



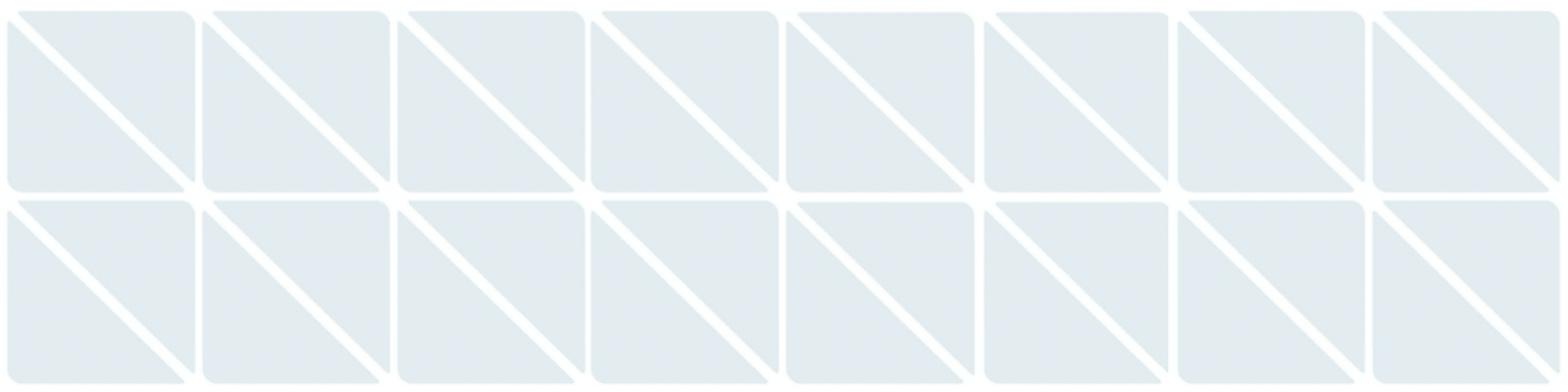
A-squared Studio

Renaissance Manchester

Remediation Strategy

July 2024

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1. Introduction

1.1. Background and Objectives

A-squared Studio Engineers Ltd (A-squared) have been appointed by Property Alliance Group Ltd to prepare this Remediation Strategy. The Remediation Strategy is for the redevelopment specifically proposed within the application boundary at the Renaissance redevelopment site in Manchester. The application boundary is shown in Figure 1.1 and the proposed development is described in Section 2. The application boundary is known as Land To The North Of Renaissance Hotel, Blackfriars Street, Manchester, M3 2EQ.

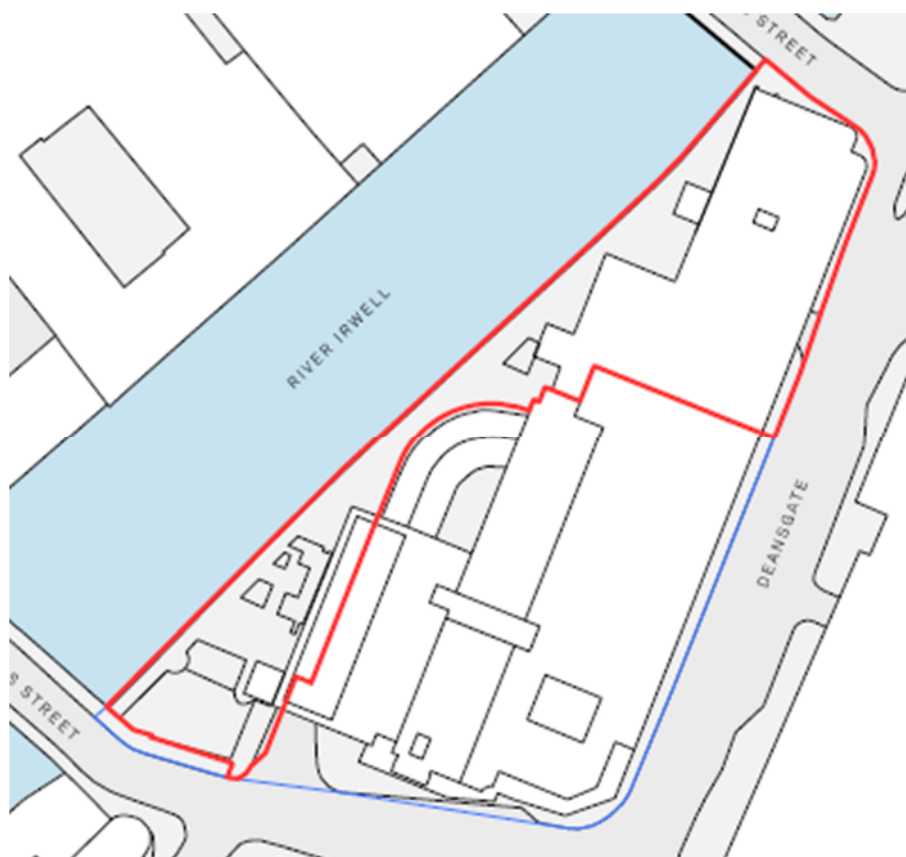


Figure 1.1 Application boundary (in red) and site boundary (in blue)

The Remediation Strategy has been prepared based on the recommendations provided in *A-squared, Supplementary Geo-environmental Assessment Report, Renaissance Manchester, dated July 2024, ref. 3199-A2S-XX-XX-RP-Y-0001-01* (the 'SGA').

The SGA was prepared based on supplementary ground investigation, monitoring rounds and 2 no. existing geo-environmental assessment reports for the proposed development by E3P, as referenced below:

- *E3P, Phase II Geoenvironmental Site Assessment, Renaissance, Manchester, Reference:14-261-R2-1, dated 21st May 2021* (the 'E3P Phase 2 Assessment').
- *E3P, Phase 1 Geoenvironmental Site Assessment, Renaissance, Manchester, Reference: 14-261-R1-1, dated September 2020* (the 'E3P Desk Study').

The content of the SGA and other geo-environmental assessment reports is generally not reproduced herein, so the previous reports should be read in conjunction with the Remediation Strategy.

The most up-to-date geo-environmental risk assessment and conceptual site model (CSM) for the proposed development is presented in the SGA. The SGA describes the findings of the multiple phases of ground investigation carried out for the proposed



redevelopment. Based on the results of the investigations, the SGA assesses the extent of contamination and the risks to the proposed development, its users and the wider environment. The geo-environmental assessments include generic quantitative risk assessment (GQRA). Outline remediation recommendations are also provided in the SGA. This Remediation Strategy expands upon the outline remedial recommendations and provides a detailed specification of works.

The Remediation Strategy has been prepared in general accordance with the principles set out in *Land Contamination Risk Management* (LCRM) guidance, published by the Environment Agency on the UK Government website, and in the context of the *National Planning Policy Framework* (NPPF) and *The Building Regulations 2010, Approved Document C - Site preparation and resistance to contaminants and moisture (2004 Edition incorporating 2010 and 2013 amendments)*. On full implementation of the Remediation Strategy, including specified verification procedures and reporting, the objective is that land contamination risks will have been appropriately mitigated such that the site is suitable for the proposed use in accordance with the *NPPF*. The objective is also that after remediation the site will not be contaminated land as defined by *Part IIA, Environmental Protection Act 1990 (as amended)*.

The Remediation Strategy shall be considered by the Principal Contractor alongside all other relevant contract documents. The requirements of the Remediation Strategy and all other contract documents must be achieved in full.

It should be noted that where Local Authority is referenced herein, this may include the Local Planning Authority and / or Environmental Health Department under the Planning regime or Building Control Inspector in relation to Building Regulations requirements.

The Remediation Strategy can be issued to the Local Authority to support planning condition discharge for the proposed development (planning application reference 132088/FO/2021). Implementation of the works specified herein must not commence until the Local Authority has confirmed acceptance of the Remediation Strategy.

Should any changes be made to the proposed development compared to the details presented herein, or should any new information become available, then the Remediation Strategy must be reconsidered.

Specification of geotechnical, structural or landscape architect criteria is outside the scope of this report.



2. Site Description and Proposed Development

2.1. Site Location and Setting

The wider Renaissance site is located in the Central Retail District of Manchester City Centre. The site is roughly triangular in shape with Deansgate to the east, River Irwell to the west, Victoria Bridge Street to the north and Blackfriars Street to the south. The River Irwell is situated within man-made river walls.

The site is currently occupied by a 13-storey hotel, four-storey office building and multi-storey car park. There is an approximately 9.5m difference in ground level across the site between Deansgate and the River Irwell, with an existing retaining wall along the Deansgate side.

Further information on the environmental setting and ground conditions are presented in the SGA.

2.2. Proposed Development for the Application Boundary

The current office building and hotel are proposed to be partially demolished to enable the construction of a part ground and 26 storey, part ground and 13 storey building to form 300 no. residential apartments and ground floor retail/leisure floorspace, together with private amenity space for residents, new public realm to include riverside walkway and leisure/food and beverage space, new landscaping, parking, cycle parking spaces, servicing, supporting infrastructure and associated works. Further details are available on the local authority planning portal under reference number *132088/FO/2021*.

The ground floor level in the proposed building is at Deansgate level. Two lower levels are proposed, level -01 and level -02. The lower levels are above the level of the River Irwell and for land contamination assessment purposes do not form a basement. The 9.5m ground level difference between Deansgate and the River Irwell means the lower levels are still actually above-ground. Proposed floor plans are presented as Figure 2.1.

The proposed building is in the north of the application area. External landscaping, walkways etc. are in the south of the application area.

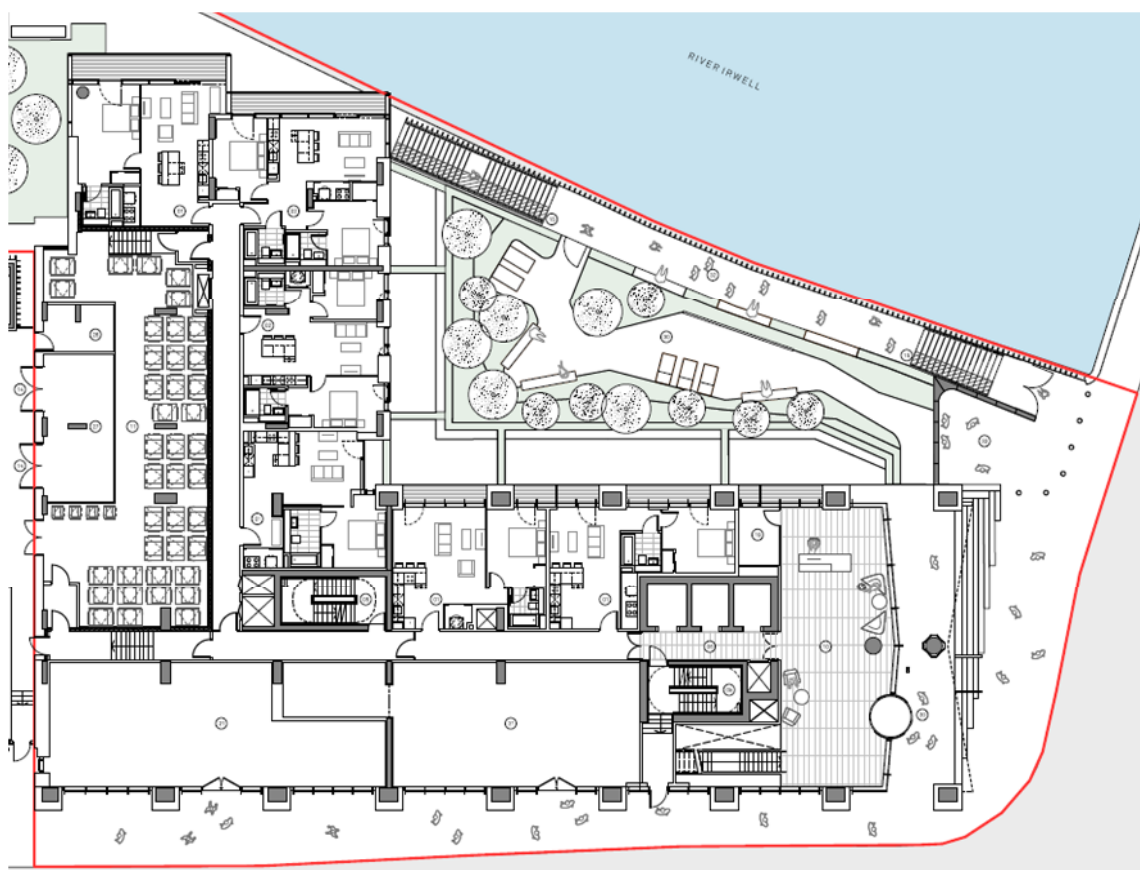


Figure 2.1a Proposed ground floor level

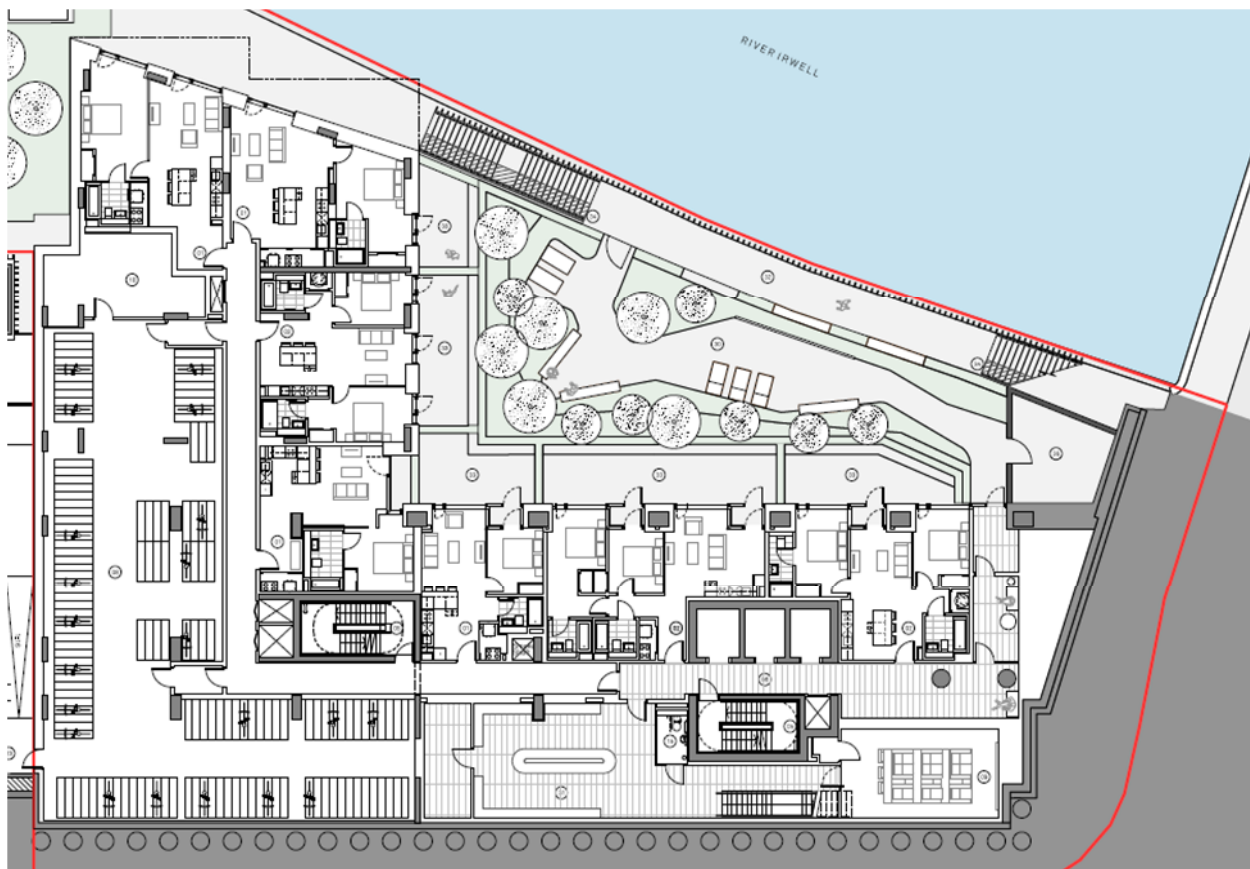


Figure 2.1b Proposed level -01

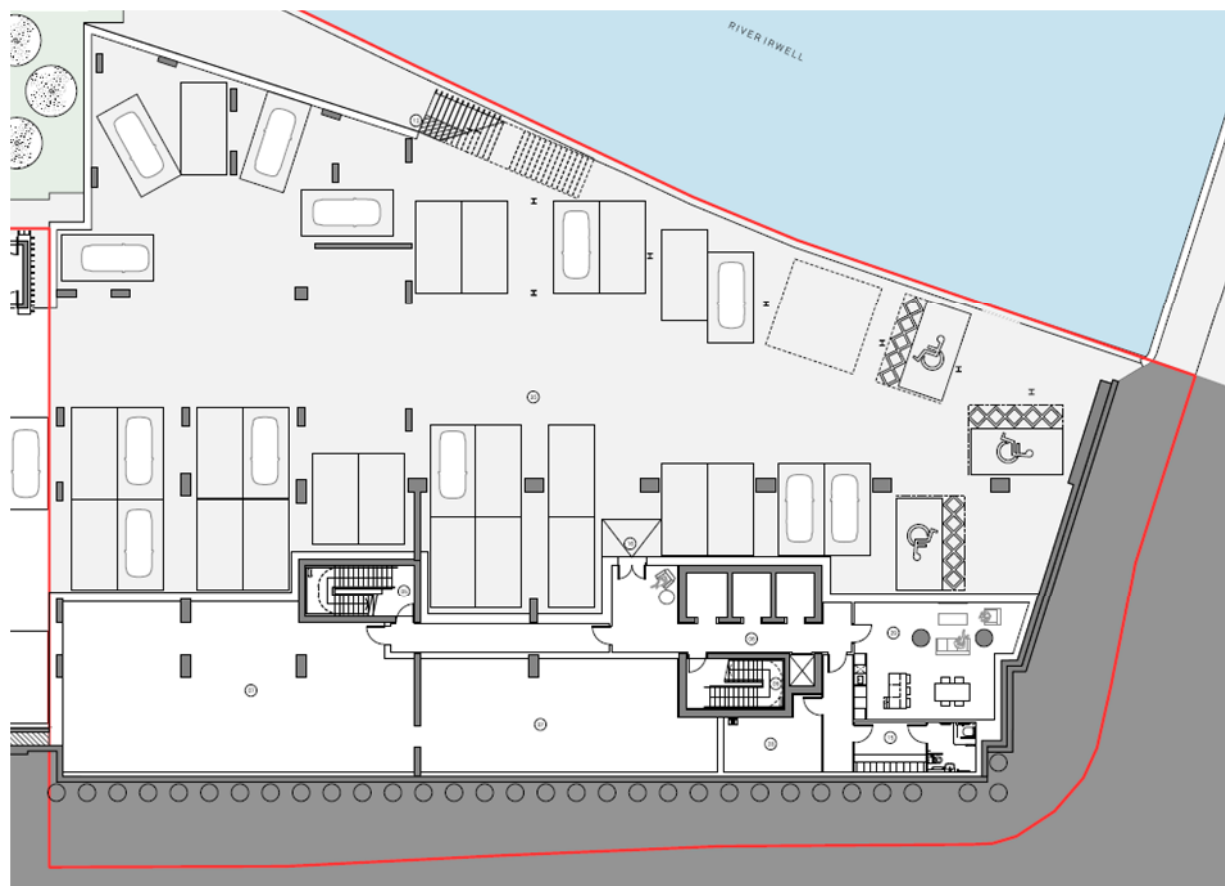


Figure 2.1c Proposed level -02



3. Geo-environmental Risk Assessment Summary and Outline Remediation Plan

It is understood that the proposed development across the wider site will proceed through the planning process as a number of separate applications. This Remediation Strategy has been prepared for the application area only.

Outline remedial recommendations for the entire site, as set out in the SGA, can be summarised as follows:

- Install clean cover in soft-landscaping proposed above in-situ soils. Imported soil for the clean cover shall be appropriately verified.
- Where soft-landscaping is to be constructed at a raised level (e.g. on a suspended deck), soil imported to the raised level shall be appropriately verified.
- Appropriate soil vapour protection shall be provided for the residential redevelopment.

The outline remedial recommendations for the entire site also included oversize clean service corridors in localised areas of the site, but as elaborated on below, these are not relevant for the application boundary.

The outline remedial recommendations are based on the latest CSM and geo-environmental risk assessment for the proposed development as presented in the SGA. The unacceptable risks requiring remediation are summarised in Table 3.1 which presents a summary risk assessment adapted from the SGA to reflect the application boundary only. The application boundary does not include TP104 and near vicinity where asbestos in soil has been detected, so oversize clean service corridors are not needed as part of this Remediation Strategy.

Table 3.1 Summary risk assessment for the application boundary prior to remediation

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Potential for Complete Pathway	Risk Level Classification
On-site	Direct contact	Proposed site end users	Yes (Unacceptable risk is present in areas of proposed soft-landscaping)	Low to moderate [†]
	Inhalation of windblown soil			
	Ingestion of impacted soil			
	Soil vapour generation and inhalation	Proposed site residential end users	Yes (Unacceptable risk has been identified for the residential development in the north of the site due to dissolved phase VOCs detected in shallow groundwater)	Low to moderate [†]
Off-site	Soil vapour generation, on-site migration and inhalation	Proposed site residential end users	Yes (Unacceptable risk has been identified for the residential development in the north of the site due to dissolved phase VOCs detected in shallow	Low to moderate [†]



Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Potential for Complete Pathway	Risk Level Classification
			groundwater which may be from an off-site source)	

† - unacceptable risk (ref. *LCRM*)

A detailed specification for delivering the remediation at the application boundary is provided as Section 4. In addition, the following shall be undertaken as part of the remediation (further details are provided in Section 4):

- Appropriate new water supply pipe shall be installed. The pipe specification shall be agreed between the Principal Contractor and utility provider. There may be no restrictions on the new water supply pipe construction that can be safely installed, but a full water supply pipe risk assessment and specification of requirements needs to be prepared.
- Unexpected contamination protocols shall be implemented.
- Piling shall proceed in accordance with the foundation works risk assessment (FWRA) included in the SGA.
- Management and decommissioning of monitoring standpipes shall be undertaken.



4. Detailed Remediation Strategy

Section 4 provides a detailed specification for the required remediation works in the application area. Verification measures are also described.

4.1. General Requirements

All remediation and verification requirements shall be implemented by the Principal Contractor. It is also the responsibility of the Principal Contractor to ensure that any required Materials Management Plans (MMPs), Qualified Person Declarations, Environmental Permits, Health and Safety Plans, RAMS, Discharge Consents and any other permits / consents / exemptions etc. relevant to the construction phase are obtained / approved to enable successful implementation of the specified remediation and verification measures.

Risks to site workers and the environment during the construction phase shall be appropriately managed by implementation of construction phase risk assessments and method statement (RAMS). The construction phase risks from potential land contamination shall be appropriately considered and mitigated by the Principal Contractor in their preparation and implementation of RAMS and construction phase plan (CPP).

All verification evidences shall be issued by the Principal Contractor to the project geo-environmental consultant. The project geo-environmental consultant shall collate the evidences issued by the Principal Contractor and prepare a Verification Report. The project geo-environmental shall attend the site for the clean cover layer verification, as specified later in detail.

4.2. Unexpected Contamination

If any unexpected contamination is encountered then the Principal Contractor shall safely stop works in the affected area and the project geo-environmental consultant shall be engaged to inform future works. The following shall be recorded by the Principal Contractor if unexpected contamination is encountered;

- Details of the unexpected contamination (including photographs).
- Mitigation measures to be employed (decided in collaboration with the geo-environmental consultant).
- Any deviations from the works specified in this Remediation Strategy.

All above records shall be provided to the project geo-environmental consultant preparing the Verification Report.

Examples of unexpected contamination are provided in Table 4.1.

Table 4.1 Example evidences of unexpected contamination

Evidence	Details
Visual	• Fuel or oil-like substances mixed in with or smeared on the soil or floating on perched groundwater. • Waste materials (refuse, barrels, industrial waste, ash or tar) buried on site. • Marked variations in colour (such as red, orange, yellow, green, light or dark blue) may indicate the presence of a range of contaminants. • Soils including large amounts of ash and clinker. • Asbestos containing materials (ACMs) or ACM fragments.
Odours	• Fuel, oil and chemical type odours including solvents. • Unusual odours such as sweet odours or fishy odours.
Wellbeing	• Feeling lightheaded or nausea when near excavations or at the working face of an excavation. • Burning of nasal passages, throat, lungs or skin. • Blistering or reddening of skin due to contact with soil.



4.3. Retention of Monitoring Standpipes and Decommissioning

Monitoring standpipes have been installed during the ground investigations and these shall be maintained and remain accessible until a time when they are no longer needed. An exploratory location plan including monitoring standpipe locations is provided as Appendix B.

The Principal Contractor is responsible for protecting the existing monitoring standpipes from damage during the construction phase and must repair any damage caused. It is recommended that each monitoring standpipe is physically protected, such as with a concrete drainage ring or similar, to reduce the chance of damage from construction plant movements or otherwise.

Once a time has been reached when the wells are no longer needed they shall be decommissioned by the Principal Contractor. A-squared recommend that decommissioning takes place after the SGA and this Remediation Strategy have been accepted by the Local Authority. The Principal Contractor shall undertake decommissioning by filling each monitoring standpipe with bentonite and cutting the standpipe below finished formation level after removing the headworks. The method for the decommissioning and the volume of bentonite used in each well shall be recorded. The Principal Contractor must ensure that no 'bridging' of the wells occurs during decommissioning so application of bentonite using a tremie pipe is recommended.

All decommissioning records shall be provided to the project geo-environmental consultant preparing the Verification Report.

4.4. Water Supply Pipes

A full water supply pipe risk assessment and specification for new water supply pipes shall be prepared by the Principal Contractor. The risk assessment and specification shall be accepted by the utility provider. The risk assessment must be completed by a suitably qualified professional and included in the Verification Report. Correspondence between the Principal Contractor and utility provider agreeing the pipe specification shall be included in the Verification Report along with documentation confirming the pipe specification actually installed and as-built diagrams for new water supply pipes.

As stated in Section 3 of this Remediation Strategy, the application boundary which is assessed in this report does not include TP104 or its near vicinity where asbestos was identified during the previous phases of work. All soil samples that underwent laboratory analysis within the application boundary did not have asbestos detected. For this reason, new underground services trenches should be backfilled with primary aggregate.

4.5. Materials Management

4.5.1. Construction Phase

Construction phase materials management should adhere to Section 4.1. The SGA and this Remediation Strategy shall be issued to the Principal Contractor to enable their implementation of suitable construction phase working procedures.

4.5.2. Permanent Works

It is the responsibility of the Principal Contractor to assess the suitability for use of any materials imported to site. Imported materials for the groundworks may fall into the following three general categories:

- **Imported Primary Aggregate** – There is no requirement to chemically validate these materials, but delivery documentation must be available (and included in the Verification Report) confirming the primary nature and origin of the materials.
- **Imported Secondary Aggregate** – Documentation must be available (and included in the Verification Report) from the supplier confirming material sources and that the materials have verifiable 'non-waste' status (suitable documentation would include evidence that the aggregate has been produced in accordance with *Wrap, Quality Protocol, Aggregates from Inert Waste, End of waste criteria for the production of aggregates from inert waste* with appropriate verification testing results available in accordance with the supplier's Factory Production Control manual or other documented QA / QC procedures);



- **Imported Soil** – Soil import is only required for the construction of clean cover and raised soft landscaping (e.g. on a suspended deck). The specific protocols for these activities are specified separately in Section 4.6 and Section 4.7.

It is understood that no bulk earthworks including significant excavation and placement of soil and / or aggregate is to be undertaken, so on this basis an MMP in accordance with the *CL:AIRE Definition of Waste Code of Practice* for use of site-won materials is not required. Should bulk cut and fill earthworks need to be undertaken then A-squared must be contacted so that we can update the Remediation Strategy and specify appropriate measures to be implemented.

Should evidence of unexpected contamination be identified during the project (see specific details in Section 4.2) then any excavated soils from the impacted area must be kept separate from other soils to prevent cross-contamination until a means of onward management has been determined. On-site storage and management shall include maintaining segregation of the excavated soil by placing it on a membrane and covering with a suitable liner. Suitable management and containment of any liquids / leachate must also be provided. The stockpile(s) shall also be clearly marked using signage.

It is recommended that any imported primary aggregate or secondary aggregate is recorded within an Earthworks Plan including stockpile referencing and clearly identified areas of permanent placement cross-referenced with the soil sample names.

4.6. Clean Cover Layer

Topsoil and subsoil shall be used to construct a clean cover layer in proposed soft-landscaping areas where Made Ground remains in-situ immediately beneath i.e. at level -02.

No clean cover layer is required within proposed building footprints, where there are areas of external hardstanding, or where no Made Ground remains in-situ following redevelopment.

The specific areas where a clean cover layer is required are identified by the green coloured areas on Figure 4.2.



Figure 4.2 Locations where clean cover shall be installed at level -02 (marked in green)



The clean cover layer shall be formed at the ground surface and be at least 600 mm thick and have a continuous high-visibility marker-layer at the base, such as a layer of orange woven terram. The high-visibility marker layer is to indicate a no-dig zone for the operational phase of the proposed development. A conceptual cross-section of the clean cover layer is provided as Figure 4.3.

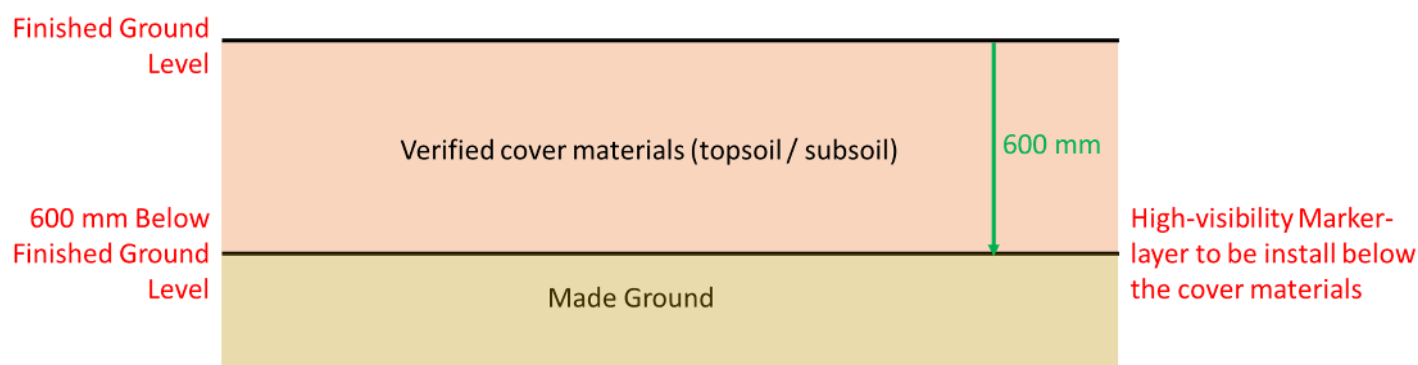


Figure 4.3 Clean cover layer conceptual cross-section

The clean cover layer shall be constructed from suitable topsoil and subsoil imported from off-site. The soils to be used in the clean cover layer must be subjected to the below verification regime delivered by the Principal Contractor:

- An as-built topographical survey shall be carried out prior to and after placement of the clean cover layer to show that the installed extents and thicknesses are as required. Topographical survey drawings must be produced showing; placement area footprints, 'base of cover layer / marker-layer' elevation and 'top of cover layer' elevation;
- Photographs shall be captured showing the relevant thicknesses and form of materials included in the construction of the clean cover layer utilising trial pits on a 20 m x 20 m grid basis, or minimum 7 no. trial pits across the site, whichever is greater. A photograph with tape measure showing thickness must be captured at each trial pit. A trial pit location plan must also be produced. The project geo-environmental consultant shall be in attendance during the trial pitting and shall agree the trial pit locations with the Principal Contractor; and
- Chemical laboratory verification testing must be undertaken by the Principal Contractor to demonstrate that the Site Acceptance Criteria (SAC) (see Appendix A) have been achieved for the clean cover layer at a minimum frequency of 1 sample per 100 m³, or 3 no. total samples per source of material, whichever is a greater number of samples. Topsoil and subsoil must be sampled separately as different sources of material. The laboratory certificates of analysis must be retained. It is preferable for the chemical analysis to be undertaken prior to soil import, so that any exceedances of the SAC can be more easily addressed.

The Principal Contractor shall provide all records from the above verification regime to the project geo-environmental consultant.

Once a potential source(s) of soil for the clean cover is identified, the project geo-environmental consultant shall be engaged to advise on compliant import and use of the soil, and to check the SAC are suitable for the proposed soil. An MMP, waste exemption or regulatory position statement may need to be followed.

The Principal Contractor shall be aware that there may also be landscape architect requirements relevant to the proposed soft-landscaped areas. Landscape architect requirements shall also be fully met when constructing the clean cover layer. In the absence of any landscape architect requirements, the clean cover layer shall comprise an upper layer of topsoil (minimum 150mm thickness) overlying a base layer of topsoil or subsoil to achieve the total minimum clean cover thickness of 600mm.



4.7. Import of Soil for Raised Soft-landscaping

Where soft-landscaping is to be constructed at a raised level (e.g. on a suspended deck) the topsoil and / or subsoil imported to site must be verified by the Principal Contractor as follows:

- The volumes of the different soil types (topsoil and subsoil) imported from different suppliers shall be recorded.
- Chemical laboratory verification testing must be undertaken by the Principal Contractor to demonstrate that the SAC (see Appendix A) have been achieved for the imported soil at a minimum frequency of 1 sample per 100 m³, or 3 no. total samples per source of material, whichever is a greater number of samples. Topsoil and subsoil must be sampled separately as different sources of material, as must soils imported from different suppliers. It is preferable for the chemical analysis to be undertaken prior to soil import, so that any exceedances of the SAC can be more easily addressed. The laboratory certificates of analysis must be retained.

The Principal Contractor shall provide all records from the above verification regime to the project geo-environmental consultant.

Once a potential source(s) of soil is identified, the project geo-environmental consultant shall be engaged to advise on compliant import and use of the soil, and to check the SAC are suitable for the proposed soil. An MMP, waste exemption or regulatory position statement may need to be followed.

The Principal Contractor should be aware that there may also be landscape architect requirements which are relevant to the proposed soft-landscaping areas. Landscape architect requirements must be fully met.

4.8. Vapour Protection

The SGA indicates that vapour protection is required for the new lift pits and stairwells to be constructed in the application area at level -02. A detailed specification of the vapour protection is provided below. The areas to be afforded vapour protection are identified on Figure 4.4. The vapour protection shall comprise a vapour resistant membrane along with the secondary structural protection inherent to the structural design of the concrete floors and slabs of the new building.

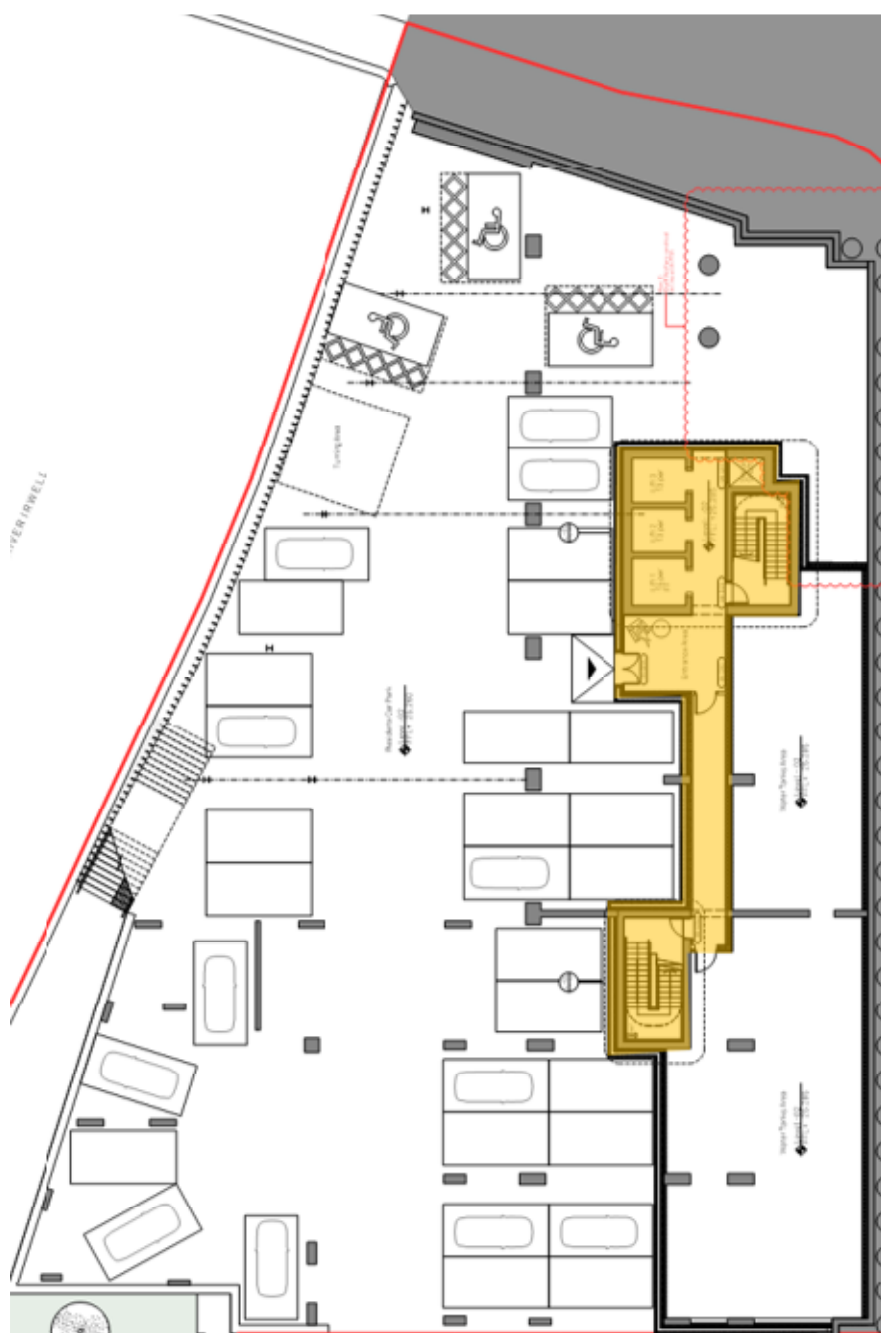


Figure 4.4 Areas to be afforded protection from vapours (marked in orange)

A vapour resistant membrane shall be provided by the Principal Contractor in accordance with the below specification:

- The membrane shall be resistant to the following vapours; trichloroethylene, tetrachloroethylene, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, 1,1-dichloroethylene and vinyl chloride.
- The membrane shall be selected, designed, installed and verified in accordance with the latest versions of *BS8485*, *Ciria C716* and *Ciria C748*.
- The membrane shall be sufficiently durable to remain serviceable for the anticipated life of the building. Test data for the chosen membrane shall confirm its chemical, puncture and tear resistance in accordance with Table A6.3 of *Ciria C716*.
- The membrane shall be capable, after installation, of providing a barrier to significant passage of the identified vapours into the proposed building(s).



- The membrane shall be installed across the entire ground floor slab where needed to afford protection for the required areas, and detailing of the membrane / foundation interfaces shall be in accordance with *BS8485*.
- Verification of the membrane shall comply with good practice verification procedures at set-out in *CIRIA Report C735*. Lines of evidence shall be produced to confirm the detailed design procedure and installation has been completed in-line with current good practice.
- The membrane shall be independently verified and have appropriate quality control testing and documentation provided by the installation contractor. Quality control data for the membrane shall include details of seam method, air temperature record for each day, trial weld details (if welding) and subgrade acceptance. All areas of the membrane shall be inspected by the verifier with leak testing of seams and penetration where appropriate.
- Verification reporting shall be in accordance with Section 5 of *CIRIA Report C735*. This shall include the completion of sign-off / inspection records detailing the site areas inspected, quality of workmanship, membrane type, membrane detailing, integrity testing methods, non-conformance and repairs, high resolution photographs and any matters requiring further investigation and / or rectification.
- The membrane can wrap down the sides of any pile caps and a high-strength liquid waterproofing layer be applied at the joint between the concretes (see Figure 4.5).

The Principal Contractor is responsible for engaging vapour membrane specialists to select, design, install and verify an appropriate membrane in accordance with the specification above.

Evidence that the membrane has been successfully designed, installed and verified, including design documents and verification reporting in accordance with *CIRIA Report C735*, shall be provided by the Principal Contractor for the project geo-environmental consultant to include in the Verification Report.

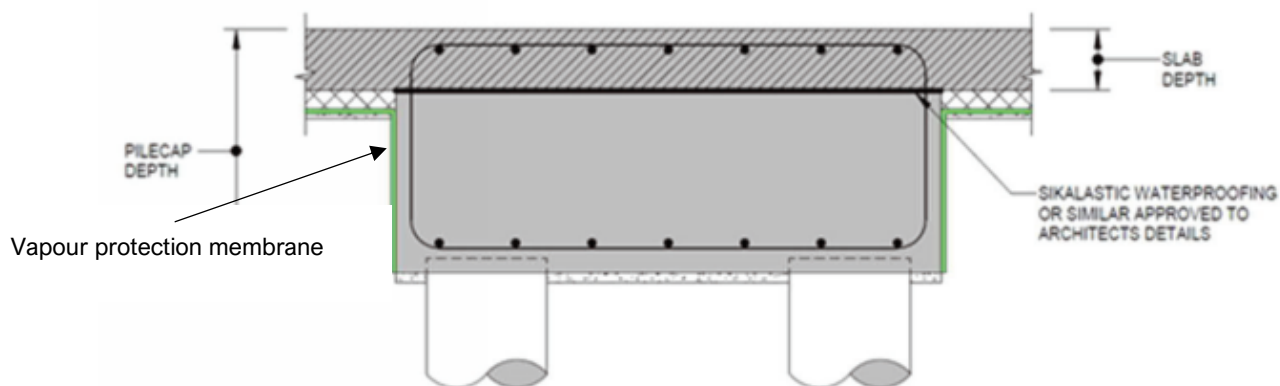


Figure 4.5 Indicative pile cap detailing

4.9. Waste

Where materials are geotechnically or geo-environmentally unsuitable for reuse within the proposed redevelopment they shall be either sent to an off-site Waste Recovery Facility or to a suitably licensed waste disposal facility. The Principal Contractor is responsible for characterising all wastes generated in accordance with the Landfill Directive, Landfill Regulations, Waste Regulations and the Hazardous Waste Regulations, current and applicable at the time of works. The Principal Contractor shall ensure that no mixing of generated wastes occurs and that no cross-contamination of waste streams occurs. Where practicable and cost effective, materials requiring off-site disposal should be selected and pre-treated to minimise waste volumes and to reduce the volume of Hazardous waste.



The Principal Contractor will be responsible for liaison with waste disposal operators and to compile a complete chain of custody in addition to complying with current waste legislation and regulation. The Principal Contractor shall collate documentary evidence to demonstrate their compliance with the duty of care arising with regards to waste legislation, including:

- Waste management licenses or exemptions;
- Completed Waste Transfer Notes;
- Completed Hazardous Waste Consignment Notes; and
- Certificate of Registration for Registered Waste Carriers.

There are no requirements for the Principal Contractor to provide evidences in relation to waste for the site Verification Report. However, the Principal Contractor could comply with this Section 4.9 to assist their management of waste.

Protocols for managing excavated Made Ground for the construction of clean service corridors around TP104 of the wider site (not within the application boundary) and for managing unexpected contamination which has been excavated, are set out in Section 4.2 and Section 4.5.

4.10. Monitoring and Maintenance

There are no long-term monitoring and maintenance requirements beyond the verification procedures defined herein.

It is recommended that this Remediation Strategy and the future site Verification Report are considered by those preparing the Health and Safety file for the operational phase of the proposed development.

Risks to site workers and the environment during the construction phase can be appropriately managed by successful implementation of construction phase RAMS, which may include some monitoring protocols. The construction phase risks from potential contamination shall be appropriately considered and mitigated by the Principal Contractor in their preparation and implementation of construction phase RAMS and CPP.

4.11. Piling

It is understood that the proposed development includes construction of piled foundations and also a piled wall in the northeast of the site from the Deansgate level. Construction of piles shall be undertaken in accordance with the FWRA included in the SGA.



5. Verification Plan (Verification Summary)

The following bullet-points provide a brief summary of the verification evidences to be prepared by the Principal Contractor and provided to the project geo-environmental consultant (as described in detail in Section 4):

- Records of any unexpected contamination encountered and dealt with in accordance with Section 4.2;
- Records of monitoring well decommissioning undertaken as per Section 4.3;
- Water supply pipe risk assessment and verification records as per Section 4.4;
- Materials management records in accordance with Section 4.5;
- Detailed verification records for the clean cover installation in accordance with Section 4.6;
- Verification records for soils imported and placed in raised soft-landscaping areas as per Section 4.7; and
- Evidence that the vapour membrane has been successfully designed, installed and verified in accordance with the specification presented in Section 4.8.

The Principal Contractor must supply the required verification evidences to the project geo-environmental consultant who will then prepare the Verification Report.

Please be aware that the Remediation Strategy includes information to assist construction site health and safety management, waste classification and piling. This is provided for information purposes but does not incorporate formal verification requirements to demonstrate suitability for use in accordance with the *NPPF*.



6. Proposed Conceptual Site Model (CSM) for the Remediated Site

Table 6.1 provides a summary of how the remediation works specified herein address the unacceptable risks identified following ground investigation (as summarised in Section 3).

Table 6.1 Remediated site conceptualisation

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Summary Remediation To Be Undertaken
On-site	Direct contact	Proposed site end users	Installation and verification of clean over at level -02. Verification of soil to be placed in raised soft-landscaped areas.
	Inhalation of windblown soil		
	Ingestion of impacted soil		
	Soil vapour generation and inhalation	Proposed site residential end users	Installation and verification of vapour protection for sensitive areas of the residential redevelopment.
Off-site	Soil vapour generation, on-site migration and inhalation	Proposed site residential end users	Installation and verification of vapour protection for sensitive areas of the residential redevelopment.



7. Final Remarks

A-squared have been appointed by Property Alliance Group Ltd to prepare this Remediation Strategy for the proposed development. The Remediation Strategy has been prepared to enable suitable mitigation of unacceptable risks due to potential land contamination in the application area. Detailed remediation and verification measures are presented.

On full implementation of the Remediation Strategy, including specified verification procedures and reporting, it is considered that that the identified land contamination risks will have been appropriately mitigated such that the application area is suitable for the proposed use in accordance with the *NPPF*. After remediation the application area will also not be contaminated land as defined by *Part IIA, Environmental Protection Act 1990 (as amended)*.

The Remediation Strategy can be issued to the Local Authority to support the proposed development through the planning process.

Appendix A: Site Acceptance Criteria (SAC)

Site Acceptance Criteria (SAC) for the clean cover layer and raised soft-landscaping are presented in Table A. To be acceptable, materials must be shown to have chemical concentrations below or equal to the SAC for all determinants listed in Table A. Please see the Notes at the base of Table A as these are important.

If import of soils is required for other reasons, for example as general fill to achieve a cut and fill balance, then A-squared must be notified as the Remediation Strategy and SAC will need to be updated prior to import commencing.

All SAC have been selected based on the risk assessments presented in the SGA (i.e. selected based on available human health Generic Assessment Criteria for the 'residential without home grown produce' land-use scenario and 1% soil organic matter). For imported materials each SAC has been limited to a maximum of 1,000 mg/kg as a precautionary measure.

All soils must also meet any relevant landscape architect specification and achieve all project geotechnical requirements.

Table A **Verification SAC**

Determinant	Concentration in Soil Imported from Off-site (mg/kg)
Asbestos	No asbestos detected (free fibres or ACMs including microscopic occurrences and those visible to the naked eye) (a positive detection below the laboratory limit of quantification (e.g. <0.001 % w/w asbestos) is considered an asbestos detection)
Arsenic	40
Cadmium	150
Chromium III	910
Copper	1,000
Lead	310
Mercury	15
Nickel	130
Selenium	430
Zinc	1,000
Hexavalent Chromium	21
Acenaphthene	1,000
Acenaphthylene	1,000
Anthracene	1,000
Benzo(a)anthracene	11
Benzo(a)pyrene	5.3
Benzo(b)fluoranthene	3.9
Benzo(g,h,i)perylene	360

Determinant	Concentration in Soil Imported from Off-site (mg/kg)
Benzo(k)fluoranthene	110
Chrysene	30
Dibenzo(a,h)anthracene	0.31
Fluoranthene	1,000
Fluorene	1,000
Ideno(1,2,3-cd)pyrene	45
Naphthalene	2.3
Phenanthrene	1,000
Pyrene	1,000
Total PAH (use EPA16 suite)	1,000
Benzene	0.89
Toluene	880
Ethylbenzene	83
Total xylenes	79
Aliphatic C5-6	42
Aliphatic C6-8	100
Aliphatic C8-10	27
Aliphatic C10-12	130
Aliphatic C12-16	1,000
Aliphatic C16-35	1,000
Aliphatic C35-44	1,000
Aromatic C5-7	370
Aromatic C7-8	860
Aromatic C8-10	47
Aromatic C10-12	250
Aromatic C12-16	1,000
Aromatic C16-21	1,000
Aromatic C21-35	1,000
Aromatic C35-44	1,000

Determinant	Concentration in Soil Imported from Off-site (mg/kg)
Total TPH C5-44 (use TPHCWG methodology)	1,000

Note – frequency of sampling is to be as indicated elsewhere the Remediation Strategy.

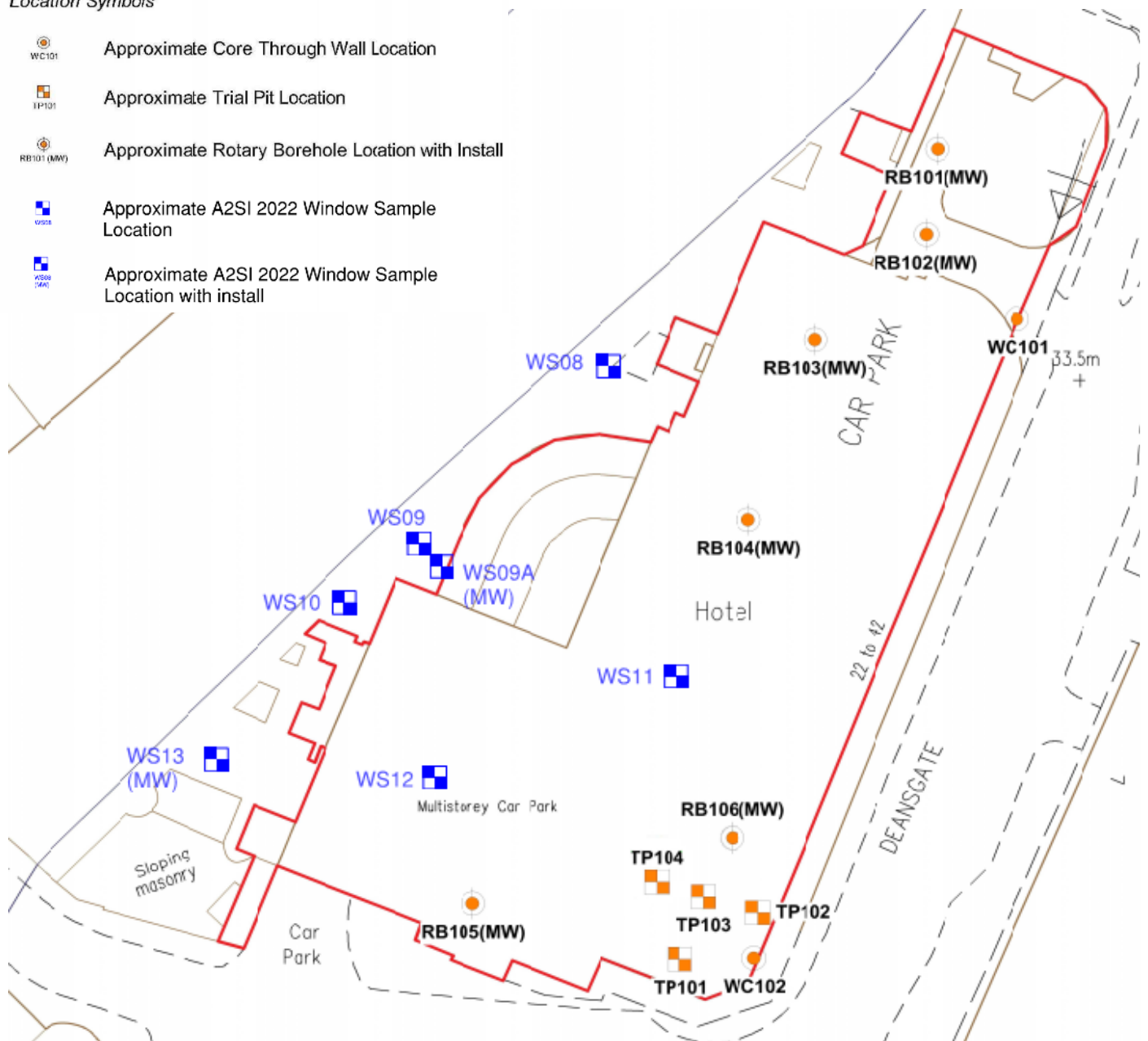
Note – source suitability for any soils imported from off-site shall be confirmed by the project geo-environmental consultant prior to import. For certain sources, additional testing and verification may be required.

Note – all laboratory testing shall be undertaken in accordance with ISO17025 by a UKAS accredited laboratory.

Appendix B: Monitoring Well Location Plan

Location Symbols

-  WC101 Approximate Core Through Wall Location
-  TP101 Approximate Trial Pit Location
-  RB101 (MW) Approximate Rotary Borehole Location with Install
-  WS08 Approximate A2SI 2022 Window Sample Location
-  WS08 (MW) Approximate A2SI 2022 Window Sample Location with install



(MW) = monitoring well present



A-squared Studio

