HPH D Ltd (company incorporated in the Isle of Man under company registration number 009065V)
Forte Anne Douglas
Isle of Man
IM1 5DP

and

Sackville UK PEC6 Hayes Nominee 1 Limited and Sackville UK PEC6 Hayes Nominee 2 Limited
78 Cannon Place
London
EC4N 6AG

# HPH4 GROUNDWATER CONTAMINATION COMMENTARY

## BACKGROUND

Ramboll was commissioned by Sackville UK PEC6 Hayes Nominee 1 Limited and Sackville UK PEC6 Hayes Nominee 2 Limited ("the Client") to undertake environmental assessment works at the wider Hyde Park Hayes site, located at Millington Road, Hayes, Middlesex, UK.

The Client acquired the Hyde Park Hayes (HPH) site from Melford Group in November 2015, prior to the successful discharge of all Planning Conditions associated with the HPH5 development. A sum of £500k was placed in ESCROW by Melford Group to be drawn on to complete the works necessary to secure the discharge of the outstanding environmental Planning Conditions, with a closure date of 21st October 2016.

Ramboll understands that the Client is preparing for the sale of plots HPH3 and (vacant) HPH4 at the site and has requested a commentary note to be prepared discussing the identified groundwater contamination impacts at HPH4 in relation to future development and planning considerations.

## ENVIRONMENTAL CONDITIONS SUMMARY

Extensive soil and groundwater surveys and assessments have been undertaken at the wider Hyde Park Hayes site by Ramboll and others, including a Detailed Quantitative Risk Assessment (DQRA) undertaken by SKM on behalf of Melfords; however, available information for the HPH4 plot is limited to two (2) boreholes; BH11 in the north of the plot was installed in July 2012 by SKM (acting for Melfords) and REH01 was installed in the south-east of the plot in July 2016 by Ramboll Environment & Health.

Ramboll has conducted a programme of groundwater sampling surveys following the Client's acquisition of the site. Ramboll's recent survey work at the site has included three (3) rounds of groundwater

monitoring and sampling surveys over 2018 (April, September, and December), and a more recent survey undertaken in October 2020.

**Ground Conditions**

Ground conditions at the HPH4 site comprise:

- Made Ground comprising reworked natural strata with some observations of concrete and brick fragments to depths of between 0.7m (REH01) and 1.8m (BH11) below ground level (bgl);
- Natural strata underlying the made ground comprised dense sandy gravel of flint (Lynch Hill Gravels) with discrete bands of gravelly Sand and silty Clay (REH01 only) to depths of between 4.5m bgl (BH11) and 4.7m bgl (REH01);
- The London Clay was encountered at the base of the Lynch Hill Gravels in both boreholes on the HPH4 plot.

**Groundwater Regime**

Groundwater depths range from 1.46m bgl (BH11, October 2020) to 2.68m bgl (BH11, April 2018).

Groundwater elevation surveys indicate an overall flow direction towards the north-east across the wider HPH site, with local flow radial flow to the north-west and north from an apparent recharge mound located in the centre-west of the site (i.e. away from HPH4).

Groundwater elevations recorded in September 2018 demonstrated a reduction in elevations across the wider HPH site relative to April and December; this pattern is consistent with the exceptionally dry summer and autumn in the UK in 2018; this observation indicates the responsiveness of the groundwater formation in general to local recharge.

Groundwater physico-chemical testing on-site indicates that the groundwater at the wider HPHP site (and specifically HPH4) is oxygenated (>1.5mg/l dissolved $O_2$) and oxidising (>100mV redox potential), which provides a supporting line of evidence for the presence of a local recharge zone on-site.

The groundwater conditions are not conducive to microbially mediated dechlorination of chlorinated hydrocarbons (natural attenuation).

**Contamination Impacts**

No impacts to soil at the HPH4 plot have been encountered to date.

The findings of the Groundwater Assessment can be summarised as follows:

- Groundwater depths on the HPH4 plot range from 1.46m bgl (BH11, October 2020) to 2.68m bgl (BH11, April 2018).
- Overall, groundwater flow direction is towards the east/north-east across the wider HPH area, which is broadly consistent with the findings of Jacobs' previous assessments and indicating a recharge mound in the vicinity of HPH4 (unsurfaced ground on/off-site to the west). Therefore, groundwater flow is away from HPH4 towards the wider HPH site;
- The groundwater system within the Lynch Hill Gravels aquifer has been demonstrated by long term field monitoring surveys to be moderately dynamic, with seasonal fluctuations in groundwater levels and physio-chemical parameters observed;

- Groundwater physico-chemical testing on-site indicates that the groundwater at the wider HPHP site (and specifically HPH4) is oxygenated (>1.5mg/l dissolved $O_2$) and oxidising (>100mV redox potential), which provides a supporting line of evidence for the presence of a local recharge zone. The observed groundwater conditions are not conducive to microbially mediated dechlorination of chlorinated hydrocarbons (natural attenuation);
- Contaminants of concern have not been detected in samples from BH11 in any of the groundwater monitoring surveys conducted by Ramboll between March 2016 and December 2018;
- Since the installation of REH01 in July 2016, some contaminants, including chlorinated hydrocarbons (specifically Trichloroethene and *cis*-1,2-Dichloroethene), have been detected at concentrations exceeding the remedial targets derived by SKM's DQRA. However, since December 2016 only one (1) of seven (7) samples recovered from REH01 (the September 2018 sample) has exceeded the remedial target. The latest detected concentration at REH01 from the October 2020 sample survey is again below the remedial target and is consistent with the overall declining trend in TCE concentrations at this location since December 2016.
- Concentrations of these contaminants have been assessed as having exhibited an overall decreasing trend between August 2016 and December 2018 (despite a moderate increase in detected concentrations in September 2018); and
- In the absence of observed groundwater conditions conducive to natural attenuation processes, the observed declining concentration in contaminant concentrations is considered likely to be representative of a declining source influenced by dilution and dispersion processes in the groundwater formation.

## ANTICIPATED REMEDIATION INTERVENTIONS

Ramboll considers that significant remedial intervention is unlikely to be required at the HPH4 plot based on the current dataset.

Using the activities undertaken as part of the HPH5 development as a template, remedial interventions required at HPH4 are likely to be limited to:

- Segregation and removal of impacted soils (if any);
- Dewatering of excavations (likely only required if development includes construction of a basement); and
- Inclusion of a vapour impermeable membrane as a precautionary measure to prevent the ingress of any residual volatile compounds present in soil / groundwater into the indoor airspace.

## PLANNING

The most recent development at the wider HPH site was building HPH5; this development was subject to Planning Conditions typical of other brownfield regeneration projects.

Discharge of the outstanding Planning Condition 14 (2) (relating to residual contaminants in groundwater) by the Local Planning Authority (LPA), following advice from the EA, was achieved on 28th October 2017.

The advice from the EA included the following comments:

*"We have recently revised our risk bars to focus our efforts on those development sites with the greatest environmental sensitivity. As such we are unable to provide specific comments on the discharge of this condition. We recommend that you seek the views of your Environmental Health / Environmental Protection Department for further advice.*

*The developer should continue to address any further risks to controlled waters from contamination at the site following the requirements of the National Planning Policy Framework (NPPF) and our Guiding Principles for Land Contamination (GPLC). Our previous correspondence provides site-specific advice regarding land contamination issues in this location. We have no further comments to make with regard to land contamination issues for this site."*

Ramboll considers that based on the above EA advice the site has been excluded from the highest environmental risk category, and therefore significant intervention or requirements for onerous remedial intervention are unlikely.

## CLOSING

Ramboll has undertaken extensive groundwater surveys at the wider HPH site since 2016.

Although the available data set is limited for the HPH4 plot, a robust understanding of the environmental conditions has been established. A localised contamination impact to groundwater has been identified in one (1) of the two (2) monitoring wells on the HPH4 plot (REH01); however, statistical analysis of the available dataset indicates an overall declining trend in detected concentrations since the installation of the monitoring well in 2016. The latest detected concentration at REH01 from the October 2020 sample survey is again below the remedial target, and is consistent with the overall declining trend in TCE concentrations at this location since December 2016.

Onerous remedial intervention is considered to be unlikely; the Environment Agency has de-prioritised the site and declined to provide comment on the discharging of Planning Conditions relating to groundwater contamination at HPH5.

We trust that this update on the groundwater conditions in the vicinity of HPH4 is self-explanatory, but please do not hesitate to contact either Steve or myself if you wish to discuss further.

Yours sincerely

**Jesse Davies**
Managing Consultant
Site Solutions - Leeds

jdavies@ramboll.com

cc Steve Reed, Principal, Environment & Health