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 Environmental Manager
 The Royal Mint
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Dear Martyn

**REPORT ON SURFACE WATER AND GROUNDWATER SAMPLING IN
 NOVEMBER 2019**

Date 10/01/2020

Ramboll UK Limited ('Ramboll') was instructed by The Royal Mint to carry out surface water sampling from selected locations in the Nant Mychydd River; and groundwater sampling from selected boreholes in the area of Building 9A, the Coin Press Room (CPR), the COMAH area and the southern site boundary. This letter presents the results of the second of two rounds of monitoring undertaken in May (first round) and November 2019 (second round).

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Background

Natural Resources Wales (NRW) issued a Compliance Assessment Report (CAR, Ref: CAR_NRW0034780) in March 2019, which confirmed acceptance of Ramboll's annual report surface water and groundwater monitoring dated February 2019 (Ref: 1700002116_01_February 2019).

Ref L1700003935_01
 November 2019

Surface water sampling from the Nant-Mychydd and its tributaries was carried out on a six-monthly basis in 2018/19; and statistical analysis of the results carried out annually. The latest report identified that the majority of metals are either stable or decreasing in concentrations over time; however, occasional exceedances of the EQS values for pH, copper and zinc were recorded over the monitoring period. NRW has agreed that surface water sampling should continue on a six-monthly basis with a view to analysing trends and demonstrating no losses of containment from the site.

Groundwater sampling was carried out on a four-monthly basis in 2018/19 from selected boreholes that recorded elevated concentrations of metals and/or low pH on more than one occasion. The most elevated concentrations have historically been identified down-hydraulic gradient (south) of Building 9A

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(Annealing and Pickling); and to the west of the building; however, a recent bund integrity survey within the building found all bunds to be in good condition. The pH values in BH8 and BH9 have been consistently low and NRW has recommended sampling from additional (existing) upgradient boreholes to help identify the source.

Overall, statistical analysis identified stable or decreasing trends in concentrations and accordingly, NRW agreed to continue groundwater sampling on a six-monthly basis in line with the surface water sampling.

November 2019 Surface Water Monitoring Results

Surface water samples were collected on the 28th November 2019 from five sampling locations on the Nant Mychudd River and the culverted watercourse that passes through the site (sampling points R1, R6, R7, R7A and C1), as shown on Figure 1. Samples were analysed for a range of metals, pH, hardness, cyanide and total petroleum hydrocarbons (TPH) at a UKAS accredited laboratory (Element, formerly Exova Jones Environmental). The laboratory certificate of analysis is included in Appendix 1, which provides the method of analysis for each determinand. The surface water analysis results from April 2011 to November 2019 are summarised in a table in Appendix 2 and represented graphically in Appendix 3.

- Nickel concentrations of 0.0028mg/l and 0.0009mg/l were recorded at sampling points R7A and C1 respectively, both of which are below the EQS value of 0.02mg/l. Nickel was below the laboratory limit of detection at all other surface water sampling points.
- Zinc was recorded at a concentration ranging from 0.0028mg/l at sampling point R1 to 0.0115mg/l at sampling point R7A, which is below the EQS value of 0.050mg/l (for hardness between 50mg/l and 100mg/l CaCO₃).
- Copper was recorded at a concentration of 0.006mg/l at sampling point R7A, which is equal to the EQS value (for hardness between 50mg/l and 100mg/l CaCO₃). Copper was below the laboratory limit of detection at all other surface water sampling points.
- Chromium was recorded at concentrations ranging from <0.0002mg/l (i.e. less than the laboratory limit of detection) at sampling point R6 to 0.0006mg/l at sampling point R7A, all of which are below the EQS value of 0.0047mg/l.
- Arsenic was recorded at a concentration of 0.001mg/l at sampling point R1, which is below the EQS value of 0.05mg/l. Arsenic was below the laboratory limit of detection at all other surface water sampling points.
- All other analysed metals and total cyanide were not recorded above the laboratory limit of detection at any of the sampling points during the November 2019 monitoring round.
- The TPH concentrations in this monitoring round were below the laboratory limit of detection in all five sampling locations; and therefore, below the UK DWS of 0.01mg/l.

NRW has requested that rainfall data is collected at the time of sampling since this may influence the levels of contaminants in the receiving watercourse. In order to provide data for the November 2019 round of monitoring, weather station information for a location approximately 13km east of the site (weather station reference IMIDGLAM3) has been obtained (www.wunderground.com).

This data is presented in Table 1 below. Rainfall data has been provided for the five days preceding the monitoring visit and compared with the daily average rainfall for November 2019 and the daily average for November in 2006 to 2019.

Table 1: Rainfall Data			
Date	Rainfall (mm)	November 2019 daily average rainfall (mm)	November 2006 – 2019 daily average rainfall (mm)
23/11/2019	9.9	4.6	4.6
24/11/2019	0.0		
25/11/2019	7.9		
26/11/2019	7.1		
27/11/2019	4.1		
28/11/2019	0.5		
Data gathered from 'IMIDGLAM3' weather station in Caerphilly located approximately 13km east of site (www.wunderground.com) (accessed 18/12/2019)			

The rainfall data indicates that average daily rainfall in November 2019 was the same as the average for recent years. Greater than average rainfall had occurred on three of the five days leading up to the sampling date; and the river level was noted to be slightly higher than normal during sampling.

Statistical Analysis of Surface Water Monitoring Results

The latest two rounds of monitoring data have been further assessed using the Mann-Kendall Test, a non-parametric statistical test to detect trends in data.

The Mann Kendall test has been applied to data from monitoring rounds undertaken from 2010 to 2019. Determinands that have exceeded the EQS on one or more occasions during the 2012 to 2019 monitoring period have been assessed using this approach. The results of the statistical analysis are shown in Table 2 below.

Table 2: Results of Trend Analysis for Surface Water Results (2010 to 2019)

	Trend			
	Copper	Nickel	Zinc	TPH
C1 (Northern Upstream Boundary)	Decreasing	No Exceedances	Stable	No Trend
R1 (Upstream Nant Mychydd)	Stable	No Exceedances	Stable	No Trend
R6 (Downstream Nant Mychydd)	Stable	No Exceedances	Probably Increasing	No Trend
R7 (Downstream of confluence)	Decreasing	No Exceedances	Decreasing	Increasing
R7A (Tributary of Nant Mychydd)	Decreasing	Decreasing	Stable	No Trend

In general, concentrations of determinands which exceeded EQS were either decreasing, stable or there was no trend. The concentration of copper at sampling point C1 (upstream of the site) has continued to be identified as 'decreasing' in 2019; however, the concentration of zinc at sampling point R6 (the Nant Mychydd at the confluence with a tributary stream) has remained as 'probably increasing'.

The concentration of TPH at sampling point R7 (downstream of the site) has been identified as 'increasing'. However, concentrations remain low, with all samples below the laboratory limit of detection in May and November 2019.

The concentration of copper at R7A, downstream of the site, is shown to be 'decreasing'. Whilst concentrations of copper regularly exceed the EQS, there is an indication that the concentration of copper is decreasing towards the EQS. Whilst also shown to be 'decreasing', slightly elevated concentrations of copper have been identified upstream of the site; indicating potentially naturally occurring or upstream sources.

The concentration of zinc at R7A, downstream of the site is shown to be 'stable'. It should be noted that the concentration of zinc has regularly exceeded the EQS, so the stable trend suggests that the concentration is not currently decreasing towards the EQS value.

November 2019 Groundwater Monitoring Results

Groundwater samples were collected from the following boreholes: BH8, BH9, BH901R, BH10, BH13, BH16, BH32, BH701, and BH801 (shown on Figure 1, Appendix 3). Boreholes BH16 and BH701 were added to the monitoring round based on a recommendation from NRW to further investigate the source of low pH in BH8 and BH9. Samples were analysed for a range of metals, pH and hardness at a UKAS accredited laboratory (Element, formerly Exova Jones Environmental).

The laboratory certificate of analysis is included in Appendix 1, which provides the method of analysis for each determinand. The analysis results are summarised in a table in Appendix 2 and represented graphically in Appendix 3.

The results have been benchmarked against previous analytical results from these monitoring wells and screened against EQS for freshwater. The results are summarised as follows:

- Samples were collected from boreholes BH9 and BH901R, located immediately south of Building 9A (pickling, plating, burnishing and annealing). Concentrations of nickel and zinc have overall

marginally increased in BH9; and the concentration of copper has marginally decreased since May 2019, each determinand remaining in excess of their respective EQS values. Concentrations of nickel, copper, and zinc have overall marginally decreased in BH901R since the previous round of monitoring in May 2019. Concentrations of nickel and copper were below the EQS value (for hardness greater than 250mg/l CaCO₃).

- Concentrations of nickel, copper and zinc have all decreased in borehole BH10 since the previous round of monitoring in May 2019; however, with the exception of zinc, continue to exceed their respective EQS values.
- BH32 is located at the approximate centre of the site and south of the central Admin Building. Concentrations of nickel, copper and zinc have slightly decreased since the previous round of monitoring in May 2019. However, concentrations of these three determinands continue to exceed their respective EQS values during the most recent round of monitoring.
- Concentrations of nickel and copper in borehole BH13, located at the southern site boundary, have increased slightly since the previous round of monitoring in May 2019. Concentrations of copper and zinc were recorded below the relevant EQS; and nickel was recorded at a concentration slightly exceeding the relevant EQS.
- Borehole BH801, located in the north of the site (adjacent to the copper plating building) and included within ongoing SPMP groundwater sampling, is now included in this monitoring programme. Concentrations of nickel and copper have further decreased since the previous round of monitoring; and are below their respective EQS values. The concentration of zinc has slightly increased and remains above the EQS value.
- Metal concentrations in boreholes BH16 and BH701 have remained similar to those recorded in May 2019; which significantly lower than concentrations recorded in 2011. Concentrations of nickel, copper, and zinc were detected below their relevant EQS values in each borehole in November 2019.
- Chromium was recorded above the EQS value of 0.0047mg/l in BH701, at a concentration of 0.0095mg/l.
- The following determinands did not exceed the screening criteria in any of the boreholes: cadmium, chromium, lead, arsenic, boron, mercury, selenium and vanadium.
- A low (acidic) pH value (<pH 6) was detected in the sample from BH8 (pH 4.95) only. Samples from this and several other locations have regularly recorded low pH values throughout the monitoring programme. Boreholes BH16 and BH701 were added to the 2019 monitoring rounds to further investigate the source of low pH in BH8 and BH9; however, low pH values (<pH 6) were not recorded at either of these locations.

Statistical Analysis of Groundwater Monitoring Results

The Mann Kendall test has been performed using data from monitoring rounds undertaken from 2010 (where applicable) to 2019. Determinands that have exceeded the EQS on one or more occasion during the overall monitoring period have been assessed using this approach. The results of the statistical analysis are shown in Table 3 below. The data are also presented graphically in Appendix 3.

Table 3: Results of Trend Analysis for Groundwater Results (2010 to 2019)

	Trend				
	Cadmium	Total Chromium	Copper	Nickel	Zinc
BH901/BH901R	No Trend	No Exceedances	No Trend	No Trend	No Trend
BH8	Decreasing	No Exceedances	Decreasing	Decreasing	Decreasing
BH9	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing
BH10	Decreasing	No Exceedances	Decreasing	Decreasing	Decreasing
BH13	Decreasing	Probably Decreasing	Decreasing	Decreasing	Decreasing
BH32	Probably Decreasing	No Exceedances	No Trend	Decreasing	Decreasing
BH801*	No Trend	No Exceedances	Decreasing	Decreasing	Decreasing

*Analysis based on monitoring data since June 2015 and prior SPMP data (from September 2014).

Overall, the statistical analysis generally showed 'no trend' or 'probably decreasing/decreasing' trends, indicating that contaminants of concern are not increasing in the groundwater.

The Mann Kendall statistical analysis showed that BH9, which has previously contained the most elevated metal concentrations is showing a 'decreasing' trend for all metals which exceeded the EQS values. This reflects a continued gradual reduction in concentrations shown on the graphs presented in Appendix 3.

Analysis has also shown that BH8, BH10 and BH13 are showing 'decreasing' or 'probably decreasing' trends for metal concentrations that exceed the relevant EQS values.

Analysis has shown 'no trend' for BH901/BH901R for copper, nickel, and zinc. It should be noted that borehole BH901 was replaced with BH901R in 2015 and the analysis includes samples collected from each of the two boreholes. Whilst 'no trend' has been identified, concentrations of nickel, copper, zinc and cadmium are all regularly recorded above the relevant EQS.

Borehole BH801, located in the north of the site, has been included in the monitoring programme since June 2015 and the Mann Kendall analysis is now based on fourteen results. With the addition of the 2019 monitoring data to the Mann Kendall analysis, trends have remained 'decreasing' for metals copper, nickel and zinc. The trend for cadmium has remained 'no trend'.

Conclusions and Recommendations

Surface Water

Overall, no significantly elevated concentrations of determinands have been detected in surface water over the 2019 monitoring period. Copper concentrations have been detected in excess of the EQS on several occasions previously; however, the elevated concentrations were detected at both upstream and down-stream locations. Baseline concentration for copper in the surface water environment has been

shown to be slightly elevated, indicating that the source is either upstream or naturally occurring. However, overall, the statistical analysis results indicated that concentrations of copper are decreasing.

NRW has previously required The Royal Mint to continue surface water monitoring on a six-monthly basis with the objective of analysing trends and demonstrating no losses of containment from the site. Ramboll recommends that six-monthly monitoring continues going forward.

Groundwater

The graphs of concentrations presented in Appendix 3 demonstrate an overall decrease in concentrations across the site over the monitoring period. This is also reflected in the statistical analysis outcome which identifies either decreasing or 'no trend' for all determinands. However, although decreasing in trend, concentrations of nickel, copper, cadmium and zinc have consistently been detected above the respective EQS at several locations.

Low (acidic) pH values have been consistently detected previously in BH8 and BH9 over the entire monitoring period dating from 2009. Recent sampling of upgradient boreholes BH16 and BH701 did not identify an upgradient source.

Given that no increasing trends have been identified, there does not appear to be an ongoing source of metal contamination. The elevated concentrations can likely be attributed to historical leaks and spillages which would have occurred before the more recent improvements and repairs to the below ground drainage system and culvert. Furthermore, a bund integrity survey was carried out within Building 9A (Armour 1) in 2019 and all were found to be in good condition. Ramboll considers that future monitoring is therefore anticipated to identify ongoing decreasing trends.

Based on the results of trend analysis, Ramboll recommends that the frequency (and scope) of groundwater monitoring may also be reduced to 6 monthly, and could therefore be carried out in line with surface water monitoring going forward. It is also recommended that BH16 and BH701 are removed from the monitoring programme. Ramboll recommends that monitoring continues on this basis given that concentrations are consistently above EQS, despite overall decreasing trends.

Ramboll recommends that NRW is consulted on the proposed groundwater monitoring programme going forward.

Please do not hesitate to contact me if there is anything you wish to discuss.

Yours sincerely



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Encl. Appendix 1, Laboratory Certificates of Analysis
 Appendix 2, Results Summary Tables
 Appendix 3, Figures and Graphs



Appendix 1

Laboratory Certificates of Analysis

Ramboll Environment and Health UK Ltd
8 Village Way
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Cardiff
CF15 7NE



Attention : Rob Hodgson
Date : 6th December, 2019
Your reference : 1700003935
Our reference : Test Report 19/19610 Batch 1
Location : Royal Mint SW/GW 2019
Date samples received : 29th November, 2019
Status : Final report
Issue : 1

Fourteen samples were received for analysis on 29th November, 2019 of which fourteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

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

Authorised By:



Paul Boden BSc
Senior Project Manager

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Element Materials Technology

Client Name: Ramboll Environment and Health UK Ltd
Reference: 1700003935
Location: Royal Mint SW/GW 2019
Contact: Rob Hodgson
EMT Job No: 19/19610

Report : Liquid

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

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-32	33-34	35-36	37-38	39-40	Please see attached notes for all abbreviations and acronyms		
Sample ID	R6	R7	R7A	R1	C1	BH901R	BH9	BH801	BH701	BH16			
Depth													
COC No / misc													
Containers	V H N P G	V H N N P G	V H N N P G	V H N N P G	V H N N P G	HN P	HN P	HN P	HN P	HN P			
Sample Date	28/11/2019 10:00	28/11/2019 10:10	28/11/2019 10:20	28/11/2019 10:40	28/11/2019 10:50	28/11/2019 11:30	28/11/2019 11:50	28/11/2019 12:30	28/11/2019 13:00	28/11/2019 13:15			
Sample Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	29/11/2019	29/11/2019	29/11/2019	29/11/2019	29/11/2019	29/11/2019	29/11/2019	29/11/2019	29/11/2019	29/11/2019	LOD/LOR	Units	Method No.
Dissolved Arsenic #	<0.9	<0.9	<0.9	1.0	<0.9	<0.9	<0.9	1.0	<0.9	<0.9	<0.9	ug/l	TM30/PM14
Dissolved Barium #	17	13	8	12	6	35	37	20	21	27	<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM30/PM14
Dissolved Boron	<12	<12	<12	<12	<12	156	97	<12	16	13	<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	ug/l	TM30/PM14
Total Dissolved Chromium #	<0.2	0.4	0.6	0.3	0.4	0.4	0.7	<0.2	9.5	1.5	<0.2	ug/l	TM30/PM14
Dissolved Copper #	<3	<3	6	<3	<3	123	340	<3	<3	<3	<3	ug/l	TM30/PM14
Dissolved Lead #	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	ug/l	TM30/PM14
Dissolved Mercury #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM30/PM14
Dissolved Nickel #	<0.2	<0.2	2.8	<0.2	0.9	193.0	256.3	5.4	<0.2	0.5	<0.2	ug/l	TM30/PM14
Dissolved Selenium #	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	ug/l	TM30/PM14
Dissolved Vanadium #	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	ug/l	TM30/PM14
Dissolved Zinc #	6.4	4.0	11.5	2.8	3.7	527.7	650.0	26.5	3.0	5.4	<1.5	ug/l	TM30/PM14
Total Hardness Dissolved (as CaCO3)	73	61	51	44	45	256	129	43	101	89	<1	mg/l	TM30/PM14
EPH (C8-C40) #	<10	<10	<10	<10	<10	-	-	-	-	-	<10	ug/l	TM5/PM30
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	<0.01	mg/l	TM89/PM0
Hexavalent Chromium	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	ug/l	TM38/PM0
Total Dissolved Chromium III	<6	<6	<6	<6	<6	<6	<6	<6	10	<6	<6	ug/l	TM0/PM0
pH #	6.90	7.41	7.58	7.61	7.61	6.91	6.41	6.66	6.99	6.82	<0.01	pH units	TM73/PM0

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 19/19610

SOILS

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

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

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REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

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

EMT Job No: 19/19610

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			

Appendix 2
Results Summary Tables

Surface Water Monitoring - Summary of Results

Sample Point	Date	Analysis															
		pH	CaCO3 (mg/l)	Sulphate (dissolved) (mg/l)	Nickel (dissolved) (mg/l)	Chromium (dissolved) (mg/l)	Cadmium (dissolved) (mg/l)	Copper (dissolved) (mg/l)	Lead (dissolved) (mg/l)	Zinc (dissolved) (mg/l)	Arsenic (dissolved) (mg/l)	Boron (dissolved) (mg/l)	Mercury (dissolved) (mg/l)	Selenium (dissolved) (mg/l)	Vanadium (dissolved) (mg/l)	Cyanide (total) (mg/l)	TPH (mg/l)
Assessment Criteria (mg/l)		6 to 9 (2)		400	0.02 (1)	0.0047 (3)	0.00009 (1)	0-50 = 0.001 50-100 = 0.006 (3)	0.0072 (1)	0-50 = 0.008 50-100 = 0.05 (3)							
R1	Jan-10	7.5	NT	9	<0.001	0.001	<0.0001	<0.001	<0.001	0.005	<0.001	<0.01	<0.0001	<0.001	<0.002	<0.02	0.06
	May-10	7.9	NT	9	0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	0.02	<0.0001	<0.001	<0.002	0.03	<0.01
	Jun-10	7.5	NT	13	0.001	0.002	<0.0001	<0.001	<0.001	<0.002	<0.001	0.01	<0.0001	<0.001	<0.002	<0.02	<0.01
	Aug-10	7.5	NT	21	0.001	0.002	<0.0001	<0.001	<0.001	<0.002	<0.001	0.02	<0.0001	<0.001	0.001	<0.02	0.01
	Oct-10	7.7	NT	10	<0.001	0.001	<0.0001	0.001	<0.001	<0.002	<0.001	0.02	<0.0001	0.002	<0.001	<0.02	0.01
	Dec-10	7.6	NT	12	<0.001	0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Apr-11	7.4	56	NT	0.001	0.001	<0.0001	0.002	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.03
	May-11	7.6	21	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	0.41	<0.0001	<0.001	<0.001	<0.02	0.02
	Jul-11	8	61	NT	<0.001	0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	0.0001	<0.02	0.02
	Sep-11	7.5	64	NT	0.001	0.003	<0.0001	<0.001	<0.001	0.009	<0.001	0.06	<0.0001	<0.001	<0.001	<0.02	0.02
	Nov-11	8.6	61	NT	0.001	0.002	<0.0001	0.001	<0.001	0.003	<0.001	0.03	<0.0001	<0.001	0.001	<0.02	0.01
	Jan-12	8.1	52	NT	0.001	0.005	<0.0001	0.001	<0.001	0.005	<0.001	0.02	<0.0001	<0.001	0.002	<0.02	0.01
	Mar-12	8.2	51	NT	0.001	0.002	<0.0001	0.002	<0.001	0.006	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	<0.01
	May-12	8	39	NT	0.001	0.001	<0.0001	0.002	<0.001	0.009	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.16
	Jul-12	7.7	45	NT	0.002	<0.001	<0.0001	0.002	<0.001	0.009	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Sep-12	7.8	47	NT	0.001	0.001	<0.0001	0.002	<0.001	0.006	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Nov-12	7.8	53	NT	0.001	<0.001	<0.0001	<0.001	<0.001	0.006	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	Jan-13	7.5	58	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.005	<0.001	0.03	<0.0001	<0.001	0.001	<0.02	0.02
	Apr-13	7.7	46	NT	<0.001	0.001	<0.0001	<0.001	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	May-13	8	62	NT	<0.001	0.001	<0.0001	<0.001	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Jul-13	7.6	68	NT	0.001	0.001	<0.0001	0.003	<0.001	0.005	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	0.105
	Oct-13	7.2	55	NT	0.001	0.001	<0.0001	0.001	<0.001	0.006	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	<0.01
	Nov-13	7.7	62	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Jan-14	7.2	36	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jun-14	6.9	60	NT	0.001	<0.001	<0.0001	0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.03
	Oct-14	8.1	50	NT	0.001	<0.001	<0.0001	0.002	<0.001	0.008	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	Feb-15	7.4	53	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
Jun-15	7.4	38	NT	0.005	<0.001	<0.0001	0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01	
Oct-15	7.4	68	NT	0.003	<0.001	<0.0001	<0.001	<0.001	0.006	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01	
Feb-16	6.8	45	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	0.02	0.06	
Jun-16	7.1	60	NT	0.001	<0.001	<0.0001	0.001	<0.001	0.003	<0.001	0.01	<0.0001	<0.001	<0.001	0.04	0.01	
Oct-16	7.4	66	NT	0.001	<0.001	<0.0001	<0.001	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01	
Feb-17	6.6	59	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01	
Jun-17	6.4	56	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	<0.01	
Oct-17	7.0	66	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01	
Feb-18	7.2	61	NT	<0.01	<0.01	<0.0001	<0.01	<0.01	<0.02	<0.01	<0.01	<0.0001	<0.01	<0.01	<0.02	0.01	
Aug-18	7.2	94	NT	0.002	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	0.02	<0.0001	<0.001	<0.001	<0.02	0.012	
Feb-19	7.2	30	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.006	<0.001	NT	<0.0001	<0.001	<0.001	<0.02	<0.01	
May-19	6.69	61	NT	<0.002	<0.0015	<0.0005	<0.007	<0.005	<0.003	<0.0025	<0.012	<0.001	<0.003	<0.0015	<0.01	<0.01	
Nov-19	7.61	44	NT	<0.0002	0.0003	<0.00003	<0.003	<0.0004	0.0028	0.001	<0.012	<0.0005	<0.0012	<0.0015	<0.01	<0.01	

Analysis

Sample Point	Date	pH	CaCO3 (mg/l)	Sulphate (dissolved) (mg/l)	Nickel (dissolved) (mg/l)	Chromium (dissolved) (mg/l)	Cadmium (dissolved) (mg/l)	Copper (dissolved) (mg/l)	Lead (dissolved) (mg/l)	Zinc (dissolved) (mg/l)	Arsenic (dissolved) (mg/l)	Boron (dissolved) (mg/l)	Mercury (dissolved) (mg/l)	Selenium (dissolved) (mg/l)	Vanadium (dissolved) (mg/l)	Cyanide (total) (mg/l)	TPH (mg/l)
Assessment Criteria (mg/l)		6 to 9 (2)		400	0.02 (1)	0.0047 (3)	0.00009 (1)	0-50 = 0.001 50-100 = 0.006 (3)	0.0072 (1)	0-50 = 0.008 50-100 = 0.05 (3)	0.05 (2)	2 (2)	0.001 (1)	0.01 (4)	0.02 (3)	0.001 (1)	0.01 (4)
R6	Jan-10	7.5	NT	9	0.001	0.001	<0.0001	<0.001	<0.001	0.002	<0.001	<0.01	0.0001	<0.001	<0.002	<0.02	0.64
	May-10	7.6	NT	10	0.002	<0.001	<0.0001	<0.001	<0.001	0.003	<0.001	0.02	<0.0001	<0.001	<0.002	0.24	<0.01
	Jun-10	7.5	NT	14	0.002	0.002	<0.0001	<0.001	<0.001	0.002	<0.001	0.01	<0.0001	<0.001	<0.002	<0.02	<0.01
	Aug-10	7.7	NT	22	0.001	0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	0.02	<0.0001	<0.001	<0.001	<0.02	0.01
	Oct-10	7.7	NT	11	0.001	0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Dec-10	7.4	NT	11	0.001	0.001	<0.0001	<0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Apr-11	7.4	52	NT	0.002	0.001	<0.0001	0.002	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.04
	May-11	7.4	23	NT	0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	0.39	<0.0001	<0.001	<0.001	<0.02	0.04
	Jul-11	7.2	71	NT	<0.001	0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	0.02
	Sep-11	7.7	64	NT	0.001	0.001	<0.0001	<0.001	<0.001	0.003	<0.001	0.04	<0.0001	<0.001	<0.001	<0.02	0.01
	Nov-11	7.7	61	NT	0.002	0.002	<0.0001	0.002	<0.001	0.003	<0.001	0.03	<0.0001	<0.001	0.002	<0.02	0.02
	Jan-12	8	57	NT	0.002	0.003	<0.0001	0.002	<0.001	0.008	<0.001	0.02	<0.0001	<0.001	0.002	<0.02	0.02
	Mar-12	8.2	57	NT	0.001	0.002	<0.0001	<0.001	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	0.02
	May-12	7.9	50	NT	0.001	0.002	<0.0001	0.002	<0.001	0.014	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.016
	Jul-12	7.7	56	NT	0.002	<0.001	<0.0001	0.001	<0.001	0.005	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Sep-12	7.9	53	NT	0.001	0.001	<0.0001	0.001	<0.001	<0.002	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Nov-12	7.9	64	NT	0.001	<0.001	<0.0001	<0.001	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	Jan-13	7.6	65	NT	0.001	<0.001	<0.0001	0.001	<0.001	0.025	<0.001	0.03	<0.0001	<0.001	0.001	<0.02	0.02
	Apr-13	7.8	51	NT	<0.001	0.007	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	May-13	8	74	NT	<0.001	0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Jul-13	7.6	74	NT	0.002	0.001	<0.0001	0.001	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	0.019
	Oct-13	7.3	52	NT	0.001	<0.001	<0.0001	0.001	<0.001	0.008	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Nov-13	7.7	77	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Jan-14	7.5	42	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jun-14	6.9	50	NT	0.002	<0.001	0.0001	0.003	<0.001	0.018	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.04
	Oct-14	8.1	34	NT	0.001	<0.001	<0.0001	0.004	<0.001	0.087	<0.001	0.01	<0.0001	<0.001	0.001	<0.02	0.15
	Feb-15	7.3	53	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Jun-15	7.4	40	NT	0.005	<0.001	<0.0001	0.001	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Oct-15	7.5	76	NT	0.002	<0.001	<0.0001	<0.001	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.13
	Feb-16	6.5	42	NT	0.001	<0.001	<0.0001	<0.001	<0.001	0.006	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.03
Jun-16	7.2	64	NT	0.002	<0.001	<0.0001	0.002	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02	
Oct-16	7.2	69	NT	0.001	<0.001	<0.0001	0.001	<0.001	0.005	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02	
Feb-17	6.7	64	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01	
Jun-17	6.6	59	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.011	<0.001	0.02	<0.0001	<0.001	<0.001	<0.02	0.04	
Oct-17	7.1	68	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02	
Feb-18	7.1	71	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.05	
Aug-18	7.2	103	NT	0.002	<0.001	<0.0001	<0.001	<0.001	0.004	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	0.013	
Feb-19	7.2	36	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.009	<0.001	NT	<0.0001	<0.001	<0.001	<0.02	<0.01	
May-19	6.81	69	NT	<0.002	<0.0015	<0.0005	<0.0005	<0.007	<0.005	<0.003	<0.0025	<0.012	<0.001	<0.003	<0.0015	<0.01	<0.01
Nov-19	6.9	73	NT	<0.0002	<0.0002	<0.00003	<0.0003	<0.0004	0.0064	<0.0009	<0.012	<0.0005	<0.0012	<0.0015	<0.01	<0.01	

Analysis

Sample Point	Date	pH	CaCO3 (mg/l)	Sulphate (dissolved) (mg/l)	Nickel (dissolved) (mg/l)	Chromium (dissolved) (mg/l)	Cadmium (dissolved) (mg/l)	Copper (dissolved) (mg/l)	Lead (dissolved) (mg/l)	Zinc (dissolved) (mg/l)	Arsenic (dissolved) (mg/l)	Boron (dissolved) (mg/l)	Mercury (dissolved) (mg/l)	Selenium (dissolved) (mg/l)	Vanadium (dissolved) (mg/l)	Cyanide (total) (mg/l)	TPH (mg/l)
Assessment Criteria (mg/l)		6 to 9 (2)		400	0.02 (1)	0.0047 (3)	0.00009 (1)	0-50 = 0.001 50-100 = 0.006 (3)	0.0072 (1)	0-50 = 0.008 50-100 = 0.05 (3)	0.05 (2)	2 (2)	0.001 (1)	0.01 (4)	0.02 (3)	0.001 (1)	0.01 (4)
R7	Jan-10	7.7	NT	7	0.005	0.003	<0.0001	0.01	<0.001	0.009	<0.001	0.01	0.0001	<0.001	<0.002	<0.02	<0.01
	May-10	8	NT	14	0.019	<0.001	<0.0001	0.039	<0.001	0.097	<0.001	0.01	<0.0001	<0.001	<0.002	0.05	<0.01
	Jun-10	7.5	NT	18	0.013	0.002	<0.0001	0.028	<0.001	0.071	<0.001	0.01	<0.0001	<0.001	<0.002	<0.02	<0.01
	Aug-10	7.8	NT	29	0.008	0.001	<0.0001	0.011	<0.001	0.017	<0.001	0.03	<0.0001	<0.001	0.001	<0.02	<0.01
	Oct-10	7.7	NT	20	0.004	0.001	<0.0001	0.007	<0.001	0.009	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Dec-10	7.4	NT	12	0.004	0.001	<0.0001	0.008	<0.001	0.012	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Apr-11	7.5	47	NT	0.017	0.001	<0.0001	0.039	<0.001	0.037	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.03
	May-11	7.7	29	NT	0.011	<0.001	<0.0001	0.023	<0.001	0.038	<0.001	0.39	<0.0001	<0.001	<0.001	<0.02	0.03
	Jul-11	7.4	61	NT	0.003	0.001	<0.0001	0.007	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	0.02
	Sep-11	7.7	50	NT	0.019	0.001	<0.0001	0.017	<0.001	0.012	<0.001	0.03	<0.0001	<0.001	<0.001	<0.02	<0.01
	Nov-11	7.7	59	NT	0.009	0.002	<0.0001	0.009	<0.001	0.008	<0.001	0.03	<0.0001	<0.001	0.001	<0.02	0.02
	Jan-12	8	52	NT	0.001	0.003	<0.0001	<0.001	<0.001	0.005	<0.001	0.01	<0.0001	<0.001	0.002	<0.02	0.01
	Mar-12	8.1	37	NT	0.006	0.001	<0.0001	0.009	<0.001	0.009	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	<0.01
	May-12	7.9	46	NT	0.002	0.001	<0.0001	0.003	<0.001	0.006	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.022
	Jul-12	7.7	38	NT	0.008	<0.001	<0.0001	0.013	<0.001	0.016	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	Sep-12	7.9	54	NT	0.002	0.001	<0.0001	0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Nov-12	7.8	51	NT	0.002	<0.001	<0.0001	0.003	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	Jan-13	7.6	49	NT	0.005	<0.001	<0.0001	0.01	<0.001	0.023	<0.001	0.03	<0.0001	<0.001	0.001	<0.02	0.02
	Apr-13	7.8	48	NT	0.002	0.001	<0.0001	0.004	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	May-13	8.1	54	NT	0.003	<0.001	<0.0001	0.007	<0.001	0.007	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jul-13	7.6	72	NT	0.002	0.002	<0.0001	0.003	<0.001	0.005	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	0.031
	Oct-13	7.3	57	NT	0.001	<0.001	<0.0001	0.002	<0.001	0.005	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Nov-13	7.7	69	NT	0.002	<0.001	<0.0001	0.004	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jan-14	7.4	36	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jun-14	7	55	NT	0.002	<0.001	<0.0001	0.003	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.03
	Oct-14	8.1	33	NT	0.012	0.001	<0.0001	0.043	0.002	0.093	<0.001	0.01	<0.0001	<0.001	0.001	<0.02	1.04
	Feb-15	7.3	49	NT	0.002	<0.001	<0.0001	0.004	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jun-15	7.4	44	NT	0.005	<0.001	<0.0001	0.001	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Oct-15	7.7	68	NT	0.01	<0.001	<0.0001	0.004	<0.001	0.027	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Feb-16	6.5	42	NT	0.002	<0.001	<0.0001	0.003	<0.001	0.008	<0.001	<0.01	<0.0001	<0.001	<0.001	0.02	0.06
Jun-16	7.2	59	NT	0.002	<0.001	<0.0001	0.003	<0.001	0.004	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	0.04	
Oct-16	7.4	62	NT	0.004	<0.001	<0.0001	0.007	<0.001	0.03	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02	
Feb-17	6.6	61	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	0.04	0.01	
Jun-17	6.4	59	NT	<0.001	<0.001	<0.0001	0.001	<0.001	0.007	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	0.02	
Oct-17	7.1	59	NT	0.001	<0.001	<0.0001	0.002	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02	
Feb-18	7.2	64	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.03	
Aug-18	7.2	94	NT	0.003	<0.001	<0.0001	0.003	<0.001	0.007	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	0.015	
Feb-19	7.1	38	NT	0.001	<0.001	<0.0001	0.002	<0.001	0.01	<0.001	NT	<0.0001	<0.001	<0.001	<0.02	<0.010	
May-19	6.82	68	NT	<0.002	<0.0015	<0.0005	<0.0005	<0.007	<0.005	<0.003	<0.0025	<0.012	<0.001	<0.003	<0.0015	<0.01	<0.01
Nov-19	7.41	61	NT	<0.0002	0.0004	<0.00003	<0.0003	<0.0004	<0.0004	0.004	<0.0009	<0.012	<0.0005	<0.0012	<0.0015	<0.01	<0.01

Analysis

Sample Point	Date	pH	CaCO3 (mg/l)	Sulphate (dissolved) (mg/l)	Nickel (dissolved) (mg/l)	Chromium (dissolved) (mg/l)	Cadmium (dissolved) (mg/l)	Copper (dissolved) (mg/l)	Lead (dissolved) (mg/l)	Zinc (dissolved) (mg/l)	Arsenic (dissolved) (mg/l)	Boron (dissolved) (mg/l)	Mercury (dissolved) (mg/l)	Selenium (dissolved) (mg/l)	Vanadium (dissolved) (mg/l)	Cyanide (total) (mg/l)	TPH (mg/l)
Assessment Criteria (mg/l)		6 to 9 (2)		400	0.02 (1)	0.0047 (3)	0.00009 (1)	0-50 = 0.001 50-100 = 0.006 (3)	0.0072 (1)	0-50 = 0.008 50-100 = 0.05 (3)	0.05 (2)	2 (2)	0.001 (1)	0.01 (4)	0.02 (3)	0.001 (1)	0.01 (4)
R7A	Jan-10	7.8	NT	7	0.004	0.001	<0.0001	0.009	<0.001	0.009	<0.001	<0.01	0.0001	<0.001	<0.002	<0.02	0.25
	May-10	8.1	NT	14	0.021	<0.001	<0.0001	0.041	<0.001	0.113	<0.001	<0.01	<0.0001	<0.001	<0.002	0.03	0.02
	Jun-10	7.5	NT	16	0.013	0.002	<0.0001	0.027	<0.001	0.085	<0.001	0.01	<0.0001	<0.001	<0.002	<0.02	<0.01
	Aug-10	7.8	NT	32	0.013	0.001	<0.0001	0.017	<0.001	0.04	<0.001	0.03	<0.0001	<0.001	<0.001	<0.02	<0.01
	Oct-10	7.7	NT	19	0.004	0.001	<0.0001	0.007	<0.001	0.009	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Dec-10	7.5	NT	15	0.008	0.001	<0.0001	0.015	<0.001	0.033	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Apr-11	7.5	47	NT	0.017	0.001	<0.0001	0.038	<0.001	0.037	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.03
	May-11	7.7	29	NT	0.011	<0.001	<0.0001	0.022	<0.001	0.036	<0.001	0.38	<0.0001	<0.001	<0.001	<0.02	0.02
	Jul-11	7.5	56	NT	0.008	0.001	<0.0001	0.018	<0.001	0.014	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	0.01
	Sep-11	7.4	50	NT	0.021	0.001	<0.0001	0.018	<0.001	0.012	<0.001	0.02	<0.0001	<0.001	<0.001	<0.02	<0.01
	Nov-11	7.7	47	NT	0.041	0.002	<0.0001	0.029	<0.001	0.03	<0.001	0.02	<0.0001	<0.001	0.001	<0.02	0.01
	Jan-12	7.9	45	NT	0.011	0.002	<0.0001	0.011	<0.001	0.016	<0.001	0.01	<0.0001	<0.001	0.002	<0.02	<0.01
	Mar-12	8.1	38	NT	0.006	0.001	<0.0001	0.009	<0.001	0.008	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	<0.01
	May-12	7.9	20	NT	0.017	0.001	<0.0001	0.052	0.001	0.07	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.057
	Jul-12	7.8	41	NT	0.008	<0.001	<0.0001	0.013	<0.001	0.016	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Sep-12	7.9	44	NT	0.017	0.001	<0.0001	0.031	<0.001	0.042	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Nov-12	7.8	47	NT	0.004	<0.001	<0.0001	0.007	<0.001	0.008	<0.001	0.02	<0.0001	<0.001	<0.001	<0.02	0.02
	Jan-13	7.6	32	NT	0.02	<0.001	0.0002	0.044	0.002	0.089	<0.001	0.03	<0.0001	<0.001	0.001	<0.02	0.04
	Apr-13	7.8	37	NT	0.003	0.001	<0.0001	0.008	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	May-13	8.3	53	NT	0.006	<0.001	<0.0001	0.017	<0.001	0.018	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jul-13	7.5	53	NT	0.018	0.001	<0.0001	0.026	<0.001	0.064	<0.001	<0.01	<0.0001	<0.001	0.001	<0.02	0.012
	Oct-13	7.3	62	NT	0.005	<0.001	<0.0001	0.010	<0.001	0.011	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Nov-13	7.8	61	NT	0.005	<0.001	<0.0001	0.009	<0.001	0.014	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jan-14	7.4	26	NT	0.004	<0.001	<0.0001	0.005	<0.001	0.062	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Jun-14	7.1	44	NT	0.013	<0.001	0.0001	0.039	0.001	0.067	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.06
	Oct-14	8.2	20	NT	0.015	0.001	<0.0001	0.057	0.003	0.141	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.6
	Feb-15	7.2	38	NT	0.005	<0.001	<0.0001	0.013	<0.001	0.013	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	Jun-15	7.5	35	NT	0.007	<0.001	<0.0001	0.006	<0.001	0.01	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Oct-15	7.5	56	NT	0.006	<0.001	<0.0001	0.012	<0.001	0.018	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Feb-16	6.4	35	NT	0.008	<0.001	<0.0001	0.011	<0.001	0.035	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.05
Jun-16	7.2	49	NT	0.006	<0.001	<0.0001	0.016	<0.001	0.018	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	0.03	
Oct-16	7.3	55	NT	0.006	<0.001	<0.0001	0.012	<0.001	0.051	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01	
Feb-17	6.7	56	NT	0.003	<0.001	<0.0001	0.006	<0.001	0.012	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01	
Jun-17	6.6	59	NT	0.008	<0.001	<0.0001	0.024	<0.001	0.032	<0.001	0.01	<0.0001	<0.001	<0.001	<0.02	0.02	
Oct-17	7.1	54	NT	0.004	<0.001	<0.0001	0.007	<0.001	0.01	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.03	
Feb-18	7.1	54	NT	0.003	<0.001	<0.0001	0.005	<0.001	0.009	<0.001	0.02	<0.0001	<0.001	<0.001	<0.02	0.02	
Aug-18	7	80	NT	0.024	<0.001	<0.0001	0.040	<0.001	0.104	<0.001	0.02	<0.0001	<0.001	<0.001	<0.02	0.015	
Feb-19	7	28	NT	0.008	<0.001	<0.0001	0.008	<0.001	0.038	<0.001	NT	<0.0001	<0.001	<0.001	<0.02	<0.01	
May-19	6.56	68	NT	0.003	<0.0015	<0.0005	<0.0005	<0.007	<0.005	0.008	<0.0025	<0.012	<0.001	<0.003	<0.0015	<0.01	<0.01
Nov-19	7.58	51	NT	0.0028	0.0006	<0.00003	0.006	<0.0004	0.0115	<0.0009	<0.012	<0.0005	<0.0012	<0.0015	<0.01	<0.01	

Analysis																	
Sample Point	Date	pH	CaCO ₃ (mg/l)	Sulphate (dissolved) (mg/l)	Nickel (dissolved) (mg/l)	Chromium (dissolved) (mg/l)	Cadmium (dissolved) (mg/l)	Copper (dissolved) (mg/l)	Lead (dissolved) (mg/l)	Zinc (dissolved) (mg/l)	Arsenic (dissolved) (mg/l)	Boron (dissolved) (mg/l)	Mercury (dissolved) (mg/l)	Selenium (dissolved) (mg/l)	Vanadium (dissolved) (mg/l)	Cyanide (total) (mg/l)	TPH (mg/l)
Assessment Criteria (mg/l)		6 to 9 (2)		400	0.02 (1)	0.0047 (3)	0.00009 (1)	0-50 = 0.001 50-100 = 0.006 (3)		0-50 = 0.008 50-100 = 0.05 (3)	0.05 (2)	2 (2)	0.001 (1)	0.01 (4)	0.02 (3)	0.001 (1)	0.01 (4)
C1	Mar-12	8.1	40	NT	0.004	0.001	<0.0001	0.009	0.002	0.01	0.001	<0.01	<0.0001	<0.001	0.002	<0.02	<0.01
	May-12	7.9	43	NT	0.011	0.001	<0.0001	0.026	<0.001	0.01	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.014
	Jul-12	7.8	45	NT	0.002	<0.001	<0.0001	0.004	<0.001	0.007	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Sep-12	7.7	43	NT	0.003	0.001	<0.0001	0.004	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Nov-12	7.7	45	NT	0.002	<0.001	<0.0001	0.002	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jan-13	7.7	30	NT	0.006	<0.001	<0.0001	0.009	<0.001	0.016	<0.001	0.03	<0.0001	<0.001	0.001	<0.02	<0.01
	Apr-13	7.8	41	NT	0.001	0.002	<0.0001	0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.04
	May-13	7.9	69	NT	0.002	<0.001	<0.0001	0.002	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Jul-13	7.4	50	NT	0.002	<0.001	<0.0001	0.003	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.058
	Oct-13	7.7	88	NT	0.002	<0.001	<0.0001	0.004	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Nov-13	7.6	37	NT	0.002	<0.001	<0.0001	0.002	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Jan-14	7.6	39	NT	0.002	<0.001	<0.0001	0.002	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Jun-14	7.0	34	NT	0.005	<0.001	<0.0001	0.01	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Oct-14	8.1	14	NT	0.008	<0.001	<0.0001	0.014	<0.001	0.012	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.3
	Feb-15	7.0	38	NT	<0.001	<0.001	<0.0001	0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	<0.01
	Jun-15	7.4	33	NT	0.005	<0.001	<0.0001	0.002	<0.001	0.003	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	Oct-15	7.6	42	NT	0.003	<0.001	<0.0001	0.002	<0.001	0.007	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
	Feb-16	6.4	30	NT	0.007	<0.001	<0.0001	0.005	<0.001	0.012	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	Jun-16	7.0	41	NT	0.003	<0.001	<0.0001	0.006	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02
	Oct-16	7.0	38	NT	0.003	<0.001	<0.0001	0.003	<0.001	0.005	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01
Feb-17	6.4	42	NT	0.001	<0.001	<0.0001	0.001	<0.001	0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01	
Jun-17	6.2	46	NT	0.001	<0.001	<0.0001	0.002	<0.001	<0.002	<0.001	0.03	<0.0001	<0.001	<0.001	<0.02	0.01	
Oct-17	6.7	42	NT	0.002	<0.001	<0.0001	0.002	<0.001	0.011	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.02	
Feb-18	7.0	45	NT	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.01	
Aug-18	6.8	60	NT	0.005	<0.001	<0.0001	0.005	<0.001	0.004	<0.001	<0.01	<0.0001	<0.001	<0.001	<0.02	0.011	
Feb-19	7.0	23	NT	0.002	<0.001	<0.0001	0.002	<0.001	0.007	<0.001	NT	<0.0001	<0.001	<0.001	<0.02	<0.010	
May-19	6.6	38	NT	<0.002	<0.0015	<0.0005	<0.007	<0.005	<0.003	<0.0025	<0.012	<0.001	<0.003	<0.0015	<0.01	<0.01	
Nov-19	7.6	45	NT	0.0009	0.0004	<0.0003	<0.003	<0.0004	0.0037	<0.0009	<0.012	<0.0005	<0.0012	<0.0015	<0.01	<0.01	

Notes:

Yellow cells indicate elevated concentrations compared with Assessment Criteria (e.g. EQS).

NG = No Guideline

NT = Not Tested

policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council.

2 = Table 2a: Environmental Quality Standards (EQS) for List 2 dangerous substances, EC Dangerous Substances Directive (76/464/EEC)

3 = Table 2b: Environmental Quality Standards (EQS) for hardness related List 2 dangerous substances, EC dangerous substances Directive (76/464/EEC)

NB - in the absence of hardness data, a conservative approach has been adopted and the lowest EQS values used

4 = Water Supply (Water Quality) (England and Wales) Regulations 2000 (SI 2000/3184) (as amended); Water Supply (Water Quality) (Wales) Regulations 2001 (SI 3911 W.323) (as amended)

Groundwater Monitoring - Summary of Results

Borehole	Date	Analysis												
		pH	CaCO3 (mg/l)	Nickel (dissolved) mg/l	Chromium (dissolved) mg/l	Cadmium (dissolved) mg/l	Copper (dissolved) mg/l	Lead (dissolved) mg/l	Zinc (dissolved) mg/l	Arsenic (dissolved) mg/l	Boron (dissolved) mg/l	Mercury (dissolved) mg/l	Selenium (dissolved) mg/l	Vanadium (dissolved) mg/l
Guideline Value		6-9 (1)	NG	0.02 (1)	0.0047(1)	0.00008(1)	0.001-0.028* (1)	0.0072 (1)	0.008 - 0.125* (1)	0.05(1)	2 (1)	0.00005(1)	0.01(2)	0.02 - 0.06* (1)
BH801	01-Mar-06	6.5	120	0.23	<0.005	<0.001	<0.005	<0.005	0.042	<0.005	<0.005	<0.00005	<0.005	NT
	01-May-06	6.7	85	0.077	<0.005	<0.001	0.017	<0.005	0.18	<0.005	0.05	<0.00005	<0.005	NT
	01-Dec-06	6.6	76	0.014	<0.005	<0.001	0.14	<0.005	0.13	<0.005	0.006	<0.00005	<0.005	NT
	01-Aug-07	6.8	59	0.017	<0.005	<0.001	<0.005	<0.005	0.047	<0.005	0.006	<0.00005	<0.005	NT
	01-Aug-08	6.9	120	0.37	<0.005	<0.001	1.8	<0.005	0.66	<0.005	0.021	<0.00005	<0.005	NT
	01-Sep-09	7.63	235	0.01	0.005	<0.001	15.9	<0.005	0.467	<0.005	<0.018	<0.00005	<0.005	NT
	01-Oct-09	6.3	88	0.06	0.002	<0.001	0.362	<0.001	0.464	<0.001	0.03	0.0002	<0.001	NT
	01-Aug-10	6.5	68	0.048	0.001	<0.001	0.369	<0.001	0.819	<0.001	0.03	<0.00005	<0.001	NT
	01-Aug-11	6.7	80	0.058	0.002	0.0002	0.482	<0.001	1.312	<0.001	0.02	<0.0001	<0.001	NT
	20-Aug-12	7	72	0.017	<0.001	<0.0001	0.066	<0.001	0.347	<0.001	0.01	<0.0001	<0.001	NT
	30-Aug-13	6.9	100	0.043	0.002	0.0002	0.767	<0.001	3.119	<0.001	<0.01	<0.0001	<0.001	NT
	04-Sep-14	7.2	79	0.057	<0.001	0.0002	0.302	<0.001	1.37	<0.001	0.04	<0.0001	<0.001	NT
	04-Jun-15	7	113	0.079	<0.001	0.0007	2.627	<0.001	4.669	<0.001	<0.01	<0.0001	<0.001	<0.001
	12-Oct-15	6.6	52	0.031	<0.001	<0.0001	0.101	<0.001	0.776	<0.001	<0.01	<0.0001	<0.001	<0.001
	17-Feb-16	6.3	47	0.018	<0.001	<0.0001	0.098	<0.001	0.629	<0.001	<0.01	<0.0001	<0.001	<0.001
	30-Jun-16	6.5	66	0.075	<0.001	0.0003	0.422	<0.001	2.253	<0.001	0.01	<0.0001	<0.001	<0.001
	25-Oct-16	6.4	43	0.013	<0.001	<0.0001	0.029	<0.001	0.232	<0.001	<0.01	<0.0001	<0.001	<0.001
	14-Feb-17	6.3	54	0.009	<0.001	<0.0001	0.005	<0.001	0.053	<0.001	<0.01	<0.0001	<0.001	<0.001
	16-Jun-17	6.2	52	0.022	<0.001	0.001	0.086	<0.001	0.784	<0.001	0.01	<0.0001	<0.001	<0.001
	31-Oct-17	6.4	51	0.008	<0.001	<0.0001	0.002	<0.001	0.045	<0.001	<0.01	<0.0001	<0.001	<0.001
07-Feb-18	6.6	54	0.012	<0.001	<0.0001	0.005	<0.001	0.166	<0.001	<0.01	<0.0001	<0.001	<0.001	
25-Jun-18	6.5	51	0.013	<0.001	0.0001	0.014	<0.001	0.141	<0.001	<0.01	<0.0001	<0.001	<0.001	
23-Oct-18	6.4	43	0.013	<0.001	<0.0001	0.017	<0.001	0.102	<0.001	<0.01	<0.0001	<0.001	<0.001	
12-Feb-19	6.9	47	0.007	<0.001	<0.0001	0.001	<0.001	0.018	<0.001	NT	<0.0001	<0.001	<0.001	
15-May-19	6.62	42	0.007	<0.0015	<0.0005	0.016	<0.005	0.020	<0.0025	<0.012	<0.001	<0.003	<0.0015	
28-Nov-19	6.66	43	0.0054	<0.0002	<0.00003	<0.003	<0.0004	0.027	0.001	<0.012	<0.0005	<0.0012	<0.0015	
BH8	01-Oct-09	4.5	NT	0.571	0.001	0.0021	0.22	0.002	0.45	<0.001	0.05	<0.0001	0.002	<0.002
	01-Feb-10	4.3	NT	0.315	0.002	0.0027	0.239	0.002	0.68	<0.001	0.06	<0.0001	0.003	<0.002
	01-Apr-10	4.4	NT	0.141	<0.001	<0.0001	0.17	<0.001	0.952	<0.001	0.03	<0.0001	0.001	<0.002
	01-Jun-10	4.6	NT	0.57	0.001	0.0019	0.195	0.002	1.368	<0.001	0.04	<0.0001	0.001	<0.002
	25-Jan-13	5.2	14	0.162	<0.001	0.0013	0.283	0.002	0.379	<0.001	0.05	<0.0001	<0.001	0.001
	03-Apr-13	5.4	5	0.19	<0.001	0.0014	0.293	0.002	0.482	<0.001	<0.01	<0.0001	0.001	<0.001
	31-May-13	5.9	<30	0.307	0.001	0.0009	0.452	<0.001	1.325	<0.001	<0.01	<0.0001	<0.001	<0.001
	26-Jul-13	4.9	<2	0.176	<0.001	0.0017	0.262	0.004	0.703	<0.001	0.02	<0.0001	<0.001	<0.001
	07-Oct-13	5.4	0	0.111	<0.001	0.001	0.225	0.003	0.323	<0.001	0.02	<0.0001	<0.001	<0.001
	25-Nov-13	6.6	7	0.103	0.001	0.0007	0.152	<0.001	0.232	<0.001	0.03	<0.0001	<0.001	<0.001
	30-Jan-14	5.9	8	0.08	<0.001	0.0007	0.099	<0.001	0.205	<0.001	0.03	<0.0001	<0.001	<0.001
	04-Jun-14	4.8	6	0.085	<0.001	0.0007	0.132	0.001	0.23	<0.001	<0.01	<0.0001	<0.001	<0.001
	08-Oct-14	6.5	<2	0.235	<0.001	0.0014	0.285	0.003	0.564	<0.001	0.03	<0.0001	<0.001	<0.001
	10-Feb-15	5.3	5	0.104	<0.001	0.0006	0.112	<0.001	0.21	<0.001	0.03	<0.0001	0.001	<0.001
	04-Jun-15	6.2	0	0.243	<0.001	0.0012	0.258	0.002	0.487	<0.001	0.04	<0.0001	0.003	<0.001

Groundwater Monitoring - Summary of Results

Borehole	Date	Analysis													
		pH	CaCO ₃ (mg/l)	Nickel (dissolved) mg/l	Chromium (dissolved) mg/l	Cadmium (dissolved) mg/l	Copper (dissolved) mg/l	Lead (dissolved) mg/l	Zinc (dissolved) mg/l	Arsenic (dissolved) mg/l	Boron (dissolved) mg/l	Mercury (dissolved) mg/l	Selenium (dissolved) mg/l	Vanadium (dissolved) mg/l	
Guideline Value		6-9 (1)	NG	0.02 (1)	0.0047(1)	0.00008(1)	0.001-0.028* (1)	0.0072 (1)	0.008 - 0.125* (1)	0.05(1)	2 (1)	0.00005(1)	0.01(2)	0.02 - 0.06* (1)	
BH8 Cont.	12-Oct-15	5.6	59	0.135	0.001	0.0008	0.168	<0.001	0.28	<0.001	<0.01	<0.0001	<0.001	<0.001	
	17-Feb-16	4.7	71	0.101	<0.001	0.0007	0.122	0.001	0.195	<0.001	<0.01	<0.0001	0.001	<0.001	
	30-Jun-16	4.4	82	0.154	<0.001	0.0009	0.179	0.002	0.316	<0.001	0.03	<0.0001	<0.001	<0.001	
	25-Oct-16	4.5	67	0.127	<0.001	0.0008	0.139	0.002	0.27	<0.001	0.02	<0.0001	<0.001	<0.001	
	14-Feb-17	4.9	61	0.097	<0.001	0.0007	0.105	0.001	0.214	<0.001	0.02	<0.0001	<0.001	<0.001	
	16-Jun-17	4.3	77	0.19	<0.001	0.0009	0.197	0.002	0.346	<0.001	0.06	<0.0001	<0.001	<0.001	
	31-Oct-17	4.8	56	0.086	<0.001	0.0006	0.09	<0.001	0.166	<0.001	<0.01	<0.0001	<0.001	<0.001	
	07-Feb-18	Not Sampled						Not Sampled							Not Sampled
	25-Jun-18	Not Sampled						Not Sampled							Not Sampled
	23-Oct-18	4.5	86	0.131	<0.001	0.0007	0.112	<0.001	0.212	<0.001	0.05	<0.0001	0.001	<0.001	
	12-Feb-19	4.5	<2	0.107	<0.001	0.0007	0.099	<0.001	0.189	<0.001	NT	<0.0001	<0.001	<0.001	
15-May-19	4.79	66	0.129	<0.0015	<0.0005	0.121	<0.005	0.194	<0.0025	0.048	<0.001	<0.003	<0.0015		
28-Nov-19	4.95	54	0.0853	0.0003	<0.00003	0.084	<0.0004	0.1438	<0.0009	0.043	<0.0005	<0.0012	<0.0015		
BH9	15-Oct-09	7.5	NA	0.002	0.001	<0.0001	0.001	<0.001	0.005	<0.001	0.05	<0.0001	<0.001	<0.002	
	06-Sep-11	4.5	NA	1.011	0.006	0.0012	1.11	<0.001	5.872	0.001	0.07	<0.0001	<0.001	<0.001	
	27-Sep-11	4.5	NA	3.96	0.004	0.0049	2.081	<0.001	19.61	<0.001	0.07	<0.0001	0.002	0.001	
	31-Oct-11	4.4	0	7.402	0.02	0.0022	9.91	0.002	31.02	0.001	NA	<0.0001	<0.001	NA	
	14-Dec-11	4.7	0	10.4	0.013	0.0059	9.567	<0.001	40.3	<0.001	0.3	<0.0001	0.003	<0.001	
	13-Mar-12	6.1	3	2.57	0.027	0.0017	3.452	0.005	22.99	0.001	<0.01	<0.0001	<0.001	0.014	
	14-May-12	4.7	0	2.254	0.012	0.0015	4.592	0.002	7.107	<0.001	0.08	<0.0001	<0.001	<0.001	
	10-Jul-12	4.5	0	1.122	0.014	0.0011	2.581	0.002	5.178	0.001	0.08	<0.0001	<0.001	0.002	
	18-Sep-12	6.7	0	0.458	0.003	0.0006	1.41	<0.001	1.921	<0.001	0.06	<0.0001	<0.001	<0.001	
	27-Nov-12	6.8	9	0.679	0.002	0.0009	1.29	<0.001	2.205	<0.001	0.09	<0.0001	<0.001	<0.001	
	25-Jan-13	7.5	24	0.546	<0.001	0.0008	0.771	<0.001	1.765	<0.001	0.11	<0.0001	<0.001	0.001	
	03-Apr-13	6.2	17	0.522	0.001	0.0008	2.185	<0.001	1.806	<0.001	0.04	<0.0001	<0.001	<0.001	
	31-May-13	5.1	117	0.754	0.006	0.0014	2.888	0.001	2.901	<0.001	0.08	<0.0001	<0.001	<0.001	
	26-Jul-13	5.4	<2	0.329	0.002	0.0009	1.397	<0.001	1.313	<0.001	0.04	<0.0001	<0.001	<0.001	
	07-Oct-13	5.1	10	1.176	0.005	0.0014	1.906	<0.001	2.568	<0.001	0.1	<0.0001	<0.001	<0.001	
	25-Nov-13	6.7	104	0.227	<0.001	0.0005	0.123	0.006	0.575	<0.001	0.07	<0.0001	<0.001	<0.001	
	30-Jan-14	6.7	111	0.121	<0.001	0.0002	0.051	<0.001	0.154	<0.001	0.05	<0.0001	<0.001	<0.001	
	04-Jun-14	6.2	115	0.066	0.001	0.0003	0.054	<0.001	0.192	<0.001	0.01	<0.0001	<0.001	<0.001	
	08-Oct-14	8	83	0.107	0.001	0.0004	0.048	<0.001	0.264	<0.001	0.02	<0.0001	<0.001	0.001	
	10-Feb-15	6.4	134	0.16	<0.001	0.0004	0.115	<0.001	0.315	<0.001	0.05	<0.0001	<0.001	<0.001	
	04-Jun-15	6.4	0	0.27	0.002	0.0006	0.72	<0.001	0.558	<0.001	0.11	<0.0001	0.001	<0.001	
	12-Oct-15	Not Sampled							Not Sampled						Not Sampled
	17-Feb-16	6.1	109	0.31	<0.001	0.0007	0.384	<0.001	0.675	<0.001	0.05	<0.0001	<0.001	<0.001	
30-Jun-16	5.3	79	0.283	<0.001	0.0006	0.736	<0.001	0.626	<0.001	0.1	<0.0001	<0.001	<0.001		
25-Oct-16	5.2	49	0.224	<0.001	0.0005	0.564	<0.001	0.508	<0.001	0.03	<0.0001	<0.001	<0.001		
14-Feb-17	4.9	58	0.307	0.001	0.0006	0.763	<0.001	0.658	<0.001	0.1	<0.0001	<0.001	<0.001		
16-Jun-17	5.2	39	0.108	<0.001	0.0003	0.448	<0.001	0.274	<0.001	0.03	<0.0001	<0.001	<0.001		
31-Oct-17	5.5	66	0.25	<0.001	0.0005	0.479	<0.001	0.566	<0.001	0.05	<0.0001	<0.001	<0.001		

Groundwater Monitoring - Summary of Results

		Analysis												
Borehole	Date	pH	CaCO ₃ (mg/l)	Nickel (dissolved) mg/l	Chromium (dissolved) mg/l	Cadmium (dissolved) mg/l	Copper (dissolved) mg/l	Lead (dissolved) mg/l	Zinc (dissolved) mg/l	Arsenic (dissolved) mg/l	Boron (dissolved) mg/l	Mercury (dissolved) mg/l	Selenium (dissolved) mg/l	Vanadium (dissolved) mg/l
Guideline Value		6-9 (1)	NG	0.02 (1)	0.0047(1)	0.00008(1)	0.001-0.028* (1)	0.0072 (1)	0.008 - 0.125* (1)	0.05(1)	2 (1)	0.00005(1)	0.01(2)	0.02 - 0.06* (1)
BH9 Cont.	07-Feb-18	5.8	77	0.298	<0.001	0.0006	0.533	<0.001	0.689	<0.001	0.07	<0.0001	<0.001	<0.001
	25-Jun-18	5.0	44	0.167	<0.001	0.0004	0.497	<0.001	0.354	<0.001	0.05	<0.0001	<0.001	<0.001
	23-Oct-18	5.0	63	0.259	<0.001	0.0006	0.556	<0.001	0.562	<0.001	0.1	<0.0001	<0.001	<0.001
	12-Feb-19	5.0	2	0.257	<0.001	0.0006	0.529	<0.001	0.496	<0.001	NT	<0.0001	<0.001	<0.001
	15-May-19	4.7	57	0.248	0.0016	0.002	0.628	<0.005	0.519	<0.0025	0.061	<0.001	<0.003	<0.0015
28-Nov-19	6.4	129	0.2563	0.0007	<0.00003	0.34	<0.0004	0.65	<0.0009	0.097	<0.0005	<0.0012	<0.0015	
BH10	01-Jun-10	4.6	NA	0.176	<0.001	0.0003	0.184	<0.001	0.314	<0.001	0.02	<0.0001	<0.001	<0.002
	06-Sep-11	5.6	NA	0.097	<0.001	0.0001	0.044	<0.001	0.428	<0.001	NA	<0.0001	<0.001	<0.001
	27-Sep-11	5.8	NA	0.052	<0.001	<0.0001	0.012	<0.001	0.154	<0.001	0.02	<0.0001	<0.001	<0.001
	31-Oct-11	6.8	13	0.073	0.001	<0.0001	0.032	<0.001	0.291	<0.001	NA	<0.0001	<0.001	NA
	14-Dec-11	7.2	50	0.009	0.001	<0.0001	0.009	<0.001	0.027	<0.001	0.07	<0.0001	0.001	<0.001
	13-Mar-12	5	0	4.727	0.001	0.0034	0.686	0.003	20.9	<0.001	0.01	<0.0001	0.002	0.001
	14-May-12	5.2	0	1.558	<0.001	0.0017	0.709	0.002	5.341	<0.001	0.04	<0.0001	<0.001	<0.001
	10-Jul-12	4.7	0	0.998	0.001	0.002	1.117	0.003	6.488	<0.001	0.05	<0.0001	0.001	<0.001
	18-Sep-12	5.1	0	0.755	0.001	0.0013	1.806	0.002	3.781	<0.001	0.04	<0.0001	<0.001	<0.001
	27-Nov-12	4.8	<2	0.752	<0.001	0.0013	0.728	0.002	3.319	<0.001	0.07	<0.0001	<0.001	<0.001
	25-Jan-13	5.4	16	0.617	<0.001	0.0011	0.984	0.002	2.05	<0.001	0.1	<0.0001	<0.001	<0.001
	03-Apr-13	5.6	4	0.596	<0.001	0.0011	1.537	0.002	1.898	<0.001	0.02	<0.0001	<0.001	<0.001
	31-May-13	5.7	49	0.464	<0.001	0.0009	1.244	0.002	1.704	<0.001	0.02	<0.0001	<0.001	<0.001
	26-Jul-13	5.4	<2	0.203	<0.001	0.0005	0.491	0.001	0.726	<0.001	<0.01	0.0002	<0.001	<0.001
	07-Oct-13	5.9	0	0.221	<0.001	0.0006	0.435	0.001	0.801	<0.001	0.03	<0.0001	<0.001	<0.001
	25-Nov-13	6.3	0	0.34	<0.001	0.0006	0.531	0.001	1.003	<0.001	0.05	<0.0001	<0.001	<0.001
	30-Jan-14	5.3	3	0.277	<0.001	0.0006	0.434	<0.001	0.945	<0.001	0.06	<0.0001	<0.001	<0.001
	04-Jun-14	4.8	4	0.138	<0.001	0.0004	0.352	0.001	0.38	<0.001	0.01	<0.0001	<0.001	<0.001
	08-Oct-14	8.1	38	0.003	<0.001	<0.0001	0.006	<0.001	0.007	<0.001	0.01	<0.0001	<0.001	<0.001
	10-Feb-15	6.8	53	0.002	<0.001	<0.0001	0.009	<0.001	0.011	<0.001	<0.01	<0.0001	<0.001	<0.001
	04-Jun-15	7.3	36	0.013	0.001	<0.0001	0.008	<0.001	0.015	<0.001	<0.01	<0.0001	<0.001	<0.001
	12-Oct-15	6.7	85	0.02	0.001	<0.0001	0.015	<0.001	0.048	<0.001	<0.01	<0.0001	<0.001	<0.001
	17-Feb-16	6.1	83	0.046	<0.001	0.0001	0.026	<0.001	0.076	<0.001	<0.01	<0.0001	<0.001	<0.001
	30-Jun-16	6.1	71	0.029	<0.001	<0.0001	0.021	<0.001	0.059	<0.001	0.03	<0.0001	<0.001	<0.001
	25-Oct-16	5.9	67	0.097	<0.001	0.0002	0.084	<0.001	0.194	<0.001	0.03	<0.0001	<0.001	<0.001
	14-Feb-17	6.2	71	0.064	<0.001	0.0001	0.06	<0.001	0.151	<0.001	0.03	<0.0001	<0.001	<0.001
	16-Jun-17	6.2	59	0.027	<0.001	<0.0001	0.03	<0.001	0.055	<0.001	0.02	<0.0001	<0.001	<0.001
	31-Oct-17	6.3	85	0.047	<0.001	0.0001	0.03	<0.001	0.085	<0.001	<0.01	<0.0001	<0.001	<0.001
07-Feb-18	6.3	113	0.121	<0.001	0.0003	0.105	<0.001	0.186	<0.001	<0.01	<0.0001	<0.001	<0.001	
25-Jun-18	6.0	63	0.074	<0.001	0.0002	0.086	<0.001	0.117	<0.001	0.02	<0.0001	<0.001	<0.001	
23-Oct-18	6.4	73	0.022	<0.001	<0.0001	0.016	<0.001	0.036	<0.001	0.02	<0.0001	<0.001	<0.001	
12-Feb-19	6.9	28	0.025	<0.001	<0.0001	0.02	<0.001	0.04	<0.001	NT	<0.0001	<0.001	<0.001	
15-May-19	6.3	63	0.071	<0.001	<0.0005	0.058	<0.005	0.109	<0.002	0.028	<0.0001	<0.0003	<0.001	
28-Nov-19	6.7	80	0.0112	<0.0002	<0.00003	0.007	<0.0004	0.0192	<0.0009	0.032	<0.0005	<0.0012	<0.0015	

Groundwater Monitoring - Summary of Results

Borehole	Date	Analysis												
		pH	CaCO ₃ (mg/l)	Nickel (dissolved) mg/l	Chromium (dissolved) mg/l	Cadmium (dissolved) mg/l	Copper (dissolved) mg/l	Lead (dissolved) mg/l	Zinc (dissolved) mg/l	Arsenic (dissolved) mg/l	Boron (dissolved) mg/l	Mercury (dissolved) mg/l	Selenium (dissolved) mg/l	Vanadium (dissolved) mg/l
Guideline Value		6-9 (1)	NG	0.02 (1)	0.0047(1)	0.00008(1)	0.001-0.028* (1)	0.0072 (1)	0.008 - 0.125* (1)	0.05(1)	2 (1)	0.00005(1)	0.01(2)	0.02 - 0.06* (1)
BH32	01-Jun-10	6.6	NA	0.004	0.001	<0.0001	0.002	<0.001	<0.002	<0.001	0.02	<0.0001	<0.001	<0.002
	06-Sep-11	5.6	NA	2.18	0.003	0.0023	0.029	<0.001	4.856	<0.001	0.06	<0.0001	<0.001	<0.001
	27-Sep-11	6.3	NA	1.992	0.004	0.0014	0.006	<0.001	2.702	<0.001	0.06	<0.0001	0.001	0.001
	31-Oct-11	5.8	18	6.396	0.003	0.0042	0.04	<0.001	16.36	<0.001	NA	<0.0001	0.002	NA
	14-Dec-11	6.9	177	0.247	0.004	0.0002	0.003	<0.001	0.265	<0.001	0.07	<0.0001	0.002	0.002
	13-Mar-12	7.2	80	0.688	0.003	0.0006	0.003	<0.001	0.963	<0.001	<0.01	<0.0001	0.001	0.002
	14-May-12	7.2	166	0.465	0.004	0.0003	0.004	<0.001	0.871	<0.001	0.03	<0.0001	0.002	0.002
	10-Jul-12	6.8	13	1.96	0.001	0.0031	0.03	<0.001	4.906	<0.001	0.07	0.0001	<0.001	<0.001
	18-Sep-12	6.6	9	2.488	0.002	0.004	0.038	<0.001	6.379	<0.001	0.11	<0.0001	<0.001	<0.001
	27-Nov-12	7.2	67	0.834	0.001	0.001	0.009	<0.001	1.657	<0.001	0.06	<0.0001	<0.001	<0.001
	25-Jan-13	7	20	0.862	<0.001	0.0013	0.012	<0.001	1.903	<0.001	0.08	<0.0001	<0.001	0.001
	03-Apr-13	7.2	26	0.952	<0.001	0.001	0.006	<0.001	1.767	<0.001	0.04	<0.0001	<0.001	<0.001
	31-May-13	6.9	52	1.87	0.001	0.0028	0.044	<0.001	3.44	<0.001	0.06	<0.0001	<0.001	<0.001
	26-Jul-13	5.4	8	2.461	0.001	0.0043	0.069	<0.001	7.082	<0.001	0.08	<0.0001	<0.001	<0.001
	07-Oct-13	5.7	13	2.991	0.001	0.0051	0.136	<0.001	6.877	<0.001	0.1	<0.0001	<0.001	<0.001
	25-Nov-13	6.7	82	0.511	<0.001	0.0007	0.005	<0.001	1.32	<0.001	0.07	<0.0001	0.003	<0.001
	30-Jan-14	6.4	66	0.298	<0.001	0.0004	0.008	<0.001	0.785	<0.001	0.05	<0.0001	0.002	<0.001
	04-Jun-14	5.8	40	0.512	<0.001	0.0008	0.005	<0.001	1.157	<0.001	0.04	<0.0001	0.001	<0.001
	08-Oct-14	7.2	7	1.349	<0.001	0.0025	0.119	<0.001	2.669	<0.001	0.08	<0.0001	<0.001	<0.001
	10-Feb-15	6.4	156	0.085	<0.001	0.0002	0.037	<0.001	0.248	<0.001	0.01	<0.0001	0.003	<0.001
	04-Jun-15	6.9	54	0.097	<0.001	0.0001	0.003	<0.001	0.226	<0.001	0.03	<0.0001	0.001	<0.001
	12-Oct-15	6.4	87	0.2	0.001	0.0003	0.005	<0.001	0.459	<0.001	0.03	<0.0001	<0.001	<0.001
	17-Feb-16	6	113	0.362	<0.001	0.0008	0.022	<0.001	0.699	<0.001	<0.01	<0.0001	<0.001	<0.001
	30-Jun-16	5.8	111	0.236	<0.001	0.0004	0.005	<0.001	0.585	<0.001	0.06	<0.0001	<0.001	<0.001
	25-Oct-16	5.7	145	0.391	<0.001	0.0007	0.009	<0.001	0.85	<0.001	0.06	<0.0001	<0.001	<0.001
	14-Feb-17	6.4	115	0.242	<0.001	0.0004	0.005	<0.001	0.581	<0.001	0.05	<0.0001	<0.001	<0.001
	16-Jun-17	5.5	96	0.345	<0.001	0.0007	0.025	<0.001	0.811	<0.001	0.07	<0.0001	<0.001	<0.001
	31-Oct-17	6.1	85	0.173	<0.001	0.0004	0.01	<0.001	0.423	<0.001	<0.01	<0.0001	<0.001	<0.001
07-Feb-18	6.3	147	0.306	<0.001	0.0006	0.017	<0.001	0.711	<0.001	<0.01	<0.0001	0.002	<0.001	
25-Jun-18	6.1	76	0.163	<0.001	0.0003	0.007	<0.001	0.362	<0.001	0.03	<0.0001	<0.001	<0.001	
23-Oct-18	5.9	66	0.166	<0.001	0.0003	0.006	<0.001	0.377	<0.001	0.04	<0.0001	<0.001	<0.001	
12-Feb-19	6.5	13	0.259	<0.001	0.0006	0.041	<0.001	0.5	<0.001	NT	<0.0001	<0.001	<0.001	
15-May-19	5.96	68	0.252	<0.0015	<0.0005	0.065	<0.005	0.482	<0.0025	0.036	<0.001	<0.003	<0.0015	
28-Nov-19	6.33	48	0.108	<0.0002	<0.00003	0.013	<0.0004	0.2486	<0.0009	0.037	<0.0005	<0.0012	<0.0015	
BH13	01-Oct-09	5.2	NA	0.721	0.001	0.002	0.243	<0.001	0.611	<0.001	0.04	0.0001	<0.001	<0.002
	01-Feb-10	5.5	NA	0.263	0.001	0.0008	0.24	<0.001	0.055	<0.001	0.03	<0.0001	<0.001	<0.002
	01-Apr-10	5.5	NA	0.214	<0.001	0.0006	0.092	<0.001	0.154	<0.001	0.01	<0.0001	<0.001	<0.002
	01-Jun-10	4.6	NA	0.244	<0.001	0.0008	0.243	0.001	0.285	<0.001	0.02	0.0001	<0.001	<0.002
	01-Nov-11	6.4	0	0.193	<0.001	0.0004	0.111	<0.001	0.528	<0.001	NA	<0.0001	<0.001	NA
	16-Dec-11	7.4	47	0.128	0.001	0.0004	0.021	<0.001	0.287	<0.001	<0.01	<0.0001	<0.001	<0.001
	13-Mar-12	6.9	198	0.009	0.006	0.0004	0.001	<0.001	0.002	<0.001	<0.01	<0.0001	0.001	0.002

Groundwater Monitoring - Summary of Results

Borehole	Date	Analysis												
		pH	CaCO ₃ (mg/l)	Nickel (dissolved) mg/l	Chromium (dissolved) mg/l	Cadmium (dissolved) mg/l	Copper (dissolved) mg/l	Lead (dissolved) mg/l	Zinc (dissolved) mg/l	Arsenic (dissolved) mg/l	Boron (dissolved) mg/l	Mercury (dissolved) mg/l	Selenium (dissolved) mg/l	Vanadium (dissolved) mg/l
Guideline Value		6-9 (1)	NG	0.02 (1)	0.0047(1)	0.00008(1)	0.001-0.028* (1)	0.0072 (1)	0.008 - 0.125* (1)	0.05(1)	2 (1)	0.00005(1)	0.01(2)	0.02 - 0.06* (1)
BH13 Cont.	14-May-12	6.7	0	0.214	<0.001	0.0005	0.104	<0.001	0.761	<0.001	0.01	<0.0001	<0.001	<0.001
	10-Jul-12	5.9	0	0.387	<0.001	0.0008	0.14	0.001	1.228	<0.001	0.02	<0.0001	<0.001	<0.001
	18-Sep-12	5.5	0	1.907	0.001	0.0037	0.138	0.002	1.851	<0.001	0.09	<0.0001	<0.001	<0.001
	27-Nov-12	7.3	12	0.249	<0.001	0.0006	0.034	<0.001	0.615	<0.001	0.02	<0.0001	<0.001	0.001
	25-Jan-13	6.5	20	0.306	<0.001	0.0007	0.114	<0.001	0.839	<0.001	0.06	<0.0001	<0.001	0.001
	03-Apr-13	6.8	12	0.276	<0.001	0.0006	0.098	<0.001	0.774	<0.001	<0.01	<0.0001	<0.001	<0.001
	31-May-13	6.9	50	0.553	<0.001	0.0011	0.091	0.001	0.681	<0.001	0.02	<0.0001	<0.001	<0.001
	26-Jul-13	5	<2	1.746	<0.001	0.0027	0.098	0.001	0.924	<0.001	0.09	<0.0001	<0.001	<0.001
	07-Oct-13	6.1	14	0.4	<0.001	0.0009	0.109	0.001	0.625	<0.001	0.04	<0.0001	<0.001	<0.001
	25-Nov-13	6.6	8	0.169	<0.001	0.0006	0.075	<0.001	0.43	<0.001	0.03	<0.0001	<0.001	<0.001
	30-Jan-14	6.3	30	0.124	<0.001	0.0005	0.004	<0.001	0.133	<0.001	0.05	<0.0001	<0.001	<0.001
	04-Jun-14	4.8	234	0.168	<0.001	0.0005	0.054	<0.001	0.373	<0.001	<0.01	<0.0001	<0.001	<0.001
	08-Oct-14	7.4	<2	0.644	<0.001	0.0015	0.115	0.001	0.594	<0.001	0.06	<0.0001	<0.001	<0.001
	10-Feb-15	5.4	4	0.075	<0.001	0.0003	0.041	<0.001	0.14	<0.001	0.02	0.0004	<0.001	<0.001
	04-Jun-15	5.8	4	0.164	0.017	0.0003	0.04	<0.001	0.198	<0.001	0.02	<0.0001	<0.001	<0.001
	12-Oct-15	6.1	40	0.102	<0.001	0.0003	0.059	<0.001	0.227	<0.001	<0.01	<0.0001	<0.001	<0.001
	17-Feb-16	4.8	61	0.096	<0.001	0.0003	0.041	<0.001	0.128	<0.001	<0.01	<0.0001	<0.001	<0.001
	30-Jun-16	4.7	53	0.077	<0.001	0.0003	0.053	<0.001	0.162	<0.001	0.03	<0.0001	<0.001	<0.001
	25-Oct-16	4.6	75	0.069	<0.001	0.0004	0.074	<0.001	0.148	<0.001	0.03	<0.0001	<0.001	<0.001
	14-Feb-17	5.0	61	0.052	<0.001	0.0002	0.052	<0.001	0.109	<0.001	0.02	<0.0001	<0.001	<0.001
16-Jun-17	5.2	47	0.038	<0.001	0.0002	0.032	<0.001	0.068	<0.001	0.03	<0.0001	<0.001	<0.001	
31-Oct-17	4.9	45	0.037	<0.001	0.0002	0.04	<0.001	0.081	<0.001	<0.01	<0.0001	<0.001	<0.001	
07-Feb-18	5.7	61	0.032	<0.001	0.0002	0.016	<0.001	0.07	<0.001	<0.01	<0.0001	<0.001	<0.001	
25-Jun-18	4.9	68	0.075	<0.001	0.0003	0.029	<0.001	0.068	<0.001	0.03	<0.0001	<0.001	<0.001	
23-Oct-18	5.1	47	0.018	<0.001	0.0001	0.014	<0.001	0.03	<0.001	0.02	<0.0001	<0.001	<0.001	
12-Feb-19	6.2	4	0.02	<0.001	0.0001	0.015	<0.001	0.033	<0.001	NT	<0.0001	<0.001	<0.001	
15-May-19	6.1	48	0.01	<0.0015	<0.0005	<0.007	<0.005	0.013	<0.0025	0.018	<0.001	<0.003	<0.0015	
28-Nov-19	6.3	59	0.0209	<0.0002	<0.00003	0.004	<0.0004	0.0126	<0.0009	0.046	<0.0005	<0.0012	<0.0015	
BH901	01-Mar-06	5.8	<20	0.076	0.008	<0.001	0.074	<0.005	0.031	<0.005	<0.005	<0.00005	<0.005	NA
	01-May-06	4.3	<20	2.7	<0.005	0.002	2.2	<0.005	0.89	<0.005	0.032	<0.00005	<0.005	NA
	01-Dec-06	3.5	<20	3.8	0.006	0.005	2.3	<0.005	1.6	<0.005	0.140	<0.00005	<0.005	NA
	01-Aug-07	6.70	62	0.09	<0.005	<0.001	0.013	<0.005	0.018	<0.005	0.031	<0.00005	<0.005	NA
	01-Aug-08	3.3	<20	2.1	<0.005	0.003	0.96	<0.005	2.5	<0.005	0.060	<0.00005	<0.005	NA
	01-Sep-09	5.36	6.5	0.342	<0.005	<0.001	0.401	<0.005	0.522	<0.005	<0.018	<0.00005	<0.005	NA
	01-Aug-10	6.40	41	0.035	0.001	<0.001	0.019	<0.001	0.142	<0.001	0.030	<0.00005	<0.005	NA
	01-Aug-11	6.70	11	0.185	<0.001	0.0003	0.067	<0.001	0.749	<0.001	0.030	<0.0001	<0.001	NA
	14-Dec-11	6	<2	0.608	<0.001	0.0008	0.3	<0.001	2.682	<0.001	0.11	<0.0001	0.001	<0.001
	13-Mar-12	5.2	0	0.44	0.002	0.0011	2.143	0.002	2.89	<0.001	<0.01	<0.0001	<0.001	0.001
14-May-12	6.7	0	3.982	0.007	0.0031	6.873	0.003	17.55	<0.001	0.03	<0.0001	0.003	<0.001	
10-Jul-12	4.9	0	0.279	0.002	0.0005	0.834	<0.001	1.561	<0.001	0.02	<0.0001	<0.001	<0.001	
18-Sep-12	6.1	0	0.212	0.001	0.0006	0.394	<0.001	0.815	<0.001	0.04	<0.0001	<0.001	<0.001	

Groundwater Monitoring - Summary of Results

Borehole	Date	Analysis												
		pH	CaCO ₃ (mg/l)	Nickel (dissolved) mg/l	Chromium (dissolved) mg/l	Cadmium (dissolved) mg/l	Copper (dissolved) mg/l	Lead (dissolved) mg/l	Zinc (dissolved) mg/l	Arsenic (dissolved) mg/l	Boron (dissolved) mg/l	Mercury (dissolved) mg/l	Selenium (dissolved) mg/l	Vanadium (dissolved) mg/l
Guideline Value		6-9 (1)	NG	0.02 (1)	0.0047(1)	0.00008(1)	0.001-0.028* (1)	0.0072 (1)	0.008 - 0.125* (1)	0.05(1)	2 (1)	0.00005(1)	0.01(2)	0.02 - 0.06* (1)
BH901 Cont.	27-Nov-12	4.7	<0	0.283	0.001	0.0006	0.523	0.002	1.196	<0.001	0.04	<0.0001	<0.001	<0.001
	25-Jan-13	6.4	13	0.319	<0.001	0.0008	0.536	0.002	1.19	<0.001	0.05	<0.0001	<0.001	0.001
	03-Apr-13	7.1	24	0.136	<0.001	0.0003	0.234	<0.001	0.462	<0.001	<0.01	<0.0001	<0.001	<0.001
	31-May-13	5.9	<30	0.307	0.001	0.0009	0.452	<0.001	1.325	<0.001	<0.01	<0.0001	<0.001	<0.001
	26-Jul-13	4.7	<2	0.316	<0.001	0.0013	0.272	0.002	1.394	<0.001	0.03	<0.0001	<0.001	<0.001
	07-Oct-13	5.4	0	0.36	<0.001	0.0014	0.437	<0.001	1.474	<0.001	0.04	<0.0001	<0.001	<0.001
	25-Nov-13	6	2	0.738	<0.001	0.0015	0.777	0.001	2.073	<0.001	0.1	<0.0001	<0.001	<0.001
	30-Jan-14	4.2	<2	0.553	<0.001	0.0009	1.356	0.003	1.592	<0.001	0.11	<0.0001	<0.001	<0.001
	04-Jun-14	4.3	0	0.521	<0.001	0.0036	1.612	0.003	2.457	<0.001	0.04	<0.0001	<0.001	<0.001
	08-Oct-14	6.3	<2	1.048	0.001	0.008	0.772	0.003	2.042	<0.001	0.04	<0.0001	<0.001	<0.001
	10-Feb-15	4.6	0	0.386	<0.001	0.0009	1.219	<0.001	1.098	<0.001	0.12	0.0002	<0.001	<0.001
	04-Jun-15	5.5	0	0.58	0.002	0.0028	1.03	0.001	1.482	<0.001	0.06	<0.0001	0.002	<0.001
12-Oct-15	Not Sampled							Not Sampled					Not Sampled	
BH901R	17-Feb-16	5.9	114	0.447	<0.001	0.0011	0.633	<0.001	1.214	<0.001	0.06	<0.0001	<0.001	<0.001
	30-Jun-16	5.9	131	0.266	<0.001	0.0006	0.184	<0.001	0.702	<0.001	0.05	<0.0001	<0.001	<0.001
	25-Oct-16	5.6	49	0.167	<0.001	0.0003	0.402	<0.001	0.448	<0.001	0.03	<0.0001	<0.001	<0.001
	14-Feb-17	6.2	125	0.202	<0.001	0.0004	0.252	<0.001	0.497	<0.001	0.06	<0.0001	<0.001	<0.001
	16-Jun-17	6.2	45	0.13	<0.001	0.0004	0.319	<0.001	0.392	<0.001	0.05	<0.0001	<0.001	<0.001
	31-Oct-17	6.3	103	0.158	<0.001	0.0003	0.222	<0.001	0.368	<0.001	0.09	<0.0001	<0.001	<0.001
	07-Feb-18	6.4	134	0.394	<0.001	0.0008	0.519	<0.001	1.154	<0.001	0.08	<0.0001	<0.001	<0.001
	25-Jun-18	5.7	73	0.146	<0.001	0.0004	0.344	<0.001	0.412	<0.001	0.05	<0.0001	<0.001	<0.001
	23-Oct-18	6.2	135	0.272	<0.001	0.0006	0.234	<0.001	0.638	<0.001	0.11	<0.0001	<0.001	<0.001
	12-Feb-19	7.2	53	0.233	<0.001	0.0005	0.215	<0.001	0.551	<0.001	NT	<0.0001	<0.001	<0.001
	15-May-19	5.72	90	0.267	<0.0015	<0.0005	0.368	<0.005	0.760	<0.0025	0.065	<0.001	<0.003	<0.0015
	28-Nov-19	6.91	256	0.193	0.0004	<0.00003	0.123	<0.0004	0.528	<0.0009	0.156	<0.0005	<0.0012	<0.0015
BH701	01-Mar-06	6.20	50	0.014	<0.005	<0.001	<0.005	<0.005	0.005	<0.005	<0.005	<0.00005	<0.005	NA
	01-May-06	6.30	65	0.007	<0.005	<0.001	<0.005	<0.005	0.01	<0.005	0.013	<0.00005	<0.005	NA
	01-Aug-07	6.80	65	0.010	<0.005	<0.001	<0.005	<0.005	0.3	<0.005	0.009	<0.00005	<0.005	NA
	01-Oct-07	6.00	NA	<0.005	<0.005	<0.001	<0.005	<0.005	0.015	<0.005	<0.005	<0.00005	NA	NA
	01-Aug-08	6.10	70	0.045	<0.005	<0.001	<0.005	<0.005	1.2	<0.005	0.012	<0.00005	<0.005	NA
	01-Sep-09	6.64	65	0.006	<0.005	<0.001	0.009	<0.005	0.04	<0.005	<0.018	<0.00005	<0.005	NA
	01-Aug-10	6.30	61	0.004	0.001	0.0005	0.004	<0.001	0.005	<0.001	0.030	<0.00005	<0.001	NA
	01-Aug-11	6.40	69	0.002	0.002	<0.0001	0.003	<0.001	0.014	<0.001	0.020	<0.0001	<0.001	NA
	14-Dec-11	6.9	64	0.119	0.001	0.0001	0.014	<0.001	0.552	<0.001	0.02	<0.0001	<0.001	<0.001
	15-May-19	6.55	71	0.006	0.0031	<0.0005	<0.007	<0.005	0.012	<0.0025	<0.012	<0.001	<0.003	<0.0015
28-Nov-19	6.99	101	<0.0002	0.0095	<0.00003	<0.003	<0.0004	0.003	<0.0009	0.016	<0.0005	<0.0012	<0.0015	

Groundwater Monitoring - Summary of Results

		Analysis												
Borehole	Date	pH	CaCO ₃ (mg/l)	Nickel (dissolved) mg/l	Chromium (dissolved) mg/l	Cadmium (dissolved) mg/l	Copper (dissolved) mg/l	Lead (dissolved) mg/l	Zinc (dissolved) mg/l	Arsenic (dissolved) mg/l	Boron (dissolved) mg/l	Mercury (dissolved) mg/l	Selenium (dissolved) mg/l	Vanadium (dissolved) mg/l
Guideline Value		6-9 (1)	NG	0.02 (1)	0.0047(1)	0.00008(1)	0.001-0.028* (1)	0.0072 (1)	0.008 - 0.125* (1)	0.05(1)	2 (1)	0.00005(1)	0.01(2)	0.02 - 0.06* (1)
BH16	15-Oct-09	6.1	NA	0.208	0.002	0.0013	0.003	<0.001	0.057	<0.001	0.03	<0.0001	<0.001	<0.002
	01-Nov-11	6.6	47	0.388	0.002	0.0011	0.28	<0.001	0.451	<0.001	NA	<0.0001	<0.001	NA
	15-Dec-11	6.9	108	0.112	0.002	0.0004	0.012	<0.001	0.112	<0.001	<0.01	<0.0001	<0.001	0.001
	15-May-19	6.53	65	0.002	<0.0015	<0.0005	<0.007	<0.005	0.004	<0.0025	<0.012	<0.001	<0.003	<0.0015
	28-Nov-19	6.82	89	0.0005	0.0015	<0.00003	<0.003	<0.0004	0.0054	<0.0009	0.013	<0.0005	<0.0012	<0.0015

Notes:

Yellow cells indicate elevated concentrations compared with Environmental Quality Standards and UK Drinking Water Standards.

Blue cells are results obtained from the Site Protection Monitoring Programme (SPMP).

NG = No Guideline

NA = Not Available

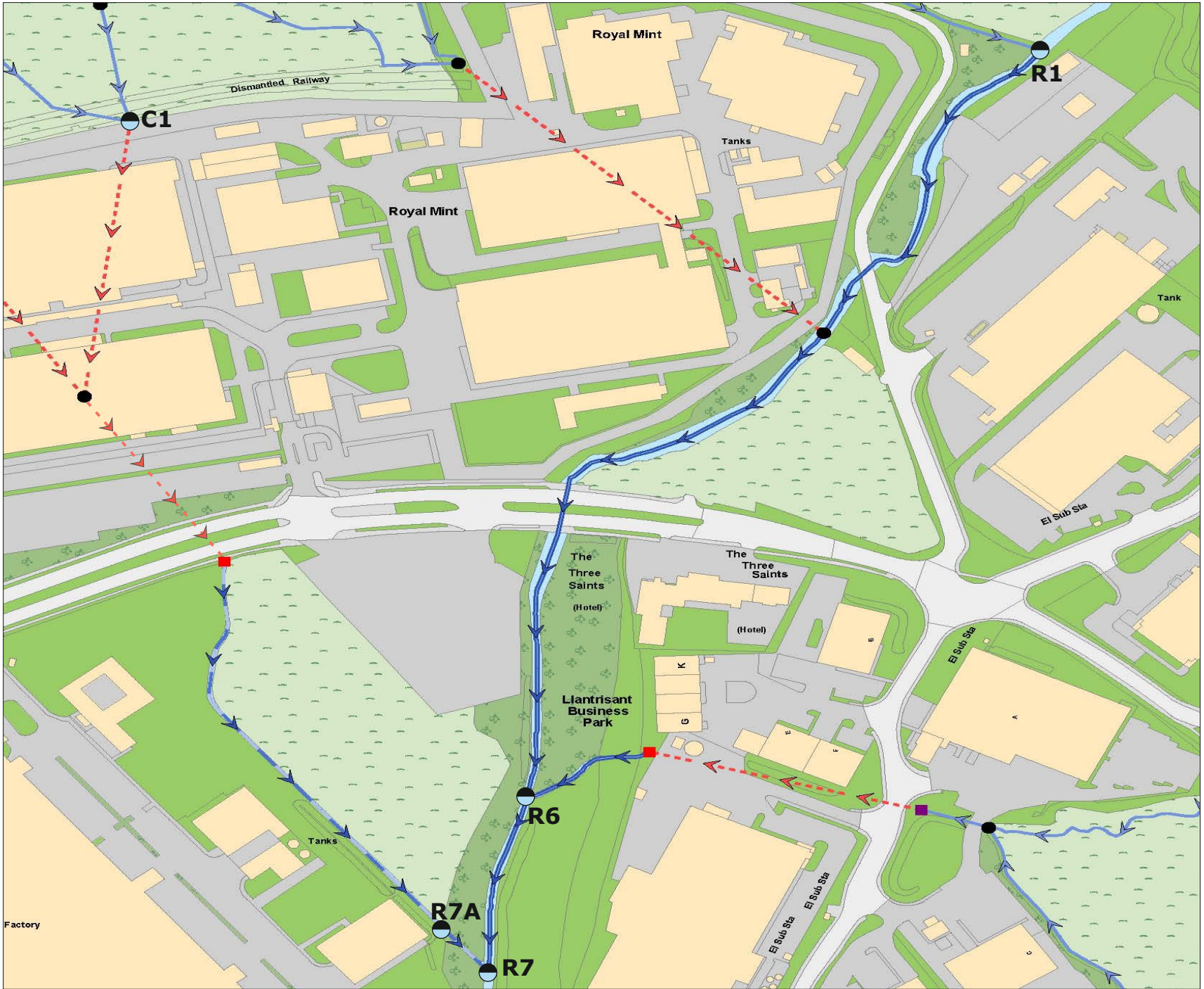
(1) = European Environmental Quality Standard (EQS): The River Basin Districts Typology, Standards and Groundwater threshold Values (Water Framework Directive (England and Wales) Directions 2010

(2) = Water Supply (Water Quality) (England and Wales) Regulations 2000 (SI 2000/3184) (as amended); Water Supply (Water Quality) (Wales) Regulations 2001 (SI 3911 W.323) (as amended)

* = Range determined by alkalinity

Appendix 3

Figures and Graphs



Legend

-  River Sampling Locations

Title **Figure 1: Surface Water Sampling Locations**

Site **The Royal Mint, Llantrisant, Pontyclun, Mid Glamorgan, CF72 8YT**

Client **The Royal Mint**

Project No. **1700003935**

Issue **1**

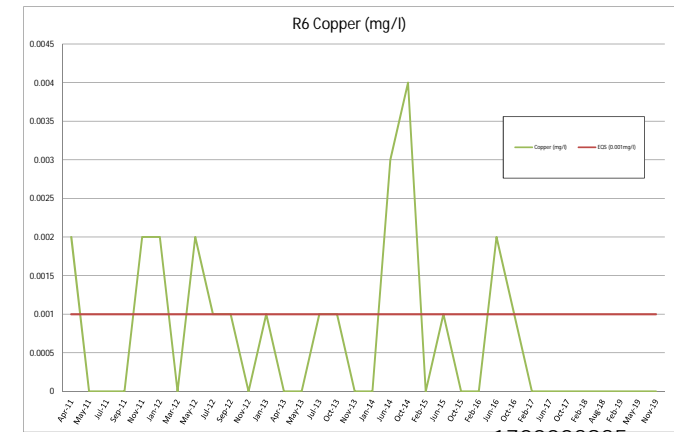
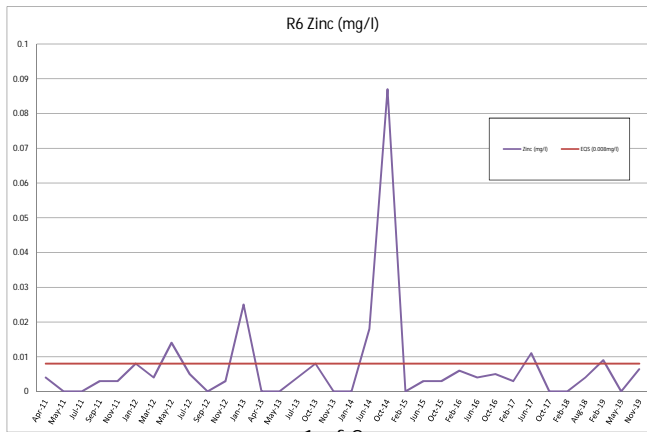
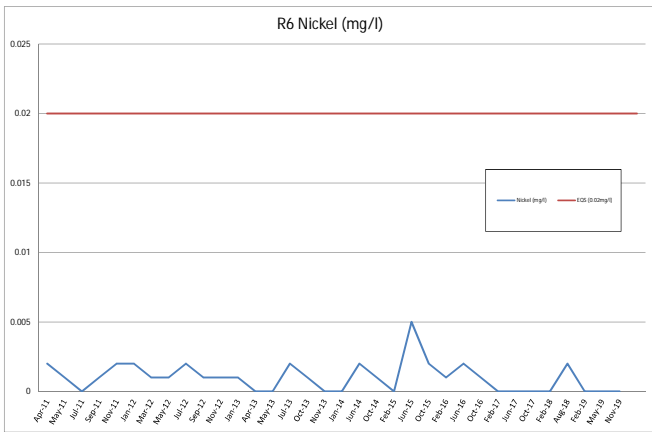
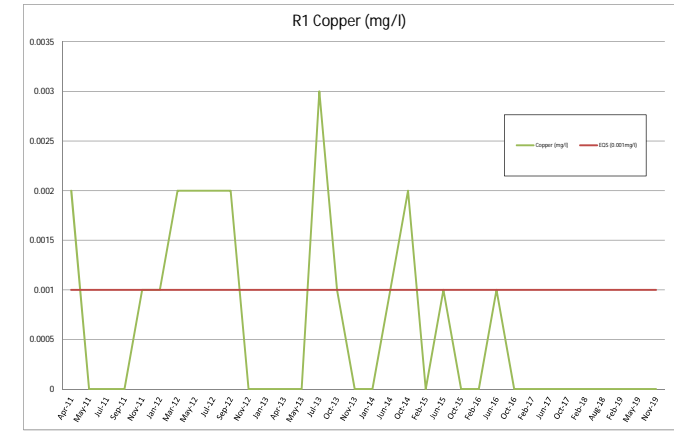
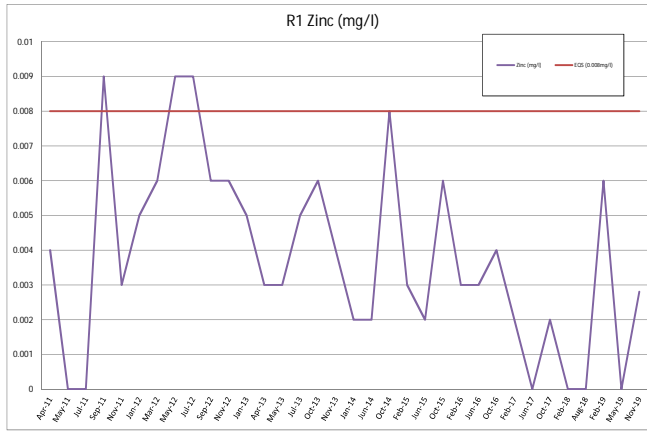
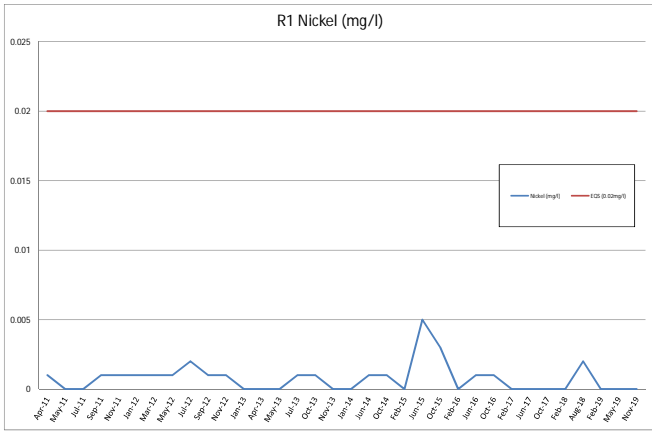
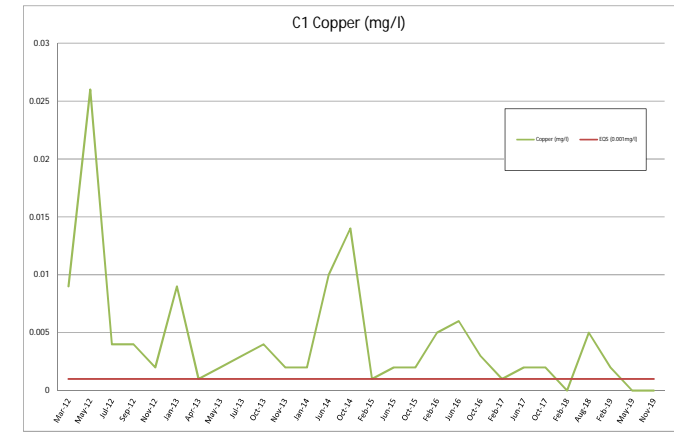
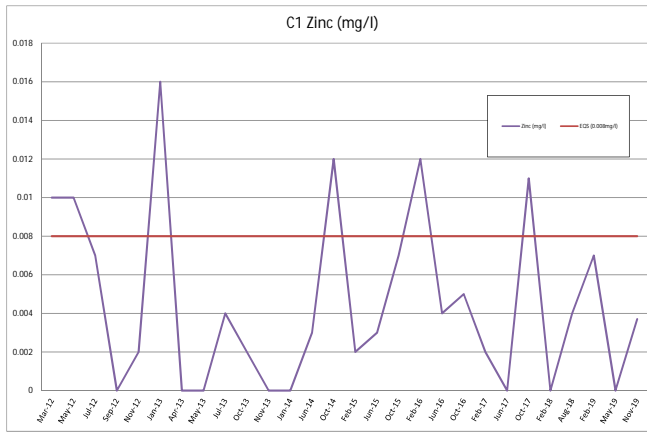
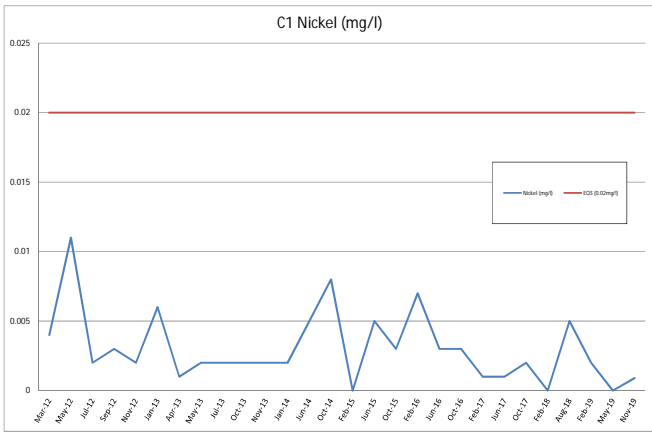
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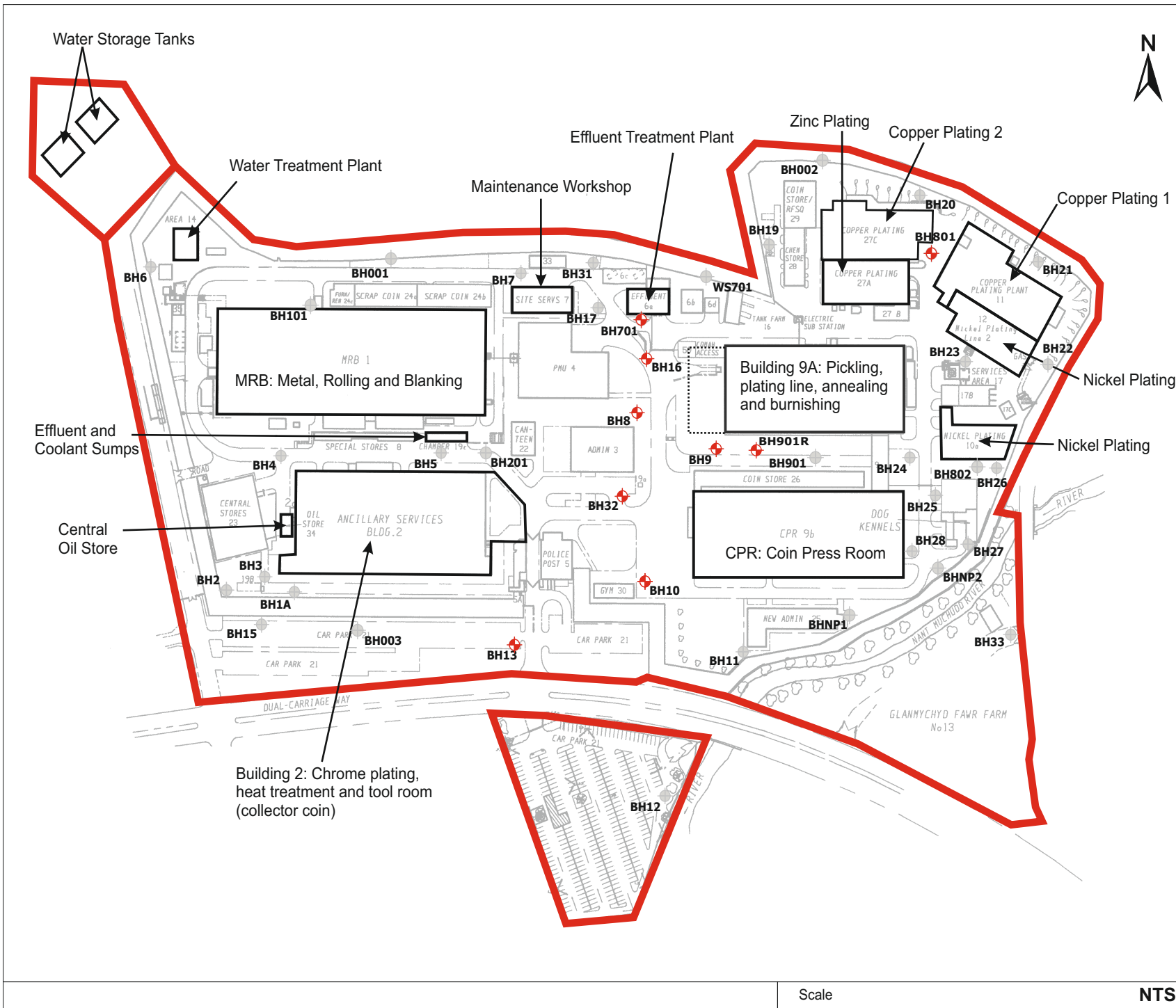
Drawn by **RH**



Scale

NTS





Legend

- Site Boundary
- ✕ Sampled Boreholes

Title **Figure 2: Groundwater Sample Location Plan**

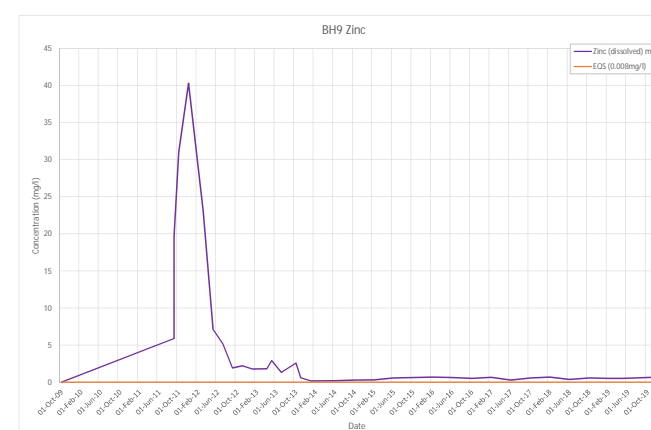
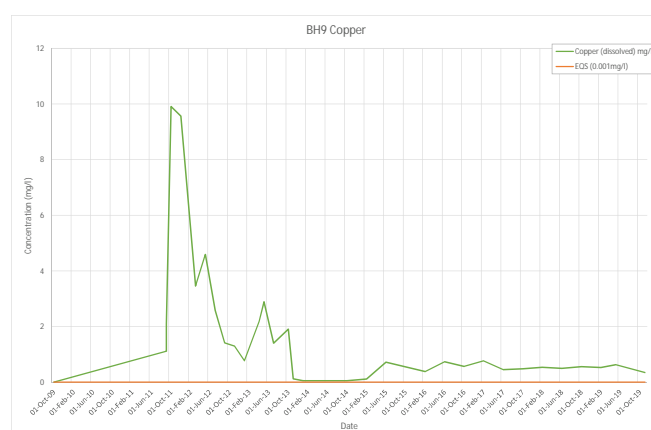
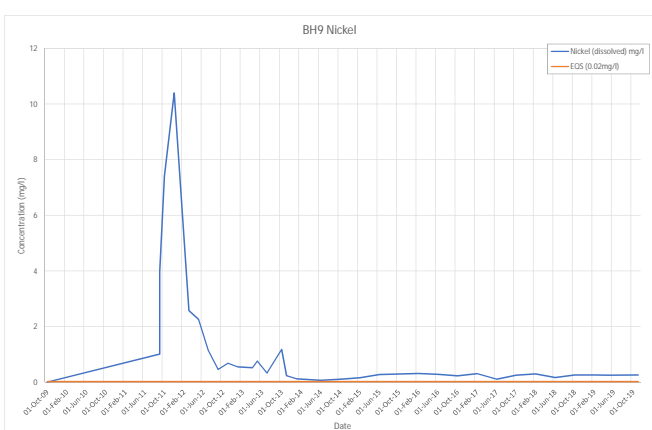
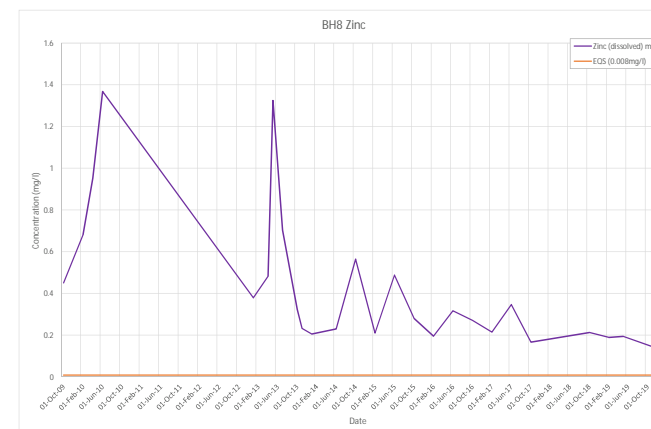
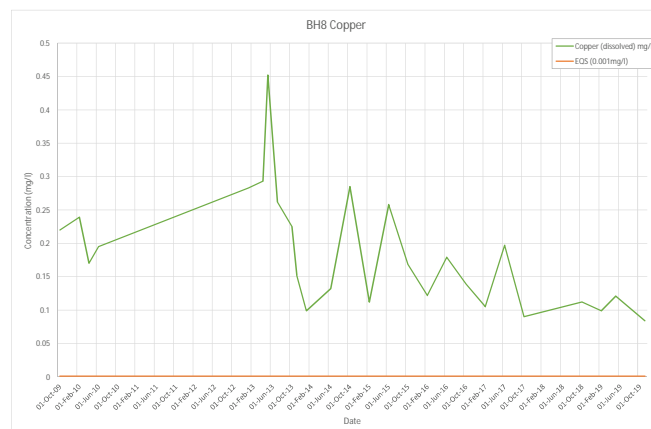
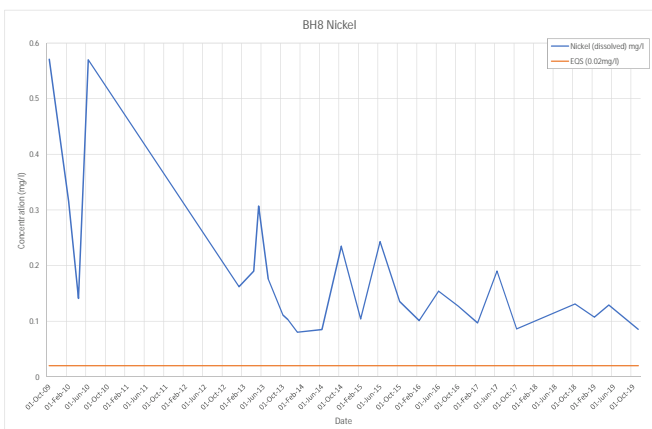
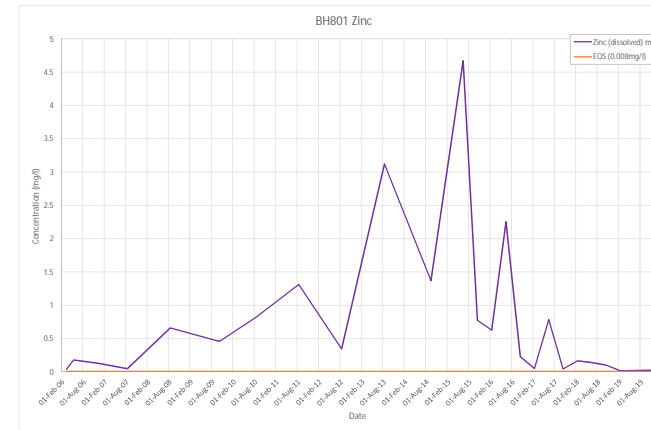
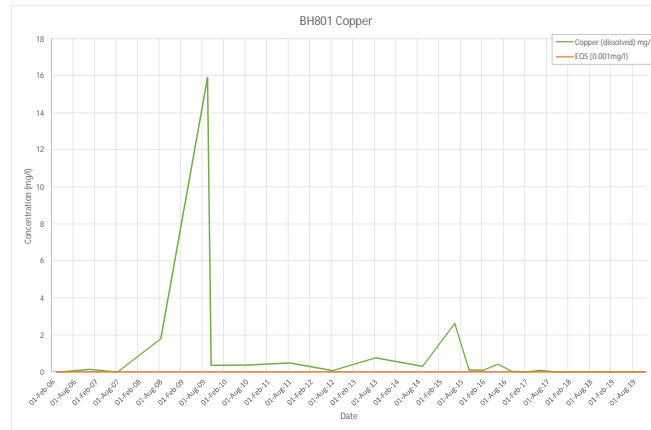
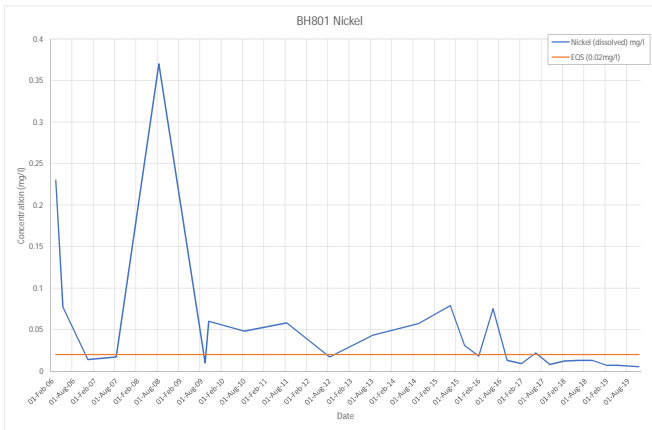
Site **The Royal Mint, Llantrisant, Pontyclun, Mid Glamorgan, CF72 8YT**

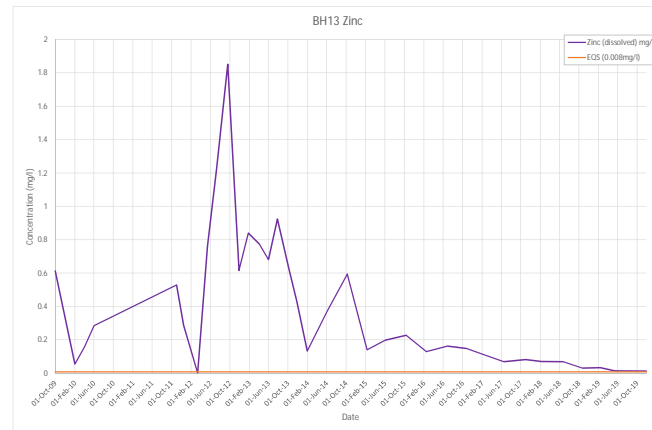
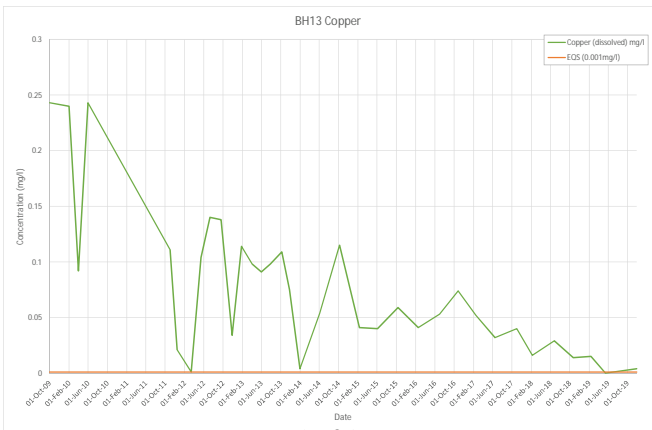
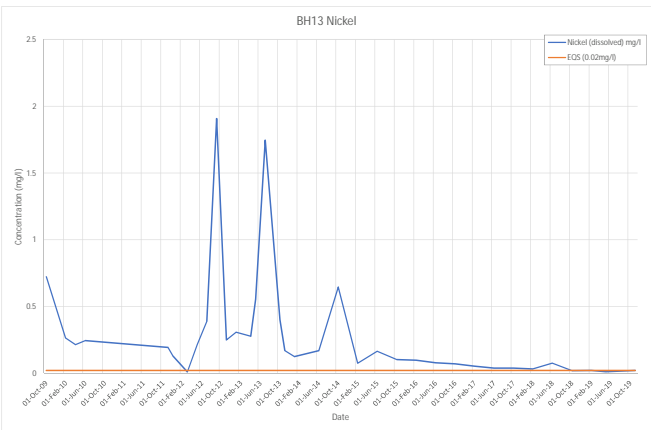
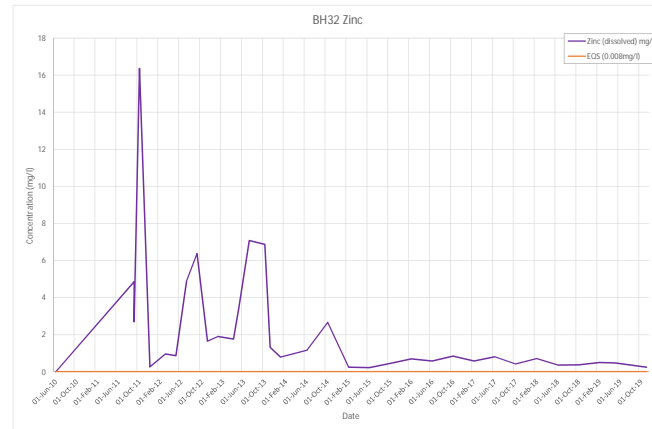
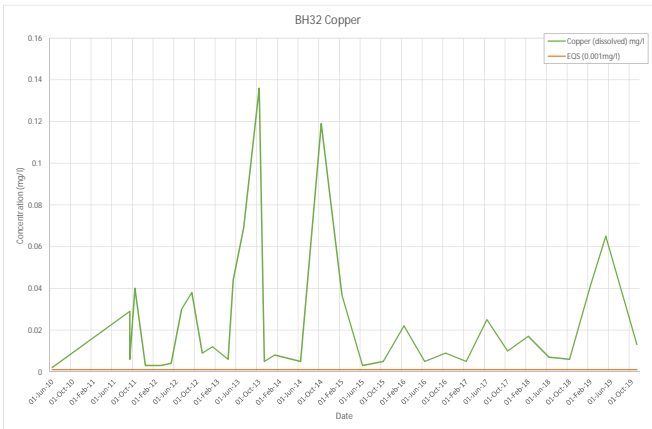
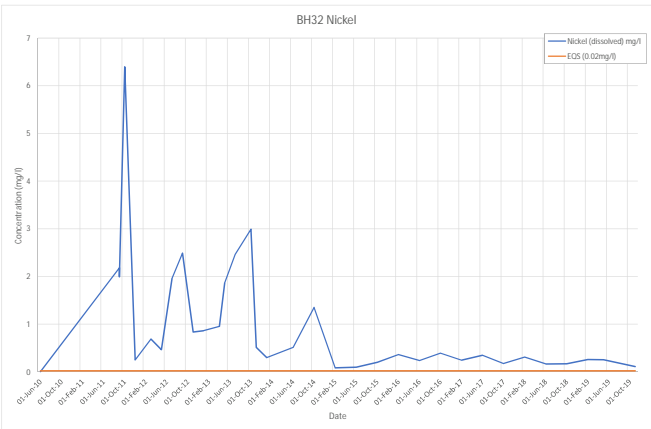
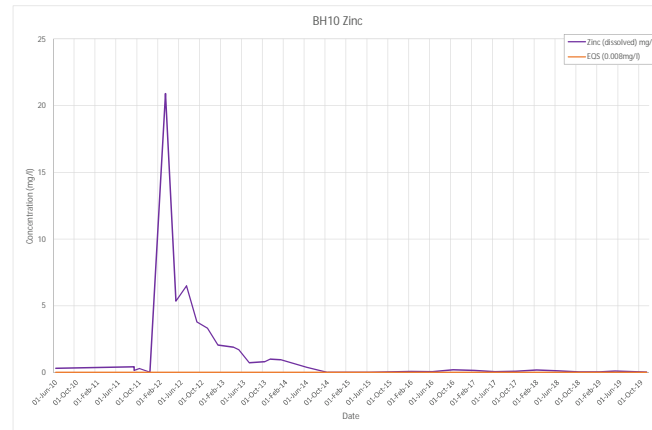
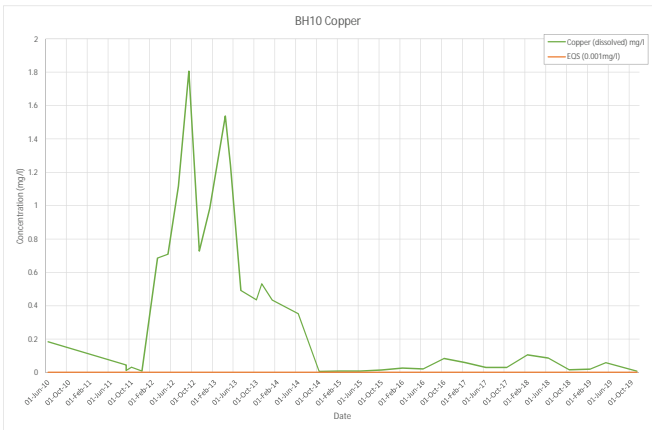
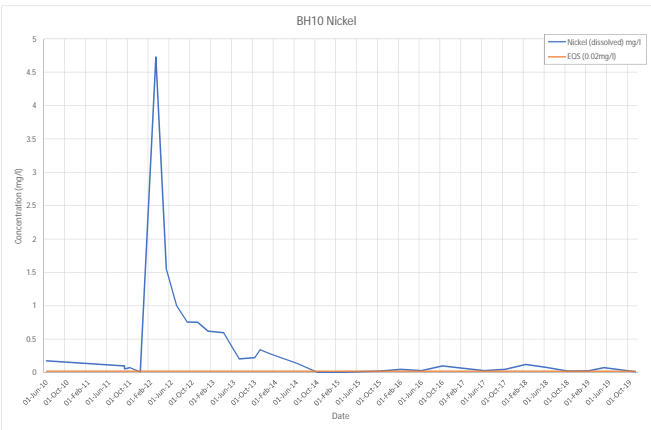
Client	The Royal Mint
Project No.	1700003935
Issue	1
Date	November 2019
Drawn by	RH



Ramboll

Groundwater Concentration Graphs





Ramboll

Groundwater Concentration Graphs

