RAMBOLL

ENVIRONMENT
& HEALTH

Hydro Components UK Ltd
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Dear Ruth,

SITE PROTECTION AND MONITORING PROGRAMME (SPMP), GROUNDWATER MONITORING, FEBRUARY 2018 (ROUND 29): ENVIRONMENTAL PERMIT REF. BX94551F

Date 16/03/2018

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Ref L1700001435_1

Background

Hydro Components UK Ltd. (Hydro), (formerly Sapa Extrusions Ltd.) has carried out regular groundwater monitoring at the installation since August 2005. Ramboll Environment and Health UK Ltd (Ramboll) has carried out twenty-five rounds of monitoring between August 2005 and February 2018; and Mabbett and Associates Ltd (M&A) carried out monitoring on four occasions (between February 2009 and April 2010). In accordance with the SPMP, groundwater monitoring is required in order to assess the nature of any identified groundwater contamination arising from potential identified sources over the longer term; and to confirm improvements in site control and management have reduced the levels of contamination.

The main manufacturing operations at the site ceased in March 2014 and the installation was partially decommissioned, including decontamination works (cleaning of press-pits, removal of oil storage tanks etc.). However, anodising and fabrication activities re-commenced at the site in 2016 and are currently ongoing.

A Compliance Assessment Report (CAR), (Ref: CAR_NRW0020594) was issued by Natural Resources Wales (NRW) on 23rd May 2016 following its review of the previous SPMP monitoring results (Ramboll Report Ref: UK17-22794_01, February 2016). NRW made the following recommendations in the CAR:

- the passive skimmer in BH12 could be removed, considering the minor amounts of product recorded over the past two years; and that the likely source of contamination (P16 Press Pit) has been emptied;

- further investigation should be carried out in order to understand the reason for discolouration in BHS6 (sentry borehole). The groundwater has been black/ brown coloured for the last few monitoring rounds; however, the hydrocarbon concentration is not significantly elevated and the groundwater was not observed to have an oily sheen;
- the pH values across the site should continue to be monitored due to a previous spillage in the anodising plant. Although the majority of pH values have returned to more neutral levels, MW2 and BH6 continued to have slightly acidic values; and
- the frequency of monitoring could be reduced to an annual event if manufacturing had ceased, unless any production activities resume. Given that production has resumed, Ramboll recommends that that six-monthly monitoring continues to be appropriate.

This report details the results of the twenty-ninth round of groundwater monitoring which was undertaken on 6th February 2018. The monitoring has taken into account the aforementioned comments and recommendations made by NRW.

Scope of Works

Groundwater samples were recovered from the following eight SPMP monitoring wells (shown on Figure 1): BH1, BH4, BH6, BHS6, BH11, BH12, MW1 and MW2.

At each location, the depth to groundwater was recorded and, where present, the thickness of free product was recorded. Boreholes were purged of three times the well volume prior to sampling.

Groundwater samples were analysed for metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, V, Be,), pH, total cyanide, sulphate, ammonia and Total Petroleum Hydrocarbons (TPH). Additionally, groundwater samples from borehole BHS6; up and down gradient boreholes BH11 and MW2; and cross gradient boreholes BH4 and BH6 were analysed for total suspended solids (TSS), total dissolved solids (TDS), total organic carbon (TOC), iron, and redox potential, in order to gain further information on the potential source of discolouration of groundwater in monitoring wells BH6 and BHS6.

For continuity, the results have been compared with UK Drinking Water Standards (UK DWS) in the groundwater analysis summary table (attached). However, given the objective of the SPMP, to identify increases in groundwater concentrations which may be attributable to the permitted operations, the UK DWS are presented for benchmarking purposes only. The 2018 concentrations should also be considered against the Reference Data collected in August 2005 (BH1, BH4, BH6, BH11, BH12, MW1, MW2) and February 2009 (BHS6), which is included in the table attached to this letter.

Results

A full set of laboratory certificates, a summary table, and graphical representation of results are attached to this letter and the main findings are summarised below.

Passive Skimmer

A passive skimmer was installed in BH12 on 11th February 2011 due to consistent measurements of free phase product (up to 7mm in thickness). The amount of floating product recovered by the skimmer was measured periodically and a total volume of 177ml of floating product has been recovered since 2011. However, over the past two years, no measurable layer of free product has been detected on the surface of the water in BH12 other than a slight oily sheen. Furthermore, the likely source of

contamination (the adjacent P16 press pit) has been emptied as part of the decommissioning process. Accordingly, Ramboll Environ removed the passive skimmer in August 2016, as agreed by NRW in an email dated 31st May 2016.

During the most recent round of monitoring, a film of free product was measured in the well; however, during sampling, the bailer did not collect a measurable thickness of free product floating on the groundwater. Overall, free product monitoring indicates that the amount of floating product present in the ground remains low and has decreased since passive skimming commenced. This also suggests that the source area of free phase hydrocarbons is likely to be limited in extent in the area of the borehole.

Groundwater Monitoring Results

A summary of the key findings of the groundwater monitoring and analysis results are presented below:

- Groundwater levels across the site ranged from 2.70m below ground level (bgl) (MW2) to 3.48m bgl (BHS6) and are slightly raised, compared to the previous round of monitoring in August 2017.
- Concentrations of TPH ranged from 0.01mg/l in BH4 to 34.3mg/l in BH12. TPH was not detected in borehole BH11. Historically, the highest TPH concentration is found in BH12 with a strong hydrocarbon odour and an oily sheen on the surface of the sample observed. Free product was detected during the most recent round of monitoring as an inconsistent film; this was removed with a disposable sampling bailer and a sample of groundwater was collected. The concentration of TPH in BH12 has decreased from 121mg/l to 34.3mg/l since the last time it was recorded in August 2017. This most recent concentration is greater than the Reference Data concentration of 7.8mg/l; however, it remains below elevated concentrations previously recorded at this location.
- The concentration of TPH in BH6 has increased from 0.02mg/l in August 2017 to 0.29 mg/l in February 2018, and is the highest recorded concentration at this location since September 2011. The February 2018 concentration is greater than the DWS of 0.01 mg/l and is greater than the 2005 reference data of 0.03mg/l.
- The concentration of TPH has remained stable in BH4 (0.01mg/l) and decreased in BH1 (from 41mg/l to 11.9mg/l); BH11 (from 0.08mg/l to below the laboratory LOD of <0.01); BH12 (from 121mg/l to 34.3mg/l); MW1 (from 0.06mg/l to 0.03mg/l); and MW2 (from 0.04mg/l to 0.03mg/l).
- The groundwater sample recovered from BHS6 (the 'sentry borehole') was coloured black which is consistent with previous monitoring rounds. During the most recent round of monitoring, the recorded TPH concentration has increased from 0.15mg/l in August 2017 to 0.58mg/l. The February 2018 concentration exceeds the sentry borehole risk-based trigger concentration of 0.108 mg/l. It is noted that the TPH concentration in MW2 (down-hydraulic gradient of BHS6) was the lowest recorded to date (0.03 mg/l) at this location, therefore indicating that increased TPH in groundwater has not migrated to the south, i.e. towards the river. Furthermore, manufacturing activities are not currently undertaken within the adjacent Extrusions Building.
- Black/brown coloured groundwater has previously been observed in monitoring wells BH6 and BH5, located adjacent east and west of BHS6. Samples of groundwater from BHS6 and BH6; and BH4, BH11 and MW2 (across, up and down gradient monitoring wells) were analysed for TSS, TDS, TOC, iron and redox potential in order to gain further information on the potential source of discolouration of groundwater at locations BHS6, BH6 and BH5. The results are presented in Table 1 and are discussed further in the following section.

- Across the site, pH values ranged from pH 6.3 (MW2) to pH 7.9 (BHS6). Historically, low (acidic) pH values have been recorded at the site. During the most recent round of monitoring (February 2018) only one pH value was recorded below the lower limit identified in the Water Supply (Water Quality) Regulations 2000 (i.e. pH 6.5); this was recorded in MW2.
- Arsenic was detected above the laboratory LOD (1µg/l) in BHS6 at a concentration of 7 µg/l, BH1 at a concentration of 3 µg/l and in BH6 at a concentration of 4 µg/l, i.e. below the UK DWS of 10µg/l and within the range of previously recorded values at these locations.
- Boron was recorded above the laboratory LOD (10µg/l) in samples from BH1, BH6, BH11 and MW1 during the most recent round of monitoring; at a maximum concentration of 190µg/l in BH6. In each case these concentrations are above the relevant Reference Data; however, concentrations remain well below the UK DWS of 1,000µg/l.
- Cadmium was detected above the laboratory LOD (<0.1µg/l) in BH6 (0.06µg/l) and BHS6 (0.2µg/l); both of which are below the UK DWS of 5µg/l and within the range of previously recorded concentrations at these locations.
- Chromium was detected above the laboratory LOD (<1µg/l) in BHS6 only (6µg/l); concentrations do not exceed the UK DWS of 50µg/l. The recorded chromium concentration for BHS6 in February 2018 has decreased from 15µg/l recorded at this location in August 2017.
- Concentrations of copper were recorded above the laboratory LOD (<1µg/l) in monitoring wells BH6 (19µg/l) and BHS6 (49µg/l), which do not exceed the UK DWS of 2,000µg/l. The recorded concentration in BHS6 is within the range of values previously recorded at the location; however, the concentration of copper in BH6 is the highest recorded at this location.
- Lead was below the laboratory LOD (<1ug/l) in all monitoring wells except BH6 (4µg/l) and BHS6 (4µg/l). Each recorded concentration is below the UK DWS of 25µg/l. The most recent (February 2018) concentration of lead recorded in BH6 is the highest recorded for this location.
- Mercury was not recorded above the laboratory LOD (<0.1µg/l) in any of the monitoring wells.
- The concentration of nickel ranged from below the laboratory LOD (<1µg/l) in BH4, BH11 and MW1 to 19µg/l in BH6 (below the UK DWS of 20µg/l). The concentration of nickel recorded in BH6 increased from 5µg/l in August 2017 to 19µg/l in February 2018. This is the highest concentration recorded at this location since June 2007, and is just below the DWS of 20 µg/l.
- Selenium was recorded above the laboratory LOD (<1ug/l) in monitoring wells BH6 (5µg/l), BH11 (3µg/l) and BHS6 (2µg/l), which are below the UK DWS of 10µg/l.
- Concentrations of zinc ranged from 11µg/l in BH12 to 248µg/l in BH6. Zinc concentrations had increased in all monitoring wells, and were the highest recorded to date in BH4, BH6, BH12 and MW1; however, the maximum concentration detected does not exceed the UK DWS (5,000µg/l).
- Concentrations of ammonia ranged from below the laboratory LOD (<10µg/l) in BH4, BHS6 and MW1 to 300µg/l in BH1, which is below the UK DWS of 500µg/l.
- Cyanide was below the laboratory LOD (<20µg/l) in all sampled monitoring wells except BH11. The concentration of cyanide in BH11 increased from below the laboratory LOD in August 2017 to 30 µg/l in February 2018. This concentration is below the DWS of 50 µg/l and is within the range of values previously recorded at this location.

- The concentrations of sulphate in groundwater ranged from 4 µg/l in BH12 to 44 mg/l in BH6. Sulphate concentrations do not exceed the UK DWS of 250mg/l at any of the monitoring locations.

Groundwater Discolouration

Table 1 below presents the results of additional analysis carried out on groundwater collected from BHS6 and BH6, which have previously been noted as discoloured; and BH4, BH11 and MW2, which are located up, down and across gradient of BHS6. Monitoring wells BHS6 and BH6 are located to the south of the main Extrusions Building; BH4 is located across gradient, to the west of BHS6; BH11 is located up hydraulic gradient of BHS6; and MW2 is located down hydraulic gradient of BHS6, in the south-east of the site.

Table 1: Additional Analysis

Determinand	BH4	BHS6	BH6	BH11	MW2
Total Suspended Solids (TSS) (mg/l)	456	225	510	1260	388
Total Dissolved Solids (TDS) (mg/l)	180	850	490	270	130
Total Organic Carbon (TOC) (mg/l)	1.2	31	18	1.1	0.64
Iron (total dissolved) (µg/l)	80	2,350	650	90	50
Redox Potential (mV)	284.7	237.4	271.8	191.2	259.7
pH	6.9	7.9	7.0	6.6	6.3
Description	Brown, silty. Very dark brown/ black at base of well	Black	Dark brown/ black	Brown, silty	Grey-Brown, slightly silty

Notes: Descriptions are based on visual observations at the time of sampling. No hydrocarbon odours or oily sheens were noted during sample collection.

The results indicate that TDS, TOC and dissolved iron concentrations were higher in BHS6 (where the most prominent discolouration occurs) than in the other analysed samples. The discolouration is therefore likely to be related to the elevated concentration of iron and resultant dissolved solids causing the groundwater to appear black, rather than a hydrocarbon source. Although an increase in hydrocarbon concentration has been identified in BHS6 and BH6 the values are not significantly elevated for an industrial site and no oily sheen was observed on groundwater.

Although redox potential and pH do not appear to correlate strongly with the discolouration, slight increases in dissolved metal concentrations do correlate with the increase in dissolved iron, suggesting that redox potential and TOC may be an influence on the groundwater chemistry in this area of the site.

The iron concentration in BHS6 (2,350 µg/l) is elevated above the UK DWS (0.2 µg/l). The UK DWS is considered to be conservative considering that groundwater is not abstracted for potable water in the area. For context, the Environmental Quality Standard (EQS) for inland surface water is 1,000 µg/l.

The cause of the discolouration and dissolved iron is not known, but may indicate an area of less oxygenated groundwater in this area of the site. The absence of discolouration in BH4, BH11 and MW2, along with comparatively lower concentrations of iron, indicates that the area of impacted groundwater is restricted to monitoring wells BHS6 and BH6. The absence of discolouration recorded in monitoring wells BH11 and MW2 suggests that on-site or off-site migration of discoloured groundwater or higher dissolved iron contamination is considered unlikely. It is also unlikely that the discolouration is attributable to an operational activity.

Conclusions and Recommendations

The results of the twenty-ninth (February 2018) round of groundwater monitoring have identified minor variations in TPH concentrations across the site; however, all are within the range of concentrations previously recorded at each monitoring point.

The TPH concentration in the Sentry Borehole (BHS6) has exceeded the risk based trigger concentration for a second time. The trigger concentration is designed to be protective of the river from hydrocarbon (including free phase product) contamination in the west of the site. However, the borehole further down-hydraulic gradient (MW2) showed a slight decrease in TPH concentration, indicating that hydrocarbons are not migrating to the south/ south-east. The identified contamination is considered to be localised with limited migration in groundwater to the south-east (in the direction of the river). It is recommended that during the next round of groundwater monitoring, TPH identification analysis is carried out on samples from the sentry borehole BHS6, BH6 and borehole BH12 to establish whether or not the type of hydrocarbons are the same, i.e. to assist in identifying the source.

An elevated ammonia concentration, in excess of the UK DWS was recorded in BH11 in January 2017. The concentration of ammonia had returned to below the UK DWS by August 2017 with a concentration of 200µg/l. This concentration has decreased further, to 30µg/l in February 2018, matching previous concentrations at this location. The source of the ammonia has not been attributed to on-site operational activities and is up-hydraulic gradient from the operational area of the site.

Investigation has continued into the presence of discoloured groundwater in BHS6 and BH6. The discolouration is localised and is considered unlikely to be migrating onto or off the site. The discolouration is unlikely to be attributed to operational activities and the results indicate that redox potential and TOC may be an influence on the groundwater chemistry in this area of the site.

Given that anodising and fabrication operations have resumed at the site; and considering the increase in TPH within BHS6, Ramboll Environ recommends that monitoring continues on a six monthly basis.

Please do not hesitate to contact us if you wish to discuss any of the above.

Yours sincerely,

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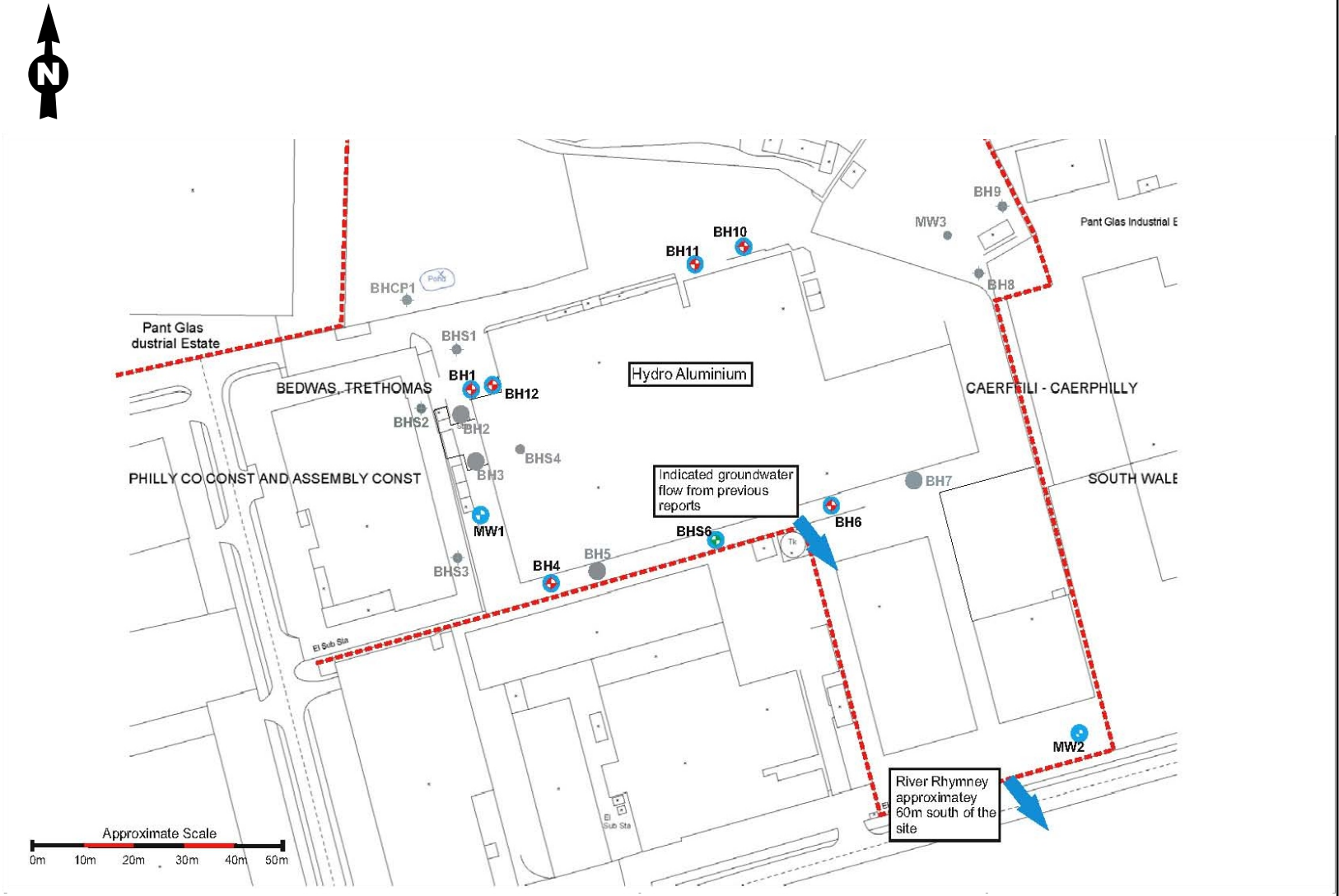
Encl. Figure 1: Borehole Location Plan

Table of Groundwater Analysis Results and Contaminant Graphs

Laboratory Certificate of Analysis



Legend

- Site Boundary
- Previously Installed Monitoring Well
- SPMP Monitoring Wells
- Previous locations
- Ramboll Monitoring Well (installed 2005)
- Monitoring Well Location for Hydrocarbon Delineation

Figure Title

Figure 1: Borehole Location Plan

Project Name

Site Protection Monitoring Programme (SPMP) Groundwater Monitoring - Round 29

Project Number	Figure No.
1700001435	1
Date	**Prepared By**
February 2018	RH
Scale	**Issue**
NTS	1

Client

Hydro Components UK Ltd

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Sapa (1700001435) - Summary of Groundwater Analysis Results (February 2018)

Borehole Location	Date	Analysis															Water Level (m bgl)
		TPH/EPH (mg/l)	Arsenic (µg/l)	Boron (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Copper (µg/l)	Lead (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Zinc (µg/l)	Ammonia as N (µg/l)	Total Cyanide (µg/l)	pH	Sulphate as SO_4 (mg/l)	
BH1	Aug-05	9	9	NA	ND	ND	ND	ND	ND	ND	ND	ND	1200	ND	6.5	10	3.85
	Nov-05	170	8	ND	ND	ND	ND	ND	ND	ND	ND	8	60	ND	6.5	12	2.90
	Feb-06	26	ND	16	ND	ND	ND	ND	ND	5	ND	ND	60	ND	6.4	ND	3.51
	May-06	9.7	ND	17	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	6.5	49	3.36
	Oct-06	58	ND	26	ND	ND	ND	ND	ND	10	ND	7	60	ND	6.5	23	3.56
	Feb-07	3.4	ND	25	ND	ND	ND	ND	ND	ND	ND	ND	70	ND	6.5	ND	2.88
	Jun-07	7.9	ND	24	ND	ND	ND	ND	ND	8	ND	ND	730	ND	6.4	24	3.45
	Dec-07	20	ND	26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.2	ND	3.13
	Apr-08	170	ND	20	ND	ND	ND	ND	ND	ND	ND	8	ND	ND	6.6	ND	3.17
	Aug-08	6	ND	64	ND	7	ND	ND	ND	ND	ND	8	ND	ND	6.6	ND	3.17
	Feb-09	8.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.10
	Jun-09	ND	1.4	39	ND	9.9	ND	ND	ND	2.3	1.3	100	120	ND	6.5	5.1	3.68
	Oct-09	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.55
	Apr-10	ND	0.9	NA	0.03	14	ND	ND	ND	4	0.5	10	NA	NA	6.5	ND	3.12
	Sep-10	9.39	ND	20	ND	6	ND	ND	ND	2	ND	ND	30	ND	6.4	12	3.49
	Apr-11	28.95	ND	20	ND	2	2	ND	ND	2	ND	9	ND	ND	6.6	6	3.72
	Sep-11	76.31	ND	20	ND	7	ND	ND	ND	2	ND	2	50	ND	6.4	8	3.53
	Mar-12	51.97	1	ND	0.1	6	2	3	ND	2	1	6	20	20	7	8	3.60
	Sep-12	7.81	1	40	ND	2	3	4	ND	3	ND	20	70	ND	7.3	11	3.24
	Apr-13	15.75	ND	NA	ND	2	ND	ND	ND	ND	ND	5	20	ND	7.3	7	3.39
	Oct-13	11.7	ND	20	ND	3	ND	ND	ND	2	ND	7	70	ND	6.9	9	3.70
	Jul-14	19.01	ND	20	ND	2	ND	ND	ND	1	ND	3	ND	ND	6.6	6	3.72
	Jan-15	0.98	ND	ND	ND	ND	ND	ND	ND	1	ND	25	110	ND	6.9	7	2.80
	Jul-15	14.4	ND	ND	ND	ND	ND	ND	ND	3	ND	ND	70	ND	7.1	9	3.53
	Feb-16	5.2	ND	30	ND	ND	ND	ND	ND	4	ND	74	130	ND	6.6	13	2.41
	Aug-16	6.11	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	80	ND	6.6	8.6	3.53
	Jan-17	9.03	ND	ND	ND	3	ND	ND	ND	4	ND	5	70	ND	7.1	8.9	3.55
	Aug-17	41	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	50	ND	6.6	10	3.46
	Feb-18	11.9	3	40	ND	ND	ND	ND	ND	5	ND	66	300	ND	6.8	8	3.05
BH4	Aug-05	61	10	NA	ND	ND	ND	ND	ND	ND	ND	ND	110	ND	6.8	34	4.02
	Nov-05	0.11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.6	20	3.10
	Feb-06	0.07	ND	24	ND	10	ND	ND	ND	ND	ND	ND	110	ND	6.8	25	3.73
	May-06	0.02	ND	23	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	6.9	26	3.56
	Oct-06	0.02	ND	30	ND	ND	17	ND	ND	ND	ND	10	ND	ND	6.8	34	3.81
	Feb-07	0.4	ND	27	ND	ND	ND	ND	ND	ND	ND	ND	80	ND	7	21	3.11
	Jun-07	0.15	ND	30	ND	ND	ND	ND	ND	ND	ND	ND	210	ND	6.8	24	3.62
	Dec-07	ND	ND	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.8	24	3.28
	Apr-08	0.19	ND	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.1	20	3.39
	Aug-08	ND	ND	36	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	6.8	19	3.30
	Feb-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.10
	Jun-09	ND	1.3	33	ND	12	1.3	ND	ND	ND	1.4	7.1	40	ND	7	15	3.80
	Oct-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.79
	Apr-10	ND	2	NA	ND	12	ND	ND	ND	3	0.7	5	NA	NA	6.9	17	3.35
	Sep-10	0.01	ND	20	ND	4	ND	ND	ND	ND	ND	ND	20	ND	6.8	15	3.62
	Apr-11	0.03	ND	30	ND	4	2	ND	ND	ND	ND	ND	ND	ND	7	16	3.84
	Sep-11	0.01	ND	20	ND	7	ND	ND	ND	ND	1	ND	30	ND	6.6	18	3.61
	Mar-12	0.03	ND	ND	0.1	6	3	2	ND	ND	2	5	ND	ND	7.3	21	3.75
	Sep-12	ND	ND	20	ND	3	1	ND	ND	ND	1	ND	ND	ND	7.5	19	3.42
	Apr-13	0.02	ND	NA	ND	3	ND	ND	ND	ND	ND	ND	10	ND	7.4	17	3.57
	Oct-13	0.02	ND	20	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	7.2	18	3.80
	Jul-14	ND	ND	20	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	7	14	3.86
	Jan-15	ND	ND	ND	ND	1	ND	ND	ND	ND	ND	ND	ND	ND	7.3	15	2.97
	Jul-15	ND	ND	20	ND	2	ND	ND	ND	ND	ND	ND	20	ND	7.5	16	3.65
	Feb-16	0.02	ND	30	ND	2	ND	ND	ND	ND	ND	21	10	ND	6.8	14	2.50
	Aug-16	0.04	ND	10	ND	ND	ND	ND	ND	ND	ND	2	ND	ND	6.8	17.5	3.69
	Jan-17	0.01	ND	ND	ND	2	ND	ND	ND	ND	ND	2	10	ND	7.4	17.6	3.70
	Aug-17	0.01	ND	ND	ND	1	ND	ND	ND	ND	ND	ND	ND	ND	6.7	17	3.60
	Feb-18	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	150	ND	ND	6.9	19	3.22
BH6	Aug-05	0.03	9	NA	2	ND	ND	ND	ND	48	ND	140	700	ND	5.5	440	3.68
	Nov-05	0.05	8	ND	2	ND	ND	ND	ND	58	ND	200	490	ND	4.5	450	3.07
	Feb-06	0.03	ND	23	2	7	7	ND	ND	45	ND	130	1200	ND	4.6	740	3.45
	May-06	ND	ND	25	2	ND	9	ND	ND	56	ND	160	920	ND	4.5	830	3.29
	Oct-06	0.01	ND	21	1	ND	7	ND	ND	46	ND	130	120	ND	4.5	380	3.41
	Feb-07	ND	ND	29	1	ND	5	ND	ND	36	ND	95	630	ND	4.6	340	2.99
	Jun-07	0.03	ND	27	ND	ND	ND	ND	ND	24	ND	54	470	ND	4.6	230	3.39
	Dec-07	ND	ND	29	ND	ND	ND	ND	ND	13	ND	53	200	ND	4.7	110	3.18
	Apr-08	ND	ND	27	ND	ND	ND	ND	ND	15	ND	39	140	ND	5.0	170	3.27
	Aug-08	ND	ND	31	ND	ND	ND	ND	ND	13	ND	31	140	ND	5.0	130	3.08
	Jun-09	ND	ND	34	ND	ND	ND	ND	ND	6.7	ND	23	160	ND	5.5	97	4.83
	Apr-10	ND	1.1	NA	0.22	3	ND	ND	ND	5	1.1	21	NA	NA	5.6	100	3.28
	Sep-10	ND	ND	20	0.3	2	ND	ND	ND	4	ND	54	20	ND	5.6	58	3.42
	Apr-11	0.59	ND	50	0.2	1	2	ND	ND	3	ND	20	ND	ND	5.6	61	3.60
	Sep-11	0.97	ND	20	0.2	4	ND	ND	ND	5	ND	11	20	ND	5.9	47	3.46
	Mar-12	0.01	ND	ND	0.3	2	ND	2	0.1	1	1	9	ND	ND	6.8	60	3.50
	Sep-12	0.06	ND	20	0.1	ND	ND	2	ND	1	2	12	ND	ND	7	51	3.24
	Apr-13	0.03	ND	NA	0.2	2	ND	ND	ND	1	1	29	ND	ND	7.1	49	3.36
	Oct-13	0.06	ND	20	0.1	2	ND	ND	ND	ND	1	13	ND	ND	6.8	32	3.56
	Jul-14	0.01	ND	20	ND	1	ND	ND	ND	ND	1	3	ND	ND	6.8	35	3.60
	Jan-15	0.08	ND	ND	ND	ND	2	ND	ND	4	ND	4	10	ND	6.9	37	2.95
	Jul-15	0.03	ND	20	ND	ND	ND	ND	ND	1	1	ND	20	ND	7.3	29	3.45
	Feb-16	0.15	1	80	0.2	ND	7	1	ND	8	1	64	20	ND	6.5	43	2.51
	Aug-16	0.02	ND	70	0.1	ND	3	ND	ND	6	ND	98	ND	ND	6.7	32.6	3.43
	Jan-17	0.05	1	ND	0.2	ND	5	ND	ND	7	ND	4	10	ND	7.3	36.2	3.43
	Aug-17	0.02	1	ND	0.1	ND	4	ND	ND	5	1	ND	ND	ND	6.8	38	3.37
	Feb-18	0.29	4	190	0.6	ND	19	4	ND	19	5	248	20	ND	7	44	3.07
BH11	Aug-05	0.06	11	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	7.4	190	3.62
	Nov-05	0.05	6	ND	ND	ND	ND	ND	ND	ND	ND	7	ND	ND	6.8	140	2.79
	Feb-06	0.03	ND	34	ND	10	ND	ND	ND	ND	ND	6	50	ND	7.6	560	3.00
	May-06	0.03	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	400	30	7.1	180	3.27
	Oct-06	0.09	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.9	13	3.33
	Feb-07	ND	ND	34	ND	ND	ND	ND	ND	ND	ND	ND	70	50	6.8	31	2.77
	Jun-07	0.04	ND	32	ND	ND	ND	ND	ND	ND	ND	ND	220	ND	6.8	44	3.21
	Dec-07	ND	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	6.5	49	3.08
	Apr-08	0.17	ND	21	ND	ND	ND	ND	ND	ND	ND	47	ND	ND	7.0	30	3.00
	Aug-08	0.04	ND	25	ND	6	5	ND	ND	25	ND	94	60	ND	6.8	200	3.10
	Jun-09	ND	ND	ND	ND	ND	1.9	1.8	ND	2.5	ND	24	230	ND	6.7	23	3.50
	Apr-10	ND	1.7	NA	0.04	10	ND	ND	0.05	4	1.8	7	NA	NA	6.5	49	3.05
	Sep-10	0.04	ND	40	ND	3	ND	ND	ND	2	ND	12	80	190	7.0	53	3.36
	Apr-11	0.24	ND	30	ND	2	3	ND	ND	1	ND	5	10	260	7.3	28	3.56
	Sep-11	0.04	ND	20	ND	5	1	ND	ND	1	1	18	10	60	6.5	41	3.48
	Mar-12	0.01	ND	ND	ND	3	ND	ND	ND	ND	2	16	ND	40	7.3	28	3.51
	Sep-12	0.47	ND	20	ND	1	1	2	ND	6	ND	15	800	ND	7.1	18	3.11
	Apr-13	0.04	ND	NA	0.1	2	ND	ND	ND	3	1	10	900	40	7.1	31	3.26
	Oct-13	0.07	ND	30	ND	2	3	ND	ND	2	1	10	70	560	7.5	40	3.60
	Jul-14	0.19	ND	50	ND	1	1	ND	ND	1	ND	7	ND	50	6.8	23	3.64
	Jan-15	0.01	ND	ND	ND	ND	ND	ND	0.3	1	ND	18	30	ND	7.7	26	2.71
	Jul-15	0.03	ND	ND	ND	ND	ND	ND	ND	3	ND	10	20	ND	7.3	12	3.45
	Feb-16	0.01	ND	ND	ND	ND	ND	ND	ND	ND	2	5	500	ND	6.4	36	2.38
	Aug-16	0.09	ND	ND	ND	ND	ND	ND	ND	3	ND	13	30	ND	6.8	27	3.44
	Jan-17	0.09	ND	ND	ND	2	3	3	ND	8	ND	7	2100	ND	7.1	24.8	3.42
	Aug-17	0.08	ND	80	ND	ND	ND	ND	ND	2	ND	11	200	ND	7	39	3.36
	Feb-18	ND	ND	20	ND	ND	ND	ND	ND	ND	3	89	30	30	6.6	35	2.96
UK Drinking Water Standard		0.01mg/l**	10µg/l*	1,000* µg/l	5*µg/l	50*µg/l	2,000* µg/l	25*µg/l	1*µg/l	20*µg/l	10*µg/l	5,000µg/l**	500*µg/l	50*µg/l	6.5-10*	250mg/l*	

		Analysis															
Borehole Location	Date	TPH/EPH (mg/l)	Arsenic (µg/l)	Boron (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Copper (µg/l)	Lead (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Zinc (µg/l)	Ammonia as N (µg/l)	Total Cyanide (µg/l)	pH	Sulphate as SO_4 (mg/l)	Water Level (m bgl)
BH12	Aug-05	7.8	7	NA	ND	ND	ND	ND	ND	ND	ND	ND	1400	ND	6.6	5	4.00
	Nov-05	34	ND	ND	ND	20	ND	ND	ND	7	ND	9	ND	ND	6.4	22	3.02
	Feb-06	13	ND	16	ND	ND	ND	ND	ND	10	ND	ND	70	ND	6.3	ND	3.64
	May-06	71	ND	15	ND	10	ND	ND	ND	5	ND	ND	ND	ND	6.5	ND	3.51
	Oct-06	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	6.5	NS*	3.26
	Feb-07	21	ND	23	ND	ND	ND	ND	ND	ND	ND	ND	120	ND	6.5	ND	3.01
	Jun-07	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	6.4	NS*	3.12
	Dec-07	1000	ND	26	ND	ND	ND	ND	ND	7	ND	30	79	ND	6.3	ND	3.23
	Apr-08	34	ND	19	ND	ND	ND	ND	ND	5	ND	ND	ND	ND	6.6	ND	3.33
	Aug-08	260	ND	23	ND	ND	ND	ND	ND	ND	ND	8	ND	ND	6.5	ND	3.28
	Feb-09	48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.45	NA	3.11
	Jun-09	240	ND	ND	ND	ND	2	1.5	ND	3.7	ND	15	190	ND	6.4	4.8	3.68
	Oct-09	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.45	NA	3.85
	Apr-10	72	1.7	NA	0.04	15	0.9	ND	ND	6	0.9	7	NA	NA	6.5	ND	3.45
	Sep-10	160.7	ND	20	ND	5	ND	ND	ND	2	ND	6	40	ND	6.4	ND	3.71
	Apr-13	45.98	1	NA	ND	2	ND	ND	ND	12	ND	10	10	ND	7.2	8	3.51
	Oct-13	128	ND	10	ND	3	ND	ND	ND	2	ND	8	80	ND	6.9	ND	3.80
	Jul-14	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	3.88
	Jan-15	34.2	ND	ND	ND	ND	ND	ND	ND	1	ND	67	60	ND	6.8	ND	2.92
	Jul-15	49	ND	ND	ND	ND	ND	ND	ND	4	ND	ND	80	ND	6.9	ND	3.68
	Feb-16	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	2.55
	Aug-16	90.2	ND	10	ND	ND	ND	ND	ND	2	ND	7	40	ND	6.5	ND	3.69
	Jan-17	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*	3.70
	Aug-17	121	ND	ND	ND	ND	ND	ND	ND	2	ND	ND	50	ND	6.5	ND	3.63
	Feb-18	34.3	ND	ND	ND	ND	ND	ND	ND	1	ND	11	200	ND	6.7	4	3.18
MW1	Aug-05	0.17	11	NA	ND	ND	ND	ND	ND	ND	ND	32	160	ND	6.6	24	4.01
	Nov-05	0.13	ND	ND	ND	ND	ND	ND	ND	ND	ND	43	ND	ND	6.8	33	3.11
	Feb-06	0.16	ND	22	ND	ND	ND	ND	ND	ND	ND	80	50	ND	6.6	25	3.73
	May-06	0.14	ND	20	ND	8	ND	ND	ND	ND	ND	32	ND	ND	6.8	23	3.58
	Oct-06	0.08	12	20	ND	10	5	ND	ND	ND	ND	24	ND	ND	7.2	22	3.87
	Feb-07	0.58	ND	27	ND	ND	ND	ND	ND	ND	ND	51	230	ND	7	22	3.18
	Jun-07	0.35	ND	27	ND	ND	ND	ND	ND	ND	ND	40	80	ND	6.7	21	3.61
	Dec-07	0.31	ND	29	ND	ND	ND	ND	ND	ND	ND	40	ND	ND	6.5	22	3.29
	Apr-08	2.1	ND	26	ND	ND	ND	ND	ND	ND	ND	37	50	ND	6.8	20	3.41
	Aug-08	0.06	ND	26	ND	ND	ND	ND	ND	ND	ND	56	ND	ND	6.7	18	3.29
	Feb-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.44
	Jun-09	ND	ND	ND	ND	ND	10	14	ND	3.4	ND	120	210	ND	7	2.6	3.15
	Oct-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.87
	Apr-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.41
	Sep-10	0.03	ND	20	0.1	4	1	ND	ND	1	ND	86	20	ND	6.6	24	3.64
	Apr-11	0.55	ND	30	0.1	1	5	ND	ND	2	ND	126	ND	ND	6.8	22	3.86
	Sep-11	0.12	ND	50	ND	4	1	ND	ND	1	ND	49	20	ND	6.7	26	3.64
	Mar-12	0.12	ND	ND	0.2	5	3	3	ND	2	1	126	ND	ND	7.1	22	3.75
	Sep-12	0.31	ND	20	ND	2	2	2	ND	1	1	46	ND	ND	7.3	19	3.41
	Apr-13	0.08	ND	NA	0.1	2	ND	ND	ND	2	ND	84	30	ND	7.3	17	3.56
	Oct-13	2.32	ND	20	ND	2	ND	ND	ND	2	1	73	ND	ND	7	22	3.80
	Jul-14	2.42	ND	20	ND	1	1	ND	ND	2	ND	40	ND	ND	6.9	15	3.86
	Jan-15	0.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	36	10	ND	7.2	14	2.95
	Jul-15	0.08	ND	20	ND	ND	ND	ND	ND	1	ND	26	60	ND	7.4	20	3.65
	Feb-16	0.3	ND	ND	ND	ND	1	ND	ND	ND	ND	26	10	ND	6.8	26	2.47
	Aug-16	0.15	ND	10	ND	ND	1	ND	ND	ND	1	14	ND	ND	6.6	19.8	3.67
	Jan-17	0.15	ND	ND	ND	2	1	ND	ND	ND	ND	38	ND	ND	7.2	20.7	3.70
	Aug-17	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	46	ND	ND	6.8	24	3.60
	Feb-18	0.03	ND	80	ND	ND	ND	ND	ND	ND	ND	168	ND	ND	6.9	22	3.20
MW2	Aug-05	0.03	6	NA	ND	ND	ND	ND	ND	140	ND	120	95	ND	5.5	370	3.19
	Nov-05	0.1	ND	ND	2	ND	ND	ND	ND	100	ND	100	ND	ND	5.4	380	2.60
	Feb-06	0.27	ND	24	4	6	ND	ND	ND	140	ND	110	70	ND	5.5	480	3.00
	May-06	ND	ND	25	3	ND	ND	ND	ND	120	ND	91	70	ND	5.6	580	2.94
	Oct-06	0.01	ND	27	7	ND	ND	ND	ND	210	ND	200	90	ND	5.8	790	3.04
	Feb-07	ND	ND	33	3	ND	ND	ND	ND	150	ND	110	90	ND	5.6	510	2.69
	Jun-07	0.03	ND	28	5	ND	ND	ND	ND	170	ND	170	240	ND	5.4	510	2.94
	Dec-07	ND	ND	29	3	ND	ND	ND	ND	100	ND	120	88	ND	5.5	350	2.68
	Apr-08	ND	ND	27	2	ND	ND	ND	ND	62	ND	72	ND	ND	5.5	210	2.83
	Aug-08	0.09	ND	30	1	ND	ND	ND	ND	50	ND	76	ND	ND	5.6	170	2.70
	Jun-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.95	NA	2.78
	Apr-10	ND	0.5	NA	0.54	8	3.6	ND	ND	10	0.6	170	NA	NA	6.3	100	2.86
	Sep-10	0.04	ND	30	0.8	3	ND	ND	ND	19	ND	121	30	ND	6.1	82	2.94
	Apr-11	11.97	ND	30	0.1	2	2	ND	ND	5	ND	7	ND	ND	7.4	71	3.14
	Sep-11	0.3	ND	40	0.1	5	ND	ND	ND	10	ND	11	60	ND	6.4	71	3.00
	Mar-12	0.2	ND	ND	0.5	2	1	6	ND	12	1	33	ND	ND	7	61	3.09
	Sep-12	0.22	ND	20	0.1	ND	1	5	ND	8	ND	30	ND	ND	7.1	54	2.82
	Apr-13	0.13	ND	NA	0.4	2	ND	ND	ND	5	ND	21	30	ND	7.7	55	2.95
	Oct-13	0.38	ND	20	ND	1	ND	ND	ND	6	ND	17	10	ND	6.7	60	3.12
	Jul-14	0.42	ND	20	ND	ND	ND	ND	ND	4	ND	16	ND	ND	6.6	45	3.18
	Jan-15	0.11	ND	ND	0.1	ND	ND	ND	ND	4	ND	17	50	ND	6.8	44	2.58
	Jul-15	0.18	ND	30	ND	ND	ND	ND	ND	7	ND	21	50	ND	7	43	3.05
	Feb-16	0.06	ND	ND	0.1	ND	ND	ND	ND	2	ND	17	20	ND	6.3	36	2.11
	Aug-16	0.71	ND	ND	ND	ND	ND	ND	ND	2	ND	9	30	ND	6.3	36.4	3.02
	Jan-17	0.12	ND	ND	0.1	1	ND	ND	ND	3	ND	9	10	ND	6.9	39.4	3.04
	Aug-17	0.04	ND	80	ND	ND	ND	ND	ND	2	ND	8	10	ND	6.2	41	2.96
	Feb-18	0.03	ND	ND	ND	ND	ND	ND	ND	2	ND	80	10	ND	6.3	36	2.70
BHS6 (Sentry Borehole)	Feb-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.47
	Jun-09	ND	2.8	ND	ND	ND	13	1.1	ND	4.2	1.8	6.7	310	ND	7.3	NA	4.00
	Oct-09	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.00
	Apr-10	0.74	30	NA	1.8	380	410	41	2.5	51	21	71	NA	NA	7.5	81	3.65
	Sep-10	0.01	ND	30	1	28	1723	11	ND	26	ND	338	300	ND	7.3	46	3.86
	Apr-11	0.04	10	40	0.8	48	85	21	0.4	7	4	37	400	ND	7.8	55	4.03
	Sep-11	0.07	9	ND	1.1	28	81	22	0.2	7	4	24	400	ND	7.5	61	3.90
	Mar-12	0.04	8	ND	0.9	14	66	17	ND	5	3	22	330	ND	7.9	63	3.95
	Sep-12	0.04	8	ND	0.8	38	99	20	0.3	7	3	15	160	ND	8.2	59	3.66
	Apr-13	0.04	ND	NA	10.6	ND	189	ND	ND	ND	ND	515	60800	ND	8.2	60	3.81
	Oct-13	0.02	7	50	0.5	24	62	14	0.2	5	2	20	280	ND	7.5	ND	3.97
	Jul-14	0.05	8	ND	0.5	8	38	4	ND	5	2	11	240	ND	7.9	47	4.02
	Jan-15	0.03	9	ND	0.4	33	119	12	0.2	8	1	9	250	ND	7.7	3	3.30
	Jul-15	0.02	9	ND	0.3	10	66	7	0.2	5	3	8	320	ND	7.8	29	3.85
	Feb-16	0.05	5	30	0.1	10	38	3	0.1	3	2	48	160	ND	7.4	56	2.85
	Aug-16	0.04	8	60	0.3	15	75	7	0.2	5	1	58	180	ND	8.1	63.4	3.86
	Jan-17	0.03	9	ND	0.3	15	81	7	0.1	5	1	19	220	ND	8.2	57.9	3.87
	Sep-17	0.15	8	ND	0.3	15	71	8	ND	7	4	27	180	ND	7.7	55	3.78
	Feb-18	0.58	7	ND	0.2	6	49	4	ND	4	2	102	ND	ND	7.9	41	3.48
UK Drinking Water Standard		0.01mg/l**	10µg/l*	1,000* µg/l	5*µg/l	50*µg/l	2,000* µg/l	25*µg/l	1*µg/l	20*µg/l	10*µg/l	5,000µg/l**	500*µg/l	50*µg/l	6.5-10*	250mg/l*	

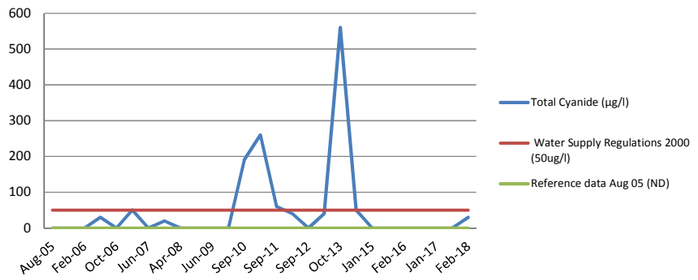
Notes:
The red cells indicate where the concentration exceeds the UK Drinking Water Standard
The yellow cells indicate where laboratory detection limits have been raised due to matrix interference
The green cells indicate rounds of monitoring carried out by Mabbett & Associates Ltd

*Water Supply (Water Quality) Regulations 2000
* *The Water Supply (Water Quality) Regulations 1989
No data available but data put in for graphs
Current SPMP monitoring locations

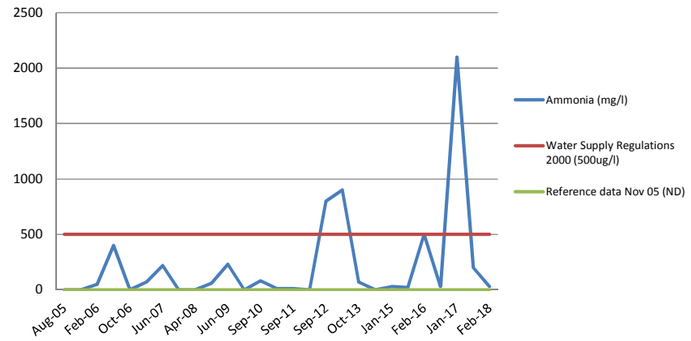
NS* = No sample taken - free product present
ND = Not detected above laboratory detection limits
NA = Not analysed

Contaminant Concentration Graphs

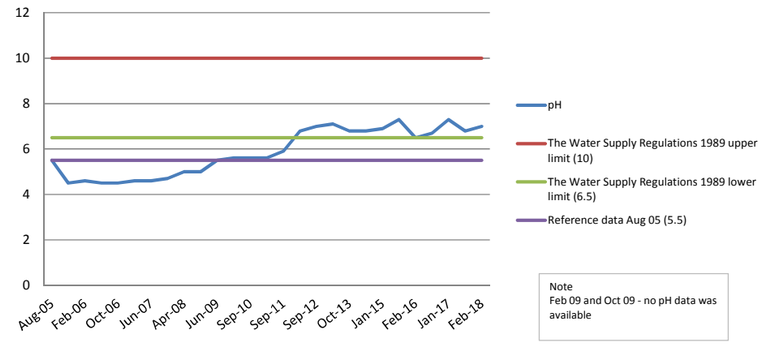
Borehole 11



Borehole 11

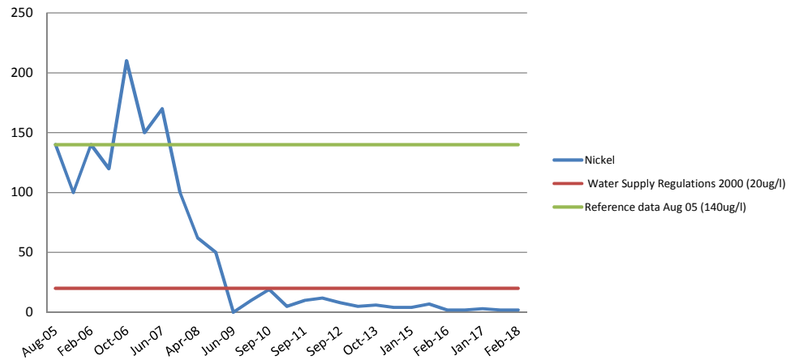


Borehole 6

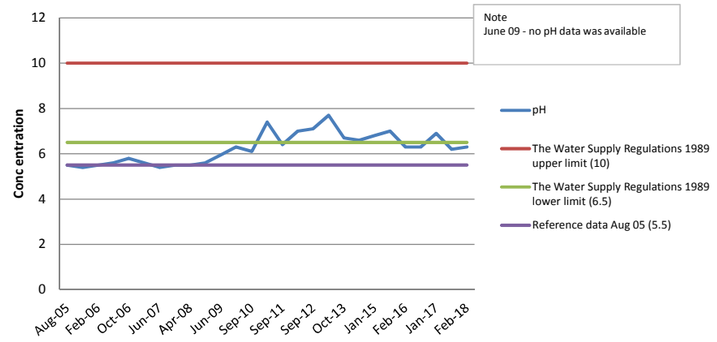


Note
Feb 09 and Oct 09 - no pH data was available

Monitoring Well 2

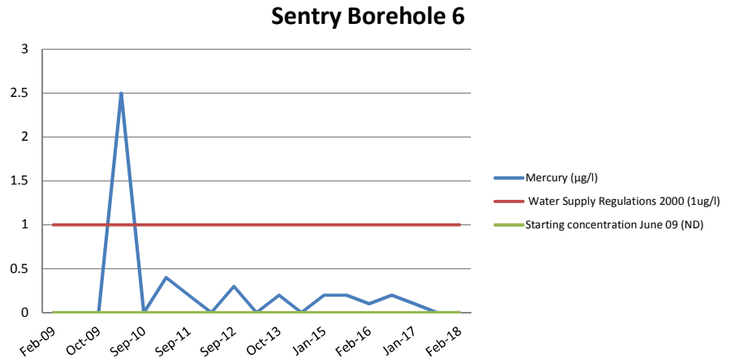


Monitoring Well 2

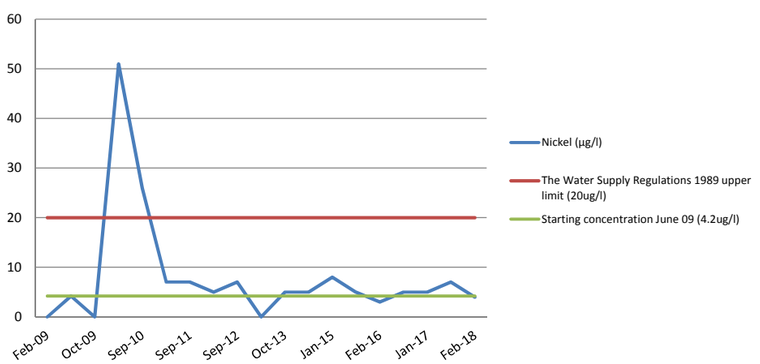


Note
June 09 - no pH data was available

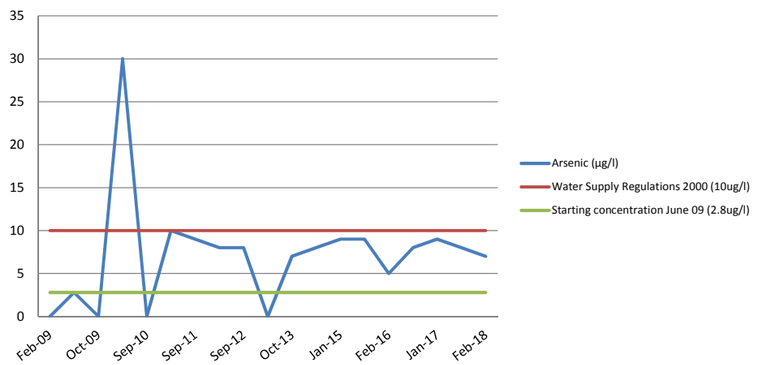
Sentry Borehole 6



Sentry Borehole 6

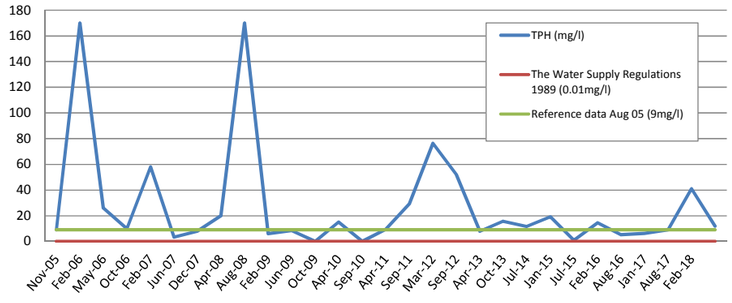


Sentry Borehole 6

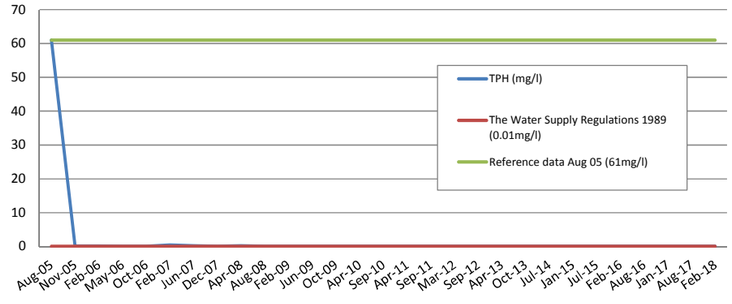


TPH Concentration Graphs

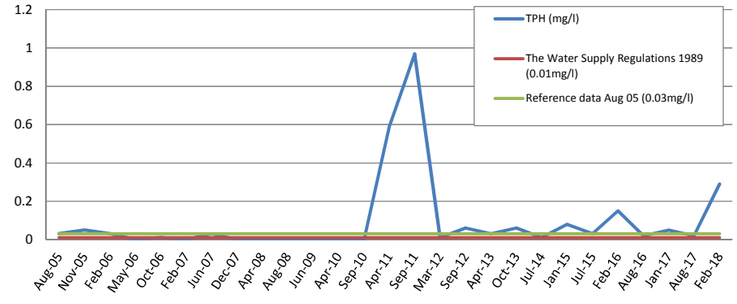
Borehole 1



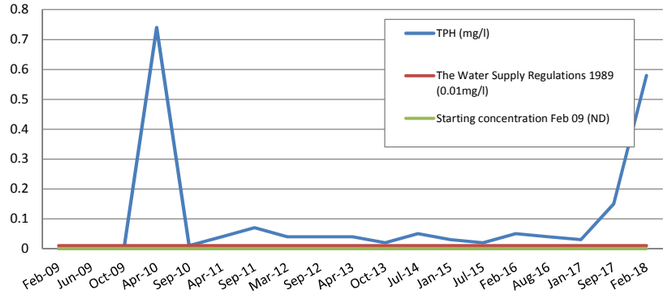
Borehole 4



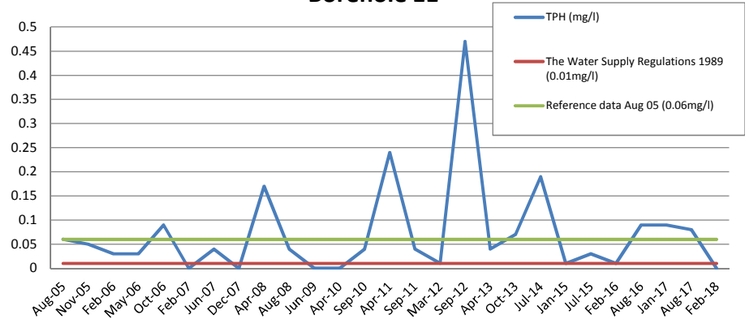
Borehole 6



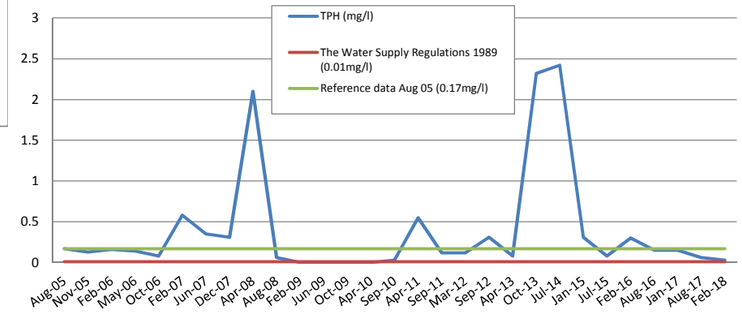
Sentry Borehole 6



Borehole 11



Monitoring Well 1



Monitoring Well 2