

WINVIC CONSTRUCTION LIMITED

**PROLOGIS PARK WEST LONDON: EXPANSION LAND
AT
STOCKLEY PARK, IRON BRIDGE ROAD N, WEST DRAYTON, UB11 1BT**

REMEDIATION IMPLEMENTATION PLAN

The Granary
White Hall Farm
Long Itchington
Warwickshire
CV47 9PU

September 2021
Report No. CCL03466.C023

Tel: 01926 815678
Fax: 01926 815222
mail@crossfield-consulting.co.uk

www.crossfield-consulting.co.uk

CONTENTS

1.	PROJECT BACKGROUND AND SCOPE OF REMEDIATION IMPLEMENTATION PLAN
2.	THE SITE
3.	SUMMARY OF GROUND CONDITIONS AND ENVIRONMENTAL SETTING
4.	PROPOSED DEVELOPMENT
5.	REMEDIATION OBJECTIVES
6.	PROPOSED SUPPLEMENTARY GROUND INVESTIGATION
7.	REMEDIATION WORKS: DEMOLITION PHASE
8.	REMEDIATION WORKS: CONSTRUCTION PHASE
9.	MATERIALS REUSE AND MANAGEMENT
10.	UNFORSEEN GROUND CONDITIONS
11.	MONITORING FOLLOWING COMPLETION OF WORKS
12.	VERIFICATION AND REPORTING REQUIREMENTS
	REFERENCES

TABLE 1	-	Revised Site Model with Relevant Contaminant Linkages
TABLE 2	-	Acceptance Criteria for Soils to be Retained on Site as General Fill
TABLE 3	-	Acceptance Criteria for Soils to be Imported to Site
FIGURE 1	-	Site Location Plan
FIGURE 2	-	Topographical Survey
FIGURE 3	-	Proposed Development Layout – Option 2
FIGURE 4	-	Proposed Earthworks Cut/Fill – Option 2
APPENDIX I	-	Discovery Strategy for Potentially Contaminated Materials Encountered During Construction Works

1. PROJECT BACKGROUND AND SCOPE OF REMEDIATION IMPLEMENTATION PLAN

It is proposed to redevelop a former commercial site within the western part of Stockley Park, Iron Bridge Road N, West Drayton. The site has historically been associated with gravel extraction pits and later with backfilling works (largely not associated with a recorded landfill, although similar backfilling to gravel pits to the west were associated with a landfill that potentially extends into the northwestern margins of the site). The site was developed with the current (albeit now vacant) commercial development during the 1990s. Two development schemes were previously under consideration: one comprising a single warehouse building and a multi-storey van park and the second consisting of two warehouse buildings. It is understood that the Option 2 scheme (two new buildings) is now being progressed and, therefore, only the Option 2 scheme is included in this document. The proposed development scheme includes external hardstanding areas for vehicle parking and delivery areas with dock levellers. Some new soft landscaping is also proposed. The new development will require earthworks to form suitable platforms for the new development. Winvic Construction Limited has been awarded the contract to undertake the enabling and building works.

WSP has undertaken several phases of ground investigation, with associated interpretive reports, at the site and has also prepared a Remediation Strategy to outline general remediation requirements and the overarching principles behind proposed remedial works. The documents prepared by WSP are listed in the References.

The WSP investigations have identified locally elevated concentrations of metals in Made Ground soils and also the presence of asbestos fibres. Whilst the risks to human health have been assessed as low (due to the typical depths of the affected Made Ground), the proposed earthworks would redistribute existing soils around the site such that impacted materials may be placed at near-surface depths and, as the proposed development include new soft landscaping, potential exposure pathways may then exist in respect of end users. To mitigate such risks, remedial works to break exposure pathways are proposed for soft landscaping areas. In view of the potential for ground conditions to differ in areas of the site not investigated, and due to potential variability in ground conditions given the site history, additional sampling and testing is required of soils that are to be reused as part of the earthworks to ensure that materials remaining on site are compatible with the currently proposed remediation works. On the basis of the current ground investigation data, WSP has assessed that there are no unacceptable risks to controlled waters or the wider environment

In addition to the known ground conditions, three underground fuel tanks are recorded at the site. The tanks are reported to have been decommissioned in 2014 but there is no documentation to support the decommissioning works. It will be necessary to remove the tanks from site as part of the proposed remediation works and test and assess soils around the tanks to determine whether they meet the on-site reuse criteria (i.e. they do not represent an unacceptable risk to human health). Above ground tanks are also present on site (reported to also have been emptied in 2014) and will also need to be removed from site.

Crossfield Consulting Limited has been commissioned, by Winvic Construction Limited, to prepare a Remediation Implementation Plan to detail how the remediation works that have been identified by WSP will be undertaken and including details of how the works will be verified so that a Remediation Verification Report can subsequently be prepared.

This document has been prepared and checked by experienced geoenvironmental staff from Crossfield Consulting Limited holding Chartered Geologist professional qualifications. It is considered that the Remediation Implementation Plan complies with National Planning Policy Framework and is in general accordance with guidance published by the Environment Agency in Land Contamination Risk Management (LCRM) (2020). It is understood that this document will be submitted to the London Borough of Hillingdon in support of a planning application and it is considered that the document should be suitable for this purpose.

2. THE SITE

2.1 Location

The site is located to the east of Iron Bridge Road N, within the western part of Stockley Park (known as an expansion land area), and approximately 1.5 km to the north of Junction 4 of the M4 motorway, as shown on Figure 1. The National Grid Reference for the site is TQ 0756 8012. The site boundaries are defined by Horton Road to the north, Stockley Road to the east, Iron Bridge Road N to the west and the Grand Union Canal to the south.

2.2 Site Description

This site description is based on information contained in the referenced WSP documents and a topographical survey, provided as Figure 2. A site reconnaissance has not been undertaken by staff from Crossfield Consulting Limited.

The site is irregular in shape and has an area of about 5.5 ha. There is a rise in level of about 1.5 m from the southern boundary towards the centre of the site and then, in the northwestern area, there is a drop in level of about 1.5 m to the northern site boundary.

The site has, until recently, been associated with the offices of a pharmaceutical company but the premises are now vacant. Three buildings are present on site, one in the northern, one in the central and one in the southern part of the site, and there is also a multi-storey car park structure in the southeastern part of the property. External areas of the site are hard surfaced (largely block paving) and were generally used as car parking. Limited soft landscaping areas are present within the developed part of the site, although there are larger tracts of soft landscaping in the undeveloped eastern part of the site and along the site boundaries.

There are two surface water features within the site; a decorative feature is in the northern part of the property and there is a balancing pond, understood to form part of the site's existing drainage infrastructure (which itself discharges to the canal to the south), in the eastern part of the site.

Three underground diesel storage tanks (30,000 litre capacity each) are present beneath the site and are reported to have been decommissioned, in 2014, and foam filled, although there is no documentation to support the decommissioning works. The tanks were associated with a back-up generator (one tank for each building). The tanks are not identified on any available plans. However, the topographical survey notes the presence of vent pipes close to each building (and a fill point close to the northern building) and it is likely that the underground tanks are close to the vent pipes. Each building also had an above ground tank (each of 500 litre capacity) and it is understood that these were also for diesel storage and were associated with the back-up generators. The above-ground tanks are reported to have been emptied at the same time that the underground tanks were decommissioned. The above ground tanks, vent pipes and fill point are annotated on Figure 3.

Electricity substations are present in the northwestern, eastern and southern part of the site (three substations in total).

2.3 Site History

The following is a brief summary of the site history and is based on information contained in the WSP reports.

It is understood that gravel extraction was undertaken at the site during the late 1800s and early 1900s. The extractions pit was infilled in two phases (the 1930s/1940s and the 1960s), although the infilling does not

appear to have been associated with a recorded landfill classification (but it is noted that similar backfilled gravel pits in close proximity to the site are recorded as former landfills). Following the infilling works, a depot and a piggery are indicated to have operated on site in the mid-1960s and a plant hire company was later added by the mid-1970s. It is understood that the site was redeveloped with the recent commercial development by the 1990s.

It is reported that the underground tank associated with the former central building on site was noted to be leaking and it was replaced in 2007 and impacted soil around the tank was also removed, although there is no documentation of those works available.

It is understood, based on information held by WSP, that Made Ground was excavated from below the area of the existing building footprints and was replaced with granular materials prior to construction of the buildings. Low permeability clay barriers were constructed adjacent to the granular materials and it is also understood that leachate drains and clay capping layers were also installed beneath the site. It is assumed that these previously installed features are no longer required such that they do not require to be maintained/protected during the construction of the proposed development.

3. SUMMARY OF GROUND CONDITIONS AND ENVIRONMENTAL SETTING

3.1 Published Geology

The 1:50,000 scale solid and drift geology map of Beaconsfield (Sheet 255), published by the British Geological Survey (BGS), together with online digital geological map data, also published by the BGS, indicates that the site is underlain by infilled ground (described as excavations that have been wholly infilled with waste). Superficial deposits beneath the site are indicated to comprise Langley Silt Member and Lynch Hill Gravel Member strata. The solid strata beneath the site are shown to consist of London Clay Formation of the Eocene Series.

3.2 Environmental Setting

The Langley Silt Member and London Clay Formation are recorded as unproductive strata (i.e. non-aquifer strata). The Lynch Hill Gravel Member is noted to be a principal aquifer. The site is not within a groundwater source protection zone and there are no licensed groundwater abstractions for potable water supply within 1 km.

Two surface water ponds are recorded on the site and the Grand Union Canal is to the south of the site. The water in the canal was given a general quality assessment (GQA) of Grade D (fair) in 2000, the most recent classification in the available information. Based on information reported by WSP, it is understood that the canal has a sheet pile wall along its length for at least the distance adjacent to the site.

3.3 Ground Investigations

Two phases of ground investigation have been undertaken at the site by WSP and data from the investigations are provided in the relevant reports listed in the References. The available reports have been used to prepare the following summary of ground conditions beneath the site.

3.4 Buried Foundations and Services

A number of exploratory holes have encountered significant concrete obstructions at typical depths of between 1.0 m and 3.0 m in the northern and central parts of the site. Given the site history, additional buried obstructions may be expected in areas that have not been investigated. Underground services are anticipated

to be present beneath the site. Three underground fuel tanks have been recorded beneath the site and are reported to be decommissioned and foam filled.

3.5 Summary of Ground Conditions

Soils Encountered Beneath the Site

Beneath surfacing materials, a typical Made Ground horizon of sand and gravel is present to depths in the order of 0.3 m to 1.1 m. It is likely that these materials are associated with construction of the previous commercial development at the site.

Below the coarse-grained horizon, a clay-based Made Ground is present. The upper part of this material typically includes man-made inclusions that are predominated by brick, concrete, ash, clinker, glass and ceramics but more localised reference is also made to plastic, wood, paper, rags and metal wire. These materials are present to depths in the order of 4 m to 6 m in northern, eastern and central parts of the site and generally to less than 2 m depth in southern and western parts of the site. A second clay horizon generally underlies the above material and man-made inclusions are typically absent. The lower clay horizon is described as a reworked natural material and is indicated to depths of about 5 m to 6.5 m in the northern half of the site and 3 m to 4 m in the southern half (although the layer often appears to be absent in the southern part of the site).

Below the Made Ground, Langley Silt Member (generally described as stiff consistency silty clay) has been identified below the southern part of the site but the Lynch Hill Gravel Member generally underlies the Made Ground (although is locally absent where it has been fully extracted by historical quarrying). London Clay strata are present below the superficial deposits, or directly underlie Made Ground where the superficiales are absent.

Groundwater

Groundwater strikes were noted at depths of between 1.3 m to 5.5 m. Monitoring work has recorded standing groundwater depths of between 0.5 m and 3.7 m. Due to historical gravel extraction and backfilling with largely clay materials, the water that has been reported may be perched and not in hydraulic groundwater within aquifer strata. It is noted that there are hydraulic barriers present to limit groundwater flow off site in the form of an engineered in ground barrier between the site and Iron Bridge Road N to the west and a sheet pile wall between the site and the Grand Union Canal to the south.

The groundwater conditions are based on observations made at the time of the fieldwork. It should be noted that groundwater levels may vary due to seasonal and other effects.

Ground Gases

Ground gas monitoring has been undertaken on four occasions. The monitoring records for standpipes installed in deeper boreholes are variable and inconsistent and have probably been influenced by groundwater. Monitoring in standpipes in shallower standpipes in windowless sample holes indicate more consistent data with carbon dioxide concentrations of between 5.1% and 13.8% recorded at four locations in the eastern and southern parts of the site. Methane has been consistently recorded at concentrations of between 5.8% to 7.8% at one location in the eastern part of the site. Gas flow rates were non-detectable or negligible (0.1 litres/hour) at the relevant locations on all monitoring visits.

4. PROPOSED DEVELOPMENT

It is understood that, of two previously considered development schemes, Option 2 is to be progressed. Option 2 (shown on Figure 3) would consist of two warehouse units and includes external hardstanding areas for vehicle parking and dock levellers together with limited new soft landscaping areas.

Earthworks will be required to form development platforms. A proposed cut/fill plan for the Option 2 development is provided as Figure 4, which indicates that up to 3.5 m depth of cut and 3 m thickness of fill could be required.

5. REMEDIATION OBJECTIVES

5.1 Proposed Remediation Works

The remediation objectives for this site are such that, on completion of the works:

- 1) there will be no identified unacceptable risks to the health of end users of the site,
- 2) there will be no identified unacceptable environmental risks relating to off-site migration and effects on surface water or groundwater resources (no unacceptable risk is currently identified but may become applicable if unexpected ground conditions are encountered), and
- 3) structures and services will not be adversely affected by ground conditions.

The design of the remediation works has been based on risk assessments provided in the WSP reports and the WSP Remediation Strategy (which included a remediation options appraisal to identify the most appropriate forms of remediation to be implemented within the proposed development). The proposed works will deal with the presence of unacceptable (defined on the basis of risk assessments presented in the Investigation Reports) soil contamination and its influence on end users, controlled waters, foundations, drainage and services, as applicable.

It is permitted to reuse site-won materials (under the CL:AIRE *Definition of Waste: Development Industry Code of Practice Version 2* (DoWCoP)) to form required site levels but, due to the historical site uses, there is a requirement to undertake testing on such site-won materials to demonstrate compliance with the acceptability criteria for reuse. The WSP Remediation Strategy specifies a testing frequency for this purpose. Supplementary ground investigation (as detailed in Section 6) is proposed at the site and it is envisaged that the bulk of the testing to demonstrate reuse compliance would be undertaken as part of such investigation to minimise delays during the earthworks. Further details on the supplementary ground investigation proposals are given in Section 6.

Pre-commencement remediation has been identified in the form of the removal of underground fuel tanks and associated pipe infrastructure. The works proposed are detailed in Section 7.

Construction-stage remediation work is also required and is to comprise the provision of capping layers in new soft landscaping and the protection of pipework for potable water supply. The construction-stage remediation works are detailed in Section 8.

Table 1 presents a revised copy of the Site Model and highlights the contaminant linkages that are currently valid and that will be eliminated or mitigated by the proposed remediation works so that risks to the relevant receptors are reduced to negligible (and, therefore, acceptable) levels.

The remediation works will be supervised and/or inspected, as appropriate, by suitably experienced geoenvironmental staff from Crossfield Consulting and a verification report will be prepared confirming the works undertaken, including details of the inspections and verification testing.

The proposed remediation works relate to the known ground conditions at the site. It is possible that, during the groundworks phase of construction, ground or groundwater conditions not previously identified may be

encountered and there may be associated potential contaminated land issues. If such ground conditions are encountered by groundworkers, the Site Manager will, under a discovery strategy (see Section 10 and Appendix I), inform Crossfield Consulting and a suitably qualified geoenvironmental engineer will attend site to assess the ground, recover samples, if necessary, and issue an assessment, including the requirement for any additional remedial works. At present, based on the ground investigations completed to date and the assessments and Remediation Strategy prepared by WSP, no requirements for groundwater remediation have been identified. However, unexpected (i.e. potentially impacted/polluted) groundwater conditions (including the presence of free-phase product on groundwater) would also be covered by the discovery strategy and groundwater treatment (which may include pumping and treating, pumping and disposal or skimming of free-product from sumps) would be undertaken, as appropriate for the conditions encountered.

To prevent fugitive dust becoming airborne and migrating to neighbouring properties, Made Ground materials will be kept damp during groundworks and earth moving operations. This will mitigate the possibility of airborne dust migration.

Although the risks to construction workers are considered to be low based on the known ground conditions, it is recommended that appropriate personal protective equipment be worn by site operatives to minimise exposure to potential contaminants in the shallow soils. As certain volatile compounds have been identified in shallow soils and detectable concentrations of methane and carbon dioxide have been recorded (albeit at low volumes due to negligible associated flow rates), it is also recommended that personal monitoring equipment be available on site for personnel working in enclosed areas (such as in, or close to, excavations) so that works can be undertaken in compliance with occupational exposure limits.

5.2 Asbestos

Asbestos fibres have been identified at several locations (generally at concentrations of <0.001% but at 0.123% at one location). There is also potential for asbestos containing materials (ACM) to be encountered beneath the site. Based on the currently recorded fibre concentrations, it is considered that conventional soil dampening during groundworks and earthworks would mitigate risks of fibre release. Wherever practical, visible ACM is to be hand-picked during groundworks and earthworks and bagged before being placed in a lidded bin or skip that is only used for asbestos waste, which should then be removed to a suitably permitted waste facility as 'hazardous' waste. If significant quantities of ACM are identified in the ground, then additional soil sampling from the affected area may be required as there could then locally be an increased potential for asbestos fibres to be present in the ground. If asbestos fibres are confirmed then the construction-stage human health risk assessment and requirements for PPE/construction controls may need to be reappraised. Additional comments on the reuse of asbestos containing soils are provided in Section 6.

6. PROPOSED SUPPLEMENTARY GROUND INVESTIGATION

6.1 Objective of Investigation

It will be necessary to undertake supplementary ground investigation at the site to obtain additional information for geotechnical design and earthworks design (including for the preparation of an earthworks specification). As previously noted, there is also a requirement within the WSP Remediation Strategy that site-won soils be tested, at a specified frequency to demonstrate compliance with acceptability criteria for reuse at the site. To minimise delays during earthworks, it is proposed to undertake appropriate analytical testing during the supplementary ground investigation on samples recovered from areas of proposed cut. On this basis, it will be possible to assess and classify materials ahead of the earthworks starting. The aim of the investigation would be to identify and assess representative materials that may be used in earthworks. If, as the earthworks progresses, unexpected or different materials are encountered (or if it is not possible to test representative

materials at the required frequency, as stated in the WSP Remediation Strategy and outlined below), then they would be segregated and stockpiled separately for additional inspection and, if applicable, testing to determine if the materials are suitable for reuse.

Trial pits would be excavated across areas of proposed cut to recover representative samples of the soils that are likely to be redistributed as part of the earthworks. Sampling would be undertaken to meet the required testing frequency specified by WSP (1 sample per 250 m³ to 500 m³ of material, depending on the nature of the materials encountered and visual/olfactory evidence of contamination).

6.2 Analytical Laboratory Testing

Within the trial pits, representative soil samples will be recovered for laboratory testing. The analytical testing suites scheduled on recovered samples will be compatible with the site's history and observations made of the ground and also with the determinands for which acceptance criteria has been set by WSP for reuse of site-won materials. All soil samples for analytical testing will be collected in appropriate containers, stored in cool boxes and sent to a UKAS and MCERTS accredited testing laboratory overnight. All samples will be recovered in accordance with procedures that are compliant with BS 10175: 2011+A2:2017, including the use of clean tools.

The following testing suite is considered to be appropriate for most soil materials that may be encountered.

- Toxic and phytotoxic metals and metalloids (as listed in Table 2)
- Cyanide
- Petroleum Hydrocarbons – aromatic/aliphatic split and carbon number banding (CWG speciation), using GC-FID techniques
- Volatile Organic Compounds – using GC-MS techniques
- Semi-Volatile Organic Compounds (including polyaromatic hydrocarbons, phenols and cresols) – using GC-MS techniques
- Polychlorinated Biphenyls (EC7 Congeners) – using GC-MS techniques
- Asbestos (identification and, if applicable, quantification)

This suite of testing may require to be expanded or reduced depending on visual and olfactory observations made at the time of the investigation work.

6.3 Assessment

The acceptance criteria for reuse of soils as general fill (i.e. below buildings, hardstanding or a capping layer in new soft landscaping) are provided in Table 2. Where concentrations of the tested determinands are below the acceptance criteria, materials will be deemed suitable for reuse as general fill. The acceptance criteria in Table 2 are considered to be not suitable for materials that would form a capping layer in soft landscaping areas and separate criteria are provided for such materials (see Section 8).

If materials are identified that exceed the given acceptability criteria then, to minimize materials being taken off site to landfill, in the first instance further risk assessment will be undertaken to determine if materials with exceedances can remain on site (potentially in conjunction with additional mitigation measures over those detailed in this Implementation Plan). Agreement would be obtained with the local planning authority before reusing materials that have been risk assessed in this manner.

6.4 Asbestos Specific Comments

It is acceptable to reuse soils with free asbestos fibres as general fill within the proposed development scheme and an upper concentration of 0.1% is noted in Table 2 for the reuse of soils with asbestos fibres. Soils with a recorded concentration of asbestos fibres of <0.001% may be reused, as general fill, without further mitigation measures. Soils with asbestos concentrations of between 0.001% and <0.1% may be reused but the location of the placed material is to be surveyed (depth and lateral extent) and is to then be covered by a high visibility geotextile and recorded in the development's health and safety file for handover on completion. If soils with asbestos fibre concentrations of 0.1% or greater are identified then, to limit material going off site to landfill, additional risk assessment would be undertaken to determine if the materials may be reused on site (potentially in conjunction with additional mitigation measures). Any such risk assessment and proposals for material reuse would be agreed with the local planning authority before reusing the materials.

Where practical, all visible asbestos should be hand-picked for off-site disposal.

7. REMEDIATION WORKS: DEMOLITION PHASE

7.1 Removal of Underground Fuel Tanks

It is proposed to remove the recorded underground fuel tanks during site preparation and demolition works. Available information indicates that there are three, 30,000 litre diesel tanks and that they were decommissioned in 2014 and foam filled (although there are no documents available to confirm the decommissioning work). Notwithstanding this, during the tank removal operations, works will proceed with caution, in case fuels or fuel residues still remain in the tanks.

The condition of the tanks will be confirmed after exposure of the top of the tanks, including any access point that may still be present, and the following procedure will be undertaken to maintain safe working conditions and mitigate risks of pollution:

- Tanks are to be opened via access pipework/manholes and with appropriate procedures that are compatible with a possible flammable atmosphere within the tanks.
- Liquid contents, if applicable, to be pumped to a suitable tanker and transported to a permitted waste facility.
- Tanks will then be de-gassed (and certified to contain a non-flammable atmosphere) and cleaned. Foam, or other decommissioning materials, would be excavated from the tanks for appropriate disposal off site. Any cleaning fluids will also be pumped to a tanker and taken to a waste facility. Tanks may then be lifted and disposed off site. Providing the tanks have a certified non-flammable atmosphere, they may be broken-up prior to removal from site.
- Pipework associated with the tanks is also to be removed and due care will be taken to ensure that residual fuels or liquids containing fuel residues are not permitted to leak to the ground.
- All operations to tanks will be carried out in accordance with the guidelines published in HSE Guidance Note CS15 (1997) together with Environment Agency PPG27 (now withdrawn but considered to contain valid best-practice advice), and with due care to avoid spreading residual liquids or contaminated soils outside the area of tank removal operations.
- If identified during site preparation or demolition works, drainage interceptors will be similarly removed by pumping liquid contents to a tanker for off-site disposal before being excavated from the ground and disposed off-site to a suitable waste facility.
- If significantly impacted soils are identified at the sides and base of the excavations and it is considered that such soil may be associated with contaminant concentrations in excess of the reuse acceptance criteria, such soils would be excavated and placed on polythene sheeting (and also covered by such sheeting to

prevent rainwater ingress and run off) while samples are being tested to determine whether the materials may be reused or will require disposal off site.

- Three above-ground diesel tanks are also reported to have been emptied. If still present on site, they will be checked to confirm that there are no fuel residues (or rainwater with fuel residues) and any liquid contents will be pumped to a suitable tanker and transported to a permitted waste facility. The tanks will be cleaned (with cleaning water pumped to a tanker for disposal) and then broken up for disposal.

The works will be undertaken in accordance with the guidance published in HSE (1991) Protection of Workers and the General Public during the Development of Contaminated Land, with care taken to preclude any uncontrolled spread of contaminated materials. The contractor undertaking the works will also prepare its own method statement to confirm compliance with the above works.

A barrier will be maintained between working areas and the site boundaries, and due care taken to ensure that neither surface water runoff nor other materials are released from the site. Vehicles entering and leaving the site will be inspected, and washed down as necessary, to minimise the risk of materials being spread on to the public highway.

If, during demolition or construction, unrecorded underground fuel tanks are identified, such tanks would also be removed in accordance with the above procedure. Crossfield Consulting Limited is to be notified to undertake inspection and verification works if unrecorded tanks are encountered.

Verification of the work will take the form of a visual inspection and photographic record to confirm that the tank/interceptors have been removed. Certificates of decommissioning, if applicable, will be obtained from the company awarded the contract for this work. Waste transfer notes will also be obtained for materials that are removed from site to permitted waste facilities.

7.2 Sampling, Testing and Assessment

Immediately following removal of the underground fuel tanks, pipework and drainage interceptors (if applicable), the resultant excavations will be inspected and soil samples will be recovered from the sides and bases, by an appropriately qualified geoenvironmental engineer, who will ensure that samples are representative of the ground conditions observed within the excavations. With respect to sampling frequency, a minimum of one sample will be recovered from each excavation side and the excavation base. The side wall samples will be taken from the midpoint of the side and at a depth halfway between ground level and the base of the excavation (if visual/olfactory evidence of impaction is present at another location on the excavation side then the sample location would be moved accordingly). For excavations longer than 10 m in length, one sample per 10 m length will be required from excavation sides. For larger excavations, one base sample will be required for each 10 m by 10 m area of base. All soil samples for analytical testing will be collected in appropriate containers, stored in cool boxes and sent to a UKAS and MCERTS accredited testing laboratory overnight. All samples will be recovered in accordance with procedures that are compliant with BS 10175:2011+A2:2017, including the use of clean tools. Tank/interceptor excavation samples will be submitted for analysis of the following determinands:

- Total Petroleum Hydrocarbons – aromatic/aliphatic split and carbon number banding (CWG speciation), using GC-FID techniques
- Volatile Organic Compounds (including BTEX and MTBE compounds) – using GC-MS techniques

If laboratory testing indicates concentrations of potential contaminants that are above appropriate acceptance criteria, as presented in Table 2, then additional materials would be excavated from the side(s) and/or base of the excavation, as appropriate. A minimum horizontal thickness of 0.1 m would be excavated from the full side wall and/or a minimum vertical thickness of 0.1 m would be removed from the full base of the excavation.

Further verification samples would then be recovered, as detailed above. Alternatively, for marginal exceedances of the acceptance criteria, additional risk assessment may be undertaken to determine that soils are not an unacceptable risk to environmental receptors such that they may remain in place (or be reused during earthworks). Agreement would be obtained from the local planning authority if such risk assessment is undertaken.

7.3 Infill of Excavations

Excavations will be back-filled with suitable arisings. Backfill may include site-won soils that have been assessed in accordance with the reuse criteria in Table 2 or crushed demolition materials providing it is not stained and there is no evidence of deleterious materials (including putrescible materials). If any materials are imported to site for backfill purposes, they will be accompanied by data that demonstrate that the supplied material is suitable for use in the proposed commercial development. Imported materials for use as general fill may be assessed in accordance with Table 2.

7.4 Decommissioning of Boreholes

Following completion of the supplementary ground investigation (as detailed in Section 6) and removal of the underground tanks and associated verification and before earthworks start, all existing borehole monitoring standpipes will be decommissioned in general accordance with the guidance provided within the Environment Agency document *Good Practice for Decommissioning Redundant Boreholes and Wells* (considered to contain appropriate best practice advice and guidance) to prevent the creation of potential pollutant pathways. If an alternative decommissioning strategy or specification is used then it would be agreed with the local planning authority before undertaking the works.

Verification of the decommissioning works, including photographs of the works and records of the types and quantities of the backfilling and sealing materials, shall be undertaken.

7.5 Verification of Demolition-Phase Remediation Works

So that it can be confirmed that the tanks (and, if applicable, interceptors) have been removed and that soils remaining on site comply with the acceptability criteria (or any additional risk assessment), the following records will, as a minimum, during the tank removal works:

- Photographic record of all tank removal and excavation inspection/sampling works
- Results of laboratory testing on verification samples to confirm that materials comply with Table 2 (or with any additional risk assessment)
- Disposal records and waste transfer notes to confirm that pumped liquids and/or other have been handled and transported by suitably permitted contractors and removed to a suitably permitted landfill or waste facility
- If applicable, a record of materials imported to site for backfill and confirmation that the materials are compatible with Table 2.
- A photographic record of borehole decommissioning works and a record of materials used.

8. REMEDIATION WORKS: CONSTRUCTION PHASE

8.1 Ground Gas/Vapour Protection Measures

8.1.1 Required Works

The WSP ground investigations have included ground gas monitoring that locally recorded methane concentrations of between 5.8% to 7.8% and carbon dioxide concentrations of between 5.1% and 13.8%. No significant ground gas flow rates have been recorded during any past monitoring visit. As a precautionary measure, WSP classified the site as Characteristic Ground Gas Situation CS2 (i.e. requiring ground gas protection measures) but subject to review and additional monitoring due to proposed earthworks that would redistribute soils and change the ground profile of the site.

Residual petroleum hydrocarbon concentrations have been identified beneath the site but not at concentrations considered to be associated with a significant vapour exposure risk. However, there is potential for greater concentrations of petroleum hydrocarbons around underground fuel tanks and such hydrocarbons may be associated with a greater risk of vapour exposure.

On the basis of the known ground conditions, vapour protection measures are not currently necessary for the Option 2 scheme. However, ground conditions and risks from indoor vapour exposure pathways will be assessed further following the underground tank removal works and verification testing. If assessment of the verification testing indicates a valid potential indoor vapour exposure risk, then an addendum to this Remediation Implementation Plan will be issued to detail the protection measures to be implemented (or further works and assessment to confirm that risks are not valid) and the addendum would be agreed with the London Borough of Hillingdon before implementing the proposed works. Further ground gas assessment, post earthworks, may be required (and this may require additional ground gas monitoring, as outlined in Section 11). If additional ground gas assessment confirms that ground gas protection measures are required then an addendum to this Remediation Implementation Plan will be issued to detail the protection measures to be implemented and the addendum would be agreed with the London Borough of Hillingdon before implementing the proposed works. Any addendum issued would also include confirmation of how the required measures would be verified as successfully completed and the information that would be collected for presentation in a Remediation Verification Report.

8.2 Soft Landscaped Areas

8.2.1 Required Works

Due to concentrations of lead that have been identified above commercial end use human health assessment criteria, the presence of asbestos fibres, the potential for additional contaminants (possibly at levels above relevant assessment criteria) in areas of the site not currently investigated and the redistribution of materials that will occur during earthworks, it is proposed to install a topsoil/subsoil capping layer (also known as a clean cover system) in areas of proposed soft landscaping. Proposed buildings and external hardstanding will form effective barriers such that no further mitigation measures are required in those areas of the site. It is also noted that there are already areas of soft landscaping at the site that are to be retained as is. As there is no change of end use within existing landscaping, which has been present for in excess of 30 years, it is considered that there is negligible risk associated with existing landscaping areas.

The WSP Remediation Strategy has provided indicative capping layer thicknesses of 300 mm to 600 mm thickness in public open space/soft landscaping and with a geotextile marker layer. However, WSP has indicated that the thicknesses are indicative and that specific thicknesses are to be agreed with the local planning authority as part of this Remediation Implementation Plan.

It is noted that proposed soft landscaping areas will be limited in extent and will form decorative features rather than large amenity space. There will be no significant future excavation into such areas in the future (limited excavation as part of a maintenance contract may occur but this would be of limited depth, possibly to replace plantings within the growing layer (i.e. the topsoil) of the capping. On this basis, it is considered that future digging would not be a valid mechanism for breaching the capping layer and returning existing Made Ground to near surface depths. Therefore, root mixing and soil organism activity would be the valid mechanisms for returning Made Ground to near-surface depths.

Due to the simple root system of grass, the potential for contaminants to be returned to the surface in areas of lawn is limited to the actions of worm activity. Based on evidence referenced in BRE Document BR 465 (2004), such activity is typically confined to the top 300 mm of soil. Therefore, a 300 mm thickness of topsoil/subsoil is considered to be justified where proposed soft landscaping is to consist of turf/grass. Plant roots typically remain within those materials that contain the highest concentrations of nutrients, hence a 450 mm thickness of topsoil/subsoil is considered appropriate for landscaping containing typical plantings. The existing ground will have construction plant tracking across it (and is to be subject to earthworks compaction) such that, by the time topsoil/subsoil is to be placed, the ground will be well compacted. It is considered that roots will have difficulty penetrating the existing ground following placement of the topsoil/subsoil and, hence, roots should remain within the capping layer. It is recommended that the upper section of the capping layer comprises a minimum thickness of 150 mm of topsoil to act as a growing medium (although the advice of a landscaping specialist preparing a planting schedule should be consulted and the topsoil thickness amended accordingly depending on the planting requirements). It should be noted that an increased capping layer thickness or tree pits may be required around proposed tree plantings and the increased thickness should be in accordance with advice from a landscaping specialist so that suitable growth and support mediums are provided.

As there is no significant potential for future digging within soft landscaping areas, it is considered that a geotextile marker layer is not necessary (and the omission of such a marker layer beneath soft landscaping capping layers would also limit the potential for confusion with geotextile markers that are to be placed to define certain asbestos impacted soils).

Prior to importing topsoil/subsoil materials to site, documentation will be obtained that demonstrates that the soils meet the requirements of BS 3882:2015 (topsoil) and BS 8601:2013 (subsoil). If the soils are sourced from a brownfield site, a recycling facility or if the material provenance is unknown/uncertain then the supplier is also to provide an analytical testing report (with testing on a minimum of three representative samples of the material to be supplied to site). The materials should be tested and confirmed that each individual compound is in accordance with the values identified in Table 3. Information regarding the source of imported materials will be reviewed by Crossfield Consulting and, if necessary, the testing suite given in Table 3 will be extended to include additional determinands that may be associated with the source site. Following review of the supplier information, the materials will be deemed as suitable for use on site or will be rejected and alternative source will be identified. Haulier delivery notes will be kept for each load of topsoil/subsoil brought to site to confirm that the materials have been sourced from the correct facility.

In addition to documentation supplied by the source site, the imported topsoil and subsoil materials will also be sampled by an independent geoenvironmental specialist after they have been imported to site to confirm that the correct materials have been provided by the supplier and that there has been no cross-contamination during transit. The samples will then be scheduled for testing that is compliant with Table 3 (modified as necessary based on the nature of the source site). Testing will be at a frequency of one sample per 250 m³ of imported material (with a minimum of three samples per material, per source). If single suppliers are identified for each of the topsoil and subsoil materials and the materials imported to site remain consistent, then the testing frequency may subsequently rise to one sample every 500 m³. Once the materials have been placed in landscaping areas, a geoenvironmental specialist will visit site to provide independent verification of the thickness of the materials that have been placed.

In addition to acting as a capping layer, the works described above will also provide a healthy growing medium for proposed plantings.

8.2.2 Verification of Landscape Material Placement

To demonstrate that the remediation works have been successfully completed, the following information will, as a minimum, be collected:

- Documentation provided by the topsoil/subsoil supplier to demonstrate imported soil suitability (including analytical laboratory test reports that demonstrate compliance with Table 3, if applicable at this stage).
- Details of soil samples taken after material import to site.
- Results of analytical laboratory testing on samples taken after material import to site (demonstrating compliance with Table 3).
- Photographs of soil inspections and confirmation that a sufficient thickness of topsoil/subsoil materials has been placed in soft landscaping areas.
- A plan showing the locations of soil inspections
- Based on the above information, confirmation that works have been undertaken in accordance with the Remediation Implementation Plan.

8.3 Potable Water Pipes

8.3.1 Required Works

With reference to UKWIR (2010), it is considered that the site would be classified as a 'brownfield site', as the property has previously been associated with fuel storage. Therefore, it is recommended that allowance be made for the use of multi-layer barrier pipe for potable water supply. Note that, a requirement for these remedial works will be dependent on the water supply company's policies and it may not be necessary to undertake these works.

8.3.2 Verification of Potable Water Supply Pipe Installation

The installation of potable water supply pipes requires to be inspected and signed off by the local water company once the company is satisfied that the pipe materials used are suitable and that the pipe has been correctly installed. On this basis, water company sign-off of the installation will be considered to act as verification that appropriate water supply pipe materials have been used to be sufficiently protective of end-user health.

9. MATERIAL REUSE AND MANAGEMENT

9.1 Requirements for Material Reuse

It is understood that cut/fill works are to be undertaken in preparation for the site development. The WSP Remediation Strategy permits the reuse of site-won materials, subject to compliance with the reuse acceptance criteria (works to further assess that soils are suitably in compliance with the criteria are detailed in Section 6). Final proposed volumes of earthworks materials are not currently known. However, current estimates are that approximately 26,000 m³ of materials will be cut and approximately 24,000 m³ of materials are to be filled.

9.2 Imported Materials

As there is surplus of materials indicated by the current cut/fill balance estimate, it is expected that site-won materials will form the earthworks materials. However, if materials are to be imported to site then one of the following will be applicable, depending on the nature of the materials:

- Imported soils should be tested in accordance with Table 2 and imported in accordance with a Materials Management Plan (MMP) or environmental permit (or exemption), as appropriate. Appropriate geotechnical testing would also be necessary but is outside the scope of this document to define.
- Imported recycled aggregates should be supplied with appropriate documentation to confirm compliance with WRAP Quality Protocols for inert recycled materials. Analytical testing in accordance with Table 3 should not then be required, although appropriate geotechnical testing may be required to confirm suitability for use.
- Imported aggregates from a natural source (such as a quarry) should not require any analytical testing, although geotechnical testing may be required to confirm suitability for use.

9.3 Materials Management Plan

The movement and reuse of Made Ground at the site should be undertaken in accordance with the procedure given in CL:AIRE *Definition of Waste: Development Industry Code of Practice Version 2* (DoWCoP). A Materials Management Plan, in accordance with the DoWCoP should be prepared for the Made Ground soils that are to be moved and reused on site.

It should be noted that there is an indication that a recorded landfill may extend into the northwestern part of the site (indicatively marked on Figure 4). Additional ground investigation (see Section 6) would be required in this area to define whether materials are different in that part of the site compared to the wider site area so that it can be determined whether a potential former landfill could realistically be assessed as extending into the site. Materials in the affected area would, by definition, be waste and, therefore, could not be moved and reused at the site under the DoWCoP. It is likely to be necessary to seek agreement with the Environment Agency that such materials can be reused at the site and an appropriate environmental permit or exemption would be necessary.

10. UNFORESEEN GROUND CONDITIONS

Given the ground investigation works that have been undertaken to date at the property, together with those that are proposed under the work detailed in Section 6, it is considered that risks to human health, the wider environment and construction materials have been adequately assessed. Hence, it is considered very unlikely that potential contamination would be encountered during development that had not previously been considered. However, a discovery strategy has been produced that outlines the procedure to be followed by site operatives should unexpected (and potentially “contaminated”) ground conditions be encountered during development. This procedure is presented in Appendix I.

11. MONITORING FOLLOWING COMPLETION OF WORKS

Following completion of the proposed earthworks, and if the Option 2 scheme is to be developed, additional ground gas monitoring should be undertaken to assess whether ground gas precautions are required. At this stage, it is envisaged that a minimum of four monitoring standpipes would be installed within the footprint of the southern proposed building (which will be constructed in an area of significant earthworks filling where existing Made Ground would form much of the fill materials). If, during earthworks inspections, it is considered

that there is potential for significant thicknesses of Made Ground to remain below the formation level of the building in the northern part of the site (largely in an area of cut where existing Made Ground will be removed), then monitoring standpipes will also be installed within the footprint of the proposed northern building. Monitoring would be undertaken on a minimum of four occasions at weekly intervals. If, prior to undertaking the gas monitoring, it is considered that standpipe locations, the number of monitoring visits or monitoring frequencies could or should be amended then the variations to the proposed gas monitoring would be agreed with the local planning authority ahead of the work.

Based on the nature of the proposed remediation works, it is considered that there is no requirement for long-term monitoring following completion of the remediation works.

With respect to maintenance/arrangement of contingency actions, details regarding future maintenance of the development to ensure that gas membranes/capping layers are not damaged, and what actions are required if such damage does occur, should be included in the Health and Safety File to be issued on handover.

12. VERIFICATION AND REPORTING REQUIREMENTS

On completion of the work indicated in this Remediation Implementation Plan, a Remediation Verification Report will be prepared. The report will provide the following information (additional information on record keeping to confirm verification of the works is included in the relevant section of this Implementation Plan):

- Confirmation that Made Ground materials were kept damp during ground works
- Details of hand-picked ACM and associated disposal records (if applicable)
- Confirmation that underground fuel tanks have been removed from site and soils surrounding the tanks have been verified as suitable to remain on site
- Details of any soils containing asbestos that were reused on site and that were surveyed and placed below a high visibility geotextile marker
- Details confirming the installation and verification of vapour protection measures (if applicable)
- Details confirming the installation and verification of ground gas protection measures (if applicable)
- A record of the imported topsoil/subsoil and confirmation that their placement is compatible with the requirements of a capping layer
- Confirmation that the local water supply company has connected the site to the mains supply
- A record of other imported materials, if applicable, and confirmation that they are suitable for use in accordance with the acceptance criteria in this Remediation Implementation Plan, that they meet the WRAP Quality Protocols for recycled inert materials or that they are a natural source from a quarry or similar.
- A summary of waste consignment notes and disposal receipts relating to the materials removed from site to a permitted or exempt site
- Confirmation that no unforeseen ground conditions were encountered or details of the assessment and remediation work undertaken if such conditions were encountered
- An updated Site Model to reflect conditions following development and completion of remediation.
- Confirmation that works have been completed in accordance with the Remediation Implementation Plan
- Confirmation that an MMP verification report has been prepared.

REFERENCES

Site Specific References

WSP (April 2019) *Prologis Park West London: Expansion Land, Phase 2 Geo-Environmental and Geotechnical Assessment Report* Ref. 70055718-P2

WSP (June 2020) *Prologis Park West London: Expansion Land, Geo-Environmental Preliminary Risk Assessment Report* Ref. 70062215-PRA

WSP (March 2021) *Prologis Park West London: Expansion Land, Generic Quantitative Risk Assessment and Geotechnical Assessment Report* Report Ref. 70077417-001

WSP (July 2021) *Prologis Park West London: Expansion Land, Remediation Strategy Report* Ref. 70077417-REM

Technical References

BRE (2004) *BR465 – Cover Systems for Land Regeneration* Building Research Establishment

BSI (2013) *BS 10175:2011+A2:2017 Code of Practice for Investigation of Potentially Contaminated Sites* British Standards Institution

BSI (2015) *BS 3882:2015 Specification for topsoil and requirements for use* British Standards Institution

CIRIA (2001) *CIRIA C552 – Contaminated Land Risk Assessment: A Guide to Good Practice* Construction Industry Research Association

CIRIA (2014) *CIRIA C735 Good Practice on the Testing and Verification of Protective Systems for Buildings Against Hazardous Ground Gas* Construction Industry Research Association

CL:AIRE (2011) *The Definition of Waste: Development Industry Code of Practice Version 2* Contaminated Land: Applications in Real Environments

DoE (1990) *The Environmental Protection Act* Department of The Environment HMSO

Environment Agency/Scottish Environment Protection Agency/Environment & Heritage Service *Installation, Decommissioning and Removal of Underground Storage Tanks: PPG27* EA

Environment Agency (October 2020, Updated April 2021) *Land Contamination Risk Management (LCRM)* EA

Environment Agency (2010) *Guiding Principles for Land Contamination – GPLC1 to 3* EA

HSE (1991) *Protection of Workers and the General Public During the Development of Contaminated Land* Health and Safety Executive

HSE Guidance Note CS15 (1997) *The Cleaning and Gas-freeing of Tanks containing Flammable Residues* Health and Safety Executive

Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Framework*

UKWIR (2010) *Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites* Report Ref. No. 10/WM/03/21 UK Water Industry Research

GENERAL NOTES

1. The report is limited to the site boundaries and is specific to the development proposals as identified by the Client (or Client's advisor) and confirmed within this report. The report should not be used in a different context. Where the report is identified as a site appraisal, further geoenvironmental assessment, and detailed investigations, will be required prior to finalisation of ground related assessment and designs. Other reports may recommend additional investigation or other works that would be considered essential prior to the preparation of final assessments and associated designs.
2. This report has been prepared by Crossfield Consulting Limited with all reasonable skill, care and diligence within the terms of the Appointment/Proposal Terms and Conditions (as applicable) and with the resources agreed with the Client. Responsibility for any matters outside the agreed scope is not accepted.
3. Where any data supplied by the Client or by other external sources, including previous site investigation data, have been used it has been assumed that the information is correct unless otherwise stated. No responsibility can be accepted by Crossfield Consulting Limited for inaccuracies within the data supplied by others.
4. Any borehole data from the British Geological Survey sources are included on the following basis: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation.
5. Any assessments made in this report are based on the ground conditions indicated by the factual records included and/or referenced in the report, namely, trial pits and/or boreholes, together with the results of any field or laboratory testing undertaken and, where appropriate, other relevant site data/desk study information which may have been obtained for the site. Variations in ground conditions may occur between exploratory hole locations and there may be special conditions appertaining to the site that have not been revealed by the investigation and that have not been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available.
6. Exploratory hole locations provided in the report are generally established by tape measurement (or similar measurement) from existing features or boundaries. Ground levels stated in the report are based on site survey plans as provided. Hole locations are not accurately surveyed and ground levels at these locations are not obtained unless specifically included in the agreed scope of services.
7. Unless stated otherwise, no consultations with regulatory authorities, funders or other third parties have been carried out; hence, definitive assurance that such third parties will accept the findings of this report cannot be provided.
8. This report is only valid when used in its entirety. Any information or advice should not be relied upon if removed from the report or not considered in the context of the whole document. Crossfield Consulting Limited cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared.
9. The report is provided for the sole use by the Client or its assignees and is confidential to the Client's professional advisers. No responsibility whatsoever for the contents of this report will be accepted to any person other than the Client or its assignees.
10. The Client cannot place reliance on the report until full payment has been made for the report and all associated works.
11. New information, improved methods, changes in published guidance, codes of practice, policies and legislation can occur at any time and may necessitate an alteration to the report in whole, or in part, after its submission. Therefore, with any change in circumstances or after the expiry of one year from the date of the report, the report should be referred to Crossfield Consulting Limited for re-assessment and, if necessary, re-appraisal.

TABLES

TABLE 1

REVISED SITE MODEL WITH RELEVANT CONTAMINANT LINKAGES

Potential Contaminant Source	Potential Pathway	Receptors and Assessed Contaminant Linkage
Solids Toxic metals Petroleum hydrocarbon residues adsorbed to soils Asbestos fibres	Movement of Solids Potential direct dermal, ingestion and inhalation exposure pathways and airborne dust migration pathways present during construction but are largely absent after development due to hardstanding barriers and buildings. Potential for dust exposure pathways (dermal, ingestion, inhalation) in soft landscaping areas are proposed. Release into Vapour Phase Potential volatilisation of residual petroleum hydrocarbons	Human Health <i>Construction workers:</i> Possible contaminant linkage <i>End users:</i> Possible contaminant linkage <i>Neighbours & public:</i> Possible contaminant linkage
Solids Chemically aggressive compounds/soil conditions (including adverse pH, sulphates and certain organic compounds)	Movement of Solids Direct contact and chemical reactions	Buried Structures & Services <i>Concrete:</i> Possible contaminant linkage <i>Potable water supply pipes:</i> Possible contaminant linkage
Ground Gases Elevated methane and carbon dioxide concentrations have been identified beneath the site. Note that proposed earthworks may eliminate source potential.	Movement of Gases Potential migration of ground gases into buildings through floor slabs and other structure/substructure details. Note that proposed earthworks may eliminate migration potential.	Human Health <i>Construction workers (in confined spaces):</i> Possible contaminant linkage <i>End users:</i> Possible contaminant linkage

NOTES

1. The above site model and assessed contaminant linkages is based on the Refined Conceptual Site Model in the WSP Remediation Strategy. Other potential contaminant sources, migration pathways and/or receptor contaminant linkages have been refined out of the model at various stages of assessment and further details of earlier versions of the site model are available in the WSP reports listed in the References.
2. The work detailed in this Remediation Implementation Plan, as based on the requirements of the WSP Remediation Strategy, will eliminate or mitigate, as appropriate, the identified contaminant linkages such that, on completion of the remedial works, there will be no unacceptable risks to the identified receptors and the contaminant linkages will no longer be valid.

TABLE 2
(Page 1 of 2)

ACCEPTANCE CRITERIA FOR SOILS TO BE RETAINED ON SITE AS GENERAL FILL

Determinand	Units	Acceptance Criteria (Commercial)
		Value
Arsenic	mg/kg	635
Barium	mg/kg	n/a
Beryllium	mg/kg	n/a
Boron	mg/kg	207,000
Cadmium	mg/kg	223
Chromium (III)	mg/kg	9550
Chromium (VI)	mg/kg	24
Copper	mg/kg	69,800
Lead	mg/kg	1390
Inorganic Mercury	mg/kg	1110
Nickel	mg/kg	1710
Selenium	mg/kg	12,300
Vanadium	mg/kg	9220
Zinc	mg/kg	n/a
Inorganic Cyanide	mg/kg	50
Petroleum Hydrocarbons		
Aliphatics C ₅ – C ₆	mg/kg	1000
Aliphatics C ₆ – C ₈	mg/kg	1000
Aliphatics C ₈ – C ₁₀	mg/kg	1000
Aliphatics C ₁₀ – C ₁₂	mg/kg	1000
Aliphatics C ₁₂ – C ₁₆	mg/kg	1000
Aliphatics C ₁₆ – C ₃₅	mg/kg	1000
Aliphatics C ₃₅ – C ₄₄	mg/kg	1000
Aromatics C ₆ – C ₇	mg/kg	1000
Aromatics C ₇ – C ₈	mg/kg	1000
Aromatics C ₈ – C ₁₀	mg/kg	1000
Aromatics C ₁₀ – C ₁₂	mg/kg	1000
Aromatics C ₁₂ – C ₁₆	mg/kg	1000
Aromatics C ₁₆ – C ₂₁	mg/kg	5000
Aromatics C ₂₁ – C ₃₅	mg/kg	5000
Aromatics C ₃₅ – C ₄₄	mg/kg	5000
VOCs		
Benzene	mg/kg	90
Toluene	mg/kg	500
Ethylbenzene	mg/kg	500
Xylenes	mg/kg	500
MTBE	mg/kg	500
Isopropylbenzene	mg/kg	500
Propylbenzene	mg/kg	500
Styrene	mg/kg	5000
Trimethylbenzenes	mg/kg	208

TABLE 2
(Page 2 of 2)

Determinand	Units	Acceptance Criteria (Commercial)
		Value
PAHs		
Naphthalene	mg/kg	1080
Benzo(a)pyrene	mg/kg	38
Phenol	mg/kg	3200
Biphenyl	mg/kg	1000
Total Cresols	mg/kg	1000
PCBs	mg/kg	9.5
Asbestos Fibres	%	<0.1

NOTES

1. The acceptance criteria are reproduced from Table 6-2 in the WSP Remediation Strategy and are based on a commercial end use scenario.
2. The acceptance criteria relate to site-won soils that are intended to be reused as general fill below buildings, hardstanding and/or a capping layer in soft landscaping areas. The acceptance criteria are not suitable for assessing materials that will form a capping layer in soft landscaping areas (see Table 3 for relevant acceptance criteria).
3. Soils with asbestos fibre concentrations in the range of <0.001% to <0.1% will be acceptable for reuse. Soils with asbestos fibre concentrations of 0.1% or greater may be acceptable for reuse but will be subject of additional risk assessment (which may require additional mitigation measures) and agreement with the local planning authority prior to reusing such materials. Where practical, visible asbestos containing materials (ACM) should be hand-picked and bagged for removal from site.
4. If soils with chemical concentrations greater than the above criteria are identified then, in the first instance and to limit materials being sent to landfill, additional risk assessment will be undertaken to determine whether the materials can be reused (possibly in conjunction with additional mitigation measures) and agreement will be obtained from the local planning authority prior to reuse of affected soils.

TABLE 3
(Page 1 of 2)

ACCEPTANCE CRITERIA FOR SOILS TO BE IMPORTED TO SITE

Determinand	Units	Acceptance Criteria (Public Open Space)
		Value
Arsenic	mg/kg	79
Barium	mg/kg	2680
Beryllium	mg/kg	2.2
Boron	mg/kg	20,500
Cadmium	mg/kg	120
Chromium (III)	mg/kg	2140
Chromium (VI)	mg/kg	5.7
Copper	mg/kg	12,500
Lead	mg/kg	310
Inorganic Mercury	mg/kg	124
Nickel	mg/kg	305
Selenium	mg/kg	1140
Vanadium	mg/kg	2110
Zinc	mg/kg	80,700
Inorganic Cyanide	mg/kg	15
Petroleum Hydrocarbons		
Aliphatics C ₅ – C ₆	mg/kg	1000
Aliphatics C ₆ – C ₈	mg/kg	1000
Aliphatics C ₈ – C ₁₀	mg/kg	1000
Aliphatics C ₁₀ – C ₁₂	mg/kg	1000
Aliphatics C ₁₂ – C ₁₆	mg/kg	1000
Aliphatics C ₁₆ – C ₃₅	mg/kg	1000
Aliphatics C ₃₅ – C ₄₄	mg/kg	1000
Aromatics C ₆ – C ₇	mg/kg	1000
Aromatics C ₇ – C ₈	mg/kg	1000
Aromatics C ₈ – C ₁₀	mg/kg	1000
Aromatics C ₁₀ – C ₁₂	mg/kg	1000
Aromatics C ₁₂ – C ₁₆	mg/kg	1000
Aromatics C ₁₆ – C ₂₁	mg/kg	3770
Aromatics C ₂₁ – C ₃₅	mg/kg	3770
Aromatics C ₃₅ – C ₄₄	mg/kg	3770
VOCs		
Benzene	mg/kg	72
Toluene	mg/kg	500
Ethylbenzene	mg/kg	500
Xylenes	mg/kg	500
MTBE	mg/kg	500
Isopropylbenzene	mg/kg	500
Propylbenzene	mg/kg	500
Styrene	mg/kg	3020
Trimethylbenzenes	mg/kg	248

TABLE 3
(Page 2 of 2)

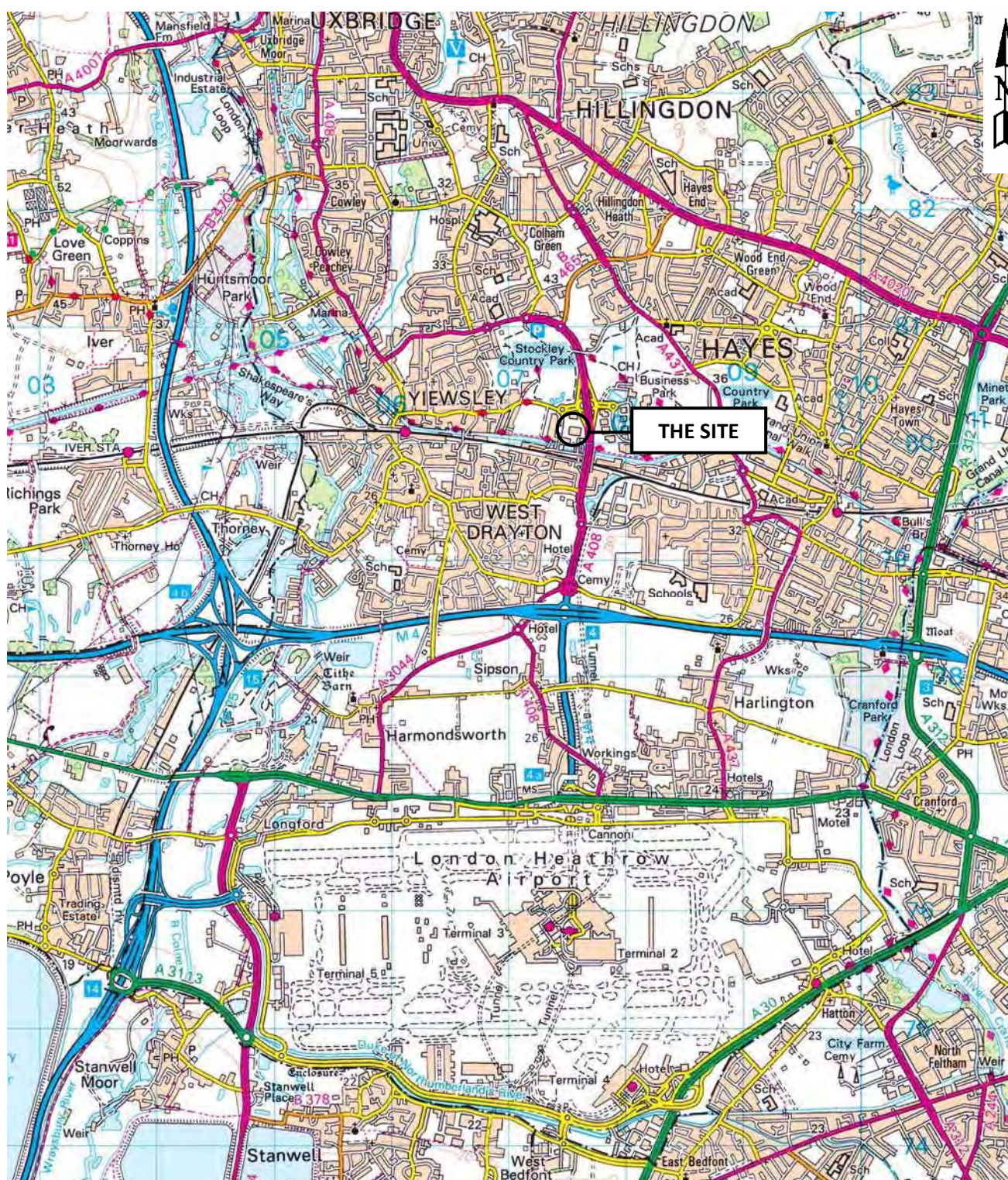
Determinand	Units	Acceptance Criteria (Public Open Space)
		Value
PAHs		
Naphthalene	mg/kg	4890
Benzo(a)pyrene	mg/kg	72
Phenol	mg/kg	760
Biphenyl	mg/kg	1000
Total Cresols	mg/kg	1000
PCBs	mg/kg	1.3
Asbestos Fibres	%	<0.001

NOTES

1. The acceptance criteria are reproduced from Table 6-2 in the WSP Remediation Strategy and are based on a public open space end use scenario.
2. The acceptance criteria relate to materials that are imported to site. It is expected that such imported materials would comprise topsoil and subsoil for use as a capping layer in areas of proposed soft landscaping.
3. Asbestos fibres recorded as not detected or, following quantification, detected at concentrations below the laboratory reporting limit (maximum acceptable method reporting limit of 0.001%) will be deemed to meet the criteria. Visible asbestos containing materials (ACM) will not be acceptable and are to be hand-picked and removed.

FIGURES

FIGURE 1



SITE LOCATION PLAN

Scale 1: 50,000

Reproduced from the 2020 1:50,000 Ordnance Survey map with the permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright. Licence No.100014660

FIGURE 2



KEY

- Above ground tank
- Vent pipe(s) and fill point
- △ Vent pipe(s)

The above annotations are based on features labelled on the survey drawing

TOPOGRAPHICAL SURVEY

Scale 1:1250

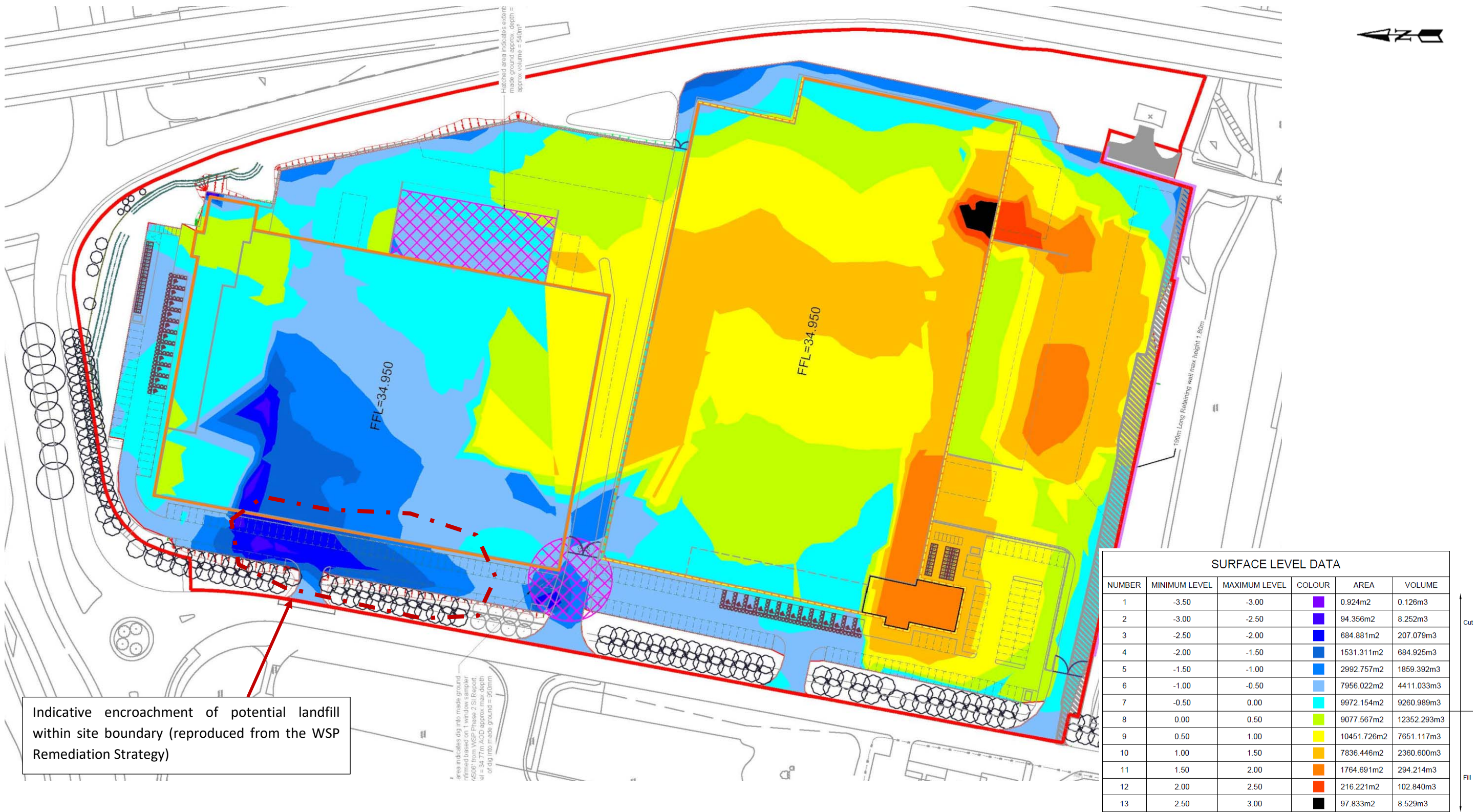
Reproduced from a topographical survey, dated June 2019, by Greenhatch Group, Dwg No. 33865_T

FIGURE 3

PROPOSED DEVELOPMENT LAYOUT – OPTION 2
Scale 1:1250

Reproduced from a proposed site layout plan, dated June 2021, by Michael Sparks Associates, Dwg No. 30928-PL-201B

FIGURE 4



PROPOSED EARTHWORKS CUT/FILL – OPTION 2

Scale 1:1250

Reproduced from a proposed earthworks (two units) plan, dated August 2019, by RPS, Dwg No. PPWLE-RPS-SI-XX-DR-C-1200

APPENDIX I

DISCOVERY STRATEGY FOR POTENTIALLY CONTAMINATED MATERIALS ENCOUNTERED DURING CONSTRUCTION WORKS

Background

This Strategy defines the process to be undertaken on site if potentially contaminated materials (soil or water) or suspicious objects are encountered during development that had not previously been identified at the site. It is intended that this Strategy should be understood and followed by all on-site workers and for all new site workers to be made aware of the procedure. A copy of this Strategy should be prominently displayed at all times during construction, such that it is readily accessible to all site operatives. This Strategy, and any work undertaken in accordance with it, is intended to fulfil the typical requirements of a local planning authority.

Identifying Potentially Contaminated Material

Materials or conditions that may be encountered at the site and which could indicate the presence of contamination include, but are not limited to:

- Unrecorded tanks
- Soils that are oily or have a strong fuel odour
- Solvent-type odours
- Certain man-made objects such as paint cans, oil drums, car parts etc.
- Fragments of asbestos

If any other material is encountered that causes doubt, advice should be sought.

Procedure

On discovery of any suspicious materials within the ground during development, the following procedure should be followed:

- Site personnel to inform the designated Site Manager immediately. Site personnel should not investigate the materials encountered.
- The Site Manager should determine whether this is potential contamination that has not previously been assessed by referring to available information in the site specific reports (as detailed below). The Site Manager will then inform Crossfield Consulting Limited. The relevant area will be cordoned off and work will cease in this area.
- Crossfield Consulting Limited will attend site to inspect the ground and recover samples for analytical laboratory testing and undertake additional risk assessment, as appropriate. Crossfield Consulting Limited will then inform the local planning authority and, in due course, forward a copy of any assessment, factual information and, where necessary, remediation strategy. Any proposed remediation works will be agreed with The London Borough of Hillingdon prior to undertaking such work.

Contact Details

- Crossfield Consulting Limited – Tel: 01926 815678 Email: mail@crossfield-consulting.co.uk

Contact Name

Telephone Number

Email Address

Relevant Reports

- WSP – Phase 2 Geo-Environmental and Geotechnical Report (April 2019) – Report No. 70055718-P2
- WSP – Geo-Environmental Preliminary Risk Assessment (June 2020) – Report No. 70062215-PRA
- WSP – Generic Quantitative Risk Assessment & Geotechnical Assessment Report (May 2021) – Report No. 70077417-001
- WSP – Remediation Strategy (July 2021) – Report No. 70077417-REM
- Crossfield Consulting – Remediation Implementation Plan (September 2021) – Report No. CCL03466.CO23