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THE ROYAL MINT, LLANTRISANT
SITE PROTECTION AND MONITORING PROGRAMME (SPMP) GROUNDWATER MONITORING ROUND XIII

RAMBOLL ENVIRON

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1. INTRODUCTION

Ramboll Environ UK Limited (Ramboll Environ) was commissioned by The Royal Mint (the Client), to design a Site Protection and Monitoring Programme (SPMP) in order to collect reference data for an IPPC Permit No. VP3539SL (the "permit").

The first phase report of the SPMP was submitted to the Environment Agency (EA) in April 2006 following an intrusive ground investigation carried out in March 2006. The objectives of the environmental monitoring programme are to monitor the effectiveness of infrastructure and management procedures and provide a warning of loss of containment. The results of the monitoring programme will assist during the permit surrender process by determining the movement of pollutants both within and on/off the site; and will provide information on long term trends.

In accordance with the Design SPMP (Ref: 63C8777, October 2005) groundwater monitoring is to be carried out annually; however, an increased frequency of monitoring may be necessary to facilitate identifying the source and extent of any pollution.

The first round of monitoring was carried out subsequent to the intrusive investigation (initial sampling) in March 2006 and the laboratory results ('Reference Data') are tabulated within the first phase report. Groundwater monitoring has been carried out annually thereafter and this report details the results of the thirteenth round of monitoring carried out on 7th and 8th September 2017. The results have been compared with the Reference Data and are presented graphically in order to identify trends in groundwater contaminant concentrations over the monitoring period to date.

This report has been written by Ramboll Environ on behalf of The Royal Mint and is to be submitted to Natural Resources Wales (NRW) in pursuance of Condition 4.1.7 of the Permit.

2. SCOPE OF WORK

Groundwater samples were recovered from eleven monitoring wells, eight of which were SPMP specific wells installed by Ramboll Environ in March 2006. The remaining three wells were selected, as agreed between NRW and The Royal Mint, following a review of the monitoring programme that addresses Action 1 of NRW Compliance Assessment Report (CAR) Ref: KP3135KV/0184470, 22nd July 2013. Each well was purged prior to the groundwater sample being obtained. The monitoring well locations are shown on Figure 1 in Appendix 1.

The groundwater samples were analysed for metals (As, Cd, Cr, Cu, Pb, Ni, Hg, Se, Zn, B), pH, total cyanide, sulphate, sulphide, alkalinity, volatile organic compounds (VOC) and Total Petroleum Hydrocarbons (TPH).

For screening purposes, reference has been made to appropriate UK water quality guidelines. Environmental Quality Standards (EQS) were used on the basis that the principal Controlled Waters receptor for the site is the Nant Mychydd River, for which the freshwater EQS is most applicable.

New EQSs were published in 2010 under the Priority Substances (Directive 2008/105/EC) daughter directive of the Water Framework Directive (2000/60/EC). The European EQSs have been transposed into the River Basins Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2015. The EQS are detailed in Part 4 (Specific Pollutants) and Part 5 (Priority Substances) of the Directive.

In the absence of an EQS under the WFD, we have referred to the former EQS under the Dangerous Substances Directive and where EQS are not available, the UK Drinking Water Standards (UK DWS).

3. GROUNDWATER ANALYSIS RESULTS

A full set of laboratory certificates and a summary table of the ongoing groundwater monitoring results are presented in Appendix 2 and Appendix 3 respectively, and the main findings are summarised below. Graphs are presented showing concentrations recorded over time for selected determinands that have been detected above the laboratory limit of detection.

Ramboll Environ has only discussed the results of analysis where the concentrations were detected above the laboratory limit of detection.

The site has been divided into zones according to their potential for pollution as described in the Design SPMP (Ramboll Environ Ref. 63C8777).

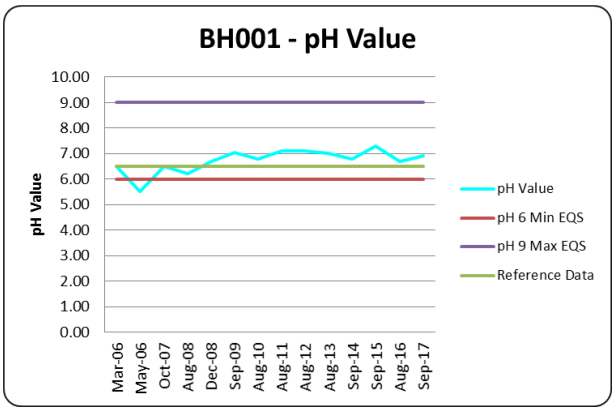
3.1 ZONE 0: Non-Target Zone

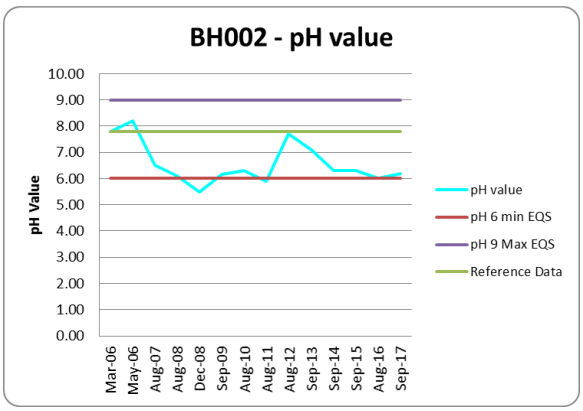
3.1.1 Perimeter Boreholes

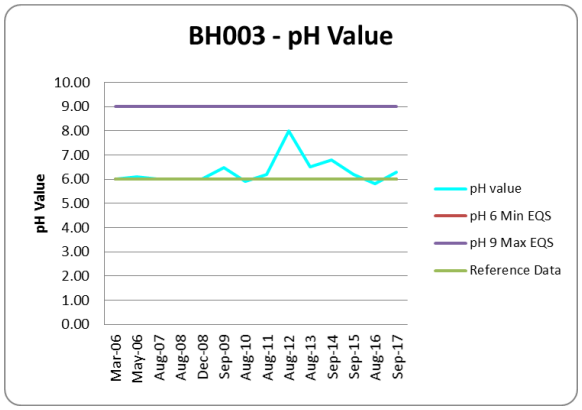
Three boreholes (BH001, BH002 and BH003) are located outside the target zones. Both BH001 and BH002 are located in an up-hydraulic gradient location on site (i.e. to the north); and BH003 is located down-hydraulic gradient (to the south).

pH Values

The pH value of groundwater from boreholes BH001, BH002 and BH003 were all within the EQS range (pH 6 to pH 9) during the most recent round of monitoring.







Metals

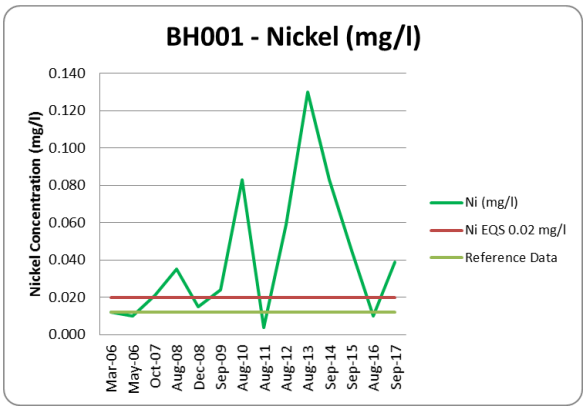
Arsenic was detected in BH001 only, at a concentration of 0.004mg/l; which is above the reference data of <0.005mg/l; however, the concentration does not exceed EQS of 0.05mg/l.

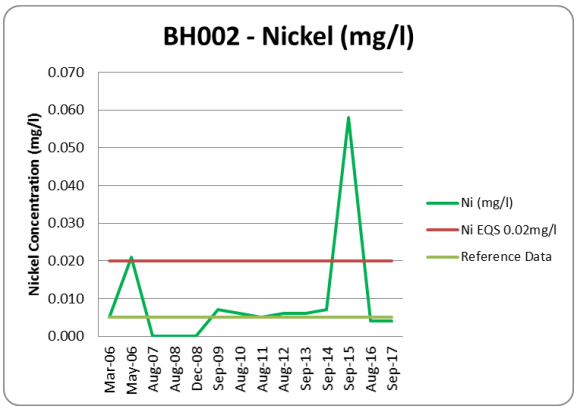
Cadmium was detected in BH003 at a concentration of 0.0001mg/l; for the purpose of screening, any recorded concentration above the laboratory LOD is considered to exceed the EQS of 0.00008mg/l. Cadmium was not detected in any of the perimeter boreholes during reference data collection; however, it has been detected in low concentrations in BH003 for the last eight rounds of annual monitoring.

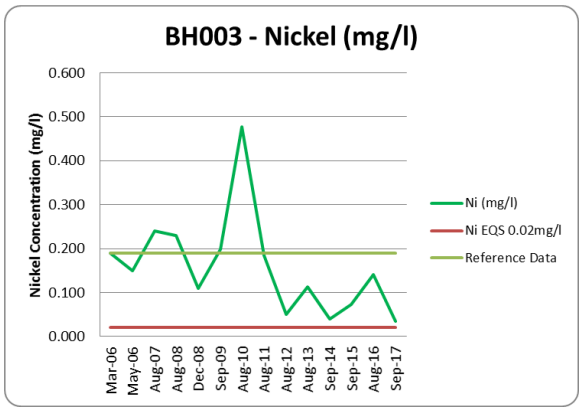
Chromium was detected in BH003 at a concentration of 0.002mg/l, which is typical of previously recorded concentrations at this locations and below the EQS value of 0.0047mg/l.

Historically, the concentration of nickel in BH001 has fluctuated above and below the EQS; the most recent recorded concentration exceeds both the EQS and the reference data at this location.

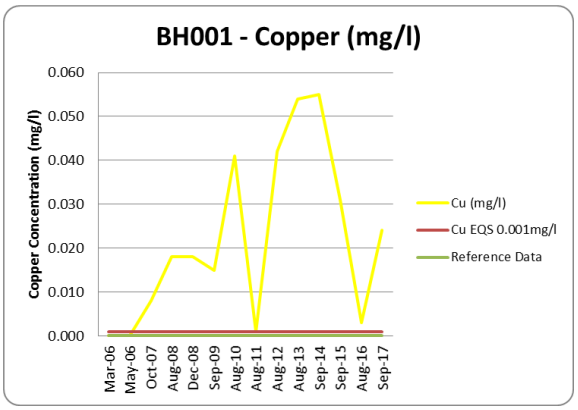
Nickel was recorded at a concentration above the EQS value of 0.02mg/l in down-hydraulic gradient borehole BH003 (0.035mg/l), which is typical of previous recorded concentrations at this location. However, the recorded concentration of nickel is below the reference data during the most recent round of monitoring.

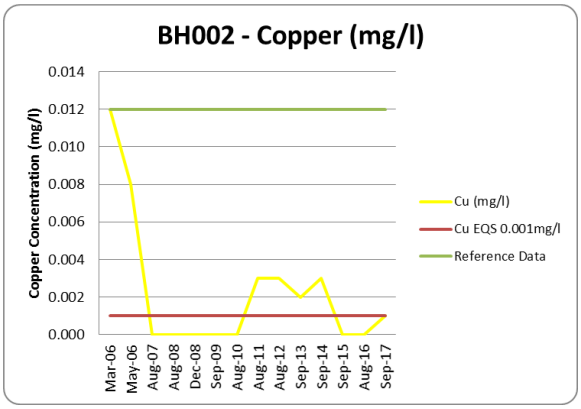


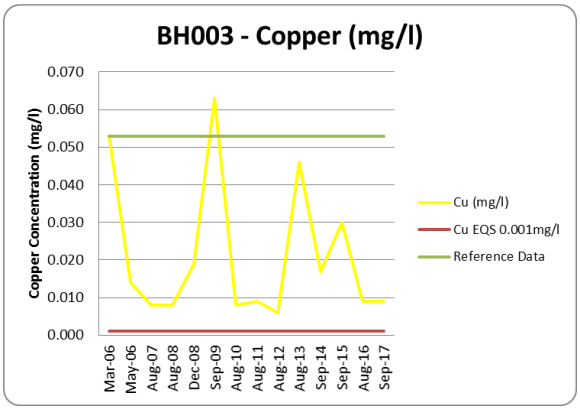




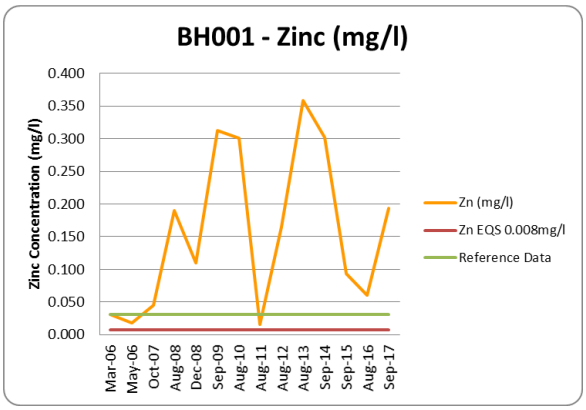
Copper was detected in each of the perimeter boreholes BH001 (0.024mg/l), BH002 (0.001mg/l), and BH003 (0.009mg/l). Recorded concentrations have remained the same or slightly increased since the previous monitoring round. All concentrations are at or above the EQS.

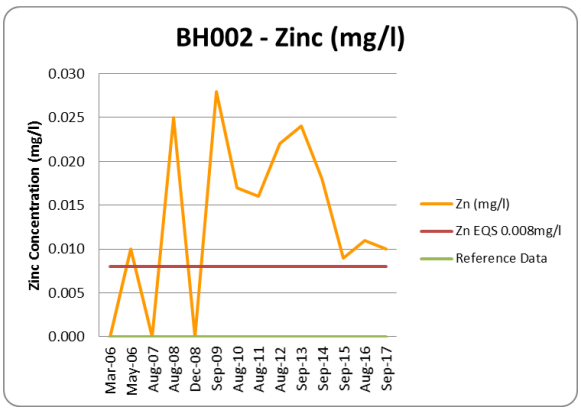


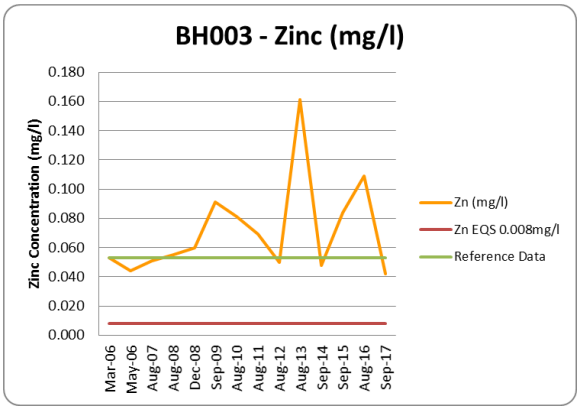




Zinc was detected in BH001 (0.193mg/l), BH002 (0.010mg/l) and BH003 (0.042mg/l); the concentration in BH002 exceeded the EQS value of 0.008mg/l. The concentration of zinc in BH003 is considered to be below the EQS of 0.075mg/l, due to a higher value for water hardness, although this is not represented on the graph.

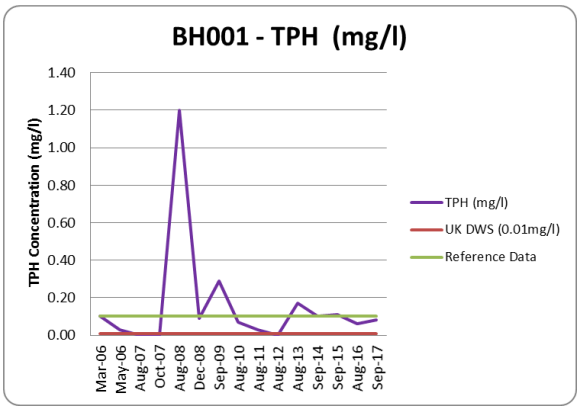


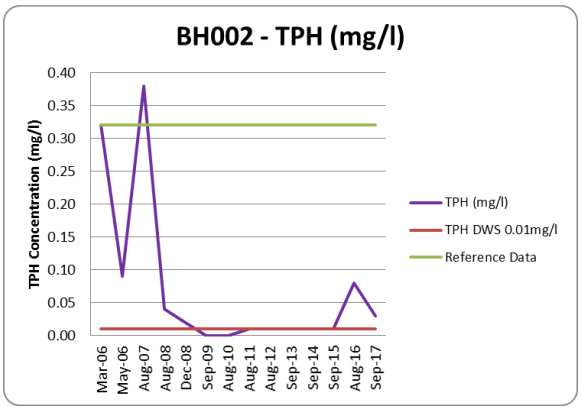


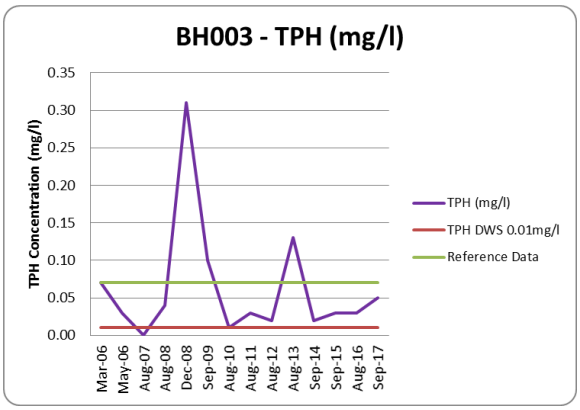


Hydrocarbons

Total Petroleum Hydrocarbons (TPH) were detected in BH001 (0.08mg/l), BH002 (0.03mg/l) and BH003 (0.05mg/l) at or above the screening value of 0.01mg/l. In each case, the most recent recorded values are below the reference data and within the range of previously recorded values at each location.







VOCs

Trace concentrations of VOCs were detected in groundwater from BH003 only, consistent with previous rounds of monitoring. 1,1,1-trichloroethane (TCA) was detected at 7µg/l which is below the EQS value of 100µg/l. Trichloroethene (TCE) has previously been detected in these monitoring wells; however, on this occasion TCE was below the laboratory LOD (<5µg/l).

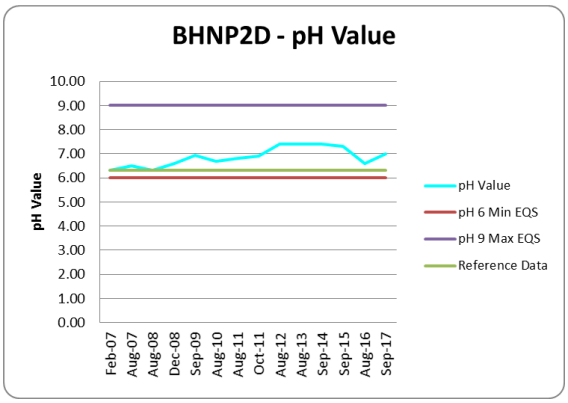
3.1.2 Additional Perimeter Monitoring Wells

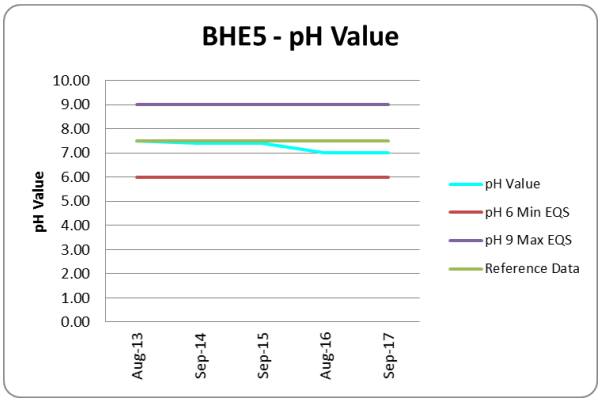
Four additional monitoring wells were added to the SPMP in order to monitor the effectiveness of groundwater remediation (for VOCs) carried out in the south-east of the site by Celtic Technologies Limited ('Celtic') between 2011 and 2013 (Celtic Report Ref: R1430/12/4003).

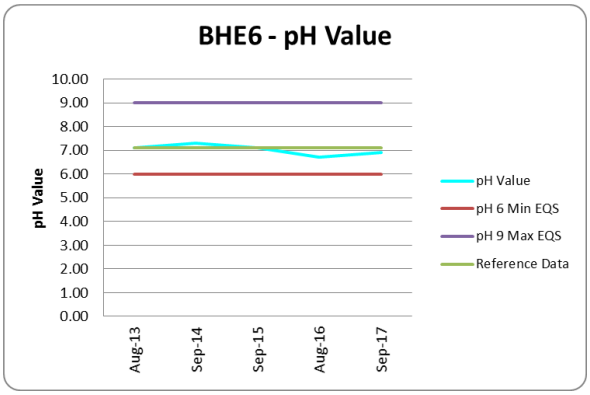
The additional wells are positioned between Zone 8 and the River Nant Mychydd and comprise: BHNP2, BHE5, BHE6 and CBH6. BHNP2 comprises dual monitoring wells, shallow and deep; this monitoring location has been included in the SPMP since its installation in 2007. It should be noted that only the deep well is monitored under the SPMP (BHNP2D). The other three boreholes (BHE5, BHE6 and CBH6) were installed by Celtic and have only been included in the SPMP since 2013.

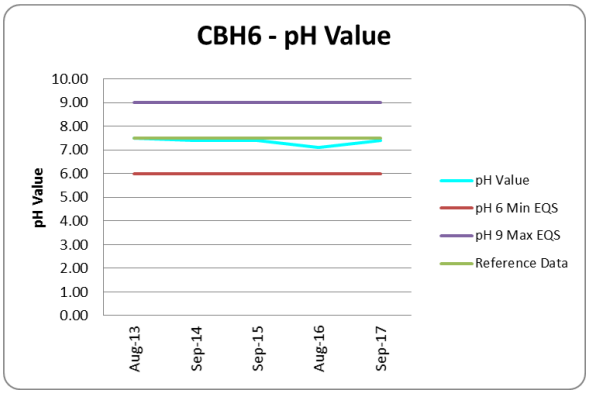
pH Values

The pH values in this area ranged from pH 6.9 (BHE6) to pH 7.4 (CBH6) and are fairly consistent with previous rounds of monitoring.







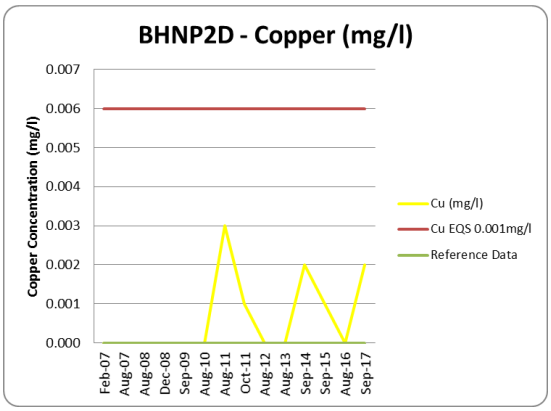


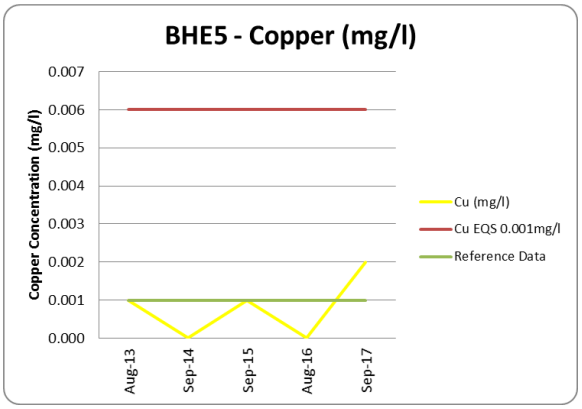
Metals

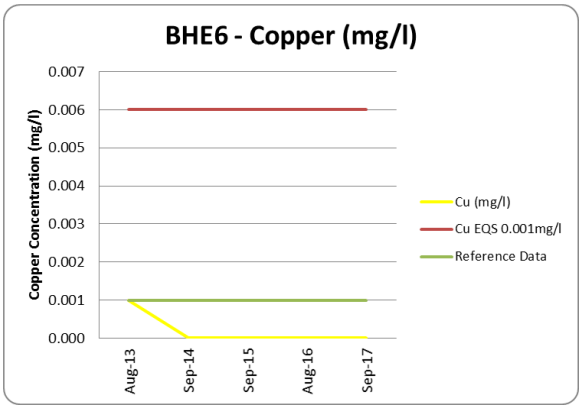
Trace concentrations of arsenic were detected in BHE5 (0.001mg/l) and BHE6 (0.001mg/l), which are well below the EQS values of 0.05mg/l. These are the first detected concentrations of arsenic in any of the four boreholes in this area; therefore, they are slightly above the reference data.

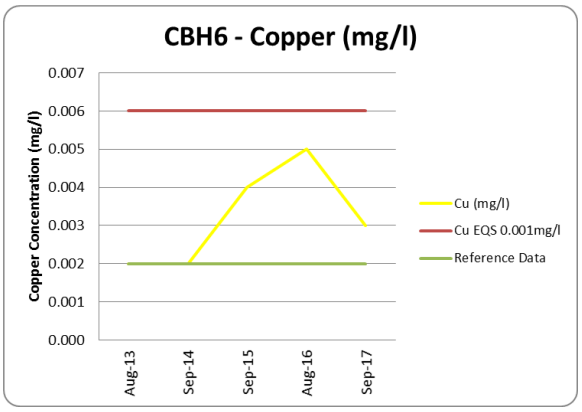
Cadmium was detected in CBH6 at a concentration of 0.0002mg/l, which is above the reference data for this sampling location (and also below the laboratory limit of detection). Trace concentrations of cadmium have historically been detected in each of the four boreholes in this area.

Copper was detected at low concentrations in three boreholes in this area; BHNP2D (0.002mg/l), BHE5 (0.002mg/l) and CBH6 (0.003mg/l); however, each detection remains below the relevant EQS value of 0.006mg/l.

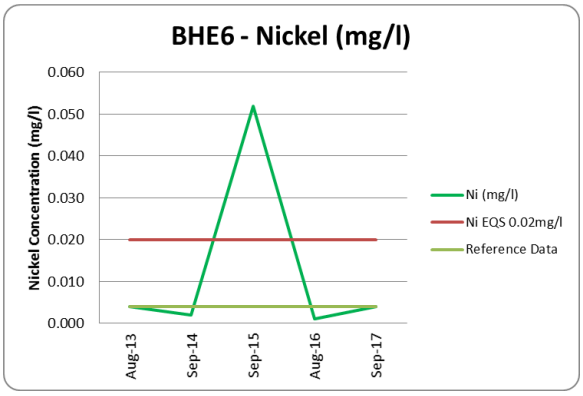


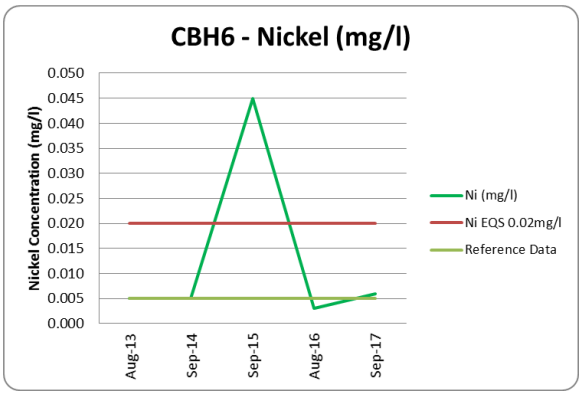


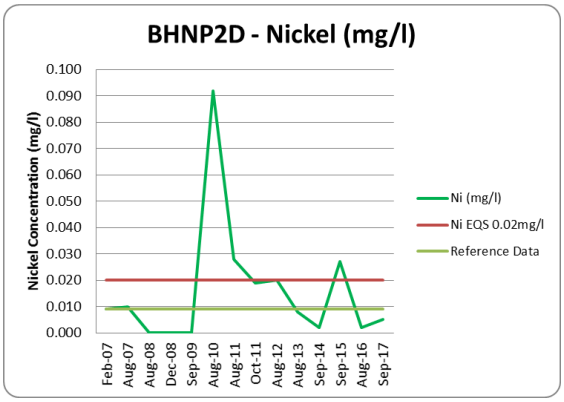


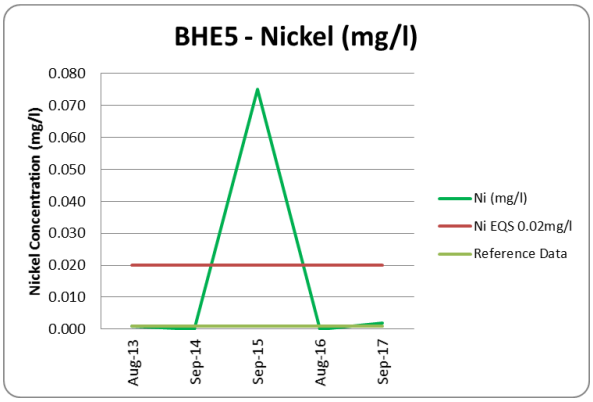


Nickel was detected at or above the laboratory LOD in each borehole in this area; BHNP2D (0.005mg/l), BHE5 (0.002mg/l), BHE6 (0.004mg/l) and CBH6 (0.006mg/l). The concentration of nickel has increased slightly in each of these boreholes since the previous round of monitoring; However, they are all similar to the respective reference data and below the EQS of 0.02mg/l.

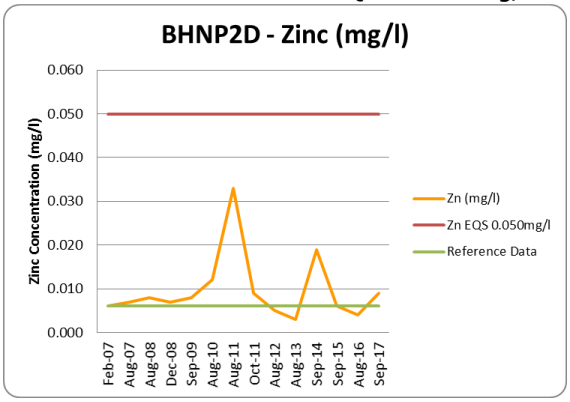


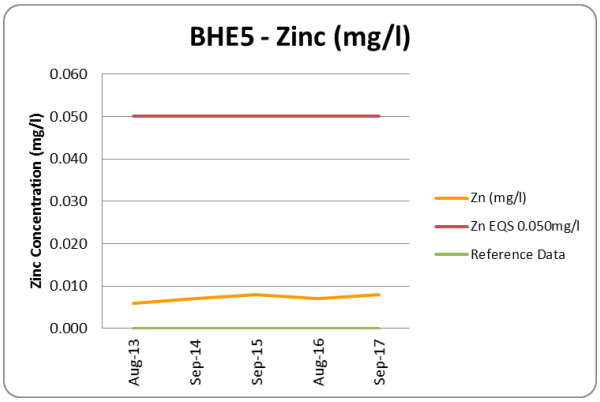


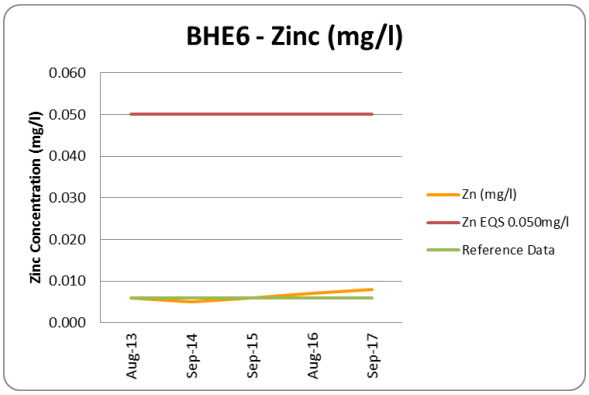


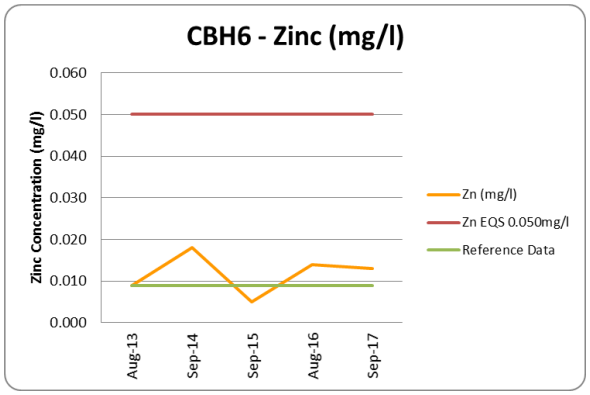


Zinc was detected above the laboratory limit of detection in BHNP2D (0.009mg/l), BHE5 (0.004mg/l), BHE6 (0.008mg/l) and CBH6 (0.013mg/l); all are slightly above reference data, but remain below the relevant EQS of 0.05mg/l.



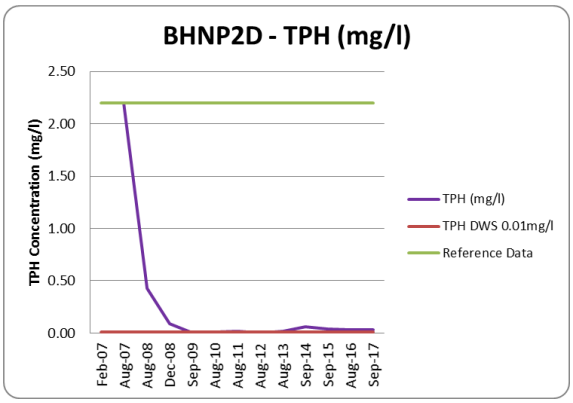


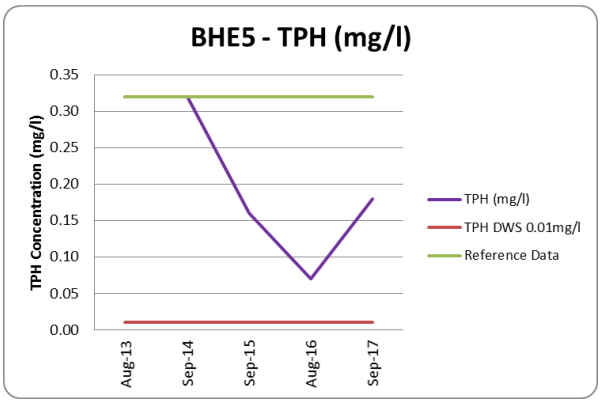


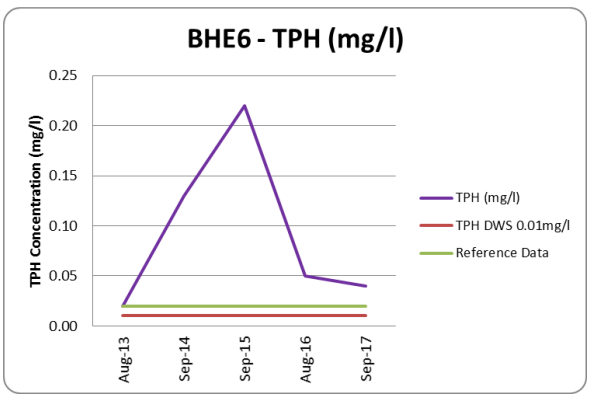


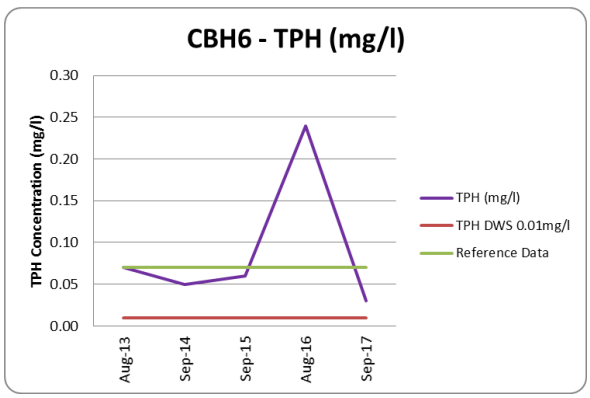
Hydrocarbons

TPH was detected at concentrations above the screening value of 0.01mg/l in BHNP2D (0.03mg/l), BHE5 (0.18mg/l), BHE6 (0.04mg/l) and CBH6 (0.03mg/l). The presence of mineral









oil has previously been identified in samples from boreholes BHE5 and BHE6, which is the likely source of elevated TPH concentrations at these locations. When boreholes BHE5 and BHE6 were installed in 2010 (Ramboll Environ Ref UK17-15394), field observations of an oily sheen were noted during groundwater sampling and maximum TPH concentrations of 25.4mg/l (BHE5) and 12.6mg/l (BHE6) were recorded. TPH concentrations in these boreholes have generally decreased in the most recent monitoring round, with the exception of BHE5.

VOCs

Remediation was carried out in this area by Celtic between 2011 and 2013 and the additional boreholes were added to the SPMP as a requirement of NRW to verify the success of the remediation scheme (BHNP2D, CBH6, BHE5 and BHE6).

The following compounds were detected in BHNP2D: 1,1,1-trichloroethane (28µg/l); 1,1-dichloroethene (3µg/l); 1,1-dichloroethane (20µg/l); cis 1,2-dichloroethene (4µg/l); and trichloroethene (7µg/l). The VOC concentrations have decreased compared to the previous round

of monitoring and are all below the respective Controlled Waters screening criteria, where available.

Site specific remedial targets were developed by Celtic for the following VOC compounds as follows:

- 1,1,1-trichloroethane: 341µg/l;
- 1,1-dichloroethene: 10.1µg/l;
- trichloroethene: 34.4µg/l; and
- tetrachloroethene: 38.5µg/l.

None of the most recent recorded concentrations exceed the remedial targets.

The following VOCs were detected in CBH6: 1,1,1-trichloroethane (9µg/l); cis 1,2-dichloroethene (8µg/l); and trichloroethene (12µg/l). Overall, VOC concentrations have decreased at this sampling location. The concentration of trichloroethene exceeds the Controlled Waters screening criteria of 10µg/l. However, the concentrations detected do not exceed any of site specific remedial targets.

VOCs were not recorded above the laboratory limit of detection in boreholes BHE5 and BHE6 during the most recent round of monitoring.

3.2 ZONE 1: Non-Ferrous Melting and Casting Activities

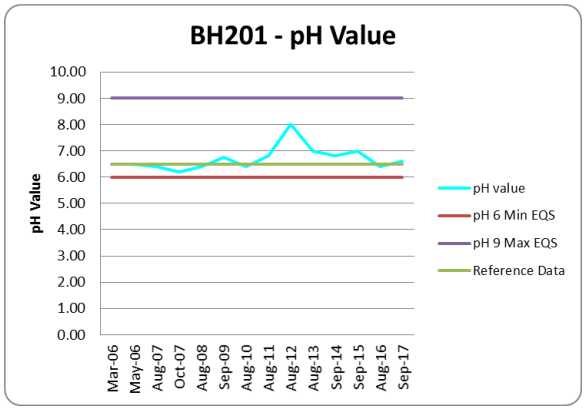
Zone 1 is located in the north-west section of the site and includes the MRB (Melting, Rolling and Blanking) building. There is one monitoring well in the area, BH101 located up-gradient of the MRB (i.e. to the north). Based on the previous stable or decreasing concentrations of determinands in this monitoring well, BH101 has not been included in the SPMP monitoring programme since August 2012. This decision was made following a review of the SPMP monitoring programme undertaken to address Action 1 of the Compliance Assessment Report (CAR) (Ref: KP3135KV/0184470) issued by NRW.

3.3 ZONE 2: Effluent and Cooling Sumps

Zone 2 is located in the centre of the site between the MRB building (to the north) and the Ancillary Services building (to the south). There is one monitoring well in this area, BH201 located immediately south east of the underground soluble oil chamber (Chamber 19C).

pH Value

The pH value recorded in BH201 was pH 6.6, which is a slight increase (less acidic) since the previous monitoring round and within the EQS values. The reference data at this location is pH 6.5.



Metals

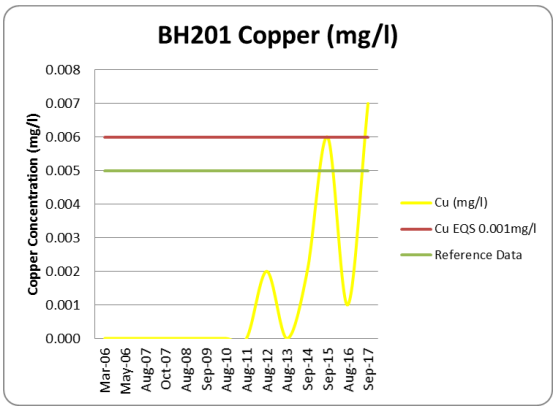
Arsenic was recorded at the laboratory LOD (0.001mg/l), which is below the respective EQS values of 0.05mg/l.

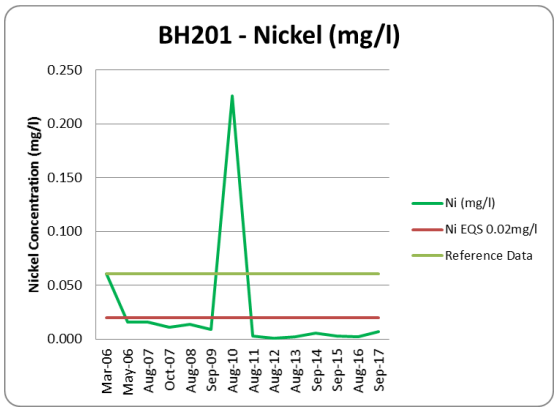
Copper was recorded at a concentration of 0.007mg/l, which represents the maximum recorded value at this location and slightly exceeds the EQS of 0.006mg/l, and is above the reference data.

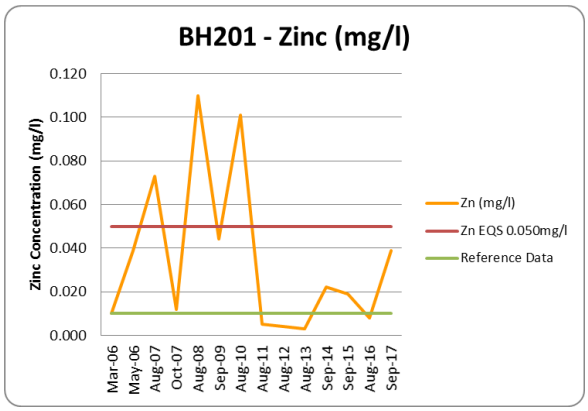
Nickel concentration was detected at 0.007mg/l, which is below the reference data and the EQS of 0.02mg/l.

Mercury was detected at the laboratory detection limit of 0.0001mg/l for the first time at this location.

The concentration of zinc was recorded at 0.039mg/l, which is an increase on the previous round of monitoring; this remains below the EQS value of 0.050mg/l for total alkalinity as $CaCO_3$ of 50mg/l to 100mg/l. The most recent recorded concentration is greater than the reference data.

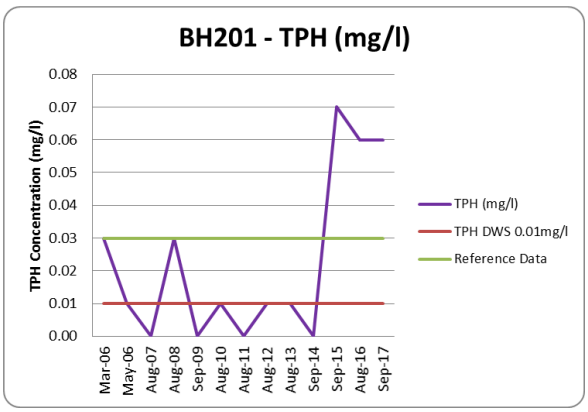






Hydrocarbons

TPH was detected at a concentration of 0.06mg/l, which is above the UK DWS (0.01mg/l) and slightly higher than the reference value of 0.03mg/l.



VOCs

A trace concentration of 1,1,1-trichloroethene (4µg/l) was detected above the laboratory LOD in BH201. Historically, 1,1,1-trichloroethene has regularly been detected in groundwater from BH201 at low concentrations; although always well below the screening value of 100µg/l.

3.4 ZONE 7: Effluent Treatment Plant

Zone 7 is located in the COMAH area to the west of Zone 8 and comprises the former effluent treatment plant (ETP) that was decommissioned in 2012. The two monitoring wells in this area (BH701 and WS701) have been removed from the SPMP monitoring programme based on stable or decreasing concentrations of determinands and the decommissioning of the ETP. This decision was made following a review of the SPMP monitoring programme undertaken to address Action 1 of the Compliance Assessment Report (CAR) (Ref: KP3135KV/0184470) issued by NRW.

3.5 ZONE 8: COMAH Area

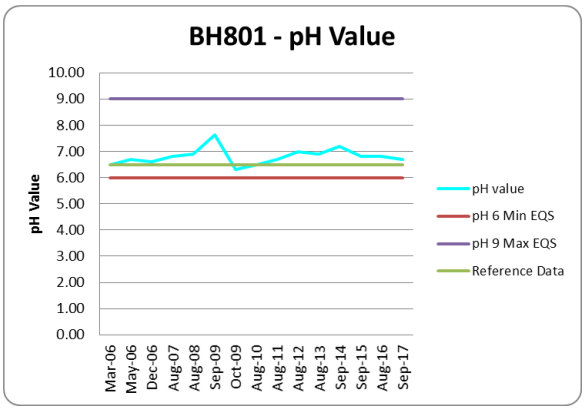
Zone 8 is located in the north-east section of the site and comprises three copper plating buildings, two nickel plating buildings, a chemical store, a coin store and a services area for acid storage and dilution. There were originally two monitoring wells located in Zone 8 (BH801 and BH802). BH801 is located to the east of Copper Plating 2 (CP2); and BH802 was formerly located immediately south of Nickel Plating 1 (NP1). BH802 was decommissioned in 2010 due to the construction of a new Waste Water Recycling Plant (WWRP).

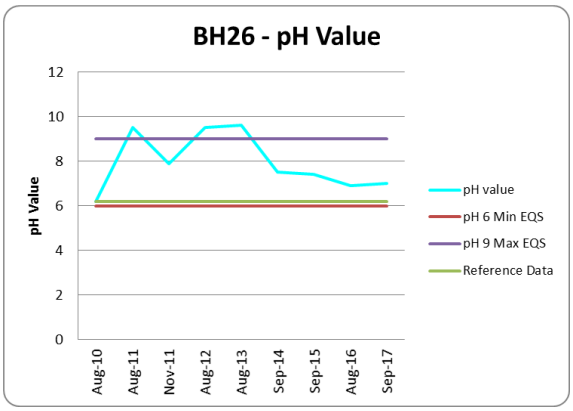
BH26 has replaced BH802 as an SPMP monitoring well which is located approximately 11m distant (to the east). Both BH802 and BH26 have previously recorded significantly elevated concentrations of nickel. The source is considered likely to be a historical spillage that occurred in the east of the NP1 building. The building has been decommissioned but the structure remains in place. Residual contamination may be present beneath the ground slab of the building in soil and groundwater. Nickel contamination in groundwater has been addressed by Celtic in this area by a 'pump and treat' system which commenced in 2012 (Celtic Report Ref: R1430/12/4003). More recently, Celtic has piloted electrolysis using stainless steel rods to remove the nickel content. The final results are awaited; however, Ramboll Environ understands that a significant reduction in concentrations has been achieved.

pH Value

The pH value of the groundwater sample from BH801 was pH 6.7 and the pH value recorded in BH26 was pH 7.0.

Metals

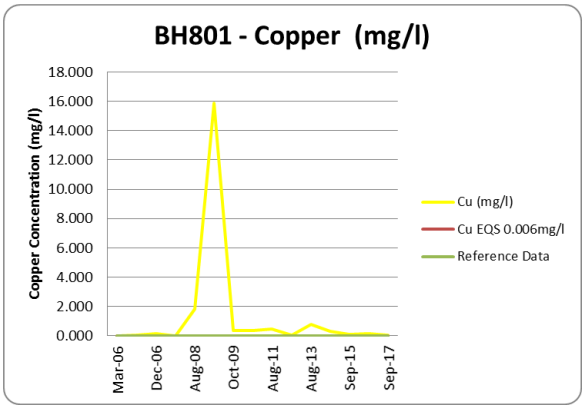


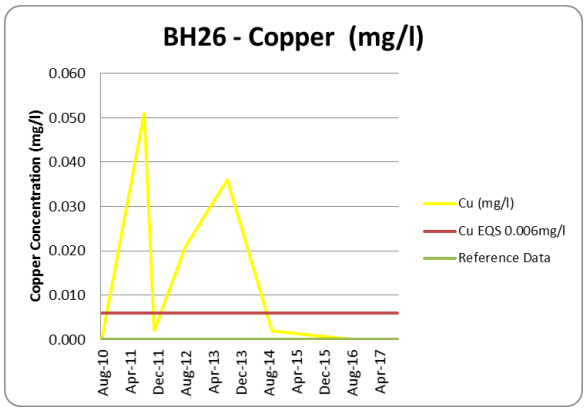


Boron was detected in BH26 at a concentration of 1.03mg/l, which does not exceed the EQS value of 2mg/l, and is below the reference data.

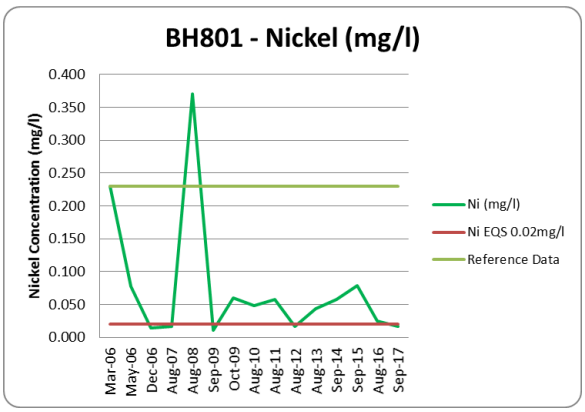
Cadmium concentrations were recorded above the LOD in both locations within Zone 8; in BH801 at 0.0002mg/l and in BH26 at 0.0012mg/l. Recorded values exceed the EQS value of 0.00008mg/l but are fairly consistent with previous monitoring rounds.

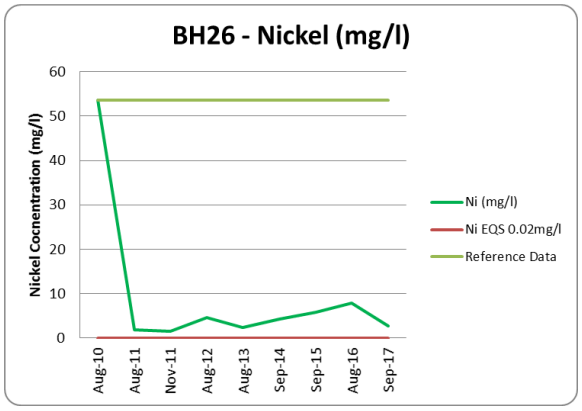
Copper was recorded in BH801 at a concentration of 0.027mg/l, which is a decrease from the results of the previous round of monitoring, and is within the range of previous concentrations recorded at this location. Copper was not recorded above the laboratory limit of detection in borehole BH26.



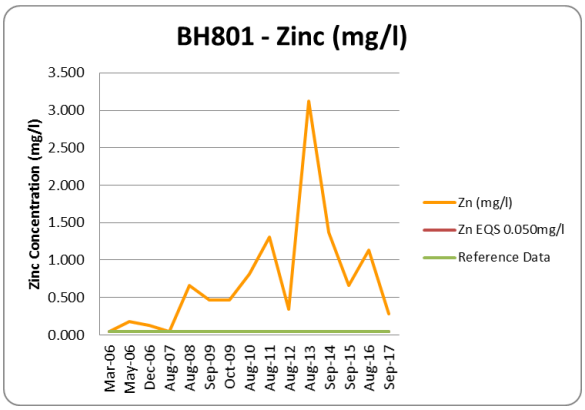


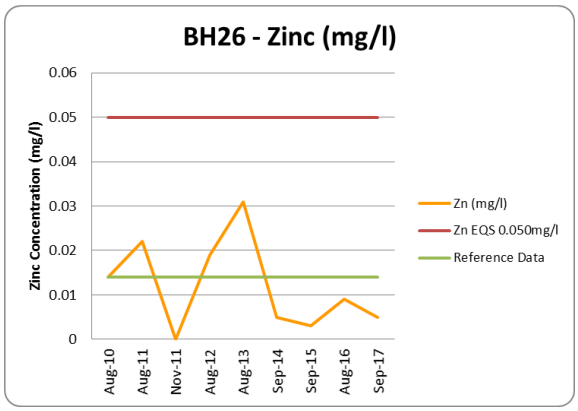
Nickel was recorded above the laboratory LOD in both boreholes; BH801 at 0.016mg/l, and BH26 at 2.75mg/l, which both exceed the EQS value of 0.02mg/l. These values are each below the reference data for BH801 and BH26.





Zinc was detected in BH801 at a concentration of 0.286mg/l, which exceeds the reference data and the relevant EQS value of 0.008mg/l. The concentration in BH26 was 0.005mg/l, which does not exceed the relevant EQS value of 0.050mg/l and is consistent with previous rounds of monitoring.



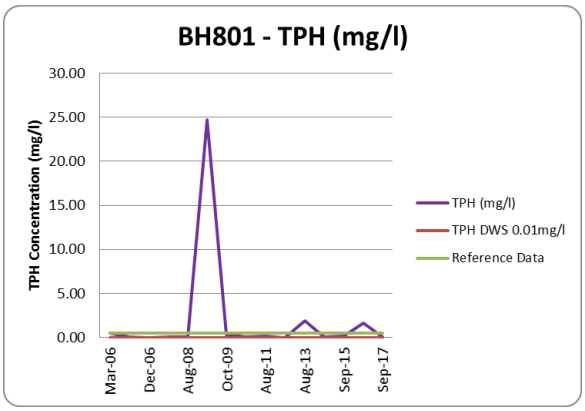


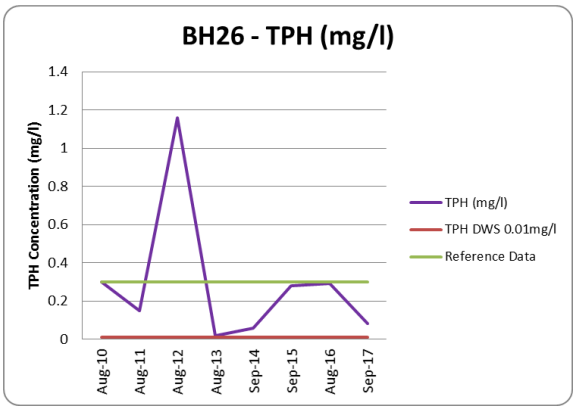
Cyanide was not detected above the laboratory LOD in either borehole in this area. Historically, cyanide has regularly been detected at BH801.

Historically, sulphate has regularly been detected at concentrations exceeding the UK DWS of 400mg/l in BH26. However, during the most recent round of monitoring, a concentration of 73mg/l was recorded; which represents the fourth consecutive recorded concentration below the UK DWS screening value.

Hydrocarbons

TPH was detected in BH801 at a concentration of 0.05mg/l and BH26 at 0.08mg/l, both exceeding the UK DWS of 0.01mg/l. However, concentrations are below the reference data in each case.



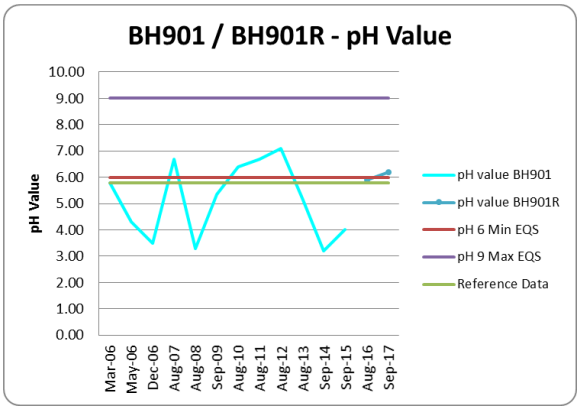


3.6 ZONE 9: Pickling, Duplex Plating Line, Annealing and Burnishing

Zone 9 is located south of the COMAH area and includes the annealing, pickling and plating (AP&P) building. Historically, there has been one monitoring well in this area, BH901, located between the AP&P and the CPR (Coin Press Room). In 2015, BH901 was decommissioned and removed as part of engineering works to the adjacent embankment. During the engineering works, a borehole was installed in the vicinity of the former BH901; for the purposes of the ongoing groundwater monitoring at the site, this borehole is acting as a replacement for BH901 and is referred to as BH901R (BH901 Replacement).

pH Value

The pH value of the groundwater sample from BH901R was pH 6.2.



Metals

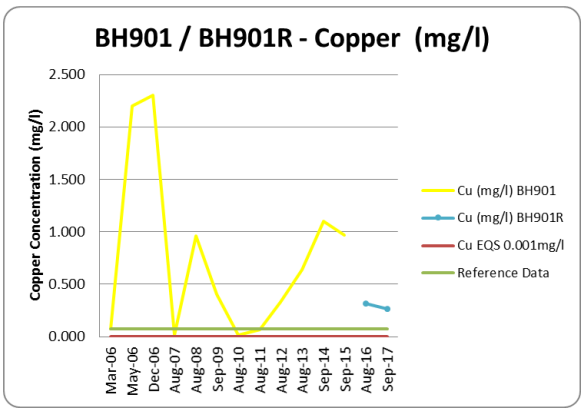
Boron was detected at a concentration of 0.010mg/l in BH901R, which is typical for the range of concentrations recorded in BH901 and is below the EQS value of 2mg/l.

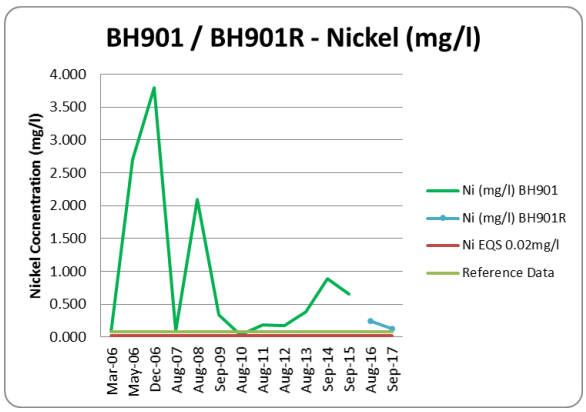
Cadmium was recorded above the laboratory LOD at a concentration of 0.0003mg/l in BH901R, which exceeds the EQS value of 0.00008mg/l. Cadmium was also detected in BH901 over the five most recent previous rounds of monitoring.

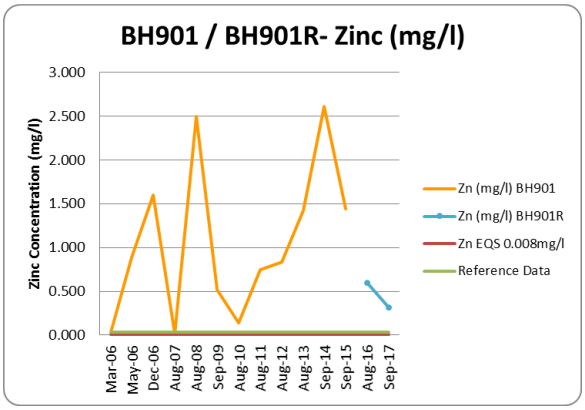
The concentration of copper was recorded at 0.262g/l in BH901R, which exceeds the relevant EQS of 0.006mg/l, and is above the 2006 reference data collected from BH901.

Nickel was detected at a concentration of 0.121mg/l in BH901R, which exceeds the EQS value of 0.02mg/l and is typical for the range of concentrations previously recorded in BH901.

Zinc was detected at a concentration of 0.317mg/l in BH901R, which exceeds the relevant EQS value of 0.050mg/l and is lower than the final recorded concentration in BH901.

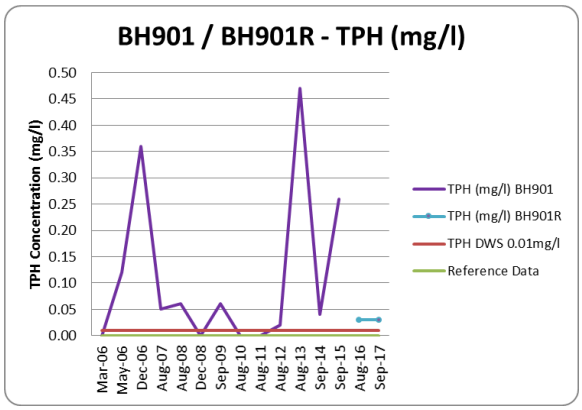






Hydrocarbons

TPH was detected at a concentration of 0.03mg/l in BH901R, which is the same as the previous round of monitoring and slightly exceeds the DWS of 0.01mg/l.



4. STATISTICAL ANALYSIS

Data from previous rounds of monitoring have been further assessed using the Mann Kendall Test, a non-parametric statistical test to detect trends in data. Mann Kendal analysis has been performed using available data from monitoring rounds undertaken from 2006 to 2017. Selected determinands that have regularly exceeded the screening values during the monitoring period have been assessed using this approach. Where sufficient data is available, the results of the statistical analysis for the main contaminants of concern are shown in Tables 4.1 and 4.2 below and are also presented for each sampling location on Figure 2.

4.1 Statistical Analysis for Metals and TPH

Table 4.1: Results of Trend Analysis for Metals and TPH in Groundwater

Borehole Location	TPH	Copper	Nickel	Zinc
BH001	No trend	Increasing	Probably Increasing	No trend
BH002	No Trend	No Trend	No trend	No Trend
BH003	No trend	Stable	Decreasing	No Trend
BHNP2D	No trend	Probably Increasing	No Trend	No Trend
BH201	No trend	Increasing	Decreasing	No Trend
BH801	No trend	No Trend	No trend	Increasing
BH26	No trend	Probably Decreasing	No trend	Stable
BH901/BH901R	No trend	No trend	No trend	No trend

In general, the majority of monitoring wells have demonstrated 'no trend' for the concentrations of determinands of concern, with the following exceptions:

- BH001 (Zone 0, up-hydraulic gradient) has identified an 'increasing' trend for concentrations of copper and a 'probably increasing' trend for nickel. Concentrations of copper, nickel and zinc have all increased slightly during the most recent monitoring round and are slightly greater than the reference data. *The increasing trends identified for copper and nickel in BH001 are considered likely have been influenced by elevated concentrations observed in 2013 and 2014, which were the highest recorded values at this location. For both nickel and copper, the graphs show that the recent concentrations are significantly lower than the most elevated concentrations detected in 2013/ 2014.*
- BH003 showed a 'stable' trend for copper and a 'decreasing' trend for nickel; however, both determinands consistently exceed the screening values at this location.
- BHNP2D showed a 'probably increasing' trend for copper. Whilst the concentration has increased since the previous round of monitoring, low level fluctuations have been recorded throughout the monitoring period that remain well below the relevant EQS value.
- BH201 showed a 'decreasing' trend for nickel and an 'increasing' trend for copper. Metal concentrations are considered to be relatively low at this location, with occasional marginal exceedances of the screening values. The 'increasing' trend identified for copper is likely to be reflective of a very slight increase in concentration over the entire monitoring period. Copper was not detected in BH201 until 2012; and, from 2012 onwards, copper was detected at low

concentrations in the majority of monitoring rounds. Overall, metal concentrations are considered to be relatively low and rarely exceed the screening criteria at this location.

- An 'increasing' trend was identified for zinc concentrations in BH801; however, the trend is considered likely to be influenced by the significantly elevated concentration detected in 2013.
- A 'stable' trend was identified for zinc in BH26 and concentrations are not significantly elevated. A 'probably decreasing' trend has been identified for copper in BH26; concentrations have remained below the EQS since 2014.

4.2 Statistical Analysis for VOCs

Throughout the monitoring period, VOCs have been recorded above the relevant EQS value or at trace concentrations in some locations. Mann Kendall analysis was carried out on the relevant VOC data at these locations, results of the statistical analysis for VOCs are presented in Table 4.2 below.

Table 4.2: Results of Trend Analysis for VOCs in Groundwater

Borehole Location	1,1,1-Trichloroethane	Trichloroethene	Tetrachloroethene
BH001	No Exceedances	No Trend	No Exceedances
BH002	No Exceedances	Stable	No Exceedances
BH003	Increasing	Decreasing	No Exceedances
BHNP2D	No Trend	No Trend	Probably Decreasing
BH201	Increasing	Decreasing	No Exceedances
BH801	No Exceedances	No Exceedances	No Exceedances
BH901	No Trend	No Exceedances	No Exceedances

'Increasing' trends were identified for 1,1,1-trichloroethane in boreholes BH201 and BH003; however, recorded concentrations are very low and well below the EQS.

'Decreasing' trends have been identified for trichloroethene in boreholes BH201 and BH003; concentrations of trichloroethene have not been recorded above the laboratory LOD at these locations since August 2007 (BH201) and December 2008 (BH003).

A 'Probably Decreasing' trend was identified for tetrachloroethene in borehole BHNP2D; this has remained below the laboratory LOD since 2011 at this location.

Statistical analysis has indicated 'no trend' for the concentrations of 1,1,1-trichloroethane and trichloroethene in BHNP2D. Concentrations of 1,1,1-trichloroethane and trichloroethene have fluctuated over recent rounds of monitoring; however, recent recorded concentrations are below screening criteria and specific remedial targets.

5. CONCLUSIONS

5.1 ZONE 0: Non-Target Zone

The concentrations of the metals copper, nickel and zinc in BH001 remain consistently elevated above the respective EQS values and reference data; however, for each metal, the concentrations are lower than the maximum detected over the SPMP monitoring period.

The concentrations of metals in BH002 and BH003 and have either remained similar or decreased with the exception of copper in BH002, which has increased slightly.

The majority of metals in the perimeter boreholes in the south-east of the site (BHNP2D, BHE5, BHE6 and CBH6) were below the laboratory LOD and all were below the relevant EQS values.

In 2015, chromium was detected above the screening criteria in all of the monitoring wells located in the east of the site. Chromium has not been detected in these boreholes during subsequent rounds of monitoring.

Elevated TPH concentrations have overall decreased slightly since the previous round of monitoring in the perimeter boreholes, with the exception of borehole BHE5, where a slight increase was recorded. A source of TPH has not been identified to date.

A historical source of VOC contamination in groundwater was previously identified in the south-east of the site and investigated by Ramboll Environ. Subsequent remediation using In-Situ Chemical Oxidation (ISCO) was carried out by Celtic between 2011 and 2012. A period of post-remediation groundwater monitoring (by Celtic) indicated that one single borehole had concentrations of VOCs fluctuating around the remedial target. Accordingly, the affected borehole (BHNP2D) was added to the SPMP as recommended by NRW. Overall, concentrations of VOCs have decreased in this borehole during the most recent round of monitoring and there were no recorded exceedances of screening criteria or site specific remedial targets.

An increase in VOC concentrations was also recorded in borehole CBH6 in 2016, with concentrations of trichloroethene and tetrachloroethene exceeding the Controlled Waters screening criteria. Concentrations recorded in the most recent round of monitoring have decreased; whilst the concentration of trichlorothene still slightly exceeds the screening criteria, it has not been detected above the site specific remedial target.

VOCs were not recorded above the laboratory limit of detection in boreholes BHE5 and BHE6 during the most recent round of monitoring.

5.2 ZONE 1: Non-Ferrous Melting and Casting Activities

Based on stable or decreasing concentrations of determinands, BH101 is no longer included in the SPMP monitoring programme, as agreed previously with NRW.

5.3 ZONE 2: Effluent and Cooling Sumps

Statistical analysis identified a ‘decreasing’ trend for nickel and an ‘increasing’ trend for copper in borehole BH201. However, metal concentrations are considered to be relatively low and have remained relatively consistent with previous monitoring rounds at this location.

5.4 ZONE 7: Former Effluent Treatment Plant

BH701 and WS701 have been removed from the SPMP monitoring programme based on stable or decreasing concentrations of determinands; and the decommissioning of the ETP.

5.5 ZONE 8: COMAH Area

Copper, nickel and zinc concentrations have remained within the same order of magnitude as previous monitoring rounds.

The concentration of nickel remains elevated in BH26. Remediation using 'pump and treat' has been ongoing at this location; however, Celtic recently piloted electrolysis using stainless steel rods to remove the nickel content. The final results are awaited; however, Ramboll Environ understands that a significant reduction in concentrations has been achieved.

5.6 ZONE 9: Pickling, Duplex Plating Line, Annealing and Burnishing

No trends were identified for contaminant concentrations in BH901 and BH901R. Metal concentrations recorded in BH901R appear to be generally slightly lower than those previously recorded in BH901; however, concentrations of TPH, cadmium, copper, nickel and zinc all exceed the relevant screening values.

The adjacent borehole (BH9), (although not monitored under the SPMP) has identified similarly elevated concentrations of metals in this area. Overall, the results and visual observations indicate that there is a potential source of impact in this area, which may be associated with Building 9A or an associated below ground pipe.

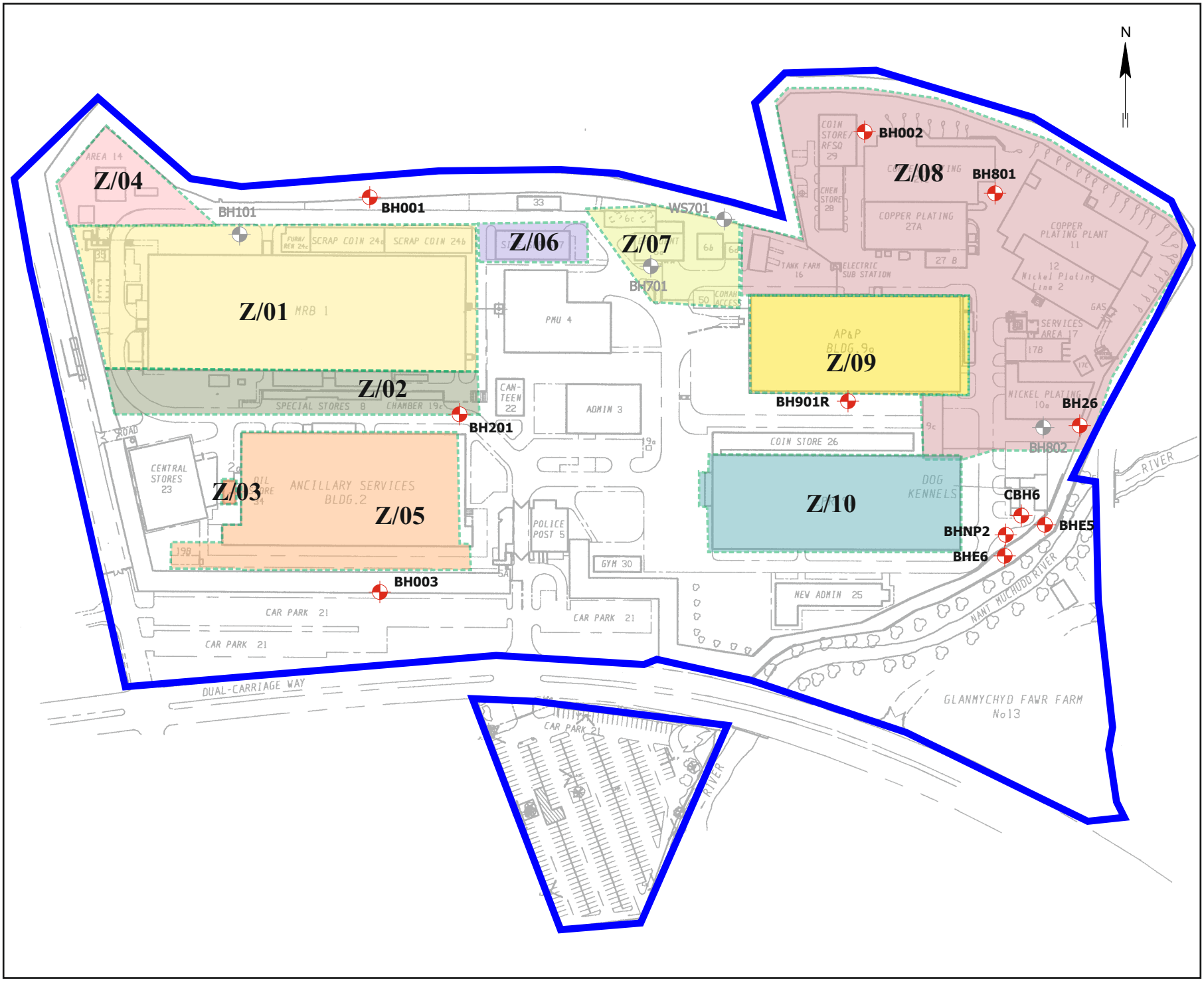
6. RECOMMENDATIONS

On the basis of this round of groundwater monitoring the following recommendations are made:

- Recent improvements to the drainage system and housekeeping in the north of the site have likely resulted in an overall decrease in concentrations of metals detected in up-gradient borehole, BH001. However, the most recent results and statistical analysis suggest that there has been a recent slight increase in concentrations of metals in this location. Mitigation measures to prevent the pathway for contaminants to groundwater and drainage systems should continue.
- The programme of drain cleaning appears to be having a positive effect on metals detected in groundwater across the wider site and it is recommended that this programme is continued. Furthermore, below ground process pipes are progressively being diverted above-ground which should also continue. NRW has confirmed that it is in agreement with this approach.
- There are two culverted streams which pass beneath the site: one in the west; and one in the east. The culvert beneath the west of the site was surveyed in 2015 and subsequent remedial work was carried out to repair cracks, clean the culvert and decommission an inlet pipe. These actions are considered likely to have contributed to the decreasing trend in nickel concentration observed in BH003. In 2017 a survey of the culvert beneath the east of the site was carried out, which not identify any major structural defects. Ramboll Environ understands that only minor repairs were recommended which are intended to be carried out in 2018.
- Ramboll Environ understands that electrolysis has been used by Celtic to remediate groundwater contaminated with nickel in the south-east of the site. The concentration of nickel at this location was significantly lower than previous measurements, indicating the success of the trial. The final results of remediation are awaited and Celtic's report will likely recommend ongoing periodic monitoring to confirm low concentrations.
- Following the completion of VOC remediation in the south-east of the site, the inclusion of boreholes BHE5, BHE6 and CBH6 into the ongoing SPMP forms part of follow on work to meet the specific objectives and remediation targets agreed with NRW. VOC concentrations in boreholes BHNP2D and CBH6 have decreased since the previous round of monitoring; however, given that certain compounds are fluctuating in concentration around the remedial target, Ramboll Environ recommends that the frequency of groundwater monitoring for VOCs remains at an increased frequency in this area. To achieve this, the affected boreholes should remain included within Ramboll Environ's periodic groundwater monitoring programme, currently undertaken at the site on a four-monthly basis.
- Since VOCs are not being detected in above the laboratory limit of detection in boreholes BHE5 and BHE6, it is recommended that they are removed from the SPMP groundwater sampling regime.
- Elevated concentrations of copper, nickel and zinc have consistently been detected in Zone 9. Although no increasing trends in concentrations have been identified, the concentrations continue to exceed screening criteria and baseline data. Ramboll Environ has proposed to undertake further investigation in this area, comprising a compliance review of Building 9A (Pickling and Plating). This would include a detailed inspection to review the facility infrastructure, including the provision of storage, containment and handling of potentially polluting substances. Given the consistently elevated concentrations in BH901 and BH901R, Ramboll Environ considers this should be a priority going forward.
- Further rounds of groundwater monitoring should be carried out on an annual basis, in accordance with the Design SPMP.

The results of this SPMP groundwater monitoring occasion should be provided to the NRW in accordance with the Permit.

APPENDIX 1
FIGURES



Key

- Site Boundary
- Sampled Boreholes
- Previously Sampled Boreholes

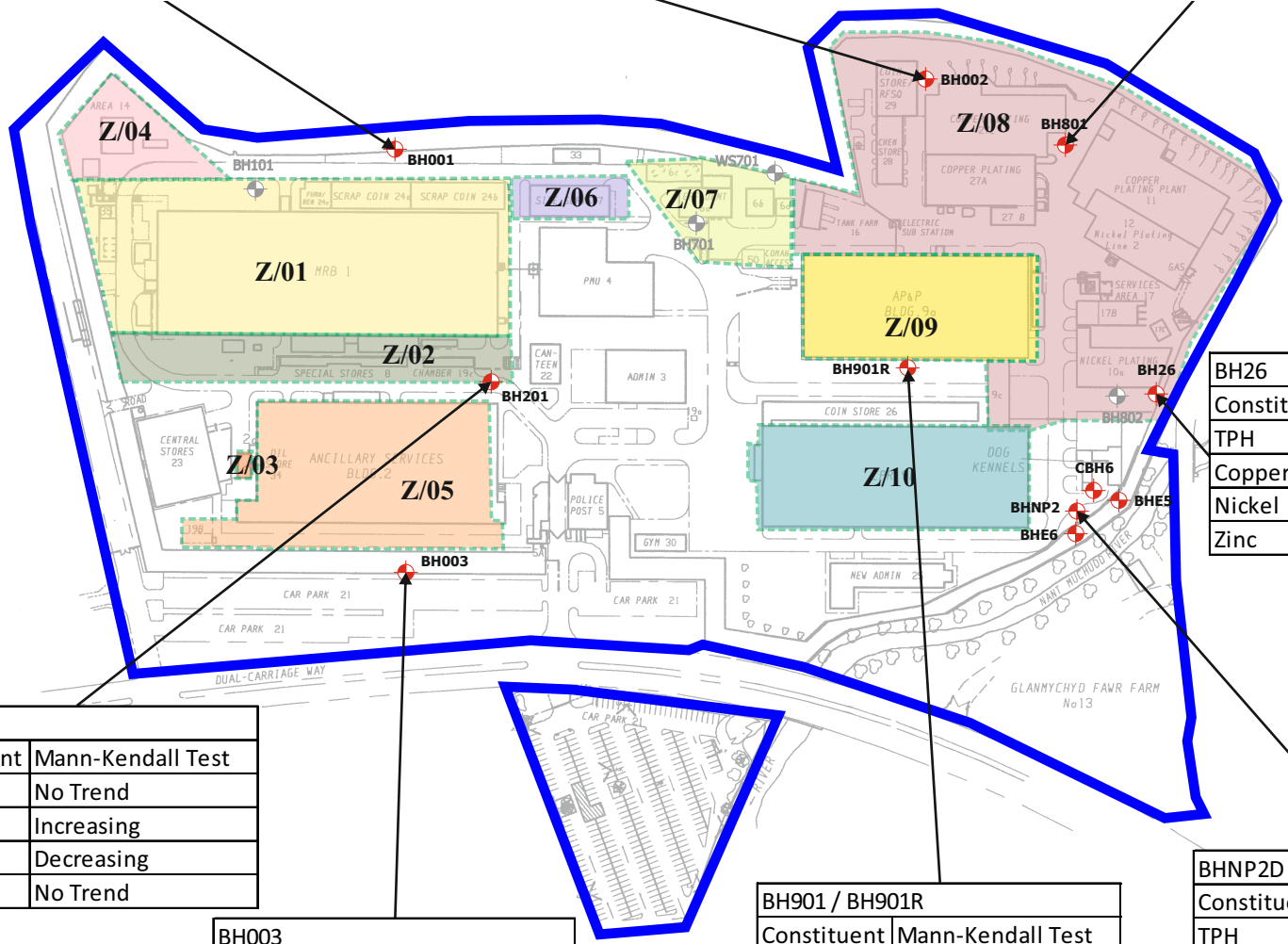
Title	Figure 1: Borehole Location Plan
Project No.	UK17-24837
Site	The Royal Mint Llantrisant Pontyclun, CF72 8YT
Client	The Royal Mint
Date	September 2017
Scale	NTS
Issue	1
Drawn by	RH

RAMBOLL
ENVIRON

BH001	
Constituent	Mann-Kendall Test
TPH	No Trend
Copper	Increasing
Nickel	Probably Increasing
Zinc	No Trend

BH002	
Constituent	Mann-Kendall Test
TPH	No trend
Copper	No trend
Nickel	No trend
Zinc	No trend

BH801	
Constituent	Mann-Kendall Test
TPH	No Trend
Copper	No Trend
Nickel	No Trend
Zinc	Increasing



BH26	
Constituent	Mann-Kendall Test
TPH	No Trend
Copper	Probably Decreasing
Nickel	No Trend
Zinc	Stable

BH201	
Constituent	Mann-Kendall Test
TPH	No Trend
Copper	Increasing
Nickel	Decreasing
Zinc	No Trend

BH003	
Constituent	Mann-Kendall Test
TPH	No Trend
Copper	Stable
Nickel	Decreasing
Zinc	No Trend

BH901 / BH901R	
Constituent	Mann-Kendall Test
TPH	No Trend
Copper	No Trend
Nickel	No Trend
Zinc	No Trend

BHNP2D	
Constituent	Mann-Kendall Test
TPH	No Trend
Copper	Probably Increasing
Nickel	No Trend
Zinc	No Trend

Key

- Site Boundary
- Sampled Boreholes
- Previously Sampled Boreholes

Title: Figure 2: Mann Kendall Analysis

Project No.: UK17-24837

Site: The Royal Mint, Llantrisant, Pontyclun,CF72 8YT

Client: The Royal Mint

Date: September 2017

Scale: NTS

Issue: 1

Drawn by: RH

RAMBOLL ENVIRON

APPENDIX 2
LABORATORY CERTIFICATES

Our Ref: EXR/248564 (Ver. 2)
Your Ref: UK17-24837

September 28, 2017

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
Tongwynlais
Cardiff
CF15 7NE

For the attention of Rob Hodgson

Dear Rob Hodgson

Sample Analysis - Royal Mint SPMP 2017

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

J Chislett
Project Co-ordinator
01283 554458

TEST REPORT

UKAS TESTING
1252

Report No. EXR/248564 (Ver. 2)

Ramboll Environ
8 Village Way
Tongwynlais
Cardiff
CF15 7NE

Site: Royal Mint SPMP 2017

The 6 samples described in this report were registered for analysis by ESG on 08-Sep-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 28-Sep-2017

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:

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 28-Sep-2017

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.

Units :			pH units	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Method Codes :			WSLM3	Calc_HD	VOCHSAW	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW
Method Reporting Limits :				7	1	3	1	1	0.01	0.001	0.001	0.0001	0.001	0.001	0.002	0.001	0.01	0.0001
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**pH units w**	**Total Hardness as CaCO3**	**VOC HSA-GCMS o**	**Total Sulphur as SO4 (Dissolved) a**	**Calcium as Ca (Dissolved) a**	**Magnesium as Mg (Dissolved) a**	**Barium as Ba (Dissolved) a**	**Nickel as Ni (Dissolved)**	**Chromium as Cr (Dissolved)**	**Cadmium as Cd (Dissolved)**	**Copper as Cu (Dissolved)**	**Lead as Pb (Dissolved)**	**Zinc as Zn (Dissolved)**	**Arsenic as As (Dissolved)**	**Boron as B (Dissolved) a**	**Mercury as Hg (Dissolved)**
1826109	BH901R	**07-Sep-17 09:45**	6.2	64	Req	51	19	4	0.02	0.121	<0.001	0.0003	0.262	<0.001	0.317	<0.001	0.01	<0.0001
1826110	BH002	**07-Sep-17 10:30**	6.2	49	Req	13	8	7	0.01	0.004	<0.001	<0.0001	0.001	<0.001	0.01	<0.001	<0.01	<0.0001
1826111	BH801	**07-Sep-17 11:15**	6.7	54	Req	5	10	7	0.03	0.016	<0.001	0.0002	0.027	<0.001	0.286	<0.001	<0.01	<0.0001
1826112	BH26	**07-Sep-17 12:30**	7	71	Req	73	17	7	0.03	2.75	<0.001	0.0012	<0.001	<0.001	0.005	<0.001	1.03	<0.0001
1826113	CBH6	**07-Sep-17 14:00**	7.4	78	Req	10	23	5	0.04	0.006	<0.001	0.0002	0.003	<0.001	0.013	<0.001	<0.01	<0.0001
1826114	BHNP2D	**07-Sep-17 14:30**	7	70	Req	11	18	6	0.04	0.005	<0.001	<0.0001	0.002	<0.001	0.009	<0.001	<0.01	<0.0001

ESG

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name **Ramboll Environ**

Contact Rob Hodgson

Royal Mint SPMP 2017

Sample Analysis

Date Printed	**28-Sep-2017**
Report Number	**EXR/248564**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l									
Method Codes :			ICPMSW	ICPMSW	KONENS	SFAPI	SFAS	TPHFID	ICPWATVAR									
Method Reporting Limits :			0.001	0.001	0.003	0.02	0.02	0.01	0.01									
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	No									
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**Selenium as Se (Dissolved)**	**Vanadium as V (Dissolved)**	**Chromium VI as Cr**	**Cyanide (Total) as CN**	**Sulphide as S**	**TPH GC**	**Beryllium as Be (Dissolved) a**									
1826109	BH901R	**07-Sep-17 09:45**	<0.001	<0.001	<0.003	<0.02	<0.02	0.03	<0.01									
1826110	BH002	**07-Sep-17 10:30**	<0.001	<0.001	<0.003	<0.02	<0.02	0.03	<0.01									
1826111	BH801	**07-Sep-17 11:15**	<0.001	<0.001	<0.003	<0.02	<0.02	0.05	<0.01									
1826112	BH26	**07-Sep-17 12:30**	<0.001	<0.001	<0.003	<0.02	<0.02	0.08	<0.01									
1826113	CBH6	**07-Sep-17 14:00**	<0.001	<0.001	<0.003	<0.02	<0.02	0.03	<0.01									
1826114	BHNP2D	**07-Sep-17 14:30**	<0.001	<0.001	<0.003	<0.02	<0.02	0.03	<0.01									

ESG

Bretby Business Park, Ashby Road

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Client Name	**Ramboll Environ**
Contact	Rob Hodgson

Royal Mint SPMP 2017

Sample Analysis

Date Printed	**28-Sep-2017**
Report Number	**EXR/248564**
Table Number	**1**

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BH901R	**Date Booked in:**	08-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826109	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8564	**Operator:**	PR	**Position:**	4

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	3.48	1	M
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	69	Dibromofluoromethane	128
1,4-Difluorobenzene	3.94	76	Toluene-d8	92
Chlorobenzene-d5	5.08	73	Bromofluorobenzene	98
1,4-Dichlorobenzene-d4	5.88	68		

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BH002	**Date Booked in:**	08-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826110	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8564	**Operator:**	PR	**Position:**	5

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	62	Dibromofluoromethane	120
1,4-Difluorobenzene	3.94	65	Toluene-d8	95
Chlorobenzene-d5	5.08	74	Bromofluorobenzene	95
1,4-Dichlorobenzene-d4	5.88	68		

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BH801	**Date Booked in:**	08-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826111	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8564	**Operator:**	PR	**Position:**	6

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	63	Dibromofluoromethane	125
1,4-Difluorobenzene	3.94	67	Toluene-d8	96
Chlorobenzene-d5	5.08	71	Bromofluorobenzene	96
1,4-Dichlorobenzene-d4	5.88	62		

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BH26	**Date Booked in:**	08-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826112	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8564	**Operator:**	PR	**Position:**	7

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	67	Dibromofluoromethane	124
1,4-Difluorobenzene	3.94	74	Toluene-d8	93
Chlorobenzene-d5	5.08	74	Bromofluorobenzene	95
1,4-Dichlorobenzene-d4	5.88	68		

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	CBH6	**Date Booked in:**	08-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826113	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8564	**Operator:**	PR	**Position:**	8

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	3.29	8	72
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	3.56	9	80
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	4.06	12	86
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	60	Dibromofluoromethane	116
1,4-Difluorobenzene	3.94	66	Toluene-d8	96
Chlorobenzene-d5	5.08	72	Bromofluorobenzene	93
1,4-Dichlorobenzene-d4	5.88	66		

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BHNP2D	**Date Booked in:**	08-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826114	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8564	**Operator:**	PR	**Position:**	9

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	1.89	3	59
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	2.89	20	98
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	3.29	4	70
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	3.56	28	92
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	4.06	7	83
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	56	Dibromofluoromethane	116
1,4-Difluorobenzene	3.94	60	Toluene-d8	94
Chlorobenzene-d5	5.08	62	Bromofluorobenzene	94
1,4-Dichlorobenzene-d4	5.88	58		

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W248564

Customer Ramboll Environ
Site Royal Mint SPMP 2017
Report No W248564

Consignment No W125875
Date Logged 08-Sep-2017
In-House Report Due 27-Sep-2017
Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	Matrix Type	Sampled	MethodID	Calc_HD	CUSTSERV	ICPMSW										ICPWATVAR					
					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	Magnesium as Mg (Dissolved) VAR	Barium as Ba (Dissolved) VAR	Boron as B (Dissolved) VAR	Beryllium as Be (Dissolved) VAR
					✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
EX/1826109	BH901R	Groundwater	07/09/17																			
EX/1826110	BH002	Groundwater	07/09/17																			
EX/1826111	BH801	Groundwater	07/09/17																			
EX/1826112	BH26	Groundwater	07/09/17																			
EX/1826113	CBH6	Groundwater	07/09/17																			
EX/1826114	BHNP2D	Groundwater	07/09/17																			

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

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 - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

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

W248564

Customer Ramboll Environ
Site Royal Mint SPMP 2017
Report No W248564

Consignment No W125875
Date Logged 08-Sep-2017
In-House Report Due 27-Sep-2017
Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	Matrix Type	Sampled	MethodID	KONENS	SFAPI	SFAS	TPHFID	VOCHSAW	WSLM3
					Chromium VI. as Cr (Kone)	Cyanide (Total) as CN SFA	Sulphide as S SFA	TPH GC	VOC HSA-GCMS	pH units
					✓	✓	✓	✓	✓	✓
EX/1826109	BH901R	Groundwater	07/09/17		E					
EX/1826110	BH002	Groundwater	07/09/17		E					
EX/1826111	BH801	Groundwater	07/09/17		E					
EX/1826112	BH26	Groundwater	07/09/17		E					
EX/1826113	CBH6	Groundwater	07/09/17		E					
EX/1826114	BHNP2D	Groundwater	07/09/17		E					

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

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 - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

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.

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
VOCHSAW	EX1826109-14	The primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (n-Butylbenzene and dibromochloromethane) . These circumstances should be taken into consideration when utilising the data.
VOCHSAW	EX1826109-14	The secondary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation , where applicable, from the affected analytes (bromoform and vinyl chloride) . These circumstances should be taken into consideration when utilising the data.

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	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	VOCHSAW	As Received	Determination of Volatile Organics Compounds by Headspace GCMS
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

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 105ºC 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^3@ 15^{o}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 Anthophylite
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
Þ 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.

Sample Descriptions

Client : Ramboll Environ
Site : Royal Mint SPMP 2017
Report Number : W24_8564

Lab ID Number	Client ID	Description
EX/1826109	BH901R	Groundwater
EX/1826110	BH002	Groundwater
EX/1826111	BH801	Groundwater
EX/1826112	BH26	Groundwater
EX/1826113	CBH6	Groundwater
EX/1826114	BHNP2D	Groundwater

Our Ref: EXR/248637 (Ver. 3)
Your Ref: UK17-24837

October 6, 2017

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
Cardiff
CF15 7NE

For the attention of Rob Hodgson

Dear Rob Hodgson

Sample Analysis - UK17-24837 Royal Mint SPMP 2017

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

J Chislett
Project Co-ordinator
01283 554458

TEST REPORT

UKAS TESTING
1252

Report No. EXR/248637 (Ver. 3)

Ramboll Environ
8 Village Way
Cardiff
CF15 7NE

Site: UK17-24837 Royal Mint SPMP 2017

The 5 samples described in this report were registered for analysis by ESG on 11-Sep-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 06-Oct-2017

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:

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 06-Oct-2017

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.

Where individual results are flagged see report notes for status.

Units :			pH units	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Method Codes :			WSLM3	Calc_HD	VOCHSAW	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR	ICPMSW
Method Reporting Limits :				7	1	3	1	1	0.01	0.001	0.001	0.0001	0.001	0.001	0.002	0.001	0.01	0.0001
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**pH units w**	**Total Hardness as CaCO3**	**VOC HSA-GCMS o**	**Total Sulphur as SO4 (Dissolved) a**	**Calcium as Ca (Dissolved) a**	**Magnesium as Mg (Dissolved) a**	**Barium as Ba (Dissolved) a**	**Nickel as Ni (Dissolved)**	**Chromium as Cr (Dissolved)**	**Cadmium as Cd (Dissolved)**	**Copper as Cu (Dissolved)**	**Lead as Pb (Dissolved)**	**Zinc as Zn (Dissolved)**	**Arsenic as As (Dissolved)**	**Boron as B (Dissolved) a**	**Mercury as Hg (Dissolved)**
1826372	BH201	**08-Sep-17 09:30**	6.6	73	Req	8	16	8	0.03	0.007	<0.001	<0.0001	0.007	<0.001	0.039	0.001	<0.01	0.0001
1826373	BH001	**08-Sep-17 10:15**	6.9	98	Req	8	21	11	0.02	0.039	<0.001	<0.0001	0.024	<0.001	0.193	0.004	<0.01	<0.0001
1826374	BHE5	**08-Sep-17 11:00**	7	93	Req	10	29	5	0.03	0.002	<0.001	<0.0001	0.002	<0.001	0.004	0.001	<0.01	<0.0001
1826375	BHE6	**08-Sep-17 11:30**	6.9	83	Req	10	25	5	0.06	0.004	<0.001	<0.0001	<0.001	<0.001	0.008	0.001	<0.01	<0.0001
1826376	BH003	**08-Sep-17 12:30**	6.3	71	Req	26	22	4	0.03	0.035	0.002	0.0001	0.009	<0.001	0.042	<0.001	<0.01	<0.0001

ESG

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Client Name **Ramboll Environ**

Contact Rob Hodgson

UK17-24837 Royal Mint SPMP 2017

Sample Analysis

Date Printed	**06-Oct-2017**
Report Number	**EXR/248637**
Table Number	**1**

Where individual results are flagged see report notes for status.

		Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l										
		Method Codes :	ICPMSW	ICPMSW	KONENS	SFAPI	SFAS	TPHFID	ICPWATVAR										
		Method Reporting Limits :	0.001	0.001	0.003	0.02	0.02	0.01	0.01										
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	No										
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Selenium as Se (Dissolved)**	**Vanadium as V (Dissolved)**	**Chromium VI as Cr**	**Cyanide (Total) as CN**	**Sulphide as S**	**TPH GC**	**Beryllium as Be (Dissolved) a**										
1826372	BH201	**08-Sep-17 09:30**	<0.001	<0.001	<0.003	<0.02	<0.02	0.06	<0.01										
1826373	BH001	**08-Sep-17 10:15**	<0.001	<0.001	<0.003	<0.02	<0.02	0.08	<0.01										
1826374	BHE5	**08-Sep-17 11:00**	<0.001	<0.001	<0.003	<0.02	<0.02	0.18	<0.01										
1826375	BHE6	**08-Sep-17 11:30**	<0.001	<0.001	<0.003	<0.02	<0.02	0.04	<0.01										
1826376	BH003	**08-Sep-17 12:30**	<0.001	<0.001	<0.003	<0.02	<0.02	0.05	<0.01										

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Client Name	**Ramboll Environ**
Contact	Rob Hodgson

UK17-24837 Royal Mint SPMP 2017

Sample Analysis

Date Printed	**06-Oct-2017**
Report Number	**EXR/248637**
Table Number	**1**

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: UK17-24837 Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BH201	**Date Booked in:**	11-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826372	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8637	**Operator:**	PR	**Position:**	31

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	3.49	2	83
1,1,1-Trichloroethane	71-55-6	3.56	4	82
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	67	Dibromofluoromethane	123
1,4-Difluorobenzene	3.94	74	Toluene-d8	83
Chlorobenzene-d5	5.08	75	Bromofluorobenzene	99
1,4-Dichlorobenzene-d4	5.88	69		

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: UK17-24837 Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BH001	**Date Booked in:**	11-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826373	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8637	**Operator:**	PR	**Position:**	32

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	71	Dibromofluoromethane	121
1,4-Difluorobenzene	3.94	72	Toluene-d8	84
Chlorobenzene-d5	5.08	69	Bromofluorobenzene	97
1,4-Dichlorobenzene-d4	5.88	68		

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: UK17-24837 Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BHE5	**Date Booked in:**	11-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826374	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8637	**Operator:**	PR	**Position:**	1

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	54	Dibromofluoromethane	129
1,4-Difluorobenzene	3.94	61	Toluene-d8	92
Chlorobenzene-d5	5.08	72	Bromofluorobenzene	97
1,4-Dichlorobenzene-d4	5.88	68		

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: UK17-24837 Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BHE6	**Date Booked in:**	11-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826375	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8637	**Operator:**	PR	**Position:**	2

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	-	< 1	-
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	67	Dibromofluoromethane	120
1,4-Difluorobenzene	3.94	70	Toluene-d8	93
Chlorobenzene-d5	5.08	74	Bromofluorobenzene	98
1,4-Dichlorobenzene-d4	5.88	66		

Where individual results are flagged see report notes for status.

Volatile Organic Compounds by HSA-GCMS

UKAS accredited?: Yes

Customer and Site Details:	Ramboll Environ: UK17-24837 Royal Mint SPMP 2017	**Directory/Quant file:**	2017\091417\ Initial Calibration	**Matrix:**	Water
Sample Details:	BH003	**Date Booked in:**	11-Sep-17	**Method:**	Headspace
LIMS ID Number:	EX1826376	**Date Analysed:**	15-Sep-17	**Multiplier:**	1
Job Number:	W24_8637	**Operator:**	PR	**Position:**	3

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Dichlorodifluoromethane	75-71-8 *	-	< 1	-
Chloromethane	74-87-3	-	< 1	-
Vinyl Chloride	75-01-4 *	-	< 1	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 1	-
1,1-Dichloroethene	75-35-4	-	< 1	-
trans 1,2-Dichloroethene	156-60-5	-	< 1	-
1,1-Dichloroethane	75-34-3	-	< 1	-
2,2-Dichloropropane	594-20-7 *	-	< 1	-
cis 1,2-Dichloroethene	156-59-2	-	< 1	-
Bromochloromethane	74-97-5	-	< 1	-
Chloroform	67-66-3	-	< 1	-
1,1,1-Trichloroethane	71-55-6	3.56	7	74
Carbon Tetrachloride	56-23-5	-	< 1	-
1,1-Dichloropropene	563-58-6	-	< 1	-
Benzene	71-43-2	-	< 1	-
1,2-Dichloroethane	107-06-2	-	< 1	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 1	-
Dibromomethane	74-95-3	-	< 1	-
Bromodichloromethane	75-27-4	-	< 1	-
cis 1,3-Dichloropropene	10061-01-5 *	-	< 1	-
Toluene	108-88-3	-	< 1	-
trans 1,3-Dichloropropene	10061-02-6 *	-	< 1	-
1,1,2-Trichloroethane	79-00-5	-	< 1	-
Tetrachloroethene	127-18-4	-	< 5	-
1,3-Dichloropropane	142-28-9	-	< 1	-
Dibromochloromethane	124-48-1 *	-	< 1	-
1,2-Dibromoethane	106-93-4	-	< 1	-
Chlorobenzene	108-90-7	-	< 1	-
Ethylbenzene	100-41-4	-	< 1	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-
m and p-Xylene	108-38-3/106-42-3	-	< 1	-
o-Xylene	95-47-6	-	< 1	-

Target Compounds	CAS #	R.T. (min.)	Concentration µg/l	% Fit
Styrene	100-42-5	-	< 1	-
Bromoform	75-25-2 *	-	< 1	-
iso-Propylbenzene	98-82-8	-	< 1	-
1,1,2,2-Tetrachloroethane	79-34-5 *	-	< 1	-
Propylbenzene	103-65-1	-	< 1	-
Bromobenzene	108-86-1	-	< 1	-
1,2,3-Trichloropropane	96-18-4	-	< 1	-
2-Chlorotoluene	95-49-8	-	< 1	-
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-
4-Chlorotoluene	106-43-4	-	< 1	-
tert-Butylbenzene	98-06-6	-	< 1	-
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-
sec-Butylbenzene	135-98-8	-	< 1	-
p-Isopropyltoluene	99-87-6	-	< 1	-
1,3-Dichlorobenzene	541-73-1	-	< 1	-
1,4-Dichlorobenzene	106-46-7	-	< 1	-
n-Butylbenzene	104-51-8 *	-	< 1	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8 *	-	< 5	-
1,2,4-Trichlorobenzene	120-82-1	-	< 5	-
Hexachlorobutadiene	87-68-3	-	< 5	-
Naphthalene	91-20-3	-	< 5	-
1,2,3-Trichlorobenzene	87-61-6	-	< 5	-

Compounds marked * are not UKAS accredited
"M" denotes that % fit has been manually interpreted

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	3.59	67	Dibromofluoromethane	140
1,4-Difluorobenzene	3.94	68	Toluene-d8	91
Chlorobenzene-d5	5.08	72	Bromofluorobenzene	99
1,4-Dichlorobenzene-d4	5.88	68		

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W248637

Customer Ramboll Environ
Site UK17-24837 Royal Mint SPMP 2017
Report No W248637

Consignment No W125959
Date Logged 11-Sep-2017
In-House Report Due 27-Sep-2017
Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working d

ID Number	Description	Matrix Type	Sampled	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	Magnesium as Mg (Dissolved) VAR	Barium as Ba (Dissolved) VAR	Boron as B (Dissolved) VAR	Beryllium as Be (Dissolved) VAR
MethodID				Calc_HD	CUSTSERV	ICPMSW										ICPWATVAR					
				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
EX/1826372	BH201	Groundwater	08/09/17																		
EX/1826373	BH001	Groundwater	08/09/17																		
EX/1826374	BHE5	Groundwater	08/09/17																		
EX/1826375	BHE6	Groundwater	08/09/17																		
EX/1826376	BH003	Groundwater	08/09/17																		

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

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 - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

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.

Analytical and Deviating Sample Overview

Customer Ramboll Environ
Site UK17-24837 Royal Mint SPMP 2017
Report No W248637

Consignment No W125959
Date Logged 11-Sep-2017
In-House Report Due 27-Sep-2017
Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working d

ID Number	Description	Matrix Type	Sampled	MethodID	KONENS	SFAPI	SFAS	TPHFID	VOCHSAW	WSLM3
					Chromium VI. as Cr (Kone)	Cyanide (Total) as CN SFA	Sulphide as S SFA	TPH GC	VOC HSA-GCMS	pH units
					✓	✓	✓	✓	✓	✓
EX/1826372	BH201	Groundwater	08/09/17		E					
EX/1826373	BH001	Groundwater	08/09/17		E					
EX/1826374	BHE5	Groundwater	08/09/17		E					
EX/1826375	BHE6	Groundwater	08/09/17		E					
EX/1826376	BH003	Groundwater	08/09/17		E					

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

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 - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

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.

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
VOCHSAW	EX1826372-76	The primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (n-Butylbenzene and dibromochloromethane) . These circumstances should be taken into consideration when utilising the data.
VOCHSAW	EX1826372-76	The secondary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation , where applicable, from the affected analytes (bromoform and vinyl chloride) . These circumstances should be taken into consideration when utilising the data.

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	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	VOCHSAW	As Received	Determination of Volatile Organics Compounds by Headspace GCMS
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

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 105ºC 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^3@ 15^{o}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 Anthophylite
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
Þ 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.

Sample Descriptions

Client : Ramboll Environ

Site : UK17-24837 Royal Mint SPMP 2017

Report Number : W24_8637

Lab ID Number	Client ID	Description
EX/1826372	BH201	Groundwater
EX/1826373	BH001	Groundwater
EX/1826374	BHE5	Groundwater
EX/1826375	BHE6	Groundwater
EX/1826376	BH003	Groundwater

APPENDIX 3
SUMMARY OF RESULTS

		Analysis																		
Borehole Location	**Date**	**TPH/EPH (mg/l)**	**Arsenic (mg/l)**	**Boron (mg/l)**	**Cadmium (mg/l)**	**Chromium (mg/l)**	**Chromium (Hexavalent) (mg/l)**	**Copper (mg/l)**	**Lead (mg/l)**	**Mercury (mg/l)**	**Nickel (mg/l)**	**Potassium (mg/l)**	**Selenium (mg/l)**	**Zinc (mg/l)**	**Total Cyanide (mg/l)**	**Total Alkalinity as CaCo3 (mg/l)**	**Chloride (mg/l)**	**pH**	**Sulphide (mg/l)**	**Sulphate as SO4 (mg/l)**
ZONE 0																				
BH001	Mar-06	0.10	<0.005	<0.005	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	0.012	<1	<0.005	0.031	<0.03	50	21	6.50	<0.05	14
	May-06	0.03	<0.005	0.012	<0.001	<0.005	0.010	<0.005	<0.005	<0.00005	0.010	1.7	<0.005	0.018	<0.03	<20	14	5.50	<0.05	22
	Aug-07	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Oct-07	<0.01	<0.005	<0.005	<0.001	<0.005	<0.010	0.008	<0.005	<0.00005	0.021	1.3	<0.005	0.045	<0.02	140	11	6.50	<0.05	18
	Aug-08	1.20	<0.005	0.040	<0.001	<0.005	<0.010	0.018	<0.005	<0.00005	0.035	3.2	<0.005	0.190	<0.02	65	<10	6.20	<0.05	<10
	Dec-08	0.09	<0.005	0.031	<0.001	<0.005	<0.010	0.018	<0.005	<0.00005	0.015	NA	<0.005	0.110	<0.02	88	<10	6.70	<0.05	10
	Sep-09	0.29	<0.005	<0.018	<0.001	<0.005	<0.010	0.015	<0.005	<0.00005	0.024	NA	<0.005	0.312	<0.02	90	9	7.04	<0.05	9
	Aug-10	0.07	0.001	0.020	<0.001	0.002	<0.010	0.041	<0.001	<0.00005	0.083	NA	<0.001	0.301	<0.02	75	6	6.80	<0.05	8
	Aug-11	0.03	0.004	0.030	<0.001	0.002	NA	0.001	<0.001	<0.0001	0.004	NA	<0.001	0.016	<0.02	98	NA	7.10	<0.05	10
	Aug-12	<0.01	0.003	0.010	<0.0001	<0.001	NA	0.042	<0.001	0.0001	0.059	NA	<0.001	0.165	<0.02	85	NA	7.10	<0.05	6
	Aug-13	0.17	<0.001	<0.01	0.0002	0.001	NA	0.054	<0.001	<0.0001	0.130	NA	<0.001	0.358	0.03	88	NA	7.00	<0.05	7
	Sep-14	0.10	<0.001	0.010	0.0002	<0.001	<0.01	0.055	<0.001	<0.0001	0.083	NA	<0.001	0.302	<0.02	72	NA	6.80	<0.05	6
	Sep-15	0.11	0.001	0.150	<0.0001	<0.001	NA	0.031	<0.001	<0.0001	0.045	NA	<0.001	0.094	<0.02	94	NA	7.30	<0.05	7
	Aug-16	0.06	0.008	<0.01	<0.0001	0.002	NA	0.003	<0.001	<0.0001	0.010	NA	<0.001	0.061	<0.02	101	NA	6.70	<0.02	8
	Sep-17	0.08	0.004	<0.01	<0.0001	<0.001	<0.003	0.024	<0.001	<0.0001	0.039	NA	<0.001	0.193	<0.02	98	NA	6.90	<0.02	8
BH002	Mar-06	0.32	<0.005	0.008	<0.001	0.005	<0.010	0.012	<0.005	<0.00005	0.005	2.2	0.013	<0.005	<0.03	250	11	7.80	<0.05	39
	May-06	0.09	<0.005	0.034	<0.001	<0.005	0.010	0.008	<0.005	<0.00005	0.021	2.1	<0.005	0.010	<0.03	320	17	8.20	<0.05	42
	Aug-07	0.38	<0.005	0.015	<0.001	<0.005	<0.010	<0.005	0.015	<0.00005	<0.005	1.3	<0.005	<0.005	<0.02	92	14	6.50	<0.05	25
	Aug-08	0.04	<0.005	0.030	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	<0.005	1.6	<0.005	0.025	<0.02	63	14	6.10	<0.05	16
	Dec-08	0.02	<0.005	0.008	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	<0.005	NA	<0.005	<0.005	<0.02	<20	12	5.50	<0.05	14
	Sep-09	<0.01	<0.005	<0.018	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	0.007	NA	<0.005	0.028	<0.02	18	12.3	6.15	<0.05	14.9
	Aug-10	<0.01	<0.001	0.030	<0.001	0.001	<0.010	<0.001	<0.001	<0.00005	0.006	NA	<0.001	0.017	NA	18	12	6.30	<0.05	13
	Aug-11	0.01	<0.001	0.070	<0.001	0.002	NA	0.003	<0.001	<0.0001	0.005	NA	<0.001	0.016	<0.02	19	NA	5.90	<0.05	13
	Aug-12	0.01	<0.001	0.020	<0.0001	0.002	NA	0.003	0.001	<0.0001	0.006	NA	<0.001	0.022	<0.02	36		7.70	<0.05	13
	Sep-13	0.01	<0.001	<0.01	0.0001	<0.001	NA	0.002	<0.001	<0.0001	0.006	NA	<0.001	0.024	<0.02	53	NA	7.10	<0.05	15
	Sep-14	0.01	<0.001	0.010	<0.0001	<0.001	<0.01	0.003	<0.001	<0.0001	0.007	NA	<0.001	0.018	<0.02	32	NA	6.30	<0.05	12
	Sep-15	0.01	<0.001	<0.01	0.0002	0.013	NA	<0.001	<0.001	<0.0001	0.058	NA	<0.001	0.009	<0.02	30	NA	6.30	<0.05	12
	Aug-16	0.08	<0.001	<0.01	<0.0001	<0.001	NA	<0.001	<0.001	<0.0001	0.004	NA	<0.001	0.011	<0.02	43	NA	6.00	<0.02	12.2
	Sep-17	0.03	<0.001	<0.01	<0.0001	<0.001	<0.003	0.001	<0.001	<0.0001	0.004	NA	<0.001	0.010	<0.02	49	NA	6.20	<0.02	13
BH003	Mar-06	0.07	<0.005	0.019	<0.001	0.009	<0.010	0.053	<0.005	<0.00005	0.190	5.2	<0.005	0.053	<0.03	30	19	6.00	<0.05	55
	May-06	0.03	<0.005	0.026	<0.001	<0.005	0.010	0.014	<0.005	<0.00005	0.150	5.1	<0.005	0.044	<0.03	25	21	6.10	<0.05	57
	Aug-07	<0.01	<0.005	0.032	<0.001	<0.005	<0.010	0.008	<0.005	<0.00005	0.240	6.1	<0.005	0.051	<0.02	38	29	6.00	<0.05	140
	Aug-08	0.04	<0.005	0.029	<0.001	<0.005	<0.010	0.008	<0.005	<0.00005	0.230	6.1	<0.005	0.055	0.02	50	19	6.00	<0.05	81
	Dec-08	0.31	<0.005	0.019	<0.001	<0.005	<0.010	0.019	<0.005	<0.00005	0.110	NA	<0.005	0.060	<0.02	32	12	6.00	<0.05	49
	Sep-09	0.10	<0.005	<0.018	<0.001	<0.005	<0.010	0.063	<0.005	<0.00005	0.198	NA	<0.005	0.091	<0.02	32	21	6.47	<0.05	88.2
	Aug-10	0.01	<0.001	0.040	0.0008	0.002	<0.010	0.008	<0.001	<0.00005	0.477	NA	<0.001	0.081	<0.02	22	35	5.90	<0.05	219
	Aug-11	0.03	<0.001	0.020	0.0004	0.003	NA	0.009	<0.001	<0.0001	0.184	NA	<0.001	0.069	<0.02	37	NA	6.20	<0.05	171
	Aug-12	0.02	<0.001	0.040	0.0001	0.002	NA	0.006	<0.001	<0.0001	0.051	NA	<0.001	0.050	<0.02	99	NA	8.00	<0.05	35
	Aug-13	0.13	<0.001	<0.01	0.0004	0.002	NA	0.046	<0.001	<0.0001	0.113	NA	<0.001	0.161	<0.02	64	NA	6.50	<0.05	46
	Sep-14	0.02	<0.001	0.030	0.0001	0.002	<0.01	0.017	<0.001	<0.0001	0.040	NA	<0.001	0.048	<0.02	35	NA	6.80	<0.05	46
	Sep-15	0.03	<0.001	0.020	0.0002	0.001	NA	0.030	<0.001	<0.0001	0.073	NA	<0.001	0.084	<0.02	33	NA	6.20	<0.05	39
	Aug-16	0.03	<0.001	<0.01	0.0004	0.002	NA	0.009	<0.001	<0.0001	0.141	NA	<0.001	0.109	<0.02	88	NA	5.80	<0.02	37.6
	Sep-17	0.05	<0.001	<0.01	0.0001	0.002	<0.003	0.009	<0.001	<0.0001	0.035	NA	<0.001	0.042	<0.02	71	NA	6.30	<0.02	26
Screening Value		**0.01(2)**	**0.05(1)**	**2 (1)**	**0.00008(1)**	**0.0047(1)**	**0.0034 (1)**	**0.001-0.028* (1)**	**0.0072 (1)**	**0.00005(1)**	**0.02 (1)**	**NG**	**0.01(2)**	**0.008 - 0.125* (1)**	**0.05(2)**	**NG**	**250(3)**	**6-9 (1)**	**NG**	**400(2)**

		Analysis																		
Borehole Location	**Date**	**TPH/EPH (mg/l)**	**Arsenic (mg/l)**	**Boron (mg/l)**	**Cadmium (mg/l)**	**Chromium (mg/l)**	**Chromium (Hexavalent) (mg/l)**	**Copper (mg/l)**	**Lead (mg/l)**	**Mercury (mg/l)**	**Nickel (mg/l)**	**Potassium (mg/l)**	**Selenium (mg/l)**	**Zinc (mg/l)**	**Total Cyanide (mg/l)**	**Total Alkalinity as CaCo3 (mg/l)**	**Chloride (mg/l)**	**pH**	**Sulphide (mg/l)**	**Sulphate as SO4 (mg/l)**
BHNP2D	Feb-07	NA	<0.005	0.072	<0.001	<0.005	<0.005	<0.005	<0.005	<0.00005	0.009	NA	<0.005	0.006	NA	NA	NA	6.30	NA	39
	Aug-07	2.20	<0.005	0.066	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	0.010	2.6	<0.005	0.007	<0.02	68	19	6.50	<0.05	46
	Aug-08	0.43	<0.005	0.036	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	<0.005	2.6	<0.005	0.008	<0.02	66	12	6.30	<0.05	21
	Dec-08	0.09	<0.005	0.049	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	<0.005	NA	NA	0.007	<0.02	71	<10	6.60	<0.05	19
	Sep-09	<0.01	<0.005	<0.018	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	<0.005	NA	<0.005	0.008	<0.02	70	13.3	6.92	<0.05	17.7
	Aug-10	0.01	<0.001	0.11	<0.001	0.002	<0.010	<0.001	<0.001	<0.00005	0.092	NA	<0.001	0.012	<0.02	66	15	6.7	<0.05	28
	Aug-11	0.02	<0.001	0.09	0.0002	0.002	NA	0.003	<0.001	<0.0001	0.028	NA	<0.001	0.033	<0.02	77	NA	6.8	<0.05	37
	Oct-11	NA	<0.001	NA	0.0002	0.002	NA	0.001	<0.001	0.0001	0.019	NA	<0.001	0.009	NA	67	NA	6.9	NA	NA
	Aug-12	<0.01	<0.001	0.08	<0.0001	<0.001	NA	<0.001	<0.001	<0.0001	0.02	NA	<0.001	0.005	<0.02	73	NA	7.4	<0.05	14
	Aug-13	0.02	<0.001	<0.01	<0.0001	0.001	NA	<0.001	<0.001	<0.0001	0.008	NA	<0.001	0.003	0.02	82	NA	7.4	<0.05	13
	Sep-14	0.06	<0.001	<0.01	0.0002	0.001	<0.01	0.002	<0.001	<0.0001	0.002	NA	<0.001	0.019	<0.02	68	NA	7.4	<0.05	15
	Sep-15	0.04	<0.001	<0.01	0.0003	0.006	NA	0.001	<0.001	0.0002	0.027	NA	0.001	0.006	<0.02	75	NA	7.3	<0.05	11
	Aug-16	0.03	<0.001	0.05	<0.0001	<0.001	NA	<0.001	<0.001	<0.0001	0.002	NA	<0.001	0.004	<0.02	80	NA	6.6	<0.02	13
	Sep-17	0.03	<0.001	<0.01	<0.0001	<0.001	<0.003	0.002	<0.001	<0.0001	0.005	NA	<0.001	0.009	<0.02	70	NA	7	<0.02	11
BHE5	Aug-13	0.32	<0.001	<0.01	<0.0001	0.001	NA	0.001	<0.001	<0.0001	0.001	NA	<0.001	<0.002	<0.02	110	NA	7.5	<0.05	14
	Sep-14	0.32	<0.001	<0.01	0.0001	<0.001	<0.01	<0.001	<0.001	<0.0001	<0.001	NA	<0.001	0.003	<0.02	78	NA	7.4	<0.05	14
	Sep-15	0.16	<0.001	<0.01	0.0002	0.018	NA	0.001	<0.001	<0.0001	0.075	NA	<0.001	0.003	<0.02	88	NA	7.4	<0.05	10
	Aug-16	0.07	<0.001	<0.01	<0.0001	<0.001	NA	<0.001	<0.001	<0.0001	<0.001	NA	<0.001	0.002	<0.02	86	NA	7	<0.02	12
	Sep-17	0.18	0.001	<0.01	<0.0001	<0.001	<0.003	0.002	<0.001	<0.0001	0.002	NA	<0.001	0.004	<0.02	93	NA	7	<0.02	10
BHE6	Aug-13	0.02	<0.001	<0.01	0.0001	<0.001	NA	0.001	<0.001	<0.0001	0.004	NA	<0.001	0.006	<0.02	105	NA	7.1	<0.05	14
	Sep-14	0.13	<0.001	<0.01	<0.0001	<0.001	<0.01	<0.001	<0.001	<0.0001	0.002	NA	<0.001	0.005	<0.02	72	NA	7.3	0.08	15
	Sep-15	0.22	<0.001	<0.01	0.0003	0.012	NA	<0.001	<0.001	0.0001	0.052	NA	<0.001	0.006	<0.02	94	NA	7.1	<0.05	10
	Aug-16	0.05	<0.001	<0.01	<0.0001	<0.001	NA	<0.001	<0.001	<0.0001	0.001	NA	<0.001	0.007	<0.02	78	NA	6.7	<0.02	9.7
	Sep-17	0.04	0.001	<0.01	<0.0001	<0.001	<0.003	<0.001	<0.001	<0.0001	0.004	NA	<0.001	0.008	<0.02	83	NA	6.9	<0.02	10
CBH6	Aug-13	0.07	<0.001	<0.01	<0.0001	0.001	NA	0.002	<0.001	<0.0001	0.005	NA	<0.001	0.009	<0.02	82	NA	7.5	<0.05	13
	Sep-14	0.05	<0.001	<0.01	<0.0001	<0.001	<0.01	0.002	<0.001	<0.0001	0.005	NA	<0.001	0.018	<0.02	80	NA	7.4	<0.05	11
	Sep-15	0.06	<0.001	<0.01	0.0002	0.011	NA	0.004	<0.001	0.0001	0.045	NA	<0.001	0.005	<0.02	66	NA	7.4	0.15	8
	Aug-16	0.24	<0.001	<0.01	<0.0001	<0.001	NA	0.005	<0.001	<0.0001	0.003	NA	<0.001	0.014	<0.02	77	NA	7.1	<0.02	10.5
	Sep-17	0.03	<0.001	<0.01	0.0002	<0.001	<0.003	0.003	<0.001	<0.0001	0.006	NA	<0.001	0.013	<0.02	78	NA	7.4	<0.02	10
ZONE 2																				
BH201	Mar-06	0.03	<0.005	<0.005	<0.001	0.008	<0.010	<0.005	<0.005	<0.00005	0.061	5.9	<0.005	0.010	<0.03	75	15	6.50	<0.05	41
	May-06	0.01	<0.005	0.011	<0.001	<0.005	0.010	<0.005	<0.005	<0.00005	0.016	4.1	<0.005	0.039	<0.03	70	14	6.50	<0.05	24
	Aug-07	<0.01	0.056	0.016	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	0.016	6.3	<0.005	0.073	<0.02	59	21	6.40	<0.05	38
	Oct-07	NA	<0.005	0.006	<0.001	<0.005	NA	<0.005	<0.005	<0.00005	0.011	NA	NA	0.012	NA	NA	NA	6.20	NA	20
	Aug-08	0.03	<0.005	0.014	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	0.014	4.2	<0.005	0.110	<0.02	85	15	6.40	<0.05	15
	Dec-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	<0.01	<0.005	<0.018	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	0.009	NA	<0.005	0.044	<0.02	110	12	6.75	<0.05	13.3
	Aug-10	0.01	<0.001	0.03	0.0006	<0.005	<0.010	<0.005	<0.001	<0.00005	0.226	NA	<0.001	0.101	<0.02	50	33	6.4	<0.05	238
	Aug-11	<0.01	<0.001	0.03	<0.0001	0.002	NA	<0.001	<0.001	<0.0001	0.003	NA	<0.001	0.005	<0.02	62	NA	6.8	<0.05	10
	Aug-12	0.01	0.017	0.03	<0.0001	<0.001	NA	0.002	<0.001	<0.0001	0.001	NA	<0.001	0.004	<0.02	46	NA	8	<0.05	17
	Aug-13	0.01	<0.001	<0.01	<0.0001	0.001	NA	<0.001	<0.001	<0.0001	0.002	NA	<0.001	0.003	<0.02	110	NA	7	<0.05	6
	Sep-14	<0.01	<0.001	0.02	<0.0001	<0.001	<0.01	0.002	<0.001	<0.0001	0.006	NA	<0.001	0.022	<0.02	68	NA	6.8	<0.05	8
	Sep-15	0.07	<0.001	<0.01	<0.0001	<0.001	NA	0.006	<0.001	<0.0001	0.003	NA	<0.001	0.019	<0.02	51	NA	7	<0.05	10
	Aug-16	0.06	0.001	<0.01	<0.0001	<0.001	NA	0.001	<0.001	<0.0001	0.002	NA	<0.001	0.008	<0.02	65	NA	6.4	<0.02	7.7
	Sep-17	0.06	0.001	<0.01	<0.0001	<0.001	<0.003	0.007	<0.001	0.0001	0.007	NA	<0.001	0.039	<0.02	73	NA	6.6	<0.02	8
Screening Value		**0.01(2)**	**0.05(1)**	**2 (1)**	**0.00008(1)**	**0.0047(1)**	**0.0034 (1)**	**0.001-0.028* (1)**	**0.0072 (1)**	**0.00005(1)**	**0.02 (1)**	**NG**	**0.01(2)**	**0.008 - 0.125* (1)**	**0.001(1)**	**NG**	**250(3)**	**6-9 (1)**	**NG**	**400(2)**

		Analysis																		
Borehole Location	**Date**	**TPH/EPH (mg/l)**	**Arsenic (mg/l)**	**Boron (mg/l)**	**Cadmium (mg/l)**	**Chromium (mg/l)**	**Chromium (Hexavalent) (mg/l)**	**Copper (mg/l)**	**Lead (mg/l)**	**Mercury (mg/l)**	**Nickel (mg/l)**	**Potassium (mg/l)**	**Selenium (mg/l)**	**Zinc (mg/l)**	**Total Cyanide (mg/l)**	**Total Alkalinity as CaCo3 (mg/l)**	**Chloride (mg/l)**	**pH**	**Sulphide (mg/l)**	**Sulphate as SO4 (mg/l)**
ZONE 8																				
BH801	Mar-06	0.47	<0.005	<0.005	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	0.230	4.5	<0.005	0.042	<0.03	120	22	6.50	<0.05	21
	May-06	0.04	<0.005	0.050	<0.001	<0.005	0.010	0.017	<0.005	<0.00005	0.077	5.8	<0.005	0.180	<0.03	85	33	6.70	<0.05	17
	Dec-06	<0.01	<0.005	0.006	<0.001	<0.005	<0.010	0.140	<0.005	<0.00005	0.014	3.5	<0.005	0.130	0.05	76	<10	6.60	<0.05	<10
	Aug-07	0.07	<0.005	0.006	<0.001	<0.005	<0.010	<0.005	<0.005	<0.00005	0.017	2.5	<0.005	0.047	<0.02	59	15	6.80	<0.05	<10
	Aug-08	0.09	<0.005	0.021	<0.001	<0.005	<0.010	1.800	<0.005	<0.00005	0.370	9.6	<0.005	0.660	1.9	120	24	6.90	<0.05	15
	Dec-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	24.70	<0.005	<0.018	<0.001	0.005	<0.010	15.900	<0.005	<0.00005	0.010	NA	<0.005	0.467	6.49	235	36	7.63	<0.05	33.7
	Oct-09	0.28	<0.001	0.030	<0.001	0.002	NA	0.362	<0.001	0.0002	0.060	NA	<0.001	0.464	0.75	88	NA	6.30	NA	<3
	Aug-10	0.03	<0.001	0.030	<0.001	0.001	<0.010	0.369	<0.001	<0.00005	0.048	NA	<0.001	0.819	0.16	68	12	6.50	<0.05	6
	Aug-11	0.12	<0.001	0.020	0.0002	0.002	NA	0.482	<0.001	<0.0001	0.058	NA	<0.001	1.312	0.58	80	NA	6.70	<0.05	6
	Aug-12	0.01	<0.001	0.010	<0.0001	<0.001	NA	0.066	<0.001	<0.0001	0.017	NA	<0.001	0.347	0.85	72	NA	7.00	<0.05	4
	Aug-13	1.87	<0.001	<0.01	0.0002	0.002	NA	0.767	<0.001	<0.0001	0.043	NA	<0.001	3.119	0.5	100	NA	6.90	<0.05	5
	Sep-14	0.10	<0.001	0.040	0.0002	<0.001	0.030	0.302	<0.001	<0.0001	0.057	NA	<0.001	1.370	0.4	79	NA	7.20	<0.05	4
	Sep-15	0.11	<0.001	<0.01	0.0002	0.014	NA	0.086	<0.001	<0.0001	0.078	NA	<0.001	0.659	<0.02	67	NA	6.80	<0.05	<3
	Aug-16	1.64	<0.001	<0.01	0.0002	<0.001	NA	0.163	<0.001	<0.0001	0.025	NA	<0.001	1.137	0.19	46	NA	6.80	<0.02	3.4
	Sep-17	0.05	<0.001	<0.01	0.0002	<0.001	<0.003	0.027	<0.001	<0.0001	0.016	NA	<0.001	0.286	<0.02	54	NA	6.70	<0.02	5
BH26	Aug-10	0.3	0.006	4.71	0.0009	0.003	NA	<0.001	<0.001	<0.0001	53.59	NA	0.002	0.014	NA	NA	NA	6.2	NA	698
	Aug-11	0.15	0.081	3.38	<0.001	0.013	NA	0.051	<0.01	<0.001	1.923	NA	<0.01	0.022	<0.02	49	NA	9.5	<0.05	722
	Nov-11	NA	0.053	NA	<0.0001	0.008	NA	0.002	<0.001	<0.0001	1.503	NA	0.007	<0.002	NA	485	NA	7.9	NA	NA
	Aug-12	1.16	0.076	3	0.0007	0.001	NA	0.021	0.001	<0.0001	4.622	NA	0.008	0.019	<0.02	768	NA	9.5	<0.05	444
	Aug-13	0.02	0.084	3.54	0.0008	0.002	NA	0.036	0.005	<0.0001	2.348	NA	0.004	0.031	<0.02	1490	NA	9.6	<0.05	450
	Sep-14	0.06	0.016	1.88	0.0001	0.002	<0.01	0.002	<0.001	<0.0001	4.207	NA	0.002	0.005	<0.02	590	NA	7.5	<0.05	183
	Sep-15	0.28	0.019	1.95	0.0002	0.02	NA	0.001	<0.001	<0.0001	5.741	NA	0.001	0.003	<0.02	291	NA	7.4	<0.05	335
	Aug-16	0.29	0.01	1.3	0.0003	<0.001	NA	<0.001	<0.001	<0.0001	7.878	NA	<0.001	0.009	<0.02	102	NA	6.9	<0.02	223
	Sep-17	0.08	<0.001	1.03	0.0012	<0.001	<0.003	<0.001	<0.001	<0.0001	2.75	NA	<0.001	0.005	<0.02	71	NA	7	<0.02	73
ZONE 9																				
BH901	Mar-06	<0.01	<0.005	<0.005	<0.001	0.008	<0.010	0.074	<0.005	<0.00005	0.076	4.4	<0.005	0.031	<0.03	<20	460	5.80	<0.05	110
	May-06	0.12	<0.005	0.032	0.002	<0.005	0.010	2.200	<0.005	<0.00005	2.700	16.0	<0.005	0.890	0.03	<20	13	4.30	<0.05	18
	Dec-06	0.36	<0.005	0.140	0.005	0.006	<0.010	2.300	<0.005	<0.00005	3.800	25.0	<0.005	1.600	<0.02	<20	63	3.50	<0.05	950
	Aug-07	0.05	<0.005	0.031	<0.001	<0.005	<0.010	0.013	<0.005	<0.00005	0.090	6.1	<0.005	0.018	<0.02	62	33	6.70	<0.05	210
	Aug-08	0.06	<0.005	0.060	0.003	<0.005	<0.010	0.960	<0.005	<0.00005	2.100	17.0	<0.005	2.500	<0.02	<20	25	3.30	<0.05	490
	Dec-08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Sep-09	0.06	<0.005	<0.018	<0.001	<0.005	<0.010	0.401	<0.005	<0.00005	0.342	NA	<0.005	0.522	<0.02	6.5	22	5.36	<0.05	128
	Aug-10	<0.01	<0.001	0.030	<0.001	0.001	<0.010	0.019	<0.001	<0.00005	0.035	NA	<0.005	0.142	<0.02	41	21	6.40	<0.05	47
	Aug-11	<0.01	<0.001	0.030	0.0003	<0.001	NA	0.067	<0.001	<0.0001	0.185	NA	<0.001	0.749	<0.02	11	NA	6.70	<0.05	73
	Aug-12	0.02	<0.001	0.030	0.0006	<0.001	NA	0.330	0.001	<0.0001	0.171	NA	<0.001	0.838	<0.02	3	NA	7.10	<0.05	70
	Aug-13	0.47	<0.001	0.030	0.0014	<0.001	NA	0.642	0.001	<0.0001	0.390	NA	<0.001	1.427	<0.02	0	NA	5.20	<0.05	143
	Sep-14	0.04	<0.001	0.020	0.0037	0.001	<0.01	1.102	0.002	<0.0001	0.886	NA	<0.001	2.609	<0.02	<2	NA	3.20	<0.05	180
	Sep-15	0.26	<0.001	0.160	0.001	<0.001	NA	0.970	<0.001	<0.0001	0.656	NA	<0.001	1.438	<0.02	<2	NA	4.00	<0.05	138
BH901R	Aug-16	0.03	<0.001	0.040	0.0006	<0.001	NA	0.313	<0.001	<0.0001	0.249	NA	<0.001	0.600	<0.02	89	NA	5.90	<0.02	104
	Sep-17	0.03	<0.001	0.010	0.0003	<0.001	<0.003	0.262	<0.001	<0.0001	0.121	NA	<0.001	0.317	<0.02	64	NA	6.20	<0.02	51
Screening Value		**0.01(2)**	**0.05(1)**	**2 (1)**	**0.00008(1)**	**0.0047(1)**	**0.0034 (1)**	**0.001-0.028* (1)**	**0.0072 (1)**	**0.00005(1)**	**0.02 (1)**	**NG**	**0.01(2)**	**0.008 - 0.125* (1)**	**0.001(1)**	**NG**	**250(3)**	**6-9 (1)**	**NG**	**400(2)**

The red cells indicate elevated concentrations compared with the screening values

NA= Not Analysed

NS= Not Sampled

NG= No Guidance

MI = Matrix Interference

(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

(3) = Environment Agency Non-Statutory Operational EQS

		Analysis (VOCs, µg/l)					
Borehole Location	**Date**	**1,1,1-Trichloroethane**	**1,1-Dichloroethene**	**1,1-Dichloroethane**	**Cis 1,2-Dichloroethene**	**Trichloroethene**	**Tetrachloroethene**
ZONE 0							
BH001	Mar-06	<1	<1	<1	<1	<1	<1
	May-06	<1	<1	<1	<1	<1	<1
	Aug-07	NS	NS	NS	NS	NS	NS
	Aug-08	<1	<1	<1	<1	<1	<1
	Dec-08	<1	<1	<1	<1	5	<1
	Sep-09	<1.3	<1.2	<1.2	<2.3	<2.5	<1.5
	Aug-10	<1	<1	<1	<1	<5	<5
	Aug-11	<1	<1	<1	<1	<5	<5
	Aug-12	<1	<1	<1	<1	<5	<5
	Aug-13	<1	<1	<1	<1	<5	<5
	Sep-14	<1	<1	<1	<1	<5	<5
	Sep-15	<1	<1	<1	<1	<5	<5
	Aug-16	<1	<1	<1	<1	<5	<5
	Sep-17	<1	<1	<1	<1	<5	<5
BH002	Mar-06	<1	<1	<1	<1	<1	<1
	May-06	<1	<1	<1	<1	<1	<1
	Aug-07	<1	<1	<1	<1	<1	<1
	Aug-08	<1	<1	<1	<1	<1	<1
	Dec-08	<1	<1	<1	<1	2	<1
	Sep-09	<1.3	<1.2	<1.2	<2.3	<2.5	<1.5
	Aug-10	<1	<1	<1	<1	<5	<5
	Aug-11	<1	<1	<1	<1	<5	<5
	Aug-12	<1	<1	<1	<1	<5	<5
	Sep-13	<1	<1	<1	<1	<5	<5
	Sep-14	<1	<1	<1	<1	<5	<5
	Sep-15	<1	<1	<1	<1	<5	<5
	Aug-16	<1	<1	<1	<1	<5	<5
	Sep-17	<1	<1	<1	<1	<5	<5
BH003	Mar-06	<1	<1	<1	<1	5	<1
	May-06	6	<1	<1	<1	2	<1
	Aug-07	8	<1	<1	<1	3	<1
	Aug-08	5	<1	<1	<1	2	<1
	Dec-08	7	<1	<1	<1	4	<1
	Sep-09	<1.3	<1.2	<1.2	<2.3	<2.5	<1.5
	Aug-10	5	<1	<1	<1	<5	<5
	Aug-11	6	<1	<1	<1	<5	<5
	Aug-12	9	<1	<1	<1	<5	<5
	Aug-13	7	<1	<1	<1	<5	<5
	Sep-14	7	<1	<1	<1	<5	<5
	Sep-15	7	<1	<1	<1	<5	<5
	Aug-16	8	<1	<1	<1	<5	<5
	Sep-17	7	<1	<1	<1	<5	<5
BHNP2D	Aug-07	57	<1	7	3	9	3
	Aug-08	29.0	<1	4.0	5.0	10.0	1.0
	Dec-08	86.0	2.0	8.0	5.0	21.0	4.0
	Sep-09	4.69	<1.2	3.93	<2.3	<2.5	<1.5
	Aug-10	106	2	10	5	39	33
	Aug-11	56	2	10	9	20	12
	Aug-12	76	3	13	22	23	<5
	Aug-13	10	<1	3	2	<5	<5
	Sep-14	7	<1	4	4	5	<5
	Sep-15	9	<1	6	3	5	<5
	Aug-16	169	15	53	7	26	<5
	Sep-17	28	3	20	4	7	<5
BHE5	Aug-13	<1	<1	<1	<1	<5	<5
	Sep-14	<1	<1	<1	<1	<5	<5
	Sep-15	<1	<1	<1	<1	<5	<5
	Aug-16	<1	<1	<1	<1	<5	<5
	Sep-17	<1	<1	<1	<1	<5	<5
BHE6	Aug-13	<1	<1	<1	<1	<5	<5
	Sep-14	<1	<1	<1	<1	<5	<5
	Sep-15	<1	<1	<1	<1	<5	<5
	Aug-16	<1	<1	<1	<1	<5	<5
	Sep-17	<1	<1	<1	<1	<5	<5
CBH6	Aug-13	27	<1	2	9	16	7
	Sep-14	7	<1	<1	5	6	<5
	Sep-15	7	<1	<1	3	7	<5
	Aug-16	72	3	5	11	28	21
	Sep-17	9	<1	<1	8	12	<5
Screening Value		**100 (1**)**	**NG**	**NG**	**NG**	**10 (1)**	**10 (1)**

		Analysis (VOCs, µg/l)					
Borehole Location	**Date**	**1,1,1-Trichloroethane**	**1,1-Dichloroethene**	**1,1-Dichloroethane**	**Cis 1,2-Dichloroethene**	**Trichloroethene**	**Tetrachloroethene**
ZONE 2							
BH201	Mar-06	<1	<1	<1	<1	4	<1
	May-06	3.00	<1	<1	<1	1	<1
	Aug-07	5.00	<1	<1	<1	1	<1
	Aug-08	<1	<1	<1	<1	<1	<1
	Sep-09	2.20	<1.2	<1.2	<2.3	<2.5	<1.5
	Aug-10	2	<1	<1	<1	<5	<5
	Aug-11	6	<1	<1	<1	<5	<5
	Aug-12	3	<1	<1	<1	<5	<5
	Aug-13	<1	<1	<1	<1	<5	<5
	Sep-14	9	<1	<1	<1	<5	<5
	Sep-15	9	<1	<1	<1	<5	<5
	Aug-16	5	<1	<1	<1	<5	<5
	Sep-17	4	<1	<1	<1	<5	<5
ZONE 8							
BH801	Mar-06	<1	<1	<1	<1	<1	<1
	May-06	<1	<1	<1	<1	<1	<1
	Aug-07	<1	<1	<1	<1	<1	<1
	Aug-08	<1	<1	<1	<1	<1	<1
	Sep-09	<1.3	<1.2	<1.2	<2.3	<2.5	<1.5
	Aug-10	<1	<1	<1	<1	<5	<5
	Aug-11	<1	<1	<1	<1	<5	<5
	Aug-12	<1	<1	<1	<1	<5	<5
	Aug-13	<1	<1	<1	<1	<5	<5
	Sep-14	<1	<1	<1	<1	<5	<5
	Sep-15	<1	<1	<1	<1	<5	<5
	Aug-16	<1	<1	<1	<1	<5	<5
	Sep-17	<1	<1	<1	<1	<5	<5
ZONE 9							
BH901	Mar-06	<1	<1	<1	<1	<1	<1
	May-06	<1	<1	<1	<1	<1	<1
	Aug-07	<1	<1	<1	<1	<1	<1
	Aug-08	<1	<1	<1	<1	<1	<1
	Sep-09	<1.3	<1.2	<1.2	<2.3	<2.5	<1.5
	Aug-10	<1	<1	<1	<1	<5	<5
	Aug-11	<1	<1	<1	<1	<5	<5
	Aug-12	<1	<1	<1	<1	<5	<5
	Aug-13	<1	2	<1	<1	<5	<5
	Sep-14	1	<1	1	<1	<5	<5
	Sep-15	<1	<1	<1	<1	<5	<5
BH901R	Aug-16	<1	<1	<1	<1	<5	<5
	Sep-17	<1	<1	<1	<1	<5	<5
Screening Value		**100 (1**)**	**NG**	**NG**	**NG**	**10 (1)**	**10 (1)**

The yellow cells indicate elevated concentrations compared with the screening values.
The green cells indicate VOCs detected above the laboratory limit of detection, however not exceeding the screening value.
NA= Not Analysed
NS= Not Sampled
NG= No UK or European Guidance

(1) - Priority Substances (Directive 2008/105/EC) daughter directive of the Water Framework Directive (WFD) (2000/60/EC). Although EU member states have until 13th July 2010 to implement the daughter directive, European WFD EQSs ahead of the formal deadline in England, Scotland and Wales. Revised European EQS used where available.

** denotes where there is no european EQS, and former EC Dangerous Substances Directive (76/464/EEC) has been applied.