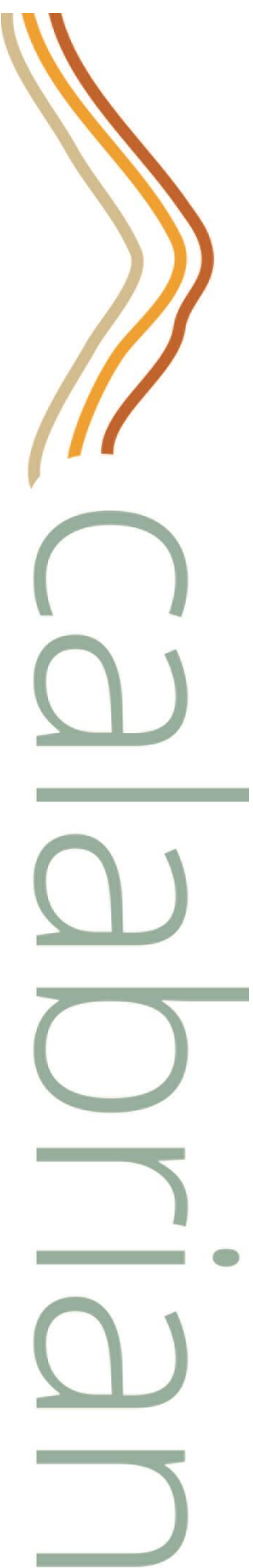


Geotechnical Engineering | Geoenvironmental Consultants



**REMEDIATION STRATEGY &
VERIFICATION PLAN**

for land at

**BLOCK B ONE MEDLOCK STRET,
MANCHESTER, M15 5FJ**

Prepared on behalf of Dominus

Report 7251/2A

February 2024

FOREWORD (Geoenvironmental Investigation Report)

This report has been prepared for the sole internal use and reliance of the Dominus. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Calabrian Limited (Calabrian); such authorisation not to be unreasonably withheld. If any unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill.

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The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from a variety of sources as detailed within this report, and which Calabrian believes are reliable. All reasonable care and skill has been applied in examining the information obtained. Nevertheless, Calabrian cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

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APPENDIX B	VISUAL INSPECTION OF GAS PROTECTION MEASURES

1 INTRODUCTION

1.1 THE COMMISSION AND BRIEF

Calabrian Limited (Calabrian) has been commissioned by Dominus to prepare a Remediation Strategy for land at Block B, One Medlock Stret, Manchester, M15 5FJ.

In preparing this report Calabrian have referred to the following reports previously prepared for the wider development site:

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The appointed Contractor will need to familiarise themselves with the above Reports and comply with all relevant recommendations contained therein.

This document outlines the remediation objectives necessary to protect environmental receptors and render the site suitable for the proposed development. A Method Statement should be prepared, in order to detail how the objectives will be achieved.

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1.2 THE PROPOSED DEVELOPMENT

It is proposed to demolish the existing hotel building and structures and redevelopment the site with office uses and flexible office/community use, along with associated ancillary internal and external amenity space, hard and soft landscaping, and associated highway works. Drawing 2072-PLA-XX-XX-DR-L-0003 details the wider site redevelopment proposals.

The building will be founded on bored piles.

The Local Planning Authority (LPA) has granted planning permission for redevelopment of this site. Condition 43a is associated with remediation as follows:

Condition 43a

- a) *Prior to the commencement of development within the Block B phase, a report (the Preliminary Risk Assessment) to identify and evaluate all potential sources and impacts of any ground contamination, groundwater contamination and/or ground gas relevant to that phase shall be submitted to and approved in writing by the Local Planning Authority. The Preliminary Risk Assessment shall conform to the current guidance document (Planning Guidance in Relation to Ground Contamination).*

In the event of the Preliminary Risk Assessment identifying risks, which in the written opinion of the Local Planning Authority require further investigation, the Phase shall not commence until a scheme for the investigation and the identification of remediation measures (the Site Investigation Proposal) has been submitted to and approved in writing by the Local Planning Authority.

The measures for investigating the site Phase identified in the Site Investigation Proposal shall be carried out, before the Phase commences and a report prepared outlining what measures, if any, are required to remediate the land (the Site Investigation Report and/or Remediation Strategy), which shall be submitted to and approved in writing by the Local Planning Authority.

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Investigation Report and/or Remediation Strategy), which shall be submitted to and approved in writing by the Local Planning Authority.

Correspondence with the LPA contaminated land team has yielded the following comments with specific regards to Block A. Points i, iii, and iv likely also apply to Block B:

- i. Submission of the calibration certificate(s) for the gas monitoring equipment to cover the whole period of monitoring.*
- ii. Submission of the post demolition Site Investigation and Risk Assessment Report*
- iii. Submission of a Remediation Strategy*
- iv. After completion of site works, a verification report is required to validate that the work undertaken conforms to the remediation proposals received and agreed by this Section.*

This report provides the Remediation Strategy required by Condition 43 including a verification plan that will be required to satisfy point iv. and a design for the post demolition site investigation and risk assessment noted in point ii.

2 BACKGROUND

2.1 SITE DESCRIPTION

Details of the site are given below:

- Location: 450m south-west of Manchester Oxford Road railway station.
- National Grid Reference: SJ 837 972.
- Nearest Postcode: M15 5FJ.
- Area: 0.35 hectares (approximately).

The site (BLOCK B) currently comprises a hotel.

2.2 GROUND INVESTIGATION

Ramboll designed the ground investigation which was undertaken by Enygo on the wider site between in May and June 2019. The ground investigation was also undertaken for geotechnical purposes. The ground investigation comprised six rotary boreholes, six windowless sampling boreholes, three trial pits along with five plate load tests. This was supplemented by gas/groundwater monitoring along with geotechnical and contamination laboratory analysis.

Made Ground

Beneath a general surface covering of asphalt made ground was encountered across the site to depths ranging from 0.45m to 5.2m depth and generally comprising granular material.

Natural Ground

Natural ground comprised a laterally variable mix of glacial sand and clay to depths of between 7.5m to 11.0m depth where Chester Formation sand and sandstone was encountered.

Groundwater

Groundwater seepages were not encountered in any of the exploratory holes on site.

Hazardous Gas

Carbon dioxide and methane concentrations were generally below the 5% and 1% respective thresholds for a CS1 classification, with the exceptions of elevated concentrations for methane within BH5 and elevated methane and carbon dioxide concentrations within WS2.

The site has been classified as Characteristic Situation CS2 in accordance BS8485:2015+A1:2019.

Contamination

No concentrations of any contaminants were found above the Ramboll Generic Assessment Criteria (GAC).

A trace of asbestos fibres (<0.001% by volume) were identified within WS05; however, this area of the site will be isolated beneath the proposed building and will not present a risk to users of the site.

Constraints

Due to the presence of the existing hotel site investigation in that area was not possible.

3 RISK ASSESSMENT & TARGET CONCENTRATIONS

Clean-up criteria relevant to the limited contamination encountered at this site are not driven by risks to controlled waters, therefore in the absence of a site-specific Quantitative Risk Assessment, it is conservatively proposed that Ramboll's' Generic Assessment Criteria values be adopted as remedial targets for hydrocarbon contamination in soils on this site.

4 REMEDIATION STRATEGY (GENERAL)

4.1 AIMS

Remediation aims are to:

- Resolve contamination issues in order to protect environmental receptors and render the site suitable for the proposed development;
- provide a stable development platform (to agreed levels and gradients) for subsequent construction of the proposed development and associated infrastructure; and,
- satisfy requirements of the Local Planning.

4.2 OVERVIEW

The following remediation works are required:

- General site clearance of surface materials and vegetation;
- demolition of buildings;
- break-up of hardstand and crushing of all suitable artificial hard material (ie. concrete/brick etc);
- installation of gas protection measures in accordance with BS8485:2015+A1:2019 for a Characteristic Situation CS2 classification (as Block B); and,
- provision of an appropriate cover of 'clean' soils within landscaped areas (likely minimum 300mm thick amenity growing layer, as Block B).

5 REMEDIATION STRATEGY (SPECIFIC OBJECTIVES)

5.1 CONTINGENCY FOR UNKNOWNNS

Even after an appropriate preliminary investigation and ground investigation, with exploratory holes on a closely spaced grid (say trial pits at 30m centres), a geoenvironmental appraisal is typically based on inspection of the ground underlying less than 0.5% of the total site area (and much less at depths in excess of about 3.5m). Consequently, there is always a possibility that unanticipated ground conditions will be encountered during the remediation works.

If unanticipated ground is encountered during the remediation works, the Contractor should immediately seek further advice from the Engineer.

Where appropriate any unanticipated grossly contaminated soil/fill should be placed in temporary stockpiles on hardstand or Visqueen, suitably covered and bunded.

Analysis of at least six samples, for an appropriate range of determinands should be undertaken. On receipt of the results, the Engineer will liaise with the Contractor regarding the most appropriate remediation option.

5.2 SITE CLEARANCE

Any trees currently under a Tree Preservation Order (TPO) should be identified and agreed with relevant authorities prior to the commencement of the works. All trees subject to a TPO should be clearly identified and protected by fencing in accordance with BS5837: 2012.

The site should then be cleared of all residual debris, any vegetation, shrubs, bushes, and unprotected trees as instructed by Dominus.

5.3 ASBESTOS

Current legislation (as outlined in HSG 264) requires a pre-demolition (formerly Type 3) asbestos survey to be undertaken, immediately prior to demolition of any building. The Contractor should request a copy of the survey report from Dominus or the Engineer. If no survey report is available, the Contractor will instruct an asbestos survey.

5.4 DEMOLITION

Demolition works will commence on completion of an asbestos removal and a "soft-strip" of the existing buildings.

Existing buildings will be demolished in a safe and controlled manner.

All demolition operations should conform to BS 6187:2000 Code of Practice for Demolition. All personnel working on these operations should be fully qualified to do so.

A detailed Method Statement specific to the project must be prepared by the Contractor and submitted to Dominus. The Method Statement should also be submitted to, and approved by, the Engineer and the Local Authority.

Once buildings have been demolished, all surface hardstand and floor slabs should be grubbed-up and stored on site, prior to crushing. Any unsuitable materials should be removed to a suitably licensed landfill site.

5.5 SUPPLEMENTARY GROUND INVESTIGATION

On completion of the demolition and hardstand grubbing-up, the Engineer will supervise the excavation of trial pits on a 30m grid spacing beneath the former building. All pits will be excavated to at least 2.5m depth (from proposed final levels) and where practical penetrate into natural ground.

Representative soil/fill samples will be taken by the Engineer. The number of samples taken will be reflective of the fill/geological complexity actually encountered. However, in general about three samples will be taken from most pits.

Selected samples will be sent to a suitably accredited laboratory and scheduled for appropriate chemical analysis (likely to comprise asbestos identification, heavy metals, speciated PAH and speciated TPH). Analysis for other determinands may be appropriate and will be requested by the Engineer, as necessary.

The investigation will be undertaken in general accordance with current UK guidance (most notably BS10175:2011). The soils encountered during this investigation will be logged in general accordance with BS 5930:2015+A1:2020.

5.6 CONTROL OF WATER

Groundwater should be controlled in accordance with CIRIA report 113 “Control of Groundwater for Temporary Works”.

Arrangements should be made to prevent ponding in any excavation “hollows”; the Contractor should ensure that ground levels are of sufficient gradient to enable the collection of surface water run-off in sumps or grips.

Pumping from over-excavated sumps may be required to maintain satisfactory working conditions.

Any potentially contaminated water should not be allowed to escape to other areas until the results of the analysis are available and, if required, a suitable means of water treatment has been agreed.

5.7 REMOVAL OF BELOW GROUND OBSTRUCTIONS

Any foundations associated with former buildings and other relict structures will be chased out and grubbed-up, in order to remove potential obstructions to new foundations and infrastructure.

Where relict structures are found to retain fluid contaminants, they should be drained first. The drained fluids should be stored in appropriate, sealed tanks/containers and analysed for a range of determinands to be agreed with the Engineer. Fluids may then be tankered off-site, or be discharged to sewer, subject to analytical results and local water treatment company consent.

Deep excavations for the removal of structures etc will be unstable in the short term and continuous side support will be necessary.

Where significantly deep foundations (eg. piles) cannot be removed by conventional means, they are to be cut at a depth to be agreed with the Engineer and the position of the remaining lower section is to be accurately recorded by survey.

Suitable materials derived from grubbing-up should be stored in a location on site, to be agreed with the Engineer, prior to crushing. Any unsuitable materials should be removed to a suitably licensed landfill site.

5.8 CRUSHING

Production of a selected granular fill should be possible if suitable materials (generated by demolition operations and grubbing-up of floor slabs, foundations, and other relict structures) are crushed.

The crushed product should be screened to remove any unsuitable elements and stockpiled for re-use during the subsequent construction works. Generation of a Class 6 material as defined in the Highways Agency Specification (Series 600) should be possible.

6F2 graded material can contain up to 50% recycled tarmac/asphalt (provided it does not pose a contamination risk to controlled waters). Recycled tarmac can be crushed to yield a 6F3 selected granular material, provided the recovered bitumen content is less than 10% (determined in accordance with BS598-102).

5.9 BOUNDARY ISSUES

Dominus's Designer should ensure that proposed levels tie in with the surrounding infrastructure, and ground levels of adjacent properties (after allowance for the placement of any required soil cover).

Advice should be sought from the Engineer if mobile contamination is encountered close to the site's boundaries.

5.10 EXPORT TO LANDFILL

Excavation arisings that are unsuitable for retention and re-use on site should be placed in temporary stockpiles on hardstand or polythene sheeting and be suitably covered to minimise the potential for dust/odour nuisance and prevent surface water run-off.

Any material exported from site to landfill should be hauled by a registered waste carrier in accordance with the requirements of the Duty of Care Regulations, 1991 and the Landfill (England & Wales) Regulations 2002.

A transfer note should be completed, signed, and retained by the parties involved. The transfer note should include the volume of waste, the nature of the material and a statement of its chemical composition, details of the source and destination sites, and details of the haulier.

5.11 PLACEMENT OF SOIL COVER

Following completion of the supplementary post-demolition site investigation and risk assessment it is likely that clean inert soil will be placed over the made ground in proposed garden and landscaped areas (but not beneath hardstanding). Ramboll UK Limited stated that this cover layer would likely to comprise a 300mm thick amenity layer of “clean” subsoil/topsoil. However, Manchester City Council within their ‘Planning & Contaminated Land – Technical Guidance’, dated February 2021 require the following minimum growing medium depths:

Vegetation Type	Rooting Depth (mm)
Grass	450
Plants	450
Shrubs	600
Trees	900

Any material imported for use as cover should be validated in accordance with Calabrian’s Protocol for Soil Importation, copied in Appendix A. This Protocol includes chemical assessment criteria which should not be exceeded.

5.12 HAZARDOUS GAS PROTECTION

Based on the site characterisation discussed above, the proposed foundation solution, and with reference to the gas protection “scoring” system outlined in BS 8485:2015 + A1:2019 for Building Type B¹, Calabrian consider that the following protective measures should be incorporated in all new structures:

Characteristic Situation (Wilson & Card, 1999)	Gas “score” req’d by BS 8485	Protective Measures		
		Floor Slab (BS8485 “score”)	Sub-floor ventilation (BS8485 “score”)	Membrane Type (BS8485 “score”)
2	3.5 (Type B)	‘Beam and Block’ segmental suspended subfloor – (0). Reinforced ground bearing slab – (0.5). Reinforced, cast in-situ suspended slab (well reinforced with minimal service penetrations & water bars around all slab penetrations & at joints) – (1.5). Basement floor and walls conforming to BS8102:2009, Grade 2 waterproofing – (2.0). Basement floor and walls conforming to BS8102:2009, Grade 3 waterproofing – (2.5).	Layer of low permeability and/or is not terminated in a venting trench (or similar). (0) Pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building) - (0.5). For smaller commercial units, passive sub-floor ventilation; venting layer could be: i. A min. 200mm clear void (2.5), or ii. A proprietary void former (expanded polystyrene shuttering) providing an equivalent clear void depth of 60mm (2.5), or iii. Min. 300mm thick blanket of 20mm single size gravel, not MOT Type 1 (0.5). Min. ventilation = 2,500 mm²/m run of external wall (via air bricks on each of 2 opposite sides), with 100mm pipes at 2m centres or honeycombing of any sub-floor sleeper walls.	Gas resistant membrane meeting criteria of Table 7 BS8485:2019 with verification in accordance with CIRIA C735 [N1]. (2.0) ***Vented CS2 this will comprise independent visual inspection. ***Unvented this will comprise independent visual inspection and air lance integrity testing.

Footnotes:

1. The membrane should always be lapped and sealed in accordance with BRE\Environment Agency Report BR 414 (2001) – “Protective Measures for housing on gas-contaminated land”. The membrane should be continuous across cavity walls, and there should be a cavity tray in external walls.
2. In all cases there should be minimum penetration of floor slab by services; any penetrations should be suitably sealed.

¹ **Type B building:** private or commercial property with central building management control of any alterations to the building or its uses but limited or no central building management control of the maintenance of the building, including the gas protection measures. Multiple occupancy. Small to medium size rooms with passive ventilation of rooms and other internal spaces throughout ground floor and basement areas. May be conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels.

BRE\Environment Agency Report BR 414 (2001) – “*Protective Measures for housing on gas-contaminated land*” provides a practical guide to good practice for the detailing and construction of passive soil gas protection measures for new residential development. Of particular relevance are a list of ‘Watchpoints’, which offer practical information for installation and buildability.

Membrane Installation

Installers

Installation of gas protection measures must be executed to National Occupational Standards (VR612 and VR613) and installers should ideally hold a level 2 NVQ diploma in Sub-structure Work Occupations (Construction) – Installation of Gas Membranes.

Installation Process

The Installer will provide a detailed Method Statement to the Verifier detailing the membrane installation process and approximate programme of works. This should include reference to the details of the extent of overlap and method of sealing (these must be in line with manufacturer’s instructions).

Membrane Damage Protection

Prior to installation of the floor construction (placement of insulation, concrete slab etc) is it essential that the integrity of the installed is not compromised.

For the ventilation system this would include blocking of the system by debris, detachment of telescopic vents or vent pipes and contamination of vent clean materials with fine particles.

The membrane is particularly susceptible to damage from the following (not an exhaustive list):

- Degradation of membrane due to prolonged exposure to UV light;
- damage to a gas membrane from a mesh reinforcement tie wire;
- prevent trafficking of the membrane by vehicle, plant and where possible the labour force;
- debris above or below membrane causing damage (consider use of sand blinding layer below and careful cleaning above and below). This could include debris created by follow-on trades, installation of scaffolding etc;
- damage where membrane becomes stressed (consider use of bitumen reinforced strips on corners or other critical junctions).

The use of protective boards/geotextile or insulation between the membrane and reinforcement should be considered immediately post placement and inspection to prevent damage. Particular attention should also be given to pipe penetrations, as often when insulation is laid, large gaps are left due to the time it takes to cut around pipes, which may expose the gas membrane to damage.

Such measures should be communicated to all site personnel during the site induction and should be stated in the gas membrane installer’s method statement.

6 VERIFICATION OF GAS PROTECTION MEASURES

6.1 VERIFIER

Formal qualifications/experience/training of the person carrying out the verification. Full details of what the verification process will comprise and at what stage verification will be carried out.

6.2 VISUAL INSPECTION – VENTING SYSTEM

Venting measures, both passive and active controls, should be subject to a visual verification inspection to establish that installation is adequate and complies with the design and the specification. If a granular layer is used, the material should be tested to ensure the grading will enable it to function as a venting layer.

The inspection should cover floor areas, paying particular attention to walls and any other locations where venting systems might be positioned. Any discrepancies with the design drawings should be highlighted. These may include missing air vents and air bricks, inadequate grading of gravel vent layers, and incorrect types of geocomposite or polystyrene vent layers. The size of connecting pipes, venting through sleeper walls, and voids and void formers should also be checked. Particular attention should be paid to venting through sleeper walls, the location of vents in relation to final ground levels and the potential for debris to BLOCK air bricks.

6.3 VISUAL INSPECTION – GAS MEMBRANE

The gas membrane installation should be subject to a visual verification inspection to establish the adequacy of the ground preparation and subsequently possible damage to the installed gas membrane.

inspections should cover both the ground prepared for the gas membrane and the gas membrane itself over the whole floor area, paying particular attention to laps, edges and the sealing of service entries and penetrations such as vent pipes and pile caps.

Any discrepancies with the membrane installation method recommended by the gas membrane supplier should be highlighted. These may include small or large holes and rips, tears and punctures, absence of tape (double sided or single sided tape) on the lapped areas, loose or unstuck tape, inadequate corner details, and unbounded seams such as loose edges and 'fish mouths' in the gas membrane. Tapes used to join gas membranes should be inspected to make sure they are compatible with the gas membrane being joined and are as specified by the gas membrane supplier or specifier. If a gas membrane has a third-party accreditation, eg BBA certificate, the installation requirements should be checked against it, including the need for protection boards or similar. Where welded joints are used, the verifier should ensure they are correctly tested.

6.4 AIR LANCE TESTING - JOINTS

Air lance testing identifies unbonded areas of seam by directing a high-pressure jet of air at the seam. The air is at a minimum pressure of 345kPa (3.45 Bar) via a 4.8mm nozzle and it is located no more than 50mm from the seam being tested.

Seams will be checked to ensure a good seal.

6.5 NON-CONFORMANCE AND DEFECT RECTIFICATION

Any discrepancies from the ventilation system design as highlighted by the points above should be corrected and confirmed by visual inspection before further construction continues.

Repairs to the membrane as required by the points above should be instructed and observed on the same day as the site visit or inspected at a later date.

6.6 VERIFICATION, CHECKLIST AND WATCHPOINTS

Verification should be undertaken in accordance with CIRIA C375 using the 'Visual Inspection Checklist' provided in Appendix B.

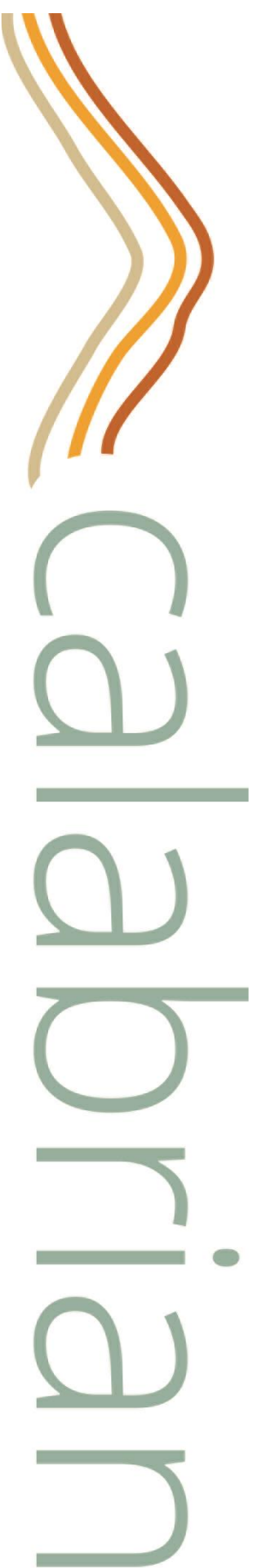
Photographs showing the ventilation system (clear void, sleeper walls, vent pipe etc) and installed membrane including examples of specific key installations such as lapped areas, DPC connections, corner details and service/stanchion/column penetrations will be included in the Verification Report.

6.7 VERIFICATION REPORT

On completion of gas protection measures installation, a Gas Protection Measures Verification Report will be issued confirming that the gas protection measures were installed as agreed and that the membrane was free from tears and punctures and was lapped and sealed as agreed at joins and around services and sub floor voids were clear and free from debris.

The verification report will include copies of the signed 'Visual Inspection of Gas Protection Measures' check list(s).

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Condition 43a

- a) *Prior to the commencement of development within the Block B phase, a report (the Preliminary Risk Assessment) to identify and evaluate all potential sources and impacts of any ground contamination, groundwater contamination and/or ground gas relevant to that phase shall be submitted to and approved in writing by the Local Planning Authority. The Preliminary Risk Assessment shall conform to the current guidance document (Planning Guidance in Relation to Ground Contamination).*

In the event of the Preliminary Risk Assessment identifying risks, which in the written opinion of the Local Planning Authority require further investigation, the Phase shall not commence until a scheme for the investigation and the identification of remediation measures (the Site Investigation Proposal) has been submitted to and approved in writing by the Local Planning Authority.

The measures for investigating the site Phase identified in the Site Investigation Proposal shall be carried out, before the Phase commences and a report prepared outlining what measures, if any, are required to remediate the land (the Site Investigation Report and/or Remediation Strategy), which shall be submitted to and approved in writing by the Local Planning Authority.

The measures for investigating the site phase identified in the Site Investigation Proposal shall be carried out, before the Phase commences and a report prepared outlining what measures, if any, are required to remediate the land (the Site

Investigation Report and/or Remediation Strategy), which shall be submitted to and approved in writing by the Local Planning Authority.

This report provides the Remediation Strategy required by Condition 43 including a verification plan that will be required to satisfy point iv. and a design for the post demolition site investigation and risk assessment noted in point ii.

2 BACKGROUND

2.1 SITE DESCRIPTION

Details of the site are given below:

- Location: 450m south-west of Manchester Oxford Road railway station.
- National Grid Reference: SJ 837 972.
- Nearest Postcode: M15 5FJ.
- Area: 0.35 hectares (approximately).

The site (BLOCK B) currently comprises a hotel.

2.2 GROUND INVESTIGATION

Ramboll designed the ground investigation which was undertaken by Enygo on the wider site between in May and June 2019. The ground investigation was also undertaken for geotechnical purposes. The ground investigation comprised six rotary boreholes, six windowless sampling boreholes, three trial pits along with five plate load tests. This was supplemented by gas/groundwater monitoring along with geotechnical and contamination laboratory analysis.

Made Ground

Beneath a general surface covering of asphalt made ground was encountered across the site to depths ranging from 0.45m to 5.2m depth and generally comprising granular material.

Natural Ground

Natural ground comprised a laterally variable mix of glacial sand and clay to depths of between 7.5m to 11.0m depth where Chester Formation sand and sandstone was encountered.

Groundwater

Groundwater seepages were not encountered in any of the exploratory holes on site.

Hazardous Gas

Carbon dioxide and methane concentrations were generally below the 5% and 1% respective thresholds for a CS1 classification, with the exceptions of elevated concentrations for methane within BH5 and elevated methane and carbon dioxide concentrations within WS2.

The site has been classified as Characteristic Situation CS2 in accordance BS8485:2015+A1:2019.

Contamination

No concentrations of any contaminants were found above the Ramboll Generic Assessment Criteria (GAC).

A trace of asbestos fibres (<0.001% by volume) were identified within WS05; however, this area of the site will be isolated beneath the proposed building and will not present a risk to users of the site.

Constraints

Due to the presence of the existing hotel site investigation in that area was not possible.

3 RISK ASSESSMENT & TARGET CONCENTRATIONS

Clean-up criteria relevant to the limited contamination encountered at this site are not driven by risks to controlled waters, therefore in the absence of a site-specific Quantitative Risk Assessment, it is conservatively proposed that Ramboll's' Generic Assessment Criteria values be adopted as remedial targets for hydrocarbon contamination in soils on this site.

4 REMEDIATION STRATEGY (GENERAL)

4.1 AIMS

Remediation aims are to:

- Resolve contamination issues in order to protect environmental receptors and render the site suitable for the proposed development;
- provide a stable development platform (to agreed levels and gradients) for subsequent construction of the proposed development and associated infrastructure; and,
- satisfy requirements of the Local Planning.

4.2 OVERVIEW

The following remediation works are required:

- General site clearance of surface materials and vegetation;
- demolition of buildings;
- break-up of hardstand and crushing of all suitable artificial hard material (ie. concrete/brick etc);
- installation of gas protection measures in accordance with BS8485:2015+A1:2019 for a Characteristic Situation CS2 classification (as Block B); and,
- provision of an appropriate cover of 'clean' soils within landscaped areas (likely minimum 300mm thick amenity growing layer, as Block B).

5 REMEDIATION STRATEGY (SPECIFIC OBJECTIVES)

5.1 CONTINGENCY FOR UNKNOWNNS

Even after an appropriate preliminary investigation and ground investigation, with exploratory holes on a closely spaced grid (say trial pits at 30m centres), a geoenvironmental appraisal is typically based on inspection of the ground underlying less than 0.5% of the total site area (and much less at depths in excess of about 3.5m). Consequently, there is always a possibility that unanticipated ground conditions will be encountered during the remediation works.

If unanticipated ground is encountered during the remediation works, the Contractor should immediately seek further advice from the Engineer.

Where appropriate any unanticipated grossly contaminated soil/fill should be placed in temporary stockpiles on hardstand or Visqueen, suitably covered and bunded.

Analysis of at least six samples, for an appropriate range of determinands should be undertaken. On receipt of the results, the Engineer will liaise with the Contractor regarding the most appropriate remediation option.

5.2 SITE CLEARANCE

Any trees currently under a Tree Preservation Order (TPO) should be identified and agreed with relevant authorities prior to the commencement of the works. All trees subject to a TPO should be clearly identified and protected by fencing in accordance with BS5837: 2012.

The site should then be cleared of all residual debris, any vegetation, shrubs, bushes, and unprotected trees as instructed by Dominus.

5.3 ASBESTOS

Current legislation (as outlined in HSG 264) requires a pre-demolition (formerly Type 3) asbestos survey to be undertaken, immediately prior to demolition of any building. The Contractor should request a copy of the survey report from Dominus or the Engineer. If no survey report is available, the Contractor will instruct an asbestos survey.

5.4 DEMOLITION

Demolition works will commence on completion of an asbestos removal and a "soft-strip" of the existing buildings.

Existing buildings will be demolished in a safe and controlled manner.

All demolition operations should conform to BS 6187:2000 Code of Practice for Demolition. All personnel working on these operations should be fully qualified to do so.

A detailed Method Statement specific to the project must be prepared by the Contractor and submitted to Dominus. The Method Statement should also be submitted to, and approved by, the Engineer and the Local Authority.

Once buildings have been demolished, all surface hardstand and floor slabs should be grubbed-up and stored on site, prior to crushing. Any unsuitable materials should be removed to a suitably licensed landfill site.

5.5 SUPPLEMENTARY GROUND INVESTIGATION

On completion of the demolition and hardstand grubbing-up, the Engineer will supervise the excavation of trial pits on a 30m grid spacing beneath the former building. All pits will be excavated to at least 2.5m depth (from proposed final levels) and where practical penetrate into natural ground.

Representative soil/fill samples will be taken by the Engineer. The number of samples taken will be reflective of the fill/geological complexity actually encountered. However, in general about three samples will be taken from most pits.

Selected samples will be sent to a suitably accredited laboratory and scheduled for appropriate chemical analysis (likely to comprise asbestos identification, heavy metals, speciated PAH and speciated TPH). Analysis for other determinands may be appropriate and will be requested by the Engineer, as necessary.

The investigation will be undertaken in general accordance with current UK guidance (most notably BS10175:2011). The soils encountered during this investigation will be logged in general accordance with BS 5930:2015+A1:2020.

5.6 CONTROL OF WATER

Groundwater should be controlled in accordance with CIRIA report 113 “Control of Groundwater for Temporary Works”.

Arrangements should be made to prevent ponding in any excavation “hollows”; the Contractor should ensure that ground levels are of sufficient gradient to enable the collection of surface water run-off in sumps or grips.

Pumping from over-excavated sumps may be required to maintain satisfactory working conditions.

Any potentially contaminated water should not be allowed to escape to other areas until the results of the analysis are available and, if required, a suitable means of water treatment has been agreed.

5.7 REMOVAL OF BELOW GROUND OBSTRUCTIONS

Any foundations associated with former buildings and other relict structures will be chased out and grubbed-up, in order to remove potential obstructions to new foundations and infrastructure.

Where relict structures are found to retain fluid contaminants, they should be drained first. The drained fluids should be stored in appropriate, sealed tanks/containers and analysed for a range of determinands to be agreed with the Engineer. Fluids may then be tankered off-site, or be discharged to sewer, subject to analytical results and local water treatment company consent.

Deep excavations for the removal of structures etc will be unstable in the short term and continuous side support will be necessary.

Where significantly deep foundations (eg. piles) cannot be removed by conventional means, they are to be cut at a depth to be agreed with the Engineer and the position of the remaining lower section is to be accurately recorded by survey.

Suitable materials derived from grubbing-up should be stored in a location on site, to be agreed with the Engineer, prior to crushing. Any unsuitable materials should be removed to a suitably licensed landfill site.

5.8 CRUSHING

Production of a selected granular fill should be possible if suitable materials (generated by demolition operations and grubbing-up of floor slabs, foundations, and other relict structures) are crushed.

The crushed product should be screened to remove any unsuitable elements and stockpiled for re-use during the subsequent construction works. Generation of a Class 6 material as defined in the Highways Agency Specification (Series 600) should be possible.

6F2 graded material can contain up to 50% recycled tarmac/asphalt (provided it does not pose a contamination risk to controlled waters). Recycled tarmac can be crushed to yield a 6F3 selected granular material, provided the recovered bitumen content is less than 10% (determined in accordance with BS598-102).

5.9 BOUNDARY ISSUES

Dominus's Designer should ensure that proposed levels tie in with the surrounding infrastructure, and ground levels of adjacent properties (after allowance for the placement of any required soil cover).

Advice should be sought from the Engineer if mobile contamination is encountered close to the site's boundaries.

5.10 EXPORT TO LANDFILL

Excavation arisings that are unsuitable for retention and re-use on site should be placed in temporary stockpiles on hardstand or polythene sheeting and be suitably covered to minimise the potential for dust/odour nuisance and prevent surface water run-off.

Any material exported from site to landfill should be hauled by a registered waste carrier in accordance with the requirements of the Duty of Care Regulations, 1991 and the Landfill (England & Wales) Regulations 2002.

A transfer note should be completed, signed, and retained by the parties involved. The transfer note should include the volume of waste, the nature of the material and a statement of its chemical composition, details of the source and destination sites, and details of the haulier.

5.11 PLACEMENT OF SOIL COVER

Following completion of the supplementary post-demolition site investigation and risk assessment it is likely that clean inert soil will be placed over the made ground in proposed garden and landscaped areas (but not beneath hardstanding). This cover layer is likely to comprise a 300mm thick amenity layer of “clean” subsoil/topsoil.

Any material imported for use as cover should be validated in accordance with Calabrian’s Protocol for Soil Importation, copied in Appendix A. This Protocol includes chemical assessment criteria which should not be exceeded.

5.12 HAZARDOUS GAS PROTECTION

Based on the site characterisation discussed above, the proposed foundation solution, and with reference to the gas protection “scoring” system outlined in BS 8485:2015 + A1:2019 for Building Type B¹, Calabrian consider that the following protective measures should be incorporated in all new structures:

Characteristic Situation (Wilson & Card, 1999)	Gas “score” req’d by BS 8485	Protective Measures		
		Floor Slab (BS8485 “score”)	Sub-floor ventilation (BS8485 “score”)	Membrane Type (BS8485 “score”)
2	3.5 (Type B)	‘Beam and Block’ segmental suspended subfloor – (0). Reinforced ground bearing slab – (0.5). Reinforced, cast in-situ suspended slab (well reinforced with minimal service penetrations & water bars around all slab penetrations & at joints) – (1.5). Basement floor and walls conforming to BS8102:2009, Grade 2 waterproofing – (2.0). Basement floor and walls conforming to BS8102:2009, Grade 3 waterproofing – (2.5).	Layer of low permeability and/or is not terminated in a venting trench (or similar). (0) Pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building) - (0.5). For smaller commercial units, passive sub-floor ventilation; venting layer could be: i. A min. 200mm clear void (2.5), or ii. A proprietary void former (expanded polystyrene shuttering) providing an equivalent clear void depth of 60mm (2.5), or iii. Min. 300mm thick blanket of 20mm single size gravel, not MOT Type 1 (0.5). Min. ventilation = 2,500 mm²/m run of external wall (via air bricks on each of 2 opposite sides), with 100mm pipes at 2m centres or honeycombing of any sub-floor sleeper walls.	Gas resistant membrane meeting criteria of Table 7 BS8485:2019 with verification in accordance with CIRIA C735 [N1]. (2.0) ***Vented CS2 this will comprise independent visual inspection. ***Unvented this will comprise independent visual inspection and air lance integrity testing.

Footnotes:

1. The membrane should always be lapped and sealed in accordance with BRE\Environment Agency Report BR 414 (2001) – “Protective Measures for housing on gas-contaminated land”. The membrane should be continuous across cavity walls, and there should be a cavity tray in external walls.
2. In all cases there should be minimum penetration of floor slab by services; any penetrations should be suitably sealed.

¹ **Type B building:** private or commercial property with central building management control of any alterations to the building or its uses but limited or no central building management control of the maintenance of the building, including the gas protection measures. Multiple occupancy. Small to medium size rooms with passive ventilation of rooms and other internal spaces throughout ground floor and basement areas. May be conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels.

BRE\Environment Agency Report BR 414 (2001) – “*Protective Measures for housing on gas-contaminated land*” provides a practical guide to good practice for the detailing and construction of passive soil gas protection measures for new residential development. Of particular relevance are a list of ‘Watchpoints’, which offer practical information for installation and buildability.

Membrane Installation

Installers

Installation of gas protection measures must be executed to National Occupational Standards (VR612 and VR613) and installers should ideally hold a level 2 NVQ diploma in Sub-structure Work Occupations (Construction) – Installation of Gas Membranes.

Installation Process

The Installer will provide a detailed Method Statement to the Verifier detailing the membrane installation process and approximate programme of works. This should include reference to the details of the extent of overlap and method of sealing (these must be in line with manufacturer’s instructions).

Membrane Damage Protection

Prior to installation of the floor construction (placement of insulation, concrete slab etc) is it essential that the integrity of the installed is not compromised.

For the ventilation system this would include blocking of the system by debris, detachment of telescopic vents or vent pipes and contamination of vent clean materials with fine particles.

The membrane is particularly susceptible to damage from the following (not an exhaustive list):

- Degradation of membrane due to prolonged exposure to UV light;
- damage to a gas membrane from a mesh reinforcement tie wire;
- prevent trafficking of the membrane by vehicle, plant and where possible the labour force;
- debris above or below membrane causing damage (consider use of sand blinding layer below and careful cleaning above and below). This could include debris created by follow-on trades, installation of scaffolding etc;
- damage where membrane becomes stressed (consider use of bitumen reinforced strips on corners or other critical junctions).

The use of protective boards/geotextile or insulation between the membrane and reinforcement should be considered immediately post placement and inspection to prevent damage. Particular attention should also be given to pipe penetrations, as often when insulation is laid, large gaps are left due to the time it takes to cut around pipes, which may expose the gas membrane to damage.

Such measures should be communicated to all site personnel during the site induction and should be stated in the gas membrane installer’s method statement.

6 VERIFICATION OF GAS PROTECTION MEASURES

6.1 VERIFIER

Formal qualifications/experience/training of the person carrying out the verification. Full details of what the verification process will comprise and at what stage verification will be carried out.

6.2 VISUAL INSPECTION – VENTING SYSTEM

Venting measures, both passive and active controls, should be subject to a visual verification inspection to establish that installation is adequate and complies with the design and the specification. If a granular layer is used, the material should be tested to ensure the grading will enable it to function as a venting layer.

The inspection should cover floor areas, paying particular attention to walls and any other locations where venting systems might be positioned. Any discrepancies with the design drawings should be highlighted. These may include missing air vents and air bricks, inadequate grading of gravel vent layers, and incorrect types of geocomposite or polystyrene vent layers. The size of connecting pipes, venting through sleeper walls, and voids and void formers should also be checked. Particular attention should be paid to venting through sleeper walls, the location of vents in relation to final ground levels and the potential for debris to BLOCK air bricks.

6.3 VISUAL INSPECTION – GAS MEMBRANE

The gas membrane installation should be subject to a visual verification inspection to establish the adequacy of the ground preparation and subsequently possible damage to the installed gas membrane.

inspections should cover both the ground prepared for the gas membrane and the gas membrane itself over the whole floor area, paying particular attention to laps, edges and the sealing of service entries and penetrations such as vent pipes and pile caps.

Any discrepancies with the membrane installation method recommended by the gas membrane supplier should be highlighted. These may include small or large holes and rips, tears and punctures, absence of tape (double sided or single sided tape) on the lapped areas, loose or unstuck tape, inadequate corner details, and unbounded seams such as loose edges and 'fish mouths' in the gas membrane. Tapes used to join gas membranes should be inspected to make sure they are compatible with the gas membrane being joined and are as specified by the gas membrane supplier or specifier. If a gas membrane has a third-party accreditation, eg BBA certificate, the installation requirements should be checked against it, including the need for protection boards or similar. Where welded joints are used, the verifier should ensure they are correctly tested.

6.4 AIR LANCE TESTING - JOINTS

Air lance testing identifies unbonded areas of seam by directing a high-pressure jet of air at the seam. The air is at a minimum pressure of 345kPa (3.45 Bar) via a 4.8mm nozzle and it is located no more than 50mm from the seam being tested.

Seams will be checked to ensure a good seal.

6.5 NON-CONFORMANCE AND DEFECT RECTIFICATION

Any discrepancies from the ventilation system design as highlighted by the points above should be corrected and confirmed by visual inspection before further construction continues.

Repairs to the membrane as required by the points above should be instructed and observed on the same day as the site visit or inspected at a later date.

6.6 VERIFICATION, CHECKLIST AND WATCHPOINTS

Verification should be undertaken in accordance with CIRIA C375 using the 'Visual Inspection Checklist' provided in Appendix B.

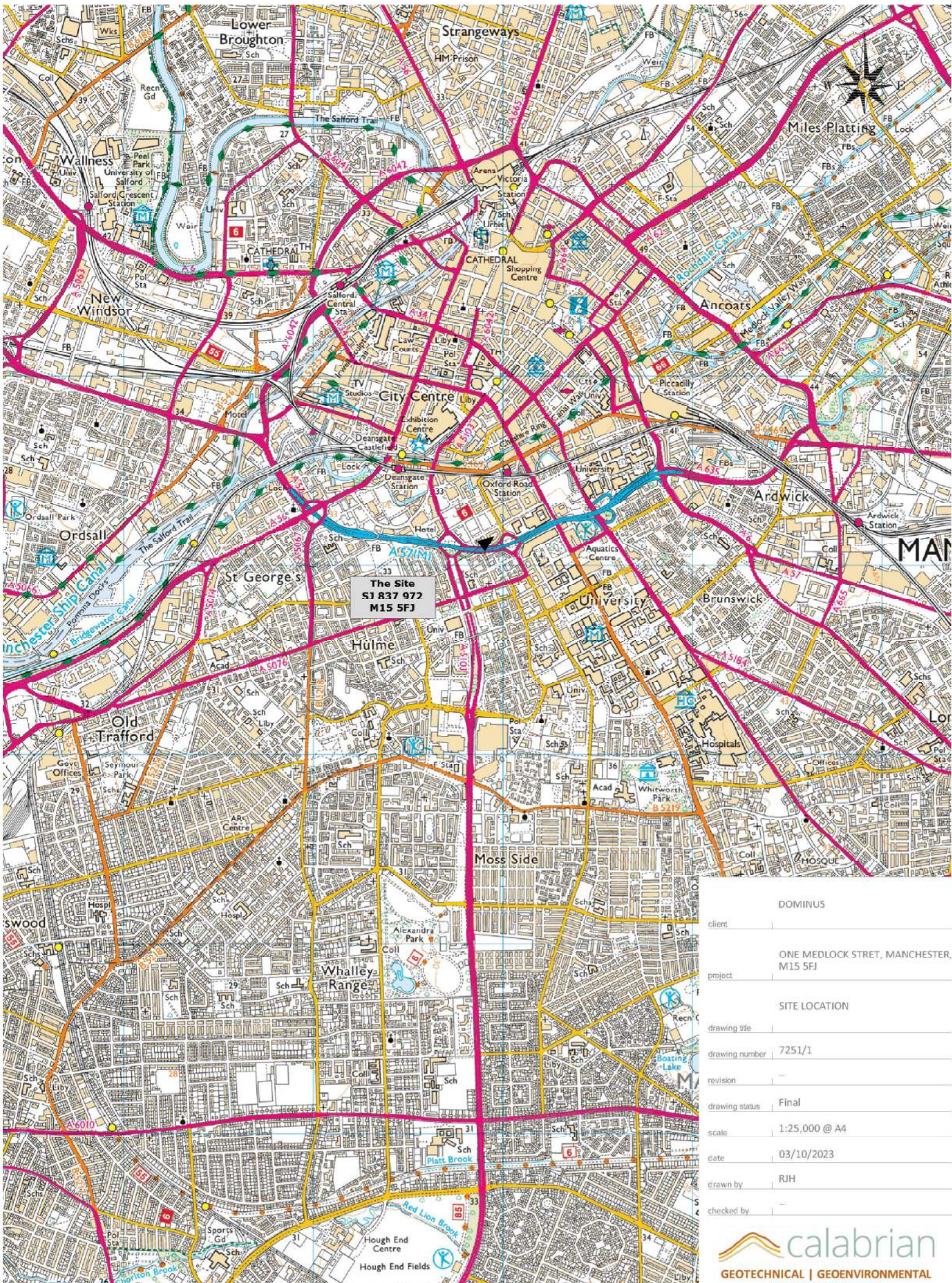
Photographs showing the ventilation system (clear void, sleeper walls, vent pipe etc) and installed membrane including examples of specific key installations such as lapped areas, DPC connections, corner details and service/stanchion/column penetrations will be included in the Verification Report.

6.7 VERIFICATION REPORT

On completion of gas protection measures installation, a Gas Protection Measures Verification Report will be issued confirming that the gas protection measures were installed as agreed and that the membrane was free from tears and punctures and was lapped and sealed as agreed at joins and around services and sub floor voids were clear and free from debris.

The verification report will include copies of the signed 'Visual Inspection of Gas Protection Measures' check list(s).

DRAWINGS	
7251/1	Site Location Plan
2072-PLA-XX-XX-DR-L-0003	Proposed Site Layout
MAN.260.001.GE.D.001	Exploratory Hole Location Plan



The Site
S1 837 972
M15 5FJ

DOMINUS

client	
project	ONE MEDLOCK STRET, MANCHESTER, M15 5FJ
SITE LOCATION	
drawing title	
drawing number	7251/1
revision	
drawing status	Final
scale	1:25,000 @ A4
date	03/10/2023
drawn by	RJH
checked by	



KEY

Application Boundary

HARDWORKS

LINEAR CONCRETE BLOCK
- Product: hydro lines or equal and approved.
Colour: grey

LINEAR CONCRETE BLOCK TO VEHICULAR ZONE
- Product: hydro lines or equal and approved.
Colour: dark grey

CONCRETE SETT PAVING
Finish: Coloured chippings
Location: To parking bays
Colour: Dark grey tones

ASPHALT
Finish: Coloured chippings
Location: To adopted carriageway

CONCRETE KERB TO ADOPTED STANDARD - UPSTAND & WIDTH VARIES

HAZARD WARNING PAVING
To pedestrian crossings and top and bottom of steps. Colour to contrast adjacent material

CONCRETE FEATURE PAVING BAND
Location: Western edge of site
Colour: Dark grey

SOFTWORKS

SEMI-MATURE TREE
- Refer to planting schedule.

TREE IN RAISED PLANTER
- Planter size: L4m/W1.5m
- To form part of wind mitigation

SHRUB PLANTING
- Evergreen species

RAIN GARDEN PLANTING

FURNITURE

PROPOSED SEATING BENCH
- Subject to further design
- Single facing aspect

PROPOSED BOLLARD
- Bollards to provide defensible line

CYCLE HOOPS
Quantity: 100

EXISTING ROAD LIGHTING COLUMN RETAINED

EXISTING LIGHTING MAST TO BE RELOCATED
Future position to be confirmed

FEATURE STREET LIGHTING
- Subject to further design

RECESSED TREE GRILLES
- trees in hard paving with 500mm aperture to tree trunk

LITTER BIN
- Subject to further design

ELECTRICAL CHARGING POINTS
- to back of parking bays to serve all parking bays along Edge Street

SUBSTATION
- Refer to architects drawings for details

WIND BAFFLES
- Subject to further design

Revision

Date

Description

Drawn

Apprvd.

P-IE

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LIVERPOOL

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Client

ASK Developments

Project

One Medlock

Drg Title

Landscape Masterplan GA

Created on

12-11-20

Created by

JC

Approved by

SF

Scale

1:250

Size

A1

Workstage

Information

Drg No.

2072-PLA-XX-XX-DR-L-0003

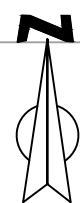
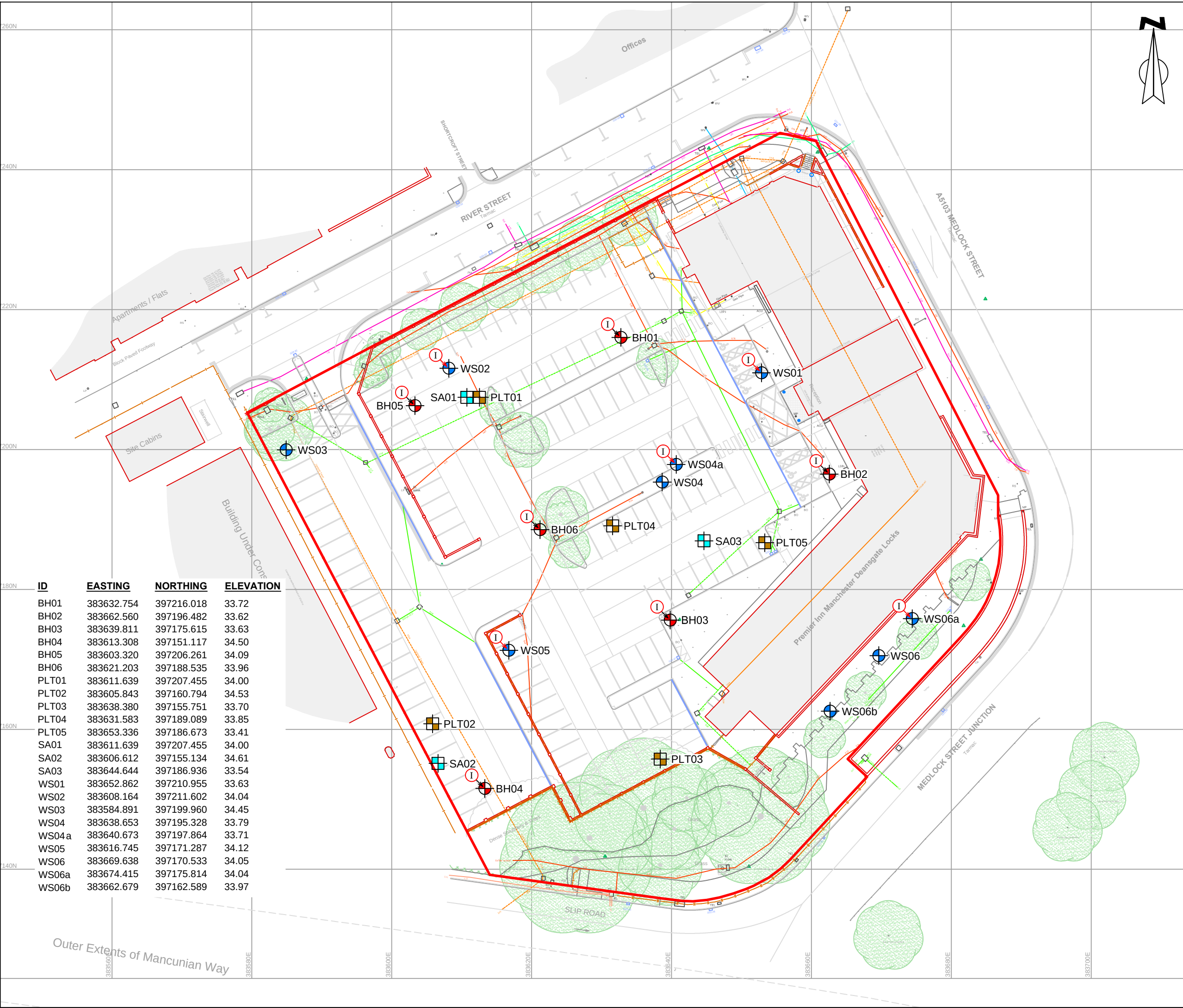
Suitability

S1

Revision

P09

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Key

Site Boundary

Dynamic (Windowless) Sampling Exploratory Holes

Rotary Borehole Locations

Plate Load Testing

Soakaway Testing

Borehole Installation (I)

- Notes
- Do not scale from this drawing.
- All dimensions are in meters unless stated otherwise.
- This drawing is to be read in conjunction with all relevant drawings and documents associated with this project.
- All existing and proposed dimensions, levels and locations to be checked and verified by the main contractor on site prior to the commencement of the works and any anomalies reported to the engineer.



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:		Whitbread PLC	
SCALE:		PROJECT REF:	
NTS		MAN.260.001	
DRAWN:		DATE:	
MG		July 2019	
CHECKED:		PROJECT:	
NR		Deansgate, Premier Inn	
TITLE:		Exploratory Hole Location Plan	
FIGURE NO:		MAN.260.001.GE.D.001	

APPENDIX A PROTOCOL FOR IMPORTATION & USE OF SOIL COVER

IMPORTATION & USE OF SOIL COVER

Introduction.

Isolation of made ground in landscaped areas beneath a cover of "clean" subsoil, and topsoil is often recommended as a remediation solution; most notably when the made ground contains inorganic (and non-volatile organic) contaminants at concentrations above guidance threshold values. A cover solution is not appropriate for volatile or semi-volatile organic contaminants (fuels, solvents etc); removal or treatment will usually be required.

The thickness of cover is dependant on the nature and degree of contamination (and sometimes the Local Authority whose area the site lies within), but typically between 600mm and 1,000mm is required. However, if the made ground is essentially "clean", but contains materials generally considered undesirable as a near-surface material in garden areas (colliery spoil, construction\demolition rubble etc) then a 300mm thick cover should be adequate. If the made ground is essentially "clean" and comprises reworked natural soil, the only cover likely to be required is topsoil.

The "clean" soil cover blocks potential linkages between the contaminated made ground and future residents. Soil cover is not required beneath hardstand or structures.

Soil cover is usually placed many weeks after completion of the preparatory\remediation works, and issue of the associated Verification Report, typically at a relatively late stage in the construction programme.

Prior to placement of soil cover, the appointed remediation contractor and\or groundworker should ensure that ground levels are low enough to accommodate the required cover thickness, taking account of any boundary issues, and without compromising the DPC.

Ideally soil quality should initially be determined by sampling of the source at least 7 working days before importation to the development site; this may be achieved by supplier sampling and analysis.

Clearly, if soil cover is imported and placed before confirmation of its suitability, Calabrian cannot guarantee that our validation work will yield the desired results. In which case, it may be necessary to excavate and export the placed soil cover and\or import further "clean" soil.

Where samples have been tested at source, and on receipt of laboratory results, Calabrian will issue confirmation of soil suitability to the Client, who in turn will instruct his Contractor to commence importation. It will probably be necessary to stockpile soil cover materials prior to placement in garden\landscaped areas. Calabrian should inspect the stockpiled material prior to placement, to confirm that it is the same material as previously tested, and it has not been cross-contaminated with miscellaneous arisings generated during the construction works.

Soil thickness and final quality can only be checked after placement; this should be done before turfing, fencing etc, but ideally after scaffolding has been dismantled.

Sampling Frequency (to check Soil Quality): The number of samples taken will be dependant on the nature of the source, and the quantity of material to be imported as detailed below:

End-Use	Greenfield Soils	Remediated Soils	Brownfield Soils	Unknown Soil Source
Residential Gardens	1:200m ³	1:100m ³	1:50m ³	1:50m ³
Soft Landscaping	1:200m ³	1:150m ³	1:150m ³	1:150m ³
Other	1:200m ³	1:200m ³	1:200m ³	1:200m ³

IMPORTATION & USE OF SOIL COVER

It should be noted that the thickness of placed topsoil is only 100mm to 150mm (cf subsoil thicknesses of around 500mm). Consequently, where samples are collected after placement (although testing at source is always preferable) testing one topsoil sample per 50m³. This is not unreasonable anyway, since from a potential contaminant perspective, topsoil, being present at surface, is more important than underlying subsoil.

Occasionally a developer just places 600mm of topsoil (i.e. no subsoil is used). In such circumstances, assuming the topsoil is from a single source, Calabrian would test a minimum of 6 samples.

A less frequent sampling rate may be appropriate for soils from a greenfield source or where large volumes (say > 5,000m³) of soil are imported from a single, relatively homogenous source.

Inspection Frequency (to check Soil Thickness): The number of inspection pits to check cover thickness and collect samples, should be 1 pit per 50m² plan area and at least 1 pit per landscaped area if the landscaping is in multiple parcels; a plan of proposed inspection pits may be provided within a site specific Remediation Strategy where necessary.

Soil Material Suitability: Inspection pits should be excavated through the entire thickness of any proposed in-situ source material, or cover material (if inspection is post-placement). Stockpiles should be assessed from both the surface and by digging into the “core”, to ensure the material is reasonably homogenous.

The soil material should:

- Be clean and free of foreign debris, building waste materials, glass sharps, or contaminants;
- topsoil should not have a gravel content of greater than 30% by dry weight and should generally have a maximum stone size of 50mm in any one direction;
- subsoil should generally have a maximum stone size of 150mm in any one direction; and,
- not have been sourced from an area within 7m laterally, or 3m vertically, of Japanese Knotweed plants, and not contain any Japanese Knotweed fragments (rhizomes, leaves, stems etc).

Laboratory Analysis: Whether samples are taken at source, from stockpiles on site, or from landscaped after placement, they should be forwarded to an analytical laboratory for testing in accordance with one of the Schedules detailed in Table 1.

Imported topsoil should be subject to such testing, wherever it is *not* being sourced from a reputable supplier; soil transfer stations would not usually be classed as a reputable supplier. In addition, some analysis in accordance with BS3882 may occasionally be appropriate.



IMPORTATION & USE OF SOIL COVER

Table 1 – Test schedule

Source	Definition	Test Schedule	Other requirements\Remarks
Greenfield	No 'source' of contamination present i.e. undeveloped; absence of made ground.	<i>pH, total metals (Cu, Ni, Zn, Cr III, Cr VI, As, Hg, Se, Cd & Pb), water soluble boron. TOC & Speciated PAH. Asbestos ID</i>	
"Low-risk" Brownfield	Development site (on former greenfield land) with excess soils, or a "low-risk" brownfield site (eg former school, offices, housing estate etc).	<i>pH, total metals (Cu, Ni, Zn, Cr III, Cr VI, As, Hg, Se, Cd & Pb), water soluble boron. TOC, BTEX, speciated TPH & Speciated PAH. Asbestos ID</i>	
Soil Transfer Stations & Other Brownfield	Source is a soil transfer stations. Potential source anticipated i.e. current or historical industrial or commercial use; evidence of bonfires; presence of made ground.	<i>pH, total metals (Cu, Ni, Zn, Cr III, Cr VI, As, Hg, Se, Cd & Pb), water soluble boron. TOC, Speciated PAH BTEX, and speciated TPH. Asbestos ID</i>	

NB The schedules detailed above have been prepared in accordance with the Secondary Model Procedures. This document states that analysis should be relevant to potential sources and not merely a set list of parameters applied to each site.

Additional determinands could be scheduled, although if considered necessary, would probably suggest the material is unlikely to be suitable for use as clean cover in gardens.

Chemical assessment (Tier 1) criteria for imported soils are provided in Table 2.

Table 2 - Chemical Assessment Criteria for Imported Soils

Contaminant	Residential End Use Without Home Grown Produce (mg/Kg) in Soil (1% SOM)	Comments/Notes
Inorganic Arsenic	40	
Cadmium	85	
Chromium (III)	910	
Chromium (VI)	6	
Copper	100 (pH<6), 135 (pH6-7), 200 (pH>7)	
Lead	310	
Inorganic Mercury	56	
Nickel	60 (pH<6), 75 (pH6-7), 110 (pH>7)	
Selenium	430	
Zinc	200 (300 if pH >7.0)	
Total PAH	50	
Speciated PAH		
Acenaphthene	3,000	
Acenaphthylene	2900	
Anthracene	31,000	
Benzo(a)anthracene	11	
Benzo(a)pyrene	3.2	
Benzo(b)fluoranthene	3.9	
Benzo(k)fluoranthene	110	

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IMPORTATION & USE OF SOIL COVER

Contaminant	Residential End Use Without Home Grown Produce (mg/Kg) in Soil (1% SOM)	Comments/Notes
Benzo(g,h,i)perylene	360	
Chrysene	30	
Dibenzo(a,h)anthracene	0.31	
Fluoranthene	1,500	
Fluorene	2,800	
Indeno(1,2,3-cd)pyrene	46	
Naphthalene	2.3	
Phenanthrene	1,300	
Pyrene	3,700	
TPH Speciated		
Aliphatic C5-C6	42	
Aliphatic C6-C8	100	
Aliphatic C8-C10	27	
Aliphatic C10-C12	130	
Aliphatic C12-C16	1,100	
Aliphatic C16-C21	65,000	
Aliphatic C21-C35	65,000	
Aromatic C5-C7	370	
Aromatic C7-C8	860	
Aromatic C8-C10	47	
Aromatic C10-C12	250	
Aromatic C12-C16	1,800	
Aromatic C16-C21	1,900	
Aromatic C21-C35	1,900	
Others		
Asbestos	Should not be detected	
Water soluble sulphate	0.5g/l	
Acidity (pH)	Not less than 5	

It should be noted that many of the compounds detected by laboratory analysis for TPH and PAH are naturally occurring in coal, humic acid, bark, leaf litter etc; these are clearly not 'sources' within the legal definition. Calabrian can undertake further risk assessment where PAH screening values are exceeded, *but* inspection of the soils has not identified any petroleum or combustion derived material.

Verification Reports

The purpose of verification documentation is to provide transparent reasoning why the remediation was required, a methodology about how it was to be undertaken and proof that the specified works have been undertaken and to provide confirmation that the site is "suitable for its intended use".

The report will include supporting documentation such as laboratory analysis results, delivery tickets for material, certificates for imported material (or if unavailable, documented evidence of the source of the Greenfield material), trial pit logs etc.

IMPORTATION & USE OF SOIL COVER

The report should include details of any measures required to maintain the cover system integrity in the future e.g. successive construction phases (management plans) and longer term (restrictive covenants on title deeds).

Photographs will also be included to evidence soil cover placement and quality, these will include (where appropriate):

- Photographs of any stockpiles and quarantine areas;
- depth of soil cover installed including survey staff as a scale;
- quality of the material to be used as cover eg absence of large stones;
- location of geotextile separator and visual warning membranes;
- method of placement and different layers if appropriate;
- inclusion of background features which will aid locating the photograph; and,
- inclusion of site identification boards within the photos which show the date, position taken i.e. corner of plot 3 and the site name.

The presence of good quality photographs is essential to prove beyond doubt that the remediation has been undertaken as specified both by method and position, and that the images have been taken from the specific area stated.



APPENDIX B VISUAL INSPECTION OF GAS PROTECTION MEASURES

VISUAL INSPECTION OF GAS PROTECTION MEASURES

Site name:	Gas characteristic situation:
Job number:	Type of development and building/block checked: (residential/commercial/other)
Date:	Building description:
Visit by:	Foundation type: (suspended floor/raft/other)
Weather at time of inspection:	Gas protection type: passive/active

No.	Item	Comments (see notes)
1 Gas membrane		
1.1	Condition of sub-grade and underside of gas membrane	
1.2	Gas membrane type	
1.3	Gas membrane condition	
1.4	Joining tape product	
1.5	Lapping design	
1.6	Laps, welds and joints seals	
1.7	Service entries seals	
2 Passive venting		
2.1	Sub-floor void	
2.2	External wall airbricks	
2.3	Internal sleeper walls	
2.4	External vent trenches/ducts	
3 Active venting		
3.1	System details	
Additional notes:		

Notes: inspection checklist

1.1	Underside of gas membrane	Check that the sub grade does not contain rough/uneven surfaces, is appropriately clean and that there are no hard/sharp objects. That protective sand blinding or geotextile (if specified) is present and meets the design criteria.
1.2	Gas membrane type	Manufacturer and product specification, gauge, colour, brand/name, material batch/roll numbers, storage arrangements (protected from dirt/damage?)
1.3	Gas membrane condition	Open punctures, tears, rips, stretching? Excessive footprints/evidence of traffic? Presence of debris? Repairs? Signs of weakness such as raised or sunken indentations? Protection plan in place to restrict access to lain gas membrane?
1.4	Joining tape product	Product type, brand, thickness, material, width, colour? Use of double-sided tape?
1.5	Lapping design	Joints lapped and sealed in accordance with manufacturer's requirements/ specification? Minimum overlap insured? Sections taped twice?
1.6	Laps and joints sealed	Welds complete? Appropriate joining/double sided tape used?
1.7	Service entries sealed	Top hats seal arrangements fixed around service entries? Use of Jubilee clips?
2.1	Sub-floor void	Is a check possible? Void former? Gravel (type/specification)? Height of void space? Is it clear?
2.2	External wall airbricks	Numbers, size, positions as design drawing?
2.3	Internal sleeper walls	Ventilation holes (honeycomb brickwork/pipe crossings?) – size, spacing, location in accordance with design?
2.4	External vent trenches/ducts	Located and constructed in accordance with design drawings? If open-topped gravel – gravel type/presence of fines? If pipe or other vent, check position and construction for functionality and absence of blockages. Ability of void former to withstand bearing of the superstructure?
3.1	Active venting	Type of air supply: mechanical, natural, combined? Location/condition/number of fans and vents? Location and size of inlets? Provision of air-cleaning devices and air heaters? Supply and exhaust ductwork? Alarm provision/installation? Gas monitoring system in under-floor void?

Photographs

No.	Description

The gas protection measures inspected:	a Are acceptable and comply with the specification
	b Are acceptable but attention is drawn to issues related to item no. xxx
	c Are not acceptable due to the issues related to item no. xxx

Name:

Signature:

Date: