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CONSULTING

PARLIAMENT HILL, CAMDEN

REMEDIATION STRATEGY

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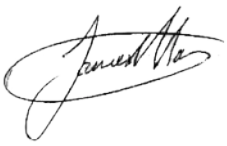
AUTHOR	JAMES MAY BSc (Hons) DIRECTOR	
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Revision and Date	Amendment Details	Revision Author	Revision Reviewer

1.0 INTRODUCTION

1.1 Lustre Consulting Limited (Lustre) has been commissioned by Farrans Construction to prepare a Remediation Strategy to facilitate the proposed redevelopment of a site located off Highgate Road, in Camden, London. The assessment has been undertaken in accordance with our fee proposal and scope of works dated 28 February 2018 which was formally approved by Farrans Construction on 28 February 2018.

1.2 This Remediation Strategy is required to ensure the appropriate management of soils and localised contamination identified during a previous investigation [1], which present unacceptable risks to identified receptors. Furthermore, the contaminative status of the ground in the vicinity of the former fuel tank fill point on the eastern facade of the main building should be confirmed. A redundant high voltage cable buried to the west of the main school building will also require appropriate management. Due to the historic and current development, there is also a potential for unforeseen contamination to be encountered during the clearance and construction works, particularly in the footprint of the existing structures. This Remediation Strategy should be read in conjunction with the previous investigation.

1.3 This Remediation Strategy has been prepared in accordance with planning condition 5 of the Decision Notice (Planning Application Ref: 2017/5395/P) imposed by the Local Planning Authority (LPA), London Borough of Camden. This report should be submitted to the LPA for comment prior to undertaking any remedial works. It is also recommended that, following approval of this report by the regulator and prior to the commencement of site works, written confirmation be sought by the Client from all relevant contractors to ensure their awareness and understanding of this document and its requirements.

Objectives

1.4 The objectives of the proposed remediation works are to ensure:

- Appropriate management of the remediation works to mitigate against accidental releases of potentially polluting materials (such as contaminated run-off) into nearby roads and drains;

[1] Phase 2 Site Investigation, Parliament Hill, Camden. By Lustre Consulting Ltd. Dated: June 2016. Ref: 1522\ML\6-2016\494

- Confirmatory testing for Made Ground in areas of proposed soft landscaping;
- Confirmatory testing for hydrocarbons within the shallow soils in the vicinity of the redundant fuel tank fill point;
- Validation of the removal of contaminated soils from identified areas and unsuitable Made Ground from soft landscaped areas (where present);
- Enquiries with the power distributer regarding the redundant HV cable;
- Validation of any imported topsoil and subsoil for use in soft landscaping, to be tested against a backfill specification;
- Validation of the upgrading of potable water pipes on site;
- Management of any 'unforeseen' potentially hazardous materials or areas of ground contamination;
- Appropriate management and off-site disposal of any hazardous, not hazardous and inert soils depending the suitability for reuse and waste classification.

1.5 This report has been prepared in keeping with best practice and current planning guidance, such as the *National Planning Policy Framework (NPPF)*[2]. A Remediation Strategy typically forms the third stage in an iterative risk based approach to addressing land affected by contamination in the UK as set out in the Environment Agency's *Model Procedures for the Management of Land Contamination (CLR11[3])*.

More information on Lustre's approach to remediation services can be found at the following link: www.lustreconsulting.com/service/remediation.

Statutory Guidance

1.6 References to the term "contaminated land" in this report relate to the statutory definition of contaminated land under the published Contaminated Land Statutory Guidance unless

[2] Department for Communities and Local Government, National Planning Policy Framework, March 2012.
[3] DEFRA/Environment Agency, Model Procedures for the Management of Land Contamination, CLR11, September 2004.

otherwise stated (also known as Category 1 and 2 under Part 2A). That definition is: *"any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances on in or under the land that –*

a) Significant harm is being caused or there is a significant possibility of such harm being caused; or

b) Significant pollution of water environment is being caused or there is significant possibility of such pollution being caused".

Other terms such as "land affected by contamination" or "land contamination" refer to the much broader categories of land where contaminants are present but usually not at a significant level of risk to be classified as contaminated land under the definition Part 2A (also known as Category 3 or Category 4 under Part 2A).

Asbestos

1.7 Under Regulation 4 of the Control of Asbestos Regulations 2012[4], those parties ("duty holders") who have control over the maintenance or repair of non-domestic premises are required to identify and manage any asbestos or presumed asbestos found in their premises. Where asbestos is or is liable to be present, the duty holder(s) shall ensure that they have an adequate management plan, undertake and review risk assessments and maintain an Asbestos Register detailing the probable exposure to all employees and site users. The duty holder may be the business owner, landlord or tenant or others by virtue of a contract.

1.8 Regulation 5 requires duty holder(s) to identify asbestos prior to maintenance or any other work which exposes or is liable to expose employees to asbestos unless there has been a sufficient assessment. There is always a risk that asbestos will be present in soils, under hardstanding and below ground structures, and that it may spread particularly during clearance and demolition works. It is therefore essential that where any asbestos or presumed asbestos is identified, it is managed, removed and disposed of by a licenced remover (if licensable work) in accordance with relevant HSE guidance. It is the responsibility of the duty holder under Regulation 16 to ensure measures are put in place to prevent the 'spread' of asbestos.

[4] Control of Asbestos Regulations (CAR) 2012

1.9 This Remediation Strategy does not include the identification, assessment, removal or validation of asbestos within any structures both above and below ground (i.e. basements, services, floor slabs). A refurbishment and demolition survey should be carried out by an appropriately experienced and qualified asbestos surveyor, ideally with a license to undertake work with asbestos. This report is for the identification, management and remediation of asbestos containing soils, normally unlicensed work.

Report Structure

1.10 Chapter 2 presents a summary of the site characterisation and investigation findings, upon which this strategy is based. Chapter 3 sets out the approach, staging and components of the remediation works. The validation works are described in Chapter 4 and recommended health and safety and environmental control measures are described in Chapter 5.

2.0 SITE CHARACTERISATION

Introduction

2.1 The site, irregular in plan, is centered at National Grid Reference 528369, 186019, and occupies an approximate area of 3.6ha, as shown in Figure 1. The site currently comprises the William Ellis School and Parliament Hill School and is located within a predominantly residential area of north London, bordering Parliament Hill to the north and west.

2.2 It is understood that Farrans Construction requires this Remediation Strategy to support the proposed re-development of the site comprising the clearance of the site and subsequent construction of several new school buildings and redevelopment of both school sites. Figure 2 illustrates the proposed development scheme.

2.3 As illustrated in Figure 2, the development proposal includes the demolition of several buildings (predominately within the Parliament Hill school area), followed by the construction of several new buildings, extensions and establishment of numerous multi-use game areas (MUGAs) and soft landscaping. It is also understood that the proposed development may also incorporate single storey basements over portions of the site

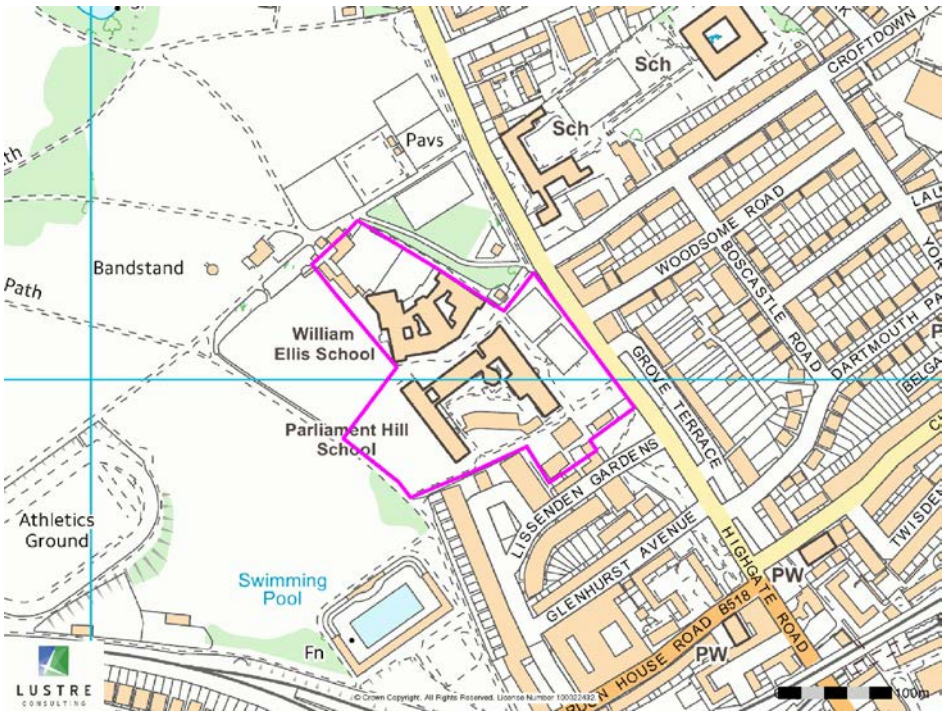

Figure 1: Site Location Plan

Figure 2: Proposed Site Layout

2.4 A site investigation was carried out on 29th – 31th March 2016 and 8th April 2016 which included ten windowless sample boreholes (WS1 to WS10) were drilled to a maximum depth of 8.0 meters below ground level (m bgl) through the Made Ground and into the underlying natural soils. A total of eleven trial pits (TP1 - TP7, TP10 - TP13) were excavated using a tracked mini-excavator to depths of up to 2.2m bgl with support from a hand pitting crew. Trial pits extended through the Made Ground and where possible proved natural strata. At appropriate depths, soil samples were deposited in sealable plastic bags to allow on-site headspace analysis. A total of 21 soil samples were scheduled for chemical testing. Samples were analysed for a standard suite of determinands, which considers the potential contaminants associated with the current/historical site uses.

2.5 Four return monitoring visits were undertaken over a period of three weeks. Gas monitoring was undertaken using a calibrated GA5000 gas analyser. Bulk gas samples were also collected for confirmatory bulk gas analysis. The findings of this are summarised hereafter.

Ground Conditions

Made Ground

2.6 Made Ground was encountered in 21 of the 22 exploratory holes (absent in BH6). The Made Ground was generally encountered as two distinct layers: an upper granular soil and a lower cohesive soil. In the majority of the exploratory positions both layers were encountered. However, in some instances, only granular Made Ground was observed (TP8 and BH4 – BH6), and occasionally only cohesive Made Ground (TP3 – TP5, BH3, BH6, BH7 and BH10). The total base depth of the Made Ground varied between 0.15m bgl to over 2.2m bgl (average 1.2m bgl).

2.7 The upper granular layer of Made Ground was typically described as a dark brownish black slightly silty variably clayey sandy subangular to subrounded fine to coarse GRAVEL. In some locations the granular layer was predominately a gravelly sand (slightly silty gravelly fine to coarse SAND). The gravel component was generally made up of brick, tarmacadam planings, clinker, flint and rare chalk with occasional brick and concrete cobbles. Minor man-made constituents included metal, plastic, tile, ceramic and coal. Pockets of ash were noted to be common throughout the granular Made Ground. The base depth of this upper granular material ranged between 0.19m bgl and 1.2m bgl, being typically thicker where the lower cohesive Made Ground was absent.

2.8 The lower cohesive Made Ground was typically described as a dark greyish brown slightly gravelly CLAY. The gravel component was similar to the upper layer however the amount of gravel was considerably less. In addition to ashy pockets, decayed organic matter and rootlets were also frequently observed in this material.

2.9 Apart from the widespread presence of blackish ashy material and clinker within the Made Ground, no other visual or olfactory evidence of contamination was noted within the Made Ground. The exception to this is within TP13 where a hydrocarbon odour was recorded within the Made Ground. In-situ headspace readings within the Made Ground did not indicate the presence of volatile compounds with a maximum concentration of 1ppm recorded in two locations (TP13 and BH5).

2.10 For full details of the ground conditions encountered, reference should be made to the previous site investigation report as referenced in Chapter 1, particularly the exploratory hole logs.

Natural Soils

2.11 Soils of the London Clay Formation were encountered in all exploratory positions where the base of the Made Ground was determined. Initially, soils were recovered as a soft to firm brown fissured CLAY. This description is typical of the upper weathered layer of the bedrock. Below this, from around 2.0m bgl, closely fissured grey mottled orangish brown CLAY was encountered. Within this material occasional pockets of orange mottled clay were noted along with rare fine rootlets, fine gravel-sized selenite crystals and pyrite. No visual or olfactory evidence of contamination was noted within the London Clay Formation.

Controlled Waters

Groundwater

2.12 Groundwater seepages were recorded at four locations (TP2, TP7, TP10 and BH3) within the base of the Made Ground / top of the London Clay at depths of between 0.8m and 1.2m bgl in the trial pits and 4.3m bgl in the borehole. The groundwater observed is considered to be perched groundwater.

2.13 During the return monitoring, groundwater was recorded at depths between 0.96m and 1.71m bgl in boreholes BH1 and BH3 perched within the Made Ground and at depths of between 4.95m and 5.43m bgl within the London Clay Formation in BH10. Considering the above, the perched groundwater is likely discontinuous and as such a groundwater flow direction cannot be determined.

Surface Water

2.14 The closest surface water feature is an extended culvert of the Regents Canal which is located approximately 70m south of the site. In addition, the Highgate Ponds are located approximately 280m north west of the site within Parliament Hill. These surface water features are not monitored by the Environment Agency under their River Basin Management Plans.

2.15 No surface water protection measures are condiered necessary during the development works.

Basement Storage Tanks Infrastructure

2.16 The main building of Parliament Hill School (PHS) once benefitted from oil fired heating. The associated tanks were located within the basement and have since been removed, however the fuel transmition lines (all of which are above ground) are present and run out to an external fill point that could not be accessed during the site investigation. Although the fill point is

probably over a tarmacadam surface, we have been unable to ascertain the age the infrastructure and if any historic leaks could have impacted the shallow soils. This feature will therefore be investigated as part of the proposed remedial works.

Invasive Plants / Tree Protection

2.17 Two stands of Japanese Knotweed (JKW) were observed at the PHS site. A large stand was located along the southern boundary between the party wall and the gymnasium. It could not be confirmed if the JKW had spread off-site (public open space accosted with residential flats) although considered highly likely. A second stand was observed on the northern boundary fence between PHS and WES. No other invasive species (e.g. Giant Hogweed, Himalayan Balsam) were identified during the site walkover. This plan does not cover the management of any invasive plant species as part of the remedial activities at the site.

2.18 During site inspections established trees have been observed across the site. This plan does not cover the surveying and protection of trees as part of the remedial activities at the site.

Assessment Findings

2.19 A Conceptual Site Model (CSM) was presented in the previous investigation report, which identified several potential sources of contamination and receptors. Based on the development proposals, these were investigated to determine the presence of any viable source-pathway-receptor pollution linkages. Any viable linkages were then subject to analysis and assessment (where appropriate). The findings of the various quantitative assessments are presented below.

Geoenvironmental Assessment Summary

Assessment	Key Findings
Generic quantitative risk assessment (human health)	Elevated PAHs (including benzo(a)pyrene) and lead above the assessment criteria for a public open space land use scenario. A source of PAH contamination has been identified attributable to the ashy granular soils of the upper Made Ground.
	Removal of ashy granular Made Ground to certain depths in some soft landscaped areas is required with the implementation of a clean cover system.
Water pipeline suitability test	The available testing results indicate that soil concentrations pose a risk to potable water pipes. Soil data failed the tests relating to PE pipes for Group 3 (Light to mid-range hydrocarbons), Group 4 (Mid to heavy range hydrocarbons).
	In accordance with UKWIR Guidance, PE pipes are not considered suitable for the site and that PVC or Barrier pipe will be required to prevent contamination of polymeric services.

Assessment	Key Findings
Phytotoxicity assessment	A single occurrence of zinc above the phytotoxicity criteria has been recorded in TP2. However, TP2 is located in an area of proposed hardstanding and, as such, the potential for plant update into flora is not considered appropriate. Elevated concentrations of zinc recorded in TP2 are not considered a concern.
	No remedial measures required.
Groundwater quality assessment	Groundwater where present is perched and discontinuous.
	No remedial measures required.
Waste classification assessment (WM3)	The preliminary investigation screened the results of the laboratory analysis in a propriety hazardous waste assessment tool (CatWasteSoil) to determine if the soils would be considered hazardous from a waste disposal perspective against WM3. None of the determinands analysed for were present at concentrations above the WM3 hazardous thresholds and, as such, soils from both the Made Ground and natural soils are considered to be **not hazardous for waste disposal**. Following this, three Waste Acceptance Criteria (WAC) test have been undertaken as part of the geotechnical investigation to determine if soils typically exceed the inert, non-hazardous (SNRHW) or hazardous waste limits for disposal **directly to landfill**. Two samples were taken from Made Ground (MG) and one sample was taken from natural soils (N). Overall, the Made Ground should fall within the **inert**. The single sample taken from London Clay Formation exceeded the inert waste criteria limits for inert waste due to elevated sulphate and TDS.
Ground gas assessment	Based on the Modified Wilson and Card method and the calculated GSVs, the site has been classified as Characteristic Situation 1. As such, a negligible ground gas regime has been identified and no special gas precaution measures are considered necessary. A **very low** risk from ground gases has been identified.
	No gas protection measures required.

3.0 REMEDIATION STRATEGY

Introduction

3.1 This chapter sets out the approach adopted for the selection of remedial measures in line with CLR11 and CIRIA Report C662[5] and provides detail on each component of the Remediation Strategy.

Approach to the Selection of Remedial Treatments

3.2 In accordance with good practice guidance, the selection of appropriate remedial measures has been undertaken using a systematic approach, as set out in CIRIA C662. Initially, a combination of technical and non-technical criteria have been adopted in the selection of the most suitable remedial options for the site, namely:

- The hazardous nature (i.e. toxic, carcinogenic) of the contamination;
- Risk management (particularly for construction personnel during remediation);
- Time constraints and the development programme;
- The technical feasibility of the selected remedial method;
- Cost-effectiveness;
- Sustainability (with least environmental impact such as minimising off-site disposal, transportation etc.)
- Waste management (such as generation of hazardous and not hazardous wastes); and
- Nuisance issues on-site and within the surrounding area (noise, air quality and impacts on land environments).

3.3 The primary objectives to address the identified risks were as follows:

- Ensure that following implementation of this strategy the site is rendered ‘suitable for use’ under the planning regime for the proposed / permitted end use. This must be to the approval of the local planning authority and other key stakeholders (such as the Environment Agency);

[5] CIRIA Selection of remedial treatments for contaminated land – A guide to good practice, 2004

- Ensure that minimal residual liability both environmentally and financially remains, and that following remediation, the site will not be classified as contaminated land under the statutory definition (Category 1 and 2) under Part 2A of the Environment Act 1995; and

- Ensure that the proposed remedial solution can be readily accommodated in the development/ build programme and provide the most cost-effective, sustainable and durable solution, where practicable.

3.4 In meeting these objectives, it is assumed that following implementation of this Remediation Strategy that any residual contamination is deemed acceptable – i.e. that residual contamination is below publicly available guideline values, or that any barrier measures meet the necessary engineering requirements and is fit for purpose.

3.5 The chosen remedial solution(s) set out in the following Remedial Strategy table have been selected based on their ability to meet all the above objectives, with a consistent track record in similar conditions. Moreover, the solutions adopted are considered to be technically feasible and easily verified to ensure regulator acceptance.

3.6 Typically, for simple and routine contaminated land issues or where prescribed remedial measures are available in the guidance, a shortlist of options or a single chosen remedial solution may have already been identified in the previous investigation. In addition, it is noted that other factors may have limited the initial options considered in the selection of remedial solutions such as the development programme, site constraints (such as available space), waste management options, financial, Client preference, construction type of buildings etc.

Selection of Contractors

3.7 The Client is responsible for ensuring those commissioned to implement the various measures set out in this strategy are competent to do so and have the correct type and level of insurance suitable for the specific task. Where required by any regulations, laws or other such legislative controls, suitably licenced and approved specialists should be used (i.e. licenced waste carriers).

3.8 The remediation works set out herein are expected to be co-ordinated by a suitably qualified contractor who will hold all necessary environmental permits, licenses, insurances and implement any necessary Duty of Care to ensure the works are carried out diligently and to safeguard against any potential pollution incidents. Those undertaking any skilled trades as

part of the implementation of this strategy, such as installing a gas or VOC barrier membrane for example, should be suitably trained, competent and hold any appropriate qualifications. As part of the verification process contractors will be required to provide evidence of this. Any contractors appointed by the Client will need to provide any relevant documentation prior to works commencing for inclusion in the Verification Report.

3.9 The remediation contractor/ demolition contractor and Client will also be responsible for ensuring that any waste generated by the remediation/construction works is properly segregated, treated, transported and disposed of using licensed contractors and at licensed waste disposal facilities (such as a landfill or treatment centre). A copy of any licenses should be obtained and kept on record, with the license number validated on the Environment Agency website (if regulated by the Environment Agency).

Remediation Plan

3.10 The proposed Remediation Plan is provided in the following table, which provides details of how each remedial measure should be implemented, along with any relevant information on recommended materials, inspection requirements and third-party documentation needed etc. Based on the information available at the time of writing, the remedial measures have been set out in the order in which they are likely to be undertaken during development. However, the principal contractor's programme will ultimately determine when each element is carried out.

3.11 Notes have been made where involvement or a site inspection will be required by the Environmental Consultant (author if this document). An indication of the need for sampling or other third party verification is also given for each measure/task, along with the requirement for the Client/ contractors to provide any verification documentation (show as red shading in following table).

3.12 The following table should be read in conjunction with the rest of this report and, in particular, Drawing 2112-002.

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
Clean Cover System (CCS)	**Brief / Scope**	A clean cover system (CCS) may be required to mitigate the risks from shallow soil contamination to end users in areas of soft landscaping and is referred to in remedial actions within this table. The CCS will not only provide clean, safe soils for end users but also prevent exposure to any residual contamination at depth. The CCS mitigates the risk by breaking the exposure pathways between any contaminated Made Ground and future end users through the construction of a CCS or engineered capping layer, and is designed in line with the *BRE Report 465*[6]. The thickness of the clean cover system is determined using the BRE 2004 assessment tool. Any imported soils should be chemically validated to determine their suitability for use prior to placement, with a minimum of 150mm clean topsoil. In each instance, any area where the CCS is to be placed the site level must first be reduced by the full thickness (recommended by the BRE assessment tool) from the final formation level, followed by the placement of: • a high visibility geotextile marker layer • approved subsoil material a minimum of 300mm or 450mm (based on BRE's recommendations) overlain by • a minimum of 150mm approved topsoil. A high visibility marker layer may be required at the base of the CCS to warn future site users as to the potential for contaminated material below and prevent soil mixing between the in-situ potentially contaminated soils and the CCS. Any soils imported to site to form the CCS must be proved to be suitable for use and undergo a verification testing at various stages of purchase, importation and placement (see consultant inspection and contractor documentation sections).	Clearance / Enabling Works
	Recommended Material	Only 'clean', suitable for use, certified topsoil and subsoil should be imported onto site with no significant quantity of putrescible material (incl. wood or paper), which may generate ground gases and no hazardous materials such as asbestos containing	

[6] BRE Report 465. Cover Systems for Land Regeneration - Thickness of Cover Systems for Contaminated Land, March 2004.

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
		materials/ free fibres or general waste (such as glass, metals etc.). Imported soils must meet the backfill specification in Appendix A for chemical suitability. Ideally, all newly imported soils (not reused) should meet the minimum standards in BS3382:2015[7].	
	Consultant Inspection / Sampling Required	Following approval of the soil source by the Environmental Consultant (prior to soils arriving on site – see below), a site inspection will be required. The consultant will attend site to sample the material prior to its placement (i.e. from the stockpiled soils), as set out in Chapter 4. Validation testing data will be compared against the soil testing criteria set out in Appendix A. Following approval of the soils on site, a verification visit will be required to determine if the CCS has been placed in the required areas and in accordance with the make-up set out above.	
	Contractor/ Client Documentation Required	Initially, validation of the imported soils shall include an assessment of the provenance of the material, which shall be supported by a chemical test certificate provided by the supplier. The test certificate should ideally be a sample taken within three months of proposed receipt date of the soils to site. **This information should be provided prior to the material arriving on site.** A copy of all delivery tickets and supplier test certificate will be required for inclusion within the Verification Report.	
Assessment of Proposed Soft Landscaping for Made Ground	**Brief / Scope**	The Phase 2 Site Investigation identified the potential for PAH impacted soils in the shallow ashy Made Ground across the site. Surface soils (within 450mm) in any new areas of soft landscaping must be both chemically and physically suitable and fit for purpose. This includes the requirement for no significant quantity of putrescible material (including wood or paper) and no hazardous materials such as asbestos containing materials or general waste (such as glass, plastics, metals etc). Confirmatory excavations should be carried out within areas of proposed soft landscaping at a frequency of 1 hole per 250m^2. Where Made Ground is identified a representative number of samples should be collected and analysed for speciated PAH and metals to understand the quality of the soil. Where contaminated Made Ground is present, a clean cover system shall be implemented. This will require delineation and removal to either its full lateral extent or to the maximum extent of the proposed soft landscaping in this area, whichever is	Clearance / Enabling Works

[7] BS 3882:2015 Specification for Topsoil. 2015

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
		smaller and to a depth of 450mm (unless 'clean' natural soils are confirmed before this depth). Validation samples will then be taken from the sides of the excavation to ensure the remaining soils are chemically suitable for future use. Once it has been verified that all contaminated soils associated with the excavation has been removed, this area can be backfilled. If contamination is still present at the base then a CCS will need to be implemented (as above). In the interim, the contractor should ensure any excavations are made safe prior to backfilling until the laboratory analysis results have been received and checked. If samples fail the validation, the excavation will be extended until testing indicates the absence of unacceptable contamination.	
	Recommended Material	Any resultant voids should be backfilled, once validated as suitable by the Environmental Consultant, with clean, inert, subsoil and topsoil.	
	Consultant Inspection / Sampling Required	An Environmental Consultant will need to be in attendance to advise and record this work being carried out, as well as taking validation samples.	
	Contractor/ Client Documentation Required	A copy of all waste consignment notes and waste haulier and recipient documentation and licenses will be required for inclusion within the Verification Report.	
Inspection of Soils in the Vicinity of the Former AST fill point	**Brief / Scope**	The previous investigation identified that an oil heating tank fill point was located along the eastern façade of the Parliament Hill School building, the location of which is shown on Drawing 2112-002. The condition of the soils needs to be assessed for hydrocarbons. Any liquid present will need to be pumped out into drums. The liquid may need to be chemically tested prior to collection by a suitably licenced waste contractor. The hardstanding in the area should be broken out, inspected and placed in a designated location. Following removal of this feature by a competent contractor, the surrounding ground conditions will be visually inspected to assess the nature of the soils and the presence of any residual contamination. A Photo-ionisation Detector (PID) will also be used to monitor levels of volatile organic compounds (VOCs) in the air and aid with the inspection. Should the surrounding soils appear to be impacted (likely to be indicated by oily staining, strong odours and elevated PID readings), the contamination will be vertically and laterally removed using an excavator until the condition of the ground has improved from visual and olfactory inspection and tested with a PID.	Clearance / Enabling Works

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
		Validation samples will then be collected from the base and the sides of any excavations (or surface soils if no indication of contamination is noted) to verify the removal of all contaminated soils. Once it has been verified that all contaminated soils associated with the any excavations have been removed, this area can be backfilled. In the interim, the contractor should ensure any excavations are made safe prior to backfilling until the laboratory analysis results have been received and checked. If samples fail the validation, the excavation will be extended until testing indicates the absence of unacceptable contamination.	
	Recommended Material	Any resultant voids should be backfilled, once validated as suitable by the Environmental Consultant, with inert, engineered fill.	
	Consultant Inspection / Sampling Required	An Environmental Consultant will need to be in attendance to advise and record this work being carried out, as well as taking validation samples.	
	Contractor/ Client Documentation Required	A copy of all waste consignment notes and waste haulier and recipient documentation and licenses will be required for inclusion within the Verification Report.	
Contaminated Soil Removal near BH2	**Brief / Scope**	*Localised remedial excavation at BH2* – Identified Contaminant: *PAH: a*shy granular soils should be delineated and removed to either its full lateral extent or to the maximum extent of the proposed soft landscaping in this area, whichever is *smaller* and to a depth of 450mm (unless 'clean' natural soils are confirmed before this depth) at the location shown on Drawing 2112-002. Validation samples will then be taken from the sides of the excavation to ensure the remaining soils are chemically suitable for future use. Once it has been verified that all contaminated soils associated with the excavation have been removed, this area can be backfilled. If contamination is still present at the base of the excavation, then a CCS will need to be implemented (as above). In the interim, the contractor should ensure any excavations are made safe prior to backfilling until the laboratory analysis results have been received and checked. If samples fail the validation, the excavation will be extended until testing indicates the absence of unacceptable contamination.	Clearance / Enabling Works
	Recommended Material	Any resultant voids should be backfilled, once validated as suitable by the Environmental Consultant, with inert subsoil and topsoil.	

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
	Consultant Inspection / Sampling Required	An Environmental Consultant will need to be in attendance to advise and record this work being carried out, as well as taking validation samples.	
	Contractor/ Client Documentation Required	A copy of all waste consignment notes and waste haulier and recipient documentation and licenses will be required for inclusion within the Verification Report.	
Redundant HV Cable	**Brief / Scope**	A redundant underground HV cable has been identified running from the west of the Parliament Hill School building, The location of which are shown on Drawing 2112-002. HV cables can be a source of oils and can contain polychlorinated biphenyls. Further investigation will be required to assess the condition of the below ground cables and surrounding soils to ensure that that they are in good condition with no potential for significant release of oils. The local power distributer should be contacted to ascertain the exact location and status of this cable.	Clearance / Enabling Works
	Recommended Material		
	Consultant Inspection / Sampling Required		
	Contractor/ Client Documentation Required	A copy of all correspondents with the local power distributer and evidence of any remedial action undertaken (if required	

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
Upgrading Potable Water Pipes	**Brief / Scope**	The available testing results indicated that soil concentrations pose a risk to potable water pipes. Soil data failed the tests relating to PE pipes for Group 3 (light to mid-range hydrocarbons). In accordance with UKWIR Guidance[8], PE pipes are not considered suitable for the site and that **PVC / Barrier pipe will be required** to prevent contamination of polymeric services.	Groundworks and Landscaping
	Recommended Product / Material & Installation Guidelines	PVC pipe / Barrier Pipe The Client or their agent/ engineer should notify the water company of their proposed selection of pipe material and details of installation for comment. The water pipe specification and construction method should be agreed with the water authority prior to installation of services. Normally, any water pipes will need to be placed at least 750mm below ground level to protect against frost susceptibility and any trafficked loads in line with the statutory water company's guidelines.	
	Consultant Inspection / Sampling Required	Unless the water pipes are crossing a known source of contamination that requires preventative measures to stop the creation of a preferential pathway, then inspection is not likely required.	
	Contractor/ Client Documentation Required	Material specification of the product used on site along with photographs of the placement of the water pipe indicating depth and construction/ placement method for inclusion into the Verification Report.	
Imported Topsoil and/or Subsoil (for additional soils – not a clean cover system)	**Brief / Scope**	Imported soil will likely be required in areas of general soft landscaping, to provide a suitable growing medium. A minimum of 150mm topsoil will be required.	Groundworks and Landscaping
	Recommended Material	Only 'clean', suitable for use, certified topsoil and subsoil should be imported onto site with no significant quantity of putrescible material (incl. wood or paper), which may generate ground gases and no hazardous materials such as asbestos containing materials or general waste (such as glass, metals etc.). Imported soils must meet the backfill specification in Appendix A for chemical suitability.	

[8] UKWIR Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites. 2010.

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
	Consultant Inspection / Sampling Required	Following approval of the soil source by the Environmental Consultant (prior to soils arriving on site – see below), a site inspection will be required. The consultant will attend site to sample the material prior to its placement (i.e. from the stockpiled soils). Validation testing data will be compared against the soil testing criteria set out in Appendix A. Following approval of the soils on site, a verification visit will be required to determine if the topsoil has been placed in the required areas at the appropriate thickness.	
	<u>Contractor/ Client</u> Documentation Required	Initially, validation of the imported soil shall include an assessment of the provenance of the material, which shall be supported by chemical data on the source soils provided by the supplier. **This information should be provided prior to the material arriving on site.** A copy of all delivery tickets and supplier information will be required for inclusion within the Verification Report.	
Waste Management and Disposal	**Brief / Scope**	Any excavated arisings associated with development works should be carefully managed to prevent mixing of different soil/waste types. Measures should be implemented on site to segregate waste streams with natural material stockpiled separately from any Made Ground. Any contaminated or potentially contaminated soils not specifically addressed in this Remedial Strategy should be separately stockpiled prior to further analysis. Stockpiles must be appropriately managed to prevent the generation of surface run-off, dusts, and/or potential fibre release, for example by use of sheeting or dampening down pending re-use/disposal or similar. None of the determinands analysed for were present at concentrations above the WM3 hazardous thresholds and, as such, soils from both the Made Ground and natural soils are considered to be not hazardous for waste disposal. Following this, three Waste Acceptance Criteria (WAC) test have been undertaken as part of the geotechnical investigation to determine if soils typically exceed the inert, non-hazardous (SNRHW) or hazardous waste limits for disposal directly to landfill. Two samples were taken from Made Ground (MG) and one sample was taken from natural soils (N). Overall, the Made Ground should fall within the inert. The single sample taken from London Clay Formation exceeded the inert waste criteria limits for inert waste due to elevated Sulphate and TDS. If, when inspecting the proposed soft landscaped areas, material is encountered that has not yet been classified and will need to be disposed of off-site, then this material should tested for waste classification and WAC in line with the *Environment Agency's Technical Guidance WM3* to inform if the material is hazardous or not hazardous and also to determine the correct landfill destination-type.	Clearance and Construction

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
		Although asbestos has not been identified within soils on site, the groundworks contractor should make provisions in their method statement for the identification and assessment of any ACS, and where required, for their safe excavation, storage and subsequent off-site disposal. The method statement will include provision of appropriate training and PPE for site operatives, other safeguards appropriate to ensure the requirements of CAR 2012[9] are met, and any other necessary Health and Safety considerations to protect site operatives and adjacent site users. Should ACM be identified during the development works which is bound within a different form of material (e.g. friable insulation board – not cement bound asbestos), specialist advice should be sought to ensure appropriate management. This will depend on the type and condition of any ACM, such as those that are notifiable to the Health and Safety Executive including, but not limited to, friable insulation board or limpet that will require specialist handling and disposal to a suitable hazardous landfill site. A copy of all waste consignment notes and waste haulier and recipient documentation and licenses will be required for inclusion within the Verification report. Documentation should be fully completed and clearly show the appropriate licenses and SIC number if applicable. These documents should be collected and retain or immediately forwarded electronically to the Environmental Consultant.	
	Recommended Material	NA	
	Consultant Inspection / Sampling Required	NA	

[9] Control of Asbestos Regulations (CAR) 2012

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
	<u>Contractor/ Client</u> Documentation Required	A copy of all waste consignment notes and waste haulier and recipient documentation and licenses will be required for inclusion within the Verification Report.	
Unforeseen Contamination	**Brief / Scope**	There is always a potential for unforeseen contamination to be encountered during any redevelopment works, particularly when groundworks are being carried out and the site cleared of existing structures and hardstanding. This will be particularly important when working within the vicinity of areas that were not investigated, or the method of investigation employed was limited. Key areas will be in areas of proposed soft landscaping not tested as part of the original site investigation and under buildings not exposed during the previous investigation. As such, there is a potential for buried hazardous materials including contaminated soils and other unforeseen contaminants to be encountered during the development works, which were not recorded during the intrusive investigation. Should any such material or potentially contaminated soils and/or water (such as stained, oily or malodours materials, or possible asbestos etc) be identified, the Environmental Consultant (and author of this document) should be contacted immediately to: • Visually inspect the suspected contamination/ materials; • Estimate the volume and extent; • Note any corresponding odours and/or staining; and • Take samples for testing to confirm type/nature of materials/ contamination present. It may be recommended that the contamination is excavated and stockpiled in order to allow further assessment and classification whilst site works continue with minimal disruption to the construction programme. The nature and means of managing the unforeseen contamination will be recorded accordingly and included in the Verification Report. The local planning authority should also be contacted if any such materials are encountered – this is likely required by the planning conditions.	Clearance and Construction
	Recommended Material	NA	
	Consultant Inspection / Sampling Required	An Environmental Consultant will need to be in attendance to take further samples and advise as necessary.	

REMEDIATION PLAN			
Remedial Measure	**Details**		**Anticipated Programme**
	Contractor/ Client Documentation Required	NA	

4.0 VERIFICATION STRATEGY

4.1 This chapter sets out the proposed verification methodology including validation sampling and testing and completion reporting in line with the Environment Agency's *Evidence, Verification of Remediation of Land Contamination*[10].

Watching Brief

4.2 A **non-specialist** (full-time) watching brief will be maintained by an appropriate person on-site throughout the works who is experienced and capable of identifying signs of potential contamination, including, but not limited to, staining, unfamiliar odours and visual evidence of potentially contaminated/ hazardous materials. This person would normally be a site manager and/ or nominated sub-contractor carrying out groundworks, demolition and enabling works when unforeseen contamination may be encountered. Should any unforeseen contamination arise during the development works, such as encountering potentially hazardous materials or contaminated soil, the appointed person and/or site manager will contact Lustre Consulting (specialist watching brief see below) to arrange a site visit for inspection, assessment and sampling (if required) in line with the Remediation Plan table in Chapter 3.

4.3 The contractor should also provide a record of the volumes of soil removed from, and imported to, site. A copy of all the waste consignment notes and delivery receipts etc should also be provided by the site manager (or nominated person) to the Environmental Consultant as necessary throughout the works.

4.4 A **specialist** watching brief will be undertaken by the Environmental Consultant at key stages during the works, such as during the remedial excavations, investigation around the fuel tank fill point, excavation in areas around BH2 and in areas of proposed soft landscaping, and the importation of soils and the placement of the CCS. It is envisaged that the specialist watching brief will entail several site visits to address the above, and also to attend site at the request

[10] Environment Agency, Evidence, Verification of Remediation of Land Contamination, SC030114/R1, 2010.

of the site manager if unforeseen contamination is encountered. During each visit, any remedial works will be inspected and a photographic record collated.

Localised Remedial Excavations / Pipework Removal

4.5 During the localised remedial excavations / Investigation around the fuel tank fill point, a full-time attendance by the Environmental Consultant will be required. Supervision will be required to delineate any contamination present, provide advice on arisings management and undertake validation sampling. Validation sampling will involve samples taken from the sides and base of the excavation(s), with testing for the contaminant of concern – PAH, TPH, lead, asbestos etc. As noted in the Remediation Plan (table) a PID will be used to assist in the delineation of any volatile contaminants. Following receipt of the laboratory test results, the consultant will inform the contractor that backfilling can be undertaken.

4.6 If required, additional samples may be taken to assist in the waste classification of any arisings from the excavation. A photographic record will be gathered and any relevant waste consignment notes collected.

Soils and Materials Used in Clean Cover System / Imported Topsoil

4.7 Soils and materials used in the CCS, including any site-won soils, imported soils and imported aggregate, will require various stages of testing and validation. Material imported for the formation of the CCS shall be obtained from a validated source. The overall validation of these materials is a two-stage process.

Stage 1: Initially, validation of the imported soils shall include an assessment of the provenance of the material, which shall be supported by chemical data on the source soils provided by the supplier. This information should be provided prior to the material arriving on site. Only 'clean', suitable for use, certified topsoil and subsoil should be imported onto site with no significant quantity of putrescible material (incl. wood or paper) which may generate ground gases and no hazardous materials such as asbestos containing materials or general waste (such as glass, metals etc.).

Stage 2: The second stage involves validation once the material is brought to site. **This stage must be completed prior to placement of material in the CCS area(s) with sampling and inspection carried out by the Environmental Consultant**. All soils will be visually assessed, photographed and logged with descriptions

conforming to *BS5930:2015*[11]. Depending on the source and nature of the materials to be used in the CCS, different testing frequencies (and testing suites, if applicable) will be required. The following testing frequencies have been determined:

1. *Imported Topsoil:* At least one validation soil sample will be taken for every 150m^3 of imported topsoil (or a minimum of three samples per source/supplier, whichever is greater). Validation testing data will be compared against the soil backfill specification (summarised in Appendix A).

2. *Potential Site-won Subsoil (Natural soils only i.e. London Clay pile arisings)*: Provided the material is visually free from contamination, putrescible materials/organics, and olfactory contamination (determined by a full-time site attendance during site scrape and stockpiling by an Environmental Consultant), at least one validation soil sample will be taken for every 150m^3 of site-won subsoil to be re-used. Validation testing data will be compared against the soil backfill specification (summarised in Appendix A).

3. *Imported Subsoil*: At least one validation soil sample will be taken for every 150m^3 of imported subsoil (or a minimum of three samples per source/supplier, whichever is greater). Validation testing data will be compared against the soil backfill specification (summarised in Appendix A).

All delivery tickets for imported materials should be provided to the Environmental Consultant.

CCS Placement Validation

[11] BS 5939: 2015. Code of Practice for Site Investigation. 2015

4.8 To ensure the CCS is placed in accordance with the specification in the Remediation Plan (table), visit(s) will be required to confirm that the CCS has been placed in the required areas and in accordance with the required specification / thicknesses.

Verification Reporting

4.9 A Verification Report will be completed to provide evidence that the work has been undertaken in accordance with this Strategy and to the satisfaction of any planning requirements. The Verification Report will document the following items:

a. A detailed description of the works completed and a photographic record.

b. A description of the soils removed off-site for recycling /disposal including approximate volumes and destination details.

c. A description of imported soil including chemical analysis results from the supplier(s) and validation samples and comparison against the backfill specification.

d. Verification of the placement and thickness of the clean cover system.

e. A copy of the potable water pipe material details used on site and a photographic record of installation.

f. Details of the confirmatory investigation in the vicinity of the fuel tank fill point, with details of any material removed and disposed off-site, including destination details along with soil validation.

g. Copies of correspondents and fulfilment of any recommendations from the Local Power Distributer regarding the redundant HV cable.

h. Details of the confirmatory investigation undertaken in the proposed new soft landscaping areas.

i. Copies of all relevant plans, drawings, design specifications and site visit records.

j. Copies of all relevant waste and soil management paperwork including conveyance notes, waste consignment notes and delivery tickets where required.

5.0 HEALTH & SAFETY, ENVIRONMENTAL AND DUTY OF CARE PLAN

Introduction

5.1 This chapter sets out the Health and Safety (H&S) and environmental duty of care associated with the proposed remediation work, including information and good practice guidance related to these potential environmental hazards. *This information is for the benefit and action of the responsible contractor undertaking the works and is intended as a guide only.*

Environmental Duty of Care

5.2 All waste soil must be taken away to a licensed recycling and/or waste disposal facility by a suitably licensed haulier. Section 34 of the Environmental Protection Act (Duty of Care) should be maintained at all times, with a record of all loads kept (including conveyance and consignment notes) for inclusion into the Verification Report. All disposal facilities should be made fully aware of the nature of any waste soil including any evidence of asbestos containing materials (ACMs) by the contractor.

5.3 Provisions should be made by the contractor to contain any run-off generated from stockpiled soils, with prevention measures in place to protect surface water drains and other water courses and also to prevent cross-contamination. This should be undertaken in accordance with the recommended methods in CIRIA's technical guidance *Control of Water Pollution from Linear Construction Projects*[12].

Construction (Design & Management) Regulations 2015

5.4 The CDM Regulations 2015[13] place responsibilities on all parties to a construction contract (including clients, designers, contractors and sub- contractors). Within this context the term "construction works" encompasses a broad range of activities including remediation. Under the regulations, whilst the client is not required to manage or supervise the works, it is recognised that the client exerts a significant influence over the way a project is carried out.

[12] Construction Industry Research and Information Association (CIRIA). Control of Water Pollution from Linear Construction Projects. Technical Guidance, 2006
[13] The Construction (Design and Management) Regulations 2015.

5.5 With respect to this remediation work, the CDM Regulations 2015 are applicable and since there will probably be more than one contractor carrying-out works then it is assumed that a Principal Designer and/or a Principal Contractor under the definition in the regulations has already been appointed. Therefore, it is presumed that Lustre Consulting Limited will be specialist sub-consultant/ sub-contractor under the CDM Regulations 2015. To ensure compliance, the contact details of the Principal Contractor and Principal Designer should be provided and a copy of this Remediation Strategy should be incorporated into the project Construction Phase Plan and Health and Safety File prepared by the Principal Contractor.

Health & Safety at Work

5.6 There is an obligation under the Health & Safety at Work Act 1974 and all other relevant health and safety legislation to safeguard employees and any persons which may be affected by their works. The contractor and any sub-contractors carrying out the elements of work related to the remediation of the site also have duties and responsibilities under any other legislation applicable to the work that they will be carrying out. The main contractor will need to be aware of, and comply with, such duties and responsibilities. It is beholden on all personnel themselves to work at all times in a safe manner and in accordance with the instructions given to them by the individuals with designated responsibility for health and safety/environmental matters.

5.7 The Health and Safety/Environmental hazards and proposed mitigation / control measures set out in this chapter should be incorporated into any contractor method statements as appropriate and supplied to all relevant parties before remediation work commences.

5.8 All site staff should have the right to stop any remedial activities, the movement of plant or equipment etc if it is considered that there is a risk to the health and safety of personnel or damage to the environment.

Emergencies

5.9 Site personnel should follow the health and safety procedures and site rules as set out by the Client / Principal Contractor. In any event, accidents are to be reported immediately to the site manager. At no time should personnel put themselves at risk.

5.10 If the Environmental Consultant needs to be contacted following the discovery of unforeseen contamination, and also at key stages in the verification works (as set out in Chapter 3), then the following contact details should be used:

Lustre Consulting Ltd: 01634 757 705 (main office) or info@lustreconsulting.com

Environmental Hazard Summary

5.11 The following table sets out general environmental hazards associated with remedial works. The responsible contractor should make suitable provisions to mitigate the risks from the identified hazards. Suggested control measures are provided.

Hazard	Recommended Mitigation / Control Measures
Direct contact with potentially contaminated materials during remediation works	Contact with waste and potentially contaminated soils should be prevented where possible. Disposable gloves and/or rigger gloves should be worn where there is a risk of direct contact. Consideration of the nature and toxicity of the contamination may warrant clearly defined 'clean and dirty' working areas and a dedicated decontamination unit.
Accidental ingestion of contaminated soils during remediation works	Eating, drinking or smoking will only take place within designated breakout areas away from the working area. Good hygiene practice should be adopted to minimise the risk of hand to mouth transfer.
Inhalation of hydrocarbon vapours, ground gases or contaminated dust	Appropriate dust or vapour masks will be worn within the designated working area. If a vapour mask is required due to a high vapour risk, then a face fit mask should be worn. If there is an asbestos risk then FF3 masks should be worn as a minimum. Gas risk sites should consider the risks of asphyxiation and explosion associated with, but not limited to, carbon dioxide and methane especially where gases can build up in confined spaces.
Encountering asbestos within the soils (and other areas of the site)	Should any asbestos be identified during the works, works should cease and specialist advice may need to be sought to ensure appropriate management and off-site disposal. This will depend on the type and condition of any asbestos, such as those that are notifiable to the Health and Safety Executive including, but not limited to, friable insulation board or limpet that will require specialist handling and disposal to a suitable landfill site.
Slip and trip hazards in and around the designated working areas and falling into excavations	All staff should remain vigilant during the works and when moving around the site. Staff should ensure that the designated working area is kept clear with good housekeeping. Any excavations which are to be left open or unattended should be made safe and secure by the contractor.
Site traffic on operational site	All staff should wear appropriate PPE suitable for the hazards identified in their task specific risk assessment, including high visibility jacket or vest at all times whilst on site to make themselves visible to other site personnel. Ensure operators are aware of your presence around the site and working areas.

Hazard	Recommended Mitigation / Control Measures
Hazards associated with underground services	All underground services should be cleared by the contractor prior to breaking ground.
Elevated levels of dust generated during the remediation works	During dry windy conditions, stockpiled material should be dampened down using dust suppression methods or covered with sheeting. Measures should be implemented, such as dedicated haulage routes, wheel-washing etc to minimise dust/mud generated. This should be covered in the construction management plan.
Spillages and leakages of potential contaminants from plant during remediation work, removed USTs/interceptors (if applicable) and or from run-off from the site	Plant and equipment proposed for use should be maintained to a high standard to minimise the likelihood of oil or fuel leakage to the ground. Should a significant leakage occur, site personnel must prevent contamination of the drains. Preventative measures may include, but not be limited too, placing a temporary bund.
General nuisance and noise associated with mechanical excavators and lorries to surrounding residents during excavation works	Plant will be operated between the hours of local authority guidelines (as set out in the Decision Notice). Lorries transporting the waste materials off-site will also run during this time period.

DRAWINGS

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Key

- Site Boundary
- Borehole (BH2) from previous site investigation
- Approximate location and number of hand pit locations to inspect ground quality in areas of proposed soft landscaping. If ashy made ground is encountered then a representative number of samples should be collected and analysed at a laboratory for speciated PAH and metals.
- Remedial delineation and excavations within proposed soft landscaped areas. Made Ground to be laterally delineated and validated by sampling from sides and base by an environmental consultant. Ashy Made Ground to be removed to a depth of 450mm or to the natural ground (whichever is shallowest). Replaced with clean, imported, certified and validated topsoil.
- Localised Investigation of former fuel fill point. Shallow excavations to allow sampling of soils and testing by PID for visual and olfactory evidence of fuel contamination. If hydrocarbons are detected then contaminated soils should be excavated and the resultant hole validated. Once validated the excavation should be replaced with clean, imported, certified and validated soil.
- Enquires to be made with local power distributer regarding status of redundant HV cable.

Notes

Do not scale from this drawing. Approximate positions only. Report all errors and omissions to author. Proposed development plan used as base plan.

The development will not undergo a reduction in the formation levels. For removal of the shallow Made Ground within the proposed soft landscaped areas, investigation around fuel fill point and inspection of soil in proposed soft landscaped areas. Refer to remedial plan for further information. Validation required by Lustre Consulting.

Rev	Date	Description

Project Number	Drawing Number	Date
2112	2112-002	28/02/2018

Project	Client
PARLIAMENT HILL, CAMDEN	FARRANS CONSTRUCTION

Parliament Hill School— Remediation Plan

Designed by	Approved by
JM	JM

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APPENDIX A: BACKFILL SPECIFICATION

BACKFILL SPECIFICATION FOR SUBOILS AND TOPSOILS

Determinand	Units	Residential End Use
Asbestos Screen	-	Detected
Total Cyanide	mg/kg	53.00
Arsenic	mg/kg	37.00
Cadmium	mg/kg	26.00
Chromium	mg/kg	910.00
Copper	mg/kg	2400.00
Lead	mg/kg	200.00
Mercury	mg/kg	170.00
Nickel	mg/kg	130.00
Selenium	mg/kg	250.00
Zinc	mg/kg	3700.00
Naphthalene	mg/kg	2.30
Acenaphthylene	mg/kg	170.00
Acenaphthene	mg/kg	210.00
Fluorene	mg/kg	170.00
Phenanthrene	mg/kg	95.00
Anthracene	mg/kg	2400.00
Fluoranthene	mg/kg	280.00
Pyrene	mg/kg	620.00
Benzo(a)anthracene	mg/kg	7.20
Chrysene	mg/kg	15.00
Benzo(b)fluoranthene	mg/kg	2.60
Benzo(k)fluoranthene	mg/kg	77.00
Benzo(a)pyrene	mg/kg	5.00
Indeno(1,2,3-cd)pyrene	mg/kg	27.00
Di-benzo(a,h)anthracene	mg/kg	0.24
Benzo(ghi)perylene	mg/kg	320.00
TPH CWG - Aliphatic >C5 - C6	mg/kg	42.00
TPH CWG - Aliphatic >C6 - C8	mg/kg	100.00
TPH CWG - Aliphatic >C8 - C10	mg/kg	27.00
TPH CWG - Aliphatic >C10 - C12	mg/kg	130.00
TPH CWG - Aliphatic >C12 - C16	mg/kg	1100.00
TPH CWG - Aliphatic >C16 - C21	mg/kg	32500.00
TPH CWG - Aliphatic >C21 - C34	mg/kg	32500.00
TPH CWG - Aromatic >C5 - C7	mg/kg	70.00
TPH CWG - Aromatic >C7 - C8	mg/kg	130.00
TPH CWG - Aromatic >C8 - C10	mg/kg	34.00
TPH CWG - Aromatic >C10 - C12	mg/kg	74.00
TPH CWG - Aromatic >C12 - C16	mg/kg	140.00
TPH CWG - Aromatic >C16 - C21	mg/kg	260.00
TPH CWG - Aromatic >C21 - C35	mg/kg	1100.00
Benzene	mg/kg	0.87
Toluene	mg/kg	130.00
Ethylbenzene	mg/kg	47.00
m & p-xylene	mg/kg	56.00
o-Xylene	mg/kg	60.00
Monohydric Phenols	mg/kg	120.00

All Units mg/kg
Based on 1.0% SOM in order to be conservative, organic thresholds may increase marginally if SOM >1%.

VISUAL SPECIFICATION

These soils must be clean with no significant quantity of putrescible material (incl. wood or paper), which may generate ground gases, and no hazardous materials such as ACM or general waste (such as glass, metals etc.)

APPENDIX B: NOTES ON LIMITATIONS

LUSTRE CONSULTING, ENVIRONMENTAL AND GEOTECHNICAL CONSULTANCY SERVICES

NOTES ON LIMITATIONS

General

Lustre Consulting have completed the attached report for the use of the Client detailed on the front cover and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed.

Third parties should not use or rely upon the contents of the report unless written approval has been gained from Lustre Consulting; (due to legal requirements, a charge may be levied against such approval).

Lustre Consulting accepts no responsibility or liability for:

a) the consequences of this documentation being used for any purpose or project other than that for which it was commissioned, and

b) this document to any third party with whom approval for use has not been agreed.

Phase I Environmental Risk Assessments, Desk Studies and Site Audits

The work completed and utilised to provide this report comprises a study of available documentation. The opinions and results presented in this report have been arrived at by utilising the finite amount of data available at the time of writing and are relevant only to the purpose for which the report was commissioned. The data which has been reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative information pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, Lustre Consulting reserves the right to review this information and, if warranted, to modify the opinions presented in the report accordingly.

It should be noted that the risks which are identified in this report are perceived risks based on the available information at the time of writing and that the actual risks associated can only be assessed following a physical investigation of the site.

Phase II Site Investigations

The intrusive investigation has been completed to provide information concerning the type and degree of contamination present along with ground and groundwater conditions which facilitates a reasonable risk assessment to be completed. The stated objectives of the ground investigation have been limited to assessing the proven risks which are associated with potential human targets, building materials, the environment (including adjacent land), and to surface and groundwater.

The amount of exploratory work, chemical testing and monitoring completed as part of this project has potentially been restricted by the short timescale available, and the locations of exploratory holes undertaken have potentially been restricted to areas unoccupied by buildings(s) and buried services. A more comprehensive post demolition / decommission investigation may be required if the site is to be redeveloped. For these reasons any costs included in relation to site remediation must be considered as tentative only at this time.

The exploratory holes investigate only a small volume of the ground in relation to the size of the site and therefore, can only provide a “snap shot” or general indication of ground conditions located on the site. The fact that the site has been investigated does not preclude the existence of localised “hotspots” of contamination where concentrations may be significantly higher than those actually encountered.

The risk assessment and opinions provided in this report take into account currently available guidance values relating to acceptable contamination concentrates; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

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