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REMEDIATION STRATEGY LETTER
PLYMOUTH GROVE, MANCHESTER

1. BACKGROUND

E3P has been instructed by HG Construction Ltd (the Client) to develop a Remediation Strategy for the proposed scheme to construct a new multi-storey residential complex with associated hardstanding and soft landscaped areas.

The development of the risk management strategy for the subject sites includes the following tasks:

- Identification of the relevant pollutant linkages;
- Review of site characteristics;
- Development of remedial objectives;
- Selection of appropriate remedial technology; and
- Development of remedial strategy.

1.1. PREVIOUS WORKS

The following phases of Geoenvironmental investigations and assessments have previously been carried out at the site:

- **Ground Risk** – Phase 2 Ground Investigation Report (Ref: GR000119-GI-1.2) dated April 2024.

To inform the assessment of the potential risk to contaminated land within the context of the proposed residential development and to inform the preparation of the remediation strategy, the pertinent points from the above Geo-environmental Investigation reports are summarised within Section 1.4 below.

For the avoidance of any doubt, the above report should be read both as a precursor to and in conjunction with this document.

1.2. REDEVELOPMENT PLAN

The development will comprise the erection of a part six storey, part eight storey building for use as purpose built student accommodation (PBSA) (Sui Generis) comprising 263 bed spaces, with associated amenity space, cycle parking, external landscaping, access and other associated works.

The proposed development layout is presented in Figure 1.1 and appended to this letter.

Figure 1.1 Snapshot of Proposed Development

1.3. SUMMARY OF PARTIES INVOLVED

Function/interest	Name of Party
Local Planning Authority	Manchester City Council
Developer	HG Construction Ltd
Geoenvironmental Consultant	E3P
Main Contractor	HG Construction Ltd
Remediation/Enabling Works Contractor	HG Construction Ltd
Human Health Regulator	Manchester City Council
Controlled Waters and Waste Regulator	Environment Agency
Highways Adoption Authority	Manchester City Council

1.4. SITE SUMMARY

TABLE 1.1 SITE SUMMARY

Site Address	1-5 Plymouth Grove, Manchester, M13 9AU	
Occupancy/Use	The Site is located to the southeast of Manchester city centre and is bounded to the south by Plymouth Grove and to the west by Dryden Street. The Site is irregular in shape, generally widening towards the southwest and narrowing towards the northeast. The Site is generally flat lying; however, there is a depression in the southern part of the Site with a drop in topographical height of approximately 1.4m. There is an open excavation along the western boundary of the Site, proximal to Dryden Street, associated with an historical well.	
Environmental Setting	**Drift Geology**	Glacial Till – Cohesive.
	Bedrock Geology	Chester Formation Sandstone - SANDSTONE
	Hydrogeology	Superficial – Secondary Undifferentiated Aquifer Bedrock – Principal Aquifer
	Hydrology	Corn Brook is located 200m north of site
	Flood Risk	The site is within a Flood Zone 1 and is therefore not affected by flooding from rivers.
Site History	The site was shown to be occupied by terraced housing in the southern part of the site from c. 1948 to 2013. There were several unreferenced smaller buildings scattered around the site from1923 to 1996. These buildings were no longer present from 2000 onwards. A former Dye Works occupied a small portion of the northernmost part of the site, with the footprint of the Works continuing north of the Site boundary.	
Landfill Sites	No landfill sites (current or historic) are located within 250m of the Site.	
Radon	Radon Class <1% of homes are estimated to be at or above the Action Level. No radon protection measures required.	
Ground Conditions	**Topsoil:** No suitable topsoil (for reuse) has been identified on-site. **Made Ground:** Made Ground was encountered from either Ground Level or below a layer of paving flags and was encountered at all exploratory locations down to proven depths between 0.55m and 1.50m bgl. Made Ground was typically granular and found to generally fall into one of the following five broad categories: 1. Reworked topsoil 2. Capping layer 3. Ashy Made Ground 4. Imported Subbase 5. Reworked or buried topsoil	

	Drift Deposits: Soils considered representative of Glacial Till deposits were encountered beneath Made Ground at all exploratory hole locations. These soils were encountered from depths between 0.50m and 1.50m to depths between 8.23m and 8.30m. These were generally described as firm becoming very stiff brown and mottled bluish grey slightly sandy gravelly CLAY with gravels of angular to subangular fine to coarse sandstone, mudstone, siltstone, quartzite and rare coal. **Bedrock:** A SANDSTONE bedrock of the Chester Formation was encountered at depth of between 8.23m and 8.30m bgl and comprised a sandstone rockhead with localised mudstone beds/lenses contained within. **Groundwater:** In BH101 and BH102 the groundwater was recorded at depth of between 10.14m and 10.45m bgl. A shallow groundwater was recorded at 0.84m bgl in WS04, however this was considered to be perched.
Human Health Risk Assessment	Chemical testing from various Made Ground soil samples has demonstrated that they pose a risk to human health receptors for a public open space near residential end use. This is due to elevated levels of arsenic, beryllium, lead, and PAHs as well as localised low level (<0.001%) asbestos fibres present within the soils. These exceedances are associated within general Made Ground and are not attributed to a specific source. However, it is anticipated that during the enabling works to prepare the site for the proposed development, the shallow Made Ground deposits will be removed facilitate the substructure works for the extension and re-engineered external hardstanding. In landscaped areas, where Made Ground soils may remain in-situ, a cover system will be installed to prevent the risk of future exposure. Therefore, the risk associated with dermal contact/ingestion of soils is mitigated.
Controlled Waters Risk Assessment	The site is not considered to present a significant risk to controlled waters receptors and no remediation is deemed necessary. Borehole installations into the bedrock aquifer should however be decommissioned in accordance with EA guidelines prior to development.
Ground Gas	The site falls under Characteristic Situation 1 (CS1) and therefore, gas protection measures are not required.
Potable Water Supply	Barrier pipe will likely be required due to the presence of localised TPH levels above the PE pipe threshold within the ashy Made Ground and dissolved TPH CWG bands >EC10-EC12, >EC12-EC16, >EC16-EC21 and >EC21-EC35. A water pipe risk assessment should be submitted to the utility provider once development proposals have been finalised.

2. SITE REMEDIATION AND ENABLING WORKS

2.1. SUMMARY OF REMEDIATION OPTIONS

It is considered that the following combination of remediation technologies provides the most sustainable, viable and economic solutions that will ultimately result in the successful remediation for the site(s):

- Installation of a suitable **cover system** in all proposed landscaping and public open space to remove any potential for direct exposure to impacted soils.
- Construction of **appropriate potable water supply** infrastructure (UKWIR assessment required).

2.2. OVERVIEW OF WORK

Prior to the commencement of works on-site, the contractor must establish all necessary plant, equipment, and site welfare facilities as is necessary to complete the contract within the agreed timescales to the rationale as outlined in the following subsections.

For the avoidance of any doubt, the proposed operations as set out herein document the required performance objectives and validation sampling protocols; however, the specific methods of work deployed to ensure the remediation objectives are achieved in a compliant manner on-site will be the responsibility of the appointed contractor.

RE-1 – SITE CLEARANCE OPERATIONS

General site clearance and provision of welfare, offices and site security are to be determined as per the contract requirements.

Vegetation material should be removed in a controlled manner with full compliance with any ecological mitigation measures that are required for the works. Any such measures are outside the scope of this report.

All vegetation should either be stockpiled at a pre-agreed location or alternatively removed from site in accordance with waste permitting regulations.

All root networks are to be removed from beneath the building footprint.

RE-2 – RETENTION OF IDENTIFIED NON-VOLATILE PAH & HEAVY METAL IMPACT

Elevated levels of non-volatile PAH and heavy metals have been identified at a number of locations within the Made Ground and it can be reasonably assumed further exceedances may be present within the wider Made Ground soils.

The identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion, soil ingestion and consumption of homegrown produce.

The elevated concentrations are associated with Made Ground deposits at depths of between 0.10m and 0.70m bgl.

These exceedances can be mitigated by the installation of a 450mm chemically suitable cover system within areas of soft landscaping or placement under hardstanding or the building footprint.

RE-3 –DELINEATION, EXCAVATION AND TREATMENT OF IDENTIFIED ASBESTOS IMPACT

Asbestos was identified within HDP06C at 0.50 m bgl (trace fibres).

This location is due to be capped by a hardstand, whereby it will pose no future exposure risk. Alternatively, this material could be removed for off-site disposal as part of the enabling works.

The contractor must ensure that all personnel working on site are trained in the identification of ACM and the risks associated with impacted soils.

Where any visual evidence of ACM is identified, these materials should be carefully segregated and removed from the soil matrices (if/where possible).

Validation sampling of the processed Made Ground should be completed to demonstrate compliance with the developed conceptual site model.

This process should be completed under strict controls to be devised and employed by the nominated contractor to ensure no potential for fibre release into ambient air.

If necessary, reassurance air testing in accordance with the requirements of HSG248 should be completed during the operation to move the soils to demonstrate the deployment of the required control procedures and safe working methods.

RE-4 – EXCAVATION, BREAKING AND PROCESSING OF ALL ABOVE- AND BELOW-GROUND STRUCTURES

Obstructions, relic foundations, and infrastructure (apart from live services) are to be removed from the areas of proposed development, including where no foundations and infrastructure is proposed.

It will be the contractor's responsibility to remove all obstructions from the sites.

Obstructions encountered within the near-surface soils will be chased to their full depth and removed; if not possible, the obstruction must be surveyed with the location communicated to E3P, the client and the developer.

Where natural soils are present at a relatively shallow depth, extreme care should be taken to ensure that the natural cohesive deposits remain undisturbed with a full reduced-level survey to be completed to map the depth of filled/processed material.

RE-5 – PREPARATION OF LANDSCAPED AREAS FOR COVER SYSTEM

As part of the land remediation works, landscaped areas will be prepared in a manner that will facilitate the placement of the clean cover system during the development phase of the works. The preparation of the areas requiring clean cover is critical in ensuring delivery of the site in a manner that will ensure no risk to the proposed end users.

Where Made Ground is deemed unsuitable for retention in a landscaped area, the area will be subject to a reduced-level dig to remove unsuitable material to a minimum depth of 450 mm below finished landscaped area level or verified natural stratum (whichever is the shallower).

Excavated soil will be stockpiled pending the results of the appropriate validation testing (to be completed in accordance with this specification) prior to reuse in an area of no sensitivity or, where necessary, this material will be removed from site in accordance with UK waste management legislation.

The placement of certified subsoil and topsoil will be completed as part of the developer's works/build-phase mitigation plan.

All landscaped areas where a cover system is required will be subject to independent validation.

RE-6 – PROVISION OF SUBSOIL

The natural drift deposits (predominantly cohesive soils) present underlying the site are considered chemically suitable for use as subsoils within the clean cover system, however these soils are at such a depth (typically >1.00m) that it would not likely be economically viable to recover for reuse.

Subsoil will therefore need to be imported and will require testing in line with the schedule present within Section 6.1 and Table 6.1.

The landscaped areas will require depth validation to satisfy the requirements of the Council of Mortgage Lenders (CML) in order to demonstrate that the appropriate thickness has been provided as a growing medium.

RE-7 – PROVISION OF TOPSOIL

No material that would be deemed suitable for use as topsoil is present, and as such, there will be a requirement to import suitable material for use within the proposed development.

Topsoil will require testing in line with the schedule presented within Section 6.1 and Table 6.1.

The landscaped areas will require depth validation to satisfy the requirements of the CML in order to demonstrate that the appropriate thickness has been provided as a growing medium.

RE-8 – INDEPENDENT VALIDATION: WATCHING BRIEF

Given the site history and potential contamination sources identified within the ICSM, a degree of uncertainty remains with regard to the potential for as yet unidentified contamination impact within the near-surface soils and groundwater beneath the building footprint.

It will therefore be necessary that the on-site contractor notify E3P if any previously unidentified contamination is encountered.

RE-9 – WASTE SOILS SURPLUS TO REQUIREMENTS

In the event that a surplus of excavation material is present on- site, this, in most cases, will be deemed to be a waste in accordance with the Waste Framework Directive (Article 3(1) Waste Framework Directive 2008/98/EE). The waste producer – but ultimately, the landowner – is responsible for the compliant disposal of such materials.

A formal waste classification assessment must be undertaken, irrespective of any future options or considerations for those materials that will be removed from site. Waste classification should only be made following the Environment Agency *Technical Guidance WM3 – Guidance on the Classification and Assessment of Waste*.

To remove the surplus material from site it will either need to be sent to a disposal site (landfill), to a permitted treatment facility or, dependent on the waste classification assessment, it may be suitable for use on a permitted land improvement or restoration operation.

Subject to suitability, these soils can be transferred to the receiving site, subject to an approved permit or materials management plan following guidance in the CL:AIRE *Definition of Waste: Code of Practice*.

RE-10 – REMEDIAL VERIFICATION REPORT

The collation of information relating to site clearance, chemical testing, remedial works, remedial verification, material movements and waste transfer documentation is required, where appropriate.

Complete remedial validation i.e. the retention and clean capping on PAH impacted materials is to be reported in line with regulatory guidance.

The report will be submitted to the Local Authority for approval following completion.

2.3. VALIDATION SAMPLING PROTOCOL

In accordance with the current requirements of the regulatory authorities, validation samples will be collected from all materials that are to be subject to movement under the protocols outlined within this remediation and enabling works strategy, or for materials to be imported onto site to facilitate the proposed residential development.

Soil samples destined for chemical analysis will be collected at regular intervals in appropriate sampling containers. All samples will subsequently be stored in cooled boxes prior to submission to a UKAS/MCERTS accredited laboratory.

All samples will be collected using appropriate personal protective equipment (PPE) and sampling equipment, which will be cleaned at each sampling location.

A detailed copy of E3P Ltd sampling methodology, QA procedures and laboratory chain of custody forms will be documented within the site records and presented with the final validation report for the site.

Where material is found to contain concentrations of potential contaminants at levels in excess of the site-specific screening criteria (as detailed within the enclosed appendices), E3P will undertake further assessment and recommendations on the appropriate use for the material in question, which may involve the disposal of such materials off-site to a suitable waste management facility.

The sampling frequency for materials to be managed under the remediation strategy is presented in Table 2.1. The validation sampling protocol has been developed utilising guidance from the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG) due to wide usage of this guidance amongst Regulatory Authorities.

TABLE 2.1 SPECIFICATION OF CHEMICAL VALIDATION LABORATORY ANALYSIS

MATERIAL USE	TESTING FREQUENCY	SUITE OF ANALYSIS
Site-Generated		
Site-Generated 6F2	1 Sample per 1000 m^3	A/B/C/D
Site-Won Made Ground General Backfill	1 Sample per 250 m3 where visual and/or olfactory impact is identified	G
Site-Won Made Ground General Backfill	1 Sample per 1000 m^3	A/B/C/D
Site-Won Made Ground General Backfill	1 Sample per 2000 m^3	I
Site-Won Natural Backfill	1 Sample per 2000 m^3	A/B/C/D
Site-Generated Subsoil	1 Sample per 250 m^3	A/B/C/D
Hotspot Validation Samples	1 Sample per 10 m of linear excavation to base and sidewall	E/G
Imported		
6F2	1 Sample per 1000 m^3	A/B/C/D
Subsoil Greenfield Source	1 Sample per 200 m^3	A/B/C/D
Subsoil Brownfield Source	1 Sample per 50 m^3	A/B/C/D
Topsoil Greenfield Source	1 Sample per 200 m^3	A/B/C/D
Topsoil Brownfield Source	1 Sample per 50 m^3	A/B/C/D
General Engineering Fill (Class 1 & 2 Soil)	1 Sample per 1000 m^3	A/B/C/D

Notes
Suites of Analysis:

A. Speciated PAH.
B. Speciated TPH (C5-C35).
C. Asbestos (ID).
D. CLEA Inorganic Heavy Metals.
E. Speciated PAH, Banded TPH and VOCs.
F. SVOC/Speciated TPH.
G. On-Site Screening for VOC Using Calibrated PID.
H. Leachate 2:1 Speciated PAH and Banded TPH.
I. Leachate Analysis of Inorganic Heavy Metals, TPH, Sulphate and PAH.

All analysis prescribed above to be completed by UKAS-accredited laboratory.

2.4. REMEDIATION CONTRACTORS SITE MANAGEMENT AND RESPONSIBILITY

The appointed remediation contractor will take full and overarching responsibility for all methods of work required to complete the site remediation and enabling operations to ensure the delivery of the site and the completion of the objectives in a safe, legislatively compliant manner that ensures no pollution to the subject site or the wider environs.

For individual remediation operations as set out within this performance specification, the contractor will provide site-specific methods of work for individual operations pertaining to the removal and treatment of contaminated liquids and soils. For each and every operation as set out herein, the contractor will provide a written methodology of works to be supplied to the supervising geo-environmental engineer prior to the instigation of operations on-site.

The site manager will be responsible for documentation of each day's activities with a full recorded schedule of works completed and corresponding site-specific method statements that have been utilised to ensure the completion of the task to the required standard.

3. ENVIRONMENTAL MONITORING AND VALIDATION

3.1. SITE MANAGEMENT

The tracking of materials will be based on the following hierarchy:

- The principal contractor will have the responsibility for setting out areas of the site on the basis of the contract specification.
- Operatives will have instructions only to excavate and to emplace materials in specified areas as assigned by the site manager/foreman.
- The site manager (employed by the principal contractor) will issue daily instructions to drivers regarding the placement of materials sourced from specific stockpiles or areas, ensuring that appropriate documentary evidence is collected that details which materials are going where and why.
- An E3P consultant, who will be in attendance as required, will:
    - Inspect the excavation areas and certify that the correct materials are being excavated;
    - Conduct spot checks on loaded vehicles to ensure compliance with this remediation strategy; and,
    - Ensure that any loads that fail visual, olfactory or spot checks either remain on the vehicle or, if unloaded, are excavated and set aside. This material will be treated according to the recommendations of the E3P site engineer.
- E3P will conduct an audit of waste consignment notes. All material imported and removed from site will have duty of care/consignment notes, copies of which will be retained on-site by the site manager.
- Materials directly reusable will be incorporated into the earthworks, subject to operational conditions and phasing of excavations, in which case they will be stockpiled prior to final placement.

3.2. COMPLETION

Following the completion of the remediation works, a report will be compiled by the nominated environmental consultant detailing all site enabling works undertaken, waste consignment notes, and all site investigations, laboratory test certificates and validation testing undertaken.

A certificate of completion of earthworks should be included within the report which should then be issued to the local authority for their approval.

E3P considers that with the adoption of the above best practices the site can be safely redeveloped. The site enabling works process and presence of any residual contamination (if this is the case) should be recorded for future reference by landowners/occupiers. Future development at the site where this may result in penetration of new areas of hardstanding should be subject to no-less-stringent measures with respect to assessment and, where appropriate, monitoring, than those set out herein.

3.3. MITIGATION OF RISK FROM SOILS WITH ASBESTOS FIBRES

Asbestos (trace fibres) were recorded within the shallow Made Ground at one location (HDP06C) at a depth of 0.50m bgl. In addition, the presence of asbestos elsewhere cannot be entirely discounted.

However, the aforementioned impacted soils will likely be removed as part of the reduced level excavation for the substructure works, as such, the below measures are advised as a precautionary mitigation.

3.3.1. PRE-COMMENCEMENT WORKS

Prior to the commencement of works the following requirements must be satisfied:

- Induction of all people that will be involved with the proposed site works; and
- All methodologies must be agreed upon by all parties involved.

3.3.2. CONTROL, MONITORING AND REPORTING OF GENERAL AERIAL EMISSIONS FROM DUSTS AND PARTICULATES

DAMPING DOWN OF SOILS – MITIGATE PARTICULATE (DUST) EMISSION

During excavation, as outlined within the detailed working methodologies, soils will be regularly damped down using water to control the generation of dust (this may also comprise precipitation). The contractor will determine the best form of dust suppression to be used when a detailed programme has been issued.

If any previously unidentified asbestos-containing materials are identified, these should be dealt with in strict accordance with the *Control of Asbestos Regulations* (2012) and industry best practice as detailed in CIRIA 733.

GENERAL CONTROL OF DUST

The following control measures should be utilised to ensure that dust levels are kept to a minimum at all times:

- Where necessary, haul road, work areas and stockpiles will be damped down with water spray.
- The application of water to haul roads, work areas and stockpiles should be closely monitored by the resident engineer to ensure that soils are not saturated and, therefore, that the potential for water run-off is appropriately mitigated.
- Once completed, any stockpiles will be sealed by compacting at the surface.
- Vehicle speeds and movements on-site will be kept to a minimum (< 5 mph) during civil excavation works to reduce the potential to generate dust.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

In accordance with the HSE *Guidance Note em6: Asbestos Essentials, Personal protective equipment (including RPE)*, E3P recommend that all site operatives present within the work area where potential asbestos-impacted soils are being excavated are supplied with the following personal protective equipment:

Overalls:

- Disposable overalls.
    - Type 5 (BS EN ISO 13982-1) are suitable.
    - Cotton overalls hold dust and need specialist laundering.
- Waterproof overalls for outdoor work.
- Use oversized overalls - this will help to prevent ripping at the seams.
- If the cuffs are loose, seal them with tape.
- Avoid wearing a long-sleeved shirt as these are difficult to cover properly.
- Wear the overall legs over footwear as tucking them in lets dust into footwear.
- Wear the hood over the RPE straps.

Failure to utilise and correctly employ PPE will result in immediate cessation of works. Works will not be permitted to recommence until the individual has undergone further training in the use of PPE or the individual is removed from the works area.

At this current time, with the levels of ACM identified within the soils, the above-listed PPE is not considered to be required for all site personnel during the entire management of these soils.

When handling asbestos-impacted soils during the enabling works, asbestos monitoring works should be conducted in accordance with, but not limited to, the following HSE legislation and guidance:

- *Health & Safety at Work Act* 1974;
- *The Control of Asbestos Regulations* 2012;
- CL:AIRE, 2016. *Control of Asbestos Regulations 2012 - Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials: Industry guidance*;
- *Approved Code of Practice L143 Work with materials containing asbestos*;
- *Management of Health and Safety at Work Regulations 1999*;
- HSE *Guidance Note HSG248 Asbestos, the analysts guide to sampling and analysis*;
- HSE *Guidance Note HSG247 Asbestos: The licensed contractors' guide*; and
- *CIRIA 733 Asbestos in soil and made ground: a guide to understanding and managing risks.*

If required, air monitoring in accordance with HSG248 will be undertaken intermittently throughout the duration of the works at a frequency to be determined by the contractor, entirely dependent on whether asbestos-impacted soils are being handled at any given time. In general terms, during any one monitoring period, ten standard monitoring pumps will be run throughout the day, for the appropriate time period to achieve the required limit of detection. These slides will be analysed immediately by the on-site UKAS-accredited laboratory.

Once any monitoring has been analysed by the on-site UKAS-accredited laboratory, the results will be delivered to the resident engineer who will then follow the correct site procedure. The results will then be included within the verification report.

4. RECORD-KEEPING AND VERIFICATION

4.1. RECORD-KEEPING

During the course of the remediation and site enabling works, the Site Manager and E3P consultant will undertake the following record-keeping protocols:

- Detailed daily site diary including material movements;
- Sampling register, testing results, photographs, details of locations of impacted soils (drawings), details of any hotspot removals, details of consignment notes of any impacted material that is required to be disposed of off-site; and
- Detailed surveys (volumes).

Record-keeping on-site, in particular movements and analysis of specific material types, will be in the form of site diaries and a remediation excavation record.

This record will remain on-site and will be completed by the Site Manager (and E3P on-site engineer) during the course of the remediation and site enabling works.

4.2. VERIFICATION

The records listed above will then be compiled into a validation report produced by E3P on completion of the remediation and site enabling works, clearly referencing the origin of the materials used and testing carried out to confirm its suitability for use, where required.

The validation report may also include the following:

- Remediation strategy (including copies of confirmation from regulatory authorities agreeing criteria);
- Detailed surveys of all excavations and production of as-built drawings for the earthworks;
- Copy of consignment notes relating to the movement of wastes to a licensed waste management facility;
- Detailed drawings showing all sampling locations for both chemical and geotechnical testing;
- Chemical test results (of in-situ soils or imported soils);
- Geotechnical test results (if any required);
- Details of qualified persons signed declaration; and
- Monitoring results if undertaken (e.g., asbestos in air, gas water).

5. CONTINGENCY PLAN

5.1. PREVIOUSLY UNIDENTIFIED CONTAMINANTS

Should significantly impacted material be encountered during the development, then it will be excavated and stockpiled on an impermeable material and sampled and tested for an appropriate range of determinants.

Once the laboratory analysis of the material is available, an assessment will be undertaken to determine whether it can be retained on-site as part of the material management plan or whether it should be disposed of off-site.

Depending on the nature of any such impact, it may be necessary to undertake validation testing of the excavation faces in order to demonstrate that no such materials are left in situ.

6. SECOND PHASE MITIGATION AND MANAGEMENT – BUILD PHASE

This document details the construction works that are required to ensure full compliance with the remediation Strategy, Regulatory Authorities, Building Control & Warranty Providers;

The following should be implemented during the build phase of the development:

- Laboratory testing of the imported topsoil and subsoil;
- Placement and validation of imported subsoil and topsoil (clean material) in a 450 mm layer within any landscaping areas overlying a geotextile membrane;
- Placement and validation of imported subsoil and topsoil (clean material) in a >600 mm layer within any tree pits;
- Installation and validation of potable water supply infrastructure that will be compliant with United Kingdom Water Infrastructure Risk (UKWIR) assessment criteria

The validation protocols are presented within the E3P Remediation and Enabling Works Strategy and are presented below.

6.1. PLACEMENT OF COVER SYSTEM

The remedial requirements with respect to human health of the future site users includes the provision of a chemically suitable clean material to be installed in all landscaped areas; the construction of the clean cover / placement of clean material shall consist of:

- 300mm subsoil;
- 150mm topsoil; and
- Geotextile membrane (to prevent cross contamination).

Installation to be advanced to between 600–900 mm in any tree pits, comprising of at least 150 mm of topsoil.

In accordance with the current requirements of the regulatory authorities, validation samples will be collected from all materials that are to be imported to confirm the proposed development will pose no unacceptable risk to human health or the wider environ.

Subsoil and topsoil shall be free of any deleterious materials, such as buildings materials, timber, plastics etc and conform to the requirements of BS 3882:2007.

Testing requirements for topsoil and subsoil are presented in Table 6.1.

TABLE 6.1 SPECIFICATION FOR SOIL TESTING

MATERIAL USE	TESTING FREQUENCY	SUITE OF ANALYSIS
Subsoil Greenfield Source (150 mm Landscaping Cover)	1 Sample per 250 m^3 (minimum 3 per source)	A/B/C/D
Subsoil Brownfield Source (150 mm Landscaping Cover)	1 Sample per 100 m^3 (minimum 6 per source)	A/B/C/D
Topsoil Greenfield Source (150 mm Landscaping Cover)	1 Sample per 100 m^3 (minimum 3 per source)	A/B/C/D
Topsoil Brownfield Source (150 mm Landscaping Cover)	1 Sample per 50 m^3 (minimum 6 per source)	A/B/C/D

Notes
Suites of Analysis:
A. Speciated PAH.
B. Speciated TPH (C5-C35).
C. Asbestos (ID).
D. CLEA Inorganic Heavy Metals.

6.1.1. PROCEDURE FOR PLACEMENT OF CHEMICALLY SUITABLE COVER SYSTEM

Made Ground soils are to be stripped from beneath proposed areas of landscaping to a minimum of 450mm bgl.

A geotextile membrane should form the base of the cover system installation, to prevent the mixing of Made Ground and placed cover system soils.

Landscaped areas need to be backfilled with a geotextile membrane (base layer), 300mm chemically validated subsoil, with 150 mm topsoil overlaying this. These soils are required to be confirmed as chemically suitable prior to placement.

Details of the source of the topsoil and subsoil will be provided by the earthworks contractor appointed to install the cover system as part of the build phase.

The placement of 450mm of clean material will be undertaken during the build phase works of the project, following construction of the apartment building.

The placement of subsoil and topsoil and corresponding validation will be documented within the Landscaping Validation Letters (to be issued on completion of the contractor's works).

If natural drift deposits are encountered within the 450mm strip, then excavations can cease here.

E3P will collect photographic evidence of the placement of 150mm of certified topsoil and 300mm of subsoil on completion of construction works. This element will also be checked by the Building Control Officer as part of the site completion prior to issuing of a CML certificate.

The landscaping validation procedure is detailed in Table 6.2 overleaf.

TABLE 6.2 LANDSCAPING VALIDATION PROCEDURE

PROCEDURE	METHOD
Chemical Validation	Imported topsoil and subsoil will need to be chemically analysed to confirm suitability for use with the proposed cover system prior to installation and completion of the landscaping systems. E3P will issue an email to the appropriate party with an assessment of the chemical suitability of the topsoil. If acceptable, the materials can be installed to the required depth, at which time the landscaped areas will be deemed complete following a validation procedure by a suitability qualified E3P engineer.
Trial Holes	Trial holes are deemed necessary for all landscaped areas given that the 300 mm cover system will need to be placed during the build phase.
Validation	Photographic evidence will be taken by E3P of the topsoil placement demonstrating the depth of topsoil and practical completion of works for all landscaped areas.
Validation Certificate	E3P will issue a validation certificate (for each landscaped parcel) to demonstrate that the required topsoil has been placed in the required landscaped areas along with the chemical analysis.

Plate 1 provides an example of validation photographs that will be required for each area of landscaping.

PLATE 1 EXAMPLE COVER SYSTEM VALIDATION

Plot No: 4 (Car Park Landscaping)		
Depth of Strata (m bgl)	0.00-0.30	Validated TOPSOIL
Depth of Cover System Materials	***Depth of Cover System Materials***	
Depth of Cover System at Ground Level and in Relation to Unit / Structure		

6.2. POTABLE WATER SUPPLY – CONTAMINANT ASSESSMENT CRITERIA

E3P has reviewed the chemical analysis results and based on the concentrations of TPHs within the shallow Made Ground, it is likely that Barrier Pipe (Type A) will be required.

A UK Water Industry Research (UKWIR) Risk Assessment will be required to confirm this.

Alternatively, if the Made Ground soils are removed, a UKWIR assessment on the imported materials would be more suitable to confirm the water supply infrastructure.

We trust this information is satisfactory to your requirements, and should I be able to be of any further assistance, please do not hesitate to contact me.

Yours sincerely,

For and on behalf of E3P Ltd

Alex Smith
Associate Director
(BSc Hons, MSc, FGS)

Enclosed

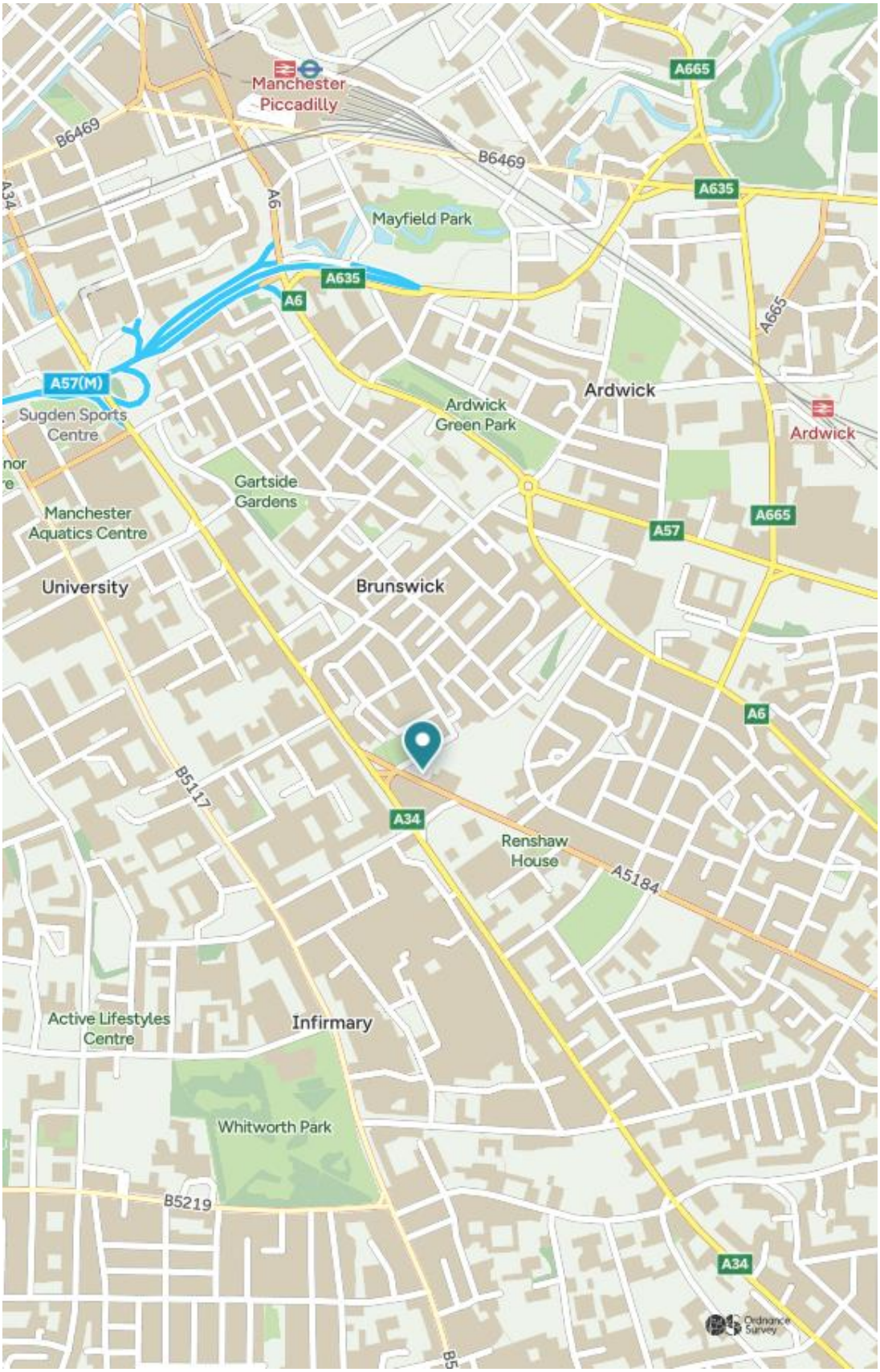
Appendix I Drawings

16-678-001	Site Location Plan
DAY-20001-P01	Proposed Site Plan

Appendix II E3P Remediation / Validation Criteria

APPENDIX I
DRAWINGS

DRAWING 18-678-001 – SITE LOCATION PLAN



N

Level	GEA
00. Level 0	1022.5 m²
01. Level 1	1134.6 m²
02. Level 2	1134.6 m²
03. Level 3	1134.6 m²
04. Level 4	1134.6 m²
05. Level 5	1134.6 m²
06. Level 6	848.3 m²
07. Level 7	848.3 m²
Total	8391.9 m²

Level	GIA
00. Level 0	941.7 m²
01. Level 1	1028.8 m²
02. Level 2	1028.8 m²
03. Level 3	1028.8 m²
04. Level 4	1028.8 m²
05. Level 5	1028.8 m²
06. Level 6	766.6 m²
07. Level 7	766.6 m²
Totals	7618.9 m²

Site Plan
1 : 200

0 4 8 12 16 20m
GRAPHIC SCALE: 1:200

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Key:

- Red line indicates site planning boundary.
- Site topography based on survey drawing **47361MCLS-01**

REV	DESCRIPTION	DATE	REV BY	CHKD BY
P01	Drawings Issued to RS - Principle Designer for review and comment.	28.11.25	BH	ST
A	Issued for Information	22.03.24	RJH	NOD

CLIENT
Plymouth Grove Property Developments Ltd

PROJECT
The Residence at Plymouth Grove, Ardwick

DRAWING STAGE
STAGE 4

DRAWING
Proposed Site Plan

SCALE
1 : 200 @ A1

FIRST ISSUED
22.03.24

CLIENT REF	DAY PROJECT	DRAWN BY	CHECKED BY
P662	P662	RJH	NOD

ORIGIN	VOLUME	LEVEL	TYPE	ROLE	NUMBER	REVISION
DAY	XX	00	DR	A	200001	P01

DRAWING STATUS
GATEWAY 2 SUBMISSION FOR REVIEW

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APPENDIX II
E3P REMEDIATION/ VALIDATION CRITERIA

HUMAN HEALTH REMEDIATION TARGETS –RESIDENTIAL END USE (APARTMENT)

DETERMINAND	UNITS	HARD STANDING *BELOW*	PUBLIC OPEN SPACE *WITHIN* 300 mm COVER	PUBLIC OPEN SPACE *BELOW* 300 mm COVER	PATHWAY
Arsenic	mg/kg	40[ii]	79[iii]	170[iv]	1
Cadmium	mg/kg	85[ii]	120[iii]	532[iv]	1
Chromium (Hexavalent)	mg/kg	6[ii]	7.7[iii]	220[iv]	1
Lead	mg/kg	310[vii]	630[viii]	1300[viii]	1
Elemental Mercury	mg/kg	1.2[ii]	16[iii]	30[iv]	2
Nickel	mg/kg	180[ii]	230[iii]	800[iv]	1
Selenium	mg/kg	430[ii]	1100[iii]	1800[iv]	1
Copper	mg/kg	7100[ii]	12,000[iii]	44,000[iv]	1
Zinc	mg/kg	40,000[ii]	81,000[iii]	170,000[iv]	1
Phenol	mg/kg	440[xiv][xi]	440[iii][xi]	440[iv][xi]	2
Naphthalene	mg/kg	2.3[xiv][xi]	1200[iv][xi]	1200[iv][xi]	2
Acenaphthylene	mg/kg	500[v]	15,000[iii][xi]	29,000[iv][xi]	3
Acenaphthene	mg/kg	500[v]	15,000[iii][xi]	29,000[iv][xi]	1
Fluorene	mg/kg	500[v]	9900[iii][xi]	20,000[iv][xi]	1
Phenanthrene	mg/kg	500[v]	3100[iii][xi]	6200[iv][xi]	3
Anthracene	mg/kg	500[v]	74,000[iii][xi]	150,000[iv][xi]	3
Fluoranthene	mg/kg	500[v]	3100[iii][xi]	6300[iv][xi]	3
Pyrene	mg/kg	500[v]	7400[iii][xi]	15,000[iv][xi]	3
Benzo(a)Anthracene	mg/kg	11[ii][xi]	29[iii][xi]	49[iv][xi]	3
Chrysene	mg/kg	30[ii][xi]	57[iii][xi]	93[iv][xi]	3
Benzo(b)Fluoranthene	mg/kg	3.9[ii][xi]	7.1[iii][xi]	13[iv][xi]	3
Benzo(k)Fluoranthene	mg/kg	110[ii][xi]	190[iii][xi]	370[iv][xi]	3
Benzo(a)Pyrene	mg/kg	3.2[ii][xi]	5.7[iii][xi]	11[iv][xi]	3
Indeno(123-cd)Pyrene	mg/kg	45[ii][xi]	82[iii][xi]	150[iv][xi]	3
Dibenzo(a,h)Anthracene	mg/kg	0.31[ii][xi]	0.57[iii][xi]	1.1[iv][xi]	3
Benzo(ghi)Perylene	mg/kg	360[ii][xi]	640[iii][xi]	1400[iv][xi]	3
TPH C_5-C_6 (aliphatic)	mg/kg	42[ii][xi]	42[ii][xi]	10,000[xiv][xi]	2
TPH C_6-C_8 (aliphatic)	mg/kg	100[ii][xi]	100[ii][xi]	10,000[xiv][xi]	2
TPH C_8-C_{10} (aliphatic)	mg/kg	27[ii][xi]	27[ii][xi]	10,000[xiv][xi]	2
TPH C_{10}-C_{12} (aliphatic)	mg/kg	130[ii][xi]	130[ii][xi]	10,000[xiv][xi]	2
TPH C_{12}-C_{16} (aliphatic)	mg/kg	1000[xiv][xi]	1000[xiv][xi]	10,000[xiv][xi]	2
TPH C_{16}-C_{21} (aliphatic)	mg/kg	1000[xiv][xi]	1000[xiv][xi]	10,000[xiv][xi]	1
TPH C_{21}-C_{35} (aliphatic)	mg/kg				1
TPH C_5-C_7 (aromatic)	mg/kg	370[ii][xi]	370[ii][xi]	10,000[xiv][xi]	2
TPH C_7-C_8 (aromatic)	mg/kg	860[ii][xi]	860[ii][xi]	10,000[xiv][xi]	2
TPH C_8-C_{10} (aromatic)	mg/kg	47[ii][xi]	47[ii][xi]	10,000[xiv][xi]	2
TPH C_{10}-C_{12} (aromatic)	mg/kg	250[ii][xi]	250[ii][xi]	10,000[xiv][xi]	2
TPH C_{12}-C_{16} (aromatic)	mg/kg	1800[ii][xi]	1800[ii][xi]	10,000[xiv][xi]	1

DETERMINAND	UNITS	HARD STANDING *BELOW*	PUBLIC OPEN SPACE *WITHIN* 300 mm COVER	PUBLIC OPEN SPACE *BELOW* 300 mm COVER	PATHWAY
TPH C_{16}-C_{21} (aromatic)	mg/kg	1900[(ii)(xi)]	1900[(ii)(xi)]	10,000[(xiv)(xi)]	1
TPH C_{21}-C_{35} (aromatic)	mg/kg	1900[(ii)(xi)]	1900[(ii)(xi)]	10,000[(xiv)(xi)]	1
Asbestos	Fibres Volume Weight (%)	0.001%	NFD	0.001	4

Notes 1

NFD = No Fibres Detected

Asbestos will be screened visually on-site by a qualified environmental consultant and where potential ACM is identified, representative samples will be subject to quantitative analysis of % volume by weight.

Should any ACM be identified within the soil matrices, further detailed % assessment would be required when the reported laboratory result exceeds the limit of detection for the analytical method at 0.01% by volume (weight).

Notes 2
Excludes matrices where free product is observed.

No viable exposure pathway beneath hardstanding and cover system.

Notes 3
Main exposure pathways: 1 = soil ingestion, 2 = vapour inhalation (indoor), 3 = dermal contact and ingestion, 4 = dust inhalation.

Abbreviations: GAC = general assessment criteria, n = number of samples, MC = maximum concentration, N/A = Not Applicable (no exceedance of assessment criteria), Loc of MC = location of exceedances.

i. Value derived from LQM Suitable 4 Use Levels (S4ULs) for residential end use with plant uptake.
ii. Value derived from LQM Suitable 4 Use Levels (S4ULs) for residential end use without plant uptake – these levels used below 600 mm cover system within residential gardens as soils will be present within a residential setting yet soils will not be disturbed and garden plants will not reach these soils.
iii. Value derived from LQM Suitable 4 Use Levels (S4ULs) for public open space (POS) residential.
iv. Value derived from LQM Suitable 4 Use Levels (S4ULs) for public open space (POS) park – these levels used below 300 mm POS cover system as soils will not be disturbed by any future site users and exposure to these soils will be similar to a park end use.
v. Value derived from LQM Suitable 4 Use Levels (S4ULs) alongside assessment with WM3 to ensure that materials remaining on-site do not exceed the WM3 toxicity criteria for hazardous waste.
vi. Value derived from Category 4 Screening Levels (C4SL) for residential land use with homegrown produce.
vii. Value derived from Category 4 Screening Levels (C4SL) for residential land use without homegrown produce.
viii. Value derived from Category 4 Screening Levels (C4SL) for public open space (POS) residential.
ix. Value derived from Category 4 Screening Levels (C4SL) for public open space (POS) park.
x. Mercury – based on elemental mercury.
xi. PAH and TPH levels used are for 1% SOM.
xii. Xylenes based on p-xylene (o-xylene 2600 mg/kg, m-xylene 3500 mg/kg) and is capped by its solubility.
xiii. Value derived from LQM Suitable 4 Use Levels (S4ULs) for residential end use with plant uptake due to the volatilisation risk.
xiv. BTEX is not SOM-related due to inhalation pathway.