

Sapa Extrusions Limited  
Bedwas Plant  
Pant Glas Industrial Estate  
Bedwas  
Caerphilly  
CF83 8DR

Dear Susan

**SITE PROTECTION AND MONITORING PROGRAMME (SPMP), FEBRUARY 2016 (ROUND 25): ENVIRONMENTAL PERMIT REF. BX94551F**

Date 09/03/2016

**Background**

Sapa Extrusions Ltd. (formerly Hydro Aluminium Extrusions) has carried out regular groundwater monitoring at the installation since August 2005. Ramboll Environ has carried out twenty-one rounds of monitoring between August 2005 and February 2016; and Mabett 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.

Ramboll Environ  
8 Village Way  
Tongwynlais  
Cardiff  
CF15 7NE  
United Kingdom

T +44 292 054 3550  
www.ramboll-environ.com

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The main manufacturing operations at the site ceased in March 2014; however, some personnel have been retained at the site, primarily for operations in the fabrication building and for decommissioning machinery in the main factory.

A meeting was held with the Environment Agency (now Natural Resources Wales (NRW)) on 31<sup>st</sup> January 2011 to discuss the long term trends in SPMP monitoring data and the future scope of monitoring requirements. The results of statistical analysis have shown that the overall concentrations of SPMP determinands in groundwater are either stable or decreasing, with the exception of total petroleum hydrocarbons (TPH) in BH12. It was agreed with the Environment Agency that a passive skimmer would be installed in BH12 to remove floating phase hydrocarbons.

Given the close proximity of some of the monitoring wells and the stable concentrations detected in the monitoring wells, it was agreed that the following wells would be omitted from future monitoring rounds: BH2, BH3, BH5, BH7 and BH10. Therefore, the remaining eight SPMP monitoring wells

Ramboll Environ UK Limited  
Registered in England  
Company No: 2331163  
Registered Office:  
Artillery House  
11-19 Artillery Row  
London  
SW1P 1RT

are: BH1, BH4, BH6, BHS6, BH11, BH12, MW1 and MW2. The SPMP wells are currently monitored on a six monthly basis as agreed with Natural Resources Wales [formerly the Environment Agency].

This report details the results of the twenty-fifth round of groundwater monitoring, in accordance with the SPMP, which was undertaken on 9<sup>th</sup> February 2016.

### **Scope of Works**

A groundwater sample was recovered from seven of the eight SPMP monitoring wells as detailed above; a sample was not collected from BH12, due the presence of free-phase hydrocarbon (discussed further below). At each location, the depth to groundwater was recorded and, where present, the thickness of free product was monitored.

The monitoring well locations are shown on Figure 1 (attached). The groundwater samples were analysed for metals (As, Cd, Cr, Cu, Pb, Ni, Hg, Se, Zn, V, Be, B), pH, total cyanide, sulphate, ammonia and Total Petroleum Hydrocarbons (TPH).

For continuity, the results have been compared with UK Drinking Water Standards in the groundwater analysis summary table (attached). However, given the objective of the SPMP, to identify any groundwater contamination arising from potential sources over the lifetime of the Environmental Permit, it is appropriate to compare results with the Reference Data (collected by Ramboll Environ, August 2005).

A graphical representation of results over time is presented on the attached Figures.

### **Results**

A full set of laboratory certificates and a summary table of the ongoing groundwater monitoring results (including Reference Data and results from M&A's monitoring) are attached to this letter and the main findings are summarised below.

#### **Passive Skimmer**

A passive skimmer was installed in BH12 on 11<sup>th</sup> February 2011. Prior to installation, the depth to floating product and groundwater was measured:

- Floating product: 3.328m bgl
- Groundwater 3.335m bgl

Therefore the thickness of free product at the time of installation was 0.7cm. The membrane of the passive skimmer was installed at the interface between the floating product and the groundwater, i.e. so that the membrane is effectively 'floating' in the oil.

The amount of floating product recovered has been measured weekly by site personnel between installation and April 2013, and intermittently from September 2014 to the present. Due to the limited number of staff operating at the site, the amount of free product was not recorded in the interim period. To date, 177ml of floating product has been recovered.

During the most recent round of monitoring, there was no free product within the skimmer; however approximately 0.3cm sheen was detected on the surface of the water in BH12. Overall, the results indicate that the amount of floating product present in the ground has remained 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 2.11m below ground level (bgl) (MW2) to 2.85m bgl (BHS6) and have risen since the previous round of monitoring in July 2015.
- During the February 2016 monitoring occasion there was no free product present in the passive skimmer collection vessel in BH12; however, a layer of approximately 0.3cm of free product was recorded with the interface probe. The passive skimmer was reset at the interface level between the groundwater and potential free product (2.55m bgl).
- Concentrations of TPH in locations where free product has not previously been identified, ranged from 0.01mg/l in BH11 to 5.2mg/l in BH1.
- Concentrations of TPH have both increased and decreased slightly across the site since the previous monitoring round. Notable increases were recorded in BH6 (from 0.03mg/l to 0.15mg/l) and MW1 (from 0.08mg/l to 0.3mg/l); however, in each case concentrations are typical of those previously recorded at each location. Other slight increases occurred in BH4 (from <0.01mg/l to 0.02mg/l) and BHS6 (from 0.02mg/l to 0.05mg/l).
- The concentration of TPH in BH1 has decreased from 14.4mg/l to 5.2mg/l.
- 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 during previous sampling occasions. This well was not sampled during the most recent monitoring round of February 2016 due to the presence of free product. Previous dissolved phase hydrocarbon concentrations have ranged from 7.8mg/l (August 2005) to 1,000mg/l (December 2007).
- The groundwater sample recovered from BHS6 (the 'sentry borehole') was coloured black/brown. The TPH concentration was low (0.05mg/l), and remains below the sentry borehole risk-based trigger concentration of 0.108mg/l.
- pH values ranged from pH 6.3 (MW2) to pH 7.4 (BHS6). Prior to 2012, the pH values of BH6 and MW2 were consistently low (acidic). Throughout 2012 to 2015, the pH was generally more alkaline. However, the most recent round of monitoring, February 2016, has recorded a decrease in pH at monitoring locations BH6, MW2 and BH11. pH values in MW2 (pH 6.3) and BH11 (pH 6.4) were marginally below the lower limit identified in the Water Supply (Water Quality) Regulations 2000 (i.e. pH 6.5).
- Arsenic was detected above the laboratory LOD (1µg/l) in BH6 and BHS6 at concentrations of 1µg/l and 5µg/l respectively, i.e. below the UK DWS of 10µg/l.
- Boron was recorded above the LOD (<10µg/l) in BH1, BH4, BHS6 (all 30µg/l) and BH6 (80µg/l). Recorded concentrations are well below the UK DWS of 1,000µg/l.
- Cadmium was detected at or above the laboratory LOD (<0.1µg/l) in BH6 (0.2µg/l), MW2 (0.2µg/l) and BHS6 (0.1µg/l), which is below the UK DWS of 5µg/l.

- Concentrations of chromium were below the laboratory LOD (<1µg/l) in all monitoring wells except BH4 at 2µg/l and BHS6 at 10µg/l. The maximum concentration detected does not exceed the UK DWS of 50µg/l.
- Concentrations of copper were recorded above the laboratory LOD (<1µg/l) in monitoring wells BH6 (7µg/l), MW1 (1µg/l) and BHS6 (38µg/l), which do not exceed the UK DWS of 2,000µg/l.
- Lead was below the laboratory LOD (<1ug/l) in all monitoring wells except BH6 (1µg/l) and BHS6 (3µg/l), below the UK DWS of 25µg/l.
- Mercury was recorded at the laboratory LOD (<0.1µg/l) in monitoring well BHS6 (0.1µg/l), which does not exceed the UK DWS of 1µg/l.
- The concentration of nickel ranged from below the laboratory LOD (<1µg/l) in BH4, BH11 and MW1 to 8µg/l in BH6 (below the UK DWS of 20µg/l). Historically, elevated concentrations of nickel have been detected in MW2, located at the southern site boundary; however, concentrations have decreased over the monitoring period to date and are now below the screening criteria.
- Selenium was recorded above the laboratory LOD (<1ug/l) in monitoring wells BH6 (1µg/l), BH11 (2µg/l) and BHS6 (2µg/l), which are below the UK DWS of 10µg/l.
- Concentrations of zinc was recorded above the laboratory LOD (<2µg/l) in all monitoring wells and ranged between 5µg/l in BH11 to 74µg/l in BH1. The maximum concentration detected does not exceed the UK DWS (3,000µg/l).
- Concentrations of ammonia ranged from 10µg/l in MW1 and BH4 to 500µg/l in BH11, which is equal to the UK DWS of 500µg/l. An elevated concentration of ammonia (60,800µg/l) was recorded in BHS6 during the monitoring round of April 2013; however, subsequent values have returned to the range of values seen prior to April 2013.
- Cyanide was below the laboratory LOD (<20µg/l) in all monitoring wells. Elevated concentrations of cyanide were recorded in BH11 on five occasions between September 2010 and July 2014. The monitoring round of October 2013 recorded the highest concentration to date, which has decreased over subsequent monitoring rounds.
- The concentrations of sulphate in groundwater ranged from 13mg/l in BH1 to 56mg/l in BHS6. Sulphate concentrations do not exceed the UK DWS of 250mg/l at any of the monitoring locations.

## Conclusions and Recommendations

The results of the twenty-fifth (February 2016) round of groundwater monitoring have identified a decrease in TPH concentrations in three of the SPMP monitoring wells; and an increase in four of the wells. Notable increases were recorded in BH6 (from 0.03mg/l to 0.15mg/l) and MW1 (from 0.08mg/l to 0.3mg/l); however, in each case concentrations are typical of those previously recorded at each location. Other slight increases occurred in BH4 (from <0.01mg/l to 0.02mg/l) and BHS6 (from 0.02mg/l to 0.05mg/l).

A sample was not collected from BH12 during the most recent round of monitoring, as free product was detected at a thickness of approximately 0.3cm.

The TPH concentration in the Sentry Borehole (BHS6) did not exceed the risk based target of 0.108mg/l, which is designed to be protective of the river from hydrocarbon (including free phase product) contamination in the west of the site. The results therefore indicate that although elevated TPH

concentrations continue to be detected in the vicinity of BH12, the contamination is localised and is not migrating in groundwater to the south-east (in the direction of the river).

Historically, elevated concentrations of cyanide were recorded in BH11; on five occasions between September 2010 and July 2014. However, cyanide was not detected above the laboratory LOD in any of the monitoring wells in the most recent round of sampling.

The pH values in BH6 and MW2 have historically been low (acidic) over the early monitoring period, with a gradual increase towards neutral values in more recent monitoring rounds (throughout 2012 to 2015, the pH was generally more alkaline). However, the most recent round of monitoring, February 2016, has recorded a decrease in pH at monitoring locations BH6, MW2 and BH11. The results are not considered to be significant as the pH values are only marginally lower than the screening value

It is recommended that the groundwater monitoring programme is continued at a 6 monthly frequency, and providing Natural Resources Wales is in agreement, the next round of monitoring will be due in August 2016. This is also necessary to monitor the concentrations of TPH in the sentry borehole (BHS6) which is intended to be protective of the nearest surface water receptor (the River Rhymney). Ramboll Environ recommends that monitoring of the passive skimmer by Sapa Aluminium Extrusions Ltd in BH12 is continued on a monthly basis considering the limited number of recorded incidents of free phase product collected over the last twelve months.

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

Yours sincerely



**Lucy Cleverley**

Manager

D +44 2920 543557

M +44 7713 311202

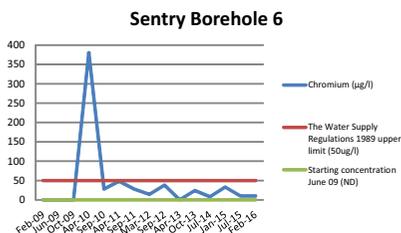
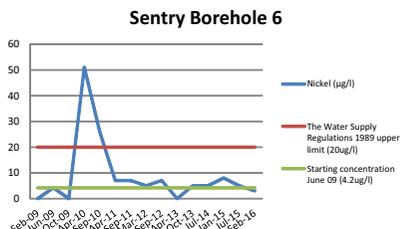
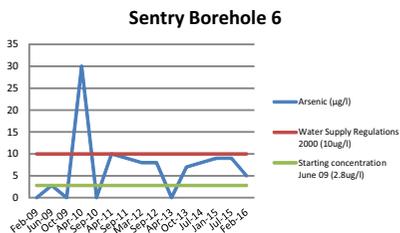
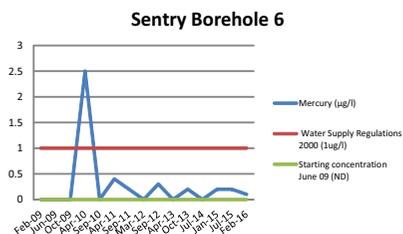
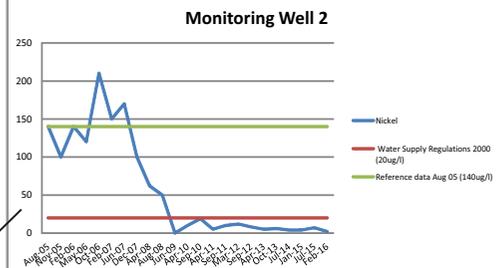
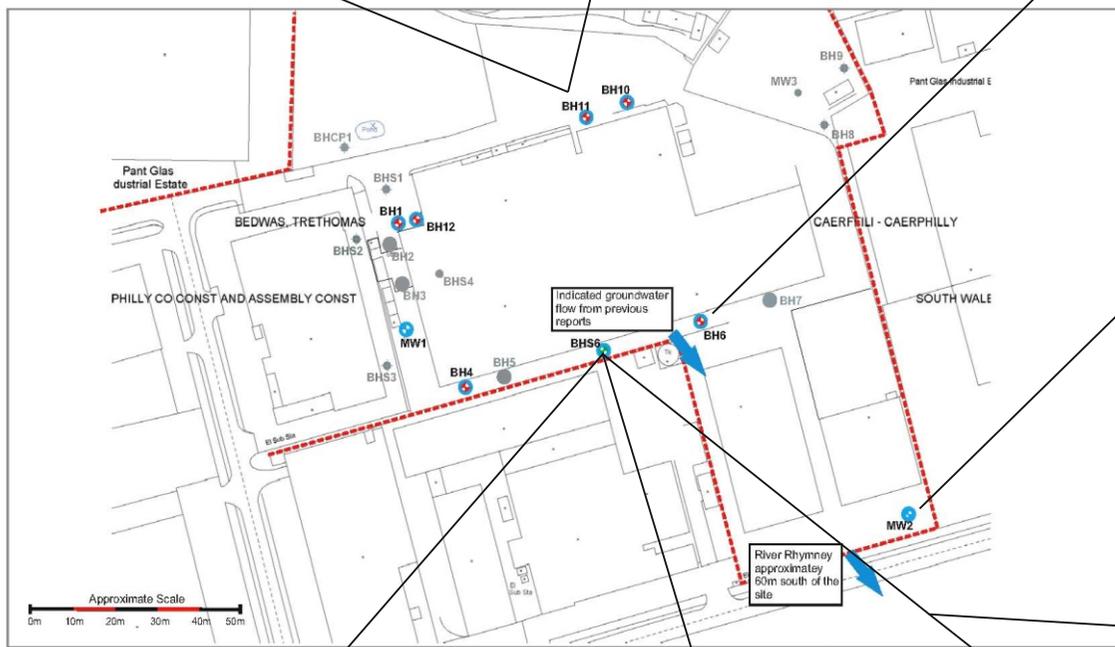
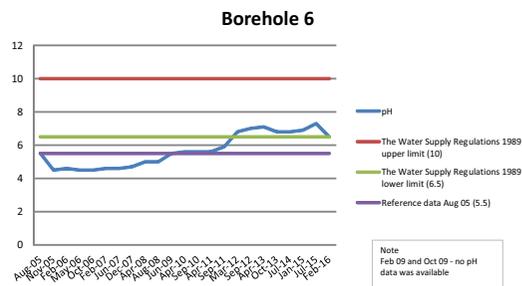
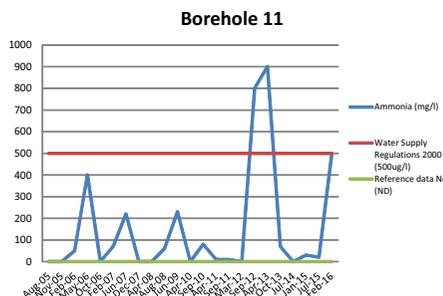
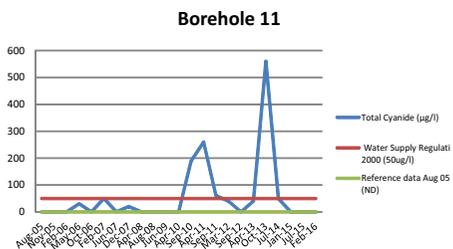
[lcleverley@ramboll.com](mailto:lcleverley@ramboll.com)

Encl.            Appendix 1, Figures  
                  Appendix 2, Table of Groundwater Analysis Results  
                  Appendix 3, Laboratory Certificate of Analysis

**Appendix 1**

**Figures**

# Contaminant Concentration Graphs



## Legend

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

Title Contaminant Concentration Graphs

Site Sapa Extrusion Ltd, Bedwas Plant, Pantglas Industrial Estate, Bedwas, Caerphilly

Client Sapa Extrusion Ltd

Project No. UK17-22794

Issue 1

Date February 2016

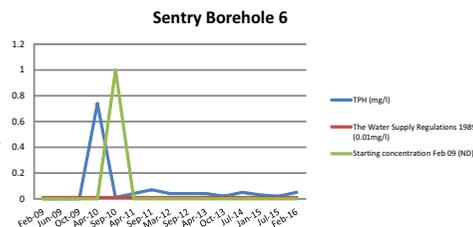
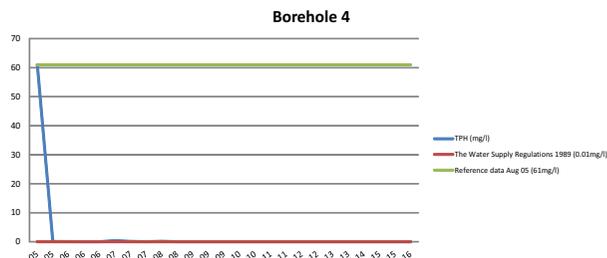
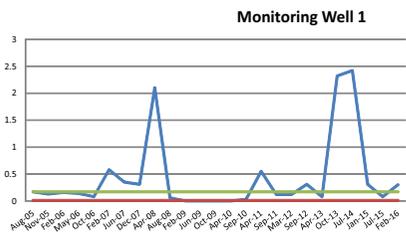
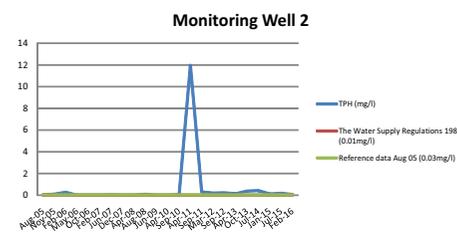
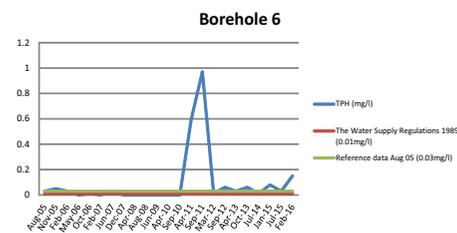
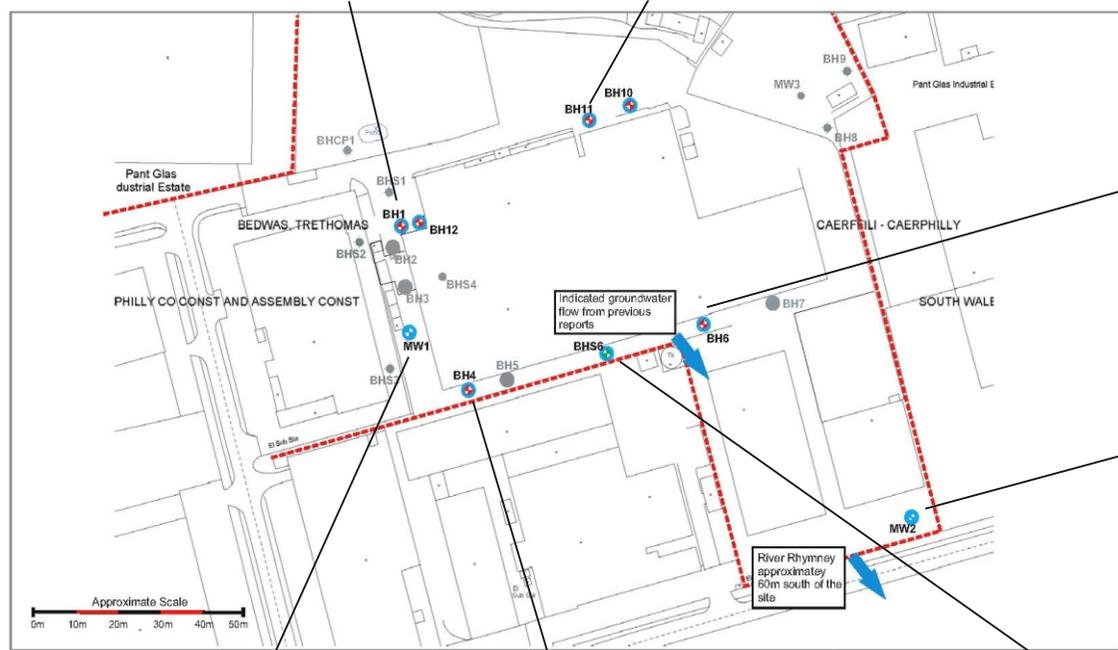
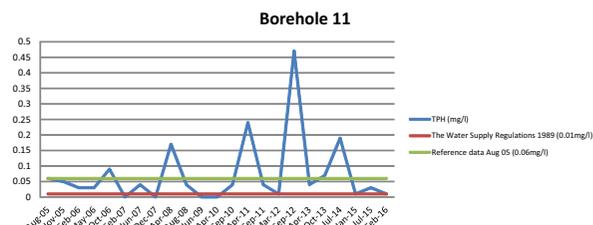
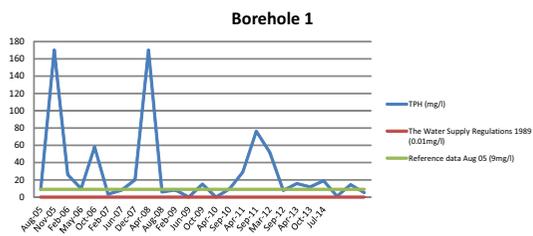
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Scale

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# TPH Concentration Graphs



## Legend

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

## Title TPH Concentration Graphs

Site Sapa Extrusions Ltd,  
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Drawn by RH

Scale

NTS



**Appendix 2**

**Table of Groundwater Analysis Results**

Sapa (UK17-22794) - Summary of Groundwater Analysis Results (February 2016)

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 <sub>4</sub> (mg/l)
BH1	Aug-05	9	9	NA	ND	ND	ND	ND	ND	ND	ND	ND	1208	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	8.7	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	2.3	1.3	100	120	ND	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	4	0.5	10	NA	NA	NA	6.5	ND	3.12
	Sep-10	9.39	ND	20	ND	6	ND	ND	2	ND	ND	30	ND	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	2	ND	2	50	ND	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	2	ND	ND	ND	2	ND	7	70	ND	6.9	9	3.70	
Jul-14	19.91	ND	20	ND	3	ND	ND	1	ND	3	ND	ND	ND	6.8	6	3.72	
Jan-15	0.36	ND	ND	ND	2	ND	ND	1	ND	3	25	110	ND	6.9	7	2.80	
Jul-15	14.4	ND	ND	ND	ND	ND	ND	3	ND	ND	70	ND	70	7.1	9	3.53	
Feb-16	5.2	ND	30	ND	ND	ND	ND	4	ND	74	130	ND	ND	6.6	13	2.41	
BH4	Aug-05	61	10	NA	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	6.6	20	3.10	
	Feb-06	0.07	ND	24	ND	10	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	6.9	26	3.56	
	Oct-06	0.02	ND	30	ND	ND	17	ND	ND	ND	10	ND	ND	6.8	34	3.81	
	Feb-07	0.4	ND	27	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	210	ND	6.8	24	3.62	
	Dec-07	ND	ND	27	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	7.1	20	3.39	
	Aug-08	ND	ND	36	ND	7	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	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	3	0.7	5	NA	NA	NA	6.9	17	3.35
	Sep-10	0.01	ND	20	ND	4	ND	ND	ND	ND	ND	20	ND	ND	6.8	15	3.62
	Apr-11	0.03	ND	30	ND	4	2	ND	ND	ND	ND	ND	ND	7	16	3.84	
Sep-11	0.01	ND	20	ND	7	ND	ND	ND	1	ND	30	ND	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	10	ND	ND	7.4	17	3.57	
Oct-13	0.02	ND	20	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	7	18	3.80	
Jul-14	ND	ND	20	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	7.2	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	20	ND	ND	6.5	16	3.65	
Feb-16	0.02	ND	30	ND	2	ND	ND	ND	ND	21	10	ND	ND	6.8	14	2.50	
BH6	Aug-05	0.03	9	NA	2	ND	ND	ND	ND	46	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	1208	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	2	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	
BH11	Aug-05	0.06	10	NA	ND	ND	ND	ND	ND	ND	ND	70	NA	ND	7.4	190	3.62
	Nov-05	0.05	8	ND	ND	ND	ND	ND	ND	ND	ND	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	400	30	7.1	180	3.27	
	Oct-06	0.09	ND	12	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	70	50	6.8	31	2.77	
	Jun-07	0.04	ND	32	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	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	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	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	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	2	5	500	ND	ND	6.4	36	2.38	
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

Borehole Location	Date	Analysis													pH	Sulphate as SO <sub>4</sub> (mg/l)	Water Level (m bgl)	
		TPH/EPH	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)				
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	6.8	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	5	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*	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*	NS*	2.55	
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	2.7	ND	26	ND	ND	ND	ND	ND	ND	ND	37	50	ND	6.8	20	3.41	
	Aug-08	0.69	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	NA	3.44
	Jun-09	ND	NA	ND	ND	ND	10	14	ND	3.4	NA	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	NA	3.87
	Apr-10	NA	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	3.84	
	Apr-11	0.55	ND	30	0.1	1	5	ND	ND	2	ND	126	ND	ND	6.8	22	3.68	
	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		
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	
	Feb-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	3.5	ND	ND	10	0.6	170	NA	NA	6.3	100	2.86	
	Sep-10	0.09	ND	30	0.8	3	2	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	6.7	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		
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		
		TPH/EPH	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 <sub>4</sub> (mg/l)	Water Level (m bgl)	
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

**Appendix 3**

**Laboratory Certificate of Analysis**

Our Ref: EXR/214279 (Ver. 1)

Your Ref: UK17-22794

February 17, 2016



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Rob Hodgson  
Ramboll Environ  
8 Village Way  
Greenmeadow Springs  
Cardiff  
CF15 7NE

For the attention of Rob Hodgson

Dear Rob Hodgson

**Sample Analysis - Sapa SPMP Round 25**

Samples from the above site have been analysed in accordance with the schedule supplied.

The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne  
Project Co-ordinator  
01283 554547

# TEST REPORT



Report No. EXR/214279 (Ver. 1)

Ramboll Environ  
8 Village Way  
Greenmeadow Springs  
Cardiff  
CF15 7NE

**Site: Sapa SPMP Round 25**

The 7 samples described in this report were registered for analysis by ESG on 10-Feb-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 17-Feb-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)  
GC-FID Chromatograms (Pages 4 to 10)  
Analytical and Deviating Sample Overview (Pages 11 to 12)  
Table of Additional Report Notes (Page 13)  
Table of Method Descriptions (Page 14)  
Table of Report Notes (Page 15)  
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of  
ESG :  
Declan Burns

  
Managing Director  
Multi-Sector Services

Date of Issue: 17-Feb-2016

Tests marked '^' have been subcontracted to another laboratory.

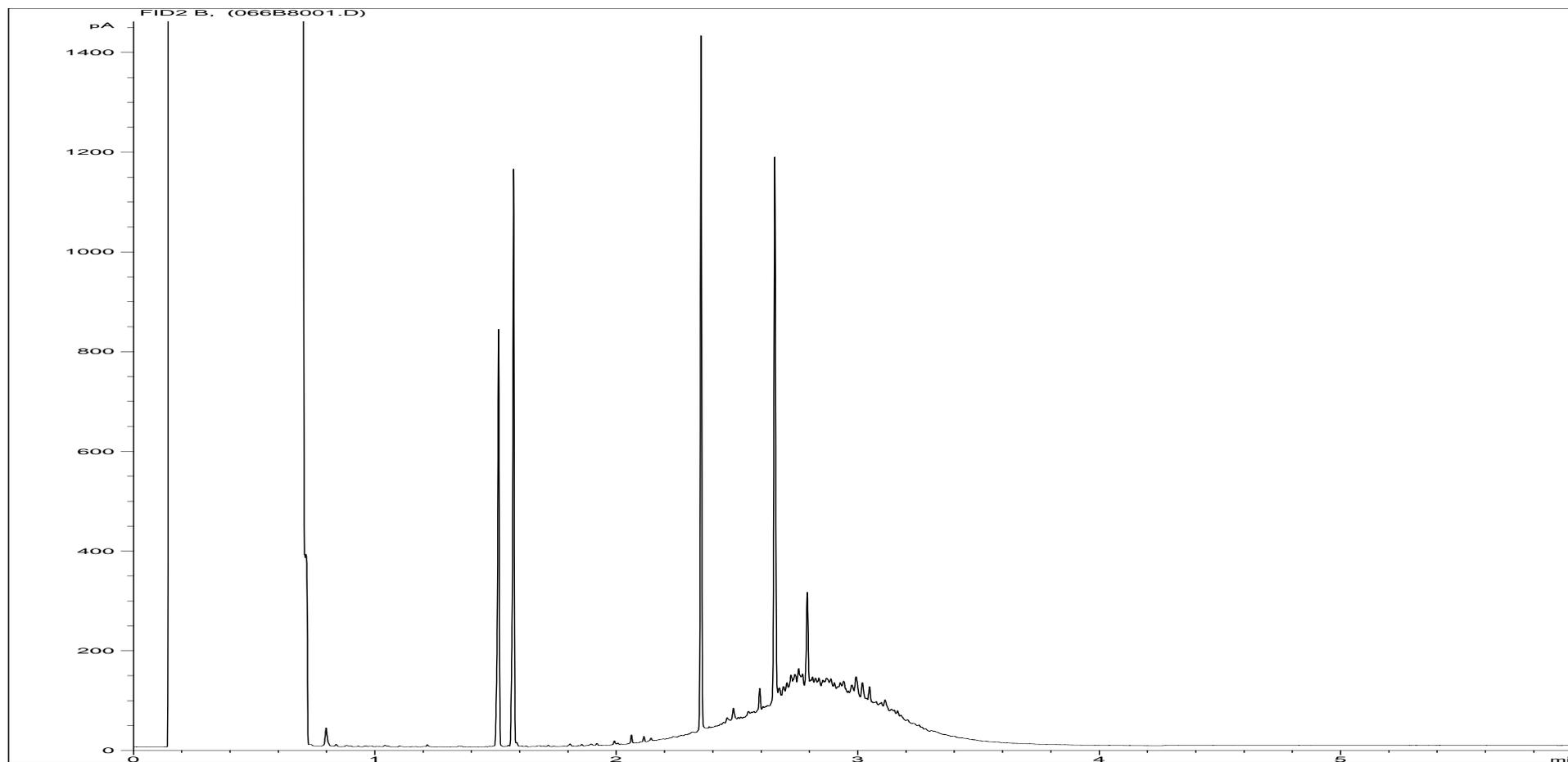
Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

ESG accepts no responsibility for any sampling not carried out by our personnel.





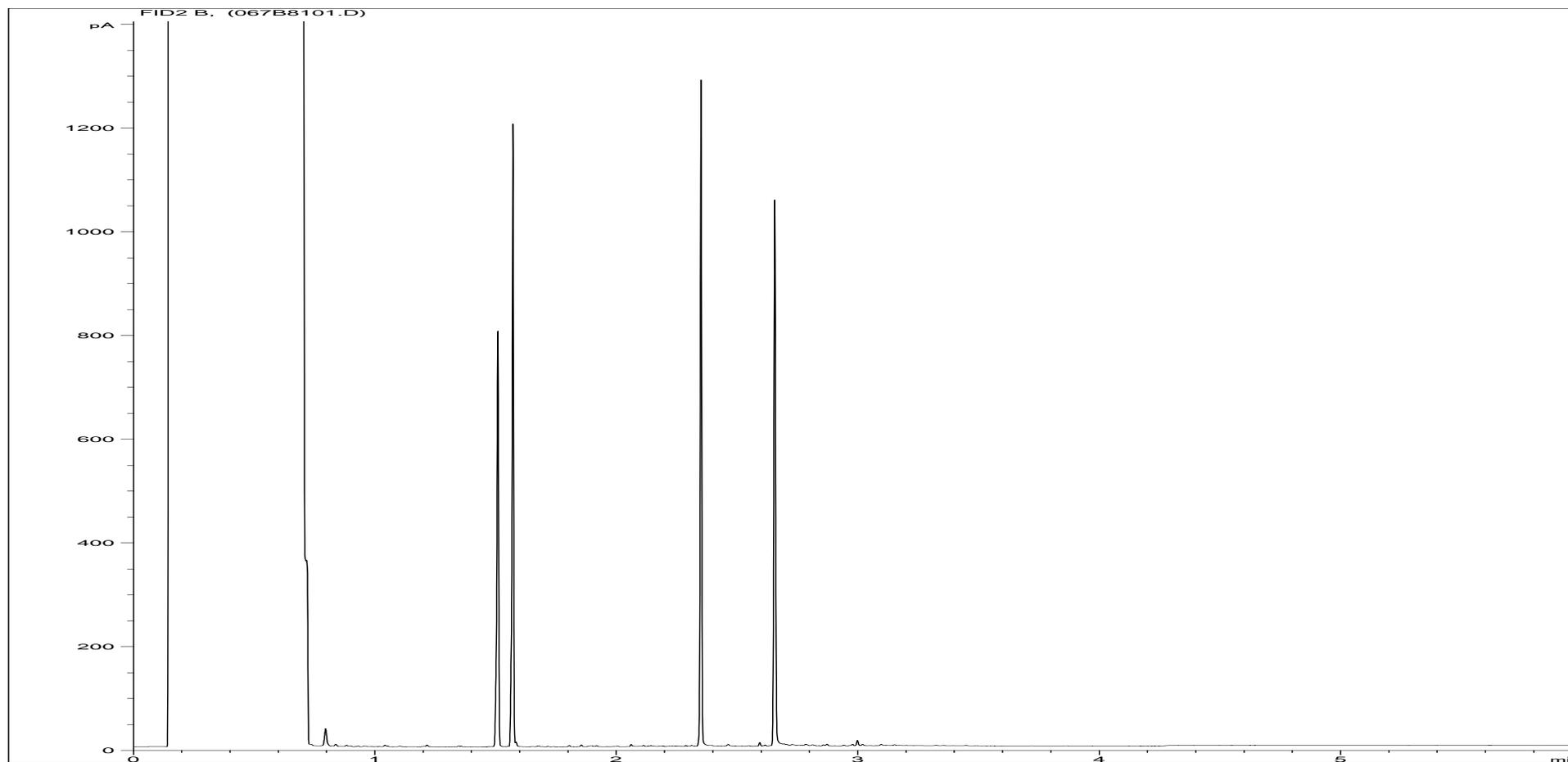
Petroleum Hydrocarbons (C8 to C40) by GC/FID



<b>Sample ID:</b>	EX1659890	<b>Job Number:</b>	W21_4279
<b>Multiplier:</b>	0.005	<b>Client:</b>	Ramboll Environ
<b>Dilution:</b>	1	<b>Site:</b>	Sapa SPMP Round 25
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	MW1
<b>Acquisition Date/Time:</b>	16-Feb-16, 03:12:30		
<b>Datafile:</b>	D:\TES\DATA\Y2016\021516TPH_GC4\021516 2016-02-15 09-22-18\066B8001.D		

Where individual results are flagged see report notes for status.

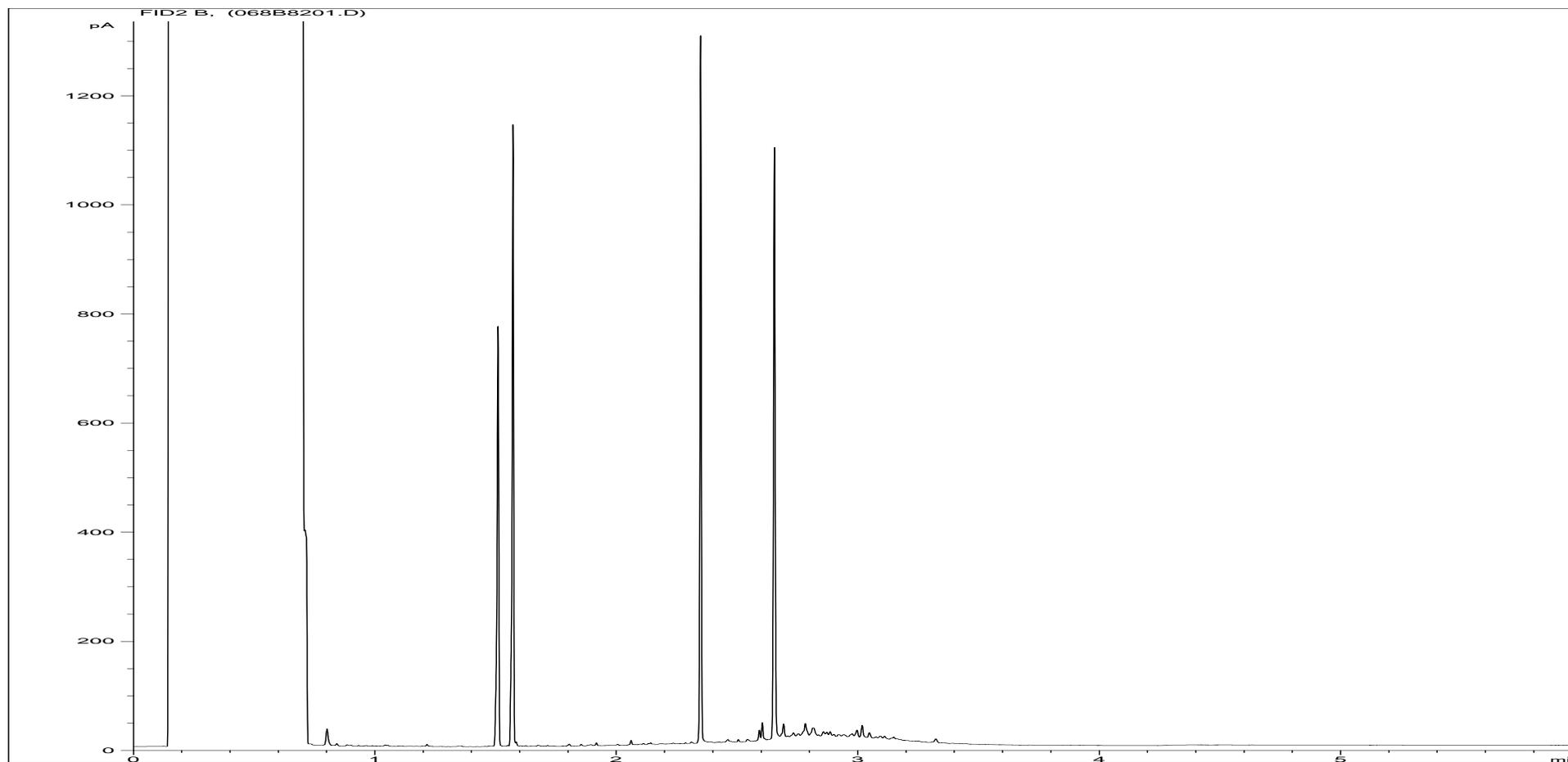
Petroleum Hydrocarbons (C8 to C40) by GC/FID



<b>Sample ID:</b>	EX1659891	<b>Job Number:</b>	W21_4279
<b>Multiplier:</b>	0.005	<b>Client:</b>	Ramboll Environ
<b>Dilution:</b>	1	<b>Site:</b>	Sapa SPMP Round 25
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	BH11
<b>Acquisition Date/Time:</b>	16-Feb-16, 03:25:49		
<b>Datafile:</b>	D:\TES\DATA\Y2016\021516TPH_GC4\021516 2016-02-15 09-22-18\067B8101.D		

Where individual results are flagged see report notes for status.

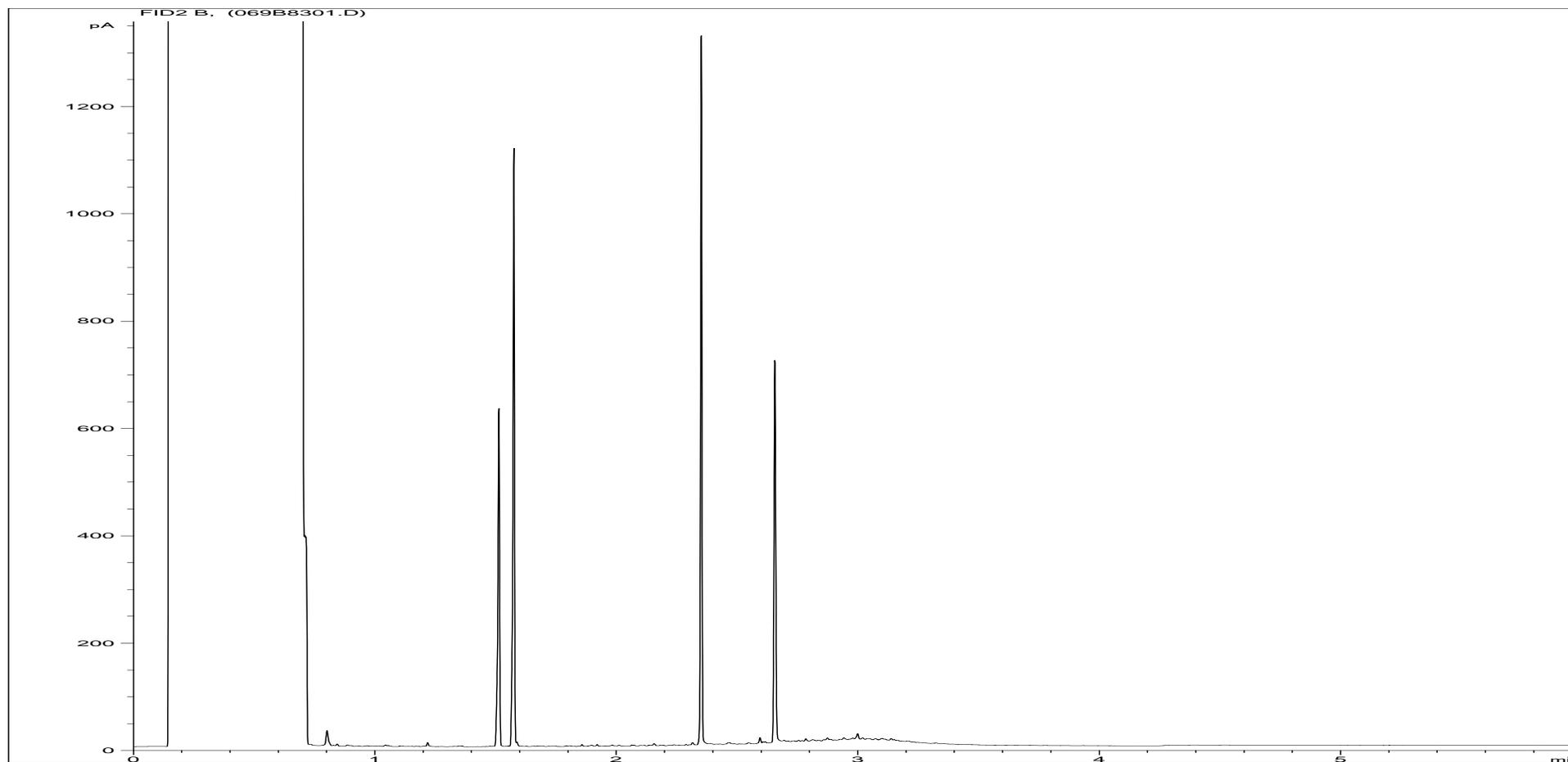
Petroleum Hydrocarbons (C8 to C40) by GC/FID



<b>Sample ID:</b>	EX1659892	<b>Job Number:</b>	W21_4279
<b>Multiplier:</b>	0.005	<b>Client:</b>	Ramboll Environ
<b>Dilution:</b>	1	<b>Site:</b>	Sapa SPMP Round 25
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	MW2
<b>Acquisition Date/Time:</b>	16-Feb-16, 03:39:20		
<b>Datafile:</b>	D:\TES\DATA\Y2016\021516TPH_GC4\021516 2016-02-15 09-22-18\068B8201.D		

Where individual results are flagged see report notes for status.

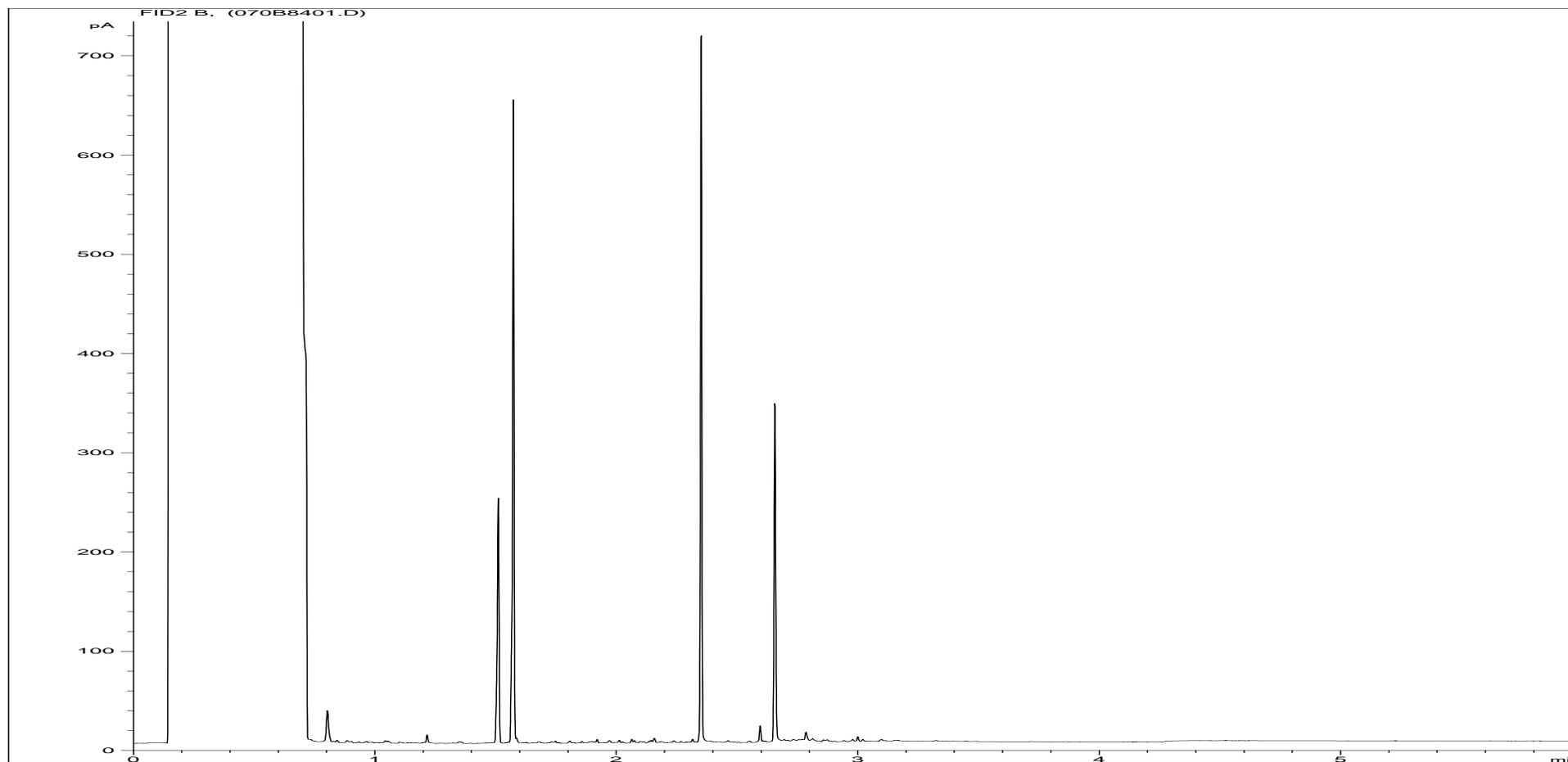
Petroleum Hydrocarbons (C8 to C40) by GC/FID



<b>Sample ID:</b>	EX1659893	<b>Job Number:</b>	W21_4279
<b>Multiplier:</b>	0.005	<b>Client:</b>	Ramboll Environ
<b>Dilution:</b>	4	<b>Site:</b>	Sapa SPMP Round 25
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	BH6
<b>Acquisition Date/Time:</b>	16-Feb-16, 03:52:33		
<b>Datafile:</b>	D:\TES\DATA\Y2016\021516TPH_GC4\021516 2016-02-15 09-22-18\069B8301.D		

Where individual results are flagged see report notes for status.

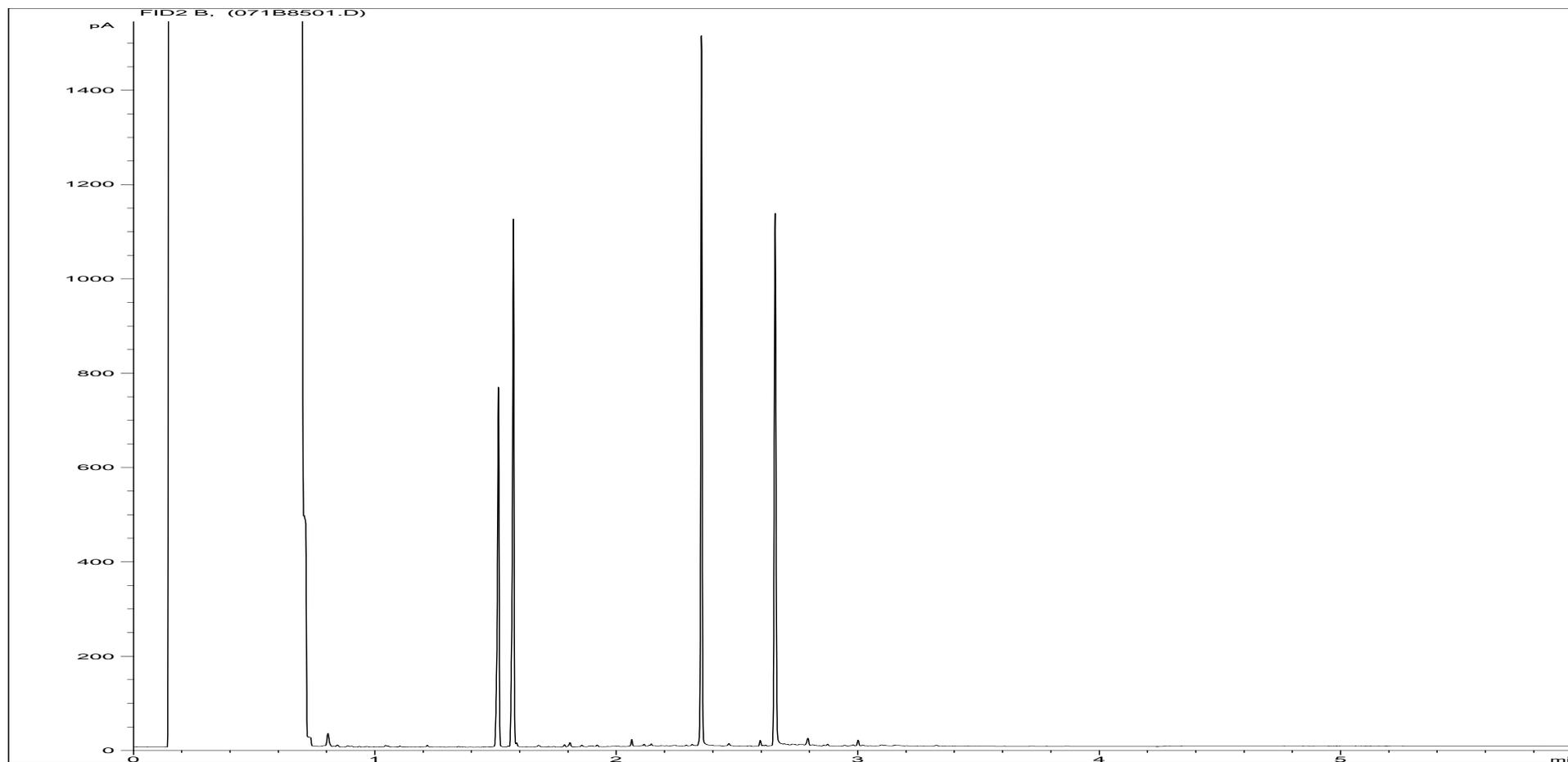
Petroleum Hydrocarbons (C8 to C40) by GC/FID



<b>Sample ID:</b>	EX1659894	<b>Job Number:</b>	W21_4279
<b>Multiplier:</b>	0.005	<b>Client:</b>	Ramboll Environ
<b>Dilution:</b>	4	<b>Site:</b>	Sapa SPMP Round 25
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	BHS6
<b>Acquisition Date/Time:</b>	16-Feb-16, 04:05:45		
<b>Datafile:</b>	D:\TES\DATA\Y2016\021516TPH_GC4\021516 2016-02-15 09-22-18\070B8401.D		

Where individual results are flagged see report notes for status.

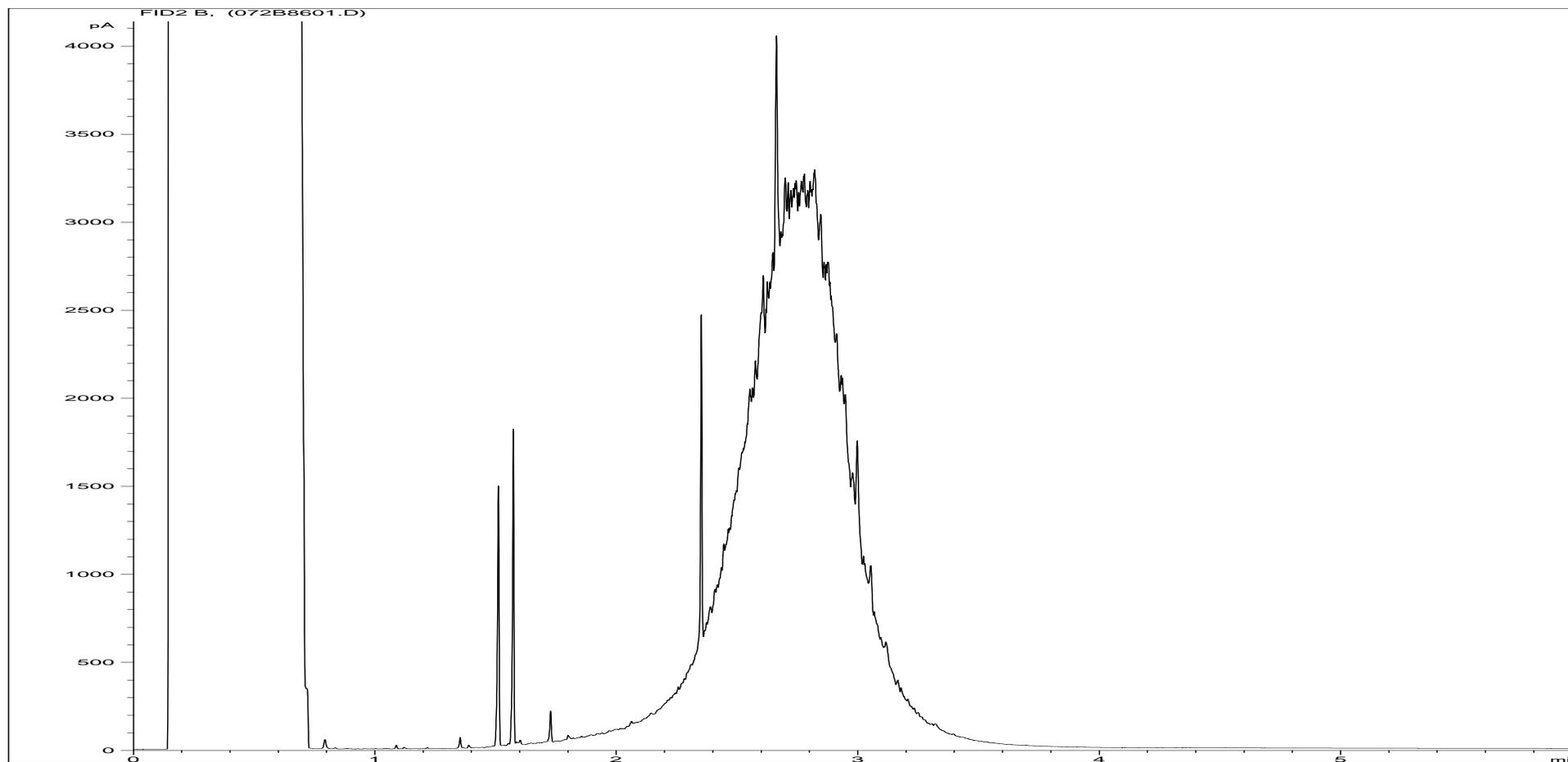
Petroleum Hydrocarbons (C8 to C40) by GC/FID



<b>Sample ID:</b>	EX1659895	<b>Job Number:</b>	W21_4279
<b>Multiplier:</b>	0.005	<b>Client:</b>	Ramboll Environ
<b>Dilution:</b>	1	<b>Site:</b>	Sapa SPMP Round 25
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	BH4
<b>Acquisition Date/Time:</b>	16-Feb-16, 04:19:03		
<b>Datafile:</b>	D:\TES\DATA\Y2016\021516TPH_GC4\021516 2016-02-15 09-22-18\071B8501.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



<b>Sample ID:</b>	EX1659896	<b>Job Number:</b>	W21_4279
<b>Multiplier:</b>	0.005	<b>Client:</b>	Ramboll Environ
<b>Dilution:</b>	1	<b>Site:</b>	Sapa SPMP Round 25
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	BH1
<b>Acquisition Date/Time:</b>	16-Feb-16, 04:32:18		
<b>Datafile:</b>	D:\TES\DATA\Y2016\021516TPH_GC4\021516 2016-02-15 09-22-18\072B8601.D		

Where individual results are flagged see report notes for status.

# Sample Analysis

## ESG Environmental Chemistry Analytical and Deviating Sample Overview

W214279

Customer **Ramboll Environ**  
Site **Sapa SPMP Round 25**  
Report No **W214279**

Consignment No W99752  
Date Logged 10-Feb-2016

Report Due 17-Feb-2016

ID Number	Description	Matrix Type	MethodID	Calc. HD	CUSTSERV	ICPMSW	ICPMSTAR													
							Total Hardness as CaCO3 (CALC)	Report A	Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Vanadium as V MS (Dissolved)	Total Sulphur as SO4 (Diss) VAR	Calcium as Ca (Dissolved) VAR
				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EX/1659890	MW1	Groundwater	09/02/16																	
EX/1659891	BH11	Groundwater	09/02/16																	
EX/1659892	MW2	Groundwater	09/02/16																	
EX/1659893	BH6	Groundwater	09/02/16																	
EX/1659894	BHS6	Groundwater	09/02/16																	
EX/1659895	BH4	Groundwater	09/02/16																	
EX/1659896	BH1	Groundwater	09/02/16																	

**Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.**

**In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.**

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - <b>Note: due date may be affected if triggered</b>
□	No analysis scheduled
^	Analysis Subcontracted - <b>Note: due date may vary</b>

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

# Sample Analysis

## ESG Environmental Chemistry Analytical and Deviating Sample Overview

W214279

Customer **Ramboll Environ**  
 Site **Sapa SPMP Round 25**  
 Report No **W214279**

Consignment No W99752  
 Date Logged 10-Feb-2016

Report Due 17-Feb-2016

ID Number	Description	Matrix Type	MethodID	KONENS	SFAP1	TPHFID	WLSLM3
				✓	✓	✓	✓
EX/1659890	MW1	Groundwater	09/02/16				
EX/1659891	BH11	Groundwater	09/02/16				
EX/1659892	MW2	Groundwater	09/02/16				
EX/1659893	BH6	Groundwater	09/02/16				
EX/1659894	BHS6	Groundwater	09/02/16				
EX/1659895	BH4	Groundwater	09/02/16				
EX/1659896	BH1	Groundwater	09/02/16				

**Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.**

**In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.**

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
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E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - <b>Note: due date may be affected if triggered</b>
	No analysis scheduled
^	Analysis Subcontracted - <b>Note: due date may vary</b>

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.



# Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	Calc_HD	As Received	Calculation based on Dissolved metals analysis by ICPOES
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

# Report Notes

## Generic Notes

### Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.  
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

### Waters Analysis

Unless stated otherwise results are expressed as mg/l

**Nil:** Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

### Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm<sup>3</sup> @ 15°C

### Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

### Asbestos Analysis

**CH** Denotes Chrysotile                      **TR** Denotes Tremolite  
**CR** Denotes Crocidolite                    **AC** Denotes Actinolite  
**AM** Denotes Amosite                      **AN** Denotes Anthophyllite  
**NAIIS** No Asbestos Identified in Sample  
**NADIS** No Asbestos Detected In Sample

## Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined                      **N.Det** Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

▯ Raised detection limit due to nature of the sample

\* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

