



HPH5, Hyde Park, Hayes

HPHD Ltd

Contamination Remediation Verification Report, HPH5

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HPH5, Hyde Park, Hayes

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Contents

1.	Introduction.....	2
2.	Summary of Remediation Works.....	5
3.	Verification Statement.....	11
4.	References	13

Figures**Figure 1 Borehole Location Plan****Figure 5 Preconstruction Topographic Plan Overlaid With Basement/Building Footprint And Areas Of Soil And Groundwater Contamination from February 2012 (reproduced from remediation Statement)****Site Location Plan (Celtic)****Site Layout Plan (Celtic)****Validation Sampling Locations (Celtic)****Photographic Log (Photos 1-7) (Celtic)****Appendices****Appendix A. Hillingdon Borough Council Planning Conditions****Appendix B. Celtic Technologies, HPH5 Validation Report****Appendix C. Landscaping Details****Appendix D. Jacobs Verification Sampling (Formation Layer and Topsoil), 18 June 15****Appendix E. Sharpe Industrial Services Method Statement for Underground Storage Tank Removal****Appendix F. Sheet Piling and Basement Drawings****Appendix G. Kier Site Waste Management Plan (SWMP) Extracts****Appendix H. Jacobs Groundwater Detailed Quantitative Risk Assessment (DQRA), Hyde Park, Hayes , HPH5, August 2015.****Appendix I. Bearing Piles Information****Appendix J. Imported Topsoil Testing Results****Appendix K. Kier Verification Sampling in Soft Landscaping, 21 July 15****Appendix L. Kier Proposed Topsoil Remediation Plan**

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to provide verification information to confirm that the remedial works, associated with soil and groundwater contamination undertaken by Jacobs and other third parties on the HPH5 development, meet the requirements of the SKM Enviro (now Jacobs) remediation statement (30 April 2013) (Ref 1). The provision of this verification report will allow Hillingdon Borough Council to discharge planning conditions associated with verification of remedial works. This is in accordance with the scope of services set out in between Sinclair Knight Merz (Europe) Ltd and HPHD Ltd ('the Client') based on the proposal 20th December 2012 and the appointment of services contract 13 September 2013. That scope of services, as described in this report, was developed with the Client.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the third party sources associated with this project. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law. This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

1. Introduction

Background information regarding the site and the objectives of works are summarised in Table 1.

Table 1. Site Details and Project Objectives

Aspect	Description
Site Address	HPH5, Hyde Park, Millington Road, Hayes, UB3 4AZ
Grid Ref	509210 179260
Site Area	HPH5 – 5,580 m ²
Background	This Report On 21 March 2013, Sinclair Knight Merz (Europe) Ltd (now Jacobs) were commissioned by HPHD Ltd to write the remediation statement (Ref. 1) and verification report for HPH5 (“the site”)¹. This is one of three areas for development on the Hyde Park, Hayes business park for HPHA Ltd, a subsidiary of Hyde Park Hayes Ltd. The building areas HPH1-3 and car park to the east are also under the ownership of Hyde Park Hayes Ltd but are considered offsite for the purposes of this assessment. Our proposal was dated 20 December 2012. Further Background Prior to this in May 2011, SKM Enviro (now Jacobs) undertook one round of groundwater monitoring from existing wells across the HPH area and completed a Phase 1 environmental assessment for HPH4-6. The Phase 1 report was updated in March 2012 (Ref. 2). In 2012 SKM Enviro (now Jacobs) undertook a site investigation (Ref.3) on three areas of the site, HPH4-6. The 2012 investigation had showed that Vinyl Chloride (VC) was elevated above UK Drinking Water Standard (UKDWS) in the underlying London Clay beneath HPH5. This is a non-aquifer with 70-80m of clay overlying the Chalk below. Our commission in January 2013 (Ref. 4) involved further site investigation and groundwater monitoring at HPH5 following feedback received from the Environment Agency (EA) . The results of groundwater monitoring in January 2013 indicated that there was evidence of localised groundwater contamination from chlorinated hydrocarbons within the Lynch Hill Gravels at HPH5 with respect to stringent UKDWS. There was also evidence of soil contamination from lead and cadmium in shallow Made Ground in the western side of HPH5. As part of the geotechnical assessment for HPH5, Halcrow have written a piling risk assessment to address EA concerns about migration of contaminations via preferential pathways from foundation piles (Ref. 5). The above reports should be read in conjunction with this verification report. The SKM Enviro (now Jacobs) remediation statement was submitted to and approved by Hillingdon Borough Council as part of the planning application for the site and is the basis for this verification report.
Development	The Hyde Park, Hayes business park contains a number of existing multi-storey buildings with hard and soft landscaping (HPH1-3) with a separate car parking area, as shown in the site layout plan below and Figure 1. The planning application, 45753/APP/2012/2029 was submitted for construction of a four storey office with basement for HPH5 and varied by Hillingdon Borough Council in 2013 in 45753/APP/2013/1980 (Appendix A).

¹ Followed up with appointment of services contract 13 September 2013

Aspect	Description
Regulatory Consultation	SKM Enviros wrote to the EA on 13 December 2012 to confirm whether the proposed scope of works for further site investigation works at HPH5 were acceptable. On 2 January 2013² the EA responded to confirm that the scope of works for the site investigation was acceptable. Following submission of the results of SKM Enviros further site investigation on HPH5, the EA provided comments on 21 March 2013³ and confirmation of groundwater monitoring requirements. The LBH contaminated land officer also provided comments on 20 March 2013⁴. A preliminary DQRA was undertaken in January 2014 (Ref. 6) and the EA commented on it in correspondence on 9 April 2014⁵. In summary the EA agreed with the recommendations of the report to collect further information to refine the DQRA. The EA also requested that sensitivity analysis should be undertaken to compare the different natures of decay and consider a range of degradation rates, based on further site specific monitoring data.
Objectives	This report is submitted to LBH and to the Environment Agency (EA) to part discharge planning conditions for the planning application 45753/APP/2012/2029 and varied by 45753/APP/2013/1980 submitted for HPH5. The completed works were intended to ensure that the site is adequate for its proposed end use and that post development the site would not present a significant risk of significant harm to future users and to the Lynch Hill Gravels Principal Aquifer. Specific objectives of remediation were as follows: • Remove source-pathway-receptor linkages from shallow soil contaminated with heavy metals and asbestos in the west of the site; • Confirm removal of contaminated soil to appropriate waste disposal facilities; • Provide uncontaminated soil for areas of soft landscaping; • Assess groundwater quality on HPH5 during the construction works; and, • Minimise the creation of fugitive dust during construction. (dealt with as part of the contractor's construction management plans). The objective of this verification report is to clearly outline the remedial actions undertaken on behalf of HPHD Ltd during the site works in order to satisfy planning conditions associated with this application. National regulatory requirements have not been stipulated as it assumed that HPHD Ltd and its contractors have adhered to these as a matter of course.
Planning Conditions	The relevant planning conditions to be discharged from 45753/APP/2013/1980 are as follows, Condition 14 14 · A verification report demonstrating completion of works set out in the approved remediation report demonstrating completion of works set out in the approved remediation strategy and the effectiveness of the remediation shall be submitted to and approved, in writing, by the local planning authority. This shall be produced in two parts: 1) No occupation of any part of the permitted development shall take place until a report detailing verification of soil contamination which represents a potential risk to human health and structures has been provided, and; 2) Within two years of the occupation of the permitted development, a verification report demonstrating completion of works set out in the approved remediation strategy shall be submitted to and approved, in writing by the Local Planning Authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met.

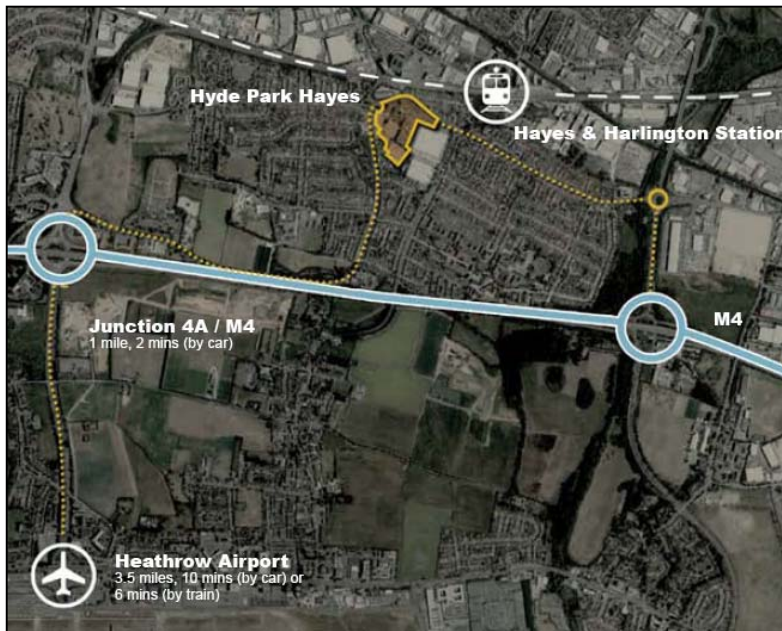
² Ref: NE/2012/116310/03-L01

³ Ref: NE/2012/116310/04-L01

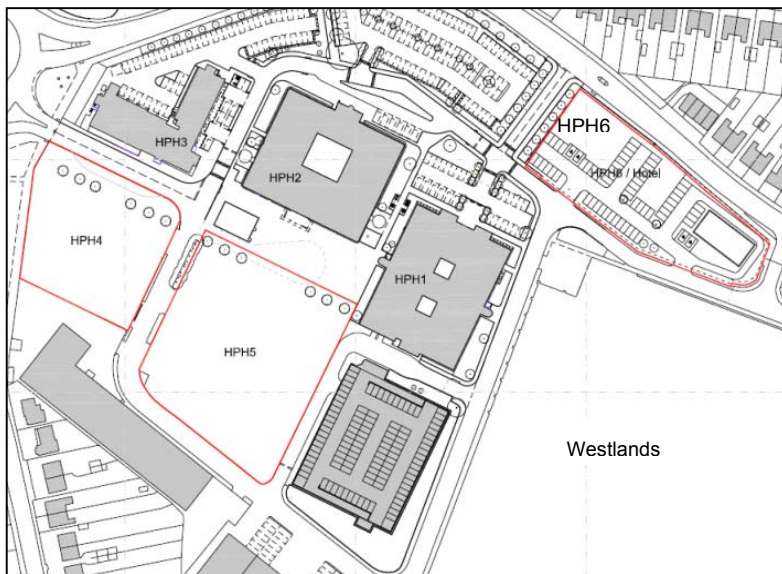
⁴ Ref Email of same date.

⁵ NE/2014/119570/02-L01

Site Location Plan



HPH Site Layout Plan



2. Summary of Remediation Works

Table 2 summarises actions agreed in the Remediation Strategy (Ref. 1) and corresponding measures undertaken.

Table 2. Remediation Actions and Verification of Remedial Measure Undertaken For Offices At HPH5

Item	Action (Responsibility)	Action Detail	Remedial Measures Undertaken	Pass / Fail
1	Implementation of dust suppression measures (Groundwork contractor)	- Vehicles transporting materials to and from the site should be enclosed or sheeted. - Minimise movement of vehicles. - Use wheel wash facilities for heavy plant to minimise the spread of unacceptable amounts of contaminated site material onto adjacent roadways. - Local roads should be regularly cleaned. - Use dust suppression techniques such as damping down of access roads and stockpiles with water during prolonged periods of dry weather.	- The site contractor, Kier has confirmed that a jet wash was positioned within the site boundary and vehicle wheels were washed prior to leaving site. - Additional road sweeping was employed periodically during the period to keep the external roads clean.	Pass
2	Appropriate H&S risk assessment (Groundwork contractor)	- The Client must alert contractors to the potential hazards from elevated metals and asbestos in soils in the west of HPH5 as part of the requirements of the Construction Design Management (CDM) Regulations. - Protective clothing should be worn by site personnel as required by health and safety risk assessment undertaken by the contractor. - Contractor to adopt precautionary measures when excavating in the vicinity of Area 1 and Area 2 [see Figure 5 from Remediation Statement reproduced in this report] due to possibility of asbestos fibres and heavy metals in soils; i.e. damping down of ground prior to excavation and avoiding works in windy conditions, stopping works and seeking appropriate advice if unexpected contamination encountered.	- Potential hazards were notified to Kier as part of the pre-construction information - Protective clothing was worn by site personnel as required. - A specialist remediation contractor Celtic Technologies (CT) was employed to carry out additional sampling in Area 1 and 2 and then carried out a watching brief during the excavation of the soils. CT produced a validation report (Ref. 7) contained in Appendix B detailing the works undertaken. - The work to remove the hazardous material was carried out from 18th November to 20th December 2013, weather conditions were such that damping down was not required. Ambient asbestos monitoring was undertaken during the works and levels were consistent for ambient air and not of concern to site operatives (See Appendix B, Section 4.0).	Pass

Item	Action (Responsibility)	Action Detail	Remedial Measures Undertaken	Pass / Fail																																								
3	Segregate and test Made Ground from Area 1 and 2 prior to off site disposal (Groundwork contractor)	- Surplus Made Ground excavated from Area 1 and 2 should be tested to confirm waste disposal requirements prior to removal from the site. - Retain waste consignment notes for verification report. - Close inspection of the HPH5 basement excavation and arisings during development activities to identify potential sources of chlorinated solvents.	- CT undertook further site investigation and collection of 30 soil samples (to classify the soils to be excavated from the site). See Appendix B, Section 2.2. - CT undertook inspection of the basement excavation material and segregation of material to identify the correct waste classification. - The classification sampling frequency was approximately one sample per 180 m³. A total of 30 no. soil samples were collected during the works of inert, hazardous and non-hazardous soils to ensure accurate classification of the materials to be taken off site. - The excavation was completed to a depth of between 0.8 and 1.5 m below original ground level resulting in a total volume of 5,483 m3 of soils which were stockpiled (see Photo 3 and 4), sampled and consigned for off-site removal. Details of the off site disposal is contained in Table 3, Appendix B. below <table><tr><th colspan="4">Material for Off Site Disposal, Hayes HPH5</th></tr><tr><th>Classification</th><th>Destination</th><th>Loads</th><th>Weight (tonnes)</th></tr><tr><td>Topsoil</td><td>Biogenie STF – reuse</td><td>31</td><td>570.06</td></tr><tr><td>Inert soils</td><td>Henry Streeter – recycle</td><td>246</td><td>4504.79</td></tr><tr><td>Inert concrete</td><td>Thames Materials & Ron Smith – recycle</td><td>38</td><td>-</td></tr><tr><td>Non-hazardous</td><td>Redhill – disposal</td><td>225</td><td>4247.22</td></tr><tr><td>Hazardous by Metals</td><td>Augean – treatment and disposal</td><td>79</td><td>1540.5</td></tr><tr><td>Liquid</td><td>Sharpes – disposal</td><td>1</td><td>20.0</td></tr><tr><td>Metal</td><td>ERM – recycle</td><td>1</td><td>-</td></tr><tr><td>Mixed waste</td><td>Skippy – disposal</td><td>1</td><td>9.02</td></tr></table> - All loads were accompanied by appropriate paperwork conforming to the Hazardous Waste Regulations, 2011; a Waste Transfer Note for inert and non Hazardous loads or a Section 62 Consignment Note for hazardous waste. The measured or estimated weights of each load and the relevant ticket numbers of its transport and disposal are provided in the appendices of the CT validation report (Appendix B).	Material for Off Site Disposal, Hayes HPH5				Classification	Destination	Loads	Weight (tonnes)	Topsoil	Biogenie STF – reuse	31	570.06	Inert soils	Henry Streeter – recycle	246	4504.79	Inert concrete	Thames Materials & Ron Smith – recycle	38	-	Non-hazardous	Redhill – disposal	225	4247.22	Hazardous by Metals	Augean – treatment and disposal	79	1540.5	Liquid	Sharpes – disposal	1	20.0	Metal	ERM – recycle	1	-	Mixed waste	Skippy – disposal	1	9.02	Pass
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Item	Action (Responsibility)	Action Detail	Remedial Measures Undertaken	Pass / Fail
4	Verification soil sampling at formation level in Area 2. (If formation level is in Made Ground and in areas of proposed soft landscaping). (Jacobs)	- After removal of ground to formation level in Area 2, inspect to establish whether there is Made Ground in areas of proposed soft landscaping. - No verification soil sampling would be required in the following situations: where formation level is within the natural ground (no contamination source) and where hard landscaping is proposed (which will break the source-pathway-receptor linkages). - Take shallow soil samples for analysis by UKAS accredited laboratory toxic / phytotoxic metals, speciated PAHs and asbestos as per Appendix 3 of the Remediation Statement (Ref 1) on a 10m X 10m grid.	- Area 2 is located to the west and south west of the HPH5 building as shown in Figure 5 of the Remediation Statement and reproduced in this report. - The areas immediately to the west of the building were covered by hard standing for car parking so no verification sampling was required in this area. This is detailed further in HED landscaping plan, drawing number HED 983.111) in Appendix C. - Four verification soil samples (FS01-04) were taken by Jacobs on 18 June 15 in soft landscaping in Area 2 to the south west of the HPH5 building, see drawing number HED 983.111) in Appendix D. - The four formation samples (FS01-04) were sent for analysis by i2 laboratories for the analysis suite specified in Appendix 3 of the remediation statement. - All four of the samples failed the remediation criteria set as shown by the results comparison table shown in Appendix D. This was due to asbestos detected in all soil samples and benzo(a)pyrene and cadmium in excess of the remediation criteria in three of the four samples. - The failure of these samples requires the topsoil to be at the required depth and for the break layer to be in place as per item 10 of the remediation statement table and this is dealt with further in that section below. - Please note that "Pass" in the next column refers to the taking of the required samples at formation level in the relevant part of Area 2 rather than the soil meeting the remediation criteria.	Pass

Item	Action (Responsibility)	Action Detail	Remedial Measures Undertaken	Pass / Fail
5	Monitor and report unexpected contamination (Groundwork contractor)	- It is recommended that excavated soils are visually monitored and if any visibly unusual or odorous material is encountered this is separated and tested for suitability. - Undertake a watching brief if contamination is found on site. Photographs to be taken as evidence. - Contact the LBH Contaminated Land Section, or an appropriate advisor, as soon as is practicable should contamination be encountered during the development of the site. - Material deemed to be unsuitable should be removed from site for suitable disposal and consignment tickets retained.	- During the course of the excavation a 6,000 gallon underground storage tank (UST) was discovered on the 10th December 2013 in the southern half of the site (See CT Validation Sampling Locations figure and Photo 7 in Figures). The UST was decontaminated, cut up and removed from site by specialist contractor Sharpe Industrial Services Ltd (employed by Celtic) in accordance with a specific Risk Assessment and Method Statement (Appendix E). - The base of the former UST on site was sampled by CT once all the accessible soil which was visually impacted was removed. Sample V4 from a localised area of gravels directly beneath the former UST contained hydrocarbon concentrations of 3,100mg/kg for TPH (Appendix B). 87% of TPH was concentrated in the C24-C40 range indicating heavier hydrocarbon chains typical of mineral oil. Based on the absence of visual impact at V4 beneath the UST there was no further removal of gravels from beneath this location by CT. - It should be noted the residual risk to groundwater within the Lynch Hill Gravels is assessed to be low given that sheet piles surround the basement and extend several meters into the London Clay. - The basement was excavated to a level of 27.35m AOD with the lift pits taken down to 25.85 mAOD. The extent of the sheet piling is shown on the attached CH2M drawings in Appendix F. - The sheet piling has been sealed by non-structural sealing welds applied to the exposed face of the interlocking clutches. - The sheet piles varied between 9m and 11m in length below a top level of 31.100m AOD. Therefore going down to a level between 22.100m AOD and 20.100m AOD. This is about 5m into the London Clay which varies between 25m AOD and 27m AOD.	Pass
6	Implement Site Waste Management Plan (SWMP) (Groundwork contractor)	- Implement site waste management plan (SWMP) and amend where required during life of the project. - Full details of soil materials exported from the site should be included, this should include consignment tickets. - Should there be an opportunity to reuse site won material from the excavation then the CLAIRE waste Code of Practice should be used in order that this material is not classified as a waste.	- See Appendix G for extracts of the relevant sections of the Kier SWMP dealing with disposal of material on site. - Details of soil exported from the site can be found in Table 3 of Appendix B, the CT validation report with full details in Appendix F within the CT report. - Owing to the surplus material on site there was no opportunity to re-use site won material, the material however was segregated and sent for disposal / reuse as per Item 3 above.	Pass

Item	Action (Responsibility)	Action Detail	Remedial Measures Undertaken	Pass / Fail
7	Monthly groundwater monitoring of HPH5 for one year (Jacobs)	- Monthly monitoring of groundwater quality from existing boreholes within HPH5 for a minimum of 1 year. Analysis for VOC. - Quarterly monitoring of groundwater levels from existing boreholes in the local area that are accessible for a minimum of 1 year. - Review and revision of the conceptual model and DQRA once those monitoring results are received. Submit report to the EA to determine requirement if any, for further groundwater monitoring, remedial options appraisal and potentially groundwater remediation.	- See Appendix H for Groundwater Detailed Quantitative Risk Assessment (DQRA), Hyde Park, Hayes , HPH5, July 2015. - Monitoring was completed on existing and new boreholes between April 2014 and June 2015. - Risk assessment using relatively conservative input parameters indicated that the predicted concentration of three VOCs at the compliance point could be above the drinking water standard at 50m from the contaminant source. - A sensitivity assessment was undertaken including using source concentration data from the most recent round of groundwater monitoring. This assessment showed a much lower impact with only one VOC potentially exceeding the drinking water standards at the 50m compliance point. - The remaining contamination is not considered to present a significant risk to the aquifer, abstractions or surface waters. - It is recommended that no further monitoring or assessment of the chlorinated solvent contamination at the HPH site is undertaken. Remediation of the remaining contamination, from a groundwater resources and impact point of view, is not required.	Pass
8	Follow recommendations in Halcrow piling risk assessment (Groundwork contractor)	See Appendix C in Halcrow geotechnical report (Ref.5).	Piling was with Continuous Flight Auger (CFA). 600mm diameter reinforced concrete piles were used on site as detailed in the Miller piling design report (Ref. 8) and piling schedule. The pile lengths were between 19m and 31m (See Appendix I).	Pass

Item	Action (Responsibility)	Action Detail	Remedial Measures Undertaken	Pass / Fail
9	Provide imported topsoil / subsoil free from contamination (Groundwork contractor)	- It is not anticipated that there is sufficient topsoil / subsoil of suitable quality on the site for use in areas of soft landscaping and hence imported material would be required. - Imported topsoil / subsoil material should be tested by the supplier and the results provided to a suitably qualified consultant prior to transport to site. - Soil must be sampled at a rate of at least 1 representative sample per 500m³ (minimum 3 samples per source). Details of the source and material description must be provided by the supplier. - Comparison to residential without plant uptake GAC values for soil in Appendix 3 of the Remediation Statement. Testing for toxic / phytotoxic metals, speciated PAHs, and asbestos. Material to be free from odours and visible contaminants (glass, metal etc.). Testing to be undertaken by UKAS accredited laboratory.	- The contractor (Kier) supplied one sample of imported topsoil from the Charles Morris Fertilizers Ltd site was tested by Tim O'Hare Associates (See Appendix J). - In order to meet the agreed sampling rate, a further three samples of topsoil (VS01-03) were taken on site on 18 June 15 by a Jacobs consultant and analysed by i2 laboratories (Appendix D). These samples were located in different areas of soft landscaping on the site as shown in the HED landscaping plan, drawing number HED 983.111 in Appendix C. - These results were compared against the SKM Enviro remediation statement. All three samples VS01-03 were found to contain chrysotile asbestos and VS03 was marginally above the remediation criteria for benzo(a)pyrene (Appendix D). The contractor was notified of the failure of the imported soil. - A further 20 samples (VS04-VS17) taken by Kier on 21st July 15 from soft landscaping (topsoil and formation) with a Jacobs Consult present as shown in see drawing number HED 983.111 in Appendix D. These were sent for analysis by ESG laboratories (Appendix K). 11 soil samples within the topsoil were found to contain asbestos and therefore failed the remediation criteria set. - Therefore Jacobs recommended that all imported soil should be removed and replaced. This has now been agreed with the contractor who is undertaking remedial work to remove all the topsoil on the site and replace it with clean imported material. Please refer to remediation strategy by Kier in Appendix L.	Fail (ongoing remediation)
10	Provide suitable thickness of topsoil / subsoil in the areas in areas of soft landscaping in Area 2 and other areas of the site. OR Cover with concrete or tarmac hardstanding. (Groundwork contractor)	- Install soil in areas of soft landscaping with at least 150mm topsoil as per landscape drawing and 300mm subsoil with a geotextile break layer at the base (Appendix 2). - Provide verification photographs and topographic levels (pre and post capping) from five locations showing depth of emplaced soil. OR - Provide concrete/tarmac hardstanding to break source-pathway-receptor linkages.	- The Contractor (Kier) imported topsoil to the site to areas shown on the landscape plan in Appendix C. The presence of a geotextile breaker layer and the thickness of topsoil was checked by Jacobs on 18 June 2015. - Measurements and observations were taken at to seven locations (see sampling plan in Appendix D). Topsoil thickness ranged from 0.27m to 0.41m and did not meet the agreed specification (Appendix D). A geotextile marker was noted at 3 of 7 locations. - Jacobs recommended that the appropriate thickness of topsoil and a geotextile marker layer should be provided in landscaped areas (refer to remediation strategy by Kier in Appendix L). - This has now been agreed with the contractor who is undertaking remedial work to remove all the topsoil on the site and replace it with clean imported material. Please refer to remediation strategy by Kier in Appendix L.	Fail (ongoing remediation)

3. Verification Statement

The report demonstrates that remediation actions 1 to 8, as detailed within the agreed Remediation Strategy (Ref. 1), have been satisfactorily completed. The submission of this document to the Hillingdon Borough Council discharges Condition 14, item 1 from planning condition 45753/APP/2013/1980. It also allows Condition 12, item 4 to be addressed by the council.

Please note that the groundwater DQRA in Appendix H should be submitted by the planning officer at Hillingdon Borough Council to the Environment Agency to satisfy their requirements as part of the planning conditions, Condition 14, item 2.

Items 9 and 10 from Table 1 which failed the remediation targets are currently being rectified by the contractor, Kier who are removing all the topsoil on the site and replacing it with clean imported material to the correct depth. Please refer to remediation strategy by Kier in Appendix L.

Once works have been completed, Jacobs will issue a revised verification report indicating completion of outstanding actions to discharge Condition 14, item 2.

4. References

- ¹ SKM Enviros, April 2013, Remediation Statement, Hyde Park, Hayes, HPH5, HPHA Ltd
- ² SKM Enviros, March 2012, Hyde Park, Hayes, Phase 1 Environmental Assessment, HPH4-6, HPHA Ltd
- ³ SKM Enviros, October 2012, Phase 2 Site Investigation, Hyde Park, Hayes, HPH4-6, HPHA Ltd
- ⁴ SKM Enviros, 22 February 2013, Additional Phase 2 Site Investigation, Hyde Park, Hayes, HPH5, HPHA Ltd
- ⁵ Halcrow, 28 March 2013, Geotechnical Interpretative Report, HPA Ltd.
- ⁶ SKM Enviros, January 2014. Groundwater Detailed Quantitative Risk Assessment (DQRA), Hyde Park, Hayes, HPH5.
- ⁷ Celtic Technologies, January 2014, HPH5 Validation Report, Kier Construction
- ⁸ Miller Piling Ltd, February 2014, Design Calculations for Bearing Pile Foundations, Millington Road, Hayes for Kier Construction