

Remediation & Verification Strategy

Unit 10, Barton Industrial Estate

Presented to: Legal & General Property Partners (Industrial Fund) Limited and Legal & General
Property Partners (Industrial) Nominees Limited

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About Us

Lucion Delta-Simons is part of Lucion, a technology-led environmental services company dedicated to protecting people and the planet. With expert advice, guidance, and a comprehensive array of services, we support you at every stage of your asset lifecycle, helping you mitigate regulatory impact, improve business practices, and ensure safety and environmental protection.

As part of Lucion's group of companies, we can support you with a broader range of holistic services. Through our pool of multidisciplinary experts, we help you navigate complex regulatory frameworks, saving you time and money.

Being part of your sustainable supply chain is a key goal for our team. As a member of the UN Global Compact and a commitment to sustainability, we are the partner of choice for businesses looking to make informed decisions and mitigate risks across your portfolio.

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If you would like support in understanding your carbon emissions, or those of your supply chain, please get in touch with your Lucion contact above who will be happy to help.

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1.0 Introduction

1.1 Appointment

Lucion Delta-Simons Limited (“Lucion”) was instructed by Legal & General Property Partners (Industrial Fund) Limited and Legal & General Property Partners (Industrial) Nominees Limited (the “Client”) to undertake the preparation of a Remediation and Verification Strategy (RVS) for the proposed redevelopment of Unit 10, Barton Industrial Estate, Eastleigh (the “Site”). The Site is subject to Planning Permission reference F/24/97441.

1.2 Context & Purpose

The purpose of this document is to:

- Present a summary of remediation requirements;
- Contribute to a sustainable development “*which meets the needs of the present without compromising the ability of future generations to meet their own needs*” as advocated by, for example, GPLC2¹
- Provide a formal statement for the likely scope of remediation requirements to facilitate the proposed development at the Site; and,
- Support the discharge of planning conditions relating to land contamination.

For information on the Site setting, and full details of intrusive investigations undertaken at the Site, this Remediation Strategy and Verification Strategy should be read in conjunction with WSP’s previous report as follows:

- Unit 10 Service Yard Investigation, Barton Industrial Estate’, by WSP on behalf of Industrial Property Investment Fund, ref 70119985-GI-R00 dated April 2024.

1.3 Scope of Works

The scope of works undertaken for this assessment was to:

- Summarise the site setting and confirmed contaminant linkages;
- Provide a remediation options appraisal;
- Select a preferred remediation approach; and,
- Present the remediation and verification strategy.

1.4 Limitations

This document sets out the measures that will be carried out during the construction to mitigate potentially significant risks as identified by the Site investigations in the context of the proposed end-use of the Site, it does not provide a verification or completion statement for the works. The standard limitations associated with this assessment are presented in Appendix A. In addition, there are the following specific limitations that apply to this assessment:

- This document is a strategy document and more detailed documentation in terms of a Contractor’s Remediation Method Statement may need to be prepared.

<https://assets.publishing.service.gov.uk/GPLC2>

2.0 Site Context

2.1 Site Information

Site Overview			
			
Showing Unit 10 in the west and the Security Hut in the east.			
Contains data from Google, Imagery©2025 Bluesky, InforterraLtd&COWI A/S, CNES / Airbus, Getmapping plc, Landsat / Copernicus, Maxar Technologies, Map data ©2025.			
Co-ordinates	Centred approximately at National Grid Reference 446094, 118950.	Elevation (approx.)	12 m AOD
		Area	<0.5Ha
Site Address and Location	The Site is located at Barton Park Industrial Estate, Chickenhall Lane, Eastleigh, SO50 6RR. The Site is approximately 8.5 km north-east of Southampton and is located in a predominantly industrial area to the east of Eastleigh. https://maps.app.goo.gl/ya4sif1UFzQUErot5 Google, Imagery©2025 Bluesky, InforterraLtd&COWI A/S, CNES / Airbus, Getmapping plc, Landsat / Copernicus, Maxar Technologies, Map data ©2025.		
Site Description	The Site is <0.5 Ha in size and is part of the wider Barton industrial estate, accessed off Bishopstoke Road to the north. The application Site comprises an industrial unit (Unit 10) with access roads at its eastern and western elevations.		

	It is understood that as part of the WSP Site walkover than an above ground fuel tank is present in the north west corner of Unit 10 with a fuel dispenser located along the eastern boundary of the building (nature of dispenser is unknown) . Information contained within drainage drawings also indicates the presence of three, three stage brick constructed interceptors in the north centre and south of the eastern boundary of the Site.
Site History	Information contained within the WSP report indicates that historically, the Site was understood to have comprised a locomotive, carriage and wagon works from the 1890s until the Site was redeveloped into Barton Park Industrial Estate in the late 20th Century. It is understood that multiple bulk fuel storage areas were historically located in the vicinity of Unit 10.
Proposed Development Description	The proposed development for the Site is to demolish the on-Site buildings (and lay a new service yard to serve the adjacent Unit 6 to the west.

2.2 Planning

It is understood that a singular planning consent has been submitted to Eastleigh Borough Council. for the demolition of Unit 10 to make way for a new service yard (planning ref F/24/97441) which was granted 09/09/2025.

Several environmental conditions relate to contamination risk and remediation, and are listed below:

Relevant Planning Conditions	F/24/97441 <i>Condition 4</i> <i>No work shall commence on site until a site-specific scheme for remedial works and measures to be undertaken to avoid the risk from contaminants as identified in the approved Ground Investigation Report produced by WSP for Unit 10 Service Yard Investigation, Barton Park Industrial State dated April 2024 reference 70119985-GI-R00, has been submitted to, and approved in writing by the Local Planning Authority. Such a scheme shall include nomination of a competent person to oversee the implementation of the works. Reason: To minimise the risk from land contamination for the safety of the workers and nearby residents.</i> <i>Condition 5</i> <i>Before any part of the development is occupied or used (unless otherwise first agreed in writing by the Local Planning Authority) a verification report demonstrating the effectiveness of the remediation works carried out in accordance with the details approved under Condition 4 shall be submitted to and approved in writing by the Local Planning Authority. Typically such a report would comprise: a. A description of the site and its background, and summary of relevant site information; b. A description of the remediation objectives and remedial works carried out; c. Verification data, including - data (sample locations/analytical results, as-built drawings of the implemented scheme, photographs of the remediation work in progress, etc.); and d. Certificates demonstrating that imported and/or material left in situ is free from contamination, confirmation of material removal, gas/vapour membranes have been installed correctly.</i>
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2.3 Physical Setting

Geology	According to British Geological Survey (BGS) mapping, the Site is underlain by superficial deposits belonging to Quaternary age River Terrace Deposits comprising sand and gravel locally with lenses of silt, clay and peat. The underlying bedrock belongs to Paleogene age Wittering Formation comprising greyish brown laminated clay; wavy- to lenticular-bedded sand interbedded with clay in equal proportions; and fine- to medium-grained sparsely glauconitic sand.
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	WSP undertook a ground investigation at Unit 10 in February 2024. The ground investigation included eight exploratory locations advanced to a maximum depth of 5 m below ground level (bgl) within the application Site as well as a single location (WS07) advanced to a maximum depth of 5 m bgl within the vicinity of the adjacent Unit 6. WSP reportedly encountered the following general ground conditions: Concrete and asphalt surfacing to depths between 0.07 and 0.33m below ground level bgl (m bgl). Made Ground to between 0.73 m bgl and 1.50 m bgl: Black angular fine to coarse gravel of clinker, white or grey vey clayey gravel of chalk, brown sandy, gravelly clay with gravel of brick, crushed concrete, clinker and flint. WSP reported that Asbestos was observed in four locations between 0.35 m bgl and 3.00 m bgl. Alluvium to 1.40 m bgl: Soft dark grey very silty Clay with an organic odour was encountered in WS06A only. River Terrace Deposits - Loam and Clay to between 1.50 m bgl and 1.75 m bgl: Greyish brown silty clay with occasional gravel of flint and calcareous fragments. River Terrace Deposits –to between 2.85 m bgl and 2.90 m bgl: Pale yellowish orange, orangish brown or light brown sandy slightly silty/clayey gravel of flint, occasional cobbles of flint in places. Wittering Formation to 5.00 m bgl (base not proven): Soft brown silty clay, becoming dark grey and very stiff with depth. Thinly laminated sandy silt and speckled greenish grey at depth. Visual and olfactory evidence of contamination was noted at WS05 at 0.35m bgl comprising a fragment of suspected asbestos containing material. No further olfactory or visual evidence of contamination was noted during the ground investigation or subsequent monitoring.
Findings of the WSP Ground Investigation	No elevated soil contaminants were found to be present at the Site. Of the nine samples screened for the presence of asbestos, asbestos was identified in three of the samples comprising: • WS04 at 0.3-0.4m bgl – Amosite – 0.0101%; • WS05 at 0.25-0.35m bgl – 1.13%;Chrysotile • WS05A at 0.35-0.5 - <0.001% Chrysotile It was considered that the identified contaminants would pose a moderate risk to construction / maintenance workers during the construction phase but not to the future occupants of the property. The results of groundwater analysis identified marginal exceedances of heavy metals with similar marginally elevated heavy metals and organics identified in the soil leachate however given that the Site was to be covered by hardstanding WSP concluded that the risks to controlled waters was negligible. A ground gas risk assessment was undertaken by WSP following ground gas monitoring. WSP subsequently classified the Site as Characteristic Situation 1 – very low risk; however, depleted oxygen was identified and was considered by WSP to pose a moderate risk to construction workers. WSP provided the following recommendations:

	• Provision of a watching brief during the development; • Risks posed by asbestos should be addressed in accordance with the Control of Asbestos Regulations 2012 • Depleted oxygen concentrations should be addressed via risk assessments during the construction phase; and • A Remediation Strategy should be produced to support the scheme.
Aquifers and Groundwater Receptors	The Environment Agency (EA) has classified the superficial deposits beneath the Site as a Secondary Undifferentiated Aquifer. The underlying bedrock is classified as Secondary A Aquifer.
Hydrology	The closest surface watercourse is the River Itchen, located approximately 190 m east.

2.4 Conceptual Site Model

On completion of WSP's ground investigation, the following linkages were confirmed as being relevant to the proposed development and warranting mitigation.

Confirmed Linkages	Source Descriptions	Pathway	Receptor
Linkage 1	Asbestos in soils.	Inhalation of fibres	Construction / maintenance workers; and, Third-party neighbours. Future Site Users
Linkage 2	Potential undiscovered contaminants in soils. i.e. spills beneath fuel storage areas/ interceptors etc.	Dermal contact Ingestion of impacted soil particles on Site and windblown to adjacent properties; and, Inhalation of dust and windblown particles.	Current Site users; Future Site users; Construction / maintenance workers; and, Third party neighbours.
Linkage 3		Vertical and lateral leaching from impacted soils and migration within groundwater.	Future construction / maintenance workers; Secondary Undifferentiated Aquifer – River Terrace Deposits; Secondary A Aquifer – Wittering Formation; and, River Itchen (approximately 190m east).
Linkage 4		Direct contact with impacted soils.	Future below ground services (e.g. potable water supply pipes); and, Future building services.
Linkage 5	Depleted Oxygen.	Migration of ground gas and volatile vapours into confined space	Construction/maintenance workers;

2.5 Data Gaps and Uncertainties

- There remains potential to encounter other unexpected/not previously encountered contamination associated with previous Site uses; and
- Unknown unknowns - for example, the potential to encounter unexpected/not previously encountered contamination such as ducting containing asbestos insulation, or hotspots associated with Site features.

3.0 Remediation Strategy

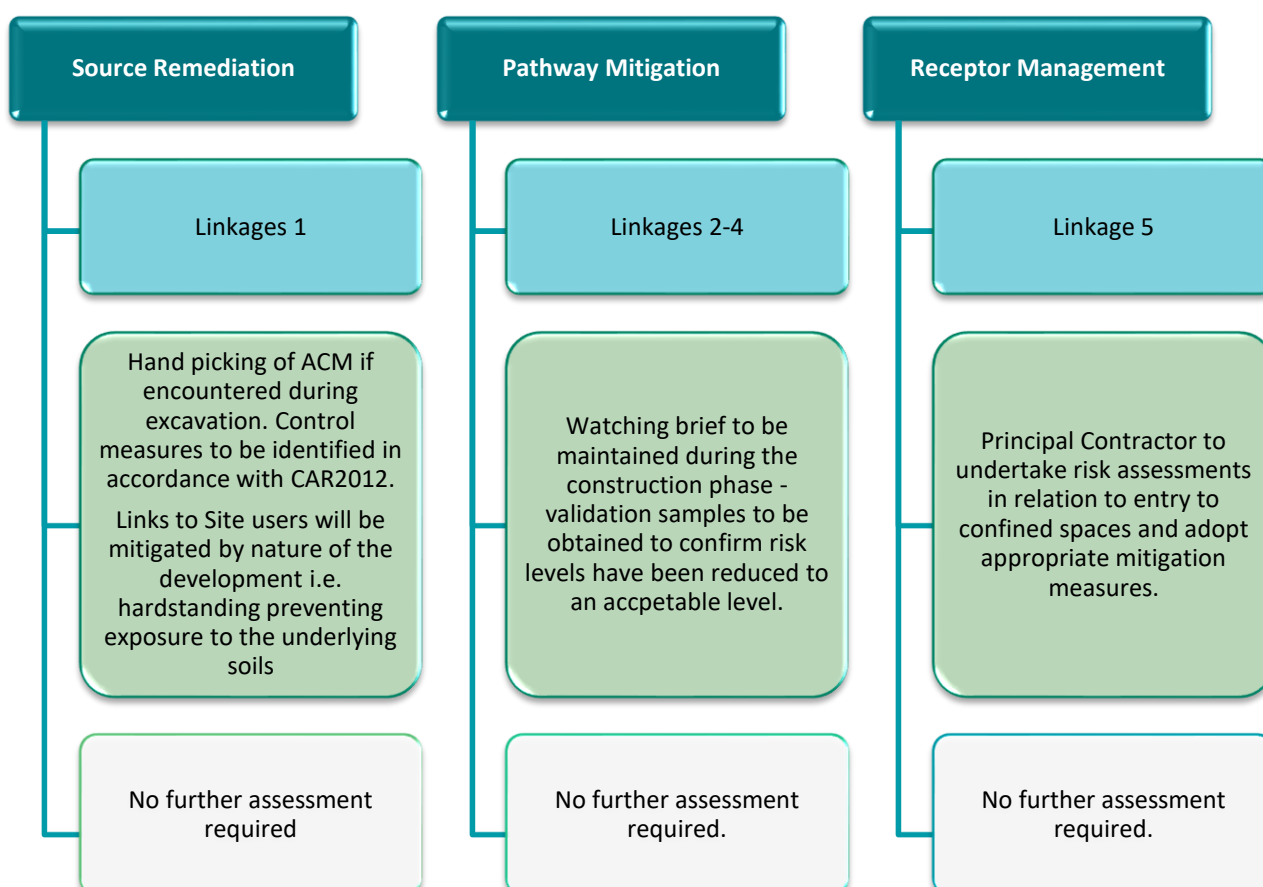
3.1 Introduction

The presence of land contamination is generally only of concern if an actual or potentially unacceptable risk exists to either the health of living organisms (i.e. humans, flora, fauna), ecological systems, property and controlled waters (i.e. rivers, aquifers etc.). Planning policy states that the Site should be 'suitable for use' and that, 'after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990'.

3.2 Remediation Options

Current UK guidance requires due consideration of sustainability indicators in the appraisal of remediation options. Reference has been made to LCRM and the SURF UK framework and this strategy broadly reflects the approach in those documents at the scale appropriate for the Site, scale of issues, and proposed development. Remediation options fall into one of three categories: Undertaking remediation of the contamination source; Mitigation of migration pathways; or, Receptor management.

Remediation strategies may incorporate a combination of techniques across the three categories to achieve the most effective and sustainable solution. The table below provides a high-level screen of remedial approaches to the identified linkages.



3.3 Stakeholders

Parties Anticipated to be Involved	Function / Interest / Likely Timing of Involvement
Legal & General Property Partners (Industrial Fund) Limited and Legal & General Property Partners (Industrial) Nominees Limited	Land Owner
Principal Contractor - GLJ Contracts Limited	Delivery of Development / CEMP
Environmental Consultant – Lucion Delta Simons	Land Quality Risk Assessment/ Remediation & Verification Strategy
Asbestos Specialist - TBC	Watching brief / advice relating to asbestos
Local Authority (CLO) – Eastleigh Borough Council	Regulation relating to Human Health

Overview

The Site remediation strategy has been devised based on the intrusive investigation undertaken by WSP in February 2024 to mitigate the risks posed by the identified contaminants of concern and break potential contaminant linkages allowing the redevelopment of the Site for open storage end use. The key features of the remedial strategy are summarised below;

Enabling Phase Works

- Hand picking of potential bulk asbestos containing materials from excavations, if encountered;
- Excavation, breaking out and processing of existing concrete hardstanding;
- Collection of validation soil samples from the areas of historical bulk fuel storage tanks/ interceptors – if removed;
- Watching brief during excavations as advised by an environmental consultant; and,
- Verification of Site-won fill materials to confirm chemical suitability for re-use (if required).

Construction Phase Works

- Installation of clean service corridors;
- A verification report to be produced upon completion of the remedial works to confirm that the work was undertaken in accordance with this remediation strategy, relevant legislation and planning conditions.

4.0 Pre-Construction Remedial Works

4.1 Background

A Principal Contractor (the “Contractor”) will be appointed by the Client to undertake the pre-construction enabling and remedial works. This will include breaking out existing concrete, excavations and regrading within the Made Ground.

It is anticipated that both Made Ground and potentially natural soils (River Terrace Deposits) will be excavated during the development (i.e. during foundation removal of existing buildings and associated below ground infrastructure). Excess materials, or those that are unsuitable for re-use, will be removed off-Site. This section of the report outlines the remedial works required prior to commencement of the construction phase of the development.

4.2 Demolition and Site Clearance

The Site should be cleared of all residual debris, fly-tipped materials and vegetation that is required to be removed to facilitate the redevelopment of the Site. All material shall be removed to a suitably licensed landfill.

4.3 Asbestos in Soils

The groundworks Contractor should be made aware of the presence of Asbestos Containing Materials (ACM) within the Made Ground across the Site and an appropriate protocol to mitigate exposure of the workforce and general public should be in place with due respect to his duties under the Control of Asbestos Regulations 2012 and with reference to the Joint Industry Working Group Asbestos in Soil and Construction & Demolition (C&D) Materials guidance (published by CL:AIRE) titled “Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition materials: Industry Guidance” (shortened name CAR-SOILTM).

The Contractor will need to prepare a risk assessment which identifies a safe system of work to handle the asbestos containing soils which is likely to include asbestos awareness training, potential hand picking exercise, a protocol for unexpected finds (should gross asbestos material be identified) as well as safe working procedures such as damping down of excavations and stockpiles in line with general dust generation mitigation. The Contractor should determine the need for appropriate levels of PPE and/or RPE and any associated air monitoring as required.

Where necessary it is recommended that the Contractor produce an Asbestos Management Plan to support the proposed works.

The Contractor shall be responsible for providing appropriate documentation for inclusion within the Verification Report including details of any significant asbestos material encountered.

4.4 Excavation, Breaking and Processing of Sub-Surface Structures

4.4.1 Relict foundations, slabs and utilities etc.

All natural or man-made hard materials including concrete slabs, hardstanding, brick-work, foundations, utilities beneath the existing buildings shall be broken out. The location and depth of all below ground obstructions remaining during the remedial works / earthworks shall be recorded by the Contractor on the final as built drawing.

All hard materials and arisings recovered during the works which are intended for re-use shall be processed and stockpiled for chemical testing to demonstrate they are suitable for re-use within the proposed redevelopment.

4.4.2 Underground Storage Tank (UST)/ Interceptor

Given the current / former use of the Site along with a fuel dispensing point, the potential for an underground storage tank (UST) cannot be discounted. If encountered during the enabling works, the following is recommended:

The UST shall be decommissioned and removed by a specialist contractor. The full extents of the UST will require proving and any remaining contents removed for disposal, prior to removal of the tank. Reference should be made to the DEFRA document on Decommissioning an Underground Storage Tank (February 2016). Whilst it is considered very unlikely the UST contains petrol, this should be confirmed in order that a safe system of work can be established.

A watching brief should be undertaken for the duration of the tank removal exercise to inspect the surrounding soils for any visual or olfactory evidence of contamination. In the event that unforeseen contamination is encountered, the ‘hotspot protocol’ as described in Section 8.4 will be implemented.

Three interceptors are also understood to be present at Site. Where these features are to be removed then it is recommended that the soils around these features be excavated and validated to confirm the absence of contamination.

4.5 Excavation of Soils

4.5.1 Health and Safety

Groundworkers and sub-surface maintenance workers should be made aware of the possibility of encountering contaminated soils through toolbox talks and in particular the potential presence of asbestos and an appropriate protocol to mitigate exposure of the workforce and general public should be in place.

The Contractor will need to prepare a risk assessment which identifies a safe system of work to handle the asbestos containing soils which is likely to include asbestos awareness training, a protocol for unexpected finds (should gross asbestos material be identified) as well as safe working procedures such as damping down of excavations and stockpiles in line with general dust generation mitigation. The risk assessment will need to identify the appropriate levels of PPE and/or RPE required. This recommendation should be captured in Site health and safety documentation and in maintenance plans.

4.6 Disposal of Water

Any waters encountered within the formation of earthworks excavations shall be chemically assessed and disposed of in accordance with legislation either off-site or through obtaining a discharge consent which should be issued by the appropriate authority.

Any perched water showing significant contamination should also be appropriately managed and removed from Site, potentially via localised de-watering of the Made Ground and / or superficial deposits.

4.7 Environmental Management

During the enabling works, it will be the responsibility of the Contractor to ensure that the works are managed in an appropriate way so as not to contaminate the ground and / or watercourses and pose a risk to off-Site receptors.

The works will involve the disturbance of soils which may contain contaminants including asbestos. The Contractor shall prepare a Construction Environmental Management Plan (CEMP) which shall include measures to prevent the emission of contamination to air (fibres, dusts or vapours) and into the wider environment to include (but not limited to):

- Damping down of dry soils/Made Ground materials;
- Odour suppression as necessary during excavation of contaminated materials;
- Asbestos in air monitoring during earthworks (including boundary and personal monitoring) to protect on and off-Site receptors(as necessary);
- Use of a wheel wash or roadsweeper to prevent mud on roads;
- Control of water including surface water run-off and water in excavations to prevent escape to adjacent properties and/or watercourses;
- Disposal of water in accordance with legislation; and
- Operation of works only within the times permitted under the planning permission; and Details of incident recording procedures.

The CEMP shall include a detailed Asbestos Management Plan (AMP) and full details of the measures to be taken which shall be communicated to staff during the Site Induction. The CEMP shall be available for inspection on Site during operating hours.

4.8 Addressing Previously Unidentified 'Hotspots' of Contamination

4.8.1 Background

As with any 'Brownfield' development, there is a possibility that unknown localised areas of soil contamination (a 'Hotspot') may be encountered during development works. As such, a 'hotspot' protocol is required during the

construction phase of the development. The purpose of the protocol is to provide a ready reference should such an area of contamination be identified by visual or olfactory means during the works.

4.8.2 Protocol

Should an area of contamination be identified by visual or olfactory means during development works, the following procedure shall be followed:

- Immediately stop all works in the area where contamination is suspected;
- Immediately inform the Site Agent who should then contact the Environmental Consultant;
- The Environmental Consultant shall provide a verbal response outlining immediate actions with regards to Site Health and Safety and to limit the potential for contaminants to migrate;
- The Environmental Consultant shall judge each occurrence on merit and should it be deemed necessary the Environmental Consultant shall attend Site to oversee the removal of the 'hotspot' and collect validation samples;
- Any excavated material should be isolated from all other material at the Site, on plastic sheeting and covered with plastic sheeting until the material can be tested for contamination and an appropriate disposal route can be identified;
- Any 'hotspot' stockpiles and excavations should be fenced off, have appropriate signage and their locations recorded on a Site drawing;
- Should any excavated material be required to be disposed of at an off-Site location, the material shall be isolated from all other material at the Site prior to disposal at a suitably licensed facility. All documentation associated with the movement and disposal of any such material shall be supplied to the Environmental Consultant shall, including waste transfer documentation;
- Subject to appropriate Site Health & Safety controls (typically comprising fencing off the excavation) the excavation will remain open until the validation has been completed. Alternatively, for Site Health & Safety reasons, it may be necessary to backfill the excavation with Site derived material. In this case, the location of the excavation will be accurately recorded and the excavation reopened if required, based on the validation results; and
- The Regulatory Authorities shall be informed by the Environmental Consultant shall of any remedial activities required and associated validation testing results. Representatives of these organisations may also wish to visit the Site.

Implementation of appropriate measures to deal with such findings remain the Contractor's responsibility.

A copy of the protocol is also presented in Appendix B to be extracted and used on-Site.

4.9 Materials Management

4.9.1 Materials Management for Earthworks

At this stage it is envisaged that no significant earthworks will be required at the Site other than localised backfilling of excavations. Should significant material movements be required then a Materials Management Plan is likely to be required to support the re use of Made Ground materials at the Site.

The Contractor shall be responsible for the preparation of a MMP and obtaining an appropriate declaration from a Qualified Person prior to the commencement of earthworks.

5.0 Construction-Phase Remediation Works

5.1 Imported Materials and Verification

5.1.1 Pre-Importation Testing

In the event that any soils are required to be imported to the Site, a detailed understanding of the provenance of such materials is to be provided to the Environmental Consultant ahead of any further investigation or import. As a minimum, this should include:

- The materials source location;
- The supplier details and proposed quantities for import; and
- A description of how the soils have been generated (e.g. stockpiled for removal from a site or manufactured at a recognised supplier).

Soil materials being considered for importation (including topsoil) shall be sampled at their source or manufacture location prior to import to Site. The soil samples shall be analysed at a UKAS accredited laboratory for the required laboratory chemical analyses and the results of these analyses (as detailed in Appendix C) shall be provided to the Environmental Consultant. Written approval from the Environmental Consultant shall be obtained prior to importing the soil to Site.

Some soil materials that are suitable for use on site may also be wastes (not products). Examples of such soils may include soils stripped from other developments prior to construction, soils sourced from third party sites and some manufactured soils. Care is needed when considering these materials for import.

Further understanding of the provenance of these materials, additional laboratory chemical analyses and an exemption, permit or other form of regulatory control are likely to be required to be able to utilise these materials within the cover system. Adherence to the Duty of Care Regulations will also likely be required if waste soils are to be recovered in the scheme. The Environmental Consultant should be consulted well in advance of when these types of material are to be utilised. The Environmental Consultant will advise on the acceptability or otherwise of such materials and agree the pathway to be followed. All natural material that is imported to Site should be done so under a DoW CoP declaration to demonstrate that it is not a waste.

If chemical data for the soil cannot be provided, then the Contractor shall procure the Environmental Consultant to undertake appropriate testing prior to importation:

Samples shall be analysed for a minimum suite of:

- Asbestos screening / ID;
- Heavy metals;
- pH;
- Sulphate (water soluble 2:1 extract);
- Polycyclic Aromatic Hydrocarbons (PAH) speciated to US EPA priority 16;
- TPHCWG, BTEX (benzene, toluene, ethylbenzene and xylene); and,
- MTBE (methyl tert-butyl ether).

The samples shall be truly representative of the soil to be offered.

The sampling frequencies recommended for imported or Site-won materials utilised for the cover layer from various sources is shown in the following table.

Type	Number of Samples	Testing Suite	Acceptance Criteria
Virgin quarried material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material	Standard metals suite (As, Cd, Cu, Cr / CrVI, Pb, Hg, Ni, Zn)	Verified in accordance with Lucion adopted Human Health Generic Assessment Criteria which are presented in Appendix C
Crushed hardcore, brick, concrete	Minimum 1 per 1,000m ³	Standard metals suite 16 PAHs Asbestos screen	
Greenfield / manufactured topsoil (off-Site source)	Minimum 3 or 1 per 250m ³ (whichever is greater)	Standard metals suite 16 PAHs Asbestos screen TPHCWG	
Brownfield / Site-won soils	Minimum 6 or 1 per 100m ³ (whichever is greater)	Standard metals suite 16 PAHs Asbestos screen TPHCWG	

The chemical criteria against which any imported soils shall be assessed is based on relevant Generic Assessment Criteria applicable at the time of the works for a residential end use (regardless of the intended use as materials should be free from contamination), as presented in Appendix C shall be used.

Any materials which fail the verification testing shall be removed from the Site and replaced with suitable materials by the Contractor.

The verification information shall be included within the verification report.

5.2 Underground Storage Tanks/ Interceptor Validation

Upon exposing a tank/ interceptor and following removal of the structure, the following procedure will be followed:

- Removal of grossly impacted soils (if present);
- Collection of samples from the base and sides of the excavation i.e. 1 sample per face minimum of five samples.
- Samples to be collected at a frequency of one sample per 25m² per exposed strata
- Soil samples will be subject to a suite of testing to be determined by the nature of contaminants stored at the location - suite likely to comprise but not limited to TPHCWG, possibly SVOCs and VOCs
- The results of soil testing will then be compared to conservative screening criteria as presented in Appendix C.
- Where failures are identified, it may be necessary to reattend the site and excavate further impacted soils until screening criteria are passed.

The end use of the material excavated from the Site will then need to be subject to a site-specific assessment to determine the most appropriate end use for the material.

5.3 Water Pipes and Below Ground Utilities / Structures

5.3.1 Background

Concentrations of organic contaminants in soils represent a potential risk to standard plastic water supply pipes. Following the 1992 Foundation for Water Research (FWR) report an update Guidance for the Selection of Water Supply Pipes used in Brownfield Land (UKWIR 2010) has been produced.

Careful selection, design and installation of water supply pipes is required on potentially contaminated sites to ensure that pipelines are satisfactorily installed.

To fully comply with the guidance a specific and detailed investigation of each pipe route is considered to be required, at the time of the investigations, no information on the specific pipe routes was available.

It is likely that a more detailed assessment based on proposed water supply routes will be needed to satisfy the requirements of the local water supplier, the following general comments are provided.

5.3.2 Standard Pipe Materials / Upgraded Pipe Material Requirements

It is recommended that the local water undertaker is consulted by the Client prior to ordering and placement of pipes in order to specify their specific requirements; however, given the contamination identified on Site it is considered likely that a barrier pipe material will need to be adopted.

Details of any upgraded pipework should be provided to the Environmental Consultant for inclusion within the Verification Report.

5.3.3 Clean Service Corridors

Services and utility corridors should be backfilled with clean site won materials. In the event that imported materials are required, all material imported to Site for this use should be tested on a ratio of 1 sample per 250 m³ for a range of contaminants appropriate to the source of the material but to include testing for the presence of asbestos as a minimum.

The Contractor shall be responsible for providing the documentation associated with the testing of the imported service trench fill to the Environmental Consultant.

6.0 Verification Reporting & Regulatory Approvals

6.1 General

Following completion of works detailed in Sections 4.0 to 5.0, for each phase of development, and Environmental Consultant shall prepare an Environmental Verification Report on the works for submission to the Local Authority to satisfy relevant planning conditions.

6.2 Verification - Enabling Phase

The Pre-Construction Phase Verification Report shall be produced upon completion of the Site demolition, remediation and earthworks. This report will include as a minimum:

- Summary of works undertaken;
- Details of waste disposal of any material from the Site including waste transfer documentation, any chemical data and details of the receiving treatment/landfill facility;
- Details of remedial measures undertaken, specifically details of asbestos removal / handpicking (including types, volumes and disposal);
- Confirmation of suitability for retention / re-use of site-won soils and volumes of material re-use;
- Site records of asbestos watching brief during excavations;
- Records of environmental monitoring including dust and asbestos (as appropriate);
- Details of the placement of clean cover including the placement of suitable marker membrane, topsoil and subsoil through a verification record as described in this strategy;
- Confirmation of the chemical results and transfer notes detailing the place of origin and quantities of any imported topsoil/ subsoil;
- Confirmation of the chemical results, and transfer notes detailing the place of origin of any imported fill;
- Details of the installation and verification of radon protection measures within building footprints;
- Details of the final water pipe material utilised within the development; and
- A record of any 'hotspots' found during construction and groundworks and the associated actions taken to remove them. This will include details of the chemical analysis of samples taken from these areas, verification that the entire hotspot has been removed as necessary, appropriate classification of the waste, waste transfer documentation, and details of the receiving disposal facility.

6.3 Regulatory Approvals and Planning Condition Discharge

It is intended that this report be submitted to Eastleigh Borough Council to support the discharge of contaminated land planning conditions (in conjunction with earlier technical reports).

Appendices

Appendix A – Limitations

Limitations

This Report was prepared by Lucion Delta-Simons Limited ("Lucion") for the sole and exclusive use of the Client and for the specific purpose for which Lucion was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Lucion, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. Lucion does not intend, without its written consent through a formal letter of reliance or warranty, for this Report to be disseminated to any party other than the named Client or to be used or relied upon by any party other than the named Client. Use of the Report by any other party is unauthorised and such use is at the sole risk of the user. Any party using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Lucion from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by Lucion. Unless explicitly agreed otherwise, in writing, this Report has been prepared under Lucions' Standard Terms and Conditions as included within our proposal to the Client.

The recommendations contained within this Report represent Lucion professional opinions, based upon the information detailed within the Report, exercising the reasonable skill and care to be expected of a professional consultant holding itself out as having the competence, experience and resources necessary for the purpose of carrying out similar work in scope and character to the services performed. The Report needs to be considered in the light of the proposal and associated limitations of scope. The Report needs to be read and considered in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the Report.

Where Lucion has obtained, reviewed and evaluated information in preparing this Report from the Client and others and Lucion conclusions, opinions and recommendations has been reasonably determined using this information, Lucion does not warrant the accuracy of the third-party information provided to it and cannot be responsible for any opinions which Lucion has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

Site surveys document the conditions encountered at the time of survey only and conditions may change due to natural processes or human intervention. As such, surveys represent an assessment at a specific point in time and Lucion cannot be responsible for adverse conditions which arise or become apparent after the time of the survey or for conditions which sit outside the scope for which the survey or Report was commissioned.

Where intrusive investigations have been completed, information, comments and opinions given in this report are based on the ground conditions encountered during the site work period and on the results of laboratory and field tests performed during the investigation. Ground conditions are inherently variable such that no investigation can be exhaustive to the extent that all adverse conditions are revealed. Conditions may therefore be present beneath the site that were not apparent in the data reviewed or obtained as part of this assessment. It should be noted that groundwater levels vary due to seasonal and other effects and may at times differ to those measured during the investigation. Lucion does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions. Where risk assessment is undertaken, this is based upon the standards, guidance and common practice at the time of the assessment and Lucion cannot be responsible for conditions which become apparent following changes in guidance or practice or advancements in scientific knowledge which change the position in relation to assessment of risk.

No aspect of this Report constitutes a design. Where this information is used in design, the designer should verify the information has been used appropriately.

Where budgets are prepared and presented within the Report, these are for information only to indicate the likely magnitude of a cost and do not represent an invitation to treat for the works. All budgets and programmes presented should be reviewed and verified by appropriately qualified and experienced independent Project Managers and Cost Consultants.

Appendix B - 'Hotspot' Protocol

Protocol for Addressing Previously Unidentified 'Hotspots' of Contamination

As with any Brownfield development, there is a possibility that an unknown area of soil contamination may be encountered during excavation works. Should an area of contamination be identified by visual or olfactory means the following procedure will be followed:

- Immediately stop all works in the area where contamination is suspected;
- Immediately inform the Site Agent who should then contact the Environmental Consultant;
- The Environmental Consultant will provide a verbal response outlining immediate actions with regard to Site Health and Safety and to limit the potential for contaminants to migrate;
- The Environmental Consultant will judge each occurrence on merit and should it be deemed necessary. The Environmental Consultant will attend Site to oversee the removal of the 'hotspot' and collect validation samples;
- Any excavated material should be isolated from all other material at the Site, on plastic sheeting and covered with plastic sheeting until the material can be tested for contamination and an appropriate disposal route can be identified;
- Any 'hotspot' stockpiles and excavations should be fenced off, have appropriate signage and their locations recorded on a Site drawing;
- Should any excavated material be required to be disposed of at an off-Site location, the material will be isolated from all other material at the Site prior to disposal at a suitably licensed facility. All documentation associated with the movement and disposal of any such material will be supplied to The Environmental Consultant, including waste transfer documentation;
- Subject to appropriate Site Health & Safety controls (typically comprising fencing off the excavation) the excavation will remain open until the validation has been completed. Alternatively, for Site Health & Safety reasons, it may be necessary to backfill the excavation with Site derived material. In this case, the location of the excavation will be accurately recorded and the excavation reopened if required, based on the validation results; and
- The Regulatory Authorities shall be informed by the Environmental Consultant of any remedial activities required and associated validation testing results. Representatives of these organisations may also wish to visit the Site.

Appendix C – Imported Soils Assessment Criteria

The following Generic Assessment Criteria shall apply as absolute limits for all soils imported for re-use as clean cover **regardless of the end use of the Site.**

The criteria selected are based on Residential with Plant Uptake land use scenario on the basis that imported clean cover soils should be 'clean' and not result in an increase in contaminant loading. It may be possible, in some circumstances, to agree alternative, higher criteria with the appropriate regulatory body, however, this is outside of the scope of this assessment.

Soils shall be tested for a suite of contaminants appropriate to the source land use but as a minimum for the contaminants stated below unless otherwise stated within this strategy. The below criteria assume a minimum of 1% Soil Organic Matter.

In addition to meeting the criteria below, imported materials shall be free from deleterious inclusions and shall be free from invasive weeds (Japanese Knotweed).

Any testing for asbestos must be from a UKAS accredited laboratory and the only acceptable criteria is 'Not Detected'. Any detected asbestos, even is reports as <0.001% is not acceptable. Asbestos containing soils must not be used for clean cover materials.

Criteria for Imported Materials			
Compound	GAC	Source	Comment
Arsenic	37	C4SL	
Cadmium	11	LQM	
Chromium (III)	910	LQM	
Chromium (VI)	6	LQM	
Copper	2400	LQM	
Lead	200	C4SL	
Mercury (inorganic)	40	LQM	
Nickel	130	LQM	
Selenium	250	LQM	
Zinc	3700	LQM	
Acenaphthene	210	LQM	
Acenaphthylene	170	LQM	
Anthracene	2400	LQM	
Benzo[a]anthracene	7.2	LQM	
Benzo[a]pyrene	2.2	LQM	
Benzo[b]fluoranthene	2.6	LQM	
Benzo[ghi]perylene	320	LQM	
Benzo[k]fluoranthene	77	LQM	
Chrysene	15	LQM	
Dibenz[ah]anthracene	0.24	LQM	
Fluoranthene	280	LQM	
Fluorene	170	LQM	
Indeno[123-cd]pyrene	27	LQM	
Naphthalene	2.3	LQM	

Criteria for Imported Materials			
Compound	GAC	Source	Comment
Phenanthrene	95	LQM	
Pyrene	620	LQM	
Benzene	0.2	C4SL	
Toluene	130	LQM	
Ethylbenzene	47	LQM	
Xylene – m/p	56	LQM	
Xylene - o	60	LQM	
Total Petroleum Hydrocarbons (TPH)	500		Professional judgement.
Aliphatic EC5-EC6	42	LQM	
Aliphatic >EC6-EC8	100	LQM	
Aliphatic >EC8-EC10	27	LQM	
Aliphatic >EC10-EC12	130	LQM	
Aliphatic >EC12-EC16	500	LQM	Capped at 500 - professional judgement
Aromatic >EC5-EC7	70	LQM	
Aromatic >EC7-EC8	130	LQM	
Aromatic >EC8-EC10	34	LQM	
Aromatic >EC10-EC12	74	LQM	
Aromatic >EC12-EC16	140	LQM	
Aromatic >EC16-EC21	260	LQM	
Aromatic >EC21-EC35	500	LQM	Capped at 500 - professional judgement
Asbestos	Not Detected		

The respective sources are:

- Soil Guidance Values (**SGV**) published by the EA;
- Category 4 Screening Levels (**C4SLs**) published by DEFRA;
- The 2014 Land Quality Management (**LQM**) / Chartered Institute of Environmental Health (CIEH) Suitable for Use Levels for Human Health Risk Assessment (S4ULs);
- The guidance values produced by the Environmental Industries Commission (**EIC**), the Association of Geotechnical and Geoenvironmental Specialists (AGS) and Contaminated Land: Application in Real Environments (CL:AIRE) in December 2009; and
- In house Generic Screening Values (**DS-GACs**) derived by Lucion.