



Wessex Water Services Ltd

Avonmouth Food Waste Treatment Plant (AFWTP) Combined Heat and Power (CH&P) Biomethane Upgrade Plant (BUP)

Annual Groundwater
Monitoring (Environmental
Permit PP3734LK) March 2019



Report for

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Executive summary

Purpose of this report

This report presents the findings of groundwater monitoring carried out at the Avonmouth Food Waste Treatment Plant (AFWTP), Combined Heat and Power (CHP) Plant and Biomethane Upgrade Plant (BUP) located at Bristol Sewage Treatment Works, Kingsweston Lane, Avonmouth ("the installation"). The installation is operated by Wessex Water Services Limited (WWSL) and is regulated under the Environmental Permitting (England and Wales) Regulations 2016, as amended, under permit reference PP3734LK.

The permit requires WWSL to carry out regular groundwater monitoring, and in accordance with the Site Protection and Monitoring Programme (SPMP)¹ monitoring takes place on an annual basis and the results are reported to the Environment Agency. This annual report is representative of the 12-month period up to the annual groundwater sampling round completed in March 2019. Chemical analysis results for groundwater have been compared against trigger values (Control Levels and Compliance Levels) agreed with the Environment Agency in 2016.

Findings and Recommendations

The annual groundwater monitoring round for 2019 has found all of the targeted organic Potentially Polluting Substances (PPS) to be below the trigger values, and inorganic PPS to generally be below the trigger values, with a few minor exceptions at one monitoring well (WS003). Inorganic PPS above the trigger values comprised chloride, sodium and potassium and in all instances the concentrations recorded were lower than in the previous monitoring round.

The data indicates that concentrations of PPS in groundwater are unlikely to have increased due to site activities. As a precautionary measure, WWSL should review this location to check if any spills or leaks have occurred.

For all locations it is recommended that WWSL continues the annual monitoring programme, with the monitoring suite continuing to include the following analytes:

- Inorganics: pH, EC, nitrite (as NO₂), nitrate (as NO₃), sulphate, sulphite, chloride, chemical oxygen demand (COD), ammoniacal nitrogen (as NH₄), phosphate (as PO₄), hardness (alkalinity as CaCO₃).
- Metals and metalloids: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Potassium (K), Selenium (Se), Sodium (Na) and Zinc (Zn).
- Organics: TPH (CWG speciated with aliphatic/aromatic split), MTBE and BTEX.

The recommended analytical suite (above) should be amended and agreed between WWSL and the Environment Agency if new processes or operations on site have the potential to release different contaminants [PPS] to the ground or groundwater.

¹ Design of a Site Protection and Monitoring Programme for the Collection of Reference Data (Amec Foster Wheeler ref. 20172/C00/RR001i2) (Amec Foster Wheeler, 2007).

Contents

1.	Introduction	5
	Legislative Context	5
	Use of Trigger Values for Groundwater Assessment	6
2.	Methodology	7
2.1	Setting Control Levels and Compliance Levels	7
2.2	Environmental Monitoring of Groundwater	8
	Environmental Monitoring Infrastructure	8
	Sampling Techniques and Protocols	8
2.3	Field Observations of Groundwater Quality	9
	Chemical Analysis	9
	Analytical Quality Assurance and Quality Control (QA/QC)	10
	Project Quality Assurance	10
3.	Groundwater Monitoring Results	12
3.1	Summary of Chemical Analysis Results (March 2019)	12
	Inorganics	12
	Organics	13
4.	Annual Site Monitoring Results Compared with Trigger Values	14
4.1	Comparison of Trigger Values with Chemical Analysis Results, January 2018	14
4.2	Conclusions	15
5.	Conclusions and Recommendations	16

Table 2.1	Monitoring Well Locations	8
Table 2.2	Suite of Laboratory Analysis (Annual Monitoring, March 2019)	9
Table 3.1	Summary of Laboratory Inorganic Chemical Analysis Results	12
Table 3.2	Summary of Metals Analysis Results	12
Table 3.3	Summary of TPH Analysis Results	13
Table 4.1	Summary of Trigger Value Comparison for Inorganics (March 2019)	14
Table 4.2	Summary of Trigger Value Comparison for Metals (March 2019)	15
Table 5.1	Summary of PPS Concentrations against Trigger Values and Trends	16

Appendix A	Figures
Appendix B	Field Monitoring Results
Appendix C	Certificates of Laboratory Analysis
Appendix D	Comparison of Results Against Trigger Values

1. Introduction

This report presents the findings of groundwater monitoring carried out at the Avonmouth Food Waste Treatment Plant (AFWTP), Combined Heat and Power (CHP) Plant and Biomethane Upgrade Plant (BUP) located at Bristol Sewage Treatment Works, Kingsweston Lane, Avonmouth ("the installation"). The installation is operated by Wessex Water Services Limited (WWSL) and is regulated under the Environmental Permitting (England and Wales) Regulations 2016, as amended, under permit reference PP3734LK. The permit requires WWSL to carry out regular groundwater monitoring, and in accordance with the Site Protection and Monitoring Programme (SPMP)² monitoring takes place on an annual basis and the results are reported to the Environment Agency. This annual report is representative of the 12-month period up to the annual groundwater sampling round completed in March 2019.

Chemical analysis results have been compared against trigger values (Control Levels and Compliance Levels) agreed with the Environment Agency in 2016³. This report is supported by, and should be read in conjunction with, previous environmental monitoring reports, as follows:

- Design of a Site Protection and Monitoring Programme for the Collection of Reference Data (Amec Foster Wheeler ref. 20172/C00/RR001i2) (Amec Foster Wheeler, 2007)².
- Wessex Water Services Ltd, Avonmouth Food Waste Treatment Plant (AFWTP)/ Combined Heat and Power (CHP) Plant/ Biomethane Upgrade Plant (BUP), Site Condition Report – Operational (Amec Foster Wheeler Report ref. 32546RR016i3), September 2017, Amec Foster Wheeler.
- Wessex Water Services Ltd, Avonmouth Food Waste Treatment Plant (AFWTP) Combined Heat and Power (CH&P) Biomethane Upgrade Plant (BUP), Annual Groundwater Monitoring (Environmental Permit PP3734LK) January 2018, Wood.

The annual groundwater monitoring results are to be provided to the Environment Agency by WWSL to demonstrate that the site soil and groundwater is being protected and that the site is being maintained in a 'satisfactory state' throughout the permitted operations. Regular monitoring also provides WWSL with a record of the site condition throughout the lifespan of the Environmental Permit. The results of monitoring should be maintained by WWSL as they can support an application to vary or surrender the Environmental Permit.

Legislative Context

The Industrial Emissions Directive (IED) is enacted in England by the Environmental Permitting (England and Wales) Regulations 2016 (EPR). Regular groundwater monitoring (minimum frequency of every 5 years) is a requirement for all Part A installations where there is a possibility of historical or future land or groundwater contamination. The IED also states that periodic soil monitoring is required at a minimum frequency of every 10 years. These requirements are set out in the Environment Agency's H5 Site Condition Report – template and guidance (Environment Agency, ref. LIT 8001 Version 3.0 April 2013). WWSL is carrying out annual groundwater monitoring in accordance with the Environmental Permit for the installation and therefore, complies with the groundwater monitoring requirements of the IED. WWSL has agreed with the Environment Agency that following the reporting of the baseline soil condition in the Site Condition Report (SCR)⁴, regular soil monitoring is not required.

² Amec Foster Wheeler (2007). Design of a Site Protection and Monitoring Programme for the Collection of Reference Data, Report Ref. 20172/C00/RR001i2.

³ Amec Foster Wheeler (July 2016). Revised Proposed Control Levels / Compliance Levels and Proposed Environmental Monitoring programme, Ref. 32546P201i1). Accepted by the Environment Agency on 4 August 2016 (Amec Foster Wheeler ref. 32546P202).

⁴ Amec Foster Wheeler (September 2017). Wessex Water Services Ltd, Avonmouth Food Waste Treatment Plant (AFWTP)/ Combined Heat and Power (CHP) Plant/ Biomethane Upgrade Plant (BUP), Site Condition Report – Operational, Report Ref. 32546RR016i3.

In the context of Site Condition Reports, pollutants are interpreted to refer to only the substances handled at the installation under an Environmental Permit, meeting the definition of 'substance' or 'hazardous substance', as given in paragraph 4 of Schedule 22 of EPR 2016. In this report the term potentially polluting substances (PPS) is used to refer to both hazardous substances and other substances with potential to cause pollution.

Use of Trigger Values for Groundwater Assessment

Trigger values (Control and Compliance Limits) have been developed for groundwater at each of the monitoring wells at the site. These are used for comparison with monitoring results to provide a means of assessing whether deterioration in groundwater quality has occurred in the vicinity of each well. In addition, use of trigger values is designed to alert WWSL if further investigation is needed to determine whether releases of PPS are occurring to the land from the installation.

The analytical suite for the groundwater monitoring has been agreed between WWSL and the Environment Agency but may be subject to amendment by agreement with the Environment Agency. The suite of analysis used in this monitoring round is detailed in Section 2.3.

2. Methodology

2.1 Setting Control Levels and Compliance Levels

The methodology used for setting the Control Levels and Compliance Levels was set out in correspondence to the Environment Agency in 2016³.

A Control Level (Trigger 1) and a Compliance Level (Trigger 2) were set for each potentially polluting substance (PPS) at each monitoring well.

Where minimum reporting values (MRVs) are available they have been used as both the Control Level and the Compliance Level. Where applicable (WS006 and WS007), the laboratory chemical test method limit of detection (LOD) has been used for hydrocarbons. Where baseline data indicates an exceedance of the respective MRV (or LOD for hydrocarbons) in background groundwater from historical contamination, the Control Level and the Compliance Level have been set at the maximum baseline value and it has been assumed that groundwater conditions will improve.

Where MRVs are not available, Compliance Levels have been set with respect to Water Quality Targets.

Calculation of Control Levels (Trigger 1) and Compliance Levels (Trigger 2)

Control Level (Trigger 1) = Mean result + (1.2 x Variance) where Variance is the maximum value minus the mean.

N.B. where the baseline data is less than the laboratory detection limit, Trigger 1 has been set as double the detection limit. In any cases where the value exceeds the Compliance Level, the Control Level has been set as the same as the Compliance Level.

Compliance Level (Trigger 2) = MRV, or WQT where MRVs are not available and the LOD for hydrocarbons (where applicable).

In any other cases, Trigger 2 has been set at ten times the detection limit where the baseline data is less than the LOD, or double the maximum 'baseline' result.

Trigger values are used as follows:

- If annual monitoring data indicates that Trigger 1 has been exceeded, it will be established by WWSL / Wessex Water whether the exceedance is due to an on-site activity (spills, leakages etc). If the exceedance is confirmed or suspected as being due to an on-site activity a repeat sample will be taken immediately, and if this is still above Trigger 1, additional quarterly monitoring will be conducted.
- If annual monitoring data indicates that Trigger 2 has been exceeded, similar measures as those for Trigger 1 will initially be taken by WWSL / Wessex Water to establish whether the exceedance is due to an on-site activity and if the exceedance is confirmed or suspected as being due to an on-site activity a repeat sample will be taken immediately. If this is still above Trigger 2, it is proposed that monthly monitoring will be conducted and further action taken to identify and address the source of the pollution.

If there is an exceedance of trigger value(s), WWSL / Wessex Water will communicate this to the Environment Agency as soon as is reasonably possible, particularly if:

- The exceedance of trigger values may be, or is confirmed to be, due to an on-site activity and a release of PPS is ongoing (established by monthly / quarterly monitoring); or
- It poses an immediate risk to the environment or other receptors.

If this is the case, then the source of the pollution will be identified, and measures taken to prevent further release. The environmental impact of any pollution caused by the permitted process will be investigated and assessed and, depending on the impact, remediation and mitigation measures may be implemented in consultation with, and the agreement of, the Environment Agency.

2.2 Environmental Monitoring of Groundwater

Six groundwater monitoring wells (WS001 to WS003 and WS005 to WS007), were used for the collection of groundwater samples and were designed to target the areas of the site outlined in Table 2.1. The site location is shown on Figure 1 and the locations of the wells are shown on Figure 2 in Appendix A. Groundwater sample collection took place on the 14 March 2019.

Table 2.1 Monitoring Well Locations

Location ID	Position/ Target
WS001	Biomethane Upgrade Plant (General) and Chemical Storage
WS002	Former Condensate Soakaway and Anaerobic Digester Tanks
WS003	Former Condensate Soakaway and Anaerobic Digester Tanks
WS005	Anaerobic Digester Tanks, Sludge Drying and Proposed Pumping Station
WS006	Former Condensate Soakaway and Standby Boiler
WS007	Fuel Storage, Workshop and Engines

Environmental Monitoring Infrastructure

The condition of the well installations was inspected and all targeted wells were found to be in good condition.

Sampling Techniques and Protocols

Groundwater sampling was carried out by a Wood consultant. Sampling was undertaken in accordance with an agreed protocol, which comprised:

- Initial groundwater measurement (depth to water, depth to installation base) using an oil/water interface meter or clean dip meter. The interface meter was used to detect the presence/absence and thickness (if present) of light non-aqueous phase liquid (LNAPL) within the monitoring well;
- A peristaltic pump was used to carry out low flow groundwater sampling, following purging of standing water in each well sufficient to ensure the sample was representative of groundwater in the surrounding area. A sample was collected following stabilisation of field monitoring

parameters including pH, electrical conductivity, dissolved oxygen and temperature (Note: the dissolved oxygen probe malfunctioned during the work).

- Samples were collected into laboratory-provided, chilled containers. Samples were then submitted by courier to ALS Life Sciences Ltd (ALS) for analysis.
- Filtration and preservation of water samples for metals analysis was undertaken onsite. This is in accordance with best practice guidance as specified in ISO5667-3:2012 Water Quality – Sampling – Part 3: Preservation and handling of Water.

The sampling method was changed from the technique used in previous rounds (inertial pumps) in order to minimise the need to dispose of purge water and also as the low flow sampling can reduce the turbidity of the water samples obtained compared to high flow methods.

All measurements and observations were recorded on Groundwater Monitoring Record Sheets, which are summarised in Appendix B.

Purge water from the monitoring wells was released to the site effluent drains flowing to the head of the sewage treatment works by prior agreement with WWSL.

2.3 Field Observations of Groundwater Quality

Visual and olfactory observations of groundwater quality during purging and sampling of the monitoring installations found that:

- No free hydrocarbon product was detected by the oil water interface probe.
- Water in all wells was brown (WS006 was brownish orange) and turbid.

Chemical Analysis

Analytical Suite

The analytical suite used for the annual site wide monitoring event is presented in Table 2.2.

Table 2.2 Suite of Laboratory Analysis (Annual Monitoring, March 2019)

Sample type	Determinands
Groundwater	pH, EC, nitrite (as NO ₂), nitrate (as NO ₃), sulphate, sulphite, chloride, chemical oxygen demand (COD), ammoniacal nitrogen (as NH ₄), phosphate (as PO ₄), hardness (alkalinity as CaCO ₃).
	Metals and metalloids: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Potassium (K), Selenium (Se), Sodium (Na) and Zinc (Zn)
	TPHCWG (speciated with aliphatic/aromatic split), MTBE and BTEX

EC – electrical conductivity

BTEX – benzene, toluene, ethylbenzene and xylenes

MTBE – methyl tertiary butyl ether

TPH – total petroleum hydrocarbons

TPH CWG (TPH Criteria Working Group)

Analytical Techniques and Detection Limits

Analytical techniques were selected to target specific PPS and on the basis of the analysis techniques having low limits of detection (LOD) and ISO 17025 accreditation, where possible. All LODs were below the trigger values.

Total Petroleum Hydrocarbons (TPH)

All samples were subject to TPH analysis using the TPHCWG approach, which divides the petroleum mixtures into fractions using the Equivalent Carbon (EC) number convention. EC numbers are used to normalise petroleum constituents by reference to their boiling point and the boiling point of equivalent n-alkanes where the number of carbon atoms is known. This allows EC numbers to be determined for constituents where only the boiling point is known. This convention is described fully in TPHCWG (1997).

In addition to dividing the petroleum mixtures by EC number, the TPHCWG method also considers aliphatic and aromatic hydrocarbon fractions separately due to their differing behaviour in the environment and variation in toxicity. Thus, for the purposes of laboratory analysis (and risk assessment), the TPHCWG recommend that petroleum mixtures are considered in fractions which includes aliphatic and aromatic compounds with equivalent carbon numbers of up to 35.

Analytical Quality Assurance and Quality Control (QA/QC)

The selected laboratory, ALS (Hawarden), has UKAS (ISO 17025) accreditation for metals, other inorganics (not including nitrate) and gasoline range organics (GRO). The laboratory accreditation for each analysis technique is detailed on the certificates presented in Appendix C.

ALS has a number of quality control systems in place including:

- Use of Analytical Quality Control Samples (AQC): These can be a Certified Reference Material (CRM), Internal Reference Material (IRM) or Matrix spiked material. These are matrix matched to and within the calibration range of the relevant test method. An AQC sample is prepared and analysed within each batch of samples. Results are charted and assessed statistically monthly to ensure continued method performance. Rules are set to indicate whether an analytical method is out of control and relevant action is taken and recorded when any one of the control rules is breached e.g. a) When any single result exceeds an action limit i.e. $\pm 3SD$, b) When two or more consecutive results fall outside the warning limits ($\pm 2SD$) and c) Cases of significant bias (9 successive QC results on the same side of the mean);
- Use of process blanks with each batch of samples and use of instrument blanks to check for contamination within the instrument; and
- Ongoing competence of analysts is monitored using proficiency testing (PT) samples and comparing Analysts' results to those expected by the PT provider. Proficiency testing is undertaken where available for every accredited component. All PT scheme results are audited and investigations and root cause analysis is carried out and recorded where unsatisfactory z scores are reported.

Project Quality Assurance

During this monitoring round the following sampling process was used to provide additional quality assurance of the sampling and analysis:

- One duplicate groundwater sample was collected from WS002 and submitted for an identical suite of analysis. The duplicate sample was obtained by taking two discrete water samples at this location.

The use of duplicate samples is designed to check that the sampling and analytical procedures provide consistent results and, therefore, provides an indication that the analysis for the remaining monitoring wells is reliable.

A comparison of the duplicate sample results (referenced as WS002 and DUP1) indicates good correlation between the samples and analysis results, with results consistently below LOD for organics and relative percentage differences (RPD) below 20% for inorganics, with the exceptions of nitrate (38 %, notably the laboratory does not have UKAS accreditation for this test) and nickel (21 %). Laboratory certificates are presented in Appendix C.

3. Groundwater Monitoring Results

Six water samples were obtained from groundwater monitoring wells WS001, WS002, WS003, WS005, WS006 and WS007. The laboratory certificates are presented in Appendix C.

3.1 Summary of Chemical Analysis Results (March 2019)

Inorganics

All samples were tested for a range of water quality parameters and inorganics. The results are presented in Table 3.1.

Table 3.1 Summary of Laboratory Inorganic Chemical Analysis Results

Inorganic	Locations where Substance Recorded above the LOD	Unit	Minimum	Maximum
pH	N/A	N/A	7.63	7.9
Electrical conductivity	All locations (WS001 to WS003, WS005 to WS007 and duplicate of WS002)	mS/cm	0.79	1.65
Hardness (as CaCO₃)	All locations (WS001 to WS003, WS005 to WS007 and duplicate of WS002)	mg/l	321	707
Ammoniacal nitrogen	All locations (WS001 to WS003, WS005 to WS007 and duplicate of WS002)	mg/l	0.95	4.63
Nitrate	WS006, WS007 and duplicate of WS002	mg/l	0.44	22.9
Nitrite	WS006	mg/l	0.051	0.051
Sulphate	WS001, WS002, WS005 to WS007 and duplicate of WS002	mg/l	39.2	224
Phosphate	WS001, WS002, WS003, WS007 and duplicate of WS002	mg/l	0.25	4.16

Metals

A range of metals and metalloids were analysed in the annual groundwater monitoring round. The sample locations with concentrations above the LOD are identified in Table 3.2.

Table 3.2 Summary of Metals Analysis Results

Inorganic	Locations where Substance Recorded above the LOD	Minimum (mg/l)	Maximum (mg/l)
Arsenic (diss.filt)	All locations (WS001 to WS003, WS005 to WS007 and duplicate of WS002)	0.00168	0.145
Cadmium (diss.filt)	None	n/a	n/a
Chromium (diss.filt)	None	n/a	n/a
Copper (diss.filt)	WS006, WS007	0.0005	0.00399

Inorganic	Locations where Substance Recorded above the LOD	Minimum (mg/l)	Maximum (mg/l)
Lead (diss.filt)	All locations (WS001 to WS003, WS005 to WS007 and duplicate of WS002)	0.000208	0.000386
Mercury (diss.filt)	None	n/a	n/a
Nickel (diss.filt)	All locations (WS001 to WS003, WS005 to WS007 and duplicate of WS002)	0.00126	0.0089
Potassium (Dis.Filt)	All locations (WS001 to WS003, WS005 to WS007 and duplicate of WS002)	5.56	36.3
Selenium (diss.filt)	WS006, WS007	0.00153	0.00158
Sodium (Dis.Filt)	All locations (WS001 to WS003, WS005 to WS007 and duplicate of WS002)	73.5	242
Zinc (diss.filt)	All locations (WS001 to WS003, WS005 to WS007 and duplicate of WS002)	0.0014	0.016

Organics

Total Petroleum Hydrocarbons (TPH)

Aliphatic TPH concentrations in the C5 to C16 carbon range, and aromatic TPH in the EC5 to EC35 range were below the LOD (<0.01mg/l) in all samples. The sample locations with concentrations above the LOD are presented in Table 3.3.

Table 3.3 Summary of TPH Analysis Results

Inorganic / Metal Element	Locations where Substance was Recorded Above LOD	Minimum (mg/l)	Maximum (mg/l)
Aliphatics >C16-C21 (aq)	WS006	<0.01	0.028
Aliphatics >C21-C35 (aq)	WS006	<0.01	0.033

The laboratory TPH analysis did not detect BTEX compounds or MTBE above the relevant LODs (<0.001mg/l to <0.008mg/l) in any samples.

4. Annual Site Monitoring Results Compared with Trigger Values

Section 2.1 of this report sets out the way trigger values are to be used to provide a comparison with the results obtained from the groundwater monitoring rounds.

The Environment Agency should be informed in the event of an exceedance of a trigger value. If the reason for the exceedance of trigger value is due to an on-site activity and the source is ongoing (established by monthly / quarterly monitoring) or critical, remediation may be necessary by agreement with the Environment Agency.

4.1 Comparison of Trigger Values with Chemical Analysis Results, January 2018

Concentrations of PPS in comparison to trigger values are tabulated in Appendix D, the results for the previous annual monitoring round in 2018 (and repeat sampling of WS006 in 2018) are also presented for comparison. Values in excess of Trigger 1 are highlighted in yellow and values in excess of Trigger 2 are highlighted in orange.

All organic PPS were at concentrations below the trigger values and the majority of analytes were at concentrations below the laboratory LOD.

The majority of inorganic PPS including metals and metalloids, were at concentrations below Trigger 1 and 2, with the exceptions of chloride, sodium and potassium in WS003.

Inorganics

In WS003 the chloride concentration of 106 mg/l slightly exceeded the Trigger 1 value of 103.23mg/l, however the result was slightly lower than in the previous annual monitoring round in 2018 where it was 111 mg/l. All other results for targeted inorganic substances were below the trigger limits in all wells.

A summary of the inorganic results compared against trigger values is presented in Table 4.1.

Table 4.1 Summary of Trigger Value Comparison for Inorganics (March 2019)

Substance	Locations where Substance was Above Trigger 1 only	Locations where Substance was Recorded Above Trigger 1 and Trigger 2	Comment
Chloride	WS003	None	The concentration slightly exceeds Trigger 1 but is below the WQT and below the last monitoring result. The result may be within the range of natural variation in the aquifer.

Metals and Metalloids

Cadmium, chromium and mercury were below their LODs (<0.00008 mg/l, <0.001 mg/l and <0.00001 mg/l, respectively) in all samples.

Arsenic, copper, lead, nickel and zinc were present at concentrations above their respective LODs in some or all of the samples, however, all concentrations were below their respective trigger values.

There were trigger value exceedances at one location, WS003, for two of the targeted metals:

- The sodium concentration was 242 mg/l and exceeded the Trigger 1 control level and the Trigger 2 compliance level of 232 mg/l (the same value for both triggers, based on a maximum concentration detected during baseline sampling). The 2019 concentration was lower than the maximum concentration previously recorded in this well of 257 mg/l in 2018.
- The potassium concentration was 33.1 mg/l and slightly exceeded the Trigger 1 control level of 32.8 mg/l. It did not exceed the Trigger 2 compliance level of 65.4 mg/l. The 2019 concentration was lower than the maximum concentration previously recorded in this well of 35.5 mg/l in 2018.

Exceedances of Trigger 1 and Trigger 2 values, are presented in Table 4.2.

Table 4.2 Summary of Trigger Value Comparison for Metals (March 2019)

Substance	Locations where Substance was Above Trigger 1 only	Locations where Substance was Recorded Above Trigger 1 and Trigger 2	Comment
Potassium	WS003	None	The potassium concentration is only slightly above the Trigger 1 value and below the previous result from 2018. Potassium is non-hazardous and there is no UK Drinking Water Standard. The result may be indicative of natural variation in the aquifer.
Sodium	WS003	WS003	Sodium is non-hazardous. The result is lower than the previous result from 2018. The results may be indicative of natural variation in the aquifer.

Total Petroleum Hydrocarbons

Concentrations of TPH were generally below LODs and all results were below the trigger values for all aliphatic/ aromatic hydrocarbon fractions. As in the previous monitoring round, only the sample from WS006 contained hydrocarbons above the LOD (see Table 3.3 in the previous section).

At each of the monitored wells concentrations of BTEX and MTBE, measured as part of the TPHCWG suite, were below the trigger value and below the LOD.

4.2 Conclusions

The inorganic PPS are generally all below both control and compliance trigger values. The only exceedances are limited to WS003 and are relatively marginal when compared to the trigger values and to UK Drinking Water Standard (where available). All of the trigger value exceedances for inorganic compounds are for non-hazardous PPS and are below the concentrations detected in the previous round of annual sampling in 2018.

Organic PPS were all below trigger values in this round.

5. Conclusions and Recommendations

The annual groundwater monitoring round for 2019 has found all of the targeted organic PPS below the trigger values, and inorganic PPS generally below the trigger values, with a few minor exceptions at one monitoring well (WS003). Inorganic PPS above the trigger values comprised chloride, sodium and potassium and in all instances the concentrations recorded were lower than in the previous monitoring round. The data indicates that concentrations of PPS in groundwater have not increased due to site activities.

Table 5.1 presents a summary of the comments on the data as compared against the trigger values and provides recommendations.

Table 5.1 Summary of PPS Concentrations against Trigger Values and Trends

PPS	Relevant Wells	Comment	Recommendations
Chloride	WS003	The chloride concentration in WS003 is slightly above Trigger 1 but lower than in the previous round in 2018. The result is well below the UK Drinking Water Standard of 250mg/l. There is the potential for the concentration to reflect natural variation.	Continued annual monitoring and check for increasing trend. As a precautionary measure, WWSL should review this location to check if any spills or leaks have occurred.
Potassium	WS003	The potassium concentration slightly exceeds Trigger 1 but is lower than in the previous round in 2018. There is the potential for the concentration to reflect natural variation	Continued annual monitoring and check for increasing trend. As a precautionary measure, WWSL should review this location to check if any spills or leaks have occurred.
Sodium	WS003	The sodium concentration slightly exceeds the Trigger 1 & 2 value (same for both), and slightly exceeds the UK Drinking Water Standard of 200mg/l but is lower than in the previous round in 2018. There is the potential for the increased concentration to reflect natural variation	Continued annual monitoring and check for increasing trend. As a precautionary measure, WWSL should review this location to check if any spills or leaks have occurred.

For all locations it is recommended that WWSL continues the annual monitoring programme, with the monitoring suite continuing to include the following analytes:

- Inorganics: pH, EC, nitrite (as NO₂), nitrate (as NO₃), sulphate, sulphite, chloride, chemical oxygen demand (COD), ammoniacal nitrogen (as NH₄), phosphate (as PO₄), hardness (alkalinity as CaCO₃).
- Metals and metalloids: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Potassium (K), Selenium (Se), Sodium (Na) and Zinc (Zn).
- Organics: TPH (CWG speciated with aliphatic/aromatic split), MTBE and BTEX.

The recommended analytical suite (above) should be amended and agreed between WWSL and the Environment Agency if new processes or operations on site have the potential to release different contaminants [PPS] to the ground or groundwater.



Appendix A

Figures

\\BSL-F51.global.amec.com\shared\Projects\40478 GENeco EMP\Drawings\40478-Br03.dwg Originator: NEIL PATTON



Key

 Site location

Wessex Water Services Limited - Avonmouth
Food Waste Treatment Plant (AFWTP),
Combined Heat and Power (CHP) Plant and
Biomethane Upgrade Plant (BUP)

Figure 1
Site location map

0 km  3 km
Scale 1:50,000 @ A4
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April 2018





Appendix B

Field Monitoring Results

Borehole Monitoring Records

Site:	Avonmouth WWTW
Data Description:	Monitoring Well Records
Date:	14/03/2019
Weather	Rain AM, Clear PM. Very windy
Monitoring values	pH, EC, DO stabilised values
Completed By:	Stuart Desmond
Checked By:	Laurence Munden

Key	
m AOD	Metres Above Ordnance Datum
m bcl	Metres below cover level
DO	Dissolved Oxygen
EC	Electrical Conductivity
µS/cm	Micro Siemens per Centimetre

Round 2

Groundwater Monitoring												
Exploratory Hole	Date	Ground Level	Depth to Water	Water Level	Well Depth	Water Column	Purge Volume	Stabilised conditions after purging				Comments
		m AOD	mbcl	m AOD	mbgl	m	Litres	pH	EC µS/cm	Temp °C	DO %	
WS001	14/03/2019	7.31	1.16	6.15	5.16	4.00	14.0	6.53	1881	12.29	0.0	Brown tint, slightly turbid. No obvious odour or sheen. DO probe malfunction
WS002	14/03/2019	7.59	1.62	5.97	5.00	3.38	11.8	7.31	919	17.24	0.0	Brown tint, moderate turbidity. No obvious odour or sheen. Do probe malfunction. DUP1
WS003	14/03/2019	7.70	1.87	5.83	4.89	3.02	10.6	7.19	1748	19.97	0.0	Brown tint, slightly turbid. No obvious odour or sheen. DO probe malfunction
WS005	14/03/2019	7.78	1.67	6.11	3.97	2.30	8.1	7.12	1034	11.57	0.0	Brown tint, moderate turbidity. No obvious odour or sheen. Well ran dry after 2.5 litres purged. Do probe malfunction.
WS006	14/03/2019	7.89	1.80	6.09	3.67	1.87	6.5	7.25	1122	11.82	0.0	Brownish-orange tint, high turbidity. No obvious odour or sheen. Do probe malfunction.
WS007	14/03/2019	7.86	2.08	5.78	4.74	2.66	9.3	7.22	1376	12.74	0.0	Brown tint, slightly turbid. No obvious odour or sheen. DO probe malfunction



Appendix C

Certificates of 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

Wood Environment & Infrastructure Solutions UK Limited

Ground Floor

Redcliff Quay

120 Redcliff Street

Almondsbury

Bristol

Avon

BS1 6HU

Attention: Laurence Munden

CERTIFICATE OF ANALYSIS

Date of report Generation: 25 March 2019
Customer: H_AMEC_BRI
Sample Delivery Group (SDG): 190315-108
Your Reference: 40478
Location: Avonmouth
Report No: 498198

We received 7 samples on Friday March 15, 2019 and 7 of these samples were scheduled for analysis which was completed on Monday March 25, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

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

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

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

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

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 190315-108
Location: Avonmouth

Client Reference: 40478
Order Number:

Report Number: 498198
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
19559318	DUP1	EWMarch 2019	0.00 - 0.00	14/03/2019
19559277	WS003	EWMarch 2019	0.00 - 3.90	14/03/2019
19559287	WS005	EWMarch 2019	0.00 - 3.00	14/03/2019
19559297	WS006	EWMarch 2019	0.00 - 2.70	14/03/2019
19559308	WS007	EWMarch 2019	0.00 - 3.50	14/03/2019
19559254	WS001a	EWMarch 2019	0.00 - 3.50	14/03/2019
19559266	WS002a	EWMarch 2019	0.00 - 4.00	14/03/2019

Maximum Sample/Coolbox Temperature (°C) :

8.0

ISO5667-3 Water quality - Sampling - Part3 -

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

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

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 190315-108
Location: Avonmouth

Client Reference: 40478
Order Number:

Report Number: 498198
Superseded Report:

Results Legend

X Test
N No Determination Possible

Sample Types -

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

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type	
	19559287	WS005	19559277	WS003	EWMarch 2019	EWMarch 2019	0.00 - 3.00	0.00 - 3.90	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
	19559287	WS005	19559277	WS003	EWMarch 2019	EWMarch 2019	0.00 - 3.00	0.00 - 3.90	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
	19559287	WS005	19559277	WS003	EWMarch 2019	EWMarch 2019	0.00 - 3.00	0.00 - 3.90	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
	19559287	WS005	19559277	WS003	EWMarch 2019	EWMarch 2019	0.00 - 3.00	0.00 - 3.90	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
	19559287	WS005	19559277	WS003	EWMarch 2019	EWMarch 2019	0.00 - 3.00	0.00 - 3.90	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Ammoniacal Nitrogen		All	NDPs: 0 Tests: 7									
Anions by Kone (w)		All	NDPs: 0 Tests: 7									
COD Unfiltered		All	NDPs: 0 Tests: 7									
Conductivity (at 20 deg.C)		All	NDPs: 0 Tests: 7									
Dissolved Metals by ICP-MS		All	NDPs: 0 Tests: 7									
EPH CWG (Aliphatic) Aqueous GC (W)		All	NDPs: 0 Tests: 7									
EPH CWG (Aromatic) Aqueous GC (W)		All	NDPs: 0 Tests: 7									
GRO by GC-FID (W)		All	NDPs: 0 Tests: 7									
Mercury Dissolved		All	NDPs: 0 Tests: 7									
Nitrite by Kone (w)		All	NDPs: 0 Tests: 7									
pH Value		All	NDPs: 0 Tests: 7									
Phosphate by Kone (w)		All	NDPs: 0 Tests: 7									
Sulphide		All	NDPs: 0 Tests: 7									
Total Metals by ICP-MS		All	NDPs: 0 Tests: 7									
TPH CWG (W)		All	NDPs: 0 Tests: 7									

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 190315-108
Location: Avonmouth

Client Reference: 40478
Order Number:

Report Number: 498198
Superseded Report:

TPH CWG (W)

Results Legend			Customer Sample Ref.		DUP1	WS003	WS005	WS006	WS007	WS001a
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00	0.00 - 3.90	0.00 - 3.00	0.00 - 2.70	0.00 - 3.50	0.00 - 3.50
M	mCERTS accredited.				Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
sq	Aqueous / settled sample.				14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019
dis.filt	Dissolved / filtered sample.				00:00	00:00	00:00	00:00	00:00	00:00
tot.unfilt	Total / unfiltered sample.				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
*	Subcontracted - refer to subcontractor report for accreditation status.				190315-108	190315-108	190315-108	190315-108	190315-108	190315-108
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery				19559318	19559277	19559287	19559297	19559308	19559254
(F)	Trigger breach confirmed				EWMarch 2019	EWMarch 2019	EWMarch 2019	EWMarch 2019	EWMarch 2019	EWMarch 2019
1-3*§@	Sample deviation (see appendix)									
Component	LOD/Units	Method								
GRO Surrogate % recovery**	%	TM245			100	96	97	95	93	92
GRO >C5-C12	<0.05 mg/l	TM245			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
					#	#	#	#	#	#
Methyl tertiary butyl ether (MTBE)	<0.003 mg/l	TM245			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Benzene	<0.007 mg/l	TM245			<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Toluene	<0.004 mg/l	TM245			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Ethylbenzene	<0.005 mg/l	TM245			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
m,p-Xylene	<0.008 mg/l	TM245			<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
o-Xylene	<0.003 mg/l	TM245			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Sum of detected Xylenes	<0.011 mg/l	TM245			<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Sum of detected BTEX	<0.028 mg/l	TM245			<0.028	<0.028	<0.028	<0.028	<0.028	<0.028
Aliphatics >C5-C6	<0.01 mg/l	TM245			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C6-C8	<0.01 mg/l	TM245			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C8-C10	<0.01 mg/l	TM245			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C10-C12	<0.01 mg/l	TM245			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C12-C16 (aq)	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatics >C16-C21 (aq)	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	0.028	<0.01	<0.01
Aliphatics >C21-C35 (aq)	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	0.033	<0.01	<0.01
Total Aliphatics >C12-C35 (aq)	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	0.061	<0.01	<0.01
Aromatics >EC5-EC7	<0.01 mg/l	TM245			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC7-EC8	<0.01 mg/l	TM245			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC8-EC10	<0.01 mg/l	TM245			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC10-EC12	<0.01 mg/l	TM245			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC12-EC16 (aq)	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC16-EC21 (aq)	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatics >EC21-EC35 (aq)	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Aromatics >EC12-EC35 (aq)	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Aliphatics & Aromatics >C5-35 (aq)	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	0.063	<0.01	<0.01
Aliphatics >C16-C35 Aqueous	<0.01 mg/l	TM174			<0.01	<0.01	<0.01	0.061	<0.01	<0.01



CERTIFICATE OF ANALYSIS

Validated

SDG: 190315-108
Location: Avonmouth

Client Reference: 40478
Order Number:

Report Number: 498198
Superseded Report:

TPH CWG (W)

Results Legend		Customer Sample Ref.	WS002a					
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
dis.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-3*§@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
GRO Surrogate % recovery**	%	TM245	95					
GRO >C5-C12	<0.05 mg/l	TM245	<0.05	#				
Methyl tertiary butyl ether (MTBE)	<0.003 mg/l	TM245	<0.003					
Benzene	<0.007 mg/l	TM245	<0.007					
Toluene	<0.004 mg/l	TM245	<0.004					
Ethylbenzene	<0.005 mg/l	TM245	<0.005					
m,p-Xylene	<0.008 mg/l	TM245	<0.008					
o-Xylene	<0.003 mg/l	TM245	<0.003					
Sum of detected Xylenes	<0.011 mg/l	TM245	<0.011					
Sum of detected BTEX	<0.028 mg/l	TM245	<0.028					
Aliphatics >C5-C6	<0.01 mg/l	TM245	<0.01					
Aliphatics >C6-C8	<0.01 mg/l	TM245	<0.01					
Aliphatics >C8-C10	<0.01 mg/l	TM245	<0.01					
Aliphatics >C10-C12	<0.01 mg/l	TM245	<0.01					
Aliphatics >C12-C16 (aq)	<0.01 mg/l	TM174	<0.01					
Aliphatics >C16-C21 (aq)	<0.01 mg/l	TM174	<0.01					
Aliphatics >C21-C35 (aq)	<0.01 mg/l	TM174	<0.01					
Total Aliphatics >C12-C35 (aq)	<0.01 mg/l	TM174	<0.01					
Aromatics >EC5-EC7	<0.01 mg/l	TM245	<0.01					
Aromatics >EC7-EC8	<0.01 mg/l	TM245	<0.01					
Aromatics >EC8-EC10	<0.01 mg/l	TM245	<0.01					
Aromatics >EC10-EC12	<0.01 mg/l	TM245	<0.01					
Aromatics >EC12-EC16 (aq)	<0.01 mg/l	TM174	<0.01					
Aromatics >EC16-EC21 (aq)	<0.01 mg/l	TM174	<0.01					
Aromatics >EC21-EC35 (aq)	<0.01 mg/l	TM174	<0.01					
Total Aromatics >EC12-EC35 (aq)	<0.01 mg/l	TM174	<0.01					
Total Aliphatics & Aromatics >C5-35 (aq)	<0.01 mg/l	TM174	<0.01					
Aliphatics >C16-C35 Aqueous	<0.01 mg/l	TM174	<0.01					



CERTIFICATE OF ANALYSIS

Validated

SDG: 190315-108
Location: Avonmouth**Client Reference:** 40478
Order Number:**Report Number:** 498198
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM101	Method 4500B & C, AWWA/APHA, 20th Ed., 1999	Determination of Sulphide in soil and water samples using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM245	By GC-FID	Determination of GRO by Headspace in waters
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 (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

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SDG: 190315-108
Location: Avonmouth

Client Reference: 40478
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Report Number: 498198
Superseded Report:

Test Completion Dates

Lab Sample No(s)
Customer Sample Ref.

AGS Ref.
Depth
Type

	19559318	19559277	19559287	19559297	19559308	19559254	19559266
	DUP1	WS003	WS005	WS006	WS007	WS001a	WS002a
	EWMarch 2019	EWMarch 2019	EWMarch 2019	EWMarch 2019	EWMarch 2019	EWMarch 2019	EWMarch 2019
	0.00 - 0.00	0.00 - 3.90	0.00 - 3.00	0.00 - 2.70	0.00 - 3.50	0.00 - 3.50	0.00 - 4.00
	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	22-Mar-2019	22-Mar-2019	22-Mar-2019	22-Mar-2019	22-Mar-2019	22-Mar-2019	22-Mar-2019
Anions by Kone (w)	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019
COD Unfiltered	16-Mar-2019	16-Mar-2019	16-Mar-2019	16-Mar-2019	16-Mar-2019	16-Mar-2019	16-Mar-2019
Conductivity (at 20 deg.C)	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019
Dissolved Metals by ICP-MS	22-Mar-2019	22-Mar-2019	22-Mar-2019	22-Mar-2019	22-Mar-2019	22-Mar-2019	22-Mar-2019
EPH CWG (Aliphatic) Aqueous GC (W)	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019
EPH CWG (Aromatic) Aqueous GC (W)	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019
GRO by GC-FID (W)	20-Mar-2019	20-Mar-2019	20-Mar-2019	20-Mar-2019	20-Mar-2019	20-Mar-2019	20-Mar-2019
Mercury Dissolved	21-Mar-2019	21-Mar-2019	21-Mar-2019	21-Mar-2019	21-Mar-2019	21-Mar-2019	21-Mar-2019
Nitrite by Kone (w)	18-Mar-2019	18-Mar-2019	18-Mar-2019	18-Mar-2019	18-Mar-2019	18-Mar-2019	18-Mar-2019
pH Value	18-Mar-2019	19-Mar-2019	18-Mar-2019	19-Mar-2019	19-Mar-2019	18-Mar-2019	18-Mar-2019
Phosphate by Kone (w)	18-Mar-2019	18-Mar-2019	18-Mar-2019	18-Mar-2019	18-Mar-2019	18-Mar-2019	18-Mar-2019
Sulphide	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019
Total Metals by ICP-MS	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019	19-Mar-2019
TPH CWG (W)	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019	25-Mar-2019



CERTIFICATE OF ANALYSIS

Validated

SDG: 190315-108
Location: AvonmouthClient Reference: 40478
Order Number:Report Number: 498198
Superseded Report:

ASSOCIATED AQC DATA

Ammoniacal Nitrogen

Component	Method Code	QC 1966
Ammoniacal Nitrogen as N	TM099	100.8 93.14 : 108.60

Anions by Kone (w)

Component	Method Code	QC 1963
Chloride	TM184	105.0 92.93 : 115.43
Phosphate (Ortho as PO4)	TM184	96.40 : 108.40
Sulphate (soluble)	TM184	106.4 90.53 : 113.03
TON as NO3	TM184	102.5 96.26 : 111.21

COD Unfiltered

Component	Method Code	QC 1952
COD	TM107	100.19 97.45 : 103.77

Conductivity (at 20 deg.C)

Component	Method Code	QC 1960	QC 1994
Conductivity (at 20 deg.C)	TM120	102.26 100.75 : 105.26	103.76 100.75 : 105.26

Dissolved Metals by ICP-MS

Component	Method Code	QC 1985
Aluminium	TM152	102.0 94.19 : 114.31
Antimony	TM152	108.0 79.80 : 122.00
Arsenic	TM152	106.5 90.42 : 111.32
Barium	TM152	105.67 90.79 : 113.16
Beryllium	TM152	104.5 93.25 : 120.04
Bismuth	TM152	107.5 94.65 : 117.05



CERTIFICATE OF ANALYSIS

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SDG: 190315-108
Location: AvonmouthClient Reference: 40478
Order Number:Report Number: 498198
Superseded Report:

Dissolved Metals by ICP-MS

		QC 1985
Borate	TM152	107.41 88.00 : 112.00
Boron	TM152	107.33 86.68 : 117.67
Cadmium	TM152	106.17 94.60 : 112.40
Calcium	TM152	105.33 83.40 : 121.11
Chromium	TM152	106.33 93.28 : 110.91
Cobalt	TM152	104.0 84.39 : 114.26
Copper	TM152	108.17 88.86 : 118.72
Iron	TM152	105.33 92.00 : 113.00
Lead	TM152	105.83 89.25 : 115.12
Lithium	TM152	99.83 89.26 : 119.04
Magnesium	TM152	104.0 86.35 : 113.36
Manganese	TM152	105.67 94.24 : 112.74
Molybdenum	TM152	103.33 87.00 : 108.89
Nickel	TM152	107.33 92.11 : 110.56
Phosphorus	TM152	105.33 90.52 : 115.47
Potassium	TM152	104.67 98.63 : 110.48
Selenium	TM152	107.0 88.44 : 113.86
Silver	TM152	107.0 94.40 : 114.74
Sodium	TM152	104.67 97.63 : 110.31
Strontium	TM152	103.67 90.72 : 114.82
Tellurium	TM152	104.5 90.72 : 112.62
Thallium	TM152	105.83 86.08 : 122.48
Tin	TM152	104.83 91.00 : 109.00
Titanium	TM152	99.5 91.87 : 102.47
Tungsten	TM152	104.0 78.12 : 132.82
Uranium	TM152	106.67 90.58 : 113.28
Vanadium	TM152	100.83 88.43 : 114.30



CERTIFICATE OF ANALYSIS

Validated

SDG: 190315-108
Location: Avonmouth

Client Reference: 40478
Order Number:

Report Number: 498198
Superseded Report:

Dissolved Metals by ICP-MS

		QC 1985
Zinc	TM152	109.0 86.52 : 115.27

EPH CWG (Aliphatic) Aqueous GC (W)

Component	Method Code	QC 1912
Total Aliphatics >C10-C40	TM174	105.12 76.90 : 121.59

EPH CWG (Aromatic) Aqueous GC (W)

Component	Method Code	QC 1973
Total Aromatics >EC10-EC40	TM174	96.83 61.18 : 130.02

GRO by GC-FID (W)

Component	Method Code	QC 1979
Benzene by GC	TM245	94.5 77.76 : 121.54
Ethylbenzene by GC	TM245	98.5 76.04 : 121.93
m & p Xylene by GC	TM245	98.25 75.79 : 121.81
MTBE GC-FID	TM245	95.0 78.56 : 122.20
o Xylene by GC	TM245	100.0 76.38 : 121.51
QC	TM245	93.42 66.08 : 129.83
Toluene by GC	TM245	96.5 76.66 : 123.55

Mercury Dissolved

Component	Method Code	QC 1936
Mercury Dissolved (CVAf)	TM183	99.8 75.00 : 111.00

pH Value



CERTIFICATE OF ANALYSIS

Validated

SDG: 190315-108
Location: Avonmouth

Client Reference: 40478
Order Number:

Report Number: 498198
Superseded Report:

pH Value

Component	Method Code	QC 1972	QC 1983
pH	TM256	101.08 99.73 : 102.16	101.62 99.33 : 102.56

Phosphate by Kone (w)

Component	Method Code	QC 1904	QC 1929
Phosphate (Ortho as PO4)	TM184	102.4 96.40 : 109.60	102.4 96.40 : 109.60

Sulphide

Component	Method Code	QC 1949	QC 1909
Sulphide	TM101	101.33 88.90 : 112.50	108.0 88.90 : 112.50

Total Metals by ICP-MS

Component	Method Code	QC 1950	QC 1953	QC 1958
Aluminium	TM152	103.0 89.90 : 110.02	101.0 89.90 : 110.02	103.0 89.90 : 110.02
Antimony	TM152	100.0 80.45 : 122.65	102.0 80.45 : 122.65	101.67 80.45 : 122.65
Arsenic	TM152	100.33 85.20 : 116.13	101.5 85.20 : 116.13	102.17 85.20 : 116.13
Barium	TM152	101.83 92.02 : 112.48	101.83 92.02 : 112.48	103.5 92.02 : 112.48
Beryllium	TM152	105.17 86.15 : 118.35	103.5 86.15 : 118.35	106.33 86.15 : 118.35
Bismuth	TM152	102.0 93.28 : 110.08	105.5 93.28 : 110.08	105.0 93.28 : 110.08
Boron	TM152	103.67 86.68 : 117.67	100.67 86.68 : 117.67	105.0 86.68 : 117.67
Cadmium	TM152	103.33 92.07 : 109.87	106.0 92.07 : 109.87	105.0 92.07 : 109.87
Calcium	TM152	104.0 81.38 : 119.09	105.33 81.38 : 119.09	105.33 81.38 : 119.09
Chromium	TM152	102.0 90.87 : 108.50	103.5 90.87 : 108.50	104.5 90.87 : 108.50
Cobalt	TM152	100.17 84.39 : 114.26	100.5 84.39 : 114.26	102.5 84.39 : 114.26
Copper	TM152	105.0 84.61 : 114.08	106.0 84.61 : 114.08	105.83 84.61 : 114.08
Iron	TM152	100.67 90.63 : 108.66	100.67 90.63 : 108.66	103.33 90.63 : 108.66



CERTIFICATE OF ANALYSIS

Validated

SDG: 190315-108
Location: Avonmouth

Client Reference: 40478
Order Number:

Report Number: 498198
Superseded Report:

Total Metals by ICP-MS

		QC 1950	QC 1953	QC 1958
Lead	TM152	103.0 85.65 : 113.58	104.0 85.65 : 113.58	104.83 85.65 : 113.58
Lithium	TM152	103.0 89.26 : 119.04	101.33 89.26 : 119.04	102.83 89.26 : 119.04
Magnesium	TM152	104.0 85.55 : 112.00	104.0 85.55 : 112.00	106.67 85.55 : 112.00
Manganese	TM152	101.17 90.63 : 109.13	101.0 90.63 : 109.13	103.5 90.63 : 109.13
Molybdenum	TM152	97.17 87.00 : 108.89	104.17 87.00 : 108.89	97.33 87.00 : 108.89
Nickel	TM152	100.83 88.26 : 111.14	102.83 88.26 : 111.14	102.83 88.26 : 111.14
Phosphorus	TM152	100.67 90.52 : 115.47	101.67 90.52 : 115.47	102.33 90.52 : 115.47
Potassium	TM152	103.33 86.97 : 112.46	102.0 86.97 : 112.46	105.33 86.97 : 112.46
Selenium	TM152	104.83 88.44 : 113.86	104.83 88.44 : 113.86	105.83 88.44 : 113.86
Silver	TM152	103.0 76.93 : 112.73	104.17 76.93 : 112.73	105.5 76.93 : 112.73
Sodium	TM152	104.67 84.47 : 113.44	104.67 84.47 : 113.44	108.0 84.47 : 113.44
Strontium	TM152	102.67 90.72 : 114.82	101.0 90.72 : 114.82	102.33 90.72 : 114.82
Tellurium	TM152	101.83 86.97 : 108.87	103.5 86.97 : 108.87	103.33 86.97 : 108.87
Thallium	TM152	101.83 80.92 : 114.72	103.0 80.92 : 114.72	103.0 80.92 : 114.72
Tin	TM152	101.17 90.79 : 108.79	103.5 90.79 : 108.79	103.17 90.79 : 108.79
Titanium	TM152	94.17 86.95 : 104.65	93.67 86.95 : 104.65	95.33 86.95 : 104.65
Uranium	TM152	98.67 90.58 : 113.28	100.67 90.58 : 113.28	99.83 90.58 : 113.28
Vanadium	TM152	101.33 88.43 : 114.30	103.67 88.43 : 114.30	102.67 88.43 : 114.30
Zinc	TM152	108.0 86.52 : 115.27	107.67 86.52 : 115.27	109.0 86.52 : 115.27

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:	190315-108	Client Reference:	40478	Report Number:	498198
Location:	Avonmouth	Order Number:		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. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

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

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

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

13. **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.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

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

18. 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.

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

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

General

21. 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.

22. 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.

23. 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.

24. **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.

Sample Deviations

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

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

Asbestos

Identification of Asbestos in Bulk Materials & Soils

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

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

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

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.



Appendix D

Comparison of Results Against Trigger Values

WS001 Biomethane Upgrade Plant (General) and Chemical Storage
Baseline Groundwater Data and EMP Trigger Levels

Assessed by:	Lynne Gemmell
Reviewed by:	Laurence Munden

Below Control and Compliance Levels
Above Control Level
Above Compliance Level

										Above Control Level	
										Above Compliance Level	

Notes
Trigger values applied associated with monitoring location
Hazardous substances with Minimum Reporting Value (MRV)

* Environment Agency MRV for Hazardous Substances used as Control Level and Compliance Level

** LOD - Limit of Detection used as Control Level and Compliance Level where above the MRV used

*** Maximum concentration used as Control Level and Trigger Level where MRV exceeded from historical contamination, or where no MRV published for hydrocarbons.

Environment Agency MRV: <https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values> [last accessed 29/06/16]

Assessed by:	Lynne Gemmell
Reviewed by:	Laurence Munden

Notes
Trigger values applied associated with monitoring location
Hazardous substances with Minimum Reporting Value (MRV)

Environment Agency MRV: <https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values> [last accessed 29/06/16]

WS003 Former Condensate Soakaways and Anaerobic Digester Tanks Baseline Groundwater Data and EMP Trigger Levels

Assessed by:	Lynne Gemmell
Reviewed by:	Laurence Munden

Below Control and Compliance Levels
Above Control Level
Above Compliance Level

Customer Sample ID	Depth	Round 1	Round 2	Round 3
		WS003	WS003	WS003
		1.91-	1.76-	1.82-

Avonmouth STW				Sampled Date	18/03/2016	30/03/2016	15/04/2016				Control Level	Compliance Level			
Test	Method	Units	LOD					Max	Min	Mean	Trigger 1	Trigger 2	Notes	Jan-18	Mar-19
Inorganics															
Conductivity @ 20 deg.C	TM120	mS/cm	<0.005	1.39	1.44	1.44	1.44	1.39	1.423		n/a	n/a		1.56	1.51
Nitrite as NO2	TM184	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10	0.50	WQT (Trigger 2)	<0.05	<0.05
pH	TM256	pH Units	<1	7.72	7.66	7.76	7.76	7.66	7.713		n/a	n/a		7.59	7.9
Sulphate	TM184	mg/l	<2	<2	<2	<2	<2	<2	<2		4.00	20.00	Trigger 2 < WQT	<2	
Sulphide	TM101	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		0.02	0.10	No standard	<0.01	<0.01
Chloride	TM184	mg/l	<2	90.1	95.5	102	102	90.1	95.867		103.23	204.00	Trigger 2 < WQT	111.00	106.00
COD, unfiltered	TM107	mg/l	<7	259	129	98.4	259	98.4	162.133		n/a	n/a		98.4	41.3
Ammoniacal Nitrogen as NH4	TM099	mg/l	<0.3	3.51	2.65	3	3.51	2.65	3.053		3.51	3.51	Max used *** (Mean + 1.2 x Variance >WQT)	2.80	2.78
Phosphate (ortho) as PO4	TM184	mg/l	<0.05	2.37	4.64	4.94	4.94	2.37	3.983		4.94	4.94	Max used *** (Mean + 1.2 x Variance >WQT)	1.23	4.16
Nitrate as NO3	TM184	mg/l	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		0.60	3.00	Trigger 2 < WQT	<0.3	<0.3
Filtered (Dissolved) Metals															
Mercury (diss.filt)	TM183	mg/l	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		n/a	n/a	No triggers set - Data for baseline	<0.00001	<0.00001
Arsenic (diss.filt)	TM152	mg/l	<0.00012	0.0987	0.145	0.206	0.206	0.0987	0.150		n/a	n/a	No triggers set - Data for baseline	0.12	0.15
Sodium (diss.filt)	TM228	mg/l	<0.076	204	214	232	232	204	216.667		232	232	Max used *** (Mean + 1.2 x Variance >WQT)	257.00	242.00
Potassium (diss.filt)	TM228	mg/l	<1	32.6	31.9	32.7	32.7	31.9	32.400		32.8	65.4	No standard	35.5	33.1
Hardness, Total as CaCO3	TM228	mg/l	<1	258	296	282	296	258	278.667		n/a	n/a	No triggers set - Data for baseline	398	374
Cadmium (diss.filt)	TM152	mg/l	<0.0001	<0.0001	<0.0001	0.00275	0.00275	0.00275	0.002750		n/a	n/a	No triggers set - Data for baseline	0.0001	<0.00008
Chromium (diss.filt)	TM152	mg/l	<0.00022	0.000233	0.0113	0.0131	0.0131	0.000233	0.008211		n/a	n/a	No triggers set - Data for baseline	<0.001	<0.001
Copper (diss.filt)	TM152	mg/l	<0.00085	<0.00085	0.00225	0.00831	0.00831	0.00225	0.005280		n/a	n/a	No triggers set - Data for baseline	0.0008	<0.0003
Lead (diss.filt)	TM152	mg/l	<0.00002	0.00198	0.00317	0.00145	0.00317	0.00145	0.002200		n/a	n/a	No triggers set - Data for baseline	0.0003	0.0004
Nickel (diss.filt)	TM152	mg/l	<0.00015	0.01	0.0125	0.00973	0.0125	0.00973	0.010743		n/a	n/a	No triggers set - Data for baseline	0.01	0.01
Selenium (diss.filt)	TM152	mg/l	<0.00039	0.00248	0.00407	0.00882	0.00882	0.00248	0.005123		n/a	n/a	No triggers set - Data for baseline	0.0007	<0.001
Zinc (diss.filt)	TM152	mg/l	<0.00041	0.00914	0.0236	0.0317	0.0317	0.00914	0.021480		n/a	n/a	No triggers set - Data for baseline	0.01	0.0014
TPH Criteria Working Group (TPH CWC)															
GRO >C5-C12	TM245	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		0.050	0.050	LOD **	<0.05	<0.05
Methyl tertiary butyl ether (MTBE)	TM245	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		0.003	0.003	LOD **	<0.003	<0.003
Benzene	TM245	mg/l	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007		0.007	0.007	LOD **	<0.007	<0.007
Toluene	TM245	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		0.004	0.004	MRV * / LOD **	<0.004	<0.004
Ethylbenzene	TM245	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		0.005	0.005	LOD **	<0.005	<0.005
m,p-Xylene	TM245	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008		0.008	0.008	LOD **	<0.008	<0.008
o-Xylene	TM245	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		0.003	0.003	MRV * / LOD **	<0.003	<0.003
Sum of detected Xylenes	TM245	mg/l	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011		0.011	0.011	LOD **	<0.011	<0.011
Sum of detected BTEX	TM245	mg/l	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028		0.028	0.028	LOD **	<0.028	<0.028
Aliphatics >C5-C6	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aliphatics >C6-C8	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aliphatics >C8-C10	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aliphatics >C10-C12	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aliphatics >C12-C16 (aq)	TM174	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aliphatics >C16-C21 (aq)	TM174	mg/l	<0.01	0.118	0.05	0.033	0.118	0.033	0.067		n/a	n/a	No triggers set - Data for baseline	0.015	<0.01
Aliphatics >C21-C35 (aq)	TM174	mg/l	<0.01	0.132	0.063	0.032	0.132	0.032	0.076		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Total Aliphatics >C12-C35 (aq)	TM174	mg/l	<0.01	0.25	0.113	0.065	0.25	0.065	0.143		n/a	n/a	No triggers set - Data for baseline	0.015	<0.01
Aromatics >EC5-EC7	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC7-EC8	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC8-EC10	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC10-EC12	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC12-EC16 (aq)	TM174	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC16-EC21 (aq)	TM174	mg/l	<0.01	0.021	0.01	<0.01	0.021	0.01	0.016		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC21-EC35 (aq)	TM174	mg/l	<0.01	0.072	0.039	<0.01	0.072	0.039	0.056		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Total Aromatics >EC12-EC35 (aq)	TM174	mg/l	<0.01	0.093	0.049	<0.01	0.093	0.049	0.071		n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Total Aliphatics & Aromatics >C5-35 (aq)	TM174	mg/l	<0.01	0.343	0.162	0.065	0.343	0.065	0.190		n/a	n/a	No triggers set - Data for baseline	0.015	<0.01

Notes

Trigger values applied associated with monitoring location
Hazardous substances with Minimum Reporting Value (MRV)

* Environment Agency MRV for Hazardous Substances used as Control Level and Compliance Level

** LOD - Limit of Detection used as Control Level and Compliance Level where above the MRV used

*** Maximum concentration used as Control Level and Trigger Level where MRV exceeded from historical contamination, or where no MRV published for hydrocarbons.

Environment Agency MRV: <https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values> [last accessed 29/06/16]

WS005 Sludge Drying, Anaerobic Digesters and Proposed Pumping Station Baseline Groundwater Data and EMP Trigger Levels

Assessed by:	Lynne Gemmell
Reviewed by:	Laurence Munden

Below Control and Compliance Levels
Above Control Level
Above Compliance Level

										Above Control Level				
										Above Compliance Level				
			Customer Sample ID	WS005	WS005	WS005								
			Depth	1.71-	1.55-	1.66-								
			Sampled Date	18/03/2016	30/03/2016	15/04/2016				Control Level	Compliance Level			
Test	Method	Units	LOD				Max	Min	Mean	Trigger 1	Trigger 2	Notes	Jan-18	Mar-19
Inorganics														
Conductivity @ 20 deg.C	TM120	mS/cm	<0.005	1.79	0.548	0.93	1.79	0.548	1.089	n/a	n/a		1.51	1.65
Nitrite as NO2	TM184	mg/l	<0.05	0.249	0.281	0.423	0.423	0.249	0.318	0.44	0.50	WQT (Trigger 2)	<0.05	<0.05
pH	TM256	pH Units	<1	8.06	7.8	7.87	8.06	7.8	7.910	n/a	n/a		7.56	7.69
Sulphate	TM184	mg/l	<2	67.4	40.6	61.9	67.4	40.6	56.633	69.55	134.80	Trigger 2 < WQT	37.20	39.20
Sulphide	TM101	mg/l	<0.01	<0.01	0.077	0.182	0.182	0.077	0.130	0.19	0.36	No standard	0.02	<0.01
Chloride	TM184	mg/l	<2	281	40.5	109	281	40.5	143.500	281.00	281.00	Max used *** (Mean + 1.2 x Variance >WQT)	191.00	244.00
COD, unfiltered	TM107	mg/l	<7	-	79	47.2	79	47.2	63.100	n/a	n/a		89.8	55.1
Ammoniacal Nitrogen as NH4	TM099	mg/l	<0.3	3.12	<0.3	1.3	3.12	1.3	2.210	3.12	3.12	Max used *** (Mean + 1.2 x Variance >WQT)	1.66	1.57
Phosphate (ortho) as PO4	TM184	mg/l	<0.05	0.12	0.251	0.103	0.251	0.103	0.158	0.27	0.50	Trigger 2 < WQT	<0.02	<0.05
Nitrate as NO3	TM184	mg/l	<0.3	0.72	24	6.68	24	0.72	10.467	26.71	48.00	Trigger 2 < WQT	0.69	<0.3
Filtered (Dissolved) Metals														
Mercury (diss.filt)	TM183	mg/l	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	n/a	n/a	No triggers set - Data for baseline	<0.00001	<0.00001
Arsenic (diss.filt)	TM152	mg/l	<0.00012	0.00543	0.00728	0.00439	0.00728	0.00439	0.006	n/a	n/a	No triggers set - Data for baseline	0.002	0.003
Sodium (diss.filt)	TM228	mg/l	<0.076	171	29.2	67	171	29.2	89.067	187	200	WQT (Trigger 2)	131.00	163.00
Potassium (diss.filt)	TM228	mg/l	<1	15.3	8.59	8.95	15.3	8.59	10.947	16.2	30.6	No standard	8	7.88
Hardness, Total as CaCO3	TM228	mg/l	<1	567	209	350	567	209	375.333	n/a	n/a	No triggers set - Data for baseline	635.000	707.000
Cadmium (diss.filt)	TM152	mg/l	<0.0001	<0.0001	<0.0001	0.000414	0.000414	0.000414	0.000414	n/a	n/a	No triggers set - Data for baseline	0.001	<0.00008
Chromium (diss.filt)	TM152	mg/l	<0.00022	0.0172	0.00393	0.00527	0.0172	0.00393	0.008800	n/a	n/a	No triggers set - Data for baseline	<0.001	<0.001
Copper (diss.filt)	TM152	mg/l	<0.00085	0.00989	0.00705	0.00784	0.00989	0.00705	0.008260	n/a	n/a	No triggers set - Data for baseline	0.0092	<0.0003
Lead (diss.filt)	TM152	mg/l	<0.00002	0.000298	0.000274	0.000114	0.000298	0.000114	0.000229	n/a	n/a	No triggers set - Data for baseline	<0.0002	0.0003
Nickel (diss.filt)	TM152	mg/l	<0.00015	0.0121	0.00282	0.00447	0.0121	0.00282	0.006463	n/a	n/a	No triggers set - Data for baseline	0.0101	0.0089
Selenium (diss.filt)	TM152	mg/l	<0.00039	0.00435	0.00777	0.00741	0.00777	0.00435	0.006510	n/a	n/a	No triggers set - Data for baseline	0.0017	<0.001
Zinc (diss.filt)	TM152	mg/l	<0.00041	0.00463	0.0411	0.0419	0.0419	0.00463	0.029210	n/a	n/a	No triggers set - Data for baseline	0.0673	0.0044
TPH Criteria Working Group (TPH CWC)														
GRO >C5-C12	TM245	mg/l	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	n/a	n/a	No triggers set - Data for baseline	<0.05	<0.05
Methyl tertiary butyl ether (MTBE)	TM245	mg/l	<0.003	-	<0.003	<0.003	<0.003	<0.003	<0.003	n/a	n/a	No triggers set - Data for baseline	<0.003	<0.003
Benzene	TM245	mg/l	<0.007	-	<0.007	<0.007	<0.007	<0.007	<0.007	n/a	n/a	No triggers set - Data for baseline	<0.007	<0.007
Toluene	TM245	mg/l	<0.004	-	<0.004	<0.004	<0.004	<0.004	<0.004	n/a	n/a	No triggers set - Data for baseline	<0.004	<0.004
Ethylbenzene	TM245	mg/l	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	n/a	n/a	No triggers set - Data for baseline	<0.005	<0.005
m,p-Xylene	TM245	mg/l	<0.008	-	<0.008	<0.008	<0.008	<0.008	<0.008	n/a	n/a	No triggers set - Data for baseline	<0.008	<0.008
o-Xylene	TM245	mg/l	<0.003	-	<0.003	<0.003	<0.003	<0.003	<0.003	n/a	n/a	No triggers set - Data for baseline	<0.003	<0.003
Sum of detected Xylenes	TM245	mg/l	<0.011	-	<0.011	<0.011	<0.011	<0.011	<0.011	n/a	n/a	No triggers set - Data for baseline	<0.011	<0.011
Sum of detected BTEX	TM245	mg/l	<0.028	-	<0.028	<0.028	<0.028	<0.028	<0.028	n/a	n/a	No triggers set - Data for baseline	<0.028	<0.028
Aliphatics >C5-C6	TM245	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aliphatics >C6-C8	TM245	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aliphatics >C8-C10	TM245	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aliphatics >C10-C12	TM245	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aliphatics >C12-C16 (aq)	TM174	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	0.019	<0.01
Aliphatics >C16-C21 (aq)	TM174	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	0.029	<0.01
Aliphatics >C21-C35 (aq)	TM174	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	0.148	<0.01
Total Aliphatics >C12-C35 (aq)	TM174	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	0.196	<0.01
Aromatics >EC5-EC7	TM245	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC7-EC8	TM245	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC8-EC10	TM245	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC10-EC12	TM245	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC12-EC16 (aq)	TM174	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Aromatics >EC16-EC21 (aq)	TM174	mg/l	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	n/a	n/a	No triggers set - Data for baseline	0.024	<0.01
Aromatics >EC21-EC35 (aq)	TM174	mg/l	<0.01	-	0.039	<0.01	0.039	0.039	0.039	n/a	n/a	No triggers set - Data for baseline	0.074	<0.01
Total Aromatics >EC12-EC35 (aq)	TM174	mg/l	<0.01	-	0.039	<0.01	0.039	0.039	0.039	n/a	n/a	No triggers set - Data for baseline	0.098	<0.01
Total Aliphatics & Aromatics >C5-35 (aq)	TM174	mg/l	<0.01	-	0.04	<0.01	0.04	0.04	0.040	n/a	n/a	No triggers set - Data for baseline	0.294	<0.01

Notes
Trigger values applied associated with monitoring location
Hazardous substances with Minimum Reporting Value (MRV)

* Environment Agency MRV for Hazardous Substances used as Control Level and Compliance Level

** LOD - Limit of Detection used as Control Level and Compliance Level where above the MRV used

*** Maximum concentration used as Control Level and Trigger Level where MRV exceeded from historical contamination, or where no MRV published for hydrocarbons.

Environment Agency MRV: <https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values> [last accessed 29/06/16]

Assessed by:	Lynne Gemmell
Reviewed by:	Laurence Munden

Notes
Trigger values applied associated with monitoring location
Hazardous substances with Minimum Reporting Value (MRV)

* Environment Agency MRV for Hazardous Substances used as Control Level and Compliance Level

WS007 Fuel Storage, Workshop and Engines Baseline Groundwater Data and EMP Trigger Levels

Assessed by:	Lynne Gemmell
Reviewed by:	Laurence Munden

				Round 1	Round 2	Round 3								
Customer Sample ID				WS007	WS007	WS007								
Depth				2.24-	2.00-	2.15-								
Sampled Date				18/03/2016	30/03/2016	15/04/2016				Control Level		Compliance Level		
Test	Method	Units	LOD				Max	Min	Mean	Trigger 1	Trigger 2	Notes	Jan-16	Mar-19
Inorganics														
Conductivity @ 20 deg.C	TM120	mS/cm	<0.005	1.81	1.7	1.58	1.81	1.58	1.697	n/a	n/a	No triggers set - Data for baseline	1.39	1.32
Nitrite as NO2	TM184	mg/l	<0.05	<0.05	<0.05	0.143	0.143	0.143	0.143	n/a	n/a	No triggers set - Data for baseline	<0.05	<0.05
pH	TM256	pH Units	<1	7.94	7.43	7.44	7.94	7.43	7.603	n/a	n/a	No triggers set - Data for baseline	7.59	7.72
Sulphate	TM184	mg/l	<2	412	345	326	412	326	361.000	n/a	n/a	No triggers set - Data for baseline	178.00	185.00
Sulphide	TM101	mg/l	<0.01	0.0895	0.149	<0.01	0.149	0.0895	0.119	n/a	n/a	No triggers set - Data for baseline	<0.01	<0.01
Chloride	TM184	mg/l	<2	193	168	139	193	139	166.667	n/a	n/a	No triggers set - Data for baseline	112.00	132.00
COD, unfiltered	TM107	mg/l	<7	203	49	72.6	203	49	108.200	n/a	n/a	No triggers set - Data for baseline	113	34.1
Ammoniacal Nitrogen as NH4	TM099	mg/l	<0.3	2.4	2.11	2.2	2.4	2.11	2.237	n/a	n/a	No triggers set - Data for baseline	2.94	1.38
Phosphate (ortho) as PO4	TM184	mg/l	<0.05	0.142	0.063	0.059	0.142	0.059	0.088	n/a	n/a	No triggers set - Data for baseline	0.16	0.31
Nitrate as NO3	TM184	mg/l	<0.3	0.385	5.47	2.77	5.47	0.385	2.875	n/a	n/a	No triggers set - Data for baseline	5.36	2.30
Filtered (Dissolved) Metals														
Mercury (diss.filt)	TM183	mg/l	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	n/a	n/a	No triggers set - Data for baseline	<0.00001	<0.00001
Arsenic (diss.filt)	TM152	mg/l	<0.00012	0.00859	0.00373	0.00295	0.00859	0.00295	0.005	n/a	n/a	No triggers set - Data for baseline	0.01	0.00
Sodium (diss.filt)	TM228	mg/l	<0.076	112	103	96.1	112	96.1	103.700	n/a	n/a	No triggers set - Data for baseline	96.60	73.50
Potassium (diss.filt)	TM228	mg/l	<1	27	25.6	24.6	27	24.6	25.733	n/a	n/a	No triggers set - Data for baseline	23.9	20.8
Hardness, Total as CaCO3	TM228	mg/l	<1	708	675	649	708	649	677.333	n/a	n/a	No triggers set - Data for baseline	699	558
Cadmium (diss.filt)	TM152	mg/l	<0.0001	<0.0001	0.000214	0.000825	0.000825	0.000214	0.000520	n/a	n/a	No triggers set - Data for baseline	0.000114	<0.00008
Chromium (diss.filt)	TM152	mg/l	<0.00022	0.00958	0.00823	0.000419	0.00958	0.000419	0.006076	n/a	n/a	No triggers set - Data for baseline	<0.001	<0.001
Copper (diss.filt)	TM152	mg/l	<0.00085	0.003	0.00268	0.00257	0.003	0.00257	0.002750	n/a	n/a	No triggers set - Data for baseline	0.0012	0.0005
Lead (diss.filt)	TM152	mg/l	<0.00002	0.00129	0.000502	0.000295	0.00129	0.000295	0.000696	n/a	n/a	No triggers set - Data for baseline	0.0004	0.0003
Nickel (diss.filt)	TM152	mg/l	<0.00015	0.0142	0.0133	0.0119	0.0142	0.0119	0.013133	n/a	n/a	No triggers set - Data for baseline	0.0044	0.0024
Selenium (diss.filt)	TM152	mg/l	<0.00039	0.00194	0.00352	0.00332	0.00352	0.00194	0.002927	n/a	n/a	No triggers set - Data for baseline	0.0010	0.0015
Zinc (diss.filt)	TM152	mg/l	<0.00041	0.0102	0.0507	0.0463	0.0507	0.0102	0.035733	n/a	n/a	No triggers set - Data for baseline	0.0337	0.0160
TPH Criteria Working Group (TPH CWC)														
GRO >C5-C12	TM245	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.050	0.050	LOD **	<0.05	<0.05
Methyl tertiary butyl ether (MTBE)	TM245	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.003	LOD **	<0.003	<0.003
Benzene	TM245	mg/l	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	0.007	0.007	LOD **	<0.007	<0.007
Toluene	TM245	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.004	0.004	MRV * / LOD **	<0.004	<0.004
Ethylbenzene	TM245	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.005	LOD **	<0.005	<0.005
m,p-Xylene	TM245	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.008	0.008	LOD **	<0.008	<0.008
o-Xylene	TM245	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.003	MRV * / LOD **	<0.003	<0.003
Sum of detected Xylenes	TM245	mg/l	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	0.011	0.011	LOD **	<0.011	<0.011
Sum of detected BTEX	TM245	mg/l	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	0.028	0.028	LOD **	<0.028	<0.028
Aliphatics >C5-C6	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.010	0.010	LOD **	<0.01	<0.01
Aliphatics >C6-C8	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.020	0.020	LOD **	<0.01	<0.01
Aliphatics >C8-C10	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.020	0.020	LOD **	<0.01	<0.01
Aliphatics >C10-C12	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.020	0.020	LOD **	<0.01	<0.01
Aliphatics >C12-C16 (aq)	TM174	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.020	0.020	LOD **	<0.01	<0.01
Aliphatics >C16-C21 (aq)	TM174	mg/l	<0.01	0.058	0.014	0.019	0.058	0.014	0.030	0.058	0.058	Max detected ***	0.024	<0.01
Aliphatics >C21-C35 (aq)	TM174	mg/l	<0.01	0.089	0.024	0.01	0.089	0.01	0.041	0.089	0.089	Max detected ***	<0.01	<0.01
Total Aliphatics >C12-C35 (aq)	TM174	mg/l	<0.01	0.147	0.038	0.029	0.147	0.029	0.071	0.147	0.147	Max detected ***	0.024	<0.01
Aromatics >EC5-EC7	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.010	0.010	LOD **	<0.01	<0.01
Aromatics >EC7-EC8	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.010	0.010	LOD **	<0.01	<0.01
Aromatics >EC8-EC10	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.010	0.010	LOD **	<0.01	<0.01
Aromatics >EC10-EC12	TM245	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.010	0.010	LOD **	<0.01	<0.01
Aromatics >EC12-EC16 (aq)	TM174	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.010	0.010	LOD **	<0.01	<0.01
Aromatics >EC16-EC21 (aq)	TM174	mg/l	<0.01	0.017	<0.01	<0.01	0.017	0.017	0.017	0.017	0.017	Max detected ***	<0.01	<0.01
Aromatics >EC21-EC35 (aq)	TM174	mg/l	<0.01	0.06	0.02	<0.01	0.06	0.02	0.040	0.060	0.060	Max detected ***	<0.01	<0.01
Total Aromatics >EC12-EC35 (aq)	TM174	mg/l	<0.01	0.077	0.02	<0.01	0.077	0.02	0.049	0.077	0.077	Max detected ***	<0.01	<0.01
Total Aliphatics & Aromatics >C5-35 (aq)	TM174	mg/l	<0.01	0.249	0.058	0.029	0.249	0.029	0.112	0.249	0.249	Max detected ***	0.024	<0.01

Notes
Trigger values applied associated with monitoring location
Hazardous substances with Minimum Reporting Value (MRV)

* Environment Agency MRV for Hazardous Substances used as Control Level and Compliance Level

** LOD - Limit of Detection used as Control Level and Compliance Level where above the MRV used

*** Maximum concentration used as Control Level and Trigger Level where MRV exceeded from historical contamination, or where no MRV published for hydrocarbons.

Environment Agency MRV: <https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values> [last accessed 29/06/16]

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