



GROUNDTECH
CONSULTING

123 BARLOW MOOR ROAD

REMEDIATION SPECIFICATION

MARCO UK

APRIL 2025

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Plans		
<i>Plan Reference</i>	<i>Revision</i>	<i>Title</i>
GRO-23382-P01	-	Project Location Plan
GRO-23382-P04	-	Exploratory Hole Location Plan
GRO-23382-P06	-	Soil Contamination Plan
318-CD-1001	P3	General Arrangement Proposed Site Layout

1.0 INTRODUCTION

1.1 Background

This Remedial Specification has been produced on behalf of Marco UK and relates to the remediation of a site at 123 Barlow Moor Road in Didsbury.

The site was most recently occupied by a detached residential dwelling with an associated driveway and private garden, an associated garage was also located in the south west of the site. A summary of the findings of the investigations are outlined in *Section 2.0*.

1.2 Proposed Works

Remediation will be undertaken at the site to prepare it for development of a pair of four bed three storey semi-detached dwellings and a pair of annexes and associated private gardens and driveways as shown on the 'General Arrangement Proposed Site Plan' *318-CD-1001 Rev P3*.

Marco Investments have submitted a planning application to Manchester City Council. This Remedial Specification has been commissioned to facilitate the discharge of any pre-commencement planning conditions that are likely to be enforced with regard to land contamination.

The Full planning permission (135315/FO/2022) is for the erection of pair of 4 bed 3 storey semi-detached houses and ancillary single storey annexes at rear with parking and landscaping.

The planning decision was approved on 24th April 2023.

1.3 Objectives

The objective of this Remedial Specification is to present details of the remedial objectives, how the remediation of the site will be implemented and to outline how the works will be validated. This Remedial Specification details how the works will be permitted under the current regulatory regime.

The remediation will ensure that upon completion of the residential development, it can be demonstrated that the ground and groundwater conditions at the site are appropriate for its intended use and risks to identified receptors have been reduced to an acceptable level.

The following Remedial Specification includes the protection measures required and to be installed in the construction phase of the redevelopment for a residential end use with plant uptake.

This is a dynamic document that may require updating at certain stages of the process, the revisions should be undertaken in agreement with the relevant regulatory bodies. In addition, this Remedial Specification is subject to the approval of the regulators pre-commencement.

1.4 Remediation Specification Scope

The scope of the Remedial Specification is in accordance with LCRM is as follows:

- *Summary of the Conceptual Site Model.*
- *Summary of the Pollution Linkage Risk Assessment.*
- *Remediation Options Appraisal including detailed assessment of preferred options.*

- *Implementation of preferred remedial solution.*
- *Specification for the remediation works.*

1.5 Sources of Information

In preparing the Remedial Specification the following documents were reviewed and should be read in conjunction with this report:

- *Geo-Environmental Appraisal produced by Groundtech Consulting referenced GRO-23382-5055 and dated March 2024.*

2.0 CONCEPTUAL SITE MODEL

2.1 Site Details

The site is generally level and rectangular in shape. The site is currently occupied with a single storey brick built dwelling in the centre of the site, with an associated private garden and garage to the south. The north of the site is surfaced with tarmac and concrete for use as a driveway, south of the site is surfaced by grass. Paving flags surface some eastern areas. Shrubbery along with semi-mature and mature trees are present in the south east and north east of the site.

2.2 Site History and Consultations

Earliest historical maps show the site being undeveloped and occupied by fields. Maps from 1894 show a building in the southern area of the site which comprises a portion of the adjacent Stormarn building. In 1907, residential buildings are shown to encroach onto the eastern and western extent of the site and a small development in the north is also shown. A greenhouse is shown encroaching on the western area of the site from the adjacent property by 1922. Maps from 1955 show a residential building located in the centre of the site and the south of the site in its current configuration. All other buildings have been demolished. Maps from 1989/92 show the buildings on site to be part of Broomfield Court. No change is indicated on maps to the present day.

In the surrounding area, earliest historical maps show residential developments in the north and south and greenhouses to the south. In later maps, the residential developments are shown to expand.

The following environmental information was identified:

- *There are no landfill recorded within influencing distance of the site.*
- *Industrial land uses located 202m north west and 141m south.*
- *Electricity substations located 217m north east, 157m west and 121m north west.*
- *The site is not in an area requiring radon protective measures in foundations.*

2.3 Geology and Hydrogeology

Based on Groundsure and available geological records, no Made Ground is indicated to underlie the site. However, due to the previous and current development on site, Made Ground is likely to be present. The superficial deposits underlying the site are indicated to be glaciofluvial sheet deposits (Secondary A Aquifer) comprising Sand and Gravel. The solid geology is indicated to be the Wilmslow Sandstone Formation (Principle Aquifer) which characteristically comprises Sandstone.

The site does not lie within a Source Protection Zone and there are no potable abstraction points within 2000m of the site. There are four groundwater abstraction points within 2000m of the site, two of which are active located 1054m south of the site that is used for spray irrigation at Didsbury Golf Club and 1874m west that is used for spray irrigation at Chorlton Golf Club.

2.4 Hydrology

There are no named watercourses within 250m of the site, the nearest surface water feature which is the River Mersey 516m west of the site.

There are two historical surface water abstraction points within 2000m of the site. The two historical abstractions are located 1458m west of the site and was used for general washing, process washing and dust suppression for AMEC/ALFRED MCALPINE JV.

There are no potable water abstraction points within 2000m of the site.

Environment Agency information indicates that the site is outside a flood risk zone and is not at risk of flooding.

2.5 Preliminary Conceptual Site Model

The following risks were determined by Groundtech Consulting:

Receptor	Level of Risk
<i>Aquifers</i>	<i>Very Low</i>
<i>Surface Waters</i>	<i>Very Low</i>
<i>Site End Users (soil)</i>	<i>Moderate</i>
<i>Site End Users (vapour)</i>	<i>Low</i>
<i>Adjacent Site End Users</i>	<i>Low</i>
<i>Potable Water Supply Pipe</i>	<i>Low</i>
<i>Ground Gas</i>	<i>Low</i>

2.6 Ground Model

Scope of Works

The following scope of works was completed on the 16th January 2024:

- Six No. windowless sample boreholes (WS01 – WS06) were drilled to a maximum depth of 5.0m bgl.
- One No. soil percolation trial pit (SuDS01) was undertaken at 2.0m bgl.

Ground Model

The site was surfaced by tarmac and concrete in the north and west of the site to a depth of 0.15m bgl. Grass surfacing is also present around the perimeter of the south eastern and north eastern boundary. Dark brown sandy topsoil was encountered in WS01, WS05 and WS06 to a maximum depth of between 0.2m and 0.4m bgl.

Natural strata generally confirmed geological records which indicate GlacioFluvial Deposits are present beneath the site. The natural ground consisted of loose to very dense brown clayey gravelly fine to coarse Sand to a maximum depth of 5.0m bgl.

Bedrock was not encountered during the Ground Investigation.

Groundwater was not encountered during the Ground Investigation.

Watching Brief

A watching brief was undertaken during the Ground Investigation for visual and olfactory evidence of contamination, no evidence of contamination was noted.

2.6 Geo-Environmental Testing Results

The following testing has been carried out by Groundtech Consulting:

- 4 No. Metals
- 4 No. Speciated Polycyclic Aromatic Hydrocarbons (PAHs)
- 4 No. Asbestos Screening

Heavy Metals

Elevated levels of lead were recorded in the granular Made Ground subbase of WS04 at 0.2m bgl in the north of the site and in the Made Ground topsoil in WS06 in the east. The source of the elevated metals is the sites former use as greenhouses and the associated pesticides and fertilizers.

No other elevated levels of heavy metals were recorded against residential with plant uptake screening values.

Speciated Polycyclic Aromatic Hydrocarbons (PAHs)

Elevated concentrations of speciated PAHs including Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene have been recorded in WS04 at 0.2m bgl when compared to residential with plant uptake screening values. No other elevated levels of PAHs were recorded in other samples tested.

The elevated levels of PAHs are likely to be associated with tarmac content of the subbase in the northern area of site.

Asbestos

Four samples of the granular Made Ground and Made Ground topsoil were screened for asbestos and no asbestos was detected.

Other Contaminants of Concern

No other contamination was noted during the Ground Investigation.

2.7 Remedial Strategy

The following remedial strategy was outlined for the proposed development.

Soils

It is anticipated that the tarmac and associated subbase in the north and west of the site will be grubbed up and if reused will be below proposed hardsurfacing.

A nominal 150mm cover system comprising suitably clean topsoil should be placed in soft landscaping areas where no Made Ground is present. Where Made Ground is present, 450mm of cover system should be placed. It is now understood that the cover will increase to 600mm to provide a suitable growing medium for shrubs and 900mm for trees.

The topsoil around WS06 is not suitable for reuse in private residential gardens due to the elevated lead, the topsoil across the site should be stripped and stockpiled separately to be tested for reuse.

A watching brief should be maintained during the demolition of the existing buildings onsite to ensure that ground conditions are consistent with the rest of the site and recommendations can remain the same.

Controlled Waters

Mobile contamination has not been encountered and remediation with respect to controlled waters is not required.

Ground Gas

No source of ground gas was identified on the site or offsite in the preliminary risk assessment and no source was identified during the Ground Investigation. No remediation is required with respect to ground gas.

The site does not lie within an area requiring radon precaution measures.

2.8 Geotechnical

Foundations

The most suitable foundations for the proposed development are considered to be strip trench foundations constructed in the medium dense Sand at a minimum depth of 0.6m bgl. Loose to Medium Dense Sand was encountered in the north eastern corner of the proposed development, all foundations should be deepened through Made Ground and unsuitable Sand deposits.

A watching brief should be maintained during the demolition of the existing buildings to ensure that the ground conditions beneath the building are consistent with the remainder of the site.

Floor Slab

Made Ground is generally greater than 600mm in thickness has been recorded beneath the western end of site and floor slabs for the proposed development should be suspended. Clay strata was not encountered during the Ground Investigation and does not influence the floor slab design.

A ground bearing floor slab is potentially an option subject to suitable earthworks design and validation testing, this would include a drainage strategy to prevent inundation settlement.

Concrete Classification

The results of laboratory pH and sulphate content indicate that ACEC Class AC-1 and sulphate class DS-1 conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005.

SuDS

The soil infiltration rates recorded during the Ground Investigation in the natural ground at the proposed locations displayed moderate soil infiltration rates due to the presence of clay as a minor constituent in the granular soils. The use of soakaways may be considered feasible if sufficient attenuation and storage is available.

3.0 POLLUTION LINKAGE ASSESSMENT REVIEW

The following section summarises the revised pollution linkage assessment undertaken in Groundtech Consulting Geo-Environmental Appraisal.

3.1 Human Health

Receptor	Level of Risk	Comments
Site End Users (Soils)	Moderate	Elevated levels of heavy metals and PAHs in the granular Made Ground recorded during the Ground Investigation. Soft landscaping is proposed as part of the development.
Site End Users (Vapours)	Low	No source of volatile contamination was identified during the Ground Investigation or PRA.
Site End Users (Ground Gas)	Low	No source of ground gas has been identified on site or in the surrounding area.
Adjacent Residents	Low	No source of mobile contamination has been identified.

3.2 Controlled Waters

Receptor	Level of Risk	Comments
Groundwater	Very Low	The site is underlain by a Secondary A superficial and Principal bedrock Aquifer. The site is not within a Source Protection Zone and there are no active potable water abstractions within 500m of the site. No groundwater was encountered during the Ground Investigation and groundwater is not considered to be a sensitive resource.
Surface Water Features	Very Low	No source of mobile contamination has been identified during the Ground Investigation and all surface water features are at a distance from site to allow considerable attenuation.

3.3 Groundworkers

Receptor	Level of Risk	Comments
Contractors	Moderate to Low	During remediation phase due to elevations in the Made Ground soils.

4.0 REMEDIATION PROPOSALS AND APPRAISAL

Remediation will be undertaken to ensure the site is suitable for its proposed residential end use which comprises the construction of a pair of 4 bedroom 3 storey semi detached dwellings with associated annexes, private gardens and driveways.

The required level of remediation, to the satisfaction of the relevant regulators and discharge planning conditions, will be accomplished through a combination of techniques as outlined in the subsequent sections.

The implementation of the remediation proposals will be in accordance with the following documented quality assurance procedures:

1. **Detailed Remediation Specification** which outlines the requirements to demonstrate the effectiveness of the remediation in order to meet the remediation objectives. These are detailed in the following sections of this report.
2. **Verification Report** which will provide a complete record of the remediation activities undertaken during the works phase as part of the verification plan to support compliance with remediation objectives and criteria. The report will also contain descriptions of the works including photographic evidence and details of any unexpected conditions encountered during the remedial works and how they were dealt with.
3. **Cover System Validation Report** which will validate the suitability and depth of cover system in the garden areas.

In addition to the above, the preferred contractor will be required to secure all necessary permits and licences to allow remediation to be undertaken and prepare appropriate health and safety risk assessments and method statements in accordance with CDM Regulations 2015 and other relevant legislation.

4.1 Outline Remediation Proposals

Based upon the findings of the Ground Investigations, risk assessment and the remediation options appraisal in accordance with LCRM, the following remediation processes will be carried out to produce a site which is suitable for its proposed residential end use and adhere with the General Requirements set out in *Appendix 2*.

Remediation works will need to be completed in accordance with the 'CL:AIRE Definition of Waste Development Industry Code of Practice, 2nd Edition', where relevant.

The following remediation activities have been selected based on the Remedial Options Appraisal presented in *Appendix 3*.

- *Site clearance including topsoil strip, delineation and demolition.*
- *Break out of all hardsurfacing and below ground obstructions and processing for re-use.*
 - *Watching brief during demolition of existing buildings.*
- *Removal of below ground substructure and crush to 6f2, if required.*
- *Off-site disposal of unsuitable or excess material.*
- *Excavations for foundations.*
- *Excavations for service runs and drainage.*
- *Installation of correct level potable water supply pipe.*
- *Placement of clean validated subsoil/topsoil in areas of gardens and soft landscaping.*

All works need to be undertaken in accordance with the Remedial Specification. All remediation works are to be overseen by the supervising consultant under a site watching brief.

A verification report completed by the supervising consultant will be required to be submitted to the regulators for approval on completion.

4.4 Project Setup and Management

Prior to commencement of site activities, detailed planning of the project shall be undertaken including liaison with the client, supervising consultant, contractors and regulators. The Remedial Specification should be submitted to the relevant regulators for approval prior to commencement.

The project is to be operated under the Construction, Design and Management (CDM) Regulations, (2015).

Under the CDM regulations, the Client should appoint a Principal Designer, who will provide the Pre-construction Information Report and a Principal Contractor who would provide a comprehensive Construction Phase Health and Safety Plan (CPHASP) prior to works commencing. If the client does not appoint a Principal Designer, they will assume the role.

The Principal Designer will review the CPHASP and notify the local office of the Health and Safety Executive (HSE) of the works prior to commencing (via form F10), if necessary. The client is to nominate the Principal Contractor for the works.

The appointed contractor will need to have suitable experience working in a similar setting, with similar ground conditions and with the contaminants of concern present at the site. It is the responsibility of the contractors to have read and understood the requirements of the Remedial Specification. Any queries should be clarified prior to the activity being undertaken.

5.0 IMPLEMENTATION OF SITE REMEDIATION PROCESSES

5.1 General

The following remedial works are required to break pollution linkages, to reduce risks to an acceptable level and make the site suitable for the proposed residential end-use.

5.2 Implementation

Activity 1 – Pre-Start, demolition and Site Clearance

At the time of the Ground Investigation, the single storey dwelling and garage was still present. The dwelling and garage requires demolition in order to progress the development. A demolition asbestos survey should also be undertaken.

A watching brief should be in place during the demolition of the existing building to confirm that ground conditions are consistent with the remainder of the site.

The works contractor shall be responsible for the true and proper setting-out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the works and for the provision of all necessary instruments, appliances and labour.

The works contractor shall carefully protect and preserve all benchmarks, sight rails, pegs and other things used in setting out the works.

Should the works contractor find any discrepancies on the drawings, he is to refer the matter to the client for verification before proceeding with the part of the works affected.

Before starting the site clearance works, the works contractor shall verify with the client and/or architect which existing fences, gates, walls, roads, paved areas, trees, shrubs, etc., are to be removed and undertake dilapidation survey of all adjacent features/construction including but not limited to boundary walls/fences, adjacent footpaths and road constructions etc. The works contractor shall be responsible for all costs associated with rectification of damage to adjacent features/construction including but not limited to boundary walls/fences, adjacent footpaths and road constructions etc. resulting from the enabling works.

The works contractor shall investigate the features of the structures, ascertain if shock or vibration could damage surrounding property or equipment therein or buried utilities and check the existence of toxic or flammable substances.

Statutory service records are for information only. The works contractor is to ensure that the records are current and complete through discussion with all appropriate statutory bodies and is responsible for all disconnection, diversion, sealing or removing of existing services as necessary (unless otherwise advised by the client).

Trees, boundaries and other features of interest, which are to be retained, shall be clearly identified and protected by a robust fence to avoid accidental impact damage and prevent excavation within the root zone of influence of foundations. All works shall be undertaken in accordance with BS 5387: 1991 'Trees in relation to Construction'. All other trees and shrubs shall be grubbed up and disposed of appropriately off site.

Prior to any works, the site shall be cleared of rubbish, debris and approved vegetation. Surface vegetation shall be stripped from all areas prior to trafficking with heavy plant and the surface vegetation is to be chipped and stockpiled.

The topsoil onsite is not suitable for reuse due to the elevation of Lead in WS06. It is indicated that the topsoil onsite will be stripped separately and removed from site to a licensed waste facility. Clean topsoil should be imported for cover system in the final development.

The works contractor shall maintain records detailing the approximate location of any unsuitable material disposed, including a brief description.

All movement of materials shall be recorded and records shall be kept detailing the nature and quantity of materials, haulier details, final destination and any other relevant information.

Water or liquids shall not be pumped or emptied into the existing sewers/drainage system without the appropriate treatment and written permission of the relevant authority. If mobile tankers/bowsers are to be used, then disposal shall be at suitably licensed facilities in accordance with current legislation.

Documentation/certification of all materials disposed of are to be included in the H&S file prepared by the enabling works contractor.

Activity 2 - Break out of Hardstanding and Below Ground Obstructions and Processing for Re-use

The works contractor shall demolish, break up and remove all below ground structures. These include, but are not limited to slabs, drains, hardsurfacing, foundations, relic structures, utility ducts, etc.

A watching brief should be in place during the demolition of the existing building to confirm that ground conditions are consistent with the remainder of the site.

Elevated Lead was identified in the granular Made Ground subbase in the north and west of the site. The subgrade where the elevated Lead was identified is to be grubbed up and removed from site.

All broken up materials shall be segregated and stockpiled within the approved working area of the site. Material shall be stockpiled at locations to be agreed with the Client and after submission of the detailed method statements.

The works contractor shall inform the consultant after each area is exposed so that they may attend and witness the excavation. The works contractor shall survey to Ordnance Survey Grid the base and sides of all excavations and will provide a composite base of excavation drawing for reference during the works, and as built records.

During the excavation of slabs etc, the works contractor will undertake a watching brief, with any additional risks to be added to the remedial requirements.

The works contractor shall provide adequate protection against collapse of the excavations and suitable groundwater control measures shall be put in place until the voids are backfilled to a suitable geotechnical specification. Consideration to surrounding buildings should also be considered during the development.

The works contractor shall ensure that, where structures or services cross the site boundary and are to remain, the risk of any future contamination entering or leaving the site area through these pollution linkages is negligible. The works contractor shall state his methodology for ensuring this requirement.

All unsuitable materials are to be removed from site to a suitably licensed facility.

Activity 3 – Watching Brief

A watching brief should be maintained for the duration of the works including in the position of the residential building, post demolition for visual or olfactory evidence of contamination. If identified, work should cease in that area and Groundtech Consulting consulted for advice and to revise the Remedial Specification, if required.

The Principal Contractor must manage the risks in accordance with their legal requirements and will need to prepare appropriate health and safety documentation and obtain appropriate approvals, licences, consents and permits prior to commencement.

Activity 4 - Reuse of Soils and Placement of Soils

Testing of soils prior to placement is required as set out in the Remedial Specification.

Where required, the reuse of soils is allowed and will need to be undertaken in accordance with the Contaminated Land: Applications In Real Environments (CL:AIRE) document: 'The Definition of Waste: Development Industry Code of Practice' (Version 2) (CoP), dated March 2011.

If, in the opinion of the Consultant, the material is not suitable for use, the works contractor is to remove and dispose of it in accordance with the Remedial Specification, at the works contractor's cost.

Activity 5 - Off-Site Disposal of Unsuitable or Surplus Material

Any soils to be removed from site are to be removed to a licensed waste management facility and the waste is to be transported by a registered waste carrier in accordance with applicable Waste Management Regulations. Testing to allow disposal of waste is to be undertaken.

All testing to allow disposal of waste is to be undertaken by the enabling works contractor at the works contractors cost.

Waste consignment/transfer notices will be required and are to be retained by the works contractor. Copies of all waste consignment/transfer notices are to be provided to Groundtech Consulting for inclusion in a validation report.

Accurate classification by assessment of the soils and WAC testing will provide indication of the most cost beneficial populations to dispose offsite.

Activity 6 - Validation Criteria During Works

The following sections detail validation criteria to be used during the works.

Testing

All materials re-used on site, or stockpiled for reuse, shall be tested prior to the completion of the works contract. Any unsuitable materials shall be removed from site in accordance with this Remedial Specification.

Additional testing of the topsoil is required once stockpiled to determine its suitability for reuse.

All sampling, logging and testing of soils shall be undertaken in accordance with BS 5930:2020 'Code of Practice for Site Investigations' and BS 10175:2011+A1:2013 'Investigation of Potentially Contaminated Sites – Code of Practice'.

The works contractor shall undertake all testing at a laboratory which holds UKAS and MCERTS accreditation for the specific tests. The consultant shall be given sufficient time to review the content of the testing and associated testing results.

General Reuse

The following testing is required to allow re-use of soils.

For soils proposed for general reuse, a minimum of 5 samples should be tested at a rate of 1 test per 1,000m³ and compared to the following guidelines:

- *No visual contamination (oil staining etc.).*
- *Minimal deleterious material (organics, wood, metal etc.).*
- *No visible Asbestos Containing material (ACM).*

The visual requirements in the list above are to be confirmed by a suitably qualified geo-environmental engineer.

Activity 7 - Installation of Correct level of Potable Water Supply Pipe

The correct potable water pipework is to be installed by the construction works contractor in accordance with local water company risk assessment. The works are to be validated by the ground works contractor, who is to provide to Groundtech Consulting:

- *Provision of delivery tickets showing correct potable supply pipework has been delivered to site.*
- *Photographic proof that the correct potable supply pipework (or similar) has been installed.*

Activity 8 - Importation of Suitable Material

Any imported materials are to be tested by the contractor in accordance with this Remedial Specification to demonstrate they are suitable from a geo-environmental engineering perspective. All topsoil will be removed from site and imported topsoil will be used as part of the cover system.

Any imported soils should be from a source not expected to be contaminated and meet both physical and chemical criteria, as detailed in this Remedial Specification.

Prior to importation of topsoil, subsoil or granular material from a commercial supplier, certification should be obtained from the supplier detailing the source site, its previous and current land use and relevant test results. A copy of this should also be forwarded to Groundtech Consulting for review and comparison against the import criteria.

Imported material should be free from:

- *Asbestos, metal, plastic, wood, glass, tarmac, brick, paper, concrete, or other potentially hazardous foreign material which could cause injury.*
- *Aggressive / invasive weeds (especially Japanese Knotweed and Giant Hogweed) and bulk vegetative growth.*

If the material is not from a supplier, it is recommended that testing is undertaken at the source to determine if the materials are likely to be suitable prior to import. Geo-environmental testing will also be required once the material arrives at site to confirm the soils imported are the same as those sampled at the donor site.

The results of geo-environmental testing for imported material are to be compared with the criteria presented in Appendix 5. If any of these thresholds are exceeded the material shall be considered unsuitable unless treatment,

further testing and risk assessment shows it to be satisfactory. Testing of the cover system and imported material should be undertaken in accordance with Manchester City Council cover system guidance. Testing should be carried out for the following general suite of contaminants:

- *Heavy metals, total cyanide, pH, speciated Polycyclic Aromatic Hydrocarbons, total phenol and organic matter.*
- *Total TPH and speciated TPH (TPHCWG).*
- *Asbestos screening.*

The sampling frequencies are set out in the table below, with a minimum of three samples being taken from each source used:

End Use	Greenfield Soils	Remediated Soils	Brownfield Soils	Unknown Soil Source
<i>Residential Gardens</i>	<i>1 per 200m³</i>	<i>1 per 100m³</i>	<i>1 per 50m³</i>	<i>1 per 50m³</i>
<i>Soft Landscaping</i>	<i>1 per 200m³</i>	<i>1 per 150m³</i>	<i>1 per 150m³</i>	<i>1 per 150m³</i>
<i>Other</i>	<i>1 per 200m³</i>	<i>1 per 200m³</i>	<i>1 per 200m³</i>	<i>1 per 200m³</i>

Imported topsoil and subsoil for the cover system should be as agreed with the client and where possible should conform to BS 3882:2015 and BS 8601:2013. It should be noted that clay soils are not recommended as they are likely to become waterlogged during handling and placement.

Activity 9: Installation of the Cover System in areas of Soft Landscaping

A clean cover system is required in garden areas to reduce the risk to an acceptable level. The cover system installation by the works contractor should be undertaken in the following steps:

- 1. Undertake geo-environmental testing and assessment of all imported soils (cohesive and granular) to establish they are suitable for use. Groundtech Consulting should be provided with the testing certificates prior to import and additional testing may be required.*
- 2. In areas where trees are planned as part of the landscaping the cover system should be increased to allow for the root ball. The dimensions of the tree pit (if required) are to be specified by a qualified arboriculturalist.*
- 3. Install house drainage and other services and storing excavated clean soils appropriately for re-use in gardens.*
- 4. Validation of the cover system to be undertaken by Groundtech Consulting in accordance with Manchester City Council.*

The cover system requirements are set out below based on the specific use:

Specific Use	Requirements
	<i>The cover system should comprise a nominal 150mm of Topsoil where no Made Ground is present.</i>
<i>Private gardens and soft landscaped areas</i>	<i>Where Made Ground is present, a 600mm cover system comprising suitably clean Topsoil (minimum 150mm) and subsoil should be installed. This cover should be increased to 900mm where trees are present to act as a growing medium.</i>

The above cover system requirements are outlined in Table 1 of the Manchester City Council Planning and Contaminated Land Guidance. In accordance with the above requirements, existing suitable clean soil will be present beneath the cover layer to support the landscaping scheme.

6.0 SUPERVISION, VERIFICATION AND REPORTING

Necessary changes to the agreed Implementation Plan, arising during the course of the works, are to be agreed in writing with the Local Authority and Environment Agency prior to being undertaken on site.

It is recommended that details of the environmental works undertaken, the rationale and design for the implementation of this strategy and verification details of the works undertaken are appended to the deeds for the property to ensure the site is sold with full knowledge of the works undertaken and the ground conditions present.

6.1 Site Supervision

Remediation works are to be undertaken with a part time site watching brief by Groundtech Consulting (The Consultant).

The works contractor is to provide appropriate geo-environmental engineer supervision during excavation and validation works.

The ground works contractor is to provide supervision by an appropriate, experienced person who has read and understand the requirements of this Remedial Specification.

6.2 Collection of Samples

All sampling, logging and testing of soils shall be undertaken in accordance with BS 5930:2020 'Code of Practice for Site Investigations' and BS 10175:2011+A2:2017 'Investigation of Potentially Contaminated Sites – Code of Practice'.

Soils for inorganic analysis will be sealed in air-tight polythene tubs, and soils for organic analysis will be sealed in amber glass jars with the minimal practicable headspace.

All samples shall be scheduled on chain of custody forms prior to being dispatched to the UKAS accredited laboratory for analysis.

All testing should be undertaken at a laboratory which holds UKAS and MCERTS accreditation for the specific tests. The consultant shall be given sufficient time to review the content of the testing and associated test results.

6.3 Enabling Works Validation

On receipt of the records from the works contractor, to demonstrate that all of the works have been undertaken in accordance with the Remedial Specification, Groundtech Consulting will provide a validation report.

The report will be prepared by Groundtech Consulting and will provide a summary of the key elements of work and will be referenced to the agreed redevelopment strategy and planning requirements with supporting information presented within appendices.

This shall be based on current risk assessment guidance and specifically will include supporting information as summarised below:

- *Details of methodology and programme*
- *Decision records covering agreements with regulators*

- *Records of works undertaken, and associated validation/monitoring records obtained from the contractor as detailed above*
- *Final status of remediation and confirmation of remedial objectives to satisfy the planning conditions*
- *Site stripping and clearance activities undertaken during remediation*
- *Records of excavations, including:*
 - *Ordnance Datum survey of extents and depth (including a final composite base of excavation drawing)*
 - *Ordnance Datum survey of extents and depth of any residual features*
 - *Photographic record of each excavation*
- *Records of any ACM encountered during the works.*
- *Records of laboratory analytical and in-situ field test results, including:*
 - *Laboratory results and location plan for each test*
 - *Laboratory measurements of accuracy and precision*
 - *Calibration data for field measurement equipment*
 - *Chain of Custody forms*
 - *Copies of the certificates for geo-environmental testing*
- *Approximate quantities for all materials removed from the site*
- *Waste classification and management documentation, including copies of all consignment notes, in particular those relating to the hazardous waste regulations, details of waste facilities where materials were disposed of*
- *Final as-built survey of the site*
- *Potable water pipe installation*

On completion of the enabling works validation to development level the appropriate documentation will be forwarded to the client, for forwarding to the Local Authority.

6.4 Cover System

Verification of cover system thickness is required. Testing of imported soils will be required in accordance with this Remedial Specification. Groundtech Consulting should be notified when the cover system has been placed and will undertake a visual inspection and inspection pits at a frequency of 1 pit per plot.

If the cover system is deemed to be inadequate, the site manager will be informed and advised on remedial measures. Verification of the cover system will only be carried out where the cover system has been completed.

The cover system validation report will include:

- *Confirmation of the source of imported material.*
- *Confirmation of the physical suitability of the material as per Section.*
- *Confirmation that the geo-environmental test results pass when compared to the appended RTVs.*

The cover system will be validated in accordance with Manchester City Council guidance.

7.0 REUSE OF SOILS AND MATERIALS MANAGEMENT

7.1 Waste Management Background

The Contaminated Land: Applications In Real Environments (CL:AIRE) document: 'The Definition of Waste: Development Industry Code of Practice' (Version 2) (CoP), dated March 2011 should be applied where relevant.

7.2 Certainty of Use and Quantity of Material

There will be an opportunity to reuse soils at the site following excavation, processing and treatment. Any excess or unsuitable soils will be disposed of.

The following excavation and placement is proposed:

- *Demolish existing buildings and excavate hardsurfacing/subsurface obstructions and crush demolition arising to create a Class 6F2 material for re-use in the works, if required.*
- *Placement of soils as set out in this Remedial Specification.*
- *Excavation of foundations.*
- *Excavation of drainage runs.*
- *Placement of clean natural soils for use as Subsoil and Topsoil in garden areas and soft landscaping.*
- *Placement of 6F2 in road and pavements/working platforms.*

Only materials deemed suitable for use by an appropriately qualified person will be utilised on site. Any out of specification material (geo-environmental and geotechnical) obtained from the site, which is not deemed suitable for use, will be classified as waste and will be disposed of or recovered in accordance with waste legislation.

Material re-used or imported to site will be subject to the necessary testing/review and comparison to this Remedial Specification prior to delivery to site to minimise the risk of the importation of unsuitable material. Any material deemed unsuitable upon arrival at the site will be rejected.

Only sufficient material required on site with the pre-determined proposals (planning conditions and drainage strategy) will be imported or reused on site. Any surplus material or material which does not meet the required specification will be disposed of off-site. It is the responsibility of the contractor at each stage of the works to have checked all volume calculations and have allowed for disposal of unsuitable or excess materials.

7.3 On Site Material Management

Stockpiles

Site won material for potential reuse, including Topsoil, will be stored on site in stockpiles. The stockpiles are to be managed by the works contractor and will be subject to operational constraints at the time of stockpiling.

Stockpile locations will be clearly marked and documented on working drawings maintained in the site office.

The contractor is to take appropriate mitigation measures and environmental precautions as considered necessary at storage locations. However, as a minimum, stockpiles should be compacted to prevent dust and they should be kept wet in periods of dry weather.

Confirmatory Testing for Material for On Site Reuse – Excavated Material

Material to be reused on the site should meet the geo-environmental requirements set out in this specification.

Confirmatory Testing for Material for Off-Site Disposal

Materials found to be out of specification are to remain on site in segregated stockpiles until such time that they can be disposed to a suitably licenced waste disposal facility.

Any material requiring disposal shall be disposed of by the contractor. They shall ensure adequate and appropriate disposal, including testing to satisfy the proposed waste facility.

Records of the removal of stockpiles off site should be maintained by the contractor including details of the disposal or treatment site to which they have been taken. These details are to be passed to Groundtech Consulting to form part of the validation report.

Appropriate precautions should be taken by the contractor to ensure that the stockpiled material does not result in risks to neighbouring land users.

Confirmatory Testing for Imported Material

Imported soil will be tested to determine it is suitable for use in accordance with this specification.

The contractor importing the material is to provide laboratory testing results to Groundtech Consulting to prove the suitability of the material to be brought on to site in line with the requirements specified in this Remedial Specification. Once the soils are present on site, additional testing will be undertaken.

8.0 CONTINGENCY PLAN AND AREAS OF UNEXPECTED CONTAMINATION

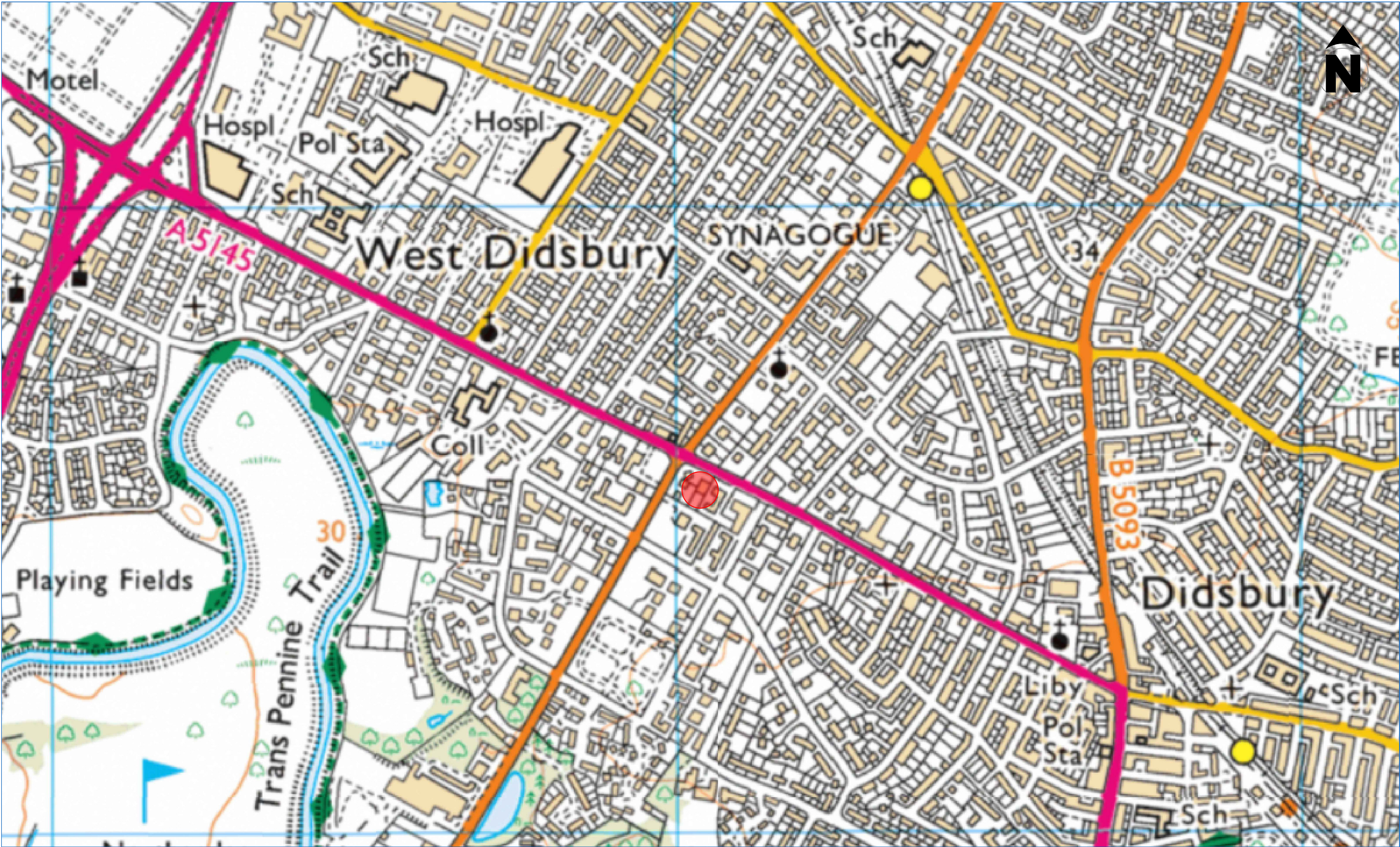
There is potential for areas of unexpected contamination to be present, due to the former use of the site. The strategy for unexpected contamination must be relayed to all site personnel during the works phase and outline a clear allocation of responsibility for reporting and dealing with contamination.

Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the requirement to report this to the client and Groundtech Consulting.

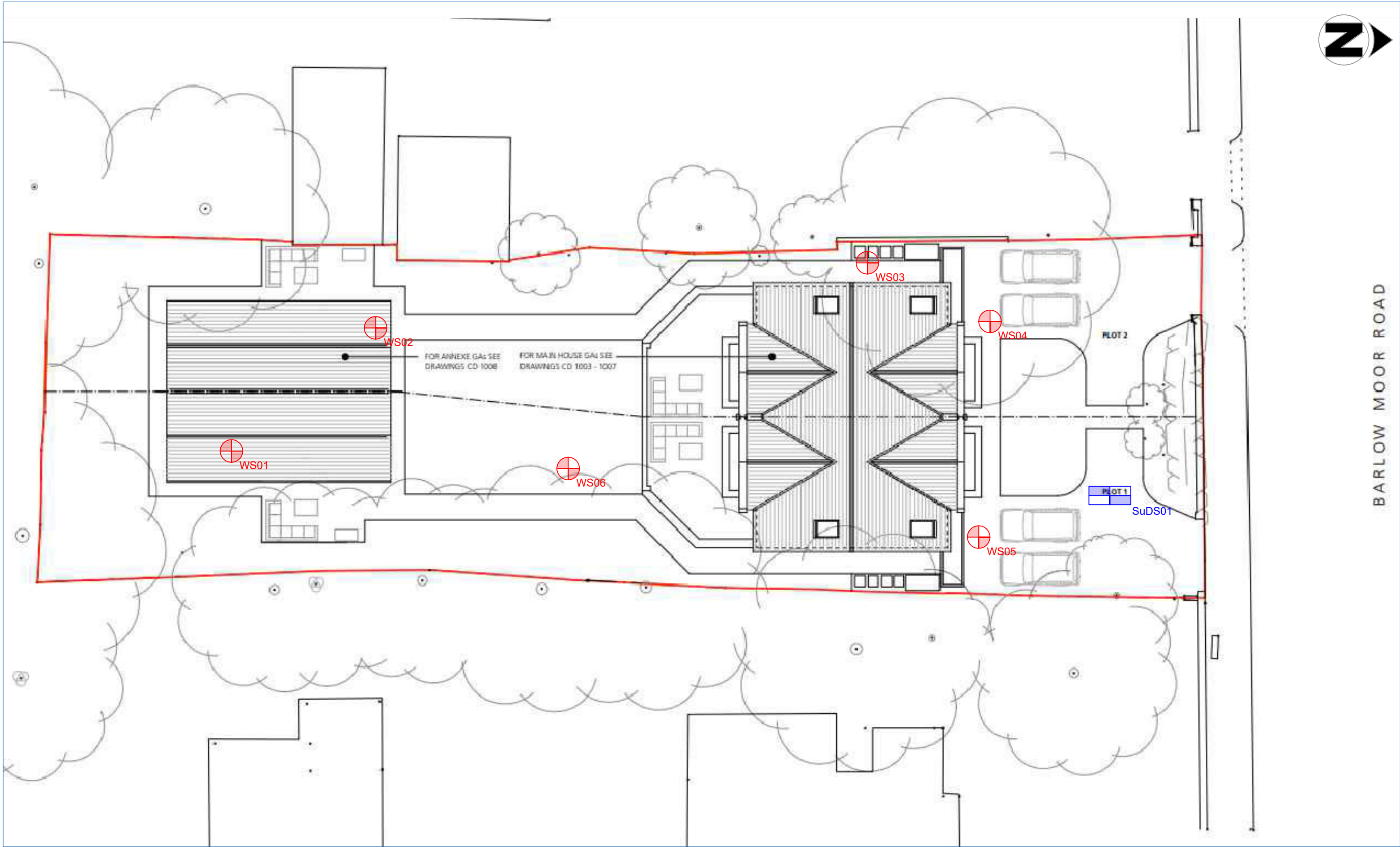
A report will be prepared by Groundtech Consulting and submitted to the regulatory parties, the Local Authority and the Environment Agency where groundwater may potentially have been impacted.

If additional materials are identified, these materials will be subject to the procedures stated in this Remedial Specification.

APPENDIX 1 - Plans

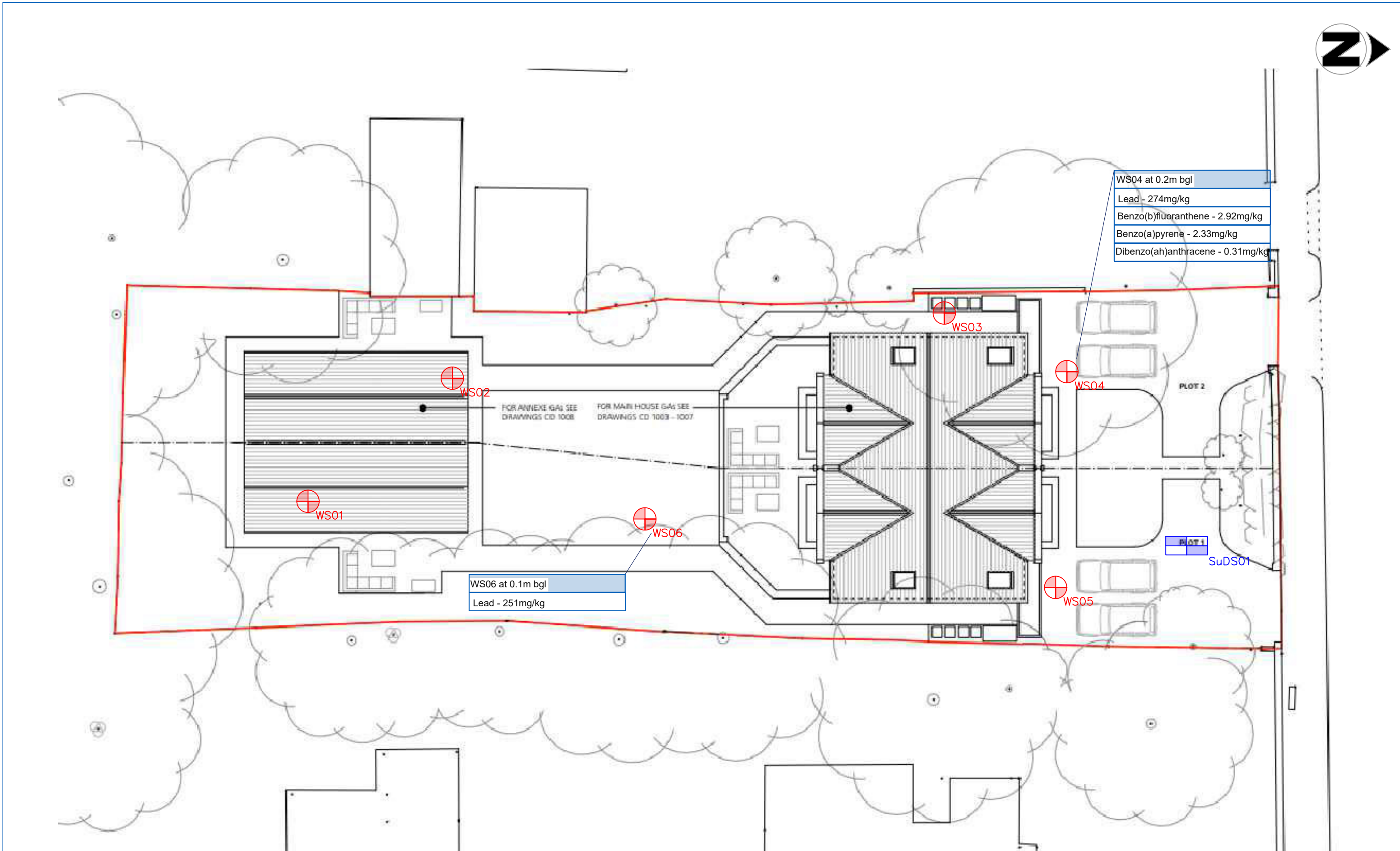


<div>GROUNDTECH</div> <div>CONSULTING</div> <div></div>	<div>CLIENT</div> <div>TAHIR AHMED</div>	<div>DATE</div> <div>MARCH 2024</div>				Status		<div>Notes</div> <div><div></div> Site Location</div>
	<div>PROJECT TITLE</div> <div>123 BARLOW MOOR ROAD, DIDSBURY</div>	<div>SCALE</div> <div>NTS</div>				Preliminary		
	<div>PLAN TITLE</div> <div>PROJECT LOCATION PLAN</div>	<div>PLAN NUMBER</div> <div>GRO-23382-P01</div>				Draft		
						Issued		
						For Comment		
			Rev.	Details	Date	Approved		



<div>GROUNDTECH CONSULTING</div> <div></div>	CLIENT	DATE			Status		<div>Notes</div> <div><div> Windowless Sample Borehole Location</div><div> Soil Percolation Test Location</div></div>
	TAHIR AHMED	JANUARY 2024			Preliminary		
	PROJECT TITLE	SCALE			Draft		
	123 BARLOW MOOR ROAD, DIDSBURY	NTS			Issued	<div><div></div><div></div></div>	
	PLAN TITLE	PLAN NUMBER			For Comment		
	EXPLORATORY HOLE LOCATION PLAN	GRO-23382-P04	Rev.	Details	Date	Approved	





<div>GROUNDTECH</div> <div>CONSULTING</div> <div></div>	<div>CLIENT</div> <div>TAHIR AHMED</div>	<div>DATE</div> <div>MARCH 2024</div>			<div>Status</div> <div>Preliminary</div>		<div>Notes</div> <div><div></div> Site Boundary</div> <div><div></div> Soil Percolation Test Location</div> <div><div></div> Windowless Sample Borehole Location</div>
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APPENDIX 2 - General Requirements

1. Compliance with Legislation and Standards

The works are to be undertaken in compliance with all relevant British Standards, codes of practice, regulations, guidance and legislation. Whilst not an exhaustive list, works shall be in compliance with the latest revision of all relevant legislation, HSE Guidelines and good working practice including, but not be limited to, the following:

- *The Health and Safety at Work etc. Act 1974.*
- *Construction Health Safety and Welfare Regulations 1996.*
- *Health and Safety Executive 'Protection of Workers and the General Public during Redevelopment of Contaminated Land' HS (G) 66, HMSO 1991.*
- *The Construction, Design and Management Regulations 2007.*
- *The Control of Substances Hazardous to Health Regulations 2002 (COSHH Regulations).*
- *The Control of Asbestos Regulations, 2012.*

The Contractor is responsible for obtaining all necessary approvals, licences, consents and permits from regulatory bodies and third parties prior to commencement.

2. Licences, Permits and Consents

Any conditions associated planning permission should be addressed prior to carrying out the works.

It will be a requirement of the Contractor to obtain any of the necessary permits and undertake the appropriate notifications and assessments.

The Contractor should only expect approvals have been sought by others where explicitly provided to the Contractor or advised in writing.

3. Health and Safety Requirements

The Principal Contractor must manage the risks in accordance with their legal requirements and all works are to be undertaken in compliance with all relevant regulations, guidance and legislation. A Construction Phase Health and Safety Plan (CPHASP) will be required to be submitted to the CDM co-ordinator, the Client and the LPA in advance of mobilisation to site. The CPHASP will be passed to the Site Manager who will implement all Health and Safety measures on site. The Site Manager will fully induct the Site Operatives prior to commencement of any works. The CPHASP will be kept as an open document and will be adapted as required to during the project. As a minimum this will include:

- *Welfare arrangements, storage and security.*
- *Air monitoring requirements (and action levels), if required.*
- *Traffic management plan.*
- *Segregation of working areas and site welfare (and decontamination units if required).*
- *Site inductions, daily safety briefings and toolbox talks.*
- *Activity specific risk assessments.*
- *Method statement briefings.*
- *Daily inspection records.*
- *Permits to work.*

During the works it will be necessary to protect the health and safety of the site personnel.

General guidance on these matters is given in the Health and Safety Executive (HSE) document 'Protection of Workers and the General Public during the Redevelopment of Contaminated Land' HS (G) 66. In summary, the following measures are suggested to provide a minimum level of protection:

- *All ground workers should be issued with protective clothing (including high visibility clothing), hard hats, footwear and gloves, personnel instructed as to how it should be used.*
- *All personnel shall wear hard hats, high visibility clothing and protective footwear at all times.*
- *Ensure that everyone on site complies with the health and safety plan.*
- *Take reasonable steps to ensure that only authorised persons are allowed on site.*
- *Display, where they can be easily read, any notification that has been sent to the Health and Safety Executive.*
- *Hand washing and boot cleaning facilities shall be provided.*
- *No smoking except in designated areas.*
- *Good practices relating to personal hygiene shall be adopted.*
- *Prepare method statements for construction operations as required by the Principal Designer.*
- *Provide the CDM Co-ordinator with any other relevant information.*

Before site operations are commenced, the necessary COSHH Assessments, Method Statements and Health and Safety Plans should be completed, approved to the Principal Designers satisfaction and issued in accordance with the CDM Regulations.

The Construction Phase Health and Safety Plan (CPHASP) should pay particular attention to the following hazards which may be encountered:

- *Potentially hazardous or contaminated materials used or encountered on site.*
- *Deep excavations.*
- *The potential for ground gases and risks on confined spaced entry.*
- *Working in the vicinity of existing underground or overhead services.*
- *Working in confined spaces.*
- *Working on, or in the vicinity of highways.*
- *Working with materials which have the potential to contain asbestos and the risk of inhalation of asbestos fibres.*
- *Manual handling.*
- *The potential for fire.*
- *Working with electrical apparatus in the vicinity of mobile plant and the potential presence of water.*
- *Poor lighting.*
- *The potential for falling/slipping/tripping and sustaining injury.*
- *The possibility for biological agents to be present, including, but not limited to: psittacosis, leptospirosis (Weill's disease), tetanus, legionella, human waste.*
- *Working in the vicinity of voids and openings.*

The Contractor shall take all necessary safety precautions throughout the ground treatment operations and shall comply with the Health and Safety at Work Act 1974 or any subsequent re-enactment thereof.

The Contractor shall submit for approval all necessary method statements to the Client prior to commencing the works.

The Contractor shall provide details of emergency procedures. Emergency services shall be informed of the site operations prior to commencement.

All statutory records to be kept in the site manager's office and these may include (not an exhaustive list and note not all may be required):

- *ASB NNLW1 – Notification of non-licensed asbestos work if the work is deemed not be requiring a licence (if required).*
- *Appropriate licence with regards to CAR 1012 if the work is deemed to require a licence.*
- *HSE Notification F10.*
- *Construction Phase Health and Safety Plan.*
- *Method Statements and Risk Assessments; Environmental Permit deployment form and associated paperwork.*
- *Discharge Consents for disposal of groundwater.*
- *Competence records (including asbestos awareness training and face-fit test records).*
- *Utility records.*
- *Plant and machinery maintenance records.*
- *Duty of Care paperwork.*

In addition, it is recommended that:

- *Asbestos Awareness training/briefing to be given to all staff.*
- *Background and ongoing air dust monitoring to be undertaken to check for presence of asbestos fibres during the works.*
- *Licensed asbestos contractors are employed to manage the licensed asbestos controlled areas, all other operatives involved in the operations must have appropriate training to satisfy the requirements of the Control of Asbestos Regulations 2012.*

4. Site Establishment and Security

Prior to the commencement of any works, the contractor, in conjunction with the Client and the Supervising Engineer, shall establish the boundaries of the site and working areas.

The Contractor shall make adequate provision to secure the site boundary and prevent unauthorised access onto the site during the course of the works.

Prior to the commencement of any works, the contractor, shall undertake a dilapidation survey of all adjacent features/construction including but not limited to boundary walls/ fences, adjacent footpath and road constructions etc. The survey is to be agreed with the Client or their representative prior to commencing any work on site.

The Contractor shall be responsible for all costs associated with rectification of damage to adjacent features/construction including but not limited to properties, boundary walls/ fences, adjacent footpath and road constructions etc. resulting from the demolition works.

The Contractor is to provide surveying capability as set out in this document facilitate the above. Prior to the completion of the works the Contractor is to discuss the continuation of the site security, including the fences, with the client and acceptable arrangements for continued security are to be agreed prior to the removal of the contractor's security provision.

5. Traffic Safety and Management

The Contractor shall comply in all respects with Chapter 8 of the Traffic Signs Manual for works on or affected the public highway and/or private roads forming the highway access to/from the site. The Enabling Works Contractor shall obtain all necessary consents from the Local Highway Authority for works on the public highway.

On-site access and haul routes should be provided and maintained by the Enabling Works Contractor in such a manner so as not to endanger either the user, those working in the vicinity of such accesses/haul routes and or the Works. Access to the site will be agreed with the Clients prior to commencement.

Suitable precautions shall be taken to prevent the spread of mud and debris on the public highways. Regular inspections of the public highway adjacent to the site shall be carried out. If deemed necessary by the Contractor, the Client or the Supervising Engineer, the highway shall be swept regularly to remove any mud, slurry or dust deposited by vehicles entering or departing the site. If the Supervising Engineer considers that significant amounts of any detritus have been deposited on the public highway then operations shall be temporarily suspended until appropriate cleaning operations have been undertaken.

The Contractor is to co-operate with other Contractors if they are present during the works. The proposed works will generate a number of vehicle movements associated with the removal of soils and delivery to site of materials. Consideration should be given to the route and the timing of these vehicle movements, to minimise risk and disturbance to sensitive locations (such as schools, residential areas).

Risks associated with the transport of soils that are potentially containing contaminated, such as dust emission, should be appropriately managed.

6. Welfare Facilities

Site cabins and welfare facilities will be established at a location to be agreed with the Supervising Engineer.

The Contractor is deemed to have made provision and arrangements for all temporary utilities associated with the welfare facilities.

7. Working Hours

Noisy operations such as the use of hydraulic breakers shall be restricted to operating times as specified by the Client and by the Planning Permission. It is understood that these are 8:30 am to 5:30 pm, or other hours agreed with the Local Authority, Monday to Friday and 9.00 am to 1.00pm on Saturday. No working shall take place on Sunday or Bank Holidays.

Prior to commencement the Contractor is to make contact with the Local Authority to establish if any further restrictions apply.

8. Mobile Plant

Mobiles plant shall be operated by suitably trained and qualified operators experienced for each item of plant. When not in use all plant shall be locked to prevent all plant shall be locked to prevent unauthorised operation.

All traffic entering or working on site shall comply with a maximum 10 mph speed limit.

Fuelling of any plant shall be undertaken in a designated area and all above ground fuel storage tanks shall comply with the requirements of the Pollution Prevention Guidelines PPG2. Specifically, any storage tanks used should:

- *Be sited within an oil-tight secondary containment system such as an impermeable bund.*
- *The secondary containment must provide storage for at least 110% of the tanks maximum capacity.*
- *Be located within a secure area.*
- *All taps and valves should be fitted with a lock and kept locked shut when not in use. Maintenance of mobile plant should be undertaken in a designated area, unless absolutely necessary.*

Waste oil, hydraulic fluid etc. should not be tipped directly or discharged on to site. Such materials shall be stored separately, in a secure bunded area, for off-site disposal. Waste oil may be a special waste and disposal shall be undertaken by a registered carrier in accordance with the Duty of Care Regulations.

A spill kit shall be kept on site in an accessible place adjacent to the designated refuelling area.

9. Unexploded Ordnance (UXO)

The site is in an area which is considered to be at a low risk with regards to UXO and mitigation measures are not required.

10. Surveying

The Contractor shall provide full time surveying personnel and equipment to undertake the following activities and any other requirement for topographical information relating to the project that arises through the duration of the enabling works contract. The survey personnel and equipment should be capable of providing accurate levels and co-ordinates in relation to the national grid and topographical survey provided within 1 day of request.

The following key activities are covered by the requirements for surveying:

- *Confirmation of topographical survey on possession of the site, and setting out of the site boundary.*
- *Confirmation of positions of existing utilities and site features.*
- *Surveying the base and extent of all excavations and remaining obstructions prior to backfilling.*
- *All setting out and levelling relating to delivery of the enabling works.*
- *The location of sub-structures removed.*
- *Interim surveys to be undertaken during the infilling works to provide information on issues such as depth of excavation, progress of earthwork, quantities of materials, testing depths and locations etc.*
- *The location and elevation of test samples and locations.*
- *As built survey information.*

The Contractor is required to undertake all necessary topographical survey works to verify these levels before the commencement of the contract. Should the Contractor find any discrepancies on the drawings they are to refer the matter to the Engineer for verification before proceeding with the part of the works affected.

The Contractor shall undertake a topographical survey following completion of the enabling works.

All topographical surveys shall include levels at maximum 10m spacing and details of any features, changes in slope, structures, services and any other features of interest.

All of the above features shall be surveyed for line and level at the site boundary and marked on a plan. Levels shall be to Ordnance Datum and locations to National Grid. The survey shall be calibrated against existing site surveys and benchmarks in the vicinity of the site.

11. Testing

The Contractor shall be responsible for undertaking all testing necessary to satisfy the Supervising Engineer that the works have been carried out in accordance with, and comply with this Remedial .

All soils and geo-environmental testing shall be carried out by a UKAS and MCERTS accredited laboratory, with accreditation for the specific analysis, to the approval of the Supervising Engineer.

12. Offsite Disposal

Materials for offsite disposal shall be sampled and analysed, by the contractor, at rates sufficient to allow the material to be adequately classified by assessment.

WAC testing should be undertaken on material exported from site to landfill, or other appropriately licensed facility. Material shall be hauled by a registered waste carrier in accordance with the requirements of the Duty of Care Regulations, 1991, Environmental Permitting (England and Wales) Regulations 2016 and where appropriate the Special Waste Regulations, 1996 and Hazardous Waste (England and Wales) Regulations 2005. A transfer note shall be completed, signed and retained by all parties involved. The transfer note shall state the volume of waste, the nature of the material and statement to the chemical composition. The waste transfer notes shall be kept by the Contractor for a period of at least 2 years.

13. Contamination

Contractors should be made aware of the possibility of encountering contaminants within soils or groundwater at the site (including asbestos) through 'toolbox' talks.

Safe working procedures should be implemented in accordance with CIRIA132 and good standards of personal hygiene should be observed and appropriate levels of PPE provided and utilised.

Eating, drinking and smoking should be strictly prohibited in the development site other than in designated mess areas.

14. The Control of Noise, Vibration and Dust Nuisance

The Contractor shall comply with the recommendations for practical measures to reduce noise and vibration set out in BS5228-1:2009 and BS5228-2:2009 and with any specific Principal Contractor requirements.

The Contractor shall take all reasonable measures to prevent dust nuisance from being generated by construction traffic, etc.

If necessary working methods will be altered in order to ensure that the level of noise generated from the works is within published tolerable limits.

The requirements of the LPA are to be sought and undertaken.

General

No fires shall be permitted on site.

Dust Mitigation

Appropriate measures shall be implemented at all times during the demolition and enabling works to minimise any dust emissions.

Any main temporary haul roads shall, where practical to do so, be constructed of crushed hardcore products. The haul roads shall be maintained for the duration of their use to minimise any build-up of loose spoil etc.

Traffic both entering and working on site shall obey a maximum speed limit of 10 mph. Wagons that are to be used for the haulage of any contaminated material from site shall be appropriately sealed or sheeted to prevent the release of fugitive dust.

Mobile water bowsers and sprayers shall be available on site at all times to water unpaved haul roads and working areas. The water spray may include chemical dust suppressants or wetting agents to improve dust control. An adequate supply of water shall be maintained on site at all times to allow for dust suppression activities to be carried out at short notice.

Where mobile water bowsers are not effective in suppressing dust then vapour masts shall be used. Such vapour masts shall be deployed at 20m centres on the downwind side of haul roads or excavations giving rise to significant dust or emissions of odour.

Air quality and dust monitoring stations will be set up and monitored by the Contractor to record the dust concentrations during the works.

With regards to stockpiles:

- *Stockpiles should be kept to a minimum to reduce 'wind whip' causing potentially hazardous material to be blown from the pile.*
- *Stockpiles should be placed on a suitable polythene membrane in a bunded area to prevent any cross contamination and care should be taken not to pierce the sheeting when placing the bulky elements of the material.*
- *Stockpiles should be dampened down or covered to prevent dust, whilst the final choice should be made by the Contractor based on site constraints, but the options include covering with plastic/polythene membrane, or by a layer of clean soil material.*
- *The drop distance from excavator bucket to stockpile will be kept as short as reasonably practicable to reduce dust.*

Odour

In general terms the excavation works are not considered likely to give rise to any significant odour problems..

If highly odorous materials are encountered, which may give rise to nuisance to neighbouring properties, appropriate vapour masts shall be deployed to provide suitable odour control. Any odorous materials shall be covered at the end of each working day and any stockpiles will be located away from any sensitive areas.

Plant and machinery shall be serviced regularly to ensure that exhaust fumes are compliant with best practice and relevant regulations.

Noise

The requirements of the Local Planning Authority and BS 5228: 1997 'Noise and vibration control on construction sites' shall be adhered to at all times.

All machinery shall be fitted with effective silencers and shall be serviced at regular intervals. No items of plant shall be operated with engine covers raised.

The location of any crushing plant shall take into consideration the location of neighbouring properties and other noise sensitive receptors and shall be located away from these areas and located adjacent to proposed stockpile locations where possible.

15. Asbestos in Soils

The Contractor must manage the risks in accordance with their legal requirements and will need to prepare appropriate health and safety documentation and obtain appropriate approvals, licences, consents and permits prior to commencement.

The remediation works are designed to break the pollution linkage with regards to contaminants within the soil. Whilst appropriate measures are required for all contaminants present, the Contractor should note the additional details provided below with regards to asbestos in the soils:

- *Asbestos is a hazard to Human Health when airborne fibres are inhaled. Asbestos containing material (ACM) that is in a bound form (such as asbestos cement tiles) is not hazardous where the asbestos fibres cannot become airborne. However, if lagging is present or the ACM is broken or crumbled in a dry condition the asbestos fibres could become airborne and could then be inhaled. When soil with asbestos is covered by hardstanding, buildings or a cover of clean soil or when the soil is kept damp, the asbestos fibres are less likely to become airborne and the risk is greatly reduced.*
- *The Health and Safety at Work Act 1974 forms the basis of health and safety legislation in the UK. In addition, the Control of Asbestos Regulations 2012 (CAR 2012) applies throughout the UK. CAR 2012 applies if land has significant asbestos content and is relevant to any work conducted on asbestos contaminated land.*
- *CAR 2012 defines a "control limit" of 0.1 fibres per cubic centimetre of air averaged over a continuous period of 4 hours. This limit is not risk based and may be much higher than the levels for control of environmental pollution.*
- *CAR 2012 applies even where exposure to asbestos of employees is sporadic and of low intensity and where exposure to asbestos of any employee will not exceed the control limit. The work must be of short non-continuous activities where non-friable materials are handled, or removal without deterioration of non-degraded materials in which asbestos fibres are firmly linked in a matrix.*
- *Lagging, broken fragments of asbestos and loose fibres have the potential to release airborne fibres in dry conditions. In addition, as the ACM and asbestos fibres have been contained in the soil for many years, the likelihood is that they would be degraded to some extent. However, the asbestos fibres detected at the site are within a soil matrix and if this is kept damp, this should assist in minimising the risk of the release of airborne fibres.*
- *The contractor should determine whether the works being undertaken would be exempt from CAR 2012 licensing requirements.*

It should be noted that information presented in this document is provided to assist in managing the soil at the site which contains asbestos. It is the responsibility of the contractor how the control measures associated with these risks are implemented and recommend that an appropriate asbestos specialist assist with both the preparation of documents and licences and site supervision.

Task specific risk assessments and method statements should be in place, and risks and required mitigation measures communicated to all relevant personnel prior to the works commencing. Appropriate PPE and if required RPE should be provided and utilised.

Visible fragments of suspected asbestos containing materials on the site surface shall be handpicked. Hand picking needs to be undertaken in accordance with an Environmental Permit and ACM shall be placed in a dedicated covered and lockable skip pending off-site disposal to a suitably licensed facility. Such remediation measures will be undertaken by suitably qualified contractors and in accordance with CAR 2012.

16. Water Quality Controls

The Contractor shall provide for such measures as may be necessary to ensure that water, whether groundwater, from precipitation or any other source does not accumulate in excavations or on sub-grades.

Adequate drainage sumps will be installed during works and cut off trenches/dewatering measures will be used as required to manage surface water run-off, to prevent any water from entering watercourses, either directly as surface water run-off, or indirectly via the surface water drainage systems; If materials escape, appropriate the Contractor is to undertake (at their cost) appropriate remedial action as soon as possible.

17. Utilities

Utility records are to be provided by the Client for information purposes within the enabling works documentation. However, the Contractor shall be responsible for liaison with the statutory utility providers to ensure all service records are current and correct. The Contractor is also responsible for the safe disconnection of existing utilities entering the site, except those which are to remain operational.

Prior to site work commencing, the position of all utilities indicated as on site or offsite but close to the site boundary shall be determined and clearly identified where on site. The locations should be confirmed on site by appropriate investigation, observations and survey. Any discrepancies between the anticipated positions and confirmed locations are to be reported to the Supervising Engineer.

All retained manholes should be located and clearly identified on site to prevent damage. The location, depth, diameter and invert level of each manhole and the size and depth of all stream connections shall be recorded. Where drains or sewers are to be grubbed up the downstream ends should be plugged prior to commencement to prevent offsite systems becoming blocked or contaminated.

Where existing drains or sewers are to remain, CCTV surveys are to be provided by the contractor. These surveys must be undertaken on commencement prior to any physical work and on completion to demonstrate no damage has occurred.

Where damage has occurred, any remedial work must be agreed with the Supervising Engineer and relevant authority/owner prior to repairs commencing. The repair costs will be borne by the contractor.

All utilities on site that are to be retained through the works are to be positively located on site, reliance shall not be placed on existing records. Utilities are to be visibly marked and protected for the duration of the works. Appropriate methods are to be put in place to ensure all site staff working in the vicinity of retained utilities are fully briefed.

The Contractor is responsible for ensuring that all hydrant covers, stop tap boxes manhole covers and the like are raised or lowered to suit the finished levels associated with the proposed enabling works plateaus and future construction thicknesses.

Following the completion of the works, a survey plan of the location of terminated services is to be provided.

18. Damage to Property

All works are to be undertaken in accordance with the Party Wall etc Act 1996. The Contractor shall ensure that all precautions are taken in order to avoid any damage to existing property arising from the Works and shall be responsible for same in the event that any damage should arise from his failure to exercise due care.

Any adjacent structures, services and the like shall be inspected prior to commencement of the Works for evidence of existing defects and, if necessary, a dilapidation survey shall be carried out by the contractor, with the agreement of the Client and/or the Supervising Engineer, prior to works commencing on site. A re-inspection shall take place on completion of the Contract to verify that no damage or deterioration of the said structure, service or apparatus has occurred as a result of the Works. A schedule of the findings of this re-inspection shall be circulated to all parties concerned for their records.

The Contractor shall execute the works with care so as to avoid damage to existing structures and drains or other services to be retained.

All fences, trees, paths, shrubs, grassed areas and other surfaces required to be retained shall be protected by the Contractor from spillage and damage caused by site operations and upon completion of the works they shall be handed over in an undamaged and proper state to the satisfaction of the Engineer.

Refer to landscape architect drawings and specifications that define the areas that require protection. The Contractor shall not raise or lower the ground level beneath the spread of the branches of any tree to be retained without the approval of the Engineer.

19. Drawings and Supplied Information

Whilst efforts have been made to ensure that the information provided to the Contractor is correct and current, the Contractor is responsible for corroborating the existing information with the benefit of their site presence and to report any discrepancies encountered or anticipated to the Supervising Engineer immediately.

Where cutting and filling operations are to be carried out the Contractor is to undertake comparative assessments with the benefit of existing information, additional survey and their anticipated sequence of work to ensure sufficient and suitable material is available to undertake the works as proposed. Any anticipated shortfall or surplus is to be report immediately.

20. Photographs

A detailed dilapidation survey shall be undertaken of the site and adjacent properties including joint site boundaries, in conjunction with adjacent land owners. Such survey shall include roads, footpaths, street lighting and road signs. A copy of the survey, including record photographs shall be provided to the Client within seven days of commencement of site works.

The Contractor is to provide on-site a digital camera and e-mail facilities to enable electronic transfer of site photographs and other information for the full duration of the contract. Progress photographs are to be taken at least weekly across all parts of the site for inclusion within the contractor's report. Photographs are to be made available to the Engineer/Client in electronic format should they be requested during the contract. Record photographs should be provided as part of the validation information

APPENDIX 3 - Remediation Options Appraisal

Introduction

This Options Appraisal has been undertaken in general accordance with Chapter 3 (Options Appraisal) of LCRM 'Model Procedures for Management of Land Contamination'. There are four main stages to this appraisal:

1. *Identifying Key Risk Drivers.*
2. *Identifying viable remediation options for each relevant pollutant linkage.*
3. *Carrying out a detailed evaluation of viable remediation options to identify the most appropriate option for each pollution linkage.*
4. *Producing a remediation strategy that reduces all relevant pollutant linkages to an acceptable level.*

Key Risk Drivers for Remedial Action

Groundtech Consulting have identified that the key risk drivers requiring remediation are:

- *Elevated levels of heavy metals and PAHs within the Made Ground.*

The following sections of this report are intended to identify suitable and practical remedial techniques which can be applied in order to achieve a site which is suitable for the proposed residential development.

Grubbing up of the Made Ground and cut/fill balance exercise will remove, as far as practicable, all underground obstructions and create a development platform, which is geotechnically suitable for development.

Ground gas risks and potable water pipelines are not discussed in the Remediation Options Assessment as they are mitigated by measures outlined British Standards and by good practice.

Remediation Options and Evaluation of Feasibility

Preliminary Assessment of Remediation Options

Investigation and risk assessment has concluded that the requires remediation to reduce the risk to receptors to an acceptable level.

The objectives of the remediation are to remove one or more elements of each of the *source-pathway-receptor* linkages.

The initial screening process considers the available remedial techniques based on following key criteria:

- | | | |
|------------------------------------|---|---|
| • <i>Effectiveness</i> | - | <i>the strategy must work within the context of the site and be effective in the removal of contamination linkages.</i> |
| • <i>Practicality</i> | - | <i>the strategy has to have been successfully used in similar situations on other sites and readily available within the UK market. Novel solutions or those still in the research stage are not considered here.</i> |
| • <i>Durability</i> | - | <i>the strategy needs to be durable and not reliant on ongoing maintenance to continue being effective.</i> |
| • <i>Relative Cost</i> | - | <i>the strategy must not be excessive cost.</i> |
| • <i>Relative Operational Time</i> | - | <i>the strategy should work in a feasible and realistic time scale.</i> |
| • <i>Sustainability</i> | - | <i>more sustainable options are preferred.</i> |

The table below summarises all of the accepted remedial techniques readily available and assess each against the six key parameters listed above.

In the first instance, the feasibility of each of the listed remedial option is assessed in terms of effectiveness at treating the contamination, which is broken down into; effective (Y), partially effective (P) or ineffective (N).

The techniques are then assessed in terms of relative cost ranging from negligible cost (£) through moderately expensive (££) to prohibitively expensive (£££+).

The timescale the remedial technique is operational has been generally assessed in units of weeks, months, years and decades. The longevity of the technique should be for the duration of the development to be effective.

The main reasons for rejection of a remedial option are generally the ongoing operational constraints, the cost and the ineffectiveness to mitigate the risk from all contaminants present. In some situations, several treatment options may be applicable and will therefore be considered as part of the appraisal.

Viable Remedial Options

As described above, certain technologies were rejected based on the above reasons. The short-list of options presented below represents those technologies which were not rejected at the pre-screening process and as such, are taken forward to the options appraisal process:

- *Watching brief during works*
- *Installation of a cover system in garden areas*
- *Materials management, comprising excavation, screening, and reuse of suitable material*
- *Disposal of unsuitable soils*

Cover System

A cover system is a proven technology for mitigating the risk from numerous contaminants. The process comprises the placement of a cover system to form a barrier between the contaminated Made Ground and site users breaking the pollution linkage.

This option is technically simple and represents a low-cost strategy that can be implemented rapidly, subject to favourable site levels to accommodate the cover system.

The timescale for installing a barrier is relatively quick allowing for rapid completion of the remediation objectives and this remediation solution could be designed and implemented within a matter of weeks/months.

Materials Management

This process can be carried out a low cost ensuring contaminated soils are at a greater depth, and for this project will be combined with the raising of site levels.

Disposal of excess or unsuitable soils

Disposal involves the removal of contaminated soils and disposal at an appropriately licensed waste management facility or surplus material potentially to a recycling facility. The benefits of excavation and disposal is short term implementation and the soils can be removed with a high degree of certainty by meeting proposed RTVs.

The cost of the method however can be significant depending on the classification and end disposal route, particularly in comparison to a cover system. The option will also take up valuable landfill space and present a significant carbon footprint in terms of vehicle movements.

The technique can be combined with other remedial options such as reuse of general Made Ground.

APPENDIX 4 – Remedial Options Appraisal Table

Applicability of Remediation Options and Initial Assessment – Soils

Remedial Activity	Effective on Asbestos	Effective on Metals	Effective on PAHs	Relative Cost	Relative Operational Time	Comments (Practicality/Sustainability/Durability)	Feasibility
Containment - Cover System	Y	Y	Y	£	Weeks	<p>A nominal 150mm Topsoil is required where Made Ground is not present. Where Made Ground is present a 450mm cover system is to be placed in garden areas and soft landscaping to mitigate against contaminated soils.</p> <p>Cover system to be inclusive of a minimum 150mm topsoil and 3000mm subsoil.</p>	Y – in conjunction with materials management.
Excavation and Disposal	Y	Y	Y	££	Weeks to months	Removal of unsuitable material and risk.	Y – in conjunction with materials management.
Containment - hydraulic barriers	Y	Y	Y	£££	Months	Not Required and not cost beneficial for size of development.	n/a
Containment - in ground barriers	Y	Y	Y	£££	Months	Not Required and not cost beneficial for size of development.	n/a
Soil flushing	N	Y	Y	£££	Months	Not Required and not cost beneficial for size of development.	n/a
Surface amendments	Y	Y	Y	£££	Months	Not Required and not cost beneficial for size of development.	n/a
Soil washing	N	Y	Y	£££	Months	Not Required and not cost beneficial for size of development.	n/a

Remedial Activity	Effective on Asbestos	Effective on Metals	Effective on PAHs	Relative Cost	Relative Operational Time	Comments (Practicality/Sustainability/Durability)	Feasibility
<i>Hydraulic binders (such as cement)</i>	Y	Y	Y	££	Weeks to months	<i>Not Required and not cost beneficial for size of development.</i>	<i>n/a</i>
<i>Vitrification</i>	N	Y	Y	£££	Months	<i>Not Required and not cost beneficial for size of development.</i>	<i>n/a</i>
<i>Incineration</i>	N	Y	Y	£££	Months	<i>Not Required and not cost beneficial for size of development.</i>	<i>n/a</i>
<i>Thermal desorption</i>	N	Y	Y	£££	Months	<i>Not Required and not cost beneficial for size of development.</i>	<i>n/a</i>

APPENDIX 5 - Remedial Target Values

APPENDIX 6 - Limitations

Limitations

This contract was completed by Groundtech Consulting on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with due skill and care, taking into consideration the project brief provided, project objectives, agreed scope of works, prevailing site conditions and budget allocation.

Other than that defined in the paragraph above, Groundtech Consulting provides no other accountability or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted industry practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Groundtech Consulting. A third party who relies on this report, does so at their own and sole risk and no liability to such parties is provided by Groundtech Consulting.

It is the understanding of Groundtech Consulting that this report is to be used for the intended purpose as set out in the introduction. The purpose was instrumental in determining the scope and level of the services provided. Should the purpose of the report or the proposed end use of the site change, this report will no longer be directly applicable, and its validity readdressed. No reliance upon the report in the revised situation should be assumed by the client without the permission of Groundtech Consulting.

The report was written in 2018, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change and should be investigated if there is any significant delay in acting on the findings of this report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions in this report should not be relied upon in the future without the written confirmation from Groundtech Consulting that it is safe to do so.

The observations and conclusions outlined in this report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting.

Groundtech Consulting are not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The services provided are based upon Groundtech Consulting observations of existing physical conditions at the site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and Groundtech Consulting assume the information to be correct.

No responsibility can be accepted for errors for third party information presented in this report. Groundtech Consulting were not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Groundtech Consulting are not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting and forms the contract with the client.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable due to its heterogeneous properties and as investigation exploratory locations only allow examination of the ground at discrete

locations. The potential exists for ground conditions to be encountered which are different to those considered in this report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. Geo-Environmental testing was carried out for a limited number of parameters [as stipulated in the contract] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawings provided in this report are not meant to be an accurate base plan, but are preliminary and used to present the general relative locations of features on, and surrounding, the site.

