

# Lower Thames Crossing

## 6.3 Environmental Statement Appendices

### Appendix 14.2 – Water Features Survey Factual Report (2 of 2)

APFP Regulation 5(2)(a)

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

Volume 6

**DATE: October 2022**

Planning Inspectorate Scheme Ref: TR010032  
Application Document Ref: TR010032/APP/6.3

**VERSION: 1.0**

# Lower Thames Crossing

## Appendix 14.2 – Water Features Survey Factual Report

### List of contents

|  | Page number |
|--|-------------|
| <b>1 Introduction .....</b>  | <b>1</b>    |
| 1.1 Objectives .....   | 1           |
| 1.2 Scope .....  | 1           |
| <b>2 Water Features Survey site work and desk study .....</b>                  | <b>3</b>    |
| <b>3 Photographs .....</b>   | <b>4</b>    |
| 3.2 South of the River Thames .....  | 5           |
| 3.3 Filborough Marshes .....   | 11          |
| 3.4 North of the River Thames.....   | 13          |
| <b>4 Manor Farm, North Ockendon.....</b>                                       | <b>16</b>   |
| <b>5 Filborough and Shorne Marshes .....</b>                                   | <b>17</b>   |
| 5.1 Introduction.....  | 17          |
| 5.2 Habitats and condition .....   | 17          |
| 5.3 Surface water features.....  | 17          |
| 5.4 Surface water level management .....                                       | 18          |
| 5.5 Shorne Marshes RSPB reserve.....   | 19          |
| 5.6 Filborough Marshes .....   | 19          |
| <b>6 Water quality monitoring .....</b>  | <b>21</b>   |
| 6.2 In situ monitoring .....   | 23          |
| 6.3 Water quality summary .....  | 24          |
| 6.4 Surveys of the Western Ditch .....   | 25          |
| <b>Annex A Water features tables .....</b>                                     | <b>29</b>   |
| <b>Annex B Water features location plans .....</b>                             | <b>50</b>   |
| <b>Annex C Surface Water Management Plan – RSPB Shorne Marshes .....</b>       | <b>86</b>   |
| <b>Annex D Water Quality Field Monitoring Results .....</b>                    | <b>87</b>   |
| <b>Annex E Photographs from Manor Farm Site Walkover, May 2021 .....</b>       | <b>90</b>   |
| <b>Annex F Manor Farm Drainage Network Survey Reports .....</b>                | <b>99</b>   |
| <b>Annex G Western Ditch water quality data from laboratory analysis .....</b> | <b>112</b>  |

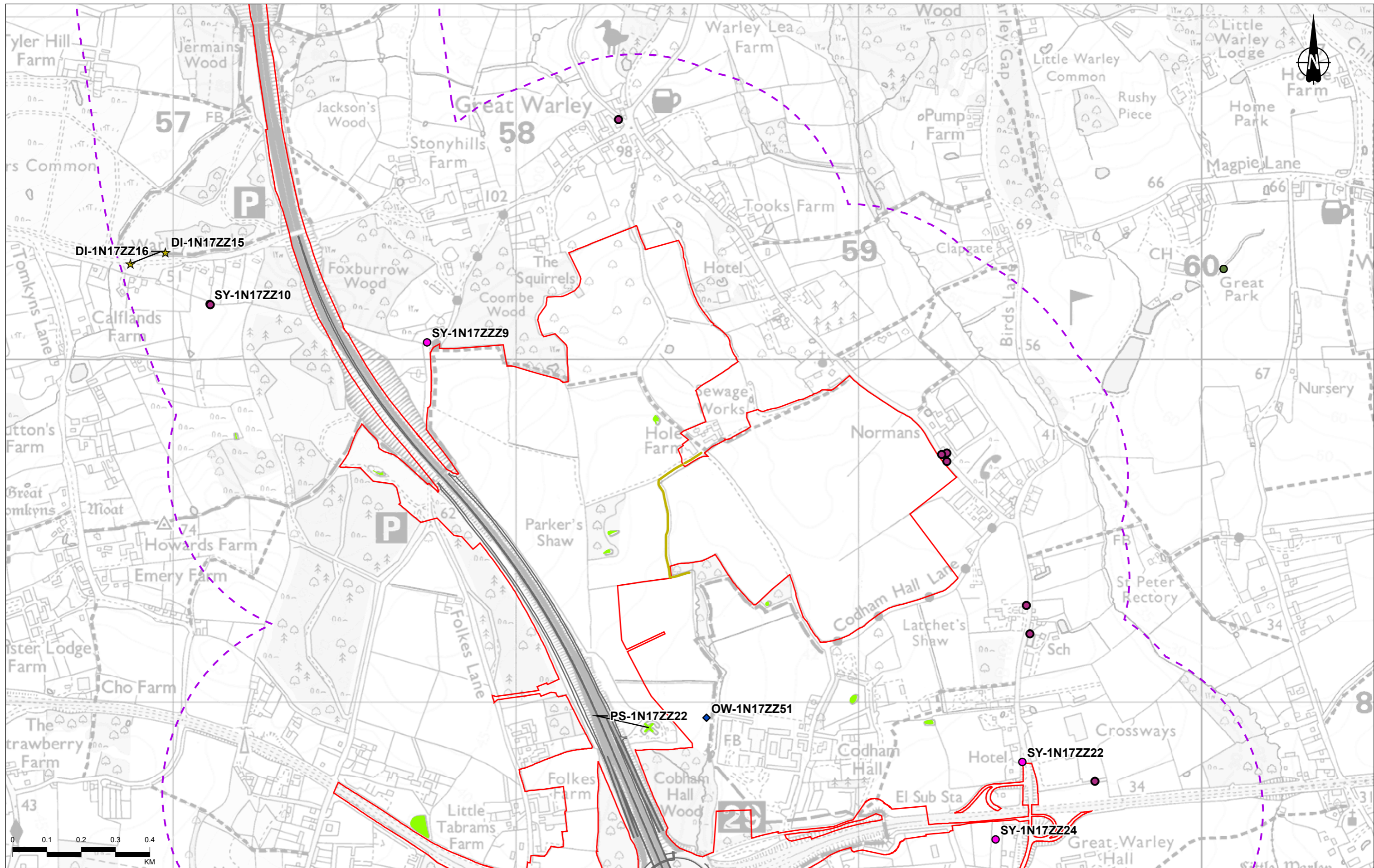


## List of tables

|   | <b>Page number</b> |
|---|--------------------|
| Table 6.1 Surface water features water quality monitoring .....                       | 21                 |
| Table 6.2 Western Ditch field water quality monitoring results.....                   | 26                 |
| Table 6.3 Summary of Western Ditch laboratory analysis results for sites 5 to 8 ..... | 27                 |

## List of plates

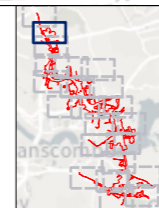
|   | <b>Page number</b> |
|---|--------------------|
| Plate 5.1 Main rivers within and near the Ramsar (Environment Agency, 2015) ..... | 18                 |
| Plate 6.1 Water quality monitoring locations .....                                | 24                 |
| Plate 6.2 Western Ditch sampling locations.....                                   | 25                 |



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| Rev | Status | Rev. Date  | Purpose of revision | Drawn | Chkd | Apprvd |
|-----|--------|------------|---------------------|-------|------|--------|
| P01 | S8     | 07/10/2022 | DCO Application     | SW    | LD   | BF     |

| Legend |  |
|--------|--|
|        | Route alignment  |
|        | Order Limits   |
|        | Order Limits 500m Buffer   |
|        | Licensed Abstraction   |
|        | Water Discharge Permits  |
|        | Water Discharge Permits  |
|        | DI - Surface waterbody, ditch (artificial bed/bank profile, not designated main river)             |
|        | PS/SI - Surface waterbody, lake or pond  |
|        | OW - Surface waterbody, ordinary watercourse (natural bed/bank profile, not designated main river) |
|        | DI - Surface waterbody, ditch (artificial bed/bank profile, not designated main river)             |
|        | PS/SI - Surface waterbody, lake or pond  |

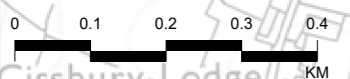
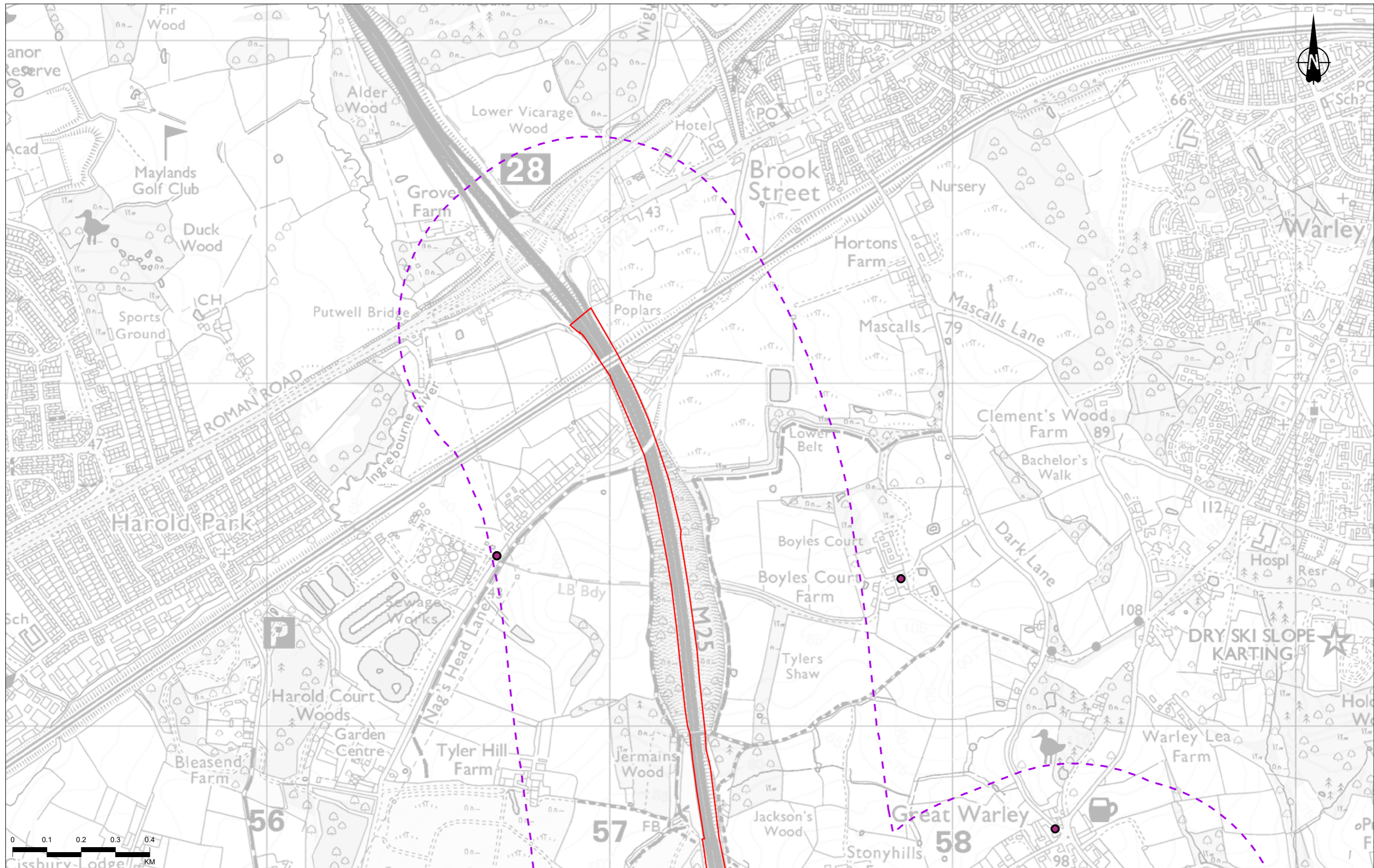


Client  
 national highways

Project  
**LOWER THAMES CROSSING**

|                             |   |               |          |          |     |
|-----------------------------|---|---------------|----------|----------|-----|
| Status                      | DCO APPLICATION   | Original Size | A3       | Revision | P01 |
| Application Document Number | TR010032/APP/6.3  | Scale         | 1:10,000 |          |     |
| Drawing Title               | Appendix 14.2 - Water Feature Survey Results - Surface Water<br>Page 22 of 23 |               |          |          |     |
| Drawing Number              | HE540039-CJV-EGN-SZP_EGNE00000000-DR-LE-50149                                 |               |          |          |     |

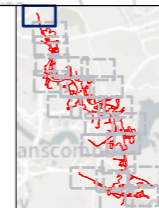




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| Rev | Status | Rev. Date  | Purpose of revision | Drawn | Chkd | Apprv'd |
|-----|--------|------------|---------------------|-------|------|---------|
| P01 | S8     | 07/10/2022 | DCO Application     | SW    | LD   | BF      |

- Legend**
- Route alignment
  - ▭ Order Limits
  - - - Order Limits 500m Buffer
  - Licenced Abstraction
  - Water Discharge Permits



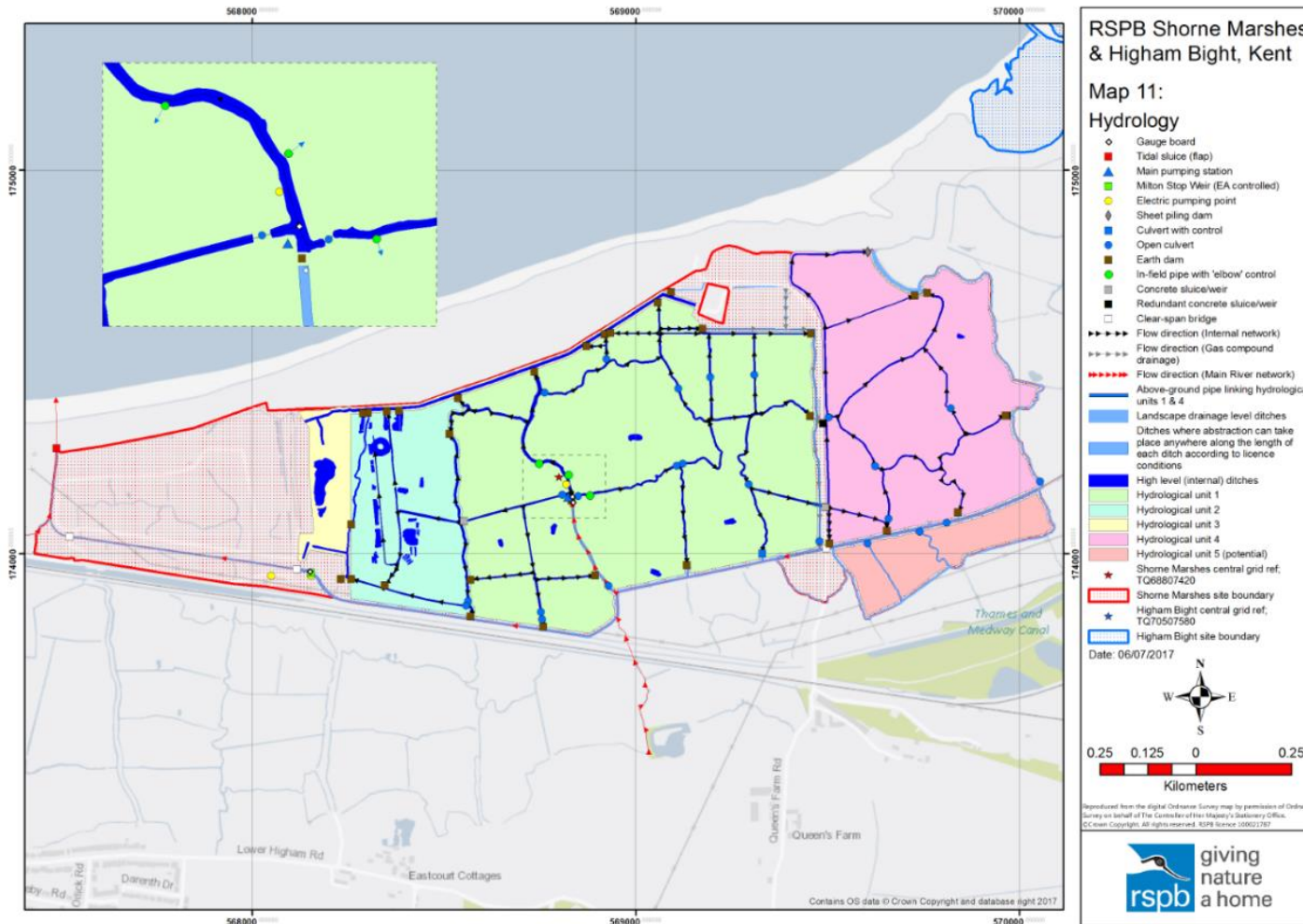
Client

Project  
**LOWER THAMES CROSSING**

|                             |   |               |          |          |     |
|-----------------------------|---|---------------|----------|----------|-----|
| Status                      | DCO APPLICATION   | Original Size | A3       | Revision | P01 |
| Application Document Number | TR010032/APP/6.3  | Scale         | 1:10,000 |          |     |
| Drawing Title               | Appendix 14.2 - Water Feature Survey Results - Surface Water<br>Page 23 of 23 |               |          |          |     |
| Drawing Number              | HE540039-CJV-EGN-SZP_EGNE0000000-DR-LE-50149                                  |               |          |          |     |

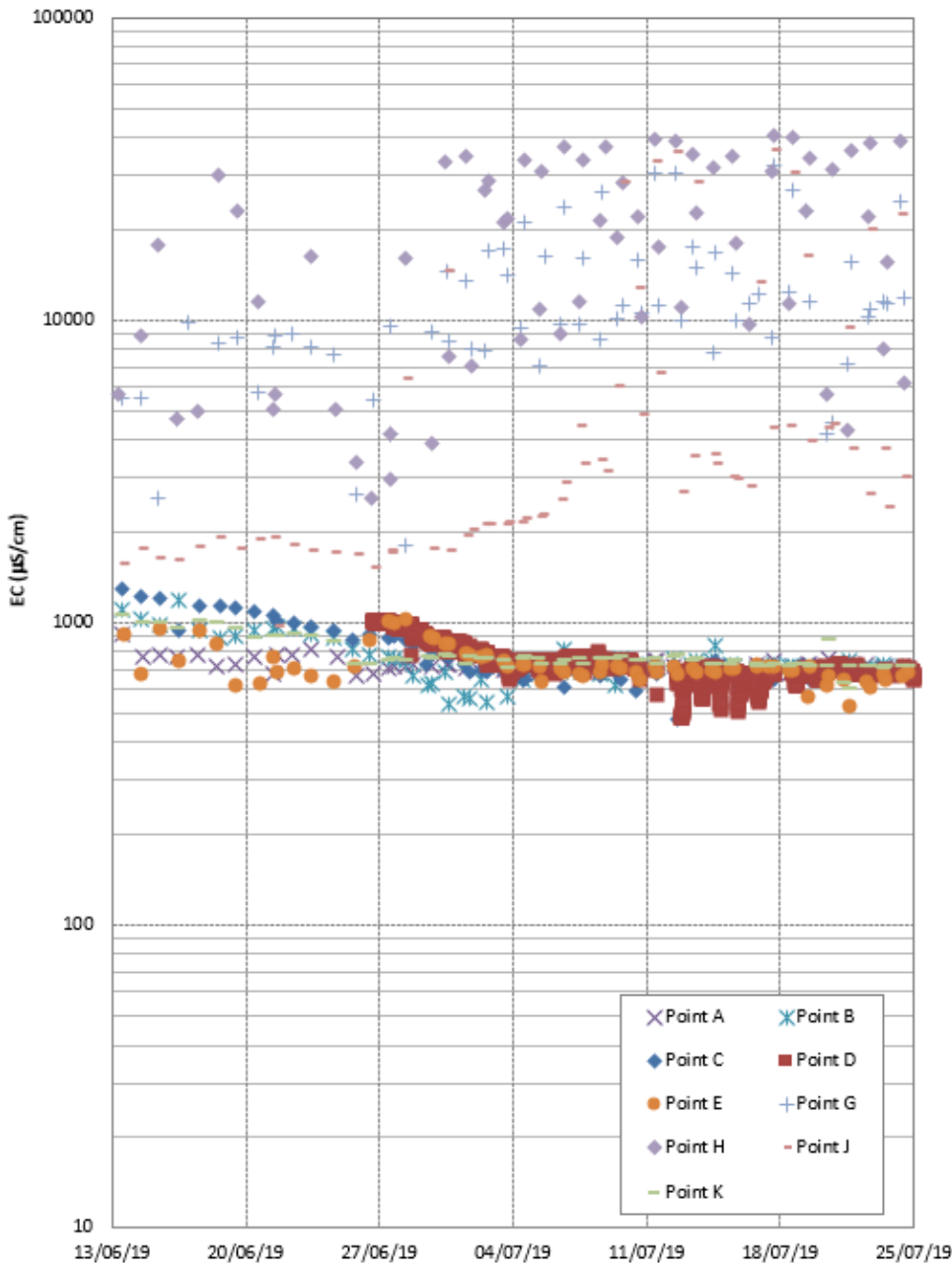


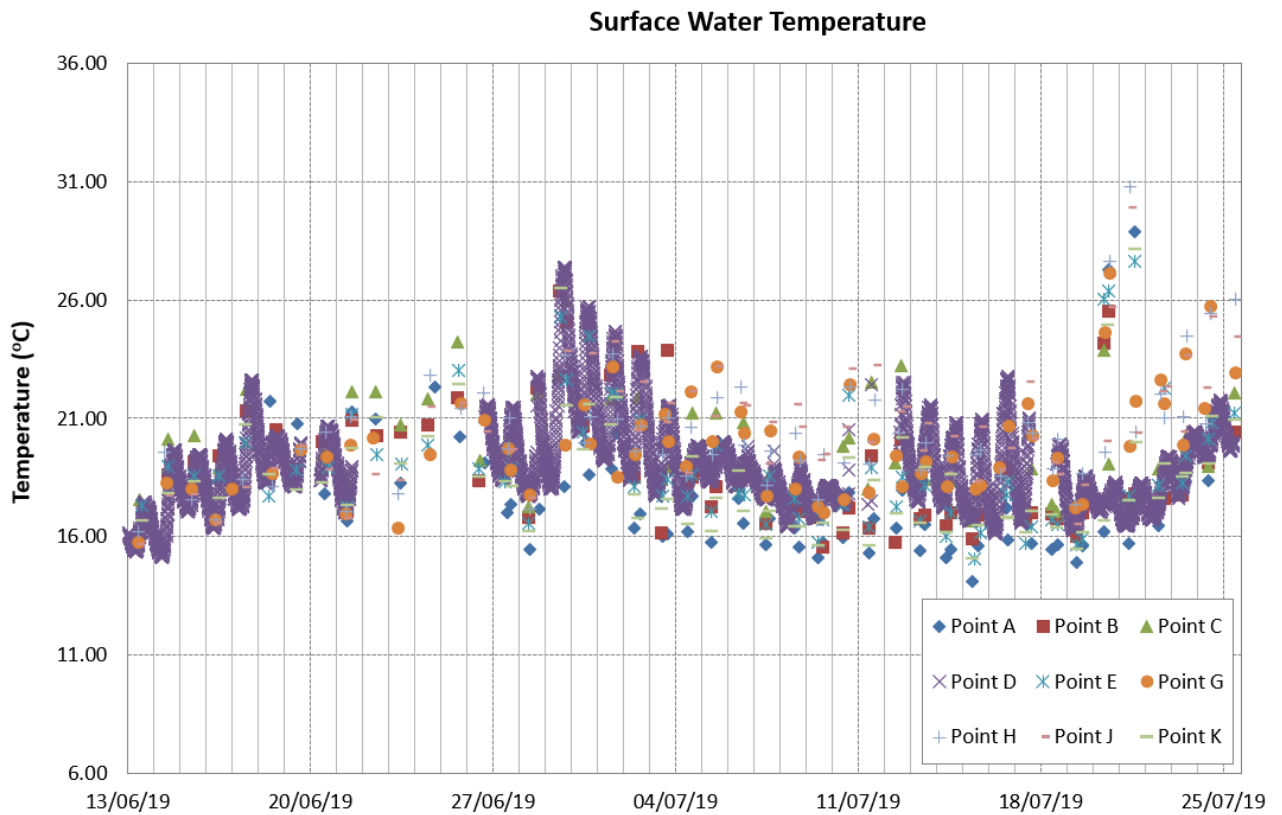
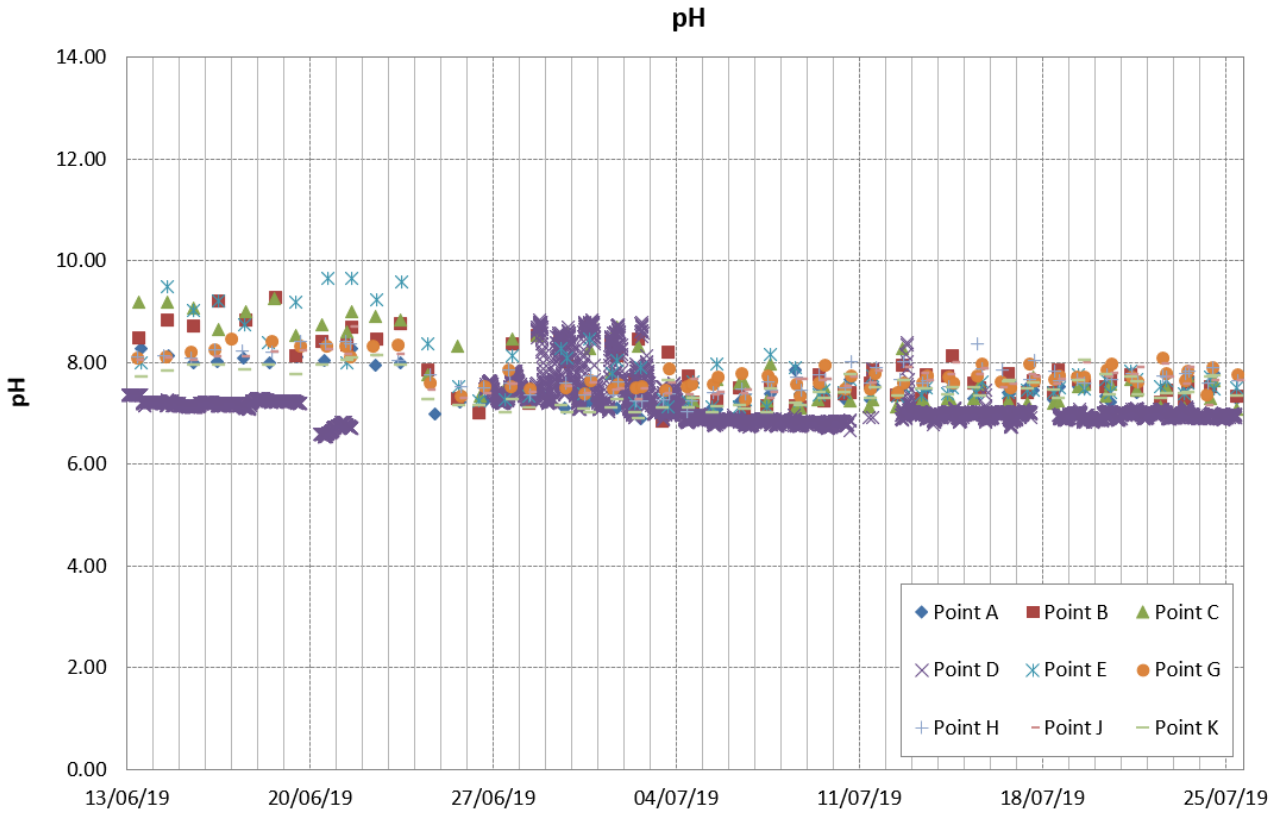
# Annex C Surface Water Management Plan – RSPB Shorne Marshes



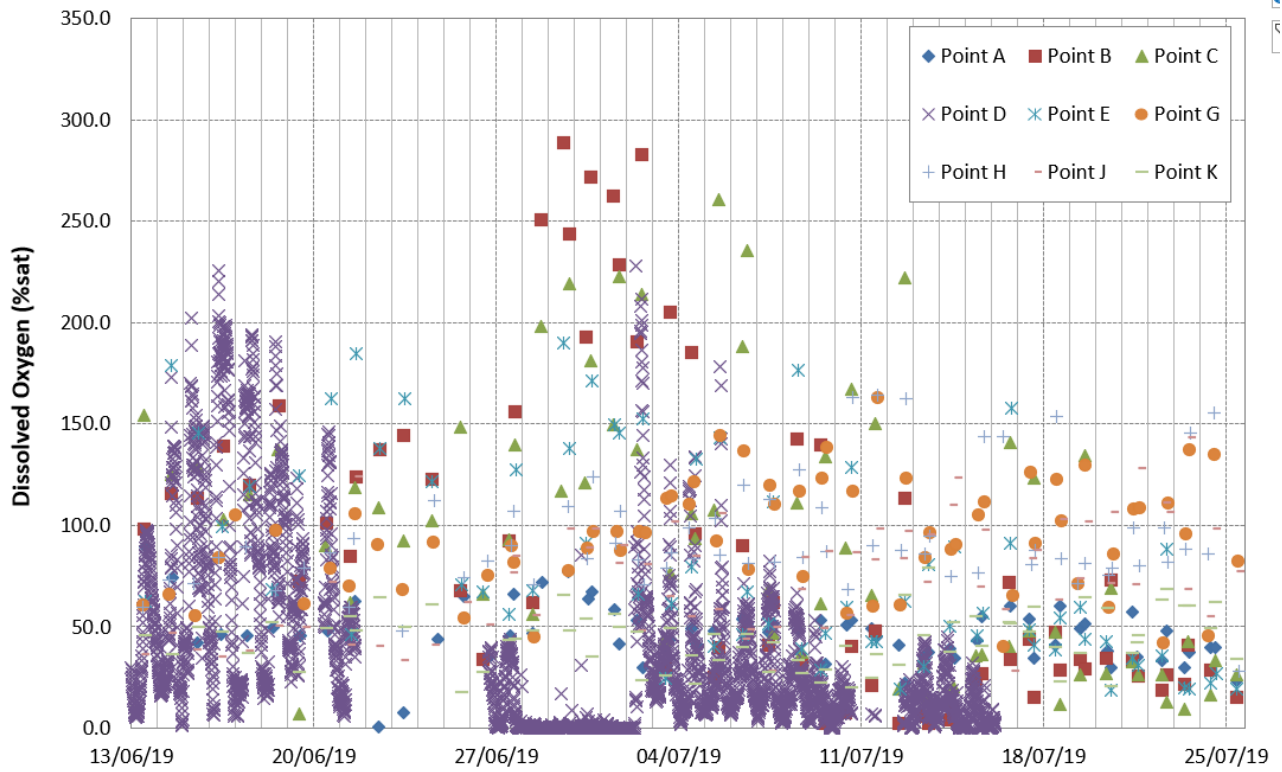
## Annex D Water Quality Field Monitoring Results

D.1.1 The plots below present the water quality field monitoring results for sample sites A to K, recorded during Project ground investigations, excluding data for sites F and I, where there were insufficient water depths.

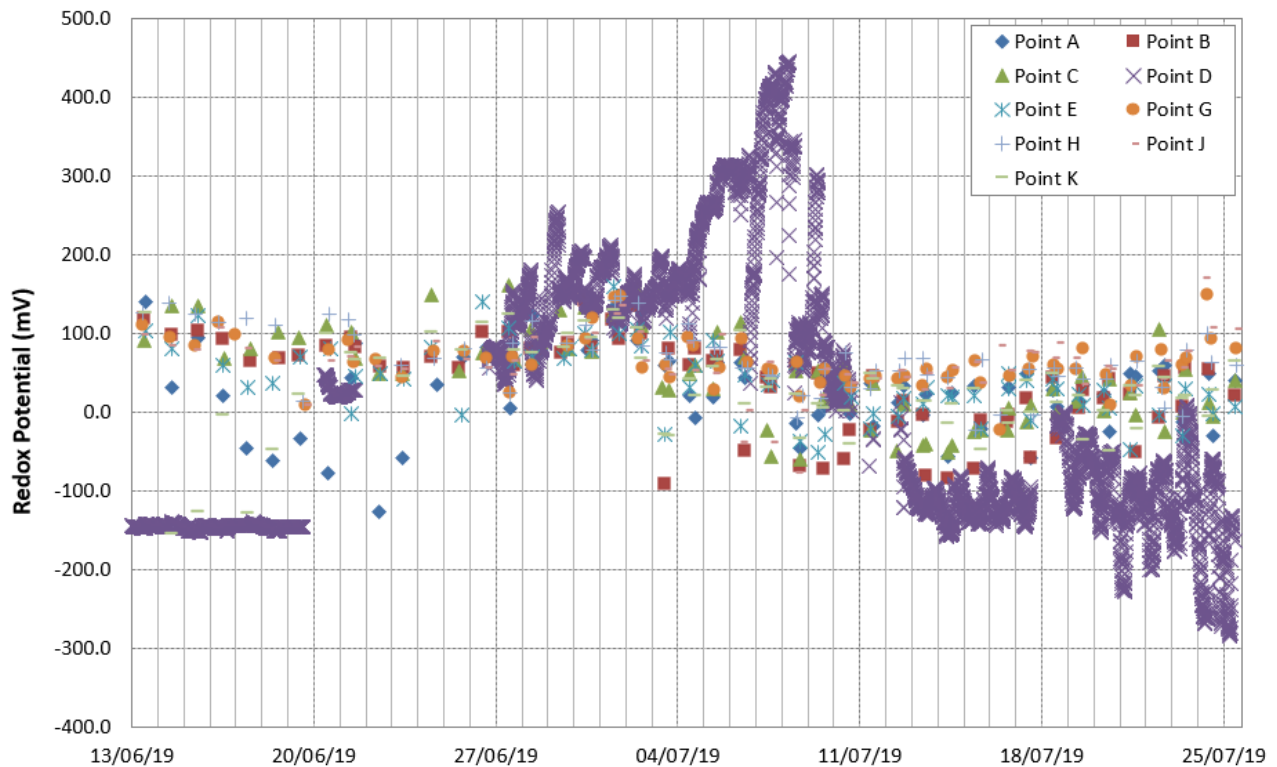




**PW03001 - Dissolved Oxygen**



**PW03001 - Redox Potential**

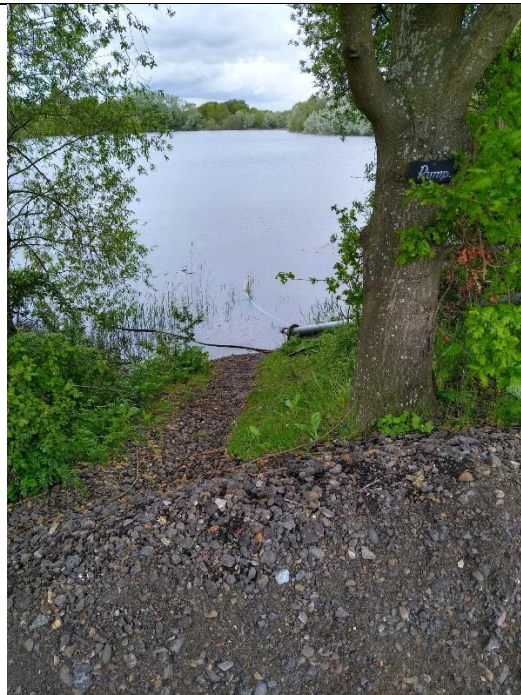




## Annex E Photographs from Manor Farm Site Walkover, May 2021



**Photo ref. 1** – Direction north. Pea Lane and M25 – adjacent headwall. Pipework beneath manhole cover related to irrigation system that takes water by gravity to a reservoir in the west and can also act in reverse to pump water back east to supply abstraction points to the east of the M25.



**Photo ref. 2** – Direction north-east. Irrigation reservoir. Pipe shown is main pipe that supplies the irrigation system and goes out to the raft structure in the reservoir shown in Photo 3.

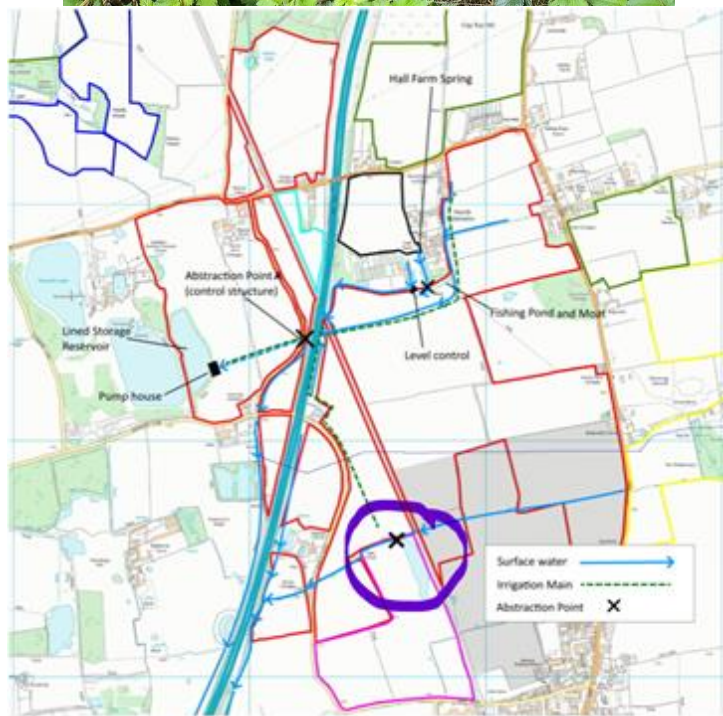
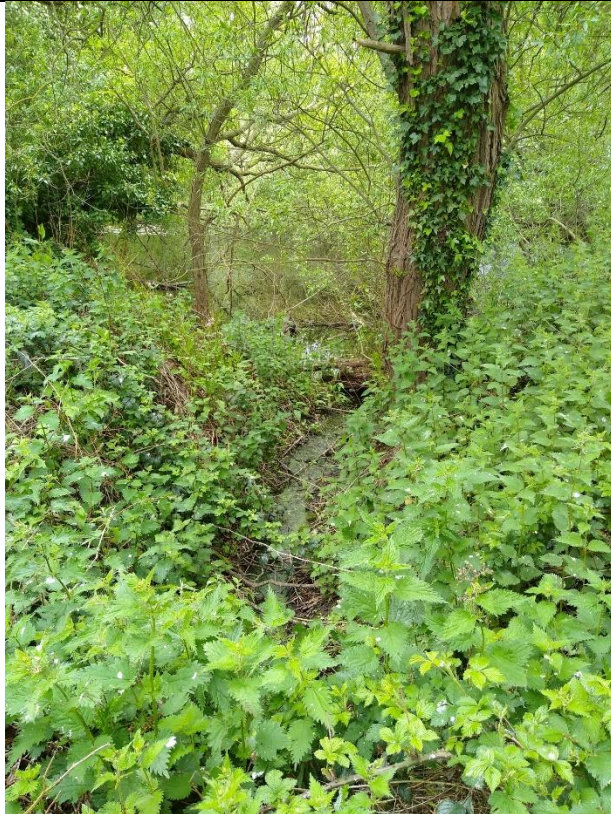




**Photo ref. 3** – Direction east. Irrigation reservoir. Surface water abstraction pumps set up on blue float in centre of reservoir.



**Photo ref. 4** – Direction north. Irrigation reservoir.



**Photo ref. 5** – Ditch feed into Kemps pond.





**Photo ref. 6** – Direction north. Headwall in ditch – West Path. Outfall into ditch from drainage beneath hill.



**Photo ref. 7** – Direction west – West Path. East to west ditch.





**Photo ref. 8** – Direction west. Moat (south pond from east). Project ground investigation temporary accommodation shown in background of photo. Temporary Project standpipe and water level data logger in water.



**Photo ref. 9** – Direction west. Moat (south pond at western end).





**Photo ref. 10** – Moat (south pond at western end).



**Photo ref. 11** – Moat (south pond at western end).





**Photo ref. 12** – Direction south – moat (middle pond).



**Photo ref. 13** – Direction north – moat (north pond to well (St Cedd's well)). Church in background.





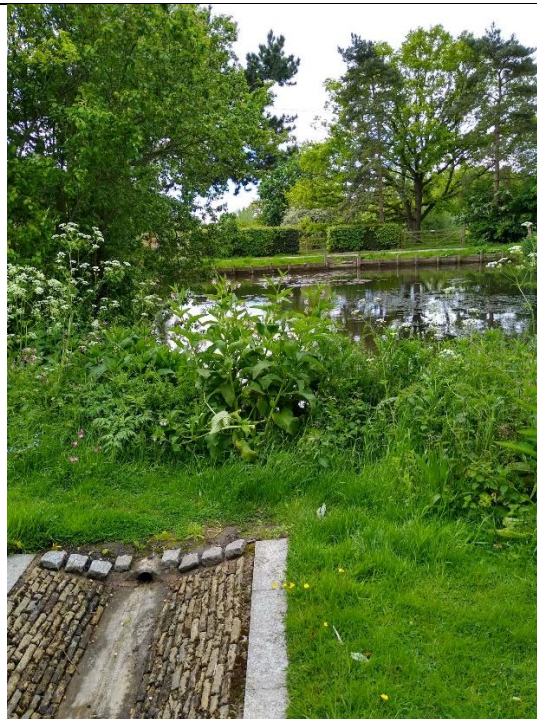
**Photo ref. 14** – Moat (north pond). Monitoring equipment owned by landowner (permanent) and temporary Project monitoring equipment shown.



**Photo ref. 15** – Moat – well spring (north pond). Built structure appears relatively modern – possibly a baptism channel.



**Photo ref. 16** – Moat – well spring (north pond). View looking inside brick structure of the well.



**Photo ref. 17** – Direction south. Moat (middle pond looking south). ‘Baptism channel’ stops before pond edge – evidence of channel being decorative only.

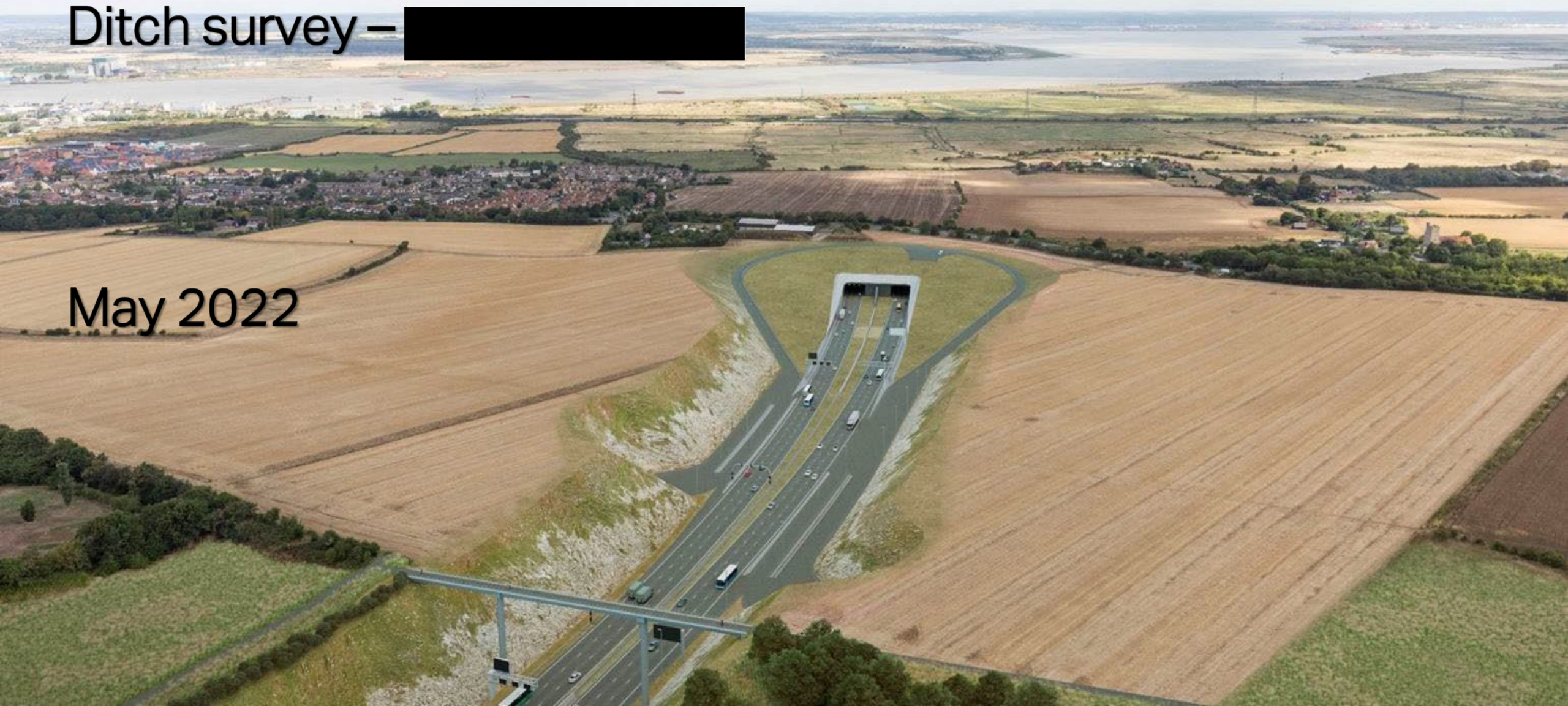


## Annex F Manor Farm Drainage Network Survey Reports

# LOWER THAMES CROSSING

## Ditch survey – [REDACTED]

May 2022





# Ditch Survey

---

- [REDACTED] ponds and nearby trenches were visited on:
  - 13 October,
  - 19 November
  - 16 December 2021
  - 25 January 2022
  - 24 February 2022 and
  - 22 March 2022
  - 28 April 2022
  - 24 May 2022
- A significant part of the areas ditch network was just heavily vegetated with no flow. The trenches are generally dry or some standing water is present (Figure 2 to Figure 9).
- In December 2021, there were a few spots of water with few cm depth (blue circular marks on the map) none of which appeared to have any significant measurable flow.
- Mild flow was noted in deep drain from December 2021 to April 2022 (Figure 2, Point 2). Water was seeping and disappearing within 10 meters (to west). After April 2022, this position was not accessible due to heavy vegetation. Stagnant water noted in the main ditch, just near the fishing pond (same level with pond, Point 4) only on December 2021.
- The ditch leading towards the M25 from the east had several spots with standing water (Points 5 and 6), during winter and spring. After April 2022 this ditch was completely dry.
- N-S ditch on the North of fishing pond has some stagnant water at base, but no flow (Point 8).

# Ditch Survey

---

- Figure 1 shows the locations visited.
- Figure 2 provides details about the southern ditch.
- Figure 3 provides details about northern ditch and downstream part on the west of M25.
- Figure 4 provides the details from the visit on 16 December, mainly on M25 culvert and Deep Drain on the East.
- Figure 5 provides the details from the visit on 25 January 2022, for the selected positions. M25 Culvert was not accessible at the time of survey (access license was not agreed with the landowner). The downstream part of the culvert was accessed from footpath and no flow was recorded.
- Figure 6, Figure 7 and Figure 8 provides the details from the visits completed on 24 February, 22 March and 28 April respectively. Mild flow was noted on the northeastern ditch. No flow was recorded on any other ditches.
- On 28 April, mild flow noted (0.013 l/s) on the ditch between two ponds (orange pipes).
- On 24 May, mild flow noted (0.012 l/s) on the ditch between two ponds (orange pipes). One week later on 31 May 2022, there was no flow (only seepage under the pipes).

# Visited Locations



 Ditch


 Positions where ponding occurs / depressions

Figure 1.  
Visited Locations





19 November 2021



13 October 2021



E-W ditch, Western end point, dry, heavily vegetated

13 October 2021



E-W ditch, stagnant water

13 October 2021



E-W ditch, stagnant water

13 October 2021

Ditch between two ponds  
Orange pipes  
No Flow

13 October 2021  
19 November 2021



N-S ditch, stagnant water . Same level with pond

13 October 2021

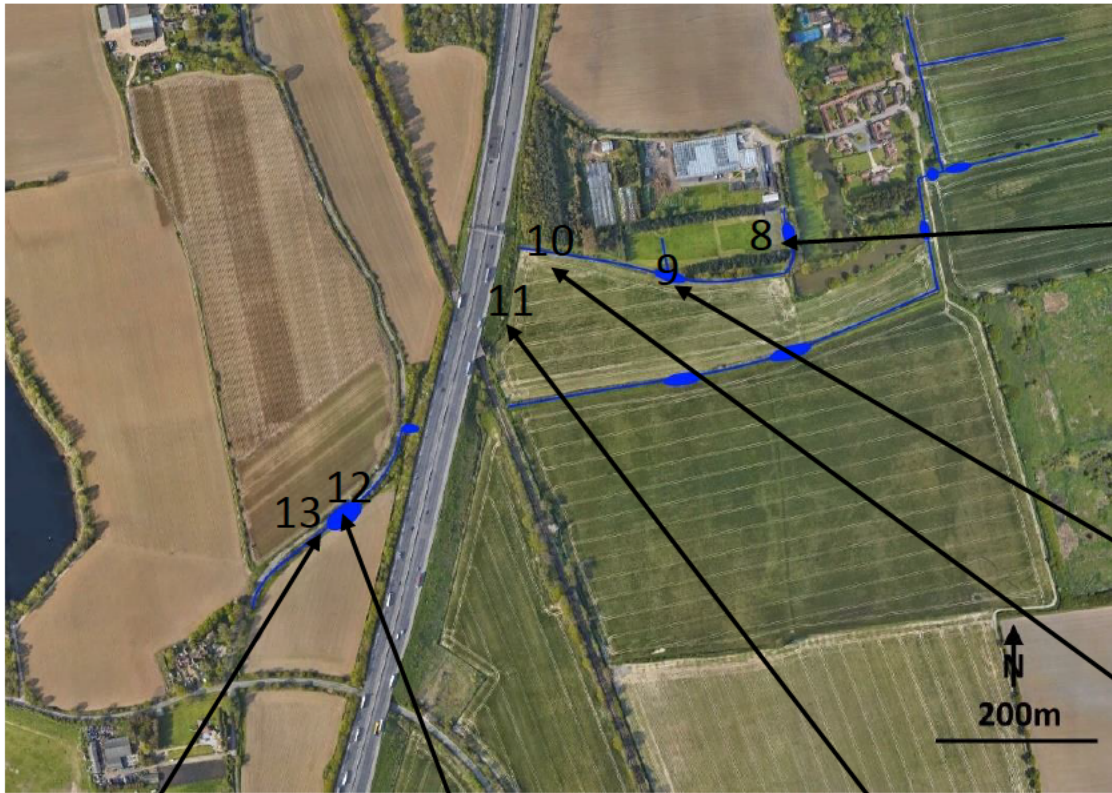


E-W ditch running along edge of field. Has some stagnant water in and is heavily vegetated.

19 November 2021

Figure 2.  
Southern Ditch





N-S ditch at W end of the pond. Has some stagnant water at base.

19 November 2021



There is a small drainage pipe entering E-W ditch running N-S under the adjacent field.

19 November 2021



Flytipping

13 October 2021



Stagnant water

13 October 2021



No ditch here

19 November 2021



E-W ditch running from corner of pond is heavily vegetated and has a small patch of stagnant water at base

19 November 2021

Figure 3.  
Northern Ditch and W of M25





Deep Drain  
Heavy vegetation

16 December 2021



Mild flow noted on  
the outfall of deep  
drain – seeps and  
disappears within  
10 meters to west.

16 December 2021



M25 Culvert outfall  
Looking North

16 December 2021



M25 Culvert outfall  
Looking East

16 December 2021



M25 Culvert outfall  
Looking West

16 December 2021



W of M25 Culvert  
No flow

16 December 2021

Figure 4.  
M25 Culvert and  
Deep Drain (East)





Heavily vegetated,  
very mild flow

25 January 2021



Standing water in  
the ditch, no flow

25 January 2021



Small amount of standing  
water, no flow.

25 January 2021



Large amount of standing  
water but no flow

25 January 2021

Wet patches  
but no flow.

Figure 5.  
25 January 2022 Visit





Mild flow coming from pipe. Flowing water is murky brown. Brown water can be seen mixing with the clear water coming down from upstream

24 February 2022



Mild flow

24 February 2022

Wet patches but no flow.



Small amount of standing water, no flow.

24 February 2022



Large amount of standing water but no flow

24 February 2022

Figure 5.  
24 February 2022 Visit





Mild flow, Heavily vegetated

22 March 2022



Standing water in the ditch, no flow

22 March 2022



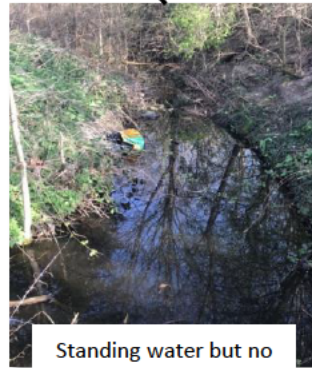
Standing Water, No flow

22 March 2022



Standing water, no flow.

22 March 2022



Standing water but no flow

22 March 2022

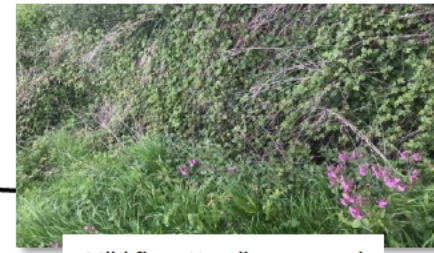


No Flow

22 March 2022

Figure 7.  
22 March 2022 Visit





Mild flow, Heavily vegetated

28 April 2022



Heavily vegetated. Some mildly flowing water observed

28 April 2022



Completely Dry

28 April 2022



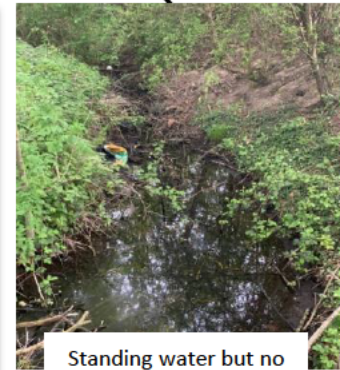
Completely Dry

28 April 2022



Standing water but no flow

28 April 2022



Mild flow, measured as 0.013 lt/sec

28 April 2022



Figure 8.  
28 April 2022 Visit





Too vegetated to observe water.  
Pipe completely obscured. No audible water flow  
24 May 2022



Too vegetated to observe any water. No audible flow of water  
24 May 2022

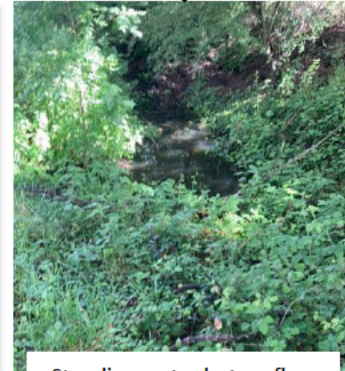
Figure 9.  
24 May 2022 Visit



Standing water present.  
No flow. Approx 20cm deep.  
24 May 2022



Completely Dry  
24 May 2022



Standing water but no flow  
24 May 2022

Orange clay pipes  
Mild flow, measured as 0.012 lt/sec

24 May 2022



Second visit on 31 May 2022, no flow, only seepage underneath the pipes

31 May 2022

## Annex G Western Ditch water quality data from laboratory analysis



Unit 7-8 Hawarden Business Park  
Manor Road (off Manor Lane)  
Hawarden  
Deeside  
CH5 3US  
Tel: (01244) 528700  
Fax: (01244) 528701  
email hawardencustomerservices@alsglobal.com  
Website: www.alsenvironmental.co.uk

ARCADIS  
ECHQ  
34 York Way  
London  
N1 9AB

## CERTIFICATE OF ANALYSIS

|                                     |                  |
|-------------------------------------|------------------|
| <b>Date of report Generation</b>    | 02 December 2021 |
| <b>Customer:</b>                    | ARCADIS          |
| <b>Sample Delivery Group (SDG):</b> | 211126-43        |
| <b>Your Reference:</b>              | LTC              |
| <b>Location</b>                     | Gravesend, Kent  |
| <b>Report No:</b>                   | 624001           |
| <b>Order Number:</b>                |                  |

We received 8 samples on Friday November 26, 2021 and 8 of these samples were scheduled for analysis which was completed on Thursday December 02, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

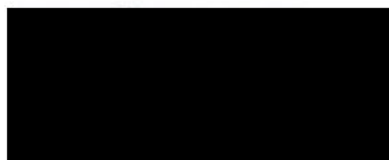
Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

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

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

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

Approved By



Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

SDG: 211126-43  
Client Ref.: LTC

Report Number: 624001  
Location: Gravesend, Kent

Superseded Report

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|------------------|----------------------|----------|-----------|--------------|
| 25408173         | 1                    |          |           | 24/11/2021   |
| 25408174         | 2                    |          |           | 24/11/2021   |
| 25408176         | 3                    |          |           | 24/11/2021   |
| 25408178         | 4                    |          |           | 24/11/2021   |
| 25408179         | 5                    |          |           | 24/11/2021   |
| 25408180         | 6                    |          |           | 24/11/2021   |
| 25408182         | 7                    |          |           | 24/11/2021   |
| 25408183         | 8                    |          |           | 24/11/2021   |

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





|          |   |  |  |                        |     |  |   |   |   |  |  |   |  |  |  |  |  |  |  |  |  |  |  |
|----------|---|--|--|------------------------|-----|--|---|---|---|--|--|---|--|--|--|--|--|--|--|--|--|--|--|
| 25408183 | 8 |  |  | H2SO4 (ALE244)         | UNL |  | X |   |   |  |  |   |  |  |  |  |  |  |  |  |  |  |  |
|          |   |  |  | 500ml Plastic (ALE208) | UNL |  |   |   | X |  |  |   |  |  |  |  |  |  |  |  |  |  |  |
|          |   |  |  | 250ml BOD (ALE212)     | UNL |  |   | X |   |  |  |   |  |  |  |  |  |  |  |  |  |  |  |
|          |   |  |  | H2SO4 (ALE244)         | UNL |  |   |   |   |  |  | X |  |  |  |  |  |  |  |  |  |  |  |
| 25408182 | 7 |  |  | 500ml Plastic (ALE208) | UNL |  | X |   |   |  |  |   |  |  |  |  |  |  |  |  |  |  |  |











# CERTIFICATE OF ANALYSIS

Validated

SDG: 211126-43  
Client Ref.: LTC

Report Number: 624001  
Location: Gravesend, Kent

Superseded Report

## Table of Results - Appendix

| Method No | Reference   | Description   |
|-----------|---|---|
| TM022     | Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872   | Determination of total suspended solids in waters   |
| TM045     | MEWAM BOD5 2nd Ed HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130  | Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids                             |
| TM099     | BS 2690: Part 7:1968 / BS 6068: Part2.11:1984   | Determination of Ammonium in Water Samples using the Kone Analyser                          |
| TM184     | EPA Methods 325.1 & 325 2,  | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers |
| TM195     | Colour and Turbidity of water. Methods for the Examination of Waters and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.                              | Determination of Turbidity in Waters & Associated Matrices                                  |
| TM256     | The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4. | Determination of pH in Water and Leachate using the GLpH pH Meter                           |

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.







# CERTIFICATE OF ANALYSIS

Validated

SDG: 211126-43  
Client Ref.: LTC

Report Number: 624001  
Location: Gravesend, Kent

Superseded Report

## ASSOCIATED AQC DATA

### Ammoniacal Nitrogen

| Component                | Method Code | QC 2583                       |
|--------------------------|-------------|-------------------------------|
| Ammoniacal Nitrogen as N | TM099       | <b>97.6</b><br>91.04 : 105.68 |

### BOD True Total

| Component | Method Code | QC 2590                        | QC 2515                        |
|-----------|-------------|--------------------------------|--------------------------------|
| BOD       | TM045       | <b>97.58</b><br>84.16 : 126.71 | <b>95.17</b><br>72.19 : 121.74 |

### pH Value

| Component | Method Code | QC 2577                        |
|-----------|-------------|--------------------------------|
| pH        | TM256       | <b>100.4</b><br>99.33 : 102.54 |

### Phosphate by Kone (w)

| Component                | Method Code | QC 2574                        | QC 2582                        |
|--------------------------|-------------|--------------------------------|--------------------------------|
| Phosphate (Ortho as PO4) | TM184       | <b>100.4</b><br>96.40 : 109.60 | <b>100.8</b><br>96.40 : 109.60 |

### Suspended Solids

| Component              | Method Code | QC 2500                        | QC 2512                         | QC 2515                        |
|------------------------|-------------|--------------------------------|---------------------------------|--------------------------------|
| Total Suspended Solids | TM022       | <b>98.41</b><br>93.62 : 102.78 | <b>100.53</b><br>93.62 : 102.78 | <b>99.47</b><br>93.62 : 102.78 |

### Turbidity in waters

| Component | Method Code | QC 2574                        | QC 2531                        |
|-----------|-------------|--------------------------------|--------------------------------|
| Turbidity | TM195       | <b>95.25</b><br>83.75 : 121.25 | <b>100.5</b><br>83.75 : 121.25 |



## CERTIFICATE OF ANALYSIS

Validated

**SDG:** 211126-43  
**Client Ref.:** LTC

**Report Number:** 624001  
**Location:** Gravesend, Kent

**Superseded Report**

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis .

The figure detailed is the percentage recovery result for the AQC .

The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control .





# CERTIFICATE OF ANALYSIS

|                                  |                              |                              |
|----------------------------------|------------------------------|------------------------------|
| <b>SDG:</b> 211126 43            | <b>Client Reference:</b> LTC | <b>Report Number:</b> 624001 |
| <b>Location:</b> Gravesend, Kent | <b>Order Number:</b>         | <b>Superseded Report</b>     |

## Appendix

## General

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

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

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

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

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

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

17. Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

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

### 19. Sample Deviations

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

|   |   |
|---|---|
| 1 | Container with Headspace provided for volatiles analysis                    |
| 2 | Incorrect container received  |
| 3 | Deviation from method   |
| 4 | Matrix interference   |
| ♦ | Sample holding time exceeded in laboratory                                  |
| @ | Sample holding time exceeded due to late arrival of instructions or samples |
| § | Sampled on date not provided  |

### 20. Asbestos

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

#### Identification of Asbestos in Bulk Materials & Soils

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

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

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

#### Visual Estimation Of Fibre Content

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

#### Respirable Fibres

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

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

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



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## CERTIFICATE OF ANALYSIS

|                                     |                 |
|-------------------------------------|-----------------|
| <b>Date of report Generation</b>    | 11 January 2022 |
| <b>Customer:</b>                    | ARCADIS         |
| <b>Sample Delivery Group (SDG):</b> | 211218-66       |
| <b>Your Reference:</b>              | LTC             |
| <b>Location</b>                     | Gravesend, Kent |
| <b>Report No:</b>                   | 628981          |
| <b>Order Number:</b>                |                 |

We received 8 samples on Saturday December 18, 2021 and 8 of these samples were scheduled for analysis which was completed on Tuesday January 11, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

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

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

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

By

Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

SDG: 211218-66  
Client Ref.: LTC

Report Number: 628981  
Location: Gravesend, Kent

Superseded Report

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|------------------|----------------------|----------|-----------|--------------|
| 25560917         | LTC 1                |          |           |              |
| 25560918         | LTC 2                |          |           |              |
| 25560919         | LTC 3                |          |           |              |
| 25560920         | LTC 4                |          |           |              |
| 25560921         | LTC 5                |          |           |              |
| 25560922         | LTC 6                |          |           |              |
| 25560924         | LTC 7                |          |           |              |
| 25560925         | LTC 8                |          |           |              |

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





| 25560924 | LTC 8 |  |  | H2SO4 (ALE244)         | UNL |   |   |   |   |   |   |   |  |  |  |
|----------|-------|--|--|------------------------|-----|---|---|---|---|---|---|---|--|--|--|
|          |       |  |  | 500ml Plastic (ALE208) | UNL |   |   |   |   |   |   |   |  |  |  |
| 25560924 | LTC 7 |  |  | 250ml BOD (ALE212)     | UNL |   |   |   |   |   |   |   |  |  |  |
|          |       |  |  | H2SO4 (ALE244)         | UNL |   |   |   |   |   |   |   |  |  |  |
|          |       |  |  | 500ml Plastic (ALE208) | UNL |   |   |   |   |   |   |   |  |  |  |
|          |       |  |  |                        |     | X |   |   |   |   |   |   |  |  |  |
|          |       |  |  |                        |     |   | X |   |   |   |   |   |  |  |  |
|          |       |  |  |                        |     |   |   | X |   |   |   |   |  |  |  |
|          |       |  |  |                        |     |   |   |   | X |   |   |   |  |  |  |
|          |       |  |  |                        |     |   |   |   |   | X |   |   |  |  |  |
|          |       |  |  |                        |     |   |   |   |   |   | X |   |  |  |  |
|          |       |  |  |                        |     |   |   |   |   |   |   | X |  |  |  |









# CERTIFICATE OF ANALYSIS

Validated

SDG: 211218-66  
Client Ref.: LTC

Report Number: 628981  
Location: Gravesend, Kent

Superseded Report

## Table of Results - Appendix

| Method No | Reference  | Description  |
|-----------|--|--|
| TM022     | Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120<br>1981;BS EN 872   | Determination of total suspended solids in waters  |
| TM045     | MEWAM BOD5 2nd Ed HMSO 1988 / Method 5210B, AWWA/APHA,<br>20th Ed., 1999; SCA Blue Book 130  | Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids                                |
| TM099     | BS 2690: Part 7:1968 / BS 6068: Part2.11:1984  | Determination of Ammonium in Water Samples using the Kone Analyser                             |
| TM184     | EPA Methods 325.1 & 325 2,   | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric<br>Analysers |
| TM195     | Colour and Turbidity of water. Methods for the Examination of Waters<br>and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.  | Determination of Turbidity in Waters & Associated Matrices                                     |
| TM256     | The measurement of Electrical Conductivity and the Laboratory<br>determination of pH Value of Natural, Treated and Wastewaters.<br>HMSO, 1978. ISBN 011 751428 4, Standard Methods for the<br>examination of waters and wastewaters 20th Edition, PHA,<br>Washington DC, USA. ISBN 0-87553-235-7 and The Determination<br>of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5. | Determination of pH, EC, TDS and Alkalinity in Aqueous samples                                 |

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.







# CERTIFICATE OF ANALYSIS

Validated

SDG: 211218-66  
Client Ref.: LTC

Report Number: 628981  
Location: Gravesend, Kent

Superseded Report

## ASSOCIATED AQC DATA

### BOD True Total

| Component | Method Code | QC 2549                        | QC 2545                        | QC 2523                        | QC 2525                         |
|-----------|-------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|
| BOD       | TM045       | <b>100.0</b><br>72.19 : 121.74 | <b>73.91</b><br>72.19 : 121.74 | <b>80.68</b><br>72.19 : 121.74 | <b>103.86</b><br>72.19 : 121.74 |

### pH Value

| Component | Method Code | QC 2544                         | QC 2550                         |
|-----------|-------------|---------------------------------|---------------------------------|
| pH        | TM256       | <b>101.07</b><br>99.33 : 102.54 | <b>101.34</b><br>99.33 : 102.54 |

### Phosphate by Kone (w)

| Component                | Method Code | QC 2511                        | QC 2518                       | QC 2550                        |
|--------------------------|-------------|--------------------------------|-------------------------------|--------------------------------|
| Phosphate (Ortho as PO4) | TM184       | <b>100.4</b><br>95.60 : 107.60 | <b>99.6</b><br>95.60 : 107.60 | <b>100.0</b><br>95.60 : 107.60 |

### Suspended Solids

| Component              | Method Code | QC 2509                         | QC 2580                        | QC 2591                        |
|------------------------|-------------|---------------------------------|--------------------------------|--------------------------------|
| Total Suspended Solids | TM022       | <b>101.06</b><br>93.62 : 102.78 | <b>97.61</b><br>93.62 : 102.78 | <b>98.94</b><br>93.62 : 102.78 |

### Turbidity in waters

| Component | Method Code | QC 2596                        | QC 2500                       |
|-----------|-------------|--------------------------------|-------------------------------|
| Turbidity | TM195       | <b>103.0</b><br>83.75 : 121.25 | <b>99.5</b><br>83.75 : 121.25 |

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis.

The figure detailed is the percentage recovery result for the AQC.

The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control.





# CERTIFICATE OF ANALYSIS

|                                  |                              |                              |
|----------------------------------|------------------------------|------------------------------|
| <b>SDG:</b> 211218 66            | <b>Client Reference:</b> LTC | <b>Report Number:</b> 628981 |
| <b>Location:</b> Gravesend, Kent | <b>Order Number:</b>         | <b>Superseded Report</b>     |

## Appendix

## General

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

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

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

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

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

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

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

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

### 19. Sample Deviations

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

|   |   |
|---|---|
| 1 | Container with Headspace provided for volatiles analysis                    |
| 2 | Incorrect container received  |
| 3 | Deviation from method   |
| 4 | Matrix interference   |
| ♦ | Sample holding time exceeded in laboratory                                  |
| @ | Sample holding time exceeded due to late arrival of instructions or samples |
| § | Sampled on date not provided  |

### 20. Asbestos

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

#### Identification of Asbestos in Bulk Materials & Soils

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

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

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

#### Visual Estimation Of Fibre Content

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

#### Respirable Fibres

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

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

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



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London  
N1 9AB

## CERTIFICATE OF ANALYSIS

|                                     |                 |
|-------------------------------------|-----------------|
| <b>Date of report Generation</b>    | 29 January 2022 |
| <b>Customer:</b>                    | ARCADIS         |
| <b>Sample Delivery Group (SDG):</b> | 220121-52       |
| <b>Your Reference:</b>              | LTC             |
| <b>Location</b>                     | Gravesend, Kent |
| <b>Report No:</b>                   | 631344          |
| <b>Order Number:</b>                |                 |

We received 7 samples on Friday January 21, 2022 and 7 of these samples were scheduled for analysis which was completed on Saturday January 29, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

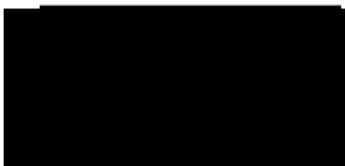
Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

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

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

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

Approved By



Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

SDG: 220121-52  
Client Ref.: LTC

Report Number: 631344  
Location: Gravesend, Kent

Superseded Report

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|------------------|----------------------|----------|-----------|--------------|
| 25680326         | LTC 2                |          |           |              |
| 25680327         | LTC 3                |          |           |              |
| 25680328         | LTC 4                |          |           |              |
| 25680329         | LTC 5                |          |           |              |
| 25680330         | LTC 6                |          |           |              |
| 25680331         | LTC 7                |          |           |              |
| 25680332         | LTC 8                |          |           |              |

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



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 220121-52  
**Client Ref.:** LTC

**Report Number:** 631344  
**Location:** Gravesend, Kent

**Superseded Report**

| Results Legend  | Lab Sample No(s) | Customer Sample Reference | AGS Reference | Depth (m) | Container          |                        |                        |                    |                        |                        |                    | Sample Type    |     |
|---|------------------|---------------------------|---------------|-----------|--------------------|------------------------|------------------------|--------------------|------------------------|------------------------|--------------------|----------------|-----|
|   |                  |                           |               |           | 250ml BOD (ALE212) | 500ml Plastic (ALE208) | 250ml BOD (ALE212)     | H2SO4 (ALE244)     | 500ml Plastic (ALE208) | 250ml BOD (ALE212)     | H2SO4 (ALE244)     |                |     |
| <b>X</b> Test<br><br><b>N</b> No Determination Possible<br><br>Sample Types -<br>S - Soil/Solid<br>UNS - Unspecified Solid<br>GW - Ground Water<br>SW - Surface Water<br>LE - Land Leachate<br>PL - Prepared Leachate<br>PR - Process Water<br>SA - Saline Water<br>TE - Trade Effluent<br>TS - Treated Sewage<br>US - Untreated Sewage<br>RE - Recreational Water<br>DW - Drinking Water Non-regulatory<br>UNL - Unspecified Liquid<br>SL - Sludge<br>G - Gas<br>OTH - Other | 25680326         | LTC 2                     |               |           |                    | 250ml BOD (ALE212)     | 500ml Plastic (ALE208) | 250ml BOD (ALE212) | H2SO4 (ALE244)         | 500ml Plastic (ALE208) | 250ml BOD (ALE212) | H2SO4 (ALE244) | UNL |
|   | 25680327         | LTC 3                     |               |           |                    | X                      |                        |                    |                        |                        |                    |                | UNL |
|   | 25680328         | LTC 4                     |               |           |                    | X                      |                        |                    |                        |                        |                    |                | UNL |
|   | 25680329         | LTC 5                     |               |           |                    | X                      |                        |                    |                        |                        |                    |                | UNL |
|   | 25680330         | LTC 6                     |               |           |                    | X                      |                        |                    |                        |                        |                    |                | UNL |
|   | 25680331         | LTC 7                     |               |           |                    | X                      |                        |                    |                        |                        |                    |                | UNL |
|   | 25680332         | LTC 8                     |               |           |                    | X                      |                        |                    |                        |                        |                    |                | UNL |
| Ammoniacal Nitrogen   | All              | NDPs: 0<br>Tests: 7       |               |           |                    | X                      |                        |                    |                        |                        |                    |                |     |
| BOD True Total  | All              | NDPs: 0<br>Tests: 7       | X             |           | X                  |                        |                        | X                  |                        | X                      |                    |                | X   |
| pH Value  | All              | NDPs: 0<br>Tests: 7       |               | X         |                    | X                      |                        | X                  |                        | X                      |                    | X              |     |
| Phosphate by Kone (w)   | All              | NDPs: 0<br>Tests: 7       |               | X         |                    | X                      |                        | X                  |                        | X                      |                    | X              |     |
| Suspended Solids  | All              | NDPs: 0<br>Tests: 7       |               | X         |                    | X                      |                        | X                  |                        | X                      |                    | X              |     |
| Turbidity in waters   | All              | NDPs: 0<br>Tests: 7       |               | X         |                    | X                      |                        | X                  |                        | X                      |                    | X              |     |













# CERTIFICATE OF ANALYSIS

Validated

SDG: 220121-52  
Client Ref.: LTC

Report Number: 631344  
Location: Gravesend, Kent

Superseded Report

## Table of Results - Appendix

| Method No | Reference  | Description  |
|-----------|--|--|
| TM022     | Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120<br>1981;BS EN 872   | Determination of total suspended solids in waters  |
| TM045     | MEWAM BOD5 2nd Ed HMSO 1988 / Method 5210B, AWWA/APHA,<br>20th Ed., 1999; SCA Blue Book 130  | Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids                                |
| TM099     | BS 2690: Part 7:1968 / BS 6068: Part2.11:1984  | Determination of Ammonium in Water Samples using the Kone Analyser                             |
| TM184     | EPA Methods 325.1 & 325 2,   | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric<br>Analysers |
| TM195     | Colour and Turbidity of water. Methods for the Examination of Waters<br>and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.  | Determination of Turbidity in Waters & Associated Matrices                                     |
| TM256     | The measurement of Electrical Conductivity and the Laboratory<br>determination of pH Value of Natural, Treated and Wastewaters.<br>HMSO, 1978. ISBN 011 751428 4, Standard Methods for the<br>examination of waters and wastewaters 20th Edition, PHA,<br>Washington DC, USA. ISBN 0-87553-235-7 and The Determination<br>of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5. | Determination of pH, EC, TDS and Alkalinity in Aqueous samples                                 |

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



# CERTIFICATE OF ANALYSIS

Validated

SDG: 220121-52  
Client Ref.: LTC

Report Number: 631344  
Location: Gravesend, Kent

Superseded Report

## Test Completion Dates

| Lab Sample No(s)      | 25680326        | 25680327        | 25680328        | 25680329        | 25680330        | 25680331        | 25680332        |
|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Customer Sample Ref.  | LTC 2           | LTC 3           | LTC 4           | LTC 5           | LTC 6           | LTC 7           | LTC 8           |
| AGS Ref.              |                 |                 |                 |                 |                 |                 |                 |
| Depth                 |                 |                 |                 |                 |                 |                 |                 |
| Type                  | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq |
| Ammoniacal Nitrogen   | 27-Jan-2022     | 27-Jan-2022     | 27-Jan-2022     | 27-Jan-2022     | 28-Jan-2022     | 28-Jan-2022     | 27-Jan-2022     |
| BOD True Total        | 29-Jan-2022     | 29-Jan-2022     | 29-Jan-2022     | 29-Jan-2022     | 29-Jan-2022     | 29-Jan-2022     | 29-Jan-2022     |
| pH Value              | 26-Jan-2022     | 26-Jan-2022     | 26-Jan-2022     | 26-Jan-2022     | 27-Jan-2022     | 27-Jan-2022     | 26-Jan-2022     |
| Phosphate by Kone (w) | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     |
| Suspended Solids      | 25 Jan 2022     | 24 Jan 2022     | 24 Jan 2022     | 24 Jan 2022     | 24 Jan 2022     | 24 Jan 2022     | 24 Jan 2022     |
| Turbidity in waters   | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     | 24-Jan-2022     |



# CERTIFICATE OF ANALYSIS

Validated

SDG: 220121-52  
Client Ref.: LTC

Report Number: 631344  
Location: Gravesend, Kent

Superseded Report

## ASSOCIATED AQC DATA

### Ammoniacal Nitrogen

| Component                | Method Code | QC 2573                        | QC 2588                        |
|--------------------------|-------------|--------------------------------|--------------------------------|
| Ammoniacal Nitrogen as N | TM099       | <b>101.2</b><br>97.60 : 105.28 | <b>100.4</b><br>97.60 : 105.28 |

### BOD True Total

| Component | Method Code | QC 2529                         |
|-----------|-------------|---------------------------------|
| BOD       | TM045       | <b>115.46</b><br>78.41 : 124.93 |

### pH Value

| Component | Method Code | QC 2541                         | QC 2544                         | QC 2542                        | QC 2545                         |
|-----------|-------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|
| pH        | TM256       | <b>101.87</b><br>99.33 : 102.54 | <b>102.01</b><br>99.33 : 102.54 | <b>101.6</b><br>99.33 : 102.54 | <b>101.74</b><br>99.33 : 102.54 |

### Phosphate by Kone (w)

| Component                | Method Code | QC 2573                        | QC 2583                        |
|--------------------------|-------------|--------------------------------|--------------------------------|
| Phosphate (Ortho as PO4) | TM184       | <b>102.0</b><br>95.60 : 107.60 | <b>102.4</b><br>95.60 : 107.60 |

### Suspended Solids

| Component              | Method Code | QC 2569                        | QC 2584                        | QC 2504                        |
|------------------------|-------------|--------------------------------|--------------------------------|--------------------------------|
| Total Suspended Solids | TM022       | <b>96.55</b><br>93.62 : 102.78 | <b>94.96</b><br>93.62 : 102.78 | <b>97.88</b><br>93.62 : 102.78 |

### Turbidity in waters

| Component | Method Code | QC 2576                        | QC 2599                        |
|-----------|-------------|--------------------------------|--------------------------------|
| Turbidity | TM195       | <b>92.75</b><br>83.75 : 121.25 | <b>102.5</b><br>83.75 : 121.25 |





## CERTIFICATE OF ANALYSIS

Validated

**SDG:** 220121-52  
**Client Ref.:** LTC

**Report Number:** 631344  
**Location:** Gravesend, Kent

**Superseded Report**

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis .

The figure detailed is the percentage recovery result for the AQC .

The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control .



# CERTIFICATE OF ANALYSIS

SDG: 220121 52 Client Reference: LTC Report Number: 631344  
 Location: Gravesend, Kent Order Number: Superseded Report

## Appendix

## General

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

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

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

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

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

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

17. Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

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

### 19. Sample Deviations

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

|   |   |
|---|---|
| 1 | Container with Headspace provided for volatiles analysis                    |
| 2 | Incorrect container received  |
| 3 | Deviation from method   |
| 4 | Matrix interference   |
| ◆ | Sample holding time exceeded in laboratory                                  |
| @ | Sample holding time exceeded due to late arrival of instructions or samples |
| § | Sampled on date not provided  |

### 20. Asbestos

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

#### Identification of Asbestos in Bulk Materials & Soils

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

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

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

#### Visual Estimation Of Fibre Content

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

#### Respirable Fibres

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

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

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



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N1 9AB



## CERTIFICATE OF ANALYSIS

|                                     |                 |
|-------------------------------------|-----------------|
| <b>Date of report Generation</b>    | 11 March 2022   |
| <b>Customer:</b>                    | ARCADIS         |
| <b>Sample Delivery Group (SDG):</b> | 220304-56       |
| <b>Your Reference:</b>              | LTC             |
| <b>Location</b>                     | Gravesend, Kent |
| <b>Report No:</b>                   | 637236          |
| <b>Order Number:</b>                |                 |

We received 7 samples on Friday March 04, 2022 and 7 of these samples were scheduled for analysis which was completed on Friday March 11, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

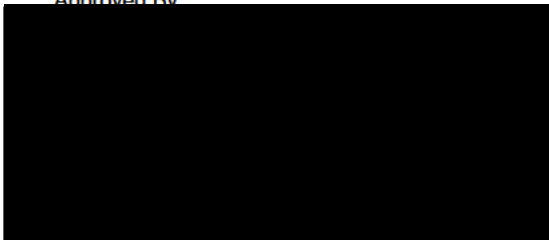
Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

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

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

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

Approved By



Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

SDG: 220304-56  
Client Ref.: LTC

Report Number: 637236  
Location: Gravesend, Kent

Superseded Report

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|------------------|----------------------|----------|-----------|--------------|
| 25915428         | LTC 2                |          |           |              |
| 25915430         | LTC 3                |          |           |              |
| 25915431         | LTC 4                |          |           |              |
| 25915432         | LTC 5                |          |           |              |
| 25915434         | LTC 6                |          |           |              |
| 25915436         | LTC 7                |          |           |              |
| 25915437         | LTC 8                |          |           |              |

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













# CERTIFICATE OF ANALYSIS

Validated

SDG: 220304-56  
Client Ref.: LTC

Report Number: 637236  
Location: Gravesend, Kent

Superseded Report

## Table of Results - Appendix

| Method No | Reference  | Description  |
|-----------|--|--|
| TM022     | Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120<br>1981;BS EN 872   | Determination of total suspended solids in waters  |
| TM045     | MEWAM BOD5 2nd Ed HMSO 1988 / Method 5210B, AWWA/APHA,<br>20th Ed., 1999; SCA Blue Book 130  | Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids                                |
| TM099     | BS 2690: Part 7:1968 / BS 6068: Part2.11:1984  | Determination of Ammonium in Water Samples using the Kone Analyser                             |
| TM184     | EPA Methods 325.1 & 325 2,   | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric<br>Analysers |
| TM195     | Colour and Turbidity of water. Methods for the Examination of Waters<br>and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.  | Determination of Turbidity in Waters & Associated Matrices                                     |
| TM256     | The measurement of Electrical Conductivity and the Laboratory<br>determination of pH Value of Natural, Treated and Wastewaters.<br>HMSO, 1978. ISBN 011 751428 4, Standard Methods for the<br>examination of waters and wastewaters 20th Edition, PHA,<br>Washington DC, USA. ISBN 0-87553-235-7 and The Determination<br>of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5. | Determination of pH, EC, TDS and Alkalinity in Aqueous samples                                 |

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.





# CERTIFICATE OF ANALYSIS

Validated

SDG: 220304-56  
Client Ref.: LTC

Report Number: 637236  
Location: Gravesend, Kent

Superseded Report

## Test Completion Dates

| Lab Sample No(s)     | 25915428        | 25915430        | 25915431        | 25915432        | 25915434        | 25915436        | 25915437        |
|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Customer Sample Ref. | LTC 2           | LTC 3           | LTC 4           | LTC 5           | LTC 6           | LTC 7           | LTC 8           |
| AGS Ref.             |                 |                 |                 |                 |                 |                 |                 |
| Depth                |                 |                 |                 |                 |                 |                 |                 |
| Type                 | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq |

|                       |             |             |             |             |             |             |             |
|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Ammoniacal Nitrogen   | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 |
| Anions by Kone (w)    | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 |
| BOD True Total        | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 |
| Nitrite by Kone (w)   | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 |
| pH Value              | 08 Mar 2022 | 08 Mar 2022 | 08 Mar 2022 | 08 Mar 2022 | 08 Mar 2022 | 08 Mar 2022 | 08 Mar 2022 |
| Phosphate by Kone (w) | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 |
| Suspended Solids      | 11-Mar-2022 | 11-Mar-2022 | 11-Mar-2022 | 09-Mar-2022 | 11-Mar-2022 | 09-Mar-2022 | 11-Mar-2022 |
| Turbidity in waters   | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 11-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 | 10-Mar-2022 |



# CERTIFICATE OF ANALYSIS

Validated

SDG: 220304-56  
Client Ref.: LTC

Report Number: 637236  
Location: Gravesend, Kent

Superseded Report

## ASSOCIATED AQC DATA

### Ammoniacal Nitrogen

| Component                | Method Code | QC 2542                       |
|--------------------------|-------------|-------------------------------|
| Ammoniacal Nitrogen as N | TM099       | <b>99.6</b><br>93.14 : 108.60 |

### Anions by Kone (w)

| Component          | Method Code | QC 2501                        |
|--------------------|-------------|--------------------------------|
| Sulphate (soluble) | TM184       | <b>102.8</b><br>91.99 : 109.30 |
| TON as NO3         | TM184       | <b>99.5</b><br>90.35 : 108.35  |

### BOD True Total

| Component | Method Code | QC 2550                        | QC 2550                        |
|-----------|-------------|--------------------------------|--------------------------------|
| BOD       | TM045       | <b>88.89</b><br>72.19 : 121.74 | <b>98.55</b><br>79.37 : 124.56 |

### pH Value

| Component | Method Code | QC 2560                         | QC 2563                        |
|-----------|-------------|---------------------------------|--------------------------------|
| pH        | TM256       | <b>100.27</b><br>99.20 : 102.41 | <b>100.4</b><br>99.20 : 102.41 |

### Phosphate by Kone (w)

| Component                | Method Code | QC 2517                        | QC 2522                        |
|--------------------------|-------------|--------------------------------|--------------------------------|
| Phosphate (Ortho as PO4) | TM184       | <b>103.6</b><br>95.60 : 107.60 | <b>104.0</b><br>95.60 : 107.60 |

### Suspended Solids

| Component              | Method Code | QC 2550                        | QC 2556                         | QC 2563                        | QC 2593                        |
|------------------------|-------------|--------------------------------|---------------------------------|--------------------------------|--------------------------------|
| Total Suspended Solids | TM022       | <b>98.14</b><br>94.43 : 102.78 | <b>101.06</b><br>94.43 : 102.78 | <b>99.47</b><br>94.43 : 102.78 | <b>97.61</b><br>94.43 : 102.78 |







# CERTIFICATE OF ANALYSIS

SDG: 220304 56 Client Reference: LTC Report Number: 637236  
 Location: Gravesend, Kent Order Number: Superseded Report

## Appendix

## General

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

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

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

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

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

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

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

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

### 19. Sample Deviations

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

|   |   |
|---|---|
| 1 | Container with HeadSpace provided for volatiles analysis                    |
| 2 | Incorrect container received  |
| 3 | Deviation from method   |
| 4 | Matrix interference   |
| ◆ | Sample holding time exceeded in laboratory                                  |
| @ | Sample holding time exceeded due to late arrival of instructions or samples |
| § | Sampled on date not provided  |

### 20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

#### Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

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

#### Visual Estimation Of Fibre Content

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

#### Respirable Fibres

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

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

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



Unit 7-8 Hawarden Business Park  
Manor Road (off Manor Lane)  
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ARCADIS  
ECHQ  
34 York Way  
London  
N1 9AB

## CERTIFICATE OF ANALYSIS

|                                     |                 |
|-------------------------------------|-----------------|
| <b>Date of report Generation</b>    | 09 May 2022     |
| <b>Customer:</b>                    | ARCADIS         |
| <b>Sample Delivery Group (SDG):</b> | 220429-39       |
| <b>Your Reference:</b>              | LTC             |
| <b>Location</b>                     | Gravesend, Kent |
| <b>Report No:</b>                   | 645220          |
| <b>Order Number:</b>                |                 |

We received 6 samples on Friday April 29, 2022 and 6 of these samples were scheduled for analysis which was completed on Monday May 09, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

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

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

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

Approved By

Operations Manager



# CERTIFICATE OF ANALYSIS

Validated

SDG: 220429-39  
Client Ref.: LTC

Report Number: 645220  
Location: Gravesend, Kent

Superseded Report

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|------------------|----------------------|----------|-----------|--------------|
| 26203636         | LTC2                 |          |           |              |
| 26203638         | LTC3                 |          |           |              |
| 26203639         | LTC5                 |          |           |              |
| 26203640         | LTC6                 |          |           |              |
| 26203641         | LTC7                 |          |           |              |
| 26203643         | LTC8                 |          |           |              |

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





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 220429-39  
**Client Ref.:** LTC

**Report Number:** 645220  
**Location:** Gravesend, Kent

**Superseded Report**

| Results Legend  | Lab Sample No(s) | Customer Sample Reference | AGS Reference | Depth (m) | Container  |  |  |  |  |  | Sample Type |   |  |  |   |  |  |  |   |
|---|------------------|---------------------------|---------------|-----------|--|--|--|--|--|--|-------------|---|--|--|---|--|--|--|---|
|   |                  |                           |               |           | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) |             |   |  |  |   |  |  |  |   |
| <b>X</b> Test<br><br><b>N</b> No Determination Possible<br><br>Sample Types -<br>S - Soil/Solid<br>UNS - Unspecified Solid<br>GW - Ground Water<br>SW - Surface Water<br>LE - Land Leachate<br>PL - Prepared Leachate<br>PR - Process Water<br>SA - Saline Water<br>TE - Trade Effluent<br>TS - Treated Sewage<br>US - Untreated Sewage<br>RE - Recreational Water<br>DW - Drinking Water Non-regulatory<br>UNL - Unspecified Liquid<br>SL - Sludge<br>G - Gas<br>OTH - Other | 26203636         | LTC2                      |               |           | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | UNL  |  |  |  |  |             |   |  |  |   |  |  |  |   |
|   | 26203638         | LTC3                      |               |           | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | UNL  |  |  |  |  |             |   |  |  |   |  |  |  |   |
|   | 26203639         | LTC5                      |               |           | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | UNL  |  |  |  |  |             |   |  |  |   |  |  |  |   |
|   | 26203640         | LTC6                      |               |           | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | UNL  |  |  |  |  |             |   |  |  |   |  |  |  |   |
|   | 26203641         | LTC7                      |               |           | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | UNL  |  |  |  |  |             |   |  |  |   |  |  |  |   |
|   | 26203643         | LTC8                      |               |           | H2SO4 (ALE244)<br>500ml Plastic (ALE208)<br>250ml BOD (ALE212) | UNL  |  |  |  |  |             |   |  |  |   |  |  |  |   |
| Ammoniacal Nitrogen   | All              | NDPs: 0<br>Tests: 6       |               |           |  |  | X  |  | X  |  |             | X |  |  | X |  |  |  | X |
| Anions by Kone (w)  | All              | NDPs: 0<br>Tests: 6       |               |           |  |  | X  |  | X  |  |             | X |  |  | X |  |  |  | X |
| BOD True Total  | All              | NDPs: 0<br>Tests: 6       |               |           |  | X  |  | X  |  | X  |             | X |  |  | X |  |  |  | X |
| pH Value  | All              | NDPs: 0<br>Tests: 6       |               |           |  | X  |  | X  |  | X  |             | X |  |  | X |  |  |  | X |
| Phosphate by Kone (w)   | All              | NDPs: 0<br>Tests: 6       |               |           |  | X  |  | X  |  | X  |             | X |  |  | X |  |  |  | X |
| Suspended Solids  | All              | NDPs: 0<br>Tests: 6       |               |           |  | X  |  | X  |  | X  |             | X |  |  | X |  |  |  | X |
| Turbidity in waters   | All              | NDPs: 0<br>Tests: 6       |               |           |  | X  |  | X  |  | X  |             | X |  |  | X |  |  |  | X |





# CERTIFICATE OF ANALYSIS

Validated

SDG: 220429-39  
Client Ref.: LTC

Report Number: 645220  
Location: Gravesend, Kent

Superseded Report

## Table of Results - Appendix

| Method No | Reference  | Description  |
|-----------|--|--|
| TM022     | Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120<br>1981;BS EN 872   | Determination of total suspended solids in waters  |
| TM045     | MEWAM BOD5 2nd Ed HMSO 1988 / Method 5210B, AWWA/APHA,<br>20th Ed., 1999; SCA Blue Book 130  | Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids                                |
| TM099     | BS 2690: Part 7:1968 / BS 6068: Part2.11:1984  | Determination of Ammonium in Water Samples using the Kone Analyser                             |
| TM184     | EPA Methods 325.1 & 325 2,   | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric<br>Analysers |
| TM195     | Colour and Turbidity of water. Methods for the Examination of Waters<br>and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.  | Determination of Turbidity in Waters & Associated Matrices                                     |
| TM256     | The measurement of Electrical Conductivity and the Laboratory<br>determination of pH Value of Natural, Treated and Wastewaters.<br>HMSO, 1978. ISBN 011 751428 4, Standard Methods for the<br>examination of waters and wastewaters 20th Edition, PHA,<br>Washington DC, USA. ISBN 0-87553-235-7 and The Determination<br>of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5. | Determination of pH, EC, TDS and Alkalinity in Aqueous samples                                 |

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.





**CERTIFICATE OF ANALYSIS**

Validated

**SDG:** 220429-39      **Report Number:** 645220      **Superseded Report**  
**Client Ref.:** LTC      **Location:** Gravesend, Kent

**Test Completion Dates**

| Lab Sample No(s)     | 26203636        | 26203638        | 26203639        | 26203640        | 26203641        | 26203643        |
|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Customer Sample Ref. | LTC2            | LTC3            | LTC5            | LTC6            | LTC7            | LTC8            |
| AGS Ref.             |                 |                 |                 |                 |                 |                 |
| Depth                |                 |                 |                 |                 |                 |                 |
| Type                 | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq |

|                       |             |             |             |             |             |             |
|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Ammoniacal Nitrogen   | 05-May-2022 | 05-May-2022 | 05-May-2022 | 05-May-2022 | 05-May-2022 | 05-May-2022 |
| Anions by Kone (w)    | 03-May-2022 | 03-May-2022 | 03-May-2022 | 03-May-2022 | 03-May-2022 | 03-May-2022 |
| BOD True Total        | 05-May-2022 | 05-May-2022 | 05-May-2022 | 05-May-2022 | 05-May-2022 | 05-May-2022 |
| Nitrite by Kone (w)   | 30-Apr-2022 | 30-Apr-2022 | 30-Apr-2022 | 30-Apr-2022 | 30-Apr-2022 | 30-Apr-2022 |
| pH Value              | 04 May 2022 | 04 May 2022 | 05 May 2022 | 05 May 2022 | 05 May 2022 | 04 May 2022 |
| Phosphate by Kone (w) | 30-Apr-2022 | 30-Apr-2022 | 30-Apr-2022 | 30-Apr-2022 | 30-Apr-2022 | 30-Apr-2022 |
| Suspended Solids      | 03-May-2022 | 03-May-2022 | 03-May-2022 | 03-May-2022 | 03-May-2022 | 03-May-2022 |
| Turbidity in waters   | 04-May-2022 | 09-May-2022 | 09-May-2022 | 04-May-2022 | 04-May-2022 | 04-May-2022 |



# CERTIFICATE OF ANALYSIS

Validated

SDG: 220429-39  
Client Ref.: LTC

Report Number: 645220  
Location: Gravesend, Kent

Superseded Report

## ASSOCIATED AQC DATA

### Ammoniacal Nitrogen

| Component                | Method Code | QC 2676                       | QC 2694                       |
|--------------------------|-------------|-------------------------------|-------------------------------|
| Ammoniacal Nitrogen as N | TM099       | <b>96.4</b><br>90.84 : 105.72 | <b>97.2</b><br>90.84 : 105.72 |

### Anions by Kone (w)

| Component          | Method Code | QC 2613                        | QC 2636                        |
|--------------------|-------------|--------------------------------|--------------------------------|
| Sulphate (soluble) | TM184       |                                | <b>98.8</b><br>91.99 : 109.30  |
| TON as NO3         | TM184       | <b>103.0</b><br>90.35 : 108.35 | <b>101.5</b><br>90.35 : 108.35 |

### BOD True Total

| Component | Method Code | QC 2666                        | QC 2613                         | QC 2640                       |
|-----------|-------------|--------------------------------|---------------------------------|-------------------------------|
| BOD       | TM045       | <b>95.65</b><br>72.19 : 121.74 | <b>104.35</b><br>79.37 : 124.56 | <b>97.1</b><br>72.19 : 121.74 |

### pH Value

| Component | Method Code | QC 2681                        | QC 2690                        | QC 2683                        | QC 2686                         |
|-----------|-------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|
| pH        | TM256       | <b>100.4</b><br>99.20 : 102.41 | <b>100.4</b><br>99.20 : 102.41 | <b>101.2</b><br>99.20 : 102.41 | <b>101.34</b><br>99.20 : 102.41 |

### Phosphate by Kone (w)

| Component                | Method Code | QC 2621                        |
|--------------------------|-------------|--------------------------------|
| Phosphate (Ortho as PO4) | TM184       | <b>102.8</b><br>95.60 : 107.60 |

### Suspended Solids

| Component              | Method Code | QC 2617                        | QC 2621                         |
|------------------------|-------------|--------------------------------|---------------------------------|
| Total Suspended Solids | TM022       | <b>99.73</b><br>94.43 : 102.78 | <b>101.86</b><br>94.43 : 102.78 |







# CERTIFICATE OF ANALYSIS

SDG: 220429 39  
Client Ref: LTC

Report Number: 645220  
Location: Gravesend, Kent

Superseded Report

## Appendix

## General

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

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

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

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

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

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

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

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

### 19. Sample Deviations

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

|   |   |
|---|---|
| 1 | Container with Headspace provided for volatiles analysis                    |
| 2 | Incorrect container received  |
| 3 | Deviation from method   |
| 4 | Matrix interference   |
| ♦ | Sample holding time exceeded in laboratory                                  |
| @ | Sample holding time exceeded due to late arrival of instructions or samples |
| § | Sampled on date not provided  |

### 20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

#### Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

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

#### Visual Estimation Of Fibre Content

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

#### Respirable Fibres

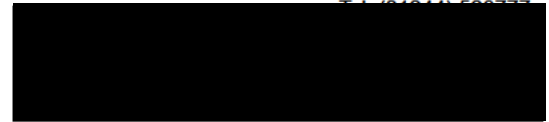
Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

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

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



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ECHQ  
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London  
N1 9AB



## CERTIFICATE OF ANALYSIS

|                                    |                 |
|------------------------------------|-----------------|
| <b>Date of report Generation:</b>  | 07 July 2022    |
| <b>Customer:</b>                   | ARCADIS         |
| <b>Sample Delivery Group (SDG)</b> | 220701-34       |
| <b>Your Reference:</b>             | LTC             |
| <b>Location:</b>                   | Gravesend, Kent |
| <b>Report No</b>                   | 653551          |
| <b>Order Number:</b>               |                 |

We received 6 samples on Friday July 01, 2022 and 6 of these samples were scheduled for analysis which was completed on Thursday July 07, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

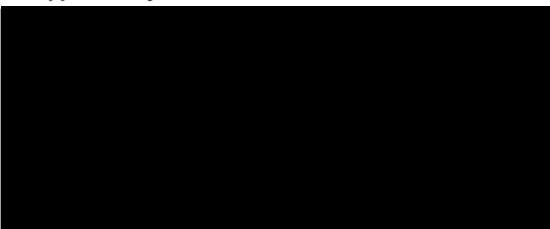
Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

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

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

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

Approved By



Operations Manager



# CERTIFICATE OF ANALYSIS

Validated

SDG: 220701-34  
Client Ref.: LTC

Report Number: 653551  
Location: Gravesend, Kent

Superseded Report

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|------------------|----------------------|----------|-----------|--------------|
| 26520193         | LTC 2                |          |           |              |
| 26520192         | LTC 3                |          |           |              |
| 26520191         | LTC 5                |          |           |              |
| 26520190         | LTC 6                |          |           |              |
| 26520194         | LTC 7                |          |           |              |
| 26520195         | LTC 8                |          |           |              |

Only received sample which have had analysis scheduled will be shown on the following page





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 220701-34  
**Client Ref.:** LTC

**Report Number:** 653551  
**Location:** Gravesend, Kent

**Superseded Report**

| Results Legend   | Lab Sample No(s) | Customer Sample Reference | AGS Reference | Depth (m) | Container | Sample Type |                |                        |                    |                |                        |                    |                |                        |                    |                |                        |                    |     |
|--|------------------|---------------------------|---------------|-----------|-----------|-------------|----------------|------------------------|--------------------|----------------|------------------------|--------------------|----------------|------------------------|--------------------|----------------|------------------------|--------------------|-----|
|  |                  |                           |               |           |           |             | 26620193       | 26620192               | 26620191           | 26620190       | 26620194               | 26620195           | LTC 2          | LTC 3                  | LTC 5              | LTC 6          | LTC 7                  | LTC 8              |     |
| <p><b>X</b> Test</p> <p><b>N</b> No Determination Possible</p> <p>Sample Types -<br/>           S - Soil/Solid<br/>           UNS - Unspecified Solid<br/>           GW - Ground Water<br/>           SW - Surface Water<br/>           LE - Land Leachate<br/>           PL - Prepared Leachate<br/>           PR - Process Water<br/>           SA - Saline Water<br/>           TE - Trade Effluent<br/>           TS - Treated Sewage<br/>           US - Untreated Sewage<br/>           RE - Recreational Water<br/>           DW - Drinking Water Non-regulatory<br/>           UNL - Unspecified Liquid<br/>           SL - Sludge<br/>           G - Gas<br/>           OTH - Other</p> |                  |                           |               |           |           |             | H2SO4 (ALE244) | 500ml Plastic (ALE208) | 250ml BOD (ALE212) | H2SO4 (ALE244) | 500ml Plastic (ALE208) | 250ml BOD (ALE212) | H2SO4 (ALE244) | 500ml Plastic (ALE208) | 250ml BOD (ALE212) | H2SO4 (ALE244) | 500ml Plastic (ALE208) | 250ml BOD (ALE212) |     |
|  |                  |                           |               |           |           | UNL         | UNL            | UNL                    | UNL                | UNL            | UNL                    | UNL                | UNL            | UNL                    | UNL                | UNL            | UNL                    | UNL                | UNL |
| Ammoniacal Nitrogen  | All              | NDPs: 0<br>Tests: 6       |               |           |           |             |                | X                      |                    | X              |                        | X                  |                | X                      |                    | X              |                        | X                  |     |
| Anions by Kone (w)   | All              | NDPs: 0<br>Tests: 6       |               |           |           |             | X              |                        | X                  |                | X                      |                    | X              |                        | X                  |                | X                      |                    | X   |
| BOD True Total   | All              | NDPs: 0<br>Tests: 6       |               |           |           |             | X              |                        | X                  |                | X                      |                    | X              |                        | X                  |                | X                      |                    | X   |
| pH Value   | All              | NDPs: 0<br>Tests: 6       |               |           |           |             | X              |                        | X                  |                | X                      |                    | X              |                        | X                  |                | X                      |                    | X   |
| Phosphate by Kone (w)  | All              | NDPs: 0<br>Tests: 6       |               |           |           |             | X              |                        | X                  |                | X                      |                    | X              |                        | X                  |                | X                      |                    | X   |
| Suspended Solids   | All              | NDPs: 0<br>Tests: 6       |               |           |           |             | X              |                        | X                  |                | X                      |                    | X              |                        | X                  |                | X                      |                    | X   |
| Turbidity in waters  | All              | NDPs: 0<br>Tests: 6       |               |           |           |             | X              |                        | X                  |                | X                      |                    | X              |                        | X                  |                | X                      |                    | X   |





# CERTIFICATE OF ANALYSIS

Validated

SDG: 220701-34  
Client Ref.: LTC

Report Number: 653551  
Location: Gravesend, Kent

Superseded Report

## Table of Results - Appendix

| Method No | Reference  | Description  |
|-----------|--|--|
| TM022     | Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120<br>1981;BS EN 872   | Determination of total suspended solids in waters  |
| TM045     | MEWAM BOD5 2nd Ed HMSO 1988 / Method 5210B, AWWA/APHA,<br>20th Ed., 1999; SCA Blue Book 130  | Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids                                |
| TM099     | BS 2690: Part 7:1968 / BS 6068: Part2.11:1984  | Determination of Ammonium in Water Samples using the Kone Analyser                             |
| TM184     | EPA Methods 325.1 & 325 2,   | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric<br>Analysers |
| TM195     | Colour and Turbidity of water. Methods for the Examination of Waters<br>and Associated Materials. HMSO, 1981, ISBN 0 11 751955 3.  | Determination of Turbidity in Waters & Associated Matrices                                     |
| TM256     | The measurement of Electrical Conductivity and the Laboratory<br>determination of pH Value of Natural, Treated and Wastewaters.<br>HMSO, 1978. ISBN 011 751428 4, Standard Methods for the<br>examination of waters and wastewaters 20th Edition, PHA,<br>Washington DC, USA. ISBN 0-87553-235-7 and The Determination<br>of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5. | Determination of pH, EC, TDS and Alkalinity in Aqueous samples                                 |

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM).





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## Test Completion Dates

| Lab Sample No(s)      | 26520193        | 26520192        | 26520191        | 26520190        | 26520194        | 26520195        |
|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Customer Sample Ref.  | LTC 2           | LTC 3           | LTC 5           | LTC 6           | LTC 7           | LTC 8           |
| AGS Ref.              |                 |                 |                 |                 |                 |                 |
| Depth                 |                 |                 |                 |                 |                 |                 |
| Type                  | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq | Unspecified Liq |
| Ammoniacal Nitrogen   | 07-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     |
| Anions by Kone (w)    | 07-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     |
| BOD True Total        | 07-Jul-2022     | 06-Jul-2022     | 07-Jul-2022     | 06-Jul-2022     | 06-Jul-2022     | 07-Jul-2022     |
| Nitrite by Kone (w)   | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     |
| pH Value              | 06-Jul-2022     | 06-Jul-2022     | 06-Jul-2022     | 06-Jul-2022     | 06-Jul-2022     | 06-Jul-2022     |
| Phosphate by Kone (w) | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     |
| Suspended Solids      | 06-Jul-2022     | 06-Jul-2022     | 06-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     | 07-Jul-2022     |
| Turbidity in waters   | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     | 05-Jul-2022     |



# CERTIFICATE OF ANALYSIS

Validated

SDG: 220701-34  
Client Ref.: LTC

Report Number: 653551  
Location: Gravesend, Kent

Superseded Report

## ASSOCIATED AQC DATA

### Ammoniacal Nitrogen

| Component                | Method Code | QC 2605                        |
|--------------------------|-------------|--------------------------------|
| Ammoniacal Nitrogen as N | TM099       | <b>101.6</b><br>93.14 : 108.60 |

### Anions by Kone (w)

| Component  | Method Code | QC 2649                         |
|------------|-------------|---------------------------------|
| TON as NO3 | TM184       | <b>102.5</b><br>100.65 : 111.75 |

### BOD True Total

| Component | Method Code | QC 2602                        | QC 2604                        | QC 2626                        |
|-----------|-------------|--------------------------------|--------------------------------|--------------------------------|
| BOD       | TM045       | <b>84.06</b><br>72.19 : 121.74 | <b>90.82</b><br>72.19 : 121.74 | <b>88.89</b><br>79.37 : 124.56 |

### pH Value

| Component | Method Code | QC 2632                        |
|-----------|-------------|--------------------------------|
| pH        | TM256       | <b>101.2</b><br>99.20 : 102.41 |

### Phosphate by Kone (w)

| Component                | Method Code | QC 2614                        |
|--------------------------|-------------|--------------------------------|
| Phosphate (Ortho as PO4) | TM184       | <b>105.2</b><br>95.60 : 107.60 |

### Suspended Solids

| Component              | Method Code | QC 2663                        | QC 2605                        | QC 2643                        |
|------------------------|-------------|--------------------------------|--------------------------------|--------------------------------|
| Total Suspended Solids | TM022       | <b>100.8</b><br>94.43 : 102.78 | <b>96.82</b><br>94.43 : 102.78 | <b>98.14</b><br>94.43 : 102.78 |



# CERTIFICATE OF ANALYSIS

Validated

SDG: 220701-34  
Client Ref.: LTC

Report Number: 653551  
Location: Gravesend, Kent

Superseded Report

## Turbidity in waters

| Component | Method Code | QC 2661                        |
|-----------|-------------|--------------------------------|
| Turbidity | TM195       | <b>93.25</b><br>83.75 : 121.25 |

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis .

The figure detailed is the percentage recovery result for the AQC .

The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control .





# CERTIFICATE OF ANALYSIS

SDG: 220701-34  
Client Ref: LTC

Report Number: 653551  
Location: Gravesend, Kent

Superseded Report:

## Appendix

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

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

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

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

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

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

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

## General

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

### 19. Sample Deviations

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

|   |   |
|---|---|
| 1 | Container with Headspace provided for volatiles analysis                    |
| 2 | Incorrect container received  |
| 3 | Deviation from method   |
| 4 | Matrix interference   |
| ♦ | Sample holding time exceeded in laboratory                                  |
| @ | Sample holding time exceeded due to late arrival of instructions or samples |
| § | Sampled on date not provided  |

### 20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

#### Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

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

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

#### Visual Estimation Of Fibre Content

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

#### Respirable Fibres

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

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

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

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Registered office Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ

National Highways Company Limited registered in England and Wales number 09346363