

Remediation & Verification Strategy

175 Willoughby Lane, London, N17 0RX

**Presented to: Paloma II (Industrial IV) Trustee I
Limited and Paloma II (Industrial
IV) Trustee II Limited**

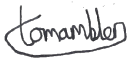
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Delta-Simons Contact	Tom Ambler (Tom.Ambler@deltasimons.com)

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				Tom Ambler Senior	Emma Singleton Associate	Simon Steele Unit Director

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As part of The Lucion Group, our combined team of 500 in the UK has a range of specialist skill sets in over 50 environmental consultancy specialisms including asbestos, hazardous materials, ecology, air and water services, geo-environmental and sustainability amongst others.



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Figure 1 - Site Location Map

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Drawing 1 - Proposed Development Plan

Drawing 2 - Planting Layout

APPENDICES

Appendix A - Limitations

Appendix B - Protocol for Addressing Localised Hydrocarbon Contamination in Soils

Appendix C - 'Hotspot' Protocol

Appendix D - Site-won Soils Assessment Criteria

Appendix E - Imported Soils Assessment Criteria

Appendix F - Inspection Pit and Testing Frequencies

1.0 Introduction

1.1 Appointment

Delta-Simons Limited ("Delta-Simons") was instructed by Paloma II (Industrial IV) Trustee I Limited and Paloma II (Industrial IV) Trustee II Limited (the "Client") to undertake the preparation of a Remediation and Verification Strategy (RVS) for 175 Willoughby Lane, London, N17 0RX (the "Site"). The Site is subject to Planning Permission reference HGY/2022/0664 (London Borough of Haringey). It is noted that the Site was formerly known as Land off Dyson's Road, Edmonton, N17 0RU.

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 Delta-Simons' previous report and cover letter as follows:

- Geo-Environmental Assessment Cover Letter - Land off Dyson's Road, Edmonton, N17 0RU/ 175, Willoughby Lane, London, N17 0RX, November 2023, ref. 105463.601571, by Delta-Simons.
- Geo-Environmental Assessment - Land off Dyson's Road, Edmonton, N17 0RU, June 2020, ref. 20-0337.01, by Delta-Simons.

1.3 Scope of Works

The scope of works undertaken for this assessment was to:

- Summarise the Site setting and confirmed contaminant linkages;
- Establish the remediation objectives and metrics;
- Complete an initial remediation screening exercise;
- 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			
			
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Co-ordinates	Centred approximately at National Grid Reference 534770, 191740.	Elevation (approx..)	10.7 – 10.9 m AOD
		Area	1.0 Ha
Site Address and Location	The Site is located in Tottenham, North London, approximately 0.6 km from Meridian Water Train Station and 13 km to the north of the City of London. A Site location map is provided as Figure 1. The property adjacent to the west of the Site is currently utilised as a vehicle breakers yard, while the north of the Site is bounded by residential properties. Dyson's Road bounds the Site to the east with vehicle servicing facilities beyond. The south of the Site is bound by Brantwood Road with warehousing beyond. Google Maps Link		
Site Description	The Site comprises a generally level parcel of land and was most recently utilised as a car dealership. The east of the Site incorporated two buildings utilised as a showroom and office space. Running parallel across the north of the Site was a building which is used for car spraying and bodyworks. A car wash was located in the south western corner of the Site. It is understood that five USTs may be present in the south-east corner of the Site. It is unclear whether these USTs have been decommissioned and removed from Site, therefore the presence of these USTs is		

	assumed. It is understood that at the time of writing, the Site was about to undergo demolition.
Site History	The earliest available mapping (1867) indicates that the Site was occupied by Whitebraid Hill Farm with a small pond in the north-east (and no longer visible by 1914). By 1935, two buildings appear on Site: a chocolate factory was located in the north of Site and a footwear factory in the south with an access road intersecting the northern and southern factories. By 1956 'tanks' were labelled in the centre of the Site immediately to the north of the access road. This was followed in 1960 by the presence of a tank on the midpoint of the western Site boundary. The Site remained in this configuration until 2006 where the central and western part of the northern factory was demolished. The southern factory was demolished by 2009 with the Site then utilised as a car recycling/ dismantling centre.
Proposed Development Description	The proposed development for the Site is for construction of seven industrial units including office and mezzanine floors, car parking, service yard areas, landscaping and associated works. A proposed development plan is presented at the rear of this report as Drawing 1. A significant cut and fill exercise to support the development is not anticipated. Any earthworks that are to be undertaken would need to be completed under a Materials Management Plan (or otherwise appropriately permitted waste exemption license) in accordance with the CL:AIRE Code of Practice to facilitate the reuse of soils.

2.2 Planning

Planning Permission has been granted for the redevelopment of the Site for commercial use (London Borough of Haringey Ref. HGY/2022/0664). The Planning Decision Notice issued by the London Borough of Haringey (Ref. HGY/2022/0664) in October 2023 imposes a number of conditions on the proposed development. Conditions 4 and 5 of the Permission relate to contamination risk and remediation, and are listed below:

Relevant Planning Conditions	<u>4. Land Contamination</u> Before development commences other than for investigative work: a. A desktop study shall be carried out which shall include the identification of previous uses, potential contaminants that might be expected, given those uses, and other relevant information. b. Using this information, a diagrammatical representation (Conceptual Model) for the site of all potential contaminant sources, pathways and receptors shall be produced. The desktop study and Conceptual Model shall be submitted to the Local Planning Authority. If the desktop study and Conceptual Model indicate no risk of harm, development shall not commence until approved in writing by the Local Planning Authority. c. If the desktop study and Conceptual Model indicate any risk of harm, a site investigation shall be designed for the site using information obtained from the desktop study and Conceptual Model. The site investigation must be comprehensive enough to enable; a risk assessment to be undertaken, refinement of the Conceptual Model, and the development of a Method Statement detailing the remediation requirements. d. The risk assessment and refined Conceptual Model shall be submitted, along with the site investigation report, to the Local Planning Authority which shall be submitted to, and approved in writing by, the Local Planning Authority prior to that remediation being carried out on site.
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	e. Where remediation of contamination on the site is required, completion of the remediation detailed in the method statement shall be carried out and a report that provides verification that the required works have been carried out, shall be submitted to, and approved in writing by the Local Planning Authority before the development is occupied. <u>5. Unexpected contamination</u> If, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the Local Planning Authority) shall be carried out until a remediation strategy detailing how this contamination will be dealt with has been submitted to and approved in writing by the Local Planning Authority. The remediation strategy shall be implemented as approved.
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2.3 Physical Setting

Geology	From review of British Geological Survey (BGS) online mapping, the Site is indicated to be underlain by superficial deposits of the Enfield Silt Member comprising clay, silt and sand. Deposits of the Kempton Park Gravel Member are likely to be present below, comprising sand and gravel. Bedrock of the London Clay Formation underlies these deposits. Borehole records in close proximity to the Site and located on the Site indicate that underlying the London Clay Formation, the Lambeth Group, Thanet Sands and Chalk Formation are located at depth. Encountered ground conditions were proven to comprise generally granular Made Ground to depths of up to 1 m bgl, underlain by the Enfield Silt Member (soft gravelly clay) to depths of up to 1.9 m bgl. The Kempton Park Gravel Formation (sand and gravel) was proven to depths of up to 5.3 m bgl, and was underlain by the London Clay Formation to depths of up to 13.4 m bgl. The Lambeth Group comprising grey, red, orange and blue clay underlain in one location by white silty sand was encountered beneath the London Clay Formation to an unproven depth (> 15 m bgl).
Aquifers and Groundwater Receptors	According to current Environment Agency (EA) data, the Enfield Silt Member is classified as Unproductive Strata. The Kempton Park Gravel is classified as Secondary A Aquifer. The London Clay Formation and Lambeth Group are classified as Unproductive Strata. The underlying Thanet Sands and Chalk are classified as Principal Aquifers. The Site is located within a Source Protection Zone II (SPZ) and lies 96 m to the west of a SPZ I; this is likely to relate to groundwater abstraction from the Chalk (Principal Aquifer). The nearest potable abstraction point is located approximately 770m to the north-east for mineral water bottling operated by Coca Cola and Schweppes which is permitted to abstract up to 360m³ of water per day.
Groundwater Levels and Flow	Groundwater levels within the Kempton Park Gravel Formation indicate resting groundwater levels may be at approximately 2 m bgl (8.7 m AOD). The inferred flow direction within the Kempton Park Gravel Formation is towards the south. A deeper groundwater body was recorded at the base of the London Clay Formation/ Lambeth Group and was noted to be sub artesian in nature.
Hydrology	The nearest surface water feature is Pymmes Brook located 291 m to the east. The Banbury and Lockwood reservoirs are located approximately 500 m to the east. According to the Envirocheck® Report, there are no surface water abstractions located within 500 m of the Site.

2.4 Summary of Contamination (Geo-Environmental Assessment, ref. 20-0337.01)

Soils

Widespread significant contamination of the soils was not identified by the Geo-Environmental Assessment for the Site. Although concentrations of heavy metals, Petroleum Hydrocarbons and PAHs were detected, they remained below relevant Generic Assessment Criteria (GAC) based on a commercial end use scenario.

Localised exceedances of Delta-Simons' derived GAC for Total Petroleum Hydrocarbons (TPH) (5,000 mg/kg) were identified in the shallow soils (Made Ground, Enfield Silt Member and Kempton Park Gravel) at DS103, Kempton Park Gravel at DS106 and the Made Ground at DS104. These locations are all noted to be in proximity to one another, in the centre-north of the Site, indicating a potential localised soil contaminant source in this area of the Site. The screening criteria, whilst not directly correlating to risks to human health was considered to be an indicator of potential product with the soil based on soil co-solubilities. A breakdown of TPH fractions indicate that the majority of elevated TPH concentrations were located within the longer chain aliphatic hydrocarbon range which are typically less mobile and also less volatile. A maximum concentration of total TPH (18,161mg/kg) was recorded within the deeper Kempton Park Gravels at DS103, however it is noted this sample was likely from the capillary fringe (i.e. impacted by groundwater) given the resting groundwater levels recorded. Similar total TPH concentrations were recorded within the Made Ground at DS104 (13,094mg/kg), predominantly comprising long chain aliphatic compound, indicating the shallow soil source may be centred around DS104.

Asbestos screening identified Asbestos Containing Materials (ACMs) consisting of chrysotile and amosite fibres in five samples from three locations, typically within the Made Ground.

Groundwater

The results of groundwater laboratory analysis identified marginally elevated heavy metals and Ammonium (NH₄) to be present across the entire Site within the Kempton Park Gravels. The analysis also identified elevated TPH fractions comprising medium and long chain aliphatic and aromatic hydrocarbon fractions to be present in the north around DS101 and DS104 and also at DS108, with elevated PAH compounds predominantly recorded at DS108.

It was noted that the elevated TPH concentration recorded in DS108 may represent a separate source area, possibly associated with a historical spill. However, it is noted that soil samples from DS108 did not record elevated soil concentrations.

The most significant groundwater TPH concentration was recorded in DS104, near the potential shallow soil hotspot in the vicinity of DS103, DS104 and DS106.

Whilst elevated TPH concentrations and localised product were identified in the soils, the results of laboratory chemical testing indicated that contaminants within the shallow groundwater were likely to have been derived from the overlying soils and were considered to correspond to lubricating oils which are not considered to be highly volatile. A review of the speciation of TPH concentrations also indicated that TPH concentrations were broadly located within the longer chain aliphatic range and therefore were unlikely to be volatile.

Two groundwater samples were obtained from the deeper Lambeth Group with samples targeted to assess the nature of contaminants at the Site boundary and also in proximity to the USTs in the south-east of the Site. The results of the laboratory analysis did not identify any exceedances when considered in the context of UK Drinking Water Standards and no evidence of contaminant exceedances within the shallow aquifer was identified in the deeper aquifer, indicating the aquifers to be isolated from each other.

Ground Gas

The results of the gas monitoring identified elevated levels of methane at DS103, DS104, DS105, DS106, and DS107, with response zones located within the Made Ground and Kempton Park Gravel (methane concentrations recorded up to 19.6% v/v). Elevated methane concentrations were typically encountered in areas where evidence of hydrocarbon staining had been noted. Carbon dioxide concentrations were generally noted to be low (<5%) across the Site with localised areas of depleted oxygen. Based on the initial findings of the preliminary investigation, the ground gas regime at the Site was considered to correspond to a CS2 in accordance with BS:8485 guidance.

Other Considerations

Chemical Attack on Buried Concrete: Given the presence of potentially pyritic materials such as ash and clinker within the Made Ground, a conservative approach was adopted when assessing the shallow soils in accordance with the recommendations presented in BRE Special Digest 1, 'Concrete in Aggressive Ground' 2005'. Buried foundations taken solely into the Made Ground and Kempton Park Gravels were recommended to be designed to resist DS2 - AC2 chemically aggressive ground conditions.

In accordance with the recommendations of BRE Special Digest 1, 'Concrete in Aggressive Ground' 2005, it was stated that the conditions of the soils at the Site for piled foundations taken into the London Clay Formation and Lambeth Group would be classified as Design Sulphate Class DS-5 and ACEC Class AC-5 for soils and groundwater, however when considering that piled foundations will not expose pyritic soils to oxidising conditions then the class can be reduced to DS4- AC4 conditions.

Potable Water Supply Pipes: Given the presence of organic contamination at the Site, it is recommended to consider the use of barrier pipe materials, subject to discussions with the relevant Local Water Authority.

2.5 Conceptual Site Model

The following linkages have been previously confirmed as being relevant to the proposed development and warranting mitigation.

Confirmed Linkages	Source Descriptions	Pathway	Receptor
Linkage 1	Localised ACMs in the Made Ground	Inhalation, ingestion, direct contact	End Users of the Site
Linkage 2			Construction-phase staff/ future maintenance workers
Linkage 3	Localised hydrocarbon impacted soils and groundwater (DS101, DS103, DS104, DS106 and DS108)	Migration/ leaching from soils to groundwater	Secondary A Aquifer - Kempton Park Gravel and third party land
Linkage 4		Inhalation, ingestion, direct contact	Construction-phase staff/ future maintenance workers
Linkage 5	Elevated methane concentrations	Vertical and lateral migration and accumulation of gas in enclosed spaces	End Users of the Site
Linkage 6	Potential for sulphate bearing strata	Direct contact with impacted soils	Future building structures
Linkage 7	Potential for organic contaminants in soils	Direct contact with impacted soils	Potable water supply pipes

Linkage 6 and 7 were not included with the Conceptual Site Model (CSM) presented within the Geo-Environmental Assessment, (ref. 20-0337.01), however, are considered applicable to the proposed development given the potential for sulphate and organic contaminants in soils.

2.6 Data Gaps and Uncertainties

The following data gaps and uncertainties apply and have been considered within the remediation strategy:

- Known Unknowns - hydrocarbon contamination encountered in DS101, DS103, DS104, DS106 and DS108 is not fully delineated therefore there is uncertainty regarding the extent of soil and groundwater contamination; and,
- Unknown unknowns - the potential to encounter unexpected/not previously encountered contamination such as bulk asbestos, or soil or groundwater hotspots.

3.0 Remediation Strategy

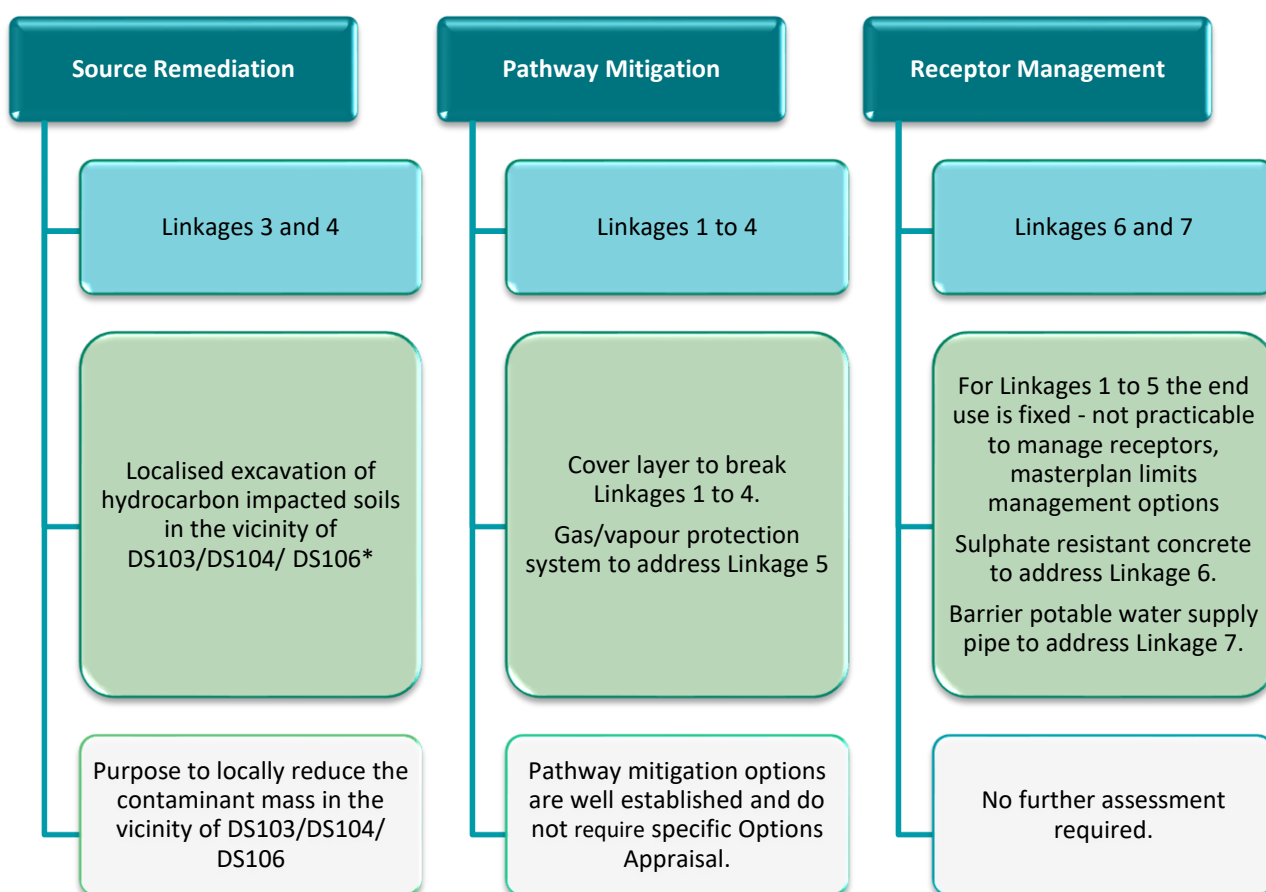
3.1 Introduction

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.



* Soil concentrations recorded in DS108 were not elevated therefore targeted excavation in the vicinity of DS108 would unlikely present a benefit to the groundwater environment. The logs for DS101 do not indicate any shallow hydrocarbon impacted soils suggesting a soil source is not present in the vicinity of DS101. The groundwater concentration recorded in DS101 is also noted to not be significantly less than that recorded in DS104 therefore excavation in the vicinity of DS101 is not recommended. Should unexpected soil contamination be encountered, the 'hotspot' protocol would be applied.

3.3 Stakeholders

Parties Anticipated to be Involved	Function / Interest / Likely Timing of Involvement
Client (Paloma II (Industrial IV) Trustee I Limited and Paloma II (Industrial IV) Trustee II Limited)	Land Owner / Developer
Principal Contractor	Delivery of Development
Delta-Simons	Land quality risk assessment
London Borough of Haringey (CLO)	Regulation relating to Human Health
Environment Agency (EA)	Regulation relating to Controlled Waters

3.3.1 Overview

The Site remediation strategy has been devised based on the intrusive investigations undertaken in May and June 2020 to mitigate the risks posed by the identified contaminants of concern and break potential contaminant linkages allowing the redevelopment of the Site for a commercial end use. The key features of the remedial strategy are summarised below;

Enabling Phase Works

- Demolition of buildings and breaking out of floor slab (Section 4.2);
- Excavation, breaking out and processing of sub-surface features (Section 4.3);
- Excavation, disposal and verification of grossly hydrocarbon impacted soils in the vicinity of DS103/DS104/ DS106 (Section 4.4);
- Verification of Site-won or imported fill materials to confirm suitability for re-use (Section 4.8).

Construction Phase Works

- Provision of a clean cover system in soft landscaped areas of the Site.
- Verification of the clean cover system by an environmental consultant to confirm depth and chemical / physical suitability of the clean cover system (Section 5.2);
- Provision of localised ground gas protection measures in accordance with BS 8585:2015 CS2 with verification by a specialist contractor (Section 5.3);
- Installation of clean service corridors, upgraded water supply pipes and use of sulphate resistant concrete (Section 5.4); and,
- 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 (Section 6).

4.0 Pre-Construction Remedial Works

4.1 Background

It is understood that a demolition, enabling and construction works contractor (the “Principal Contractor”) will be appointed by the Client.

A significant cut and fill exercise to support the development is not anticipated. Any earthworks that are to be undertaken would need to be completed under a Materials Management Plan (or otherwise appropriately permitted waste exemption license) in accordance with the CL:AIRE Code of Practice to facilitate the reuse of soils.

This section of the report outlines the enabling works required prior to commencement of the construction phase of the development.

4.2 Demolition and Site Clearance

A Demolition Asbestos Survey Report should be undertaken prior to demolition. Asbestos may need to be removed by a licensed asbestos contractor prior to demolition and the removal should be appropriately reported by the contractor.

All existing buildings should be demolished and the ground slab broken out.

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 waste management facility.

4.3 Excavation, Breaking and Processing of Sub-Surface Structures

4.3.1 Relict foundations, slabs and utilities etc.

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

All Site-won hard materials (e.g. concrete, brick and asphalt) which are intended for re-use beneath the cover system shall be processed and stockpiled for chemical testing to demonstrate they are suitable for re-use within the proposed development.

4.3.2 Relict Drainage

The condition of existing foul and surface drainage is currently unknown; however, it is assumed that much of the existing drainage was installed when the Site was redeveloped in the 1960s, at which point the Site appears to have been relatively unchanged to the present day (apart from above ground demolition).

Delta-Simons is unaware of any drainage condition surveys and none were available within the archive information reviewed. Given the age of the drainage system it is plausible that some localised leakages into surrounding soils have occurred.

The relict drainage system (both surface water and foul) will require cleaning prior to removal, with all impacted sludge, sediment and liquid removed as far as practicable. The relict drainage will be cleaned out by a specialist drain cleaning company using a jet vacuum unit. The contents of the drains will be vacuum extracted to the tanker for off-site disposal to a suitably licensed facility. In the event that unforeseen contamination is encountered, the ‘hotspot protocol’ as described in Section 4.7 will be implemented.

4.3.3 Underground Storage Tanks (UST)

It is understood that five USTs may be present in the south-east corner of the Site. It is unclear whether these USTs have been decommissioned and removed from Site, therefore the presence of these USTs should be assumed and allowance made for safe removal during the enabling works programme, unless otherwise confirmed.

The USTs shall be decommissioned and removed by a specialist contractor. The full extents of the USTs 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). The contents of the USTs 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 4.7 will be implemented.

4.3.4 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 hydrocarbon impacted soils and groundwater 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.

The Principal Contractor should undertake their own assessment of Unexploded Ordnance (UXO) risk in relation to their specific proposed scope of works.

4.4 Local Excavation of Hydrocarbon Impacted Soils

The Principal Contractor will be responsible for the localised excavation of hydrocarbon impacted soils in the vicinity of DS103/ DS104/ DS106, appropriate disposal of the excavated soils to a suitably licenced facility and the verification soil sampling requirements. Appendix B outlines the generalised methodology for the excavation and disposal of the hydrocarbon impacted soils and subsequent verification requirements. The excavation depth shall not exceed 1.5 m bgl or progress into the saturated zone (whichever is shallower). Significant excavation into the Kempton Park Gravel Formation is not recommended.

The Principal Contractor is responsible for the import of chemically verified materials for backfill, free from visual and/or olfactory contamination. Alternatively, the Principal Contractor may use Site-won material free from visual and/or olfactory contamination for backfill.

4.5 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.

4.6 Environmental Management

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

The works will involve the disturbance of soils which may contain contaminants including asbestos. The Principal Contractor shall prepare a Construction Environmental Management Plan (CEMP) which shall include measures to prevent the emission of contamination to air 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 - damping down and / or misting as appropriate;

- Asbestos in air monitoring during earthworks (including boundary and personal monitoring);
- Use of a wheel wash or roadsweeper to address mud on roads;
- Control of water including surface water run-off and water in excavations to prevent escape to adjacent properties and/or watercourses;
- 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.

4.7 Addressing Previously Unidentified 'Hotspots' of Contamination

4.7.1 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.

4.7.2 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 regard 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 finds remain the Contractor's responsibility.

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

4.8 Materials Management

4.8.1 Materials Management for Earthworks

A significant cut and fill exercise to support the development is not anticipated. Any earthworks that are to be undertaken would need to be completed under a Materials Management Plan (or otherwise appropriately permitted waste exemption license) in accordance with the CL:AIRE Code of Practice to facilitate the reuse of soils.

The minimum testing frequency for Site-won hard materials (e.g. concrete, brick and asphalt) to be used as fill should be 1 sample per 1,000m³ (minimum of 3 samples), tested for standard metals suite, 16 PAHs and Asbestos screen, compared to a commercial GAC (included as Appendix D).

The chemical criteria against which any imported soils shall be assessed is based on relevant GAC applicable at the time of the works (regardless of the intended use as materials should be free from contamination), alternatively, Delta-Simons Human Health Generic Assessment Criteria as presented in Appendix E shall be used.

4.8.2 Asbestos in Soils - Earthworks

The assessments undertaken have identified that asbestos is present in soils at the Site.

The groundworks Contractor should be made aware of the possibility of encountering potential 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 document was prepared with the support of the Health and Safety Executive and presents the definitive explanation of how the legal requirements of the CAR 2012 have been interpreted to apply to work with asbestos contaminated soil and construction & demolition materials. The guidance is underpinned by the fundamental requirements expressed in the Regulations, in relation to the protection of employees from risks related to exposure to asbestos but is set within a carefully considered framework designed specifically for soil and C&D materials contaminated with asbestos.

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 Contractor should determine the need for appropriate levels of PPE and/or RPE and any associated air monitoring as required.

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

4.8.3 Asbestos in Soils - Post Earthworks

The requirement for a clean cover layer in all areas of soft landscaping is detailed further in Section 5.

5.0 Construction-Phase Remediation Works

5.1 Certified Clean Topsoil / Subsoil Layer - Cover System

Delta-Simons consider that a clean cover system should be placed for landscaping areas where Made Ground is present at surface, to break the identified pollutant linkage and to facilitate the growing of flora. Intrusive investigation works have identified Made Ground at surface across the Site; therefore, it is considered that a clean cover system will be required in all landscaping areas on-Site.

For areas where a clean cover system is required (anticipated to be areas of soft landscaping at the Site), the following criteria are recommended:

- A high visibility membrane or hard-dig layer should be installed on top of Made Ground upon which the cover layer will then be placed. This is to provide a physical break of a potential pathway between Made Ground and the cover system;
- Within proposed landscaped areas, the clean cover layer shall be a minimum thickness of 700 mm, consisting of 400 mm subsoil and 300 mm topsoil in line with the landscape architects Planting Layout, included as Drawing 2;
- Where trees are to be planted as part of landscaping, the cover system will be deepened to accommodate the root-ball.

In accordance with BS 3882:2015, the depth of topsoil shall not exceed 300 mm but the depth of subsoil should be at least double the depth of the topsoil.

5.2 Imported Materials and Verification

5.2.1 Pre-Importation Testing

In the event that any soils are required to be imported to the Site to be used in cover systems 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 material's 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 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 E) 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.

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;

- pH, heavy metals;
- Total petroleum hydrocarbons; and
- Speciated Polyaromatic Hydrocarbons (16 PAH).

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

One composite sample shall be taken for every 250 m³ of imported soil to be used, with a minimum of 3 No. samples of each soil type shall be tested from each source/supplier.

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 (regardless of the intended use as materials should be free from contamination), alternatively, Delta-Simons Human Health Generic Assessment Criteria as presented in Appendix E 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.

5.2.2 Post-Placement Verification

Following the placement of the clean cover system in soft landscaped areas, the depth of cover must be physically inspected to confirm the minimum thicknesses detailed in Section 5.1 have been achieved. It is anticipated that subsoil and topsoil may have been tested for chemical suitability prior to placement.

The inspection is to be undertaken by the Environmental Consultant and will comprise (at least):

- Inspection pits on a 25 m grid in soft landscaped areas.
- The location of the inspection pits is to be determined by the Environmental Consultant to ensure a good spatial coverage.
- The Environmental Consultant will record the overall depth of the clean cover along with the thickness of topsoil and subsoil, and the presence of a membrane or hard-dig layer. A photographic record of the excavation, with suitable scale, will be obtained for the verification report.

The inspection pit and testing frequencies required are summarised in the table below. A copy is also presented in Appendix F; it is recommended that this is distributed to the Contractor for use on-Site during the groundworks.

	Soft Landscaping Requirements (required in all soft landscaping areas)
Clean cover thickness where Made Ground is present (must comprise chemically and physically validated subsoil and topsoil)	700 mm minimum cover consisting of: - 300 mm topsoil - 400 mm subsoil
Inspection Pit frequency (to confirm cover thickness and membrane depth, where required)	25 m grid: A minimum of 1 inspection pit per 25 m grid is required in soft landscaped areas
Testing frequency (coverage to be determined by Environmental Consultant)	Topsoil and subsoil: Samples required from each inspection pit on a 25 m grid in soft landscaped areas
If Made Ground is present at surface (Made Ground identified Site-wide)	Membrane required: Where Made Ground is present, a high visibility membrane or hard-dig layer should be installed to break a potential pathway to asbestos containing materials

5.2.3 Cover systems and other potentially interacting site works

Careful consideration should be given to the programming of in-ground Site works with the potential to disturb the cover system once it has been placed. For example:

- Erection of fencing (where post holes are to be created and arisings generated);
- Planting of trees;
- Services installation.

Ideally, these works (or similar), which would result in made ground being brought to surface, should be programmed to occur *before* installation of the cover system to avoid disturbance/cross-contamination of the cover soils.

In the event such works occur after placement of the cover system, care should be taken to control arisings to avoid such cross-contamination. Evidencing of the absence of cross contamination may be required.

5.3 Ground Gas Protection

The preliminary data indicates that the Site can be classified as CS2.

Gas protection measures will be required for the proposed buildings.

5.3.1 Ground Gas Risk Summary

The results of the gas monitoring identified elevated levels of methane with response zones located within the Made Ground and Kempton Park Gravel (methane concentrations recorded up to 19.6% v/v). Carbon dioxide concentrations were generally noted to be low (<5%) across the Site with localised areas of depleted oxygen. Based on the initial findings of the preliminary investigation, the ground gas regime at the Site was considered to correspond to a CS2 in accordance with BS:8485 guidance.

5.3.2 Installation of Ground Gas Protection Measures

Ground gas protection measures (where required) shall be installed in accordance BS8485:2015 guidance as appropriate and should be agreed with the Local Authority prior to adoption.

It is recommended that the design and installation of the gas protection measures is carried out by a suitably qualified and experienced subcontractor to meet the requirements of the Local Authority and BS 8485:2015.

BS:8485 provides a scoring system to determine the appropriate protection measures for a proposed development in accordance with the identified ground gas regime. Table 3 of BS:8485 summarises typical UK building types, which for this development will comprise Type D (commercial/ industrial). Table 4 details the points required for the Characteristic Situation, which for CS2 is 1.5. This can be achieved by a combination of the following:

- Structural barriers (Table 5);
- Ventilation (Table 6); and
- Gas Membrane (Table 7).

The above should be considered in conjunction with the proposed foundation / floor slab design to achieve the minimum score required within BS:8485. It is recommended that the installer of the membranes should have the appropriate qualifications (NVQ Level 2 'Gas Membrane Installations').

5.3.3 Verification of Ground Gas and Soil Vapour Protection Measures

In order to meet the requirements of BS 8485:2015 it is recommended that the installation of the gas protection measures is verified by a suitably qualified and experienced specialist, independent of the developer.

It is imperative that third party inspection of the membrane and ventilation installation is undertaken for every plot, whilst the gas membrane is visible.

Engineer's drawings confirming the inclusion of gas protection measures shall be included within the Verification Report.

The developer shall commission independent verification certification/integrity testing as outlined in BS 8485:2015 and photographs of the installed gas protection measures, copies of which should be provided for inclusion within the Verification Report. The frequency of independent inspection of gas protections should be undertaken in accordance with CIRIA C735.

5.4 Water Pipes and Below Ground Utilities / Structures

5.4.1 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.

A specific investigation in compliance with the requirements of UKWIR 2010 and / or the local water supplier has not been undertaken.

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.

5.4.2 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.

5.4.3 Clean Service Corridors

Services and utility corridors should be backfilled with clean imported or clean Site-won materials. All imported or Site-won material 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.

5.4.4 Sulphate Resistant Concrete

A requirement for sulphate resistant concrete has been identified and the Contractor shall review and confirm the needs for sulphate resistant concrete.

Given the presence of potentially pyritic materials such as ash and clinker within the Made Ground, a conservative approach has been adopted when assessing the shallow soils in accordance with the recommendations presented in BRE Special Digest 1, 'Concrete in Aggressive Ground' 2005'. Buried foundations taken solely into the Made Ground and Kempton Park Gravels should be designed to resist DS2 - AC2 chemically aggressive ground conditions.

In accordance with the recommendations of BRE Special Digest 1, 'Concrete in Aggressive Ground' 2005, the conditions of the soils at the Site for piled foundations taken into the London Clay Formation and Lambeth Group would therefore be classified as Design Sulphate Class DS-5 and ACEC Class AC-5 for soils and groundwater, however when considering that piled foundations will not expose pyritic soils to oxidising conditions then the class can be reduced to DS4- AC4 conditions.

6.0 Verification Reporting & Regulatory Approvals

6.1 General

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

It is noted that verification reporting will not be needed for a number of parcels where no remediation is required beyond confirmation from an appropriate qualified party that no unexpected finds were made in the process of development.

6.2 Verification - Enabling Phase and Construction Phase Works

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

Demolition and Enabling Phase Works

- Details of waste disposal of any material from the Site including waste transfer documentation and details of the receiving treatment/landfill facility;
- Details of remedial measures undertaken (if necessary), specifically details of asbestos removal / handpicking, and excavation and disposal of hydrocarbon impacted soil (including types, volumes and disposal certificates);
- Confirmation of suitability for retention / re-use of Site-won hard materials and volumes of material re-used;
- Confirmation of the chemical results, and transfer notes detailing the place of origin of any imported fill including any stockpiles left for the subsequent cover system; 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.

Construction Phase Works

- Details of the placement of clean cover including the placement of geotextile, 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 of any imported topsoil/ subsoil;
- Details of the ground gas protection measures installed along with the required verification information;
- Confirmation of the chemical results of material used for clean service corridors; and,
- Details of the final water pipe material utilised within the development.

6.3 Regulatory Approvals and Planning Condition Discharge

It is intended that the Verification Report be submitted to London Borough of Haringey to support the discharge of contaminated land planning conditions (in conjunction with earlier technical reports).

Figures

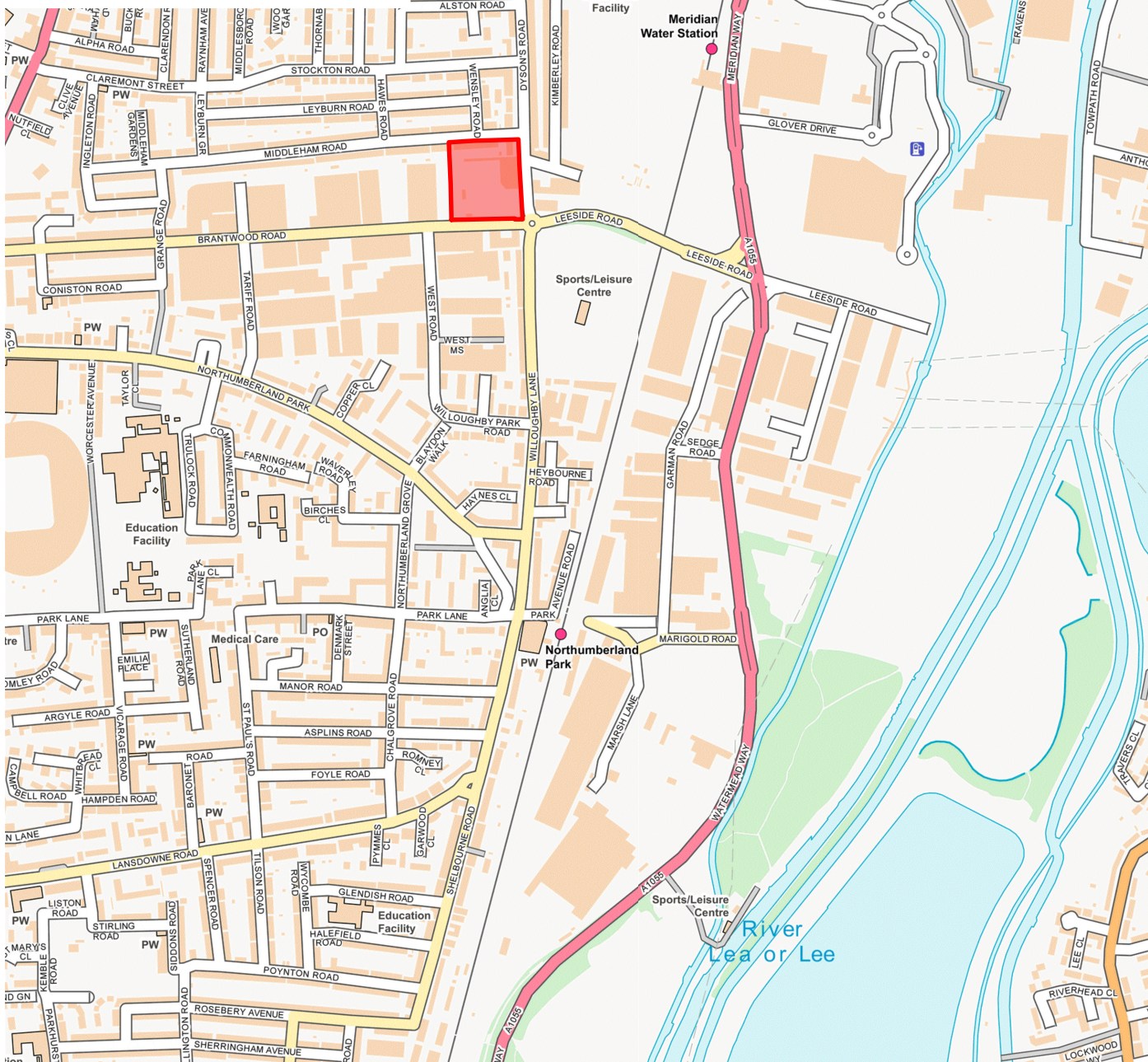
Figure 1 – Site Location Map



LEGEND



Site Boundary



Contains OS data © , Crown Copyright and Database Right (2020)

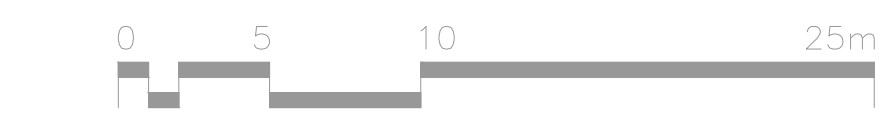
Drawings

Drawing 1 – Proposed Development Plan



NOTES:
SUBJECT TO STATUTORY CONSENTS
BASED ON SURVEY BY HOLLIS REF: 92550-10100 A7
BASED ON OS MAP REPRODUCED BY PERMISSION OF CONTROLLER OF HM STATIONARY OFFICE (c) CROWN COPYRIGHT
COPYRIGHT RESERVED
DO NOT USE ELECTRONIC VERSIONS OF THIS DRAWING TO DETERMINE DIMENSIONS UNLESS SPECIFICALLY AUTHORISED BY MICHAEL SPARKS ASSOCIATES
IF USING AN ELECTRONIC VERSION OF THIS DRAWING FIGURED DIMENSIONS TAKE PRECEDENCE AND NOTIFY MICHAEL SPARKS ASSOCIATES OF ANY DISCREPANCIES

AIR SOURCE HEAT PUMPS / CONDENSERS (LOW LEVEL)



F	10.02.23	Boundary amended.	mk	mt
E	23.01.23	PVs shown; air source heat pumps/condensers indicated.	sd	-
D	27.09.22	Amenity space added. Mono-pitch roof shown.	sd	-
C	20.06.22	Cycle parking enlarged.	sd	-
B	08.02.22	Rooflights shown	sd	-
A	14.09.21	Roof hips removed.	sd	-
-	10.09.21	First issue	sd	-
REV	DATE	NOTE	DRAW	CHK

GRAFTONGATE

CHARTERED ARCHITECTS

11 PLATO PLACE
STATIONERS ROAD
LONDON SW6 4TU

TELEPHONE 020 7736 6162
www.msa-architects.co.uk

TITLE
DYSON'S ROAD, EDMONTON

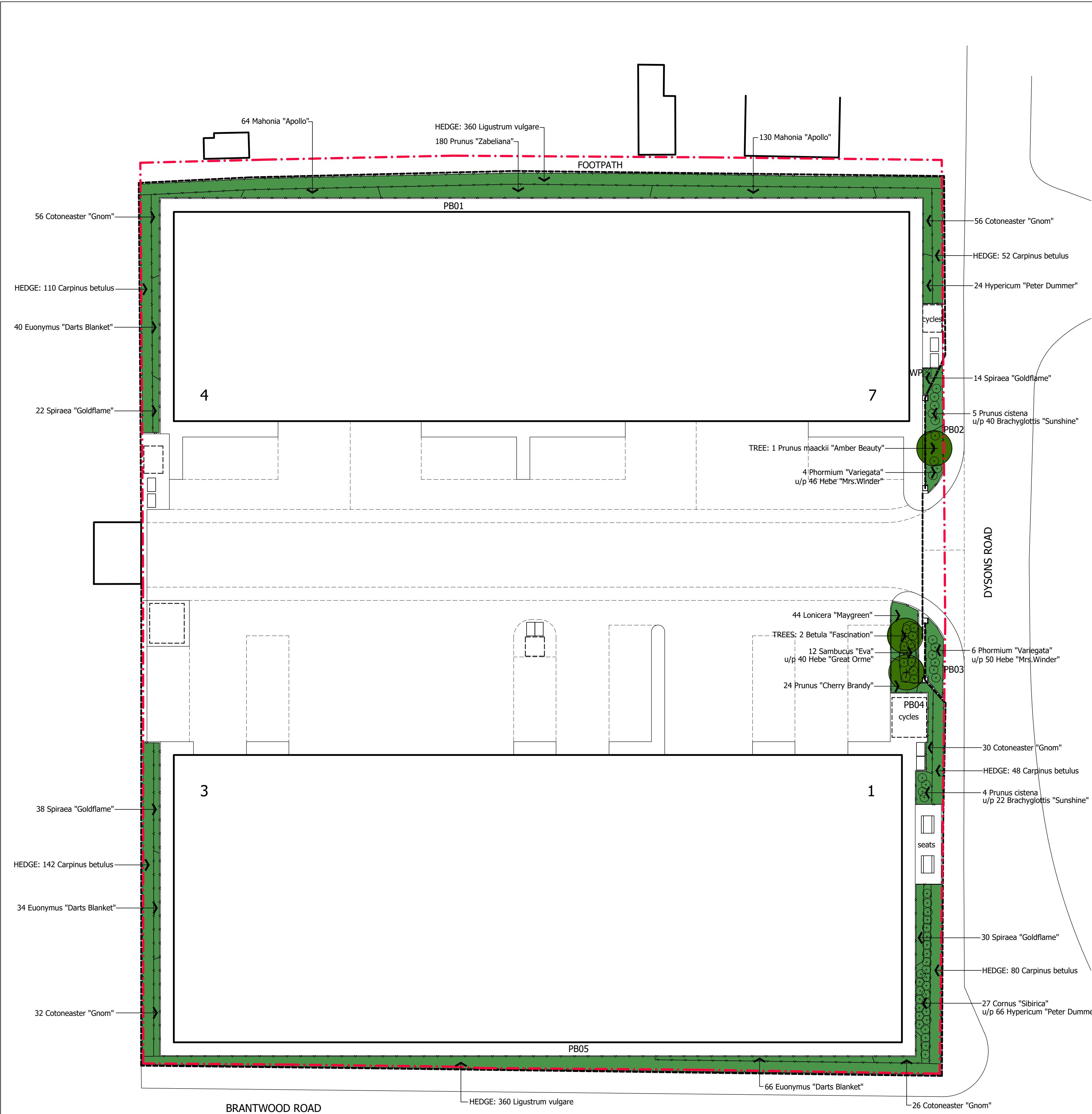
DRAWING
SITE LAYOUT PLAN

CLIENT
GRAFTONGATE DEVELOPMENTS

DATE JULY 2021	SCALE 1:250@A1	DRAWN SD
	STATUS PLANNING	CHECKED MS

DRAWING NUMBER
31380-PL-201F

Drawing 2 - Planting Layout



OUTLINE SPECIFICATION

Refer to schedules for plant sizes, form, support and treepit dimensions

Treepit dimensions: Formation depth as schedules
300mm depth topsoil over 600mm depth free draining subsoil
Plant Beds: 300mm depth topsoil over 400mm depth of subsoil

The CA to inspect and approve areas where topsoil can be placed directly onto undisturbed clean site subsoil.

Subsoil shall be sourced from soils below the topsoil layer with minimal organic matter and consist of a mix of clay and stone. No construction fill shall be evident in this layer.

Imported topsoil shall be in accordance with BS3882:2015. "Multi-Purpose" grade as supplied by Freeland Horticulture or otherwise approved. Tel:01322-619161

Remove objects greater than 75mm in size from the topsoil and cart away.

Provide an analysis of imported/ stockpiled topsoil with recommendations for making good any deficiencies. Provide details of the source and a 1Kg sample of imported topsoil for approval by the Landscape Architect.

TREES
Tree Inspection
Trees to be selected by the Landscape Architect at the grower's nursery.

Triple staking: 3No. 75mm diam. x 1800mm long stakes set equidistant around the tree rootball. Top of stake 800mm above ground level. Tree tied to each stake with 25mm wide neoprene straps and 300mm long plastic sleeves.

Root Preparation
Trees to be rootballed for planting between November and March inclusive.
All trees to be container grown or containerised for planting between April to October inclusive.

Install 75mm diameter land drain to completely surround the rootball of each tree with one end exposed above the mulch.

SHRUB SELECTION
Do not deliver onto site any substitution of species, cultivar, plant size or container volume other than described in the Plant Schedules without prior approval from the Landscape Architect. The Contractor shall submit a list of possible alternatives beforehand for agreement by the Landscape Architect.

SHRUB PLANTING
Refer to schedules for container grown or bareroot shrubs. Bareroots to be planted between November and March inclusive. For all shrubs and transplants, backfill 300 x 300 x 300mm deep plant pit with 1 part Green-Waste compost and 5 parts topsoil thoroughly mixed before backfilling.

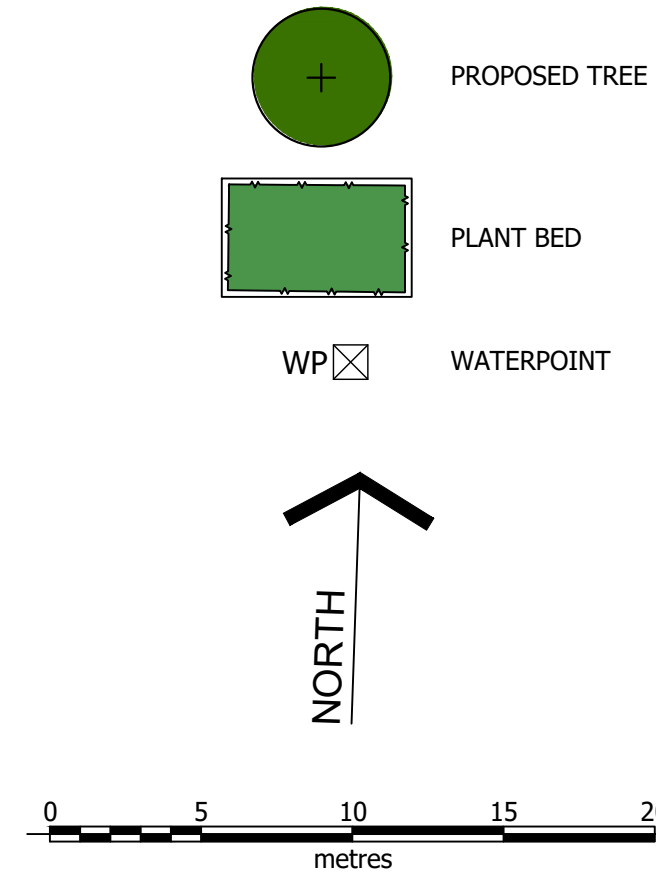
BAREROOT / TRANSPLANT PLANTING
Bareroot plants only to be planted between November and March inclusive. Substitute for container grown stock if planted outside the planting season.

Shrubs planted into graded and cultivated subsoil within 30 x 30 x 30cm deep plant pits backfilled with imported/ stockpiled topsoil mixed with an approved Green-Waste compost at a rate of 3Kg per cu.m. Conditioner must be mixed with topsoil prior to backfilling plant pits.

All bareroot trees and shrubs to be dipped in mycorrhizal fungi slurry as Mycorrhiza Rootgrow Professional supplied by Green-Tech

PLANT SCHEDULES

TOTAL	TREES	SIZE (girth)	FORM	SUPPORT	TREEPIT
2	Betula albosinensis "Fascination"	20-25	Clear Stem	Triple	1.2x1.2x0.9m deep
1	Prunus maackii "Amber Beauty"	25-30	Clear Stem	Triple	1.5x1.5x0.9m deep
TOTAL	SHRUBS	SIZE (cm)	POT (litre)	COMMENTS	
62	Brachyglottis "Sunshine"	30-40	3.0		
432	Carpinus betulus	60-80	Bareroot	Hedge plants	
27	Cornus alba "Sibirica"	60-80	5.0	Minimum 5 basal breaks	
200	Cotoneaster salicifolius "Gnom"	30-40	3.0	Minimum 3 basal breaks	
140	Euonymus "Darts Blanket"	30-40	3.0		
40	Hebe "Great Orme"	30-40	3.0		
96	Hebe "Mrs. Winder"	30-40	3.0		
90	Hypericum dummeri "Peter Dummer"	30-40	3.0		
720	Ligustrum vulgare	60-80	Bareroot	Hedge plants	
44	Lonicera "Maygreen"	30-40	3.0		
194	Mahonia "Apollo"	30-40	3.0		
10	Phormium tenax "Variegata"	-	10.0	Triple Crown	
24	Prunus "Cherry Brandy"	30-40	3.0		
180	Prunus "Zabeliana"	30-40	3.0		
9	Prunus cistena	60-80	10.0	Minimum 5 basal breaks	
12	Sambucus porophorylla "Eva"	60-80	5.0	Bushy plant	
104	Spiraea "Goldflame"	30-40	3.0		



(www.green-tech.co.uk), or similar approved. Mix 2 sachets of Root Dipping Gel with 60-80 litres of water and add granules as instructions. Dip whole root system prior to planting. Allow for suitable containers to be located close to the planting areas.

MULCH
50mm thick 35-75mm size bark mulch cover to all exposed topsoil within plant beds. 14% maximum wood content permitted. Provide a sample to the Landscape Architect prior to delivery.

WATERPOINT
1No. Waterpoint to be installed to meet the local Water Authority requirements: 25mm coupling set 300mm above ground level within lockable galvanised metal box on concrete foundation, separated from water supply with break valves.

MAINTENANCE
Defects Period for 52 weeks following Practical Completion.
Allow for 17 maintenance visits for watering, cutting, weeding, pruning and litter collection.

A 11-07-22 Sub. Ligustrum ovalifolium for L.vulgare
B 05-10-22 Estate entrance plant beds

DYSONS ROAD, EDMONTON

PLANTING LAYOUT

Scale	1:250 @ A1	Date	JUNE 2022
Drawing	837.19.02	Revision	B

Appendices

Appendix A - Limitations

Limitations

This Report was prepared by Delta-Simons Ltd (Delta-Simons) for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, 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. Delta-Simons 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 Delta-Simons 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 Delta-Simons. Unless explicitly agreed otherwise, in writing, this Report has been prepared under Delta-Simons' Standard Terms and Conditions as included within our proposal to the Client.

The recommendations contained within this Report represent Delta-Simons 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 Delta-Simons has obtained, reviewed and evaluated information in preparing this Report from the Client and others and Delta-Simons conclusions, opinions and recommendations has been reasonably determined using this information, Delta-Simons does not warrant the accuracy of the third-party information provided to it and cannot be responsible for any opinions which Delta-Simons 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 Delta-Simons 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. Delta-Simons 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 Delta-Simons 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 – Protocol for Addressing Localised Hydrocarbon Contamination in Soils

The following protocol/ remediation strategy should be followed for the localised excavation and disposal of hydrocarbon impacted soils in the vicinity of DS103/DS104/ DS106. The protocol is based on an attempt to reduce the contaminant mass in the north-east of the Site so far as is reasonably practicable and within the development constraints. If treatment of excavated material is to be undertaken, a Remediation Method Statement should be prepared by the Principal Contractor.

General method

- A Remediation Target Criteria (RTC) for TPH of 5,000 mg/kg has been selected based upon Delta-Simons' professional judgement as an indicator of potential NAPL.
- Exceedances of the RTC were recorded in DS103 at 0.5 m bgl (6,424 µg/l), 2.5 m bgl (18,161 µg/l), in DS106 at 1.5 m bgl (5,142 µg/l) and in DS104 at 0.4 m bgl (13,094 µg/l). It is noted that the DS103 sample collected at 2.5 m bgl and the DS106 sample collected at 1.5 m bgl were collected from the capillary fringe/ saturated zone and therefore not considered to be accurate representations of the soil concentrations. Given samples collected from DS104 at 2.5 and 4.0 m bgl recorded TPH concentrations below the RTC and the resting groundwater level (approximately 2 m bgl), excavation to a maximum depth of 1.5 m bgl is considered appropriate.
- Given elevated soil concentrations have not been recorded at DS101 and DS108, soil excavation in this area is not proposed. Should unexpected contamination be identified during groundworks, the 'hotspot' protocol (Appendix C) will be applied.
- The excavation shall be centred on DS104 where the greatest near surface TPH soil concentration was recorded. The excavation shall also be extended to the north, east, west and south but the excavation should be no greater than 20 x 20 m. The excavation is likely to cover the locations of DS104, DS103 and DS106. The maximum depth of the excavation should be 1.5 m bgl - excavation into the Kempton Park Gravel is not recommended.
- The excavated material should be separated based upon visual and/or olfactory evidence of contamination. Visually and olfactorily unimpacted material can be retained on-Site without further laboratory testing.
- Impacted material should be temporarily stockpiled on concrete hardstanding or impermeable polythene sheeting for treatment or prior to disposal off-Site.
- The excavation should be extended laterally (maximum excavation size 20 x 20m) and vertically (no deeper than 1.5 m bgl) as far as reasonably practicable until there is no evidence for significant visual or olfactory contamination.

Groundwater and NAPL

- Treatment of dissolved phase groundwater contamination or recovery of NAPL is not considered reasonably viable. NAPL has not been recorded during monitoring.

Excavation Verification

- Soil samples will be collected for every 10 m of face excavated and a minimum of two samples from the base. Should the soil samples record TPH concentrations less than the RTC, the excavation can be backfilled with Site-won material free from visual and/or olfactory contamination or chemically verified imported material (Appendix E for import criteria). Should the soil samples exceed the RTC, the excavation will be extended laterally as far as reasonably practicable but not to exceed 20 x 20 m. The excavation will not exceed 1.5 m depth. Backfilling of the excavation should be carried out in a suitably engineered manner, compacted and validated in accordance with the Manual of Contract Documents for "Highway Works - Volume 1: Specification for Highway Works, Series 600" or similar.
- The Principal Contractor should keep a record of the area that was excavated, laboratory results and all disposal certificates.

- The Principal Contractor should keep a photographic record of the excavation, treatment and backfilling works.



Appendix C - '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 D - Site-won Soils Assessment Criteria

The following Generic Assessment Criteria shall apply as absolute limits for Site-won materials (e.g. concrete, asphalt and brick) used beneath the cover system.

The criteria selected are based on a Commercial land use scenario.

Soils shall be tested for a suite of contaminants appropriate to the Site-won material 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, reused Site-won hard 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'. Site-won hard materials must not be used for clean cover materials.

Criteria for Site-won materials			
Compound	GAC	Source	Comment
Arsenic	640	LQM	
Cadmium	190	LQM	
Chromium (III)	8600	LQM	
Chromium (VI)	8600	LQM	
Copper	68,000	LQM	
Lead	2300	C4SL	
Mercury (inorganic)	1100	LQM	
Nickel	980	LQM	
Selenium	12,000	LQM	
Zinc	730,000	LQM	
Acenaphthene	84,000	LQM	
Acenaphthylene	83,000	LQM	
Anthracene	520,000	LQM	
Benzo[a]anthracene	170	LQM	
Benzo[a]pyrene	35	LQM	
Benzo[b]fluoranthene	44	LQM	
Benzo[ghi]perylene	3,900	LQM	
Benzo[k]fluoranthene	1,200	LQM	
Chrysene	350	LQM	
Dibenz[ah]anthracene	3.5	LQM	
Fluoranthene	23,000	LQM	
Fluorene	63,000	LQM	
Indeno[123-cd]pyrene	500	LQM	
Naphthalene	190	LQM	
Phenanthrene	22,000	LQM	
Pyrene	54,000	LQM	
Asbestos	Detected	DS-GAC	

The respective sources are:

- Category 4 Screening Levels (**C4SLs**) published by DEFRA;
- The 2014 Land Quality Management (**LQM**); and
- In house Generic Screening Values (**DS-GACs**) derived by Delta-Simons.

Appendix E - 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 Delta-Simons.

Appendix F - Inspection Pit and Testing Frequencies

Inspection pit and testing frequencies required are summarised below.

It is recommended that this is distributed to the Contractor for use on-Site during the groundworks.

	Soft Landscaping Requirements (required in all soft landscaping areas)
Clean cover thickness where Made Ground is present (must comprise chemically and physically validated subsoil and topsoil)	700 mm minimum cover consisting of: - 300 mm topsoil - 400 mm subsoil
Inspection Pit frequency (to confirm cover thickness and membrane depth, where required)	25 m grid: A minimum of 1 inspection pit per 25 m grid is required in soft landscaped areas
Testing frequency (coverage to be determined by Environmental Consultant)	Topsoil and subsoil: Samples required from each inspection pit on a 25 m grid in soft landscaped areas
If Made Ground is present at surface (Made Ground identified Site-wide)	Membrane required: Where Made Ground is present, a high visibility membrane or hard-dig layer should be installed to break a potential pathway to asbestos containing materials