

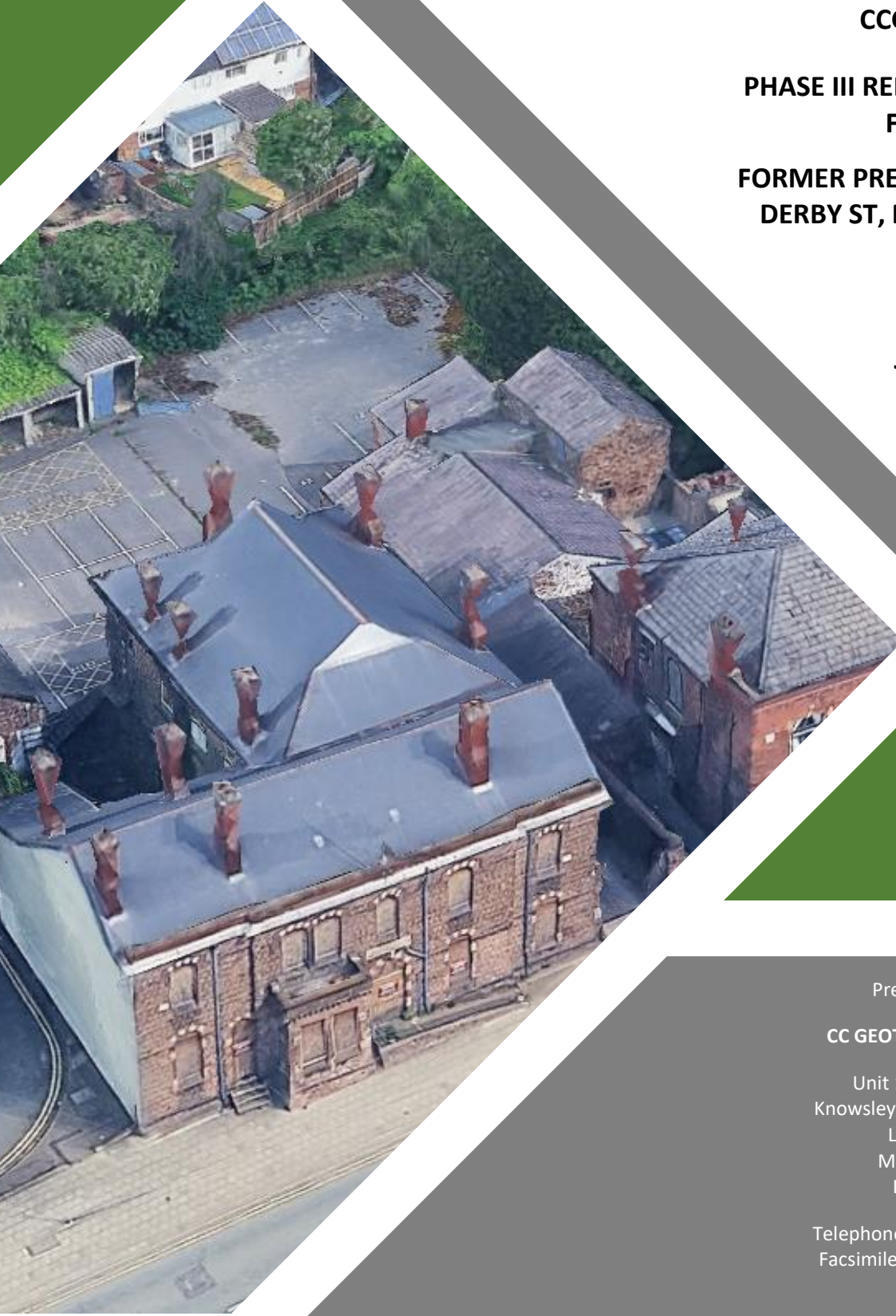


CCG-C-26-16259

**PHASE III REMEDIATION STRATEGY
FOR SITE AT**

**FORMER PRESCOT POLICE STATION,
DERBY ST, MERSEYSIDE, L34 3LG**

JUNE 2026



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REMEDIATION STRATEGY DOCUMENT

Document No: CCG-C-26-16259**Site: Former Prescott Police Station, Derby Street, Prescott, Merseyside, L34 3LG****INTRODUCTION:**

CC Geotechnical Limited (CCG) was commissioned by **PRIMA GROUP LTD (THE CLIENT)** to prepare a site Remediation Strategy in connection with proposed redevelopment of the former Prescott Police Station, Derby Street, Prescott, Merseyside, L343LG.

It is understood that an existing Police Station fronting on to Derby Street is to be retained and modified / converted for residential land use to form 7nr self-contained apartments, with an outbuilding located to the rear of the site being modified / converted to provide 2nr self-contained apartments.

It is further proposed that the land to the rear of the Police Station is to be developed by the construction of 4nr 2.5-storey town houses constructed of traditional brick elevations under pitched roofing materials together with associated newly created hard paved access / egress roadway, off-road car parking facilities and front and rear private gardens.

The proposed site layout is as annotated on **KWL ARCHITECTS** architectural drawings contained herein.

The proposed development falls within the administrative jurisdiction of **KNOWSLEY METROPOLITAN BOROUGH COUNCIL** administered under planning application number 22/00757/COND1.

It should be borne in mind that the data and opinions contained in this report should be read in conjunction with the Notes on Limitations, given in Appendix D.

ASSOCIATED REPORT REFERENCES:**DATE:**Phase I Desk Study Report (CCG-C-21-12516) prepared by **CC GEOTECHNICAL LTD**

September 2021

Phase II Geo-environmental Report (CCG-C-21-12518-3) prepared by **CC GEOTECHNICAL LTD**

September 2021

Recommendations**1.0 Soil Contamination**

The human health risk assessment contained in the above referenced Phase II Report identified elevated levels of Lead, Arsenic and several PAH species within the made ground soils. Consequently, several potential risks to receptors were identified, and hence some remedial actions / measures were recommended, as tabulated hereunder:

Table 1: Post Investigation Conceptual Model

Source	Pathway	Receptor	Remedial Recommendations
Elevated levels of soil contaminants including: Lead Arsenic Benz(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(a)pyrene Dibenzo(ah)anthracene	ingestion and dermal pathways	Construction operatives Future residents Workers in adjacent business premises General transient public	No remedial works will be required in areas of proposed permanent hardstanding – building / pavements - since the hard cover will break all plausible pathways. For all new soft garden / landscaped areas, a clean cover layer is required. It is therefore recommended that soft garden / landscaped areas be reduced by 600mm below finished level and levels restored with verified clean imported soils. The composition of the imported clean soils is to be made up of a minimum 150mm imported topsoil and 450mm of sub-soil. Additionally, if made ground soils remain below 600mm dig depth within garden areas, a geotextile membrane is to be incorporated to act as a break layer between the imported soils and existing insitu ground

Table 1: Post Investigation Conceptual Model (continued)

Source	Pathway	Receptor	Remedial Recommendations
Natural Radon gas arising from on-site bedrock (Mudstone)	Inhalation and ingestion pathways	Future residents	Current radon mapping (https://www.ukradon.org/information/ukmaps) (accessed 26 th April 2024) shows the site to be within an area where it is believed that between 3-5% of the properties within the area are affected by Radon, consequently Basic Radon protective measures are required for all new buildings in contact with the ground.
Contaminant concentrations above WRAS criteria for PE potable water supply	Ingestion of contaminated water	Future occupants	New water mains must be specified as PE/AL/PE barrier (Protectaline) pipe construction. Pipes should be laid in accordance with BS EN 12201-2 'Plastic piping systems for water supply, and for drainage and sewerage under pressure' as stated in UKWIR guidance.

2.0 Site Preparation / Trafficking

The ground investigation has shown the site to be underlain by superficial deposits of made ground. Full removal of these deposits is neither practicable nor environmentally beneficial. In order to control potentially harmful dust releases (as far as practically possible), it is therefore recommended that exposed made ground soils are dampened, such that general site activity and trafficking do not cause release of made ground soil dust. Foundation and service excavations through the cover into the made ground must be undertaken in a controlled manner by the contractor.

3.0 Gas Contamination

Based on the gas monitoring data obtained, the risk to the proposed development was assessed in line with Situation A as defined in CIRIA C665, and on this basis the site complies with Characteristic Situation 1, and no gas protection measures are required.

Notwithstanding the above assessment, current radon mapping (<https://www.ukradon.org/information/ukmaps>) (accessed 26th April 2024) shows the site to be within an area where it is believed that between 3-5% of the properties within the area are affected by Radon, consequently Basic Radon protective measures are required for all new buildings in contact with the ground.

4.0 Water Mains Supply

Assessment of the soil chemical data to specify the construction of new water mains at the development site was based on the criteria specified in Paper 10/WM/03/21 'Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites' January 2011 published by UK Water Industry Research (UKWIR) and the supplementary guidance UUENG/RL/V2/July 2011 published by United Utilities Water (UWU).

Concentrations of the pertinent soil contaminants were found to be above the threshold values recommended under the UKWIR and UWU guidance. On this basis, new water mains must be specified as PE/AL/PE barrier (Protectaline) pipe construction. Also, new water mains should be laid in a clean remediated alignment, with 300mm clean gravel surround (i.e 600mm wide trench, with mains set centrally).

Pipes should be laid in accordance with BS EN 12201-2 'Plastic piping systems for water supply, and for drainage and sewerage under pressure' as stated in UKWIR guidance.

Notwithstanding the above preliminary assessment, the developer should contact the local water supplier (UWU) to obtain concurrence with the recommendations given above. The supplier may require the developer to return a completed UWU Risk Assessment document.

Fill materials imported from offsite sources will require contamination assessment at a rate of 1 analysis per 100m³.

5.0 Unanticipated Contamination

As with all urban developments, disturbance of the ground may uncover unanticipated features which may give rise to considerations of contamination insofar as the exposed conditions may have the potential to impact on receptors *inc* humans, animals, controlled waters, or the fabric of buildings. Any such encounters will require the contractor to halt work, isolate the risk area, and summon CCG to site to determine the nature of the exposure and to determine an appropriate course of action. Any such incidents will be fully documented in the site Validation Report.

Detailed Remediation Strategy

Recommendation (see above)	Governing Standard Operating Procedure	Site Specific Additions to Standard Operating Procedure
1 & 2	CCG Standard Operating Procedures 1, 2 & 3	GARDEN / CULTIVATED LANDSCAPE AREA REMEDIATION WORKS No remediation required under areas of hardstanding and building cover. The following measures should be carried out within garden / cultivated landscaped areas: - Reduction to 600mm below proposed finished level and restored to finished design levels by placement of clean imported soils comprising 150mm (minimum) topsoil with the remaining 450mm composite subsoil. All materials imported for landscaping will be subject to a regime of validation sampling and testing, and proof excavations will be undertaken to verify compliance with the stated thickness. - Test suite and compliance thresholds for imported clean subsoil / topsoil / granular fill are presented on the enclosed series of tables 'Cover System – Validation Analysis Test Suite and Threshold Assessment Criteria, Imported Materials'. - Where possible imported soils should be sourced from a single supplier and be visually inspected prior to transportation to site to ensure soil is free from detritus and deleterious materials. Record keeping / Validation - Removal of surplus soils generated during site level reduction works will be documented by Waste Transfer Notes, to be retained by the Contractor and made available to CCG for inclusion in the Validation Report. - Test suite and compliance thresholds for imported clean topsoil / subsoil are presented on the enclosed tabulation - Summary of LQM GAC Thresholds and Proposed Acceptance Criteria for Imported Soils in Appendix C. The suite of testing will comprise metals, non-metals, asbestos identification, BTEX compounds, speciated PAH's, and hydrocarbons to the TPHCWG methodology. - Analysis of soils for demonstration of compliance will be undertaken at a frequency of 1 analysis per 50m³, with a minimum of 4nr samples per source. - Soil chemical analyses are to be carried out at a UKAS/MCERTs laboratory. - Results of analyses will be collated in a Validation Report. Dockets for imported subsoil / topsoil to be retained by the Contractor and provided to CCG for inclusion in the Validation Report. - The Contractor will keep photographic records during site preparation works and provide these to CCG for inclusion in the Validation Report - CCG will independently validate thickness of topsoil by inspection pits/photography following completion of works. These records will be

		incorporated in the Validation Report.
3	CCG Standard Operating Procedures 4	<u>RADON GAS PROTECTION MEASURES AND SUBFLOOR VOID TREATMENT</u> The requirements to protect against radon ground gas contamination are as follows: - Incorporate a proprietary Basic Radon protection membrane (i.e Visqueen Radon R400 membrane or similar) in the suspended floor slab. Provide drawn details of ground slab construction showing position of membrane in the slab construction. Record keeping / Validation Validation records will be provided to CCG for incorporation into the Phase 4 Validation Report: - Photographic records of passively vented subfloor void. - Records of membrane purchases for reconciliation with total floor area to be provided by the Contractor for inclusion in the report appendices. - Inspection of on-site membrane storage and handling provisions to demonstrate low risk of sustaining damage. - Inspection visits (including photographic records) will be undertaken at appropriate intervals to monitor installation in accordance with the pro-forma contained in Appendix D. It is the responsibility of the Contractor to inform CCG of when construction is at the appropriate stage(s) for inspection visits.
4	Standard Operating Procedure 5	<u>WATER MAIN PROTECTION MEASURES</u> New water mains should be specified as Protecta-Line (PE/AL/PE) pipe construction. Good practice requires that water mains be laid in a remediated alignment comprising of clean granular fill extending to 600mm + pipe diameter and to 300mm below pipe underside. Pipes should be laid in accordance with BS EN 12201-2 'Plastic piping systems for water supply, and for drainage and sewerage under pressure – Polyethylene (PE) as stated in UKWIR guidance. Notwithstanding the above preliminary assessment, the contractor may wish to liaise with the relevant water supply company (United Utilities) to confirm these recommendations and any consequential requirements. Record keeping / Validation Validation records will be provided to CCG for incorporation into the Phase 4 Validation Report: - Records of the correct pipe purchases for reconciliation with plans and drawings to be provided by the Contractor for inclusion in the report appendices. - Photographs to be provided by the Contractor of mains installation showing clean backfill surround

The Standard Operating Procedures referred to above are attached in Appendix B.

APPENDIX A

DRAWINGS

APPENDIX B

STANDARD OPERATING PROCEDURES

STANDARD OPERATING PROCEDURES REMEDIATION AND VALIDATION



Subject: REMOVAL OF CONTAMINATED SOILS

Approval:

Doc. No: CCG SOP 1.0

Revision: 1

Effective Date:

10/10/07

Page: 1 of 2

1.0 PURPOSE

The purpose of this procedure is to identify the methodology, sequence of events, responsibilities, and reporting requirements required in connection with site remediation involving excavation of contaminated soils to a level where soils of acceptable contamination status remain in place

2.0 SCOPE

The methods described within this procedure are applicable to the mechanical/hand removal of site soils impacted by contamination.

3.0 RESPONSIBILITIES

CC GEOTECHNICAL (CCG) – Responsible for delineating the lateral extent and notional vertical extent of soil removal, and for on site monitoring of the excavation works. In some cases, the lateral extent will not require delineation by CCG as the whole site will fall under the same remediation regime.

Site Management - The site manager is to ensure that the instructed excavations are undertaken as detailed by CCG. It is the site manager`s responsibility to accurately transfer dimensions of all areas to be remediated from drawings to site markers.

Precautions should be taken to ensure that the foundations of adjacent structures are not undermined by excavation activities. Similarly, care should be taken to prevent the collapse of excavations.

Spoil to be disposed, is to be transported off-site as soon as practicable. Only licensed waste transfer operators are to be employed for spoil removal offsite. Where possible, excavated spoil is to be loaded directly on to a waiting wagon ready for transportation to the accepting landfill. Wagons must be sheeted.

Where stockpiling of waste spoil is to take place, preventative action should be undertaken to ensure mixing of contaminated and clean soils does not occur. Measures are to include placement of stockpile on an impermeable membrane.

The site manager is to ensure that any stockpiles of spoil are homogenous.

4.0 PROCEDURE

Soils identified for removal are to be excavated by mechanical / hand dug methods. Where the depth of contamination and hence depth of required excavation is known, this should be adhered to.

Where a specific impacted stratum is to be removed e.g. where the objective is to remove all made ground, excavations are likely to be undertaken to varying depths – following the profile of the underlying strata.

There may be incidences where general oversite validation testing or localised validation testing is required at the base of remedial excavations. Such circumstances will be proposed in the Remediation Strategy, which will propose a frequency of testing and validation criteria against which the results will be assessed.

Where the results of testing indicate that the soils at the base of excavations fail the criteria, then further excavation and disposal of impacted soils will be undertaken.

Once the desired depth of excavation/site strip has been achieved photographic records of the nature of the reduced subgrade level will be obtained. Where agreed remedial action is that soils are to be removed to a specified depth, photographic records supported by survey levels will be collated.

STANDARD OPERATING PROCEDURES REMEDATION AND VALIDATION



Subject: REMOVAL OF CONTAMINATED SOILS

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5.0 REPORTING DELIVERABLES

The following will be reported in the Validation Report:

1. Drawing showing lateral extent of excavation
2. Drawing showing post excavation depths of dig
3. Photographs of reduced dig including levelling staff
4. Analyses for base of remediation excavations at a rate of 1 per 100m²
5. Transfer notes for all loads of spoil carted offsite

6.0 SITE SPECIFIC REQUIREMENTS

Site specific requirements over and above the provision of this SOP must be proposed and agreed in the Remediation Strategy

STANDARD OPERATING PROCEDURES REMEDATION AND VALIDATION



Subject: INSTALLATION OF CLEAN SOIL COVER SYSTEMS

Approval:

Doc. No: CCG SOP 2.0

Revision: 1

Effective Date:

10/10/07

Page: 1 of 2

1.0 PURPOSE

The purpose of this procedure is to identify the methodology, sequence of events, responsibilities, and reporting requirements required in connection with site remediation involving placement of clean imported soils to specified finished levels and/or thickness

2.0 SCOPE

The methods described within this procedure are applicable to the mechanical/manual placement of clean imported soils.

3.0 RESPONSIBILITIES

CC GEOTECHNICAL – Responsible for delineating the lateral extent and vertical extent of soil placement, the relative thickness of subsoil and topsoil (where appropriate), and for on site monitoring of the placement works. Responsible for sampling the soils at the frequency agreed with the Local Authority, procuring laboratory analyses, and reporting on the conformance of the soils in relation to the agreed criteria.

SITE MANAGEMENT - The site manager is to ensure that the instructed placements are undertaken as delineated by CC GEOTECHNICAL in terms of lateral and vertical dimensional control. It is the site managers responsibility to accurately transfer dimensions of all areas to be remediated from drawings to site markers.

Soil to be imported to site, is to be transported in sheeted wagons.

Where temporary stockpiling of imported soil is to take place, preventative action should be undertaken to ensure mixing of underlying ground and imported soils does not occur. Measures are to include placement of stockpile on an impermeable membrane.

4.0 PROCEDURE

Soils are to be spread in layers by mechanical / manual methods.

Where soils are placed under cultivated areas then they must be of suitable physical properties to promote root establishment and healthy plant growth

The imported soils may be sampled in stockpiles on the development site at a frequency proposed in the Remediation Strategy and approved by the Local Authority.

The imported soils will be sampled insitu at a frequency proposed in the Remediation Strategy and approved by the Local Authority.

Where a geotextile separation layer is to be placed beneath the remediated area, then it shall be to a specification proposed in the Remediation Strategy and approved by the Local Authority

Where a sample fails to meet the threshold criteria, then the specific plot at which the sample was taken will be excavated and the soil replaced. Other individual plots represented by the sample will be sampled and the sample analysed, to conform whether each individual plot fails the criteria, and if so the soil on the affected plots will be replaced.

Once the desired depth of subsoil placement has been achieved, the works will be halted and photographic records made of the remaining depth to finished level.

Once the desired finished placement level of topsoil has been achieved, photographic records will be made of the finished remediation.

STANDARD OPERATING PROCEDURES REMEDATION AND VALIDATION



Subject: INSTALLATION OF CLEAN SOIL COVER SYSTEMS

Approval:

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10/10/07

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Photographs records are to include as a minimum the following:

1. Spatial panoramic and individual stills of both the development and the areas of soft landscaping
2. Photographs taken of and within excavations showing all layering of soils with clearly shown depths of the strata. The excavations will additionally be photographed to show their spatial position within the site.
3. All photographs are to be taken in good light, with all aspects to be shown on the photograph clear and unobscured by shadow.
4. All photographs are to remain untouched as original exposures. No modification using photographic editing software is to be undertaken whatsoever.
5. Photograph locations are to be noted, and a plan demonstrating this constructed.
6. All photographs are to be fully and adequately described.
7. Once completed photographs of the landscaping are to be taken demonstrating extent of bare ground, planting volume and quality of workmanship.

5.0 REPORTING DELIVERABLES

The following will be reported in the Validation Report:

1. Drawing showing lateral extent of placement
2. Drawing showing total thickness of cover and division of subsoil / topsoil thickness
3. Photographs of subsoil completion including location / date / levelling staff
4. Photographs of completed restoration to top of topsoil including location / date / levelling staff
5. Analyses of subsoil and topsoil
6. Details of the source origin of cover materials
7. Delivery dockets for each consignment

6.0 SITE SPECIFIC REQUIREMENTS

Site specific requirements over and above the provision of this SOP must be proposed and agreed in the Remediation Strategy

STANDARD OPERATING PROCEDURES REMEDATION AND VALIDATION



Subject: SOIL SAMPLING

Approval:

Doc. No: CCG SOP 3.0

Revision: 1

Effective Date: 10/10/07

Page: 1 of 1

1.0 PURPOSE

The purpose of this procedure is to identify the equipment, sequence of events, and appropriate methods necessary to obtain soil samples during validation sampling activities.

2.0 SCOPE

The methods described within this procedure are applicable while collecting soil samples at the base of excavations and from stockpiled materials.

3.0 RESPONSIBILITIES

Site Manager - The site manager is to ensure that site soils are accessible to the environmental project manager for the purpose of extracting samples. Where soils are identified as contaminated, preventative action should be undertaken to ensure mixing of contaminated and clean soils does not occur.

The site manager is to ensure that all stockpiles are homogenous.

CC GEOTECHNICAL appointed Project Manager – The environmental project manager is responsible for the design and implementation of the sampling strategy.

4.0 PROCEDURES

Samples to be taken from the base of excavations are to be taken from within the top 0.1m of exposed ground.

Samples to be taken from stockpiled materials are to be sampled from varying positions throughout the stockpile, penetrating it as far as practical. Sample positions to be identified by photographic means where possible.

Samples may be extracted by hand using a stainless steel trowel or spade. Such tools shall be decontaminated by means of rinsing with clean water prior to obtaining each and every sample.

Samples shall be immediately deposited to suitable tubs/jars, labelled, packaged in cool boxes and accompanied by a chain-of-custody record ready for transportation to the laboratory.

The positions/frequency at which samples are extracted will be as detailed in the remediation statement, any variation from this is to be accurately documented and the relevant local authority is to be notified.

5.0 EQUIPMENT

Disposable gloves, stainless steel spade, stainless steel hand trowel, sample containers, cool boxes, labels, logbook.

STANDARD OPERATING PROCEDURES REMEDATION AND VALIDATION



Subject: INSTALLATION OF GAS PROTECTIVE MEASURES

Approval:

Doc. No: CCG SOP 4.0

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Page: 1 of 1

1.0 PURPOSE

The purpose of this procedure is to identify the methodology, sequence of events, responsibilities, and reporting requirements required in connection with the installation of gas protection measures in buildings.

2.0 SCOPE

The requirements described within this procedure are applicable to the installation of gas/hydrocarbon vapour resistant membranes.

3.0 RESPONSIBILITIES

Contractor – The contractor is responsible for the design of the gas protection measures, in accordance with the general recommendations provided in the site investigation reports and approved in principle by the Local Authority. The contractor is responsible for the submission of the specification and detailed design of gas protection measures to the Local Authority and obtaining approval to these submissions.

The contractor is responsible for ensuring that the approved specification and design of the gas protection measures is communicated to **CC GEOTECHNICAL (CCG)**.

The contractor is responsible for the installation of the gas protection measures in accordance with the approved specification and design. The site manager is to ensure where required, that the gas/vapour resistant membrane be installed in line with the manufacturers instructions.

CCG or Independent Inspector - Responsible for the inspection and verification that gas protection measures are installed in accordance with the approved specification and design.

4.0 PROCEDURES

The installation of the gas/vapour resistant membrane is to be undertaken in accordance with the specific manufacturers methodology. The installation of membranes must be undertaken by experienced and competent personnel.

5.0 REPORTING DELIVERABLES

The following will be reported in the Validation Report:

- Manufacturers certificates
- Independent inspectors statement of storage suitability
- Independent inspectors statement of subgrade inspection
- Independent inspectors statement of roll out damage inspection
- Independent inspectors photographic records of installation (identifying date & plot/block)
- Independent inspectors completion of Gas Protection Validation Record (see pro-forma)

STANDARD OPERATING PROCEDURES REMEDICATION AND VALIDATION



Subject: INSTALLATION OF WATER MAINS

Approval:

Doc. No: CCG SOP 5.0

Revision: 1

Effective Date:

11/03/08

Page: 1 of 2

1.0 PURPOSE

The purpose of this procedure is to identify the methodology, sequence of events, responsibilities, and reporting requirements required in connection with the installation of specified water mains.

2.0 SCOPE

The methods described within this procedure are applicable to the installation of water mains.

3.0 RESPONSIBILITIES

Contractor – The contractor is responsible for the installation of the water mains in accordance with the general recommendations provided in the site investigation reports. The contractor is responsible for the submission of the specification and detailed design of water mains to United Utilities, and for obtaining their approval to the proposals.

The contractor is responsible for ensuring that the approved specification and design of the water mains is communicated to **CC GEOTECHNICAL LTD.**

The contractor is responsible for the installation of the water mains in accordance with the approved specification and design.

CC GEOTECHNICAL LTD - Responsible for the inspection and verification that water mains are installed in accordance with the approved specification and design.

4.0 PROCEDURES

The installation of water mains is to be undertaken in accordance with the approved specification and design. Mains installation will be undertaken by experienced and competent personnel. Only quarried virgin material will be acceptable for the formation of the remediated alignment around mains.

The installation works will be monitored for compliance in the following areas:

- Receipt of mains materials compliant with the specification stated within the Remediation Statement (eg. PE/Al/PE)
- Receipt of granular fill with appropriate source documentation
- Correct storage of mains / granular materials to ensure no cross contamination with onsite soils
- Certification of quarried granular fill (delivery notes etc.)
- Classification of quarried granular fill (eg. Limestone etc)
- Trench excavation to agreed depth/width
- Placement of geotextile where required
- Installation of mains
- Backfill with clean soils where required

5.0 REPORTING DELIVERABLES

The following will be reported in the Validation Report:

1. Manufacturers certificates
2. Photographic records of trench excavation/dimensions
3. Photographic records of geotextile placement where required
4. Photographic records of mains installation works
5. Photographic records of placement of mains surround with quarried granular fill

STANDARD OPERATING PROCEDURES REMEDATION AND VALIDATION



Subject: INSTALLATION OF WATER MAINS

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6.0 SITE SPECIFIC REQUIREMENTS

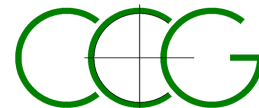
Site specific requirements over and above the provision of this SOP must be proposed and agreed in the Remediation Strategy

APPENDIX C

SOIL CONTAMINANT ACCEPTANCE CRITERIA

SOIL ASSESSMENT CRITERIA FOR RESIDENTIAL LAND USE (WITH HOMEGROWN PRODUCE)

(Updated: January 2023)



Contaminant	Assessment Criteria for Residential at 1% SOM (mg/kg)	Assessment Criteria for Residential at 2.5% SOM (mg/kg)	Assessment Criteria for Residential at 6% SOM (mg/kg)
Metals			
Arsenic	37	37	37
Boron	290	290	290
Cadmium	11	11	11
Chromium III	910	910	910
Chromium VI	6	6	6
Copper	2400	2400	2400
*Lead	200	200	200
Mercury	1.2	1.2	1.2
Nickel	130	130	130
Selenium	250	250	250
Vanadium	410	410	410
Zinc	3700	3700	3700
Non-Metals			
Phenol	120	200	380
Polyaromatic Hydrocarbons (PAH)			
Acenaphthene	210	510	1100
Acenaphthylene	170	420	920
Anthracene	2400	5400	11000
Benz[a]anthracene	7.2	11	13
Benzo[a]pyrene	2.2	2.7	3.0
Benzo[b]fluoranthene	2.6	3.3	3.7
Benzo[ghi]perylene	320	340	350
Benzo[k]fluoranthene	77	93	100
Chrysene	15	22	27
Dibenz[ah]anthracene	0.24	0.28	0.3
Fluoranthene	280	560	890
Fluorene	170	400	860
Indeno[123-cd]pyrene	27	36	41
Naphthalene	2.3	5.6	13
Phenanthrene	95	220	440
Pyrene	620	1200	2000
Coal Tar [Bap as surrogate marker]	0.79	0.98	1.1
Petroleum Hydrocarbons			
Aliphatic EC 5-6	42	78	160
Aliphatic EC >6-8	100	230	530
Aliphatic EC >8-10	27	65	150
Aliphatic EC >10-12	130	330	760
Aliphatic EC >12-16	1100	2400	4300
Aliphatic EC >16-35	65000	92000	110000
Aliphatic EC >35-44	65000	92000	110000
Aromatic EC 5-7 (Benzene)	70	140	300
Aromatic EC >7-8 (Toluene)	130	290	660
Aromatic EC >8-10	34	83	190
Aromatic EC >10-12	74	180	380
Aromatic EC >12-16	140	330	660
Aromatic EC >16-21	260	540	930
Aromatic EC >21-35	1100	1500	1700
Aromatic EC >35-44	1100	1500	1700
Aliphatic – Aromatic EC >44-70	1600	1800	1900
Other			
Asbestos Containing Materials (ACM)	No Detection	No Detection	No Detection

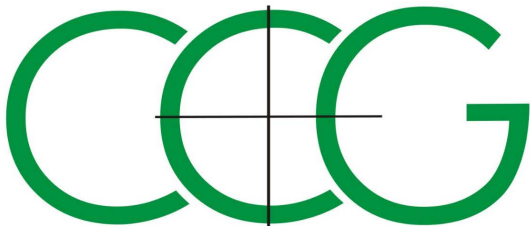
Copyright: Land Quality Management Limited (LQM)

The above is based on criteria contained in publication LQM/CIEH S4UL's for Human Health Risk Assessment (2015) (CCG Licence No. S4UL3233), applicable to the "Residential" land use (with home grown produce) scenario for soil organic matter (SOM) content of 1% - 6%.

*This document does not provide criteria for Lead, for which the results were compared to the C4SL published by DEFRA SP1010 Development of Category 4 Screening Levels.

APPENDIX D

GAS VALIDATION PROFORMA



Gas Protection Validation Record

One record sheet to be completed for each plot inspected by a SUITABLY QUALIFIED independent consultant/engineer

job number		design source/ref:		specification source/ref:		other documents attached	✓ / ✗	☐
site name / location		building use:	residential ☐	commercial ☐	other (describe)			
plot number/s		building description:	no. of storeys =		detached ☐	semi-detached ☐	terrace ☐	apartment block ☐
compiled by:		gas protection type:	active / passive		foundation type:	suspended floor / raft / other		

Ventilated sub-floor (if present)	inspection date/time:		inspected by:		photographed:	✓ / ✗	☐
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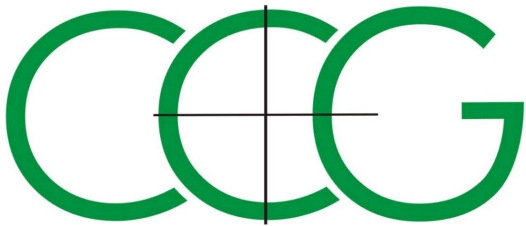
✓ / ✗ **Notes/recommendations (see guide below)**

void former type	☐	1.	
height of void space	☐	2.	
gravel type	☐	3.	
pipe size and spacing	☐	4.	
external wall airbricks	☐	5.	
internal sleeper walls	☐	6.	
external vent trenches / ducts	☐	7.	

Gas barrier	inspection date/time:		inspected by:		photographed:	✓ / ✗	☐
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✓ / ✗ **Notes/recommendations**

membrane type	☐	8.	
extent of coverage	☐	9.	
underside of membrane	☐	10.	
slab/membrane condition	☐	11.	
laps and joints	☐	12.	

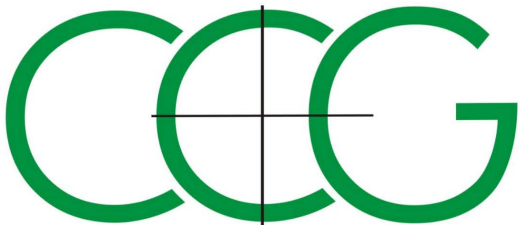


Gas Protection Validation Record

damp-proof course	☐	13.
service entries and seals	☐	14.
cavity inspection	☐	15.

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris. Take photographs of stockpile close up shot of stone with tape measure. Alternatively check details on delivery tickets for stone. Take photographs of adjacent plots if at this stage of construction. Check depth of stone conforms to at least 300mm if visible.
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents? Take photographs of vents on external walls for each plot. (May be possible to photograph other plots on site which are at stage of installing vents. Will be useful for these plots later on).
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycombe brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? Check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	underside of membrane	Where necessary, for example, when using a granular blanket as a ventilation layer, check the underside of the membrane has adequate protection e.g. minimum 50mm no fines concrete blinding layer or appropriate geo-textile (see also below)



Gas Protection Validation Record

11	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage. Take photographs of each plot inspected.
12	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals). Take photographs of jointing for each plot.
13	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
14	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check , with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections. Take photographs for all plots inspected.
15	cavity Inspection	check gas membrane or gas resistant dpc is taken across cavity. Check for rips across cavity. Check for jointing detail of gas resistant dpc or membrane across cavity to main membrane. Take photographs for all plots inspected.

This plot has PASSED / FAILED* inspection.

(Any proposed remedial works will be noted in the 'Remarks' column on this form).

An addition inspection visit IS / IS NOT* required for this plot.

Qualified Engineer:
(Print Name)

Signed:.....

* Delete as appropriate

APPENDIX E

NOTES ON LIMITATIONS

Notes on Limitations For Geoenvironmental and Geotechnical Consultancy Services

General

This document has been prepared by CC GEOTECHNICAL LTD within the terms of the contract, scope of work, and resources agreed in writing with the client. The limitations of liability of CC GEOTECHNICAL LTD for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

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The findings and opinions provided in this document are made in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined in this document.

The findings and opinions are relevant to the dates when the assessment was undertaken, but should not necessarily be relied upon to represent conditions at a substantially later date. In particular, seasonal groundwater levels, with the effects of precipitation, may affect the conditions found during the investigation. The report should be read in conjunction with the further Notes on Limitations included in Appendix A.

Where opinions expressed in this report are based on current available guidance and legislation, no liability can be accepted by CC GEOTECHNICAL LTD for the effects of any future changes to such guidelines and legislation. Additional information, improved practices, new guidance, changes in legislation, or amendments to design proposals, may necessitate this report having to be reviewed in whole or in part after that date. Opinions and interpretations are not accredited by UKAS.

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1. the consequences of this document being used for any purpose or project other than for which it was commissioned and/or
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Phase I Environmental Audits / Desk Studies

The work undertaken to provide the basis of a Phase 1 Desk Study report comprises a study of available documented information from a variety of sources (including the client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in a Desk Study report have been dictated by finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in the report, CC GEOTECHNICAL LTD reserves the right to review such information and to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Factual Ground Investigations

The investigation of the site has been carried out in accordance with the scope and specification instructed by the Client. No interpretations of the data generated by the investigation have been provided or implied. The exploratory holes undertaken in this commission, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. Conditions may exist on the site which have not been detected by the works undertaken. Furthermore, the number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" or more widespread contamination where concentrations may be significantly higher than those actually encountered.

Interpretative Phase II Environmental Audits

The investigation of the site has been carried out with the intention of providing sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated to potential human targets, building materials, the environment (including adjacent land), and surface and groundwater.

The amount of exploratory work and chemical testing undertaken may have been restricted by factors including inter alia the Clients budget, the available timescale, access to all parts of the site, the existence of buried services etc., and where this is the case, a more comprehensive investigation may be required if the site is to be redeveloped, since a number of important engineering and environmental issues may need further assessment.

For those reasons, if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

It must be borne in mind, that the exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which have not been disclosed by this investigation, and which have therefore not been taken into account in this report. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" or more widespread contamination where concentrations may be significantly higher than those actually encountered. The findings of the investigation are valid for the time of investigation and the passage of time may result in changes to the contamination status of the site, and a reassessment of the site may be required where significant time has elapsed.

Geoenvironmental Ground Investigations

The investigation of the site has been carried out within the constraints of Client budget, available timeframe, access to all parts of the site, the existence of buried services and a more comprehensive investigation may be required to provide sufficient information regarding the type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions, to formulate a reasonable assessment of the environmental risks together with engineering and development implications.

If costs have been included in relation to the site remediation, these must be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of the site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which have not been disclosed by this investigation, and which have therefore not been taken into account in this report. The findings of the investigation are valid for the time of investigation and the passage of time may result in changes to the contamination status of the site, and a reassessment of the site may be required where significant time has elapsed.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal, weather, or other effects.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations and no liability can be accepted for the retrospective effects of any future changes or amendments to these values.