

A46 Newark Bypass

TR010065/APP/6.3

6.3 Environmental Statement

Appendix 13.5 Surface Water Quality Monitoring Report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and
Procedure) Regulations 2009

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**The Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations 2009**

A46 Newark Bypass

Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT

APPENDIX 13.5 SURFACE WATER QUALITY MONITORING REPORT

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1 Introduction

1.1 Purpose of this report

1.1.1 This surface water quality monitoring report has been produced to provide details on the surface water quality monitoring strategy and present the results received to date. The results received to date have been used to support the assessment contained within Chapter 13 (Road Drainage and Water Environment) of the Environmental Statement (ES) **(TR010065/APP/6.1)**.

1.2 Scheme information

1.2.1 A detailed description of the Scheme is contained within Chapter 2 (The Scheme) of the ES **(TR010065/APP/6.1)**.

2 Surface Water Quality Monitoring strategy

2.1 The need for surface water quality monitoring

- 2.1.1 Surface water quality monitoring is required to assess the baseline conditions of the watercourses identified within the 1 kilometre study area of the Order Limits.
- 2.1.2 Samples are being collected quarterly to provide a representative baseline of the main and ordinary watercourses within the 1 kilometre study area, prior to commencement of the construction phase.
- 2.1.3 The baseline conditions identified from the samples that have been taken to date have been used to inform Chapter 13 (Road Drainage and the Water Environment) of the ES (**TR010065/APP/6.1**) and will also be used to provide a point of comparison for ongoing monitoring during and post-construction.

2.2 Consultation

- 2.2.1 On the 13 June 2022, the Environment Agency was consulted on the scope of surface water quality monitoring for the Scheme. During this meeting, the methodology, frequency, and proposed locations of the monitoring points were discussed. It was suggested the frequency of the monitoring could be increased during construction if deemed necessary following a review of pre-construction test results, however further consultation would be undertaken to fully understand the requirements.

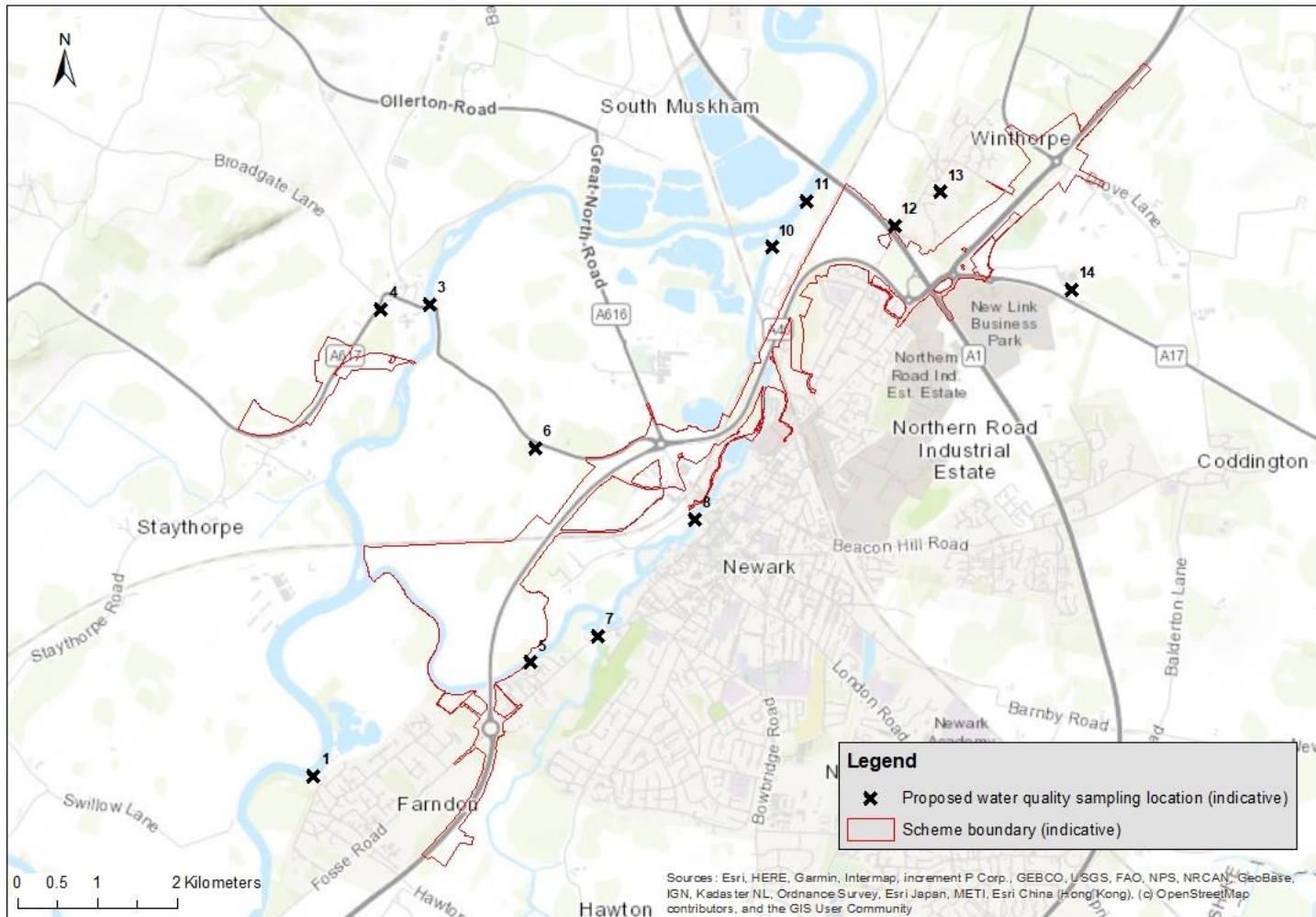
2.3 Site visit

- 2.3.1 A site visit was undertaken in August 2022 to confirm location details (including accessibility and parking).

2.4 Location selection

- 2.4.1 The sample locations are shown indicatively on Figure 2.1 within this report below. The sample locations were selected based on publicly accessible information and existing Environment Agency monitoring points on the watercourses. The exact locations are subject to change depending on accessibility, parking requirements, and conditions of site on the day of sampling.

Figure 2.1: Surface water quality monitoring locations



Note: Scheme boundary depicts an earlier version of the Order Limits. The current Order Limits for the Scheme are shown on Figure 2.1 (Scheme Location Plan) of the ES Figures (TR010065/APP/6.2).

2.4.2 Table 2-1 provides the grid references for each location and justification for choosing the locations.

Table 2-1: Surface water quality monitoring locations

ID	Watercourse	Indicative grid reference	Comments
1	River Trent	SK 76789 52138	This point is upstream of Farndon marina and will be sampled to represent the water quality of the River Trent upstream of the Scheme.
2	This point was removed during the site visit as it was decided it was unnecessary as data for the water quality for the River Trent would already be provided by Points 1, 3, and 5.		
3 ¹	Mission Drain	SK 77567 55661	This is located near Kelham on the Mission Drain close to the outfall into the River Trent.
4	Misson Drain	SK 77237 55645	This is located within Kelham, upstream of the confluence of the Misson Drain and the River Trent. This watercourse is adjacent to the Kelham and Averham FCA.
5	River Trent	SK 78382 53025	This is located on the River Trent, where the Old Trent Dyke meets the River Trent, and upstream of the confluence of the River Devon. This point is downstream of works proposed at Windmill Viaduct.
6	Old Trent Dyke	SK 78413 54618	This is located on the Old Trent Dyke, downstream of where the watercourse is culverted under the A46.
7	River Devon	SK 78918 53198	This is located on the River Devon, upstream of the confluence with the River Trent. This point will monitor the water quality of the River Devon prior to the confluence with the River Trent.
8	River Trent	SK 79614 54110	This point is located on the River Trent, under the Great North Road bridge. It is downstream of the confluence of the River Devon and River Trent.
9	This point was removed due to accessibility issues.		
10	River Trent	SK 80235	This is located downstream of

¹ This exact point was not visited during the site visit.

ID	Watercourse	Indicative grid reference	Comments
		56224	Nether Lock Viaduct but upstream of the confluence of the two branches of the River Trent.
11	River Trent	SK 80453 56532	This is located downstream of the confluence of the two branches of the River Trent.
12	Unnamed	SK 81103 56333	This point is on a drain which flows adjacent to Brownhills Roundabout, and which is culverted under the A46 and the A1 before flowing into the Fleet.
13	The Fleet	SK 81459 56462	This is located within Winthorpe. The point is downstream of the culvert under the A46 adjacent to Friendly Farmer Roundabout.
14	The Fleet	SK 82342 55853	This is located adjacent to Godfrey Drive and is upstream of Point 13. The Fleet is culverted under the A17 twice before reaching the A46.

2.5 Sampling methodology

2.5.1 On arrival to each sample location, the date/time and weather conditions was recorded.

In-situ measurements

2.5.2 A visual inspection of the watercourse was carried out to include (but not be limited to):

- Surface conditions (for example, is it oily on the surface?)
- Debris amount (such as is there any debris (algae/suspended sediments/vegetation)?)
- Surrounding activities (such as are there any notable activities² within the immediate vicinity of the location?)

2.5.3 In-situ measurements were taken using a hand-held probe for the following parameters:

- Temperature;
- pH;
- Dissolved Oxygen (DO);

² Notable activities could include if there are any boats on the water, in particular near the marinas, outfalls in operation, high volume of traffic or fishing activities.

- Redox³; and,
- Conductivity.

Laboratory analysis

2.5.4 Samples were collected using an extending pole to reach samples, if required. The samples were collected from flowing water within the main channel of the watercourses rather than by the bank, as this gives a better representation of the watercourse conditions across the river span. The samples were sent to a UKAS accredited laboratory for analysis.

2.5.5 The determinands tested for were as follows:

- pH;
- Biochemical Oxygen Demand (BOD);
- Total Suspended Solids (TSS);
- Total and dissolved Metals (Copper, Cadmium, Lead, Nickel, and Zinc);
- Total petroleum hydrocarbons (TPH);
- Polycyclic aromatic hydrocarbons (PAH);
- Chloride;
- Nitrates; and,
- Phosphate.

2.6 Frequency of monitoring

2.6.1 Monitoring is being undertaken quarterly to provide a baseline of the watercourses across the year to input into the ES (commencing with a winter 2022/23 survey to capture monitoring samples during high flows).

2.6.2 The sampling frequency will be reviewed in light of water quality results and drainage design (i.e. locations with lots of drainage outfalls, more sampling may be required) and to reflect requirements during construction.

³ Reduction and oxidation potential) is typically measured to determine the oxidising or reducing potential of a water sample. It indicates possible contamination.

3 Surface Water Quality Standards

- 3.1.1 The results provided within this report cover the sampling taken in January, April and July 2023, and have been used to inform the ES.
- 3.1.2 The results for in-situ measurements are provided in Appendix A of this report.
- 3.1.3 The results for the laboratory analysis (full results and detailed PAH results) are provided in the following appendices of this report:
- January 2023 results: Appendix B and Appendix C;
 - April 2023 results: Appendix D and Appendix E; and,
 - July 2023 results: Appendix F and Appendix G.
- 3.1.4 The water quality standards (WQS) (see Table 3-1) have been extracted from a range of different literature to provide quantitative values to compare the water quality values to. These values are the maximum allowable concentration of pollutants, therefore, values above this number are considered to exceed acceptable limits. No WQS for TPH was found, therefore the baseline values provided from the monitoring have been used as the WQS.

Table 3-1: Water Quality Standards

Parameter	Unit	Water Quality Standards	Justification	Source
pH	pH unit	6-9	The value for this standard was derived from annual average.	Table 3 - The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (legislation.gov.uk)
BOD	mg/l	6.5	The value for this standard was derived from the 90 th percentile.	Table 2 - The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (legislation.gov.uk)
TSS	mg/l	100	The value for this standard was derived from annual average.	Water quality standards: Total suspended solids - Responsible Seafood Advocate (globalseafood.org)
Copper	mg/l	0.002	The value for this standard was derived from annual average.	Table 1: The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (legislation.gov.uk)
Zinc	mg/l	0.01	The value for this standard was derived from annual average.	

Parameter	Unit	Water Quality Standards	Justification	Source
Cadmium	mg/l	0.0002 ⁴	The value for this standard was derived from annual average.	Annex II Part A: Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy (Text with EEA relevance) (legislation.gov.uk)
Lead	mg/l	0.014	The value for this standard was derived from annual average.	
Nickel	mg/l	0.034	The value for this standard was derived from annual average.	
Chloride	mg/l	250	The value for this standard was derived from the mean concentrations levels.	Chloride in Drinking Water, WHO Guidelines for Drinking-water Quality, <i>World Health Organisation</i> , 2003 ⁵
Nitrates	mg/l	<0.9 ⁶ (high) <1.8 (good)	The value for this standard was derived from annual average.	Indicator 3: Water Quality Indicators 2017 (epa.ie)
Phosphates	mg/l	<0.025 ⁷	The value for this standard was derived from the 90 th percentile.	Indicator 4: Water Quality Indicators 2017 (epa.ie)
PAH	µg/l	0.27	The value for this standard was derived from annual average.	Annex I: Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy (Text with EEA relevance) (legislation.gov.uk)

⁴ This value has been derived from the Annual Average allowance, as the hardness of the water is not known at this stage.

⁵ Available online [redacted]
[redacted] (Accessed December 2023)

⁶ There are no WQS for nitrate but average nitrate values less than 0.9mg/l and less than 1.8 mg/l are considered by the Environmental Protection Agency to be indicative of high and good quality respectively.

⁷ Concentrations of phosphate consistently greater than 0.025 mg/l are likely to lead to nutrient pollution.

4 Surface water monitoring results

4.1.1 Table 4-1 below outlines the monitoring results for the 12 monitoring points throughout the Scheme.

Table 4-1: Surface water quality monitoring results⁸

Location	Date	pH	BOD (mg/l)	TSS (mg/l)	Copper (mg/l)	Zinc (mg/l)	Cadmium (mg/l)	Lead (mg/l)	Nickel (mg/l)	Chloride (mg/l)	Nitrates (mg/l)	Phosphates (mg/l)	PAH (µg/l)	TPH (µg/l)
River Trent Samples														
Point 1	January 2023	7.9	62.1	10	< 0.008	< 0.002	< 0.0008	< 0.004	< 0.0008	27.5	23.7	< 0.04	0.20	2260
	April 2023	7.4	8.6	15	0.14	< 0.0008	0.0106	0.0302	0.011	45.0	27.9	0.23	0.26	325
	July 2023	7.4*	5.09*	10*	0.020	0.100	<0.0008	0.015	0.0349	53.1*	25.4*	0.73	0.03	87.8
Point 5	January 2023	7.9	46.5	16	< 0.008	< 0.002	< 0.0008	< 0.004	< 0.0008	27.9	23.6	0.13	0.21	1750
	April 2023	7.8	6.0	5.0	0.178	0.049	0.0013	0.0056	0.104	44.6	27.0	0.24	0.18	288
	July 2023	7.6*	5.25*	8.5*	<0.008	0.093	<0.0008	0.009	0.0334	51.7*	25.1*	0.72	< 0.01	484
Point 8	January 2023	7.9	53.3	26	< 0.008	< 0.002	< 0.0008	< 0.004	< 0.0008	28.0	27.4	0.13	0.47	1000
	April 2023	7.9	6.4	28	0.209	0.04	0.0012	< 0.0008	0.023	43.5	29.0	0.21	1.24	229
	July 2023	7.6*	<4.00*	8.0*	0.034	0.316	0.0033	0.027	0.0523	53.3*	26.3*	0.72	< 0.01	<10.0
Point 10	January 2023	7.9	< 4.00	22	< 0.008	< 0.002	< 0.0008	< 0.004	< 0.0008	29.7	28.8	0.16	0.64	< 10.0
	April 2023	7.9	5.9	8.0	0.199	0.037	0.0104	< 0.0008	0.057	40.6	28.2	0.25	0.30	557
	July 2023	7.6*	<4.00*	6.5*	0.017	0.364	0.0010	0.024	0.0874	78.4*	48.9*	0.47	0.08	159
Point 11	January 2023	7.9	29.7	20	< 0.008	< 0.002	< 0.0008	< 0.004	< 0.0008	30.5	26.8	0.23	0.31	634
	April 2023	7.9	3.3	22	0.142	0.067	< 0.0008	< 0.0008	< 0.004	43.0	28.1	0.27	4.26	481
	July 2023	7.7*	<4.00*	12*	0.026	0.179	<0.0008	0.041	0.0168	50.6*	27.2*	0.72	< 0.01	<10.0
Misson Drain														
Point 3	January 2023	7.6	51.3	12	< 0.008	< 0.002	< 0.0008	< 0.004	0.165	51.3	59.8	0.16	0.16	1500
	April 2023	7.4	6.4	9.5	0.138	0.013	< 0.0008	< 0.0008	<0.004	52.9	49.2	< 0.04	0.29	408
	July 2023	7.2*	8.66*	380*	0.024	0.110	0.0009	0.035	0.0104	5.68*	3.37*	0.62	0.45	<10.0

⁸ *** identifies a deviation in the samples and it is possible therefore that the results provided may not be representative of the sample taken. Review the full results attached in the Appendices to identify what the deviation is.

Location	Date	pH	BOD (mg/l)	TSS (mg/l)	Copper (mg/l)	Zinc (mg/l)	Cadmium (mg/l)	Lead (mg/l)	Nickel (mg/l)	Chloride (mg/l)	Nitrates (mg/l)	Phosphates (mg/l)	PAH (µg/l)	TPH (µg/l)
Point 4	January 2023	7.6	< 4.00	6.0	< 0.008	< 0.002	< 0.0008	< 0.004	< 0.0008	56.6	57.5	0.11	0.15	1950
	April 2023	7.3	14.8	310	0.003	< 0.0008	< 0.0008	< 0.0008	< 0.004	82.5	50.3	< 0.04	0.22	79.7
	July 2023	7.0*	17.5*	320*	0.087	0.247	< 0.0008	0.024	0.0110	55.5*	4.86*	0.25	1.82	310
Old Trent Dyke														
Point 6	January 2023	7.6	< 4.00	< 4.0	< 0.008	< 0.002	< 0.0008	< 0.004	< 0.0008	72.0	13.1	< 0.04	0.19	1640
	April 2023	7.3	5.6	13	0.116	< 0.008	0.0053	0.0418	< 0.004	69.5	0.938	< 0.04	0.12	338
	July 2023	7.3*	11.2*	62*	0.045	0.21	< 0.0008	0.04	0.0263	91.5	0.968*	1.27	<0.01	161
River Devon														
Point 7	January 2023	7.7	6.01	16	< 0.008	< 0.002	< 0.0008	< 0.004	< 0.0008	27.5	50.0	< 0.04	0.43	1830
	April 2023	7.7	5.9	9.5	0.179	0.092	< 0.0008	< 0.0008	0.084	37.7	38.8	< 0.04	0.02	359
	July 2023	7.4*	<4.00*	7*	0.024	0.178	0.0021	0.068	0.018	49.1	27.9*	0.66	8.61	113.0
Unknown Watercourse														
Point 12	January 2023	7.8	< 4.00	18	< 0.008	< 0.002	< 0.0008	< 0.004	< 0.0008	258	10.0	< 0.04	0.28	920
	April 2023	7.7	5.9	29	0.226	0.014	< 0.0008	< 0.0008	< 0.0004	416	3.06	< 0.04	1.90	493
	July 2023	7.5*	<4.00*	140*	0.01	0.091	< 0.0008	0.013	0.006	64.1	3.14*	0.19	0.09	< 10.0
The Fleet														
Point 13	January 2023	7.7	18.3	8.0	< 0.008	< 0.002	< 0.0008	< 0.004	0.049	73.9	51.2	< 0.04	0.05	1410
	April 2023	7.8	5.6	7.0	0.322	0.131	0.003	0.0769	0.004	79.1	34.9	< 0.04	0.75	200
	July 2023	7.5*	<4.00*	9.5*	0.023	0.116	< 0.0008	0.025	0.0023	73.7	15.7*	< 0.04	0.001	< 10.0
Point 14	January 2023	7.5	5.46	22	< 0.008	< 0.002	< 0.0008	< 0.004	0.03	69.1	53.6	< 0.04	0.37	< 10.0
	April 2023	7.6	4.9	< 4.0	0.203	0.019	0.0067	0.0124	0.03	70.5	40.7	< 0.04	0.37	392
	July 2023	7.1*	4.15*	14*	0.055	0.072	< 0.0008	0.012	1.323	71	20.9*	< 0.04	<0.01	332

5 Analysis of results

5.1 River Trent samples (Points 1, 5, 8, 10 and 11)

- 5.1.1 The pH values recorded range from 7.4 to 7.9 with no clear trend identified. All levels were within the WQS range.
- 5.1.2 The majority of the BOD concentrations were recorded as below 10 mg/l. The January 2023 results were an exception to this, as Points 1, 5, 8, and 11 recorded concentrations between 29.7 mg/l and 62.1 mg/l which were significantly higher than other sample values. All data sets exceed the WQS threshold limit. Generally, there was a downward trend in BOD concentrations during the year for all samples, with the exception of Point 11. The BOD concentrations exceed the threshold for Good Ecological Status.
- 5.1.3 TSS concentrations fluctuated throughout the year, and did not show a correlation between seasonal variation and concentration. None of the concentrations recorded exceed the WQS threshold limit.
- 5.1.4 Copper levels were recorded as having the same concentrations (<0.008 mg/l) across all points in January 2023 and at Point 5 in July 2023. These values were less than the laboratory's limit of detection (LOD) value, which is higher than the WQS. Therefore, it is undetermined whether the WQS threshold limit was exceeded or not. All sample points were recorded as having concentrations exceeding the WQS threshold in April 2023 and July 2023, with the exception of Point 10 which did not exceed the WQS threshold in July 2023. The results showed an increase in concentrations of copper levels between the April 2023 and July 2023 measurements, therefore there is a potential correlation between concentration and seasonality. There was no clear correlation between concentration and distance downstream.
- 5.1.5 The samples collected in January 2023 showed zinc levels below the LOD (<0.002 mg/l) and therefore did not exceed the WQS threshold values. This was also true of Point 1 in April 2023. All other samples in April 2023 and July 2023 exceeded the WQS threshold. There is no clear correlation between concentration of zinc and distance downstream, or seasonality.
- 5.1.6 The majority of cadmium concentrations recorded across the sample points across the monitoring period were below the LOD (<0.0008 mg/l). These values are higher than the WQS (0.0002 mg/l), therefore it is undetermined whether the WQS threshold limit has been exceeded or not. There were only six samples exceeding this LOD value with four of the six exceedances recorded in April 2023, suggesting these samples were outliers.
- 5.1.7 Lead levels were below the LOD (<0.004 mg/l) across all points in January 2023 which do not exceed the WQS threshold. In April 2023,

Point 1 exceeded the WQS threshold (0.014 mg/l). Similarly in July 2023 Points 1, 8, 10 and 11 exceeded the WQS threshold. The sample results showed an increase in concentration during the sample period. However, there was no clear correlation between concentration and distance downstream.

- 5.1.8 Nickel levels were recorded below the LOD (<0.0008 mg/l) across all points in January 2023. These results are below the WQS threshold (0.034 mg/l). In April 2023, Points 5 and 10 exceeded the WQS threshold. All sample points collected in July 2023 exceeded the WQS threshold. There was no clear correlation between concentration and distance. There was a general trend of increased concentration during the sample period, with the exception of Point 5.
- 5.1.9 The concentrations of chloride ranged between 27.5 to 30.5 in January 2023, 40.6 to 45.0 in April 2023, and 50.6 to 53.3 in July 2023 (Point 10 has concentrations of 78.4 mg/l which appears to be an outlier in the trend). These values were below the WQS threshold (250 mg/l) for chloride. The sample results suggest a trend of increasing concentration during the sample period, but no clear correlation between concentration and distance downstream.
- 5.1.10 Nitrate concentrations ranged from 23.6 mg/l to 28.8 mg/l in January 2023, 27.0 mg/l to 29.0 mg/l in April 2023, and 25.1 mg/l to 26.3 mg/l (with an outlier of 48.9 mg/l at Point 10) in July 2023. There was no clear trend of concentrations with distance downstream. All values had concentrations exceeding the WQS (values considered for good quality).
- 5.1.11 Phosphate concentrations (with the exception of Point 8 in April 2023) showed an increasing concentration downstream, whilst all samples showed an increase in concentration during the sample period. All the samples (with the exception of Point 1 in January 2023) recorded concentrations exceeding the WQS (0.025 mg/l) and therefore have the potential to be considered nutrient enriched as they have concentrations of phosphates consistently greater than 0.025 mg/l.
- 5.1.12 The total PAH concentrations fluctuated throughout the sample period and with distance downstream. Points 1 and 5 did not exceed the WQS threshold in any of the samples collected, however Points 8, 10 and 11 exceeded the threshold in January 2023 and April 2023. Point 8 and 11 significantly exceeded the threshold (1.24 µg/l and 4.26 µg/l respectively) in April 2023, however concentrations reduced in July 2023 to levels below the LOD.
- 5.1.13 TPH concentrations showed a general decrease in concentration during the sampling year, with the exception of Point 5 and Point 10. Point 5 showed an initial decrease in concentration in April 2023 compared to January 2023, followed by an increase in concentrations in July 2023. Point 10 showed an increase in concentration in April 2023 compared to January 2023, followed by a decreased in July 2023. There is no WQS threshold limit for TPH.

5.2 Misson Drain (Point 3 and 4)

- 5.2.1 The water samples taken in Kelham (Points 3 and Point 4) were recorded as having a pH range of 7.6 to 7.0 which are within pH WQS range. The results showed a downward trend of pH values during the sample period.
- 5.2.2 BOD concentrations at Point 3 and 4 fluctuated throughout the sample period. Point 3 exceeded the WQS threshold limit in January 2023 and July 2023, and Point 4 exceeded the WQS threshold limit in April 2023 and July 2023. There was no clear correlation between BOD concentrations and distance downstream, or with seasonality.
- 5.2.3 TSS values at Point 3 and Point 4 fluctuated throughout the sample period. Concentrations recorded in April 2023 for both points exceed the WQS threshold (100 mg/l). There was no clear correlation between concentration and distance downstream, or with seasonality.
- 5.2.4 Copper levels were recorded as below LOD values in January 2023 at Point 3 and 4, and in April 2023 at Point 4. The levels recorded showed an increasing trend in concentration between the April 2023 and July 2023 samples. The levels recorded in July 2023 exceeded the WQS threshold (0.002 mg/l).
- 5.2.5 Zinc levels recorded in January 2023 were below LOD values at both Point 3 and 4. The levels increased in April 2023 with a significant difference between the sample points (Point 3 recorded levels of 0.013 mg/l whilst Point 4 only recorded levels of 0.003 mg/l). In July 2023, there was another significant difference in concentrations at Point 3 and Point 4 (0.110 mg/l and 0.247 respectively). The values recorded at Point 3 in April 2023, and at both points in July 2023 exceeded the WQS threshold (0.01 mg/l). There was an overall trend of increasing concentration with seasonality.
- 5.2.6 Cadmium levels were below LOD values at both sample points in January 2023 and April 2023, and at Point 4 in July 2023. The LOD value is higher than the WQS, therefore it is undetermined whether the WQS threshold limit had been exceeded or not. Point 3 recorded an increase in concentration in July 2023 (0.0009 mg/l) compared to previous samples which exceeded the WQS threshold limit (0.0002 mg/l). With the exception of Point 3 in July 2023, there was no change in concentration during the sampling period or distance downstream.
- 5.2.7 Lead levels were below the LOD values (<0.004 mg/l in January 2023, and <0.0008 mg/l in April 2023) at both sample points in January 2023 and April 2023. In July 2023, the concentrations had increased to 0.035 mg/l and 0.024 mg/l at Point 3 and 4 respectively. These concentrations exceeded the WQS threshold (0.014 mg/l). There was no clear correlation between concentration of lead and distance downstream, or during the sampling period.

- 5.2.8 Nickel levels were below the LOD value at Point 4 in January 2023, and exceeded the WQS threshold (0.034 mg/l) at Point 3 in January 2023. Point 3 and 4 showed an increase in concentrations between April 2023 and July 2023, however neither of these values exceeded the WQS threshold (0.034 mg/l). There was no clear correlation between concentration of nickel and distance downstream, or throughout the sampling period.
- 5.2.9 Chloride concentrations were recorded as 51.3 mg/l and 56.6 mg/l in January 2023, 52.9 mg/l and 82.5 mg/l in April 2023, with a lower concentration recorded closer to the River Trent. In July 2023, concentrations were recorded as 5.68 mg/l and 55.5 mg/l, with the significantly lower concentration recorded upstream at Point 4 (furthest from the River Trent). These concentrations were all below the WQS threshold for chloride. There was no clear correlation between concentration of chloride and distance downstream, or during the sampling period.
- 5.2.10 Nitrate concentrations show a decrease in concentration during the sampling period, with values recorded in July 2023 significantly lower than those recorded in January 2023 and April 2023. There was no clear correlation between concentration and distance downstream at this stage of monitoring. The recorded nitrate concentrations are much higher than the WQS identified for 'high' and 'good' quality.
- 5.2.11 Phosphate concentrations fluctuated throughout the year. January 2023 and July 2023 values were recorded as greater than the identified WQS threshold. The samples collected in April 2023 were below the LOD value which is higher than the WQS. Therefore it is undetermined whether the WQS threshold limit has been exceeded or not at either of the points in April 2023. There was no clear correlation between concentration of phosphate and distance downstream, or during the sampling period.
- 5.2.12 The PAH values recorded in April 2023 and July 2023 for Point 3, and July 2023 for Point 4 exceeded the WQS threshold. There appeared to be an increasing trend of PAH concentration during the sampling period, with no clear correlation between concentration and distance downstream at this stage of monitoring.
- 5.2.13 Total TPH concentrations did not show a correlation between TPH concentrations and time during the sampling period or distance downstream at this stage of monitoring.

5.3 Old Trent Dyke (Point 6)

- 5.3.1 The pH of the sample was 7.6 in January 2023, 7.3 in April 2023 and 7.3 in July 2023 which is within the pH WQS range.
- 5.3.2 BOD concentrations recorded in January 2023 and April 2023 were below the WQS threshold limit (6.5 mg/l), however the July 2023 value

- exceeded the threshold. There was no clear correlation between BOD concentrations and seasonality at this stage of monitoring.
- 5.3.3 TSS concentrations were recorded as below the WQS threshold limit and show a trend of increasing concentration with seasonality at this stage of monitoring.
- 5.3.4 Copper concentrations were recorded as exceeding the WQS threshold in April 2023 and July 2023. There was no clear correlation between copper concentrations and seasonality at this stage of monitoring.
- 5.3.5 Zinc concentrations were recorded as exceeding the WQS threshold in July 2023. There was no clear correlation between zinc concentrations and seasonality at this stage of monitoring.
- 5.3.6 The only sample to exceed the WQS threshold for cadmium concentration was collected in April 2023. There was no clear correlation between cadmium concentrations and seasonality at this stage of monitoring.
- 5.3.7 Lead concentrations were recorded as <0.004 mg/l in January 2023, 0.0418 mg/l in April 2023, and 0.04 in July 2023. These results showed a significant increase between January 2023 and April 2023, with little change between April 2023 and July 2023. Both samples collected in April 2023 and July 2023 exceeded the WQS threshold (0.014 mg/l). There was no clear correlation between lead concentrations and seasonality at this stage of monitoring.
- 5.3.8 Nickel concentrations were recorded as <0.0008 mg/l in January 2023, <0.004 mg/l in April 2023, and 0.018 mg/l in July 2023. This showed a trend of increasing concentrations during the sampling period.
- 5.3.9 All samples were recorded as having chloride concentrations below the WQS threshold, with no clear correlation between chloride concentrations and seasonality at this stage of monitoring.
- 5.3.10 The nitrate concentrations were recorded as 13.1 mg/l in January 2023, 0.938 mg/l in April 2023, and 0.968 mg/l in July 2023. January 2023 results exceeded the WQS thresholds which indicated 'poor' quality whilst the April 2023 and July 2023 samples indicated 'good quality'. There was no clear correlation between nitrate concentrations and seasonality at this stage of monitoring.
- 5.3.11 Samples collected in January 2023 and April 2023 recorded phosphate concentrations of <0.04 mg/l. This value is less than the LOD, which is higher than the WQS threshold limit therefore it is uncertain whether the sample exceeded the threshold. The July 2023 sample showed a significant increase in concentrations with a recorded value of 1.27 mg/l which exceeds the WQS threshold. Further monitoring will determine whether this value is an outlier.
- 5.3.12 The PAH concentration was recorded as below the WQS threshold with a trend of decreasing concentration during the sampling period.

5.3.13 TPH concentrations were recorded as showing a trend of decreasing concentration over the sampling period. There is no WQS threshold for TPH.

5.4 River Devon (Point 7)

5.4.1 The pH of the sample was 7.7 in January 2023 and April 2023, and 7.4 in July 2023. All sample results recorded pH values within the pH WQS range.

5.4.2 BOD concentrations were recorded as below the WQS threshold limit, with a trend of decreasing concentration during the sampling period.

5.4.3 TSS concentrations were recorded as below the WQS threshold limit, with a trend of decreasing concentration during the sampling period.

5.4.4 Copper concentrations were recorded as exceeding the WQS threshold in samples collected in April 2023 and July 2023. There was no clear correlation between concentrations and seasonality at this stage of monitoring.

5.4.5 Zinc concentrations were recorded as exceeding the WQS threshold in July 2023. There was a trend of increasing concentrations during the sampling period.

5.4.6 Cadmium concentrations were recorded as <0.0008 mg/l in the January 2023 and April 2023 samples. This LOD value is higher than the WQS, therefore it is undetermined whether the WQS threshold limit was exceeded. The July 2023 sample recorded concentrations of 0.0021 mg/l, which is higher than the WQS threshold. There was no clear correlation between cadmium concentrations and seasonality at this stage of monitoring.

5.4.7 Lead concentrations were recorded as exceeding the WQS threshold in July 2023. There was no clear correlation between lead concentrations and seasonality at this stage of monitoring.

5.4.8 Nickel concentrations were recorded as below LOD value in January 2023 and exceeding the WQS threshold in April 2023, however concentrations reduced to below this threshold in July 2023. There was no clear correlation between nickel concentrations and seasonality at this stage of monitoring.

5.4.9 All samples collected exceeded the WQS threshold for chloride. The samples showed an increase in chloride concentration during the sampling period.

5.4.10 All samples collected recorded nitrate concentrations which were higher than the WQS threshold identified for 'high' and 'good' quality, indicating the water is of 'poor' quality for nitrates. The samples showed a decrease in nitrate concentration during the sampling period.

5.4.11 Samples collected in January 2023 and April 2023 recorded phosphate concentrations of <0.04 mg/l. This value was less than the LOD, which is

higher than the WQS threshold limit therefore it is uncertain whether the sample exceeded the WQS threshold. The July 2023 sample showed a significant increase in concentration with a recorded value of 0.66 mg/l which exceeded the WQS threshold. Further monitoring will determine whether this value is an outlier.

5.4.12 The PAH concentration was recorded as 0.43 µg/l in January 2023, 0.02 µg/l in April 2023, and 8.61 µg/l in July 2023. The January 2023 and July 2023 concentrations exceed the WQS threshold limit. There was no clear correlation between PAH concentrations and seasonality at this stage of monitoring.

5.4.13 TPH concentrations were recorded as showing a trend of decreasing concentration during the sampling period. There is no WQS threshold for TPH.

5.5 Unknown watercourse (Point 12)

5.5.1 The pH of the sample was recorded as 7.8 in January 2023, 7.7 in April 2023, and 7.5 in July 2023 which is within the WQS range. The samples showed a decrease in pH during the sampling period.

5.5.2 The BOD concentration was recorded as below the LOD value (< 4.00 mg/l) in January 2023 and July 2023, and 5.9 mg/l in April 2023 which are all lower than the WQS threshold. There was no clear correlation between BOD concentrations during the sampling period at this stage of monitoring.

5.5.3 The TSS concentration was recorded as below the WQS threshold with no clear correlation between concentrations during the sampling period at this stage of monitoring.

5.5.4 The samples collected in April 2023 and July 2023 exceeded the WQS threshold for copper concentrations. There was no clear correlation between copper concentrations and seasonality at this stage of monitoring.

5.5.5 Zinc concentrations were recorded as exceeding the WQS threshold in April 2023 and July 2023. The samples showed an increase in zinc concentration during the sampling period.

5.5.6 Cadmium concentrations were recorded as <0.0008 mg/l during all three samples. There was no change in concentration across the sampling period, and none of the samples exceeded the WQS threshold.

5.5.7 None of the samples collected had concentrations exceeding the WQS threshold for lead with no clear correlation between lead concentrations and seasonality at this stage of monitoring.

5.5.8 None of the samples collected had concentrations exceeding the WQS threshold for nickel with no clear correlation between nickel concentrations and seasonality at this stage of monitoring.

- 5.5.9 The samples collected in January 2023, and April 2023 exceeded the WQS threshold for chloride, with no clear correlation between chloride concentrations and seasonality at this stage of monitoring.
- 5.5.10 All samples exceeded the WQS thresholds for 'high' and 'good' quality which indicates 'poor' quality for nitrate with no clear correlation between nitrate concentrations and seasonality at this stage of monitoring.
- 5.5.11 Samples collected in January 2023 and April 2023 recorded phosphate concentrations of <0.04 mg/l. This value was less than the LOD, which was higher than the WQS threshold limit therefore it is uncertain whether the sample exceeds the WQS threshold. The July 2023 sample showed a large increase in phosphate concentrations with a recorded value of 0.19 mg/l which exceeded the WQS threshold. Further monitoring will determine whether this value is an outlier.
- 5.5.12 The PAH concentration was recorded as exceeding the WQS threshold in January 2023, and April 2023, with no clear correlation between PAH concentrations and seasonality at this stage of monitoring.
- 5.5.13 TPH concentrations were recorded as showing a trend of decreasing concentration during the sampling period. There is no WQS threshold for TPH.

5.6 The Fleet (Point 13 and 14)

- 5.6.1 The pH values recorded were between 7.1 and 7.8 which are within the WQS range for pH.
- 5.6.2 The only data that exceeded the WQS threshold for BOD concentrations was Point 13 in January 2023. The results showed a decrease in concentration levels during the sampling period but no clear correlation between concentrations and distance downstream.
- 5.6.3 All of the samples recorded TSS concentrations below the WQS threshold, with no clear correlation between TSS concentrations and seasonality or distance downstream identified at this stage of monitoring.
- 5.6.4 With the exception of the January 2023 sample, all samples recorded copper concentrations exceeding the WQS threshold. There was no clear correlation between concentration and seasonality or distance along the watercourse at this stage of monitoring.
- 5.6.5 All samples (with the exception of the January 2023 sample) recorded zinc concentrations which exceeded the WQS threshold. There was an increasing trend of concentration during the sampling period. The April 2023 and July 2023 samples suggested an increase in concentration downstream.
- 5.6.6 Cadmium concentrations were recorded as <0.0008 mg/l at both points in January 2023, and July 2023, and 0.003 mg/l and 0.0067 mg/l in April 2023 at Points 13 and 14 respectively. The <0.008 mg/l values were less than the LOD value, which is higher than the WQS (0.0002 mg/l),

therefore it is undetermined whether the WQS threshold limit has been exceeded or not. The samples collected in April 2023 exceeded the WQS threshold at both sample points. There was no clear correlation between concentration and seasonality or distance along the watercourse at this stage of monitoring.

- 5.6.7 Only samples collected at Point 13 in April 2023 and July 2023 exceeded the WQS threshold for lead. The sample results suggested an increase in lead concentration downstream with no clear correlation between concentration and seasonality at this stage of monitoring.
- 5.6.8 Nickel concentrations exceeded the WQS threshold at samples collected at Point 13 in January 2023 and Point 14 in July 2023. There was no clear correlation between nickel concentration and seasonality or distance downstream at this stage of monitoring.
- 5.6.9 All samples collected recorded chloride concentrations below the WQS threshold limit, with a trend of decreasing chloride concentration with distance downstream.
- 5.6.10 The nitrate concentrations were recorded as exceeding the WQS threshold in all samples collected and show a decrease in nitrate concentration over the sampling period.
- 5.6.11 All phosphate concentrations recorded to date were less than the LOD value (<0.04 mg/l). This was higher than the WQS threshold, therefore it is undetermined whether the WQS has been exceeded.
- 5.6.12 The samples collected at Point 13 in April 2023, and at Point 14 in January 2023 and April 2023 exceeded the WQS threshold for PAH. There was no clear correlation between PAH concentration and seasonality or distance downstream at this stage of monitoring.
- 5.6.13 The samples collected at Point 13 showed a decrease in TPH concentration during the sampling period, however Point 14 did not follow this trend. There is no WQS threshold for TPH.

6 Next steps

- 6.1.1 Further water quality sampling will be undertaken to provide baseline conditions of the identified waterbodies and to identify potential pressures acting on them, and their overall importance. It is currently proposed that water quality monitoring be undertaken quarterly. This initial baseline data will also be used to compare with monitoring data from the construction and post-construction phases.

7 References

¹ [Clarification note]

² [Clarification note]

³ [Clarification note]

⁴ [Clarification note]

⁵ Available online at: [REDACTED]
[REDACTED]
[REDACTED] (Last
accessed December 2023).

⁶ [Clarification note]

⁷ [Clarification note]

⁸ '**' [Clarification note]

Appendix A: In-situ measurement results

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 1**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694380			710983			729197					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			21/04/2023			19/07/2023					
Time : Sampled / Site Tested		N/A			08:30			09:30					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Cloudy			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	4.4		11.28			20.15					
Sample Temperature		°C	6.4		10.08			18.21					
pH Value		Nr.	8.14		8.18			7.89					
Electrical Conductivity		µs.cm-1	102.8		542.61			651.32					
Dissolved Oxygen		%	75.6		95.76			98.06					
Redox		mV	291.4		10.8			216.3					
Laboratory Analysis	Limits	Units											
Chloride		mg/l	27.5		45			53.1					
Nitrate		mg/l	23.7		27.9			25.4					
Phosphate (Ortho) PO4		mg/l	< 0.04		0.23			0.73					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		0.0106			< 0.0008					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.14			0.02					
Ni (Total)		mg/l	< 0.0008		0.011			0.0349					
Zinc (Total)		mg/l	< 0.002		< 0.008			0.1					
Pb (Total)		mg/l	< 0.004		0.0302			0.015					
Nickel		mg/l	< 0.0008		0.0			0.0031					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		0.006			0.006					
Total TPH LL		ug/L	2260.0		325			87.8					
pH (@ 20°C)		units	7.9		7.4			7.4					
BOD (Biochemical Oxygen Demand)		mg/l	62.1		8.6			5.09					
Suspended Solids		mg/l	10		15			10					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level		Reported values in Green Bold = LOD exceeds trigger level											

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 3**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694381			710983			729198					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			21/04/2023			19/07/2023					
Time : Sampled / Site Tested		N/A			10:00			11:00					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Cloudy			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	2.1		10.91			19.7					
Sample Temperature		°C	5.5		9.48			17.19					
pH Value		Nr.	8.16		7.72			8.12					
Electrical Conductivity		µs.cm-1	163.4		1199.9			94.5					
Dissolved Oxygen		%	79.4		76.8			82.67					
Redox		mV	299.8		71.5			168.9					
Laboratory Analysis	Limits	Units											
Chloride		mg/l	51.3		52.9			5.68					
Nitrate		mg/l	59.8		49.2			3.37					
Phosphate (Ortho) PO4		mg/l	0.16		< 0.04			0.62					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		< 0.0008			0.0009					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.138			0.024					
Ni (Total)		mg/l	0.165		< 0.004			0.0104					
Zinc (Total)		mg/l	< 0.002		0.013			0.11					
Pb (Total)		mg/l	< 0.004		< 0.0008			0.035					
Nickel		mg/l	< 0.0008		0.0			< 0.0008					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		0.003			0.003					
Total TPH LL		ug/L	1500.0		408			< 10.0					
pH (@ 20°C)		units	7.6		7.4			7.2					
BOD (Biochemical Oxygen Demand)		mg/l	51.3		6.4			8.66					
Suspended Solids		mg/l	12		9.5			380					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
R+A1:P49 reported values in Red Bold = Outside Trigger Level		Reported values in Green Bold = LOD exceeds trigger level											

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref: **Point 4**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694382			710983			729199					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			21/04/2023			19/07/2023					
Time : Sampled / Site Tested		N/A			09:45			11:30					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Cloudy			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	1.7		10.84			19.86					
Sample Temperature		°C	5.1		9.57			17.38					
pH Value		Nr.	8.09		7.59			7.91					
Electrical Conductivity		µs.cm-1	155.2		1195.5			96.71					
Dissolved Oxygen		%	81.6		69.28			92.2					
Redox		mV	299		74.6			193.2					
Laboratory Analysis	Limits	Units											
Chloride		mg/l	56.6		82.5			55.5					
Nitrate		mg/l	57.5		50.3			4.86					
Phosphate (Ortho) PO4		mg/l	0.11		< 0.04			0.25					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		< 0.0008			< 0.0008					
Copper		mg/l	< 0.008		< 0.008			0.01					
Copper (Total)		mg/l	< 0.008		0.003			0.087					
Ni (Total)		mg/l	< 0.0008		< 0.004			0.011					
Zinc (Total)		mg/l	< 0.002		< 0.008			0.247					
Pb (Total)		mg/l	< 0.004		< 0.0008			0.024					
Nickel		mg/l	< 0.0008		< 0.0008			0.0					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		0.003			0.043					
Total TPH LL		ug/L	1950.0		79.7			310.0					
pH (@ 20°C)		units	7.6		7.3			7					
BOD (Biochemical Oxygen Demand)		mg/l	< 4.00		14.8			17.5					
Suspended Solids		mg/l	6		310			320					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing			Quarterly Testing		Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level			Reported values in Green Bold = LOD exceeds trigger level										

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 5**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694383			710983			729200					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			21/04/2023			19/07/2023					
Time : Sampled / Site Tested		N/A			08:50			10:30					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Cloudy			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	5.5		12.0			20.5					
Sample Temperature		°C	5.7		10.3			18.3					
pH Value		Nr.	7.87		8.12			8.01					
Electrical Conductivity		µs.cm-1	155.8		506.0			644.3					
Dissolved Oxygen		%	88.3		95.7			96.25					
Redox		mV	288.3		50.8			207.3					
Laboratory Analysis	Limits	Units											
Chloride		mg/l	27.9		44.6			51.7					
Nitrate		mg/l	23.6		27			25.1					
Phosphate (Ortho) PO4		mg/l	0.13		0.24			0.72					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		0.0013			< 0.0008					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.178			< 0.008					
Ni (Total)		mg/l	< 0.0008		0.104			0.0334					
Zinc (Total)		mg/l	< 0.002		0.049			0.093					
Pb (Total)		mg/l	< 0.004		0.0056			0.009					
Nickel		mg/l	< 0.0008		0.0			0.0					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		0.006			0.005					
Total TPH LL		ug/L	1750.0		288			484.0					
pH (@ 20°C)		units	7.9		7.8			7.6					
BOD (Biochemical Oxygen Demand)		mg/l	46.5		6			5.25					
Suspended Solids		mg/l	16		5			8.5					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level			Reported values in Green Bold = LOD exceeds trigger level										

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 6**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694384			710983			729201					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			21/04/2023			19/07/2023					
Time : Sampled / Site Tested		N/A			10:30			10:45					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Cloudy			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	2.9		10.82			20.41					
Sample Temperature		°C	4.2		9.89			16.59					
pH Value		Nr.	8.37		7.32			7.66					
Electrical Conductivity		µs.cm-1	128.2		744.02			1035.5					
Dissolved Oxygen		%	98.7		62.9			58.01					
Redox		mV	293		26.1			186.2					
Laboratory Analysis	Limits	Units											
Chloride		mg/l	72		69.5			91.5					
Nitrate		mg/l	13.1		0.938			0.968					
Phosphate (Ortho) PO4		mg/l	< 0.04		< 0.04			1.27					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		0.0053			< 0.0008					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.116			0.045					
Ni (Total)		mg/l	< 0.0008		< 0.004			0.0263					
Zinc (Total)		mg/l	< 0.002		< 0.008			0.21					
Pb (Total)		mg/l	< 0.004		0.0418			0.04					
Nickel		mg/l	< 0.0008		0.0			0.0					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		0.002			0.002					
Total TPH LL		ug/L	1640		338			161.0					
pH (@ 20°C)		units	7.6		7.3			7.3					
BOD (Biochemical Oxygen Demand)		mg/l	< 4.00		5.6			11.2					
Suspended Solids		mg/l	< 4.0		13			62					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level			Reported values in Green Bold = LOD exceeds trigger level										

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 7**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694385			710983			729202					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			21/04/2023			19/07/2023					
Time : Sampled / Site Tested		N/A			09:35			10:30					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Cloudy			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	2.4		11.6			20.8					
Sample Temperature		°C	5.5		9.9			17.6					
pH Value		Nr.	8.31		8.04			7.68					
Electrical Conductivity		µs.cm-1	133.8		1103.5			1457.8					
Dissolved Oxygen		%	75.3		90.17			76.68					
Redox		mV	292.5		60.7			219.3					
Laboratory Analysis	Limits	Units											
Chloride		mg/l	27.5		37.7			49.1					
Nitrate		mg/l	50		38.8			27.9					
Phosphate (Ortho) PO4		mg/l	< 0.04		< 0.04			0.66					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		< 0.0008			0.0021					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.179			0.024					
Ni (Total)		mg/l	< 0.0008		0.084			0.018					
Zinc (Total)		mg/l	< 0.002		0.092			0.178					
Pb (Total)		mg/l	< 0.004		< 0.0008			0.068					
Nickel		mg/l	< 0.0008		< 0.0008			0.0					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		< 0.002			< 0.002					
Total TPH LL		ug/L	1830		359			113.0					
pH (@ 20°C)		units	7.7		7.7			7.4					
BOD (Biochemical Oxygen Demand)		mg/l	6.01		5.9			< 4.00					
Suspended Solids		mg/l	16		9.5			7					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level			Reported values in Green Bold = LOD exceeds trigger level										

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 8**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694386			710983			729203					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			21/04/2023			18/07/2023					
Time : Sampled / Site Tested		N/A			10;15			15;30					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Cloudy			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	2.4		10.8			22.7					
Sample Temperature		°C	6.3		10.5			19.9					
pH Value		Nr.	7.91		8.06			7.63					
Electrical Conductivity		µs.cm-1	114.3		614.5			680.3					
Dissolved Oxygen		%	85.6		89.36			96.13					
Redox		mV	290.1		1.6			203.7					
Laboratory Analysis	Limits	Units											
Chloride		mg/l	28		43.5			53.3					
Nitrate		mg/l	27.4		29			26.3					
Phosphate (Ortho) PO4		mg/l	0.13		0.21			0.72					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		0.0012			0.0033					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.209			0.034					
Ni (Total)		mg/l	< 0.0008		0.023			0.0523					
Zinc (Total)		mg/l	< 0.002		0.04			0.316					
Pb (Total)		mg/l	< 0.004		< 0.0008			0.027					
Nickel		mg/l	< 0.0008		0.0			0.0					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		0.209			0.006					
Total TPH LL		ug/L	1000		229			< 10.0					
pH (@ 20°C)		units	7.9		7.9			7.6					
BOD (Biochemical Oxygen Demand)		mg/l	53.3		6.4			< 4.00					
Suspended Solids		mg/l	26		28			8					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level			Reported values in Green Bold = LOD exceeds trigger level										

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 10**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694387			710983			729204					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			20/04/2023			18/07/2023					
Time : Sampled / Site Tested		N/A			13:00			15:00					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Fair			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	-2.4		18.8			22.2					
Sample Temperature		°C	2.5		16.9			19.2					
pH Value		Nr.	8.24		8.09			7.76					
Electrical Conductivity		µs.cm-1	150.8		705.3			843.4					
Dissolved Oxygen		%	87.6		10.43			95.03					
Redox		mV	280.3		49.2			161.6					
Laboratory Analysis	Limits	Units											
Chloride		mg/l	29.7		40.6			78.4					
Nitrate		mg/l	28.8		28.2			48.9					
Phosphate (Ortho) PO4		mg/l	0.16		0.25			0.47					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		0.0104			0.001					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.199			0.017					
Ni (Total)		mg/l	< 0.0008		0.057			0.0874					
Zinc (Total)		mg/l	< 0.002		0.037			0.364					
Pb (Total)		mg/l	< 0.004		< 0.0008			0.024					
Nickel		mg/l	< 0.0008		0.0			0.0					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		0.005			0.012					
Total TPH LL		ug/L	< 10.0		557			159					
pH (@ 20°C)		units	7.9		7.9			7.6					
BOD (Biochemical Oxygen Demand)		mg/l	< 4.00		5.9			< 4.00					
Suspended Solids		mg/l	22		8			6.5					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level			Reported values in Green Bold = LOD exceeds trigger level										

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 11**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694388			710983			729205					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			20/04/2023			18/07/2023					
Time : Sampled / Site Tested		N/A			13:30			14:45					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Fair			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	1.2		28.3			21.6					
Sample Temperature		°C	4.2		19.1			18.5					
pH Value		Nr.	8.22		8.08			7.96					
Electrical Conductivity		µs.cm-1	127.9		472.34			657.22					
Dissolved Oxygen		%	87.5		110.53			97.57					
Redox		mV	209.8		42.9			144.5					
Laboratory Analysis		Units											
Chloride		mg/l	30.5		43			50.6					
Nitrate		mg/l	26.8		28.1			27.2					
Phosphate (Ortho) PO4		mg/l	0.23		0.27			0.72					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		< 0.0008			< 0.0008					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.142			0.026					
Ni (Total)		mg/l	< 0.0008		< 0.004			0.0168					
Zinc (Total)		mg/l	< 0.002		0.067			0.179					
Pb (Total)		mg/l	< 0.004		< 0.0008			0.041					
Nickel		mg/l	< 0.0008		0.0024			0.003					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		0.005			0.006					
Total TPH LL		ug/L	634		481			< 10.0					
pH (@ 20°C)		units	7.9		7.90			7.70					
BOD (Biochemical Oxygen Demand)		mg/l	29.7		3.3			< 4.00					
Suspended Solids		mg/l	20		22			12					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level			Reported values in Green Bold = LOD exceeds trigger level										

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 12**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694389			710983			729206					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			20/04/2023			18/07/2023					
Time : Sampled / Site Tested		N/A			14:00			13:30					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Fair			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	1.5		29.0			22.82					
Sample Temperature		°C	1.7		15.9			17.04					
pH Value		Nr.	8.19		7.8			7.63					
Electrical Conductivity		µs.cm-1	183		1898.1			455.7					
Dissolved Oxygen		%	75.3		67.2			58.03					
Redox		mV	301.4		15.1			213.5					
Laboratory Analysis		Units											
Chloride		mg/l	258		416			64.1					
Nitrate		mg/l	10		3.06			3.14					
Phosphate (Ortho) PO4		mg/l	< 0.04		< 0.04			0.19					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		< 0.0008			< 0.0008					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.226			0.01					
Ni (Total)		mg/l	< 0.0008		< 0.004			0.006					
Zinc (Total)		mg/l	< 0.002		0.014			0.091					
Pb (Total)		mg/l	< 0.004		< 0.0008			0.013					
Nickel		mg/l	< 0.0008		0.0029			0.0012					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		0.038			0.02					
Total TPH LL		ug/L	920		493			< 10.0					
pH (@ 20°C)		units	7.8		7.7			7.5					
BOD (Biochemical Oxygen Demand)		mg/l	< 4.00		5.9			< 4.00					
Suspended Solids		mg/l	18		29			140					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level			Reported values in Green Bold = LOD exceeds trigger level										

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 13**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694390			710983			729207					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			20/04/2023			18/07/2023					
Time : Sampled / Site Tested		N/A			14:45			12:25					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Fair			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C	1.0		29.7			22.8					
Sample Temperature		°C	4.5		14.3			16.5					
pH Value		Nr.	8.04		7.78			7.69					
Electrical Conductivity		µs.cm-1	178.4		708.9			672.3					
Dissolved Oxygen		%	84.3		116.69			84.45					
Redox		mV	302.9		74.4			209.23					
Laboratory Analysis	Limits	Units											
Chloride		mg/l	73.9		79.1			73.7					
Nitrate		mg/l	51.2		34.9			15.7					
Phosphate (Ortho) PO4		mg/l	< 0.04		< 0.04			< 0.04					
Cadmium		mg/l	< 0.0008		< 0.0008			< 0.0008					
Cadmium (Total)		mg/l	< 0.0008		0.003			< 0.0008					
Copper		mg/l	< 0.008		< 0.008			< 0.008					
Copper (Total)		mg/l	< 0.008		0.322			0.023					
Ni (Total)		mg/l	0.049		0.004			0.0023					
Zinc (Total)		mg/l	< 0.002		0.131			0.116					
Pb (Total)		mg/l	< 0.004		0.0769			0.025					
Nickel		mg/l	< 0.0008		0.0			0.0					
Lead		mg/l	< 0.004		< 0.004			< 0.004					
Zinc		mg/l	< 0.002		< 0.002			0.007					
Total TPH LL		ug/L	1410		200			< 10.0					
pH (@ 20°C)		units	7.7		7.8			7.5					
BOD (Biochemical Oxygen Demand)		mg/l	18.3		5.6			< 4.00					
Suspended Solids		mg/l	8		7			9.5					
Speciated Low Level PAH			Attached		Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level			Reported values in Green Bold = LOD exceeds trigger level										

Client : **CMTL**

Contract : **Newark - A46**

Client Borehole/Ref : **Point 14**

Monitoring Conducted:		Surface Water Monitoring											
Month		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Laboratory Reference		23-90212			23-93067			23-95854					
Sample ID		694391			710983			729208					
Technician		SB			MF			MF					
Date : Sampled / Site Tested		17/01/2023			20/04/2023			18/07/2023					
Time : Sampled / Site Tested		N/A			15:00			12:00					
Method of Sampling (Pump/Bailer/Bottle)		Bottle			Bottle			Bottle					
Water Monitor Used		YSI			Aqua Troll			Aqua Troll					
Thermometer Reference		N/A			TD44			TD47					
Deviation from Testing Procedure		None			None			None					
Weather Conditions		Sunny			Fair			Cloudy					
Site Testing GW/SW/Leach	Trigger Level*	Units											
Air Temperature		°C			2.7			22.8					
Sample Temperature		°C			4.9			16.4					
pH Value		Nr.			8.11			7.12					
Electrical Conductivity		µs.cm-1			169.1			729.5					
Dissolved Oxygen		%			75.9			82.8					
Redox		mV			305.4			-0.21					
Laboratory Analysis		Units											
Chloride		mg/l			69.1			71					
Nitrate		mg/l			53.6			20.9					
Phosphate (Ortho) PO4		mg/l			< 0.04			< 0.04					
Cadmium		mg/l			< 0.0008			< 0.0008					
Cadmium (Total)		mg/l			< 0.0008			< 0.0008					
Copper		mg/l			< 0.008			< 0.008					
Copper (Total)		mg/l			< 0.008			0.055					
Ni (Total)		mg/l			0.03			1.323					
Zinc (Total)		mg/l			< 0.002			0.072					
Pb (Total)		mg/l			< 0.004			0.012					
Nickel		mg/l			< 0.0008			0.0022					
Lead		mg/l			< 0.004			< 0.004					
Zinc		mg/l			< 0.002			0.006					
Total TPH LL		ug/L			< 10.0			332					
pH (@ 20°C)		units			7.5			7.10					
BOD (Biochemical Oxygen Demand)		mg/l			5.46			4.15					
Suspended Solids		mg/l			22			14					
Speciated Low Level PAH					Attached			Attached					
Monthly Testing		Quarterly Testing			Annual Testing			Denotes - Not Required / Unable to Conduct / Not Instructed					
Reported values in Red Bold = Outside Trigger Level		Reported values in Green Bold = LOD exceeds trigger level											

Appendix B: ACS January 2023 full laboratory results

Certificate of Analysis

Certificate Number : 23-00080-Issue 1-Page: 1


Report Fao: GEO RESULTS
Site Address^: Newark - A46
Client Order No: 23-90212
Date of Sampling^: 17/01/2023
Date Received: 19/01/2023
Date of Analysis: 19/01/2023 - 03/02/2023
Report Date: 03/02/2023

Please find your certificates of test attached for your samples received in the laboratory on 19/01/2023 under our laboratory reference 23-00080.

Remarks:

Metal analysis carried out by UKAS accredited subcontract and not by normal IH method as stated on report

Results reviewed by:



Eoin Byrne Laboratory Manager

Test Certificates approved by:



David Redfern Technical Supervisor

*Any opinions or interpretations indicated are outside the scope of our UKAS accreditation.
This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.
Excel copies of reports are valid only when accompanied by this PDF certificate.
Client's Sample Description / ACS Material Description are noted for reference only.*

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Registered in England and
Wales No. 6000065

ACSE Sample Number Sample ID	68330 694380 - 23-90212	68331 694381 - 23-90212	68332 694382 - 23-90212
Clients Sample Ref.^	Point 1	Point 3	Point 4
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	17/01/2023	17/01/2023	17/01/2023
Time Sampled^	0900	0900	0900
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 1	Point 3	Point 4
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	27.5	*	51.3	*	56.6	*
Nitrate		mg/l	MT/ACSE/204	AR	23.7	*	59.8	*	57.5	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	< 0.04		0.16		0.11	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Cadmium (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008	*	< 0.008	*	< 0.008	*
Copper (Total)		mg/l	MT/ACSE/205	AR	< 0.008		< 0.008		< 0.008	
Ni (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		0.1650		< 0.0008	
Zinc (Total)		mg/l	MT/ACSE/205	AR	< 0.002		< 0.002		< 0.002	
Pb (Total)		mg/l	MT/ACSE/205	AR	< 0.004		< 0.004		< 0.004	
Nickel		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Lead		mg/l	MT/ACSE/205	AR	< 0.004	*	< 0.004	*	< 0.004	*
Zinc		mg/l	MT/ACSE/205	AR	< 0.002	*	< 0.002	*	< 0.002	*
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	2260		1500		1950	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.9	*ef	7.6	*ef	7.6	*ef
Subcontracted Analysis										
Metals		SC	SC	SC	Attached		Attached		Attached	
Metals		SC	SC	SC	Attached		Attached		Attached	
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
BOD (Biochemical Oxygen Demand)		mg/l	MT/ACSE/306	AR	62.1	*ef	51.3	*ef	< 4.00	*ef
Suspended Solids		mg/l	MT/ACSE/305	AR	10	*ef	12	*ef	6.0	*ef

ACSE Sample Number Sample ID	68333 694383 - 23-90212	68334 694384 - 23-90212	68335 694385 - 23-90212
Clients Sample Ref.^	Point 5	Point 6	Point 7
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	17/01/2023	17/01/2023	17/01/2023
Time Sampled^	0900	0900	0900
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 5	Point 6	Point 7
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	27.9	*	72.0	*	27.5	*
Nitrate		mg/l	MT/ACSE/204	AR	23.6	*	13.1	*	50.0	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	0.13		< 0.04		< 0.04	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Cadmium (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008	*	< 0.008	*	< 0.008	*
Copper (Total)		mg/l	MT/ACSE/205	AR	< 0.008		< 0.008		< 0.008	
Ni (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Zinc (Total)		mg/l	MT/ACSE/205	AR	< 0.002		< 0.002		< 0.002	
Pb (Total)		mg/l	MT/ACSE/205	AR	< 0.004		< 0.004		< 0.004	
Nickel		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Lead		mg/l	MT/ACSE/205	AR	< 0.004	*	< 0.004	*	< 0.004	*
Zinc		mg/l	MT/ACSE/205	AR	< 0.002	*	< 0.002	*	< 0.002	*
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	1750		1640		1830	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.9	*ef	7.6	*ef	7.7	*ef
Subcontracted Analysis										
Metals		SC	SC	SC	Attached		Attached		Attached	
Metals		SC	SC	SC	Attached		Attached		Attached	
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
BOD (Biochemical Oxygen Demand)		mg/l	MT/ACSE/306	AR	46.5	*ef	< 4.00	*ef	6.01	*ef
Suspended Solids		mg/l	MT/ACSE/305	AR	16	*ef	< 4.0	*ef	16	*ef

ACSE Sample Number Sample ID	68336 694386 - 23-90212	68337 694387 - 23-90212	68338 694388 - 23-90212
Clients Sample Ref.^	Point 8	Point 10	Point 11
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	17/01/2023	17/01/2023	17/01/2023
Time Sampled^	0900	0900	0900
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 8	Point 10	Point 11
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	28.0	*	29.7	*	30.5	*
Nitrate		mg/l	MT/ACSE/204	AR	27.4	*	28.8	*	26.8	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	0.13		0.16		0.23	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Cadmium (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008	*	< 0.008	*	< 0.008	*
Copper (Total)		mg/l	MT/ACSE/205	AR	< 0.008		< 0.008		< 0.008	
Ni (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Zinc (Total)		mg/l	MT/ACSE/205	AR	< 0.002		< 0.002		< 0.002	
Pb (Total)		mg/l	MT/ACSE/205	AR	< 0.004		< 0.004		< 0.004	
Nickel		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Lead		mg/l	MT/ACSE/205	AR	< 0.004	*	< 0.004	*	< 0.004	*
Zinc		mg/l	MT/ACSE/205	AR	< 0.002	*	< 0.002	*	< 0.002	*
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	1000		< 10.0		634	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.9	*ef	7.9	*ef	7.9	*ef
Subcontracted Analysis										
Metals		SC	SC	SC	Attached		Attached		Attached	
Metals		SC	SC	SC	Attached		Attached		Attached	
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
BOD (Biochemical Oxygen Demand)		mg/l	MT/ACSE/306	AR	53.3	*ef	< 4.00	*ef	29.7	*ef
Suspended Solids		mg/l	MT/ACSE/305	AR	26	*ef	22	*ef	20	*ef

ACSE Sample Number Sample ID	68339 694389 - 23-90212	68340 694390 - 23-90212	68341 694391 - 23-90212
Clients Sample Ref.^	Point 12	Point 13	Point 14
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	17/01/2023	17/01/2023	17/01/2023
Time Sampled^	0900	0900	0900
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 12	Point 13	Point 14
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	258	*	73.9	*	69.1	*
Nitrate		mg/l	MT/ACSE/204	AR	10.0	*	51.2	*	53.6	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	< 0.04		< 0.04		< 0.04	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Cadmium (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008	*	< 0.008	*	< 0.008	*
Copper (Total)		mg/l	MT/ACSE/205	AR	< 0.008		< 0.008		< 0.008	
Ni (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		0.0490		0.0300	
Zinc (Total)		mg/l	MT/ACSE/205	AR	< 0.002		< 0.002		< 0.002	
Pb (Total)		mg/l	MT/ACSE/205	AR	< 0.004		< 0.004		< 0.004	
Nickel		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Lead		mg/l	MT/ACSE/205	AR	< 0.004	*	< 0.004	*	< 0.004	*
Zinc		mg/l	MT/ACSE/205	AR	< 0.002	*	< 0.002	*	< 0.002	*
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	920		1410		< 10.0	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.8	*ef	7.7	*ef	7.5	*ef
Subcontracted Analysis										
Metals		SC	SC	SC	Attached		Attached		Attached	
Metals		SC	SC	SC	Attached		Attached		Attached	
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
BOD (Biochemical Oxygen Demand)		mg/l	MT/ACSE/306	AR	< 4.00	*ef	18.3	*ef	5.46	*ef
Suspended Solids		mg/l	MT/ACSE/305	AR	18	*ef	8.0	*ef	22	*ef

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Technical Information for Analytical Results

Analysis

* - denotes analysis covered by our UKAS accreditation.

- denotes analysis covered by our MCERTS certification & UKAS accreditation.

Loss on Ignition (MT/ACSE/302) is carried out at our laboratory at Unit D11 Admiralty Park, Station Road, Holton Heath, Poole, Dorset BH16 6HX.

AD = Sample tested in air dried condition.

AR = Sample tested in as-received condition.

AS = Accreditation status.

D = Sample tested in dry condition.

L = Laboratory prepared leachate.

SC = Sub contracted.

^ = Clients supplied information.

All MCERTS certified test values reported on a dry weight basis.

The preparation of 10:1 Leachates (to BS EN 12457-2:2002) and 2:1 leachates (to BS EN 12457-1:2002) fall outside the scope of our UKAS accreditation.

Soils and leachates are prepared at our laboratory at Unit D11 Admiralty Park, Station Road, Holton Heath, Poole, Dorset BH16 6HX.

Method uncertainty available on request.

Where results are less than the limit of detection, the value of 0 is used in calculations.

Key to HWOL Acronyms

Acronym	Description
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 -	e.g. EH_2D_Total_#1 means humics mathematically subtracted
#2 -	e.g. EH_2D_Total_#2 means 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

Deviating Codes

Deviating Samples

The use of any of the following symbols indicates that the sample was deviating and it is possible therefore that the results provided may not be representative of the sample taken.

- a - The date and /or time of sampling has not been provided, therefore it is not known if the time lapse between sampling and analysis has exceeded the acceptable holding time(s)*.
- b - The test item was received in a container which has not been recommended*.
- c - On receipt, the temperature of the sample received was found to fall outside the recommendations of BS ISO 18512:2007, Soil Quality. Guidance on long and short term storage of soil samples*.
- d - The sample was received in a container that had not been filled as recommended*.
- e - The delay between sampling and sample receipt is greater than the recommended holding time for the analyte of interest in this matrix*.
- f - The delay between sampling and analysis is greater than the recommended holding time for the analyte of interest in this matrix*.

In accordance with the requirements of Technical Policy Statement TPS 63; UKAS Policy on Deviating Samples, all UKAS accredited testing laboratories are required to notify their clients that calibration or test results may be invalid where samples are found to be deviating. It is the opinion of ACSE that the term invalid should be interpreted as 'not fully representative of the sample taken at source'.

The following Additional Deviating Sample Codes may also be used.

- I/S - Insufficient sample mass/volume received for accurate quantification of this analyte.
- U/S - The sample received was deemed unsuitable for accurate determination of this analyte using the Test Methods available.

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Appendix C: January 2023 PAH results



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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 23-46086

Issue: 1

Date of Issue: 27/01/2023

Contact: Dave Redfern

Customer Details: ACS Environmental testing Ltd
Unit 14b Blackhill Road West
Holton heath Trading park
Poole
DorsetBH16 6LE

Quotation No: Q22-03485

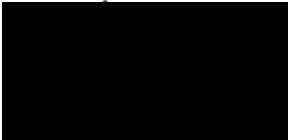
Order No: E / 23-00080 / 5253

Customer Reference: 23-00080

Date Received: 20/01/2023

Date Approved: 27/01/2023

Details: 23-00080

Approved by: 

Mike Varley, General Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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Sample Summary

Report No.: 23-46086, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
308842	Point 1 68330	17/01/2023	20/01/2023		
308843	Point 3 68330	17/01/2023	20/01/2023		
308844	Point 4 68330	17/01/2023	20/01/2023		
308845	Point 5 68330	17/01/2023	20/01/2023		
308846	Point 6 68330	17/01/2023	20/01/2023		
308847	Point 7 68330	17/01/2023	20/01/2023		
308848	Point 8 68330	17/01/2023	20/01/2023		
308849	Point 10 68330	17/01/2023	20/01/2023		
308850	Point 11 68330	17/01/2023	20/01/2023		
308851	Point 12 68330	17/01/2023	20/01/2023		
308852	Point 13 68330	17/01/2023	20/01/2023		
308853	Point 14 68330	17/01/2023	20/01/2023		



Results Summary

Report No.: 23-46086, issue number 1

ELAB Reference	308842	308843	308844	308845	308846	308847	308848	308849	308850	308851	308852	308853
Customer Reference	68330	68330	68330	68330	68330	68330	68330	68330	68330	68330	68330	68330
Sample ID												
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sample Location	Point 1	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 10	Point 11	Point 12	Point 13	Point 14
Sample Depth (m)												
Sampling Date	17/01/2023	17/01/2023	17/01/2023	17/01/2023	17/01/2023	17/01/2023	17/01/2023	17/01/2023	17/01/2023	17/01/2023	17/01/2023	17/01/2023
Sampling Time	9:00	9:00	9:00	9:00	9:00	9:00	9:00	9:00	9:00	9:00	9:00	9:00

Determinand	Codes	Units	LOD												
Polyaromatic hydrocarbons															
Naphthalene GCMS	N	ug/l	0.01	0.06	0.10	0.07	0.06	0.05	0.06	0.07	0.18	0.17	0.13	0.03	0.06
Acenaphthylene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene GCMS	N	ug/l	0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.03	0.02	< 0.01	< 0.01
Fluorene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene GCMS	N	ug/l	0.01	0.02	0.02	< 0.01	0.02	0.02	0.01	0.03	0.04	0.02	0.02	< 0.01	< 0.01
Anthracene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene GCMS	N	ug/l	0.01	0.02	< 0.01	< 0.01	0.03	0.02	0.02	0.03	0.06	0.02	0.02	< 0.01	0.02
Pyrene GCMS	N	ug/l	0.01	0.02	< 0.01	< 0.01	0.02	0.02	0.01	0.02	0.06	0.01	0.02	< 0.01	0.02
Benzo (a) anthracene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	0.01	0.01	0.02	0.03	0.03	< 0.01	0.01	< 0.01	0.02
Chrysene GCMS	N	ug/l	0.01	0.01	< 0.01	< 0.01	0.01	0.01	0.05	0.04	0.05	0.01	0.01	< 0.01	0.03
Benzo (b) fluoranthene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.04	0.03	0.02	< 0.01	< 0.01	< 0.01	0.03
Benzo (k) fluoranthene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.04	0.02	0.02	< 0.01	< 0.01	< 0.01	0.03
Benzo (a) pyrene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.01	0.03	0.02	< 0.01	< 0.01	< 0.01	0.03
Indeno (1,2,3-cd) pyrene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05	0.04	0.03	< 0.01	< 0.01	< 0.01	0.03
Dibenzo(a,h)anthracene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.04	0.04	0.04	< 0.01	< 0.01	< 0.01	0.04
Benzo(ghi)perylene GCMS	N	ug/l	0.01	0.01	< 0.01	< 0.01	0.02	< 0.01	0.06	0.06	0.05	< 0.01	< 0.01	< 0.01	0.05
Total PAH(16) GCMS	N	ug/l	0.01	0.20	0.16	0.15	0.21	0.19	0.43	0.47	0.64	0.31	0.28	0.05	0.37



Method Summary

Report No.: 23-46086, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Water					
PAHs and/or PCBs in waters	N		27/01/2023	135	GC-MS

Tests marked N are not UKAS accredited

Report Information

Report No.: 23-46086, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

LOD LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.
Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.
ELAB are unable to provide an interpretation or opinion on the content of this report.
The results relate only to the sample received.
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request
Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

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	EH_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

Appendix D: ACS April 2023 full laboratory results

Certificate of Analysis

Certificate Number : 23-00887-Issue 1-Page: 1

Report Fao: GEO RESULTS
Site Address^: Newark - A46
Client Order No: 23-93067
Date of Sampling^: 21/04/2023
Date Received: 25/04/2023
Date of Analysis: 25/04/2023 - 10/05/2023
Report Date: 11/05/2023

Please find your certificates of test attached for your samples received in the laboratory on 25/04/2023 under our laboratory reference 23-00887.

Remarks:

None

Results reviewed by:

Test Certificates approved by:

Craig Williams *Senior Analyst*

David Redfern *Technical Supervisor*

*Any opinions or interpretations indicated are outside the scope of our UKAS accreditation.
This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.
Excel copies of reports are valid only when accompanied by this PDF certificate.
Client's Sample Description / ACS Material Description are noted for reference only.*

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ACS Environmental Testing Limited
Registered in England and
Wales No. 6000065

ACSE Sample Number Sample ID	71958 710983 - 23-93067	71959 710984 - 23-93067	71960 710985 - 23-93067
Clients Sample Ref.^	Point 1	Point 3	Point 4
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	21/04/2023	21/04/2023	21/04/2023
Time Sampled^	0830	1000	0945
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 1	Point 3	Point 4
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	45.0	*	52.9	*	82.5	*
Nitrate		mg/l	MT/ACSE/204	AR	27.9	*	49.2	*	50.3	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	0.23		< 0.04		< 0.04	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Cadmium (Total)		mg/l	MT/ACSE/205	AR	0.0106		< 0.0008		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008	*	< 0.008	*	< 0.008	*
Zinc (Total)		mg/l	MT/ACSE/205	AR	0.140		0.138		0.003	
Pb (Total)		mg/l	MT/ACSE/205	AR	0.011		< 0.004		< 0.004	
Copper (Total)		mg/l	MT/ACSE/205	AR	< 0.008		0.013		< 0.008	
Ni (Total)		mg/l	MT/ACSE/205	AR	0.0302		< 0.0008		< 0.0008	
Nickel		mg/l	MT/ACSE/205	AR	0.0024	*	0.0014	*	< 0.0008	*
Lead		mg/l	MT/ACSE/205	AR	< 0.004	*	< 0.004	*	< 0.004	*
Zinc		mg/l	MT/ACSE/205	AR	0.006	*	0.003	*	0.003	*
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	325		408		79.7	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.4	*ef	7.4	*ef	7.3	*ef
Subcontracted Analysis										
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
BOD (Biochemical Oxygen Demand)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
Suspended Solids		mg/l	MT/ACSE/305	AR	15	*ef	9.5	*ef	310	*ef

ACSE Sample Number Sample ID	71961 710986 - 23-93067	71962 710987 - 23-93067	71963 710988 - 23-93067
Clients Sample Ref.^	Point 5	Point 6	Point 7
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	21/04/2023	21/04/2023	21/04/2023
Time Sampled^	0850	1030	0935
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 5	Point 6	Point 7
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	44.6	*	69.5	*	37.7	*
Nitrate		mg/l	MT/ACSE/204	AR	27.0	*	0.938	*	38.8	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	0.24		< 0.04		< 0.04	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Cadmium (Total)		mg/l	MT/ACSE/205	AR	0.0013		0.0053		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008	*	< 0.008	*	< 0.008	*
Zinc (Total)		mg/l	MT/ACSE/205	AR	0.178		0.116		0.179	
Pb (Total)		mg/l	MT/ACSE/205	AR	0.104		< 0.004		0.084	
Copper (Total)		mg/l	MT/ACSE/205	AR	0.049		< 0.008		0.092	
Ni (Total)		mg/l	MT/ACSE/205	AR	0.0056		0.0418		< 0.0008	
Nickel		mg/l	MT/ACSE/205	AR	0.0024	*	0.0013	*	< 0.0008	*
Lead		mg/l	MT/ACSE/205	AR	< 0.004	*	< 0.004	*	< 0.004	*
Zinc		mg/l	MT/ACSE/205	AR	0.006	*	0.002	*	< 0.002	*
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	288		338		359	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.8	*ef	7.3	*ef	7.7	*ef
Subcontracted Analysis										
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
BOD (Biochemical Oxygen Demand)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
Suspended Solids		mg/l	MT/ACSE/305	AR	5.0	*ef	13	*ef	9.5	*ef

ACSE Sample Number Sample ID	71964 710989 - 23-93067	71965 710990 - 23-93067	71966 710991 - 23-93067
Clients Sample Ref.^	Point 8	Point 10	Point 11
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	21/04/2023	20/04/2023	20/04/2023
Time Sampled^	1015	1300	1330
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 8	Point 10	Point 11
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	43.5	*	40.6	*	43.0	*
Nitrate		mg/l	MT/ACSE/204	AR	29.0	*	28.2	*	28.1	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	0.21		0.25		0.27	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Cadmium (Total)		mg/l	MT/ACSE/205	AR	0.0012		0.0104		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008	*	< 0.008	*	< 0.008	*
Zinc (Total)		mg/l	MT/ACSE/205	AR	0.209		0.199		0.142	
Pb (Total)		mg/l	MT/ACSE/205	AR	0.023		0.057		< 0.004	
Copper (Total)		mg/l	MT/ACSE/205	AR	0.040		0.037		0.067	
Ni (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Nickel		mg/l	MT/ACSE/205	AR	0.0020	*	0.0022	*	0.0024	*
Lead		mg/l	MT/ACSE/205	AR	< 0.004	*	< 0.004	*	< 0.004	*
Zinc		mg/l	MT/ACSE/205	AR	0.209	*	0.005	*	0.005	*
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	229		557		481	
pH and Conductivity										
pH (@ 20°C)		units	MT/ACSE/301	AR	7.9	*ef	7.9	*ef	7.9	*ef
Subcontracted Analysis										
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
BOD (Biochemical Oxygen Demand)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
Suspended Solids		mg/l	MT/ACSE/305	AR	28	*ef	8.0	*ef	22	*ef

ACSE Sample Number Sample ID	71967 710992 - 23-93067	71968 710993 - 23-93067	71969 710994 - 23-93067
Clients Sample Ref.^	Point 12	Point 13	Point 14
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	20/04/2023	20/04/2023	20/04/2023
Time Sampled^	1400	1445	1500
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 12	Point 13	Point 14
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	416	*	79.1	*	70.5	*
Nitrate		mg/l	MT/ACSE/204	AR	3.06	*	34.9	*	40.7	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	< 0.04		< 0.04		< 0.04	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008	*	< 0.0008	*	< 0.0008	*
Cadmium (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		0.0030		0.0067	
Copper		mg/l	MT/ACSE/205	AR	< 0.008	*	< 0.008	*	< 0.008	*
Zinc (Total)		mg/l	MT/ACSE/205	AR	0.226		0.322		0.203	
Pb (Total)		mg/l	MT/ACSE/205	AR	< 0.004		0.004		0.030	
Copper (Total)		mg/l	MT/ACSE/205	AR	0.014		0.131		0.019	
Ni (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		0.0769		0.0124	
Nickel		mg/l	MT/ACSE/205	AR	0.0029	*	0.0027	*	0.0020	*
Lead		mg/l	MT/ACSE/205	AR	< 0.004	*	< 0.004	*	< 0.004	*
Zinc		mg/l	MT/ACSE/205	AR	0.038	*	< 0.002	*	< 0.002	*
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	493		200		392	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.7	*ef	7.8	*ef	7.6	*ef
Subcontracted Analysis										
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
BOD (Biochemical Oxygen Demand)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
Suspended Solids		mg/l	MT/ACSE/305	AR	29	*ef	7.0	*ef	< 4.0	*ef

Technical Information for Analytical Results

Analysis

* - denotes analysis covered by our UKAS accreditation.

- denotes analysis covered by our MCERTS certification & UKAS accreditation.

Loss on Ignition (MT/ACSE/302) is carried out at our laboratory at Unit D11 Admiralty Park, Station Road, Holton Heath, Poole, Dorset BH16 6HX.

AD = Sample tested in air dried condition.

AR = Sample tested in as-received condition.

AS = Accreditation status.

D = Sample tested in dry condition.

L = Laboratory prepared leachate.

SC = Sub contracted.

^ = Clients supplied information.

All MCERTS certified test values reported on a dry weight basis.

The preparation of 10:1 Leachates (to BS EN 12457-2:2002) and 2:1 leachates (to BS EN 12457-1:2002) fall outside the scope of our UKAS accreditation.

Soils and leachates are prepared at our laboratory at Unit D11 Admiralty Park, Station Road, Holton Heath, Poole, Dorset BH16 6HX.

Method uncertainty available on request.

Where results are less than the limit of detection, the value of 0 is used in calculations.

Key to HWOL Acronyms

Acronym	Description
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 -	e.g. EH_2D_Total_#1 means humics mathematically subtracted
#2 -	e.g. EH_2D_Total_#2 means 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

Deviating Codes

Deviating Samples

The use of any of the following symbols indicates that the sample was deviating and it is possible therefore that the results provided may not be representative of the sample taken.

- a - The date and /or time of sampling has not been provided, therefore it is not known if the time lapse between sampling and analysis has exceeded the acceptable holding time(s)*.
- b - The test item was received in a container which has not been recommended*.
- c - On receipt, the temperature of the sample received was found to fall outside the recommendations of BS ISO 18512:2007, Soil Quality. Guidance on long and short term storage of soil samples*.
- d - The sample was received in a container that had not been filled as recommended*.
- e - The delay between sampling and sample receipt is greater than the recommended holding time for the analyte of interest in this matrix*.
- f - The delay between sampling and analysis is greater than the recommended holding time for the analyte of interest in this matrix*.

In accordance with the requirements of Technical Policy Statement TPS 63; UKAS Policy on Deviating Samples, all UKAS accredited testing laboratories are required to notify their clients that calibration or test results may be invalid where samples are found to be deviating. It is the opinion of ACSE that the term invalid should be interpreted as 'not fully representative of the sample taken at source'.

The following Additional Deviating Sample Codes may also be used.

- I/S - Insufficient sample mass/volume received for accurate quantification of this analyte.
- U/S - The sample received was deemed unsuitable for accurate determination of this analyte using the Test Methods available.

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Appendix E: April 2023 PAH results



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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 23-47884
Issue: 1
Date of Issue: 05/05/2023
Contact: Lauren Jones
Customer Details: ACS Environmental testing Ltd
Unit 14b Blackhill Road West
Holton heath Trading park
Poole
DorsetBH16 6LE
Quotation No: Q22-03485
Order No: E / 23-00887 / 5657
Customer Reference: 5657
Date Received: 27/04/2023
Date Approved: 05/05/2023
Details: 23-00887
Approved by: 

Tim Reeve, Quality Officer

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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Sample Summary

Report No.: 23-47884, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
320120	Point 1 - 710983 71958	21/04/2023	27/04/2023		
320121	Point 3 - 710984 71959	21/04/2023	27/04/2023		
320122	Point 4 - 710985 71960	21/04/2023	27/04/2023		
320123	Point 5 - 710986 71961	21/04/2023	27/04/2023		
320124	Point 6 - 710987 71962	21/04/2023	27/04/2023		
320125	Point 7 - 710988 71963	21/04/2023	27/04/2023		
320126	Point 8 - 710989 71964	21/04/2023	27/04/2023		
320127	Point 10 - 710990 71965	21/04/2023	27/04/2023		
320128	Point 11 - 710991 71966	21/04/2023	27/04/2023		
320129	Point 12 - 710992 71967	21/04/2023	27/04/2023		
320130	Point 13 - 710993 71968	21/04/2023	27/04/2023		
320131	Point 14 - 710994 71969	21/04/2023	27/04/2023		



Results Summary

Report No.: 23-47884, issue number 1

ELAB Reference	320120	320121	320122	320123	320124	320125	320126	320127	320128	320129
Customer Reference	71958	71959	71960	71961	71962	71963	71964	71965	71966	71967
Sample ID										
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sample Location	Point 1 - 710983	Point 3 - 710984	Point 4- 710985	Point 5 - 710986	Point 6 - 710987	Point 7 - 710988	Point 8 - 710989	Point 10 - 710990	Point 11 - 710991	Point 12 - 710992
Sample Depth (m)										
Sampling Date	21/04/2023	21/04/2023	21/04/2023	21/04/2023	21/04/2023	21/04/2023	21/04/2023	21/04/2023	21/04/2023	21/04/2023

Determinand	Codes	Units	LOD										
Polyaromatic hydrocarbons													
Naphthalene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01
Acenaphthylene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Acenaphthene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02
Fluorene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02
Phenanthrene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.04	0.09
Anthracene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03	0.06
Fluoranthene GCMS	N	ug/l	0.01	0.02	0.06	0.06	0.08	0.03	0.01	0.30	0.05	1.46	0.29
Pyrene GCMS	N	ug/l	0.01	0.02	0.05	0.08	0.07	0.03	0.01	0.31	0.05	1.18	0.25
Benzo (a) anthracene GCMS	N	ug/l	0.01	0.03	0.03	0.02	0.01	0.02	< 0.01	0.17	0.02	0.36	0.12
Chrysene GCMS	N	ug/l	0.01	0.07	0.05	0.02	0.02	0.04	< 0.01	0.18	0.04	0.37	0.14
Benzo (b) fluoranthene GCMS	N	ug/l	0.01	0.04	0.04	0.02	< 0.01	< 0.01	< 0.01	0.10	0.03	0.22	0.20
Benzo (k) fluoranthene GCMS	N	ug/l	0.01	0.03	0.01	0.02	< 0.01	< 0.01	< 0.01	0.10	0.03	0.19	0.19
Benzo (a) pyrene GCMS	N	ug/l	0.01	0.04	0.03	< 0.01	< 0.01	< 0.01	< 0.01	0.05	0.04	0.19	0.16
Indeno (1,2,3-cd) pyrene GCMS	N	ug/l	0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.02	0.07	0.11
Dibenzo(a,h)anthracene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03	0.06
Benzo(ghi)perylene GCMS	N	ug/l	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03	0.02	0.10	0.16
Total PAH(16) GCMS	N	ug/l	0.01	0.26	0.29	0.22	0.18	0.12	0.02	1.24	0.30	4.26	1.90



Results Summary

Report No.: 23-47884, issue number 1

ELAB Reference	320130	320131
Customer Reference	71968	71969
Sample ID		
Sample Type	WATER	WATER
Sample Location	Point 13 - 710993	Point 14 - 710994
Sample Depth (m)		
Sampling Date	21/04/2023	21/04/2023

Determinand	Codes	Units	LOD		
Polyaromatic hydrocarbons					
Naphthalene GCMS	N	ug/l	0.01	< 0.01	0.01
Acenaphthylene GCMS	N	ug/l	0.01	< 0.01	< 0.01
Acenaphthene GCMS	N	ug/l	0.01	< 0.01	< 0.01
Fluorene GCMS	N	ug/l	0.01	< 0.01	< 0.01
Phenanthrene GCMS	N	ug/l	0.01	0.02	< 0.01
Anthracene GCMS	N	ug/l	0.01	0.01	< 0.01
Fluoranthene GCMS	N	ug/l	0.01	0.06	0.02
Pyrene GCMS	N	ug/l	0.01	0.07	0.03
Benzo (a) anthracene GCMS	N	ug/l	0.01	0.08	0.01
Chrysene GCMS	N	ug/l	0.01	0.10	0.03
Benzo (b) fluoranthene GCMS	N	ug/l	0.01	0.10	0.03
Benzo (k) fluoranthene GCMS	N	ug/l	0.01	0.10	0.03
Benzo (a) pyrene GCMS	N	ug/l	0.01	0.09	0.05
Indeno (1,2,3-cd) pyrene GCMS	N	ug/l	0.01	0.04	0.04
Dibenzo(a,h)anthracene GCMS	N	ug/l	0.01	0.02	0.02
Benzo(ghi)perylene GCMS	N	ug/l	0.01	0.05	0.06
Total PAH(16) GCMS	N	ug/l	0.01	0.75	0.37



Method Summary

Report No.: 23-47884, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Water					
PAHs and/or PCBs in waters	N		05/05/2023	135	GC-MS

Tests marked N are not UKAS accredited

Report Information

Report No.: 23-47884, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	<p>LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.</p> <p>Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.</p> <p>ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received.</p> <p>PCB congener results may include any coeluting PCBs</p> <p>Uncertainty of measurement for the determinands tested are available upon request Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.</p>

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
 All water samples will be retained for 7 days following the date of the test report
 Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

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	EH_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

Appendix F: July 2023 full laboratory results

Certificate of Analysis

Certificate Number : 23-01883-Issue 2-Page: 1

Report Fao: GEO RESULTS
Site Address^: Newark - A46
Client Order No: 23-95854
Date of Sampling^: 19/07/2023
Date Received: 20/07/2023
Date of Analysis: 20/07/2023 - 04/08/2023
Report Date: 07/08/2023

Please find your certificates of test attached for your samples received in the laboratory on 20/07/2023 under our laboratory reference 23-01883.

This Test Certificate replaces and supersedes Test Certificate number : 23-01883-Issue 1

Remarks:

UKAS accreditation for Metals was removed due to analysis being carried out by ICP-MS at clients request.

Results reviewed by:

Test Certificates approved by:

[Redacted Signature]

Craig Williams Senior Analyst

Eoin Byrne Laboratory Manager

*Any opinions or interpretations indicated are outside the scope of our UKAS accreditation.
This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.
Excel copies of reports are valid only when accompanied by this PDF certificate.
Client's Sample Description / ACS Material Description are noted for reference only.*

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ACSE Sample Number	75597	75598	75599
Sample ID	729197 - 23-95854	729198 - 23-95854	729199 - 23-95854
Clients Sample Ref.^	Point 1	Point 3	Point 4
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	19/07/2023	19/07/2023	19/07/2023
Time Sampled^	0930	1100	1130
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 1	Point 3	Point 4
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	53.1	*	5.68	*	55.5	*
Nitrate		mg/l	MT/ACSE/204	AR	25.4	*	3.37	*	4.86	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	0.73		0.62		0.25	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Cadmium (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		0.0009		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008		< 0.008		0.010	
Zinc (Total)		mg/l	MT/ACSE/205	AR	0.100		0.110		0.247	
Ni (Total)		mg/l	MT/ACSE/205	AR	0.0349		0.0104		0.0110	
Pb (Total)		mg/l	MT/ACSE/205	AR	0.015		0.035		0.024	
Copper (Total)		mg/l	MT/ACSE/205	AR	0.020		0.024		0.087	
Nickel		mg/l	MT/ACSE/205	AR	0.0031		< 0.0008		0.0011	
Lead		mg/l	MT/ACSE/205	AR	< 0.004		< 0.004		< 0.004	
Zinc		mg/l	MT/ACSE/205	AR	0.006		0.003		0.043	
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	87.8		< 10.0		310	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.4	*ef	7.2	*ef	7.0	*ef
Subcontracted Analysis										
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
BOD (Biochemical Oxygen Demand)		mg/l	MT/ACSE/306	AR	5.09	ef	8.66	ef	17.5	ef
Suspended Solids		mg/l	MT/ACSE/305	AR	10	*f	380	*f	320	*f

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ACSE Sample Number Sample ID	75600 729200 - 23-95854	75601 729201 - 23-95854	75602 729202 - 23-95854
Clients Sample Ref.^	Point 5	Point 6	Point 7
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	19/07/2023	19/07/2023	19/07/2023
Time Sampled^	1030	1045	1030
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 5	Point 6	Point 7
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	51.7	*	91.5	*	49.1	*
Nitrate		mg/l	MT/ACSE/204	AR	25.1	*	0.968	*	27.9	*
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	0.72		1.27		0.66	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Cadmium (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		0.0021	
Copper		mg/l	MT/ACSE/205	AR	< 0.008		< 0.008		< 0.008	
Zinc (Total)		mg/l	MT/ACSE/205	AR	0.093		0.210		0.178	
Ni (Total)		mg/l	MT/ACSE/205	AR	0.0334		0.0263		0.0180	
Pb (Total)		mg/l	MT/ACSE/205	AR	0.009		0.040		0.068	
Copper (Total)		mg/l	MT/ACSE/205	AR	< 0.008		0.045		0.024	
Nickel		mg/l	MT/ACSE/205	AR	0.0027		0.0024		0.0010	
Lead		mg/l	MT/ACSE/205	AR	< 0.004		< 0.004		< 0.004	
Zinc		mg/l	MT/ACSE/205	AR	0.005		0.002		< 0.002	
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	484		161		113	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.6	*ef	7.3	*ef	7.4	*ef
Subcontracted Analysis										
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
BOD (Biochemical Oxygen Demand)		mg/l	MT/ACSE/306	AR	5.25	ef	11.2	ef	< 4.00	ef
Suspended Solids		mg/l	MT/ACSE/305	AR	8.5	*f	62	*f	7.0	*f

ACSE Sample Number Sample ID	75603 729203 - 23-95854	75604 729204 - 23-95854	75605 729205 - 23-95854
Clients Sample Ref.^	Point 8	Point 10	Point 11
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	18/07/2023	18/07/2023	18/07/2023
Time Sampled^	1530	1500	1445
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 8	Point 10	Point 11
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	53.3	*	78.4	*	50.6	*
Nitrate		mg/l	MT/ACSE/204	AR	26.3	*f	48.9	*f	27.2	*f
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	0.72		0.47		0.72	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Cadmium (Total)		mg/l	MT/ACSE/205	AR	0.0033		0.0010		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008		< 0.008		< 0.008	
Zinc (Total)		mg/l	MT/ACSE/205	AR	0.316		0.364		0.179	
Ni (Total)		mg/l	MT/ACSE/205	AR	0.0523		0.0874		0.0168	
Pb (Total)		mg/l	MT/ACSE/205	AR	0.027		0.024		0.041	
Copper (Total)		mg/l	MT/ACSE/205	AR	0.034		0.017		0.026	
Nickel		mg/l	MT/ACSE/205	AR	0.0028		0.0029		0.0030	
Lead		mg/l	MT/ACSE/205	AR	< 0.004		< 0.004		< 0.004	
Zinc		mg/l	MT/ACSE/205	AR	0.006		0.012		0.006	
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	< 10.0		159		< 10.0	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.6	*ef	7.6	*ef	7.7	*ef
Subcontracted Analysis										
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
BOD (Biochemical Oxygen Demand)		mg/l	MT/ACSE/306	AR	< 4.00	ef	< 4.00	ef	< 4.00	ef
Suspended Solids		mg/l	MT/ACSE/305	AR	8.0	*f	6.5	*f	12	*f

ACSE Sample Number Sample ID	75606 729206 - 23-95854	75607 729207 - 23-95854	75608 729208 - 23-95854
Clients Sample Ref.^	Point 12	Point 13	Point 14
Location / Sample Depth (m)^	Ref. Plan	Ref. Plan	Ref. Plan
Date Sampled^	18/07/2023	18/07/2023	18/07/2023
Time Sampled^	1330	1225	1200
Sample deviating codes	ef	ef	ef
Client's Sample Description^			
ACS Testing Material Description^	Point 12	Point 13	Point 14
ACSE Material Description (Principal Matrix - As Received)	WATER	WATER	WATER

Determination	HWOL Acroynm	Units	Method	Prepared As	Result	AS	Result	AS	Result	AS
Anions										
Chloride		mg/l	MT/ACSE/204	AR	64.1	*	73.7	*	71.0	*
Nitrate		mg/l	MT/ACSE/204	AR	3.14	*f	15.7	*f	20.9	*f
Phosphate (Ortho) PO4		mg/l	MT/ACSE/204	AR	0.19		< 0.04		< 0.04	
Metals (Water)										
Cadmium		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Cadmium (Total)		mg/l	MT/ACSE/205	AR	< 0.0008		< 0.0008		< 0.0008	
Copper		mg/l	MT/ACSE/205	AR	< 0.008		< 0.008		< 0.008	
Zinc (Total)		mg/l	MT/ACSE/205	AR	0.091		0.116		0.072	
Ni (Total)		mg/l	MT/ACSE/205	AR	0.0060		0.0023		1.323	
Pb (Total)		mg/l	MT/ACSE/205	AR	0.013		0.025		0.012	
Copper (Total)		mg/l	MT/ACSE/205	AR	0.010		0.023		0.055	
Nickel		mg/l	MT/ACSE/205	AR	0.0012		0.0023		0.0022	
Lead		mg/l	MT/ACSE/205	AR	< 0.004		< 0.004		< 0.004	
Zinc		mg/l	MT/ACSE/205	AR	0.020		0.007		0.006	
Petroleum Hydrocarbons LL										
Total TPH LL		ug/L	NAM/ACSE/X02	AR	< 10.0		< 10.0		332	
pH and Conductivity										
pH (@ 20 °C)		units	MT/ACSE/301	AR	7.5	*ef	7.5	*ef	7.1	*ef
Subcontracted Analysis										
Speciated PAH (Low Level)		SC	SC	SC	Attached		Attached		Attached	
Waters and Leachates										
BOD (Biochemical Oxygen Demand)		mg/l	MT/ACSE/306	AR	< 4.00	ef	< 4.00	ef	4.15	ef
Suspended Solids		mg/l	MT/ACSE/305	AR	140	*ef	9.5	*ef	14	*ef

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Technical Information for Analytical Results

Analysis

* - denotes analysis covered by our UKAS accreditation.

- denoted analysis covered by our MCERTS certification & UKAS accreditation.

Loss on Ignition (MT/ACSE/302) is carried out at our laboratory at Unit D11 Admiralty Park, Station Road, Holton Heath, Poole, Dorset BH16 6HX.

AD = Sample tested in air dried condition.

AR = Sample tested in as-received condition.

AS = Accreditation status.

D = Sample tested in dry condition.

L = Laboratory prepared leachate.

SC = Sub contracted.

^ = Clients supplied information.

All MCERTS certified test values reported on a dry weight basis.

The preparation of 10:1 Leachates (to BS EN 12457-2:2002) and 2:1 leachates (to BS EN 12457-1:2002) fall outside the scope of our UKAS accreditation.

Soils and leachates are prepared at our laboratory at Unit D11 Admiralty Park, Station Road, Holton Heath, Poole, Dorset BH16 6HX.

Method uncertainty available on request.

Where results are less than the limit of detection, the value of 0 is used in calculations.

Key to HWOL Acronyms

Acronym	Description
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 -	e.g. EH_2D_Total_#1 means humics mathematically subtracted
#2 -	e.g. EH_2D_Total_#2 means 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

Deviating Codes

Deviating Samples

The use of any of the following symbols indicates that the sample was deviating and it is possible therefore that the results provided may not be representative of the sample taken.

- a - The date and /or time of sampling has not been provided, therefore it is not known if the time lapse between sampling and analysis has exceeded the acceptable holding time(s)*.
- b - The test item was received in a container which has not been recommended*.
- c - On receipt, the temperature of the sample received was found to fall outside the recommendations of BS ISO 18512:2007, Soil Quality. Guidance on long and short term storage of soil samples*.
- d - The sample was received in a container that had not been filled as recommended*.
- e - The delay between sampling and sample receipt is greater than the recommended holding time for the analyte of interest in this matrix*.
- f - The delay between sampling and analysis is greater than the recommended holding time for the analyte of interest in this matrix*.

In accordance with the requirements of Technical Policy Statement TPS 63; UKAS Policy on Deviating Samples, all UKAS accredited testing laboratories are required to notify their clients that calibration or test results may be invalid where samples are found to be deviating. It is the opinion of ACSE that the term invalid should be interpreted as 'not fully representative of the sample taken at source'.

The following Additional Deviating Sample Codes may also be used.

- I/S - Insufficient sample mass/volume received for accurate quantification of this analyte.
- U/S - The sample received was deemed unsuitable for accurate determination of this analyte using the Test Methods available.
- S/C - The sample received was subcontracted for analysis.

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Appendix G: July 2023 PAH results



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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 23-49196

Issue: 1

Date of Issue: 28/07/2023

Contact: Dave Redfern

Customer Details: ACS Environmental testing Ltd
Unit 14b Blackhill Road West
Holton heath Trading park
Poole
DorsetBH16 6LE

Quotation No: Q22-03485


Order No: E / 23-01883 / 6170

Customer Reference: 23-01883

Date Received: 24/07/2023

Date Approved: 28/07/2023

Details: 23-01883

Approved by: 

Tim Reeve, Quality Officer

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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Sample Summary

Report No.: 23-49196, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
332079	Point 1	19/07/2023	24/07/2023		
332080	Point 3	19/07/2023	24/07/2023		
332081	Point 4	19/07/2023	24/07/2023		
332082	Point 5	19/07/2023	24/07/2023		
332083	Point 6	19/07/2023	24/07/2023		
332084	Point 7	19/07/2023	24/07/2023		
332085	Point 8	18/07/2023	24/07/2023		
332086	Point 10	18/07/2023	24/07/2023		
332087	Point 11	18/07/2023	24/07/2023		
332088	Point 12	18/07/2023	24/07/2023		
332089	Point 13	18/07/2023	24/07/2023		
332090	Point 14	18/07/2023	24/07/2023		



Results Summary

Report No.: 23-49196, issue number 1

ELAB Reference	332079	332080	332081	332082	332083	332084	332085	332086	332087	332088	332089	332090		
Customer Reference														
Sample ID														
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER		
Sample Location	Point 1	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 10	Point 11	Point 12	Point 13	Point 14		
Sample Depth (m)														
Sampling Date	19/07/2023	19/07/2023	19/07/2023	19/07/2023	19/07/2023	19/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023	18/07/2023		
Sampling Time	9:30	11:00	11:30	10:30	10:45	10:30	15:30	15:00	14:45	13:30	12:25	12:00		
Determinand	Codes	Units	LOD											
Polyaromatic hydrocarbons														
Naphthalene GCMS	N	ug/l	0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene GCMS	N	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene GCMS	N	ug/l	0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene GCMS	N	ug/l	0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene GCMS	N	ug/l	0.01	0.01	0.04	0.12	< 0.01	< 0.01	0.17	< 0.01	0.01	< 0.01	0.01	< 0.01
Anthracene GCMS	N	ug/l	0.01	< 0.01	0.02	0.05	< 0.01	< 0.01	0.07	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene GCMS	N	ug/l	0.01	0.01	0.09	0.33	< 0.01	< 0.01	2.14	< 0.01	0.03	< 0.01	0.03	< 0.01
Pyrene GCMS	N	ug/l	0.01	0.01	0.09	0.34	< 0.01	< 0.01	1.72	< 0.01	0.03	< 0.01	0.03	0.01
Benzo (a) anthracene GCMS	N	ug/l	0.01	< 0.01	0.04	0.16	< 0.01	< 0.01	0.61	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene GCMS	N	ug/l	0.01	< 0.01	0.06	0.15	< 0.01	< 0.01	1.48	< 0.01	0.01	< 0.01	0.02	< 0.01
Benzo (b) fluoranthene GCMS	N	ug/l	0.01	< 0.01	0.04	0.15	< 0.01	< 0.01	0.73	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo (k) fluoranthene GCMS	N	ug/l	0.01	< 0.01	0.04	0.16	< 0.01	< 0.01	0.70	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo (a) pyrene GCMS	N	ug/l	0.01	< 0.01	0.03	0.03	< 0.01	< 0.01	0.19	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno (1,2,3-cd) pyrene GCMS	N	ug/l	0.01	< 0.01	< 0.01	0.12	< 0.01	< 0.01	0.38	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene GCMS	N	ug/l	0.01	< 0.01	< 0.01	0.04	< 0.01	< 0.01	0.06	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene GCMS	N	ug/l	0.01	< 0.01	< 0.01	0.12	< 0.01	< 0.01	0.35	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total PAH(16) GCMS	N	ug/l	0.01	0.03	0.45	1.82	< 0.01	< 0.01	8.61	< 0.01	0.08	< 0.01	0.09	0.001



Method Summary

Report No.: 23-49196, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Water					
PAHs and/or PCBs in waters	N		25/07/2023	135	GC-MS

Tests marked N are not UKAS accredited

Report Information

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Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

LOD LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.
Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.
ELAB are unable to provide an interpretation or opinion on the content of this report.
The results relate only to the sample received.
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request
Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

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	EH_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