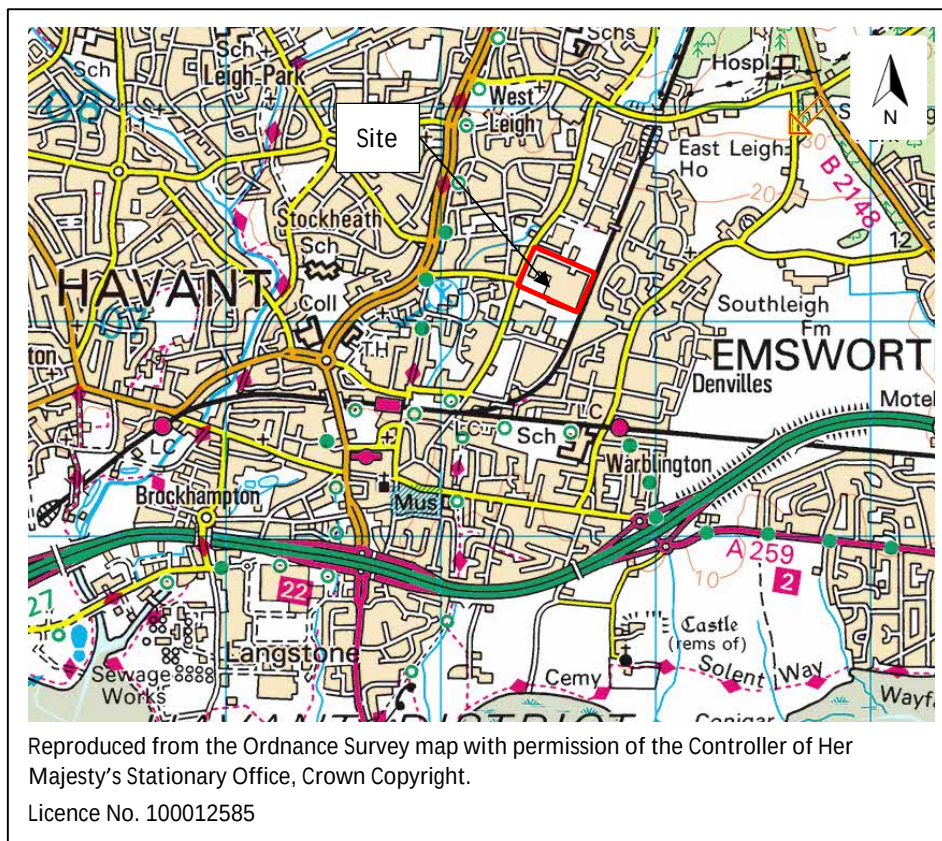
2. SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at 32 New Lane Havant PO9 2NG and is bound by New Lane to the west, industrial estates to the north and south a railway line to the east. The Ordnance Survey grid reference for the approximate centre of the site is 472525, 107219.

A site location plan is included in Plate 1.

Plate 1. Site Location Plan



2.2 Site Description

The site occupies a rectangular shaped parcel of land approximately 67,000m² (6.70 hectares or 16.5 acres). All former above ground structures had been demolished and removed from site as demolition waste prior to commencement for the Phase 1 earthworks remediation. In locations where structures and hardstanding had been removed the ground cover comprised gravelly clay or very clayey gravel. In the north and eastern half of the site, concrete foundations and hardstanding from the former development were still present.

2.3 Proposed Development

The proposed development includes construction of a warehouse with piled foundations, a multi storey car park, delivery unloading yard, landscaping, and other supporting infrastructure. It is understood the development will use a mix of piled and shallow foundations. A plan showing the proposed warehouse building footprint is included in Appendix B.

2.4 Ground Conditions

The British Geological Survey mapping Sheet 316² indicates the geology at the site is covered by superficial deposits of Head Gravel, comprising clayey gravel, in the west and Aeolian Deposits (Brickearth), consisting of mainly fine sandy silt, locally contaminated with gravel, in the east. These superficial strata rest unconformably on the London Clay Formation. A visual inspection of the composition of the exposed natural deposits on site suggest the superficial deposits are Head Gravel that comprised of orangish brown very clayey gravel or gravelly clay. The gravel was medium to coarse subangular to subrounded of flint. The site won fill, used to construct the platform, was Made Ground which comprised the Head Gravel mixed with some medium to coarse gravel of concrete, tiles and brick.

² British Geological Survey (1998). Geological Survey of England and Wales 1:63,360/1:50,000 geological map series, New Series Sheet 316.

3. WORKS INFORMATION

3.1 Definitions

In the Specification the “Client” shall mean TSL Limited (TSL), the “Engineer” shall mean Card Geotechnics Limited (CGL) and the “Contractor” shall mean Collins and their Sub-Contractors.

3.2 Summary of works undertaken

The scope of the works undertaken in Phase 1 earthworks comprised the following sequence of works as set out in Pinnacle’s Earthworks Specification¹:

Site clearance of any surface detritus shall be undertaken. Vegetation (i.e., shrubs, trees and roots etc.) mulched on site.

Breaking out existing slabs, tarmac and concrete foundations.

Crushing excavated concrete slabs and foundations to form Class 6F2 material for reuse on site or offsite; will be disposed off-site.

Disposal of unsuitable materials offsite to a suitable waste licensing facility;

Excavation of existing un-remediated fill and natural strata to formation level and proof rolling;

Stockpiling and classification of site won material for re-use on site;

Material acceptability testing to confirm suitability of material for earthworks;

Filling and proof rolling to 15.050mOD (formation level 14.950mOD +100mm sacrificial protection layer) with site won material including the completion of a site compaction trial to confirm the compaction method;

Acceptability end-product compliance testing on compacted fill and cut levels, at formation level +100mm sacrificial protection layer, prior to cement stabilisation suitable for a pile mat and construction materials;

3.3 Specification

The Contractor shall carry out the works in accordance with the requirements of the Highways Agency Manual of Contract Documents for Highway Works Volume 1: Specification for Highway Works, dated March 1998 with all current amendments (November 2021), herein referred to as the SHW, together with the Appendices to the Specification included in Pinnacle’s Specification¹ for the site.

3.3.1 Earthworks Specification

Pinnacle's Earthworks Specification¹ produced for the site outlined the specific earthworks methodology and verification procedure that was to be employed at the site to provide an adoptable development platform. The specification utilises the National Highways (formerly Highways England) Specification for Highways Works³ (SHW) and was tailored specifically to the commercial development proposed at the site. An Earthworks Strategy⁴ report prepared by Collins, TSL's earthworks contractor, sets out the proposed methodology for the earthworks based on the specification.

Material acceptability testing was undertaken in accordance with BS 1377-9:1990⁵. As part of this testing the site won excavated soil used as fill to level the site was classified as a Class 1A well graded granular material and Class 2C stony cohesive material. A compaction trial was undertaken at the commencement of the works to confirm the suitability of the proposed placement and compaction of the fill. The Class 1A and Class 2C fill were compacted in accordance with Method 2; Table 6/4 as defined in the SHW. This was achieved by building up in 225mm layers with 4 to 8 passes of a roller with mass per metre width >5000kg. This compaction methodology was assessed as acceptable at the beginning of the works based on a compaction trial of the initial area of fill placed. The compaction trial area was subsequently incorporated into the works.

End product testing was required for aspects of fill material placed within the scheme to include compaction testing, which specified 95% maximum dry density for placed materials with a maximum 5% air voids. Plate load CBR testing was undertaken using a 600mm diameter plate, where a minimum CBR value of 5.0% at formation level was required by the specification..

Hand Shear Vane tests and Mexe Cone testing were specified to compare and corroborate the results obtained from laboratory triaxial undrained shear strength testing and plate load equivalent CBR tests. However, owing to the high gravel content, it was not possible to perform either the Mexe Cone or Hand Shear Vane tests. Dynamic Cone Penetrometer (DCP) tests were attempted to obtain an estimation for CBR, in lieu of Mexe Cone, however, it was considered these too gave spurious and misleading results due to the gravel content of the fill.

³ Highways Agency. Manual of Contract Documents for Highway Works (March 1998 with all current amendments to November 2021). Volume 1: Specification for Highway Works.

⁴ Collins Earthworks (January 2022). Earthworks Strategy Document, Havant – Portsmouth. Ref. HAV-CEL-ZZ-00-SP-X-EWS116-XX P01

⁵ British Standard. BS 1377-1:1990. (Incorporating Amendment No. 1). Methods of Test for Soil Engineering Purposes.

4. EARTHWORKS

4.1 Outline Design

Phase 1 of the earthworks requires levelling of the site won soils across the site, and placement and compaction as engineered fill to form a level platform for construction to progress. This included infilling of excavations formed by removal of the existing slab foundations up to 1.5m thick, and reinforced concrete piles. Phase 2 of the earthworks will involve cement stabilisation of the platform for piling the foundations of the proposed new buildings. The proposed development is a new warehouse, multi storey car park, and surrounding areas of car parking, and landscaping. The stabilised engineered fill will form the subgrade for the external areas of car parking and hardstanding.

A plan showing the layout of the pre-existing buildings, where foundations were removed, is included in Appendix A. The location of the proposed warehouse building is shown in Appendix B, and an isopachyte drawing showing the cut and fill areas and proposed building layout is shown in Appendix C.

4.2 As-dug Ground Conditions

The excavated fill material consisted of a very gravelly clay or clayey gravel, where the gravel fraction comprised predominantly flint gravel with some concrete and masonry (brick, tiles).

This material was consistent with the anticipated material prior to the works.

4.3 Problems Not Envisaged at Design Stage and Their Solutions

4.3.1 Buried Foundations

The thickness of the concrete slabs and foundations encountered were in excess of those anticipated prior to excavation. The foundations were up to 1.5m thick, in the southwestern area of the site. In the same area, concrete piles were encountered, and were removed. Excavations to a depth of around 2.0mbgl were required to remove the buried concrete. The excavations were backfilled with well compacted site won fill material. The concrete was processed on site, using up to three crushers, to Class 6F5 and Type 1 recycled aggregate. This material was stockpiled along the southern edge of the earthworks area, ready for reuse in Phase 2 of the works, or removal off site.

It is understood that the larger than anticipated volume of foundation removal than had been anticipated, has led to a shortfall in site won fill required to raise the ground to formation level +100mm sacrificial protection layer in the eastern area of the site at test location grid squares, K2 to K4, H4 to H6, H10, J10, K4 to K7 and J10. In addition, the generated stockpiles of recycled aggregate have been larger than anticipated, beneath the footprints of which the formation has not been

prepared or tested for earthwork acceptability, in test grids C2, C3, D2 and D3. It is intended that completion of the earthworks in these areas, including removal of the stockpiled recycled aggregate will be completed within Phase 2 of the earthworks.

4.4 Materials Management and Haul Conditions

Haul roads were constructed at the site to mitigate against disturbance of the placed fill materials. No problems were encountered with the use of the recycled aggregate as haul road material.

5. MATERIALS CLASSIFICATION AND ACCEPTABILITY TESTING

5.1 Classification Procedure

Material classification and acceptability testing requirements and test frequencies were stipulated in Pinnacle's earthwork specification as given in Table 1.

Table 1. Appendix 5/1 Acceptability of Materials

Material	Test	Frequency of Testing
Class 1A	Grading	1 per 1,000m ³ (min. 3 per source)
	Single point MCV	1 per 1,000m ³ (min. 3 per source)
	Moisture Content	1 per 500m ³ (min. 3 per source)
	OMC / mc/Particle Density (2.5kg rammer)	1 per 2,000m ³ (min. 3 per source)
	Uniformity Coefficient	1 per 1,000m ³ (min. 3 per source)
	Chemical Suite, including ACM screen*	1 per 2,500m ³ (min. 3 per source)
Class 2C	Grading	1 per 1,000m ³ (min. 3 per source)
	Single point MCV	1 per 1,000m ³ (min. 3 per source)
	Moisture Content	1 per 1,000m ³ (min. 3 per source)
	OMC / mc/Particle Density (2.5kg rammer)	1 per 2,000m ³ (min. 3 per source)
	Undrained shear strength	1 per 1,000m ³ (min. 3 per source)
	Chemical Suite, including ACM screen*	1 per 2,500m ³ (min. 3 per source)
Class 6F2	Grading	1 per 1,000m ³ (min. 3 per source)
	Moisture Content	1 per 500m ³ (min. 3 per source)
	OMC / mc/Particle Density (vibrating rammer)	1 per 500m ³ (min. 3 per source)
	Moisture Content	1 per 1,000m ³ (min. 3 per source)
	Los Angeles Coefficient	1 per 1,000m ³ (min. 3 per source)
	Class Ra (asphalt content)	1 per 1,000m ³ (min. 3 per source)
	Bitumen content	1 per 1,000m ³ (min. 3 per source)
	Effective Angle of Internal Friction	1 per 1,000m ³ (min. 3 per source)
	Chemical Suite, including ACM screen*	1 per 2,500m ³ (min. 3 per source)

Note: ACM screening was undertaken by others in conjunction with the specified chemical testing.

5.2 Site Won Fill

To date, approximately 1,500m³ of site won material has been excavated and placed as engineered fill, prior to cement stabilisation. Three samples of the site won fill were obtained for classification and compaction testing of the fill, and the results are summarised in the following sections.

The results for the site won fill material acceptability testing are included in Appendix E.

5.2.1 Atterberg Limits and Plasticity Index Testing

Plasticity Index testing was undertaken in accordance with BS 1377:1990 Part 2:5:1990.

The results indicated that the samples classified as intermediate plasticity, with Plasticity Indexes ranging from 19% to 21%, Liquid Limits from 36% to 40% and Plastic Limits from 17% to 19%.

5.2.2 Particle Size Distribution Testing

Particle Size Distribution (PSD) testing was undertaken in accordance BS 1377:1990 Part 2:9.2.

The results indicated a grading classification of Class 2C for one sample. The remaining two samples were classified as Class 1A owing to lower fines content of 11% and 14%, slightly less than 15% required for classification as Class 2C. None of the samples contained material in excess of 125mm. A summary of the results is given in Table 2.

Table 2. Particle Size Distribution – Site Won Fill (Class 1A/2C)

Material	Sieve Particle Size Percentage Passing (mm)			
	300	125	2	0.063
Class 2C	-	100	55	47
Class 1A	100	100	-	11 - 14

5.2.3 Single Point Moisture Condition Value

Single Point Moisture Condition Value (MCV) tests were undertaken in accordance with BS 1377: Part 4: 1990: Clause 5.4. MCVs ranged between 8.2 and 9.8 where results for the Class 1A samples were 9.0 and 9.8, and 8.2 for the Class 2C sample.

5.2.4 Maximum Dry Density/Moisture Content Relationship

Compaction control parameters were determined in accordance with BS 1377 (1990), Part 4, Clause 3.4 using a 2.5kg hammer compacted in a CBR mould. The testing was undertaken to determine an appropriate end-product compaction criterion.

A summary of the maximum dry densities for the site won Class 1A and Class 2C material is set out in Table 3 below for assessment of relative compaction, using assumed particle densities of 2.53 Mg/m³ to 2.65 Mg/m³ to plot air voids.

Table 3. Maximum Dry Density Data – Site Won Fill

Compaction Test	SHW Class	Natural Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density (Mg/m ³)
2.5kg	2C	14 - 18	15	1.81
2.5kg	1A	14 - 15	12.0 – 15.0	1.85 – 1.87

5.2.5 Undrained Shear Strength

Undrained Shear Strength tests were undertaken as Triaxial Compression Without Pore Pressure Measurement in Accordance with BS 1377: Part 7: 1990 Clause 8. The results ranged between 69kPa and 75kPa corresponding to a 'medium' undrained shear strength⁶.

5.2.6 Uniformity Coefficient

The percentage passing 63µm was <10% therefore the uniformity coefficient was estimated to be >100 indicating a well graded soil.

5.3 Recycled Aggregate 6F2 and Type 1

Some recycled aggregate, produced on site from the excavated concrete foundations, has been placed to form areas of hard standing beneath the crushed concrete stockpiles, and for haul roads. It is understood this Class 6F5 and Type1 material will be removed and the ground brought up to formation level with Class 2 fill prior to cement stabilisation.

The results for the recycled material acceptability testing are included in Appendix F.

5.3.1 Particle Size Distribution Testing

Particle Size Distribution (PSD) testing was undertaken in accordance BS 1377:1990 Part 2:9.2.

Four PSD gradings undertaken on the Class 6F5 material and 3 PSD gradings on the Type 1 material confirmed the material classifications and the results are summarised in Table 4 and Table 5. One sample of Type 1 failed to meet the specified grading criteria, although conforming to the grading specification for Class 6F5, and one sample failed to meet the gradings for Class 6F5 and Type 1.

Table 4. Particle Size Distribution – Class 6F5

Material	Sieve Particle Size Percentage Passing (mm)						
	125	80	40	20	10	2	0.063
Class 6F5	92 - 100	75 - 100	64 - 97	42 - 79	23 - 51	10 - 27	2.3 - 12

Table 5. Particle Size Distribution – Type 1

Material	Sieve Particle Size Percentage Passing (mm)							
	63	31.5	16	8	4	2	1	0.063
Type 1	97 - 100	75 - 82	40 - 62	14 - 41	6 - 25	6 - 20	3 - 16	0.9 - 8.5

⁶ British Standard. BS 5930:2015. Code of Practice for Ground Investigations.

5.3.2 Maximum Dry Density/Moisture Content Relationship

Parameters were determined in accordance with BS 1377 (1990), Part 4, Clause 3.7 using a vibrating hammer. The testing was undertaken to determine an appropriate end-product compaction criterion.

A summary of the maximum dry densities on 6 samples of the recycled aggregate material is set out in Table 6 for assessment of relative compaction, using an assumed particle density of 2.65 Mg/m³ to plot air voids.

Table 6. Maximum Dry Density Data – Recycled Aggregate

Compaction Test	SHW Class	Natural Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density (Mg/m ³)
Vibrating Hammer	6F5/Type 1	5.9 – 10.9	10.5 – 12.5	1.91 – 1.98

5.3.3 Los Angeles Coefficient

Determination of resistance of coarse aggregate to fragmentation tests were undertaken in accordance with BS EN 1097-2: 2010. Los Angeles Coefficient results on three samples of Type 1, and three samples of Class 6F5 ranged between 27 and 33, all within the acceptable upper limit of 50.

5.3.4 Bituminous Material, Ra

Classification tests on the constituents of 6 samples of the recycled aggregate was undertaken in accordance with BSEN 933-11:2009 to determine bitumen content, Class Ra. The material comprised predominantly concrete, concrete products and concrete masonry, masonry units (bricks, tiles) and unbound aggregate, natural stone and hydraulically bound aggregate. No bitumen was recorded in the samples tested.

5.3.5 Effective Angle of Internal Friction

No results for effective angle of internal friction on the recycled aggregate have been made available to date.

6. FILL CONSTRUCTION

6.1 Excavation and Formation Preparation

The site won soils were excavated from areas, as required, to reduce levels to achieve formation level of the platform plus a 100mm sacrificial protection layer. The average cut depth was around 200mm, allowing for a 100mm thick sacrificial layer. The greatest thickness of cut was in the eastern half of the site where the maximum cut depth was 1.3m. The formation soils comprised very gravelly clay or clayey gravel, the gravel comprising of flint, concrete and brick. The formation soils were proof rolled and inspected to check for soft spots prior to in situ earthwork acceptability testing.

Natural soils were also excavated to enable removal of the buried foundations and concrete piles. These excavations were around 2.0m deep and south of the proposed building footprint (test grid squares H4 to H6 and K4 to K7).

The sides of the excavations were battered to maintain stability of the open excavations in the short term. CGL's Engineer did not observe any evidence of adverse instability of the excavations.

Photographs and records of formation level verification are included in the CGL site visit records, presented in Appendix D.

6.2 Source of Material Placed

The Class 2C stony cohesive and Class 1A well graded site won fill material were excavated from the areas of cut as shown on the isopachyte cut/fill plan in Appendix C.

6.3 Locations of Material Placed

The materials were placed in accordance with the Pinnacle Specification. Compliance testing was undertaken to demonstrate the materials met the Earthworks Acceptability Requirements, as defined in the Specification. The tests have been undertaken on all earthworks material placed to date, since the start of the Phase 1 earthworks operations. The results of the compliance testing have been used to validate the placement of the earthworks.

Photographs and records of fill placement and compaction are included in the CGL site visit records, included in Appendix D.

Acceptable site won fill (Class 2C and Class 1A) material was placed as fill to:-

- raise low spot areas to the finished platform formation level plus a 100mm thick sacrificial weather protection layer, in layers not exceeding 225mm.

- infill excavations arising from removal of the existing foundations and piles.

6.4 Weather Conditions

Weather conditions during placement of the material were variable and ranged between cold dry and sunny to occasional light rain or drizzle, except for the week commencing 14 February until 18 February 2022 when gale force storms occurred across the UK however, by this time the majority of earthworks had been completed.

6.5 Plant Used and Details of Problems Encountered

The plant used for transport, placement and compaction of the fill comprised the following:

- 30T dumper trucks
- 38T excavators
- 19T smooth wheeled roller

Compaction of the material was undertaken in accordance with the criteria given in Appendix 6/1. No problems were encountered with the plant used for the earthworks.

6.6 Instability Problems and Unusual Ground Conditions

No instability or unusual ground conditions were encountered during the works.

6.7 Drainage and Treatment of Soft Areas

No soft areas or unsuitable material requiring overdig excavation were encountered during the works. Ponded water was present locally on top of the sacrificial protection layer. Surface water collected in excavations resulting from removal of the buried structures, and groundwater was encountered in excavations at approximately 2.0mbgl in the west of the site. Accumulated water was pumped from the excavations by sump pumping to surface water drainage within the site boundary.