GROUNDTECH
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WHITEHALL ROAD WEST, BIRKENSHAW

REMEDIAL SPECIFICATION

ORION HOMES

MAY 2026

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Plan Reference	*Revision*	*Title*
GRO-24078-P01	-	*Project Location Plan*
2306/02/001	-	*Site Plan*

1.0 INTRODUCTION

1.1 Background

This Remedial Specification has been produced on behalf of Orion Homes and relates to the remediation of a site at Whitehall Road West in Birkenshaw.

The site is currently undeveloped and formed by two parcels of land, the northern parcel was generally level and the southern parcel was uneven and hummocky.

A summary of the findings of the investigations is outlined in *Section 2.0*.

1.2 Proposed Works

Remediation will be undertaken at the site to prepare it for development of the residential housing as shown on the proposed development layout drawings submitted through planning. It is proposed to construct 23 No. dwellings on the 0.8 hectare site with associated garages, garden areas, highways and driveways.

Orion Homes have submitted a planning application which is currently under consideration by Kirklees Council. This Remedial Specification has been commissioned to facilitate the discharge of any pre-commencement planning conditions that are likely to be enforced with regard to land contamination.

The full planning permission (2024/62/92281/E) is for the erection of 23 No. dwellings and associated works with means of access from Whitehall Road West.

1.3 Objectives

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

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

The following Remedial Specification includes the protection measures required and to be installed during the works phase for a residential end use with plant uptake.

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

1.4 Remediation Specification Scope

The scope of the Remedial Specification is in accordance with Land Contamination Risk Management (LCRM) guidance as follows:

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

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

1.5 Sources of Information

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

- *JNP Group Consulting Engineers Ltd 'Whitehall Road West, Birkenshaw' (Ref. NG7020/WHI/JAW/vl) dated 01 May 2008.*
- *RSK Environment Ltd 'Site Investigation' (Ref. 350520-R01 (00)) dated November 2022.*
- *ARP Geotechnical Ltd 'Combined Stage 1/Stage 2 Geo-Environmental Report (Ref. ORH/20r1) dated 11th August 2023.*
- *Groundtech Consulting Ltd 'Coal Mining Risk Assessment' (Ref. GRO-24208-5354) dated 16 August 2024.*
- *Groundtech Consulting Ltd 'Supplementary Investigation' (Ref. GRO-24208-5483_1.1) dated 04 November 2024.*
- *Groundtech Consulting Ltd Letter Report '2025/92161 Whitehall Road West, Birkenshaw Planning Comments' (Ref. GRO-24208-5483_1.1) dated 04 November 2024.*

2.0 CONCEPTUAL SITE MODEL

2.1 Site Details

The site is almost rectangular in shape and split into a Northern Parcel and Southern Parcel. The entire site is approximately 0.8 hectares in area. The Northern Parcel is generally level and sits circa 1m lower than the Southern Parcel. The topography of the Southern Parcel is uneven and hummocky.

This area of site was occupied by an existing two storey brick-built residential dwelling in the eastern section of the parcel. Immediately north of the dwelling was a block paving access road utilised as a driveway accessed via Whitehall Road to the north of the site. A small wooden fenced garden area was located south of the dwelling.

The Northern Parcel is bounded by a circa 1m high retaining wall to the north, palisade fencing to the west and hedgerow/trees to the south. The eastern boundary is defined by the neighbouring residential property and associated hedgerow/garden to the south eastern boundary.

The Southern Parcel is unoccupied and undeveloped, it was also predominantly soft surfaced with grass and associated shrubbery including bramble. The vegetation in the centre of the centre of site was less dense than the surrounding areas, some semi-mature to mature trees are present in the centre.

2.2 Site History and Consultations

The site comprised undeveloped fields since the earliest available historical maps. From the 1930s the site was used as landscaped gardens, following which no further development is shown.

The following environmental information was identified:

- *The site lies within an area where between 3% and 5% of properties are affected by radon and basic radon protective measures are required.*
- *There are four pollution incidents within 250m of the site, the nearest is 100m with a minor effect.*
- *No historic or active landfills recorded within 500m of the site.*
- *The site is not within an area at risk of flooding from rivers and the seas.*

2.3 Geology and Hydrogeology

Made Ground is not indicated to underly the site, however due to previous developments Made Ground is likely to be present.

No superficial deposits are indicated beneath the site. The solid geology is indicated to be the Lepton Edge Formation which comprises Sandstone and is classified as a Secondary A Aquifer.

The nearest groundwater abstraction license is 1553m south of the site.

2.4 Hydrology

The nearest watercourse is an unnamed watercourse located 58m south west of site.

Environment Agency information indicates that the site is outside a flood risk zone and is not at Risk of Flooding from Rivers and Sea (RoFRaS).

2.5 Mining

Coal Seams

Geological records indicate that the First and Second Brown Metal Coal outcrops in the *Northern Parcel.* The First and Second Brown Metal Coals are indicated to be joined together to create a single seam on geological maps. The First Brown Metal Coal is indicated to be between 0m to 1.0m thick and the Second Brown Metal Coal is indicated between 0m to 0.8 thick.

Previous investigation undertaken by RSK have recorded the Coal seam at a shallower level in TP6 and deepest in TP8, this indicates the outcrop of the 2nd Brown Metal Coal is further to the south west than the published records indicate. The RSK investigation has recorded the weathered coal as between 0.2m and 0.4m thick in the *Northern Parcel.* Furthermore, the RSK investigation has not encountered two different Coal seams in this location indicating the seam encountered onsite was the 2nd Brown Metal and the 1st Brown Metal is further north east as indicated on the maps. The investigation did not record any workings in the Brown Metal Coal on the site with competent bedrock being present between 2.6m and 4.0m begl.

The Brown Metal Coals outcrops to the north of the *Southern Parcel* and dips away from this section of the site and is therefore not influencing this parcel. Sandstone is recorded at very shallow depths beneath the *Southern Parcel* directly beneath the topsoil.

The Middleton Little Coal Seam is indicated to be the next Coal seam in the geological sequence which outcrops 400m west of the *Northern Parcel* of the site and 800m west of the *Southern Parcel* of the site. The angle of dip is not recorded on geological maps or the Coal Authority (CA) records, likely due to its insignificance and poor quality. At its thickest, this seam is indicated to be approximately 0.2m to 0.9m thick. At Drighlington, immediately east of the site, the seam is indicated to be approximately 0.3m thick.

The Middleton Main Coal is the next in the geological sequence and lies circa 15m below the Middleton Little Coal. The Middleton Main is indicated to contain dirt partings, however is recorded to have been worked on a small scale around the area of Gomersal which is located south of the site. There are no recorded workings in the Middleton Main Coal beneath the site.

Coal Authority information indicated that the Blocking Coal is the shallowest worked Coal seam at circa 91m begl followed by the Shirtcliffe Coal at circa 130m begl.

A summary of identified coal seams is provided in the table below:

Seam	Approximate Thickness (m)	Est Depth below top of bedrock (m)
1st Brown Metal	*0.0 - 1.0*	*Immediate*
2nd Brown Metal	*0.0 - 0.8*	*Immediate*
Middleton Little	*0.2 - 0.9*	*13.0 to 15.0*
Middleton Main	*1.0*	*30.0*

Underground Mining

The Silkstone (Blocking Coal) is indicated to be present beneath the site at 100m, dipping to the north east with a dip angle of 2° and extraction thickness of 70cm. The Silkstone is recorded to have been last worked in 1928.

The Whinmoor (Shirtcliffe Coal) Coal is indicated to be present 148m beneath the site dipping to the north at an angle of 1.2°, last worked in 1969.

Mine Entries

Two mine entries and an adit have been identified by the Coal Authority close to the site.

Mine Entry No.	Shaft / Adit	Grid Reference	Treatment Description
420427-013	*Shaft*	*420221 427837*	*Not given*
420427-015	*Shaft*	*420125 427647*	*Not given*
420427-018	*Adit*	*420264 427771*	*Not given*

The adit is indicated at an angle of 355° heading away from site. It is likely that the adit is targeting the First Brown Metal seam away from site.

Recommendations

Further investigation was recommended in the north eastern extent of the site to confirm if workings are present associated with the 1st Brown Metal Coal Seam.

Combustibility testing of the coal should be undertaken to record the calorific value and assess the combustibility of the coal if excavated during the enabling works.

A watching brief is recommended during the ground works as a precaution for unrecorded mine entries.

Foundations for the proposed buildings on the site should be reinforced to the structural engineers specification due to the residual risk and fault.

2.6 Ground Model

Scope of Works

The following scope of works has been completed on the site by RSK Geosciences, ARP Geotechnical and Groundtech Consulting.

Consultant	Date	Scope
RSK Geosciences	*July 2022*	*8 No. Dynamic Sampling boreholes were drilled to depths of between 0.75m begl and 2.42m begl in the southern parcel.*
ARP Geotechnical	*June 2023*	*8 No. Machine excavated trial pits were advanced to depths of between 2.8m begl and 4.3m begl in the northern parcel.*
Groundtech Consulting	*September 2024*	*4 No. Trial Trenches were advanced to depths of between 2.3m begl and 5.75m begl.*

Surfacing

The site was surfaced with Topsoil in all of the locations undertaken on the site to date.

Made Ground

Possible Made Ground was encountered in TP1 by ARP Geotechnical between the depths of 0.2m and 0.45m begl recorded as soft to firm dark brown slightly sandy silty clay (reworked natural ground).

One main Made Ground population was encountered during the investigation by Groundtech Consulting and comprised firm brown sandy gravelly clay with minor constituents of subangular to subrounded fine to coarse brick and sandstone encountered from ground level to a maximum depth of 0.45m begl in all exploratory hole locations (TT101 to TT104).

Superficial Deposits
High strength stiff light brown slightly sandy silty Clay was encountered in all exploratory hole locations undertake by ARP Geotechnical between the depths of 0.2m and 3.1m begl.

Medium strength firm to stiff grey slightly sandy silty Clay was encountered in TP1, TP3 to TP8 below weathered Coal seam between the depths of 1.2m and 4.1m begl.

Groundtech consider the above to be weathered Coal Measures as no superficial deposits are recorded underlying the site.

Solid Geology
The investigation by RSK Geosciences recorded weathered bedrock of the Lepton Edge Formation underlying the Topsoil to the base of the boreholes. the bedrock was predominantly recovered as orangish brown sandy gravel of Sandstone and gravelly sand locally in WS01.

During the investigation by ARP Geotechnical, a band of Mudstone was encountered in TP3 between the depths of 1.0m and 1.1m begl. Extremely weak Siltstone recovered as cobbles and gravel was recorded in TP1 to TP5 and TP7 to TP8 between the depths of 2.6m and 4.3m begl. Extremely weak Mudstone recovered as cobbles and gravel were encountered in TP6 between the depths of 2.6m and 2.9m begl.

Groundtech Consulting recorded firm light brown silty Clay in all exploratory hole locations from depths of between 0.15m and 0.4m begl to a maximum depth of 2.95m begl, which was considered to be residually weathered Coal Measures. Extremely weak orange brown turning light grey Siltstone residually weathered recovered as firm to stiff silty Clay was encountered in all exploratory hole locations at depths of between 1.8m and 4.4m begl. Weak to medium strong light grey Siltstone slightly weathered recovered as angular fine to coarse gravel and cobbles was encountered in TT101A between the depths of 4.4m and 5.57m begl.

Coal Seams
No coal seams were encountered by RSK Geosciences in the southern area of the site.

ARP Geotechnical encountered weathered Coal seam in all exploratory hole locations between the depths of 0.8m and 1.2m begl and 1.8m and 3.4m begl in the northern area of the site.

Black anthracite Coal with bituminous inclusions was encountered within all the trial trenches undertaken by Groundtech Consulting between the depths of 1.9m and 3.0m begl to a maximum depth of 3.2m begl.

Groundwater
Perched groundwater was encountered by Groundtech Consulting in the Made Ground at a depth of 0.15m begl.

Watching Brief
A watching brief was maintained during the Ground Investigation for visual and olfactory evidence of contamination. No visual or olfactory evidence of contamination was noted during the RSK, ARP or Groundtech Ground Investigations.

2.7 Geo-Environmental Testing Results - Soils

The following suite of testing was undertaken by RSK Geosciences and ARP Geotechnical:

- *12 No. Heavy Metals*
- *12 No. Speciated Polycyclic Aromatic Hydrocarbons (PAHs)*

- *2 No. Total Petroleum Hydrocarbons (TPH CWG)*
- *12 No. asbestos screens*

Heavy Metals
The previous investigation by RSK identified elevated concentrations of arsenic in 3 of the 4 samples of topsoil screened from across the southern site area and the later investigation by ARP recorded no elevated concentrations of arsenic in the eight samples screened from the northern area of the site. The elevated concentrations of arsenic recorded by RSK were recorded at concentrations of 47mg/kg, 41mg/kg and 37mg/kg when compared to the screening value of 37mg/kg for residential end use with plant uptake.

Statistical analysis was undertaken by Groundtech Consulting on the entire dataset as part of the letter report which determined that the true mean for the recorded arsenic concentrations lies below the critical concentration and no further action was required with respect to arsenic for the natural topsoil at the site.

No further elevated concentrations of heavy metals were recorded in the other eleven samples screened across the site by RSK Geosciences and ARP Geotechnical.

Speciated Polycyclic Hydrocarbons (PAHs)
No elevated concentrations of speciated PAHs were detected in the twelve samples screened across the site by RSK Geosciences and ARP Geotechnical.

Total Petroleum Hydrocarbons (TPH CWG and BTEX)
No elevated concentrations of speciated hydrocarbons were recorded in the two samples tested by RSK Geosciences.

Asbestos
No asbestos was detected in the twelve samples screened by RSK Geosciences and ARP Geotechnical.

2.8 Ground Gas

A ground gas risk assessment was undertaken by RSK Geosciences, the gas monitoring programme classified the site as within Characteristic Situation 1 (CS1) where no gas precaution measures are required.

The risk from mine gas was determined to be low as part of the letter report by Groundtech Consulting and the overall risk from permanent ground gases was considered to be *Low*.

The site lies within an area where between 3-5% of properties are above the action level for radon and basic protection measures are required. The site specific radon search is presented in *Appendix 5.*

2.9 Outline Remedial Strategy

The following remedial strategy was outlined for the proposed development.

Soils
On commencement of the enabling phase the topsoil is to be stripped and stockpiled separately from the remainder of the material and it considered that sufficient dilution will occur of the arsenic concentrations further reducing the risk to site end users. No further action is considered to be necessary with respect the arsenic within the topsoil based on the chemical testing undertaken to date and topsoil is considered to be suitable for reuse onsite within private garden areas.

Validation of the cover systems placed in private garden areas including chemical and depth validation is to be undertaken following placement in accordance with YALPAG and a validation frequency of 1 per 2 plots is proposed at present.

Controlled Waters
Mobile contamination was not encountered and remediation in relation to controlled waters is not required.

Ground Gas
The site was classified as within CS1 by RSK Geosciences and the risk from mine gases was determined to be low by Groundtech Consulting, no gas precautions measures are required for the proposed development.

The site lies within an area where between 3-5% of properties are above the action level for radon and basic protection measures are required.

Watching Brief & Regulatory Compliance
A watching brief should be in place during the works and construction. If previously unidentified contamination is encountered, work should cease in that area and Groundtech Consulting contacted for advice.

Regulatory Liaison
Regulatory compliance should be obtained pre-commencement to avoid delays during the construction phase which will have cost implications.

3.0 POLLUTION LINKAGE ASSESSMENT REVIEW

The following section summarises the revised pollution linkage assessment.

3.1 Human Health

Receptor	Level of Risk	Comments
Site End Users (Soils)	*Low*	*Elevated concentrations of arsenic were recorded by RSK Geosciences however statistical analysis by Groundtech Consulting has determined that no further action is required.*
Site End Users (Vapours)	*Low*	*No visual or olfactory evidence of contamination and no elevated volatile vapours.*
Site End Users (Ground Gas)	*Low*	*Ground Gas monitoring places site in CS1 and ground gas precautions are not required.* *Basic radon protection measures are required.*

3.2 Controlled Waters

Receptor	Level of Risk	Comments
Groundwater	*Low*	*No mobile contamination encountered by RSK Geosciences, ARP Geotechnical or Groundtech Consulting.*
Surface Water Features	*Low*	*No mobile contamination encountered by RSK Geosciences, ARP Geotechnical or Groundtech Consulting.*

3.3 Groundworkers

Receptor	Level of Risk	Comments
Contractors	*Low*	*Significant contamination not encountered by RSK Geosciences, ARP Geotechnical or Groundtech Consulting.*

4.0 REMEDIATION PROPOSALS AND APPRAISAL

Remediation will be undertaken to ensure the site is suitable for its proposed residential end use which comprises the construction of 23 No. residential houses with garden areas, access roads, garages and driveways.

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

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

1. ***Detailed Remediation Specification*** which outlines the requirements to demonstrate the effectiveness of the remediation in order to meet the remediation objectives. These are detailed in the following sections of this report.

2. ***Enabling Works Verification Report*** which will provide a complete record of the remediation activities undertaken during the enabling phase as part of the verification plan to support compliance with remediation objectives and criteria. The report will also contain descriptions of the works including photographic evidence and details of any unexpected conditions encountered during the remedial works and how they were dealt with. The mining remediation is to be issued under a separate cover.

3. ***Cover System Validation Report*** which will validate the suitability and depth of cover system in garden areas.

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

4.1 Outline Remediation Proposals

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

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

The following phased remediation works will be undertaken to deliver the site suitable for the defined residential end use, the phases are divided into:

- *Enabling Works Phase*
- *Construction Works Phase*

4.2 Enabling Works Phase

The following works are considered necessary during the enabling works phase:

- *Site clearance including topsoil strip*
- *Materials management comprising excavation, screening, and reuse of suitable material*
- *Cut site to Formation Level*
- *Watching brief for visual and olfactory contamination*

- *Watching brief for coal seams to isolate potential combustible source.*
- *Off-site disposal of unsuitable or excess material*
- *Validation during the enabling works*

It is anticipated the enabling works phase will be undertaken by a single contractor, referred to as the enabling works contractor.

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

Following completion of the Enabling Phase Works, a verification report completed by the supervising consultant will be required to be submitted to the regulators for approval.

4.3 Construction Phase

It is anticipated that the construction phase of works will be undertaken by a separate contractor, referred to as the ground works contractor, who shall undertake the following:

- *Excavations for foundations*
- *Excavations for service runs and drainage*
- *Installation of correct level potable water supply pipe*
- *Placement of clean validated subsoil/topsoil in areas of gardens and soft landscaping*
- *Installation of basic radon protection measures in accordance with BRE 211.*

All works need to be undertaken in accordance with the Remedial Specification. Following completion of the Construction Phase Validation Works, validation reports for cover system will be required to be submitted to the regulators for approval.

4.4 Project Setup and Management

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

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

5.0 IMPLEMENTATION OF SITE REMEDIATION PROCESSES

5.1 General

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

5.2 Enabling Phase Implementation

Activity E1 - Pre-Start Site Clearance

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

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

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

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

The enabling works contractor shall investigate the features of the structures, ascertain if shock or vibration could damage surrounding property or equipment therein or buried utilities and check the existence of toxic or flammable substances. Consideration will need to be given to the neighbouring development to the west which is indicated to sit on a higher level to site.

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

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

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

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

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

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

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

Activity E2 - Topsoil Strip

The topsoil encompassing the development area should be stripped and stockpiled separately from the reminder of the material on the site. Based on the Geo-Environmental testing results from the previous investigations by RSK Geosciences and ARP Geotechnical, as well as the statistical analysis and site wide Conceptual Site Model produced by Groundtech Consulting, the topsoil is considered to be suitable for reuse onsite with the cover system in private garden areas and areas of soft landscaping. Due care should be taken to ensure the topsoil is not mixed with any underlying Made Ground soil or weathered bedrock.

Appropriate precautions and demarcation should be maintained to mitigate cross contamination or mixing of the topsoil with any other materials from the site.

Activity E3 - Break out of Hardstanding and Below Ground Obstructions and Processing for Reuse

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

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

The enabling works contractor shall survey to Ordnance Survey Grid the base and sides of all excavations and will provide a composite base of excavation drawing for reference during the works, and as built records.

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

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

Activity E4 - Reuse of Soils, Importation and Placement of Soils

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

Testing of soils prior to placement is required as set out in the is Remedial Specification. The natural soils captured from the cut exercise on the site are to be stockpiled for use as general fill to formation level. The physical suitability of the material is to be determined prior to use as fill.

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

Activity E5 - Off-Site Disposal of Unsuitable or Surplus Material

Any material excavated on site may be classified as waste, all arisings should be regarded as contaminated unless proven otherwise. Any soils to be removed from site are to be removed to a licensed waste management facility. The waste is to be taken by a registered waste carrier in accordance with applicable Waste Management Regulations.

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

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

Activity E6 - Watching Brief

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

No visual or olfactory evidence of contamination was recorded during the RSK Geosciences, ARP Geotechnical or Groundtech Ground Investigations. In addition, asbestos has not been detected in any of the samples screened.

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

During the development of the site a watching brief should be maintained for evidence of coal seams. If encountered this should be isolated from future site end users in accordance with current guidance. If encountered during foundation excavations, foundations should be extended below ay coal seams and any arisings isolated as above.

Activity E7 - Validation Criteria During Works

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

Testing

All testing during the works shall be undertaken by the works contractor and all sampling, logging, and testing of soils shall be undertaken in accordance with BS 5930:2020 'Code of Practice for Site Investigations' and BS 10175:2011+A1:2019 'Investigation of Potentially Contaminated Sites – Code of Practice'.

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

General Reuse

The following is required to allow re-use of soils:

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

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

Activity E8 - Enabling Works Contractors Validation Records

The enabling works contractor shall maintain a daily written and photographic record of the works undertaken.

All records provided by the enabling works contractor shall be available to the Client and Groundtech Consulting for comment along with all geo-environmental data.

5.3 Construction Phase Implementation

It is the responsibility of the contractor to have read and understood the requirements of the Remedial Specification and any geotechnical specification documents. If there are any queries, please contact Groundtech Consulting for clarification.

The following will be undertaken during the construction phase of works by the ground works contractor. The ground works contractor shall undertake:

- *Excavations for foundations*
- *Excavations for service runs and drainage*
- *Installation of correct level potable water supply pipe*
- *Placement of clean validated subsoil/topsoil in areas of gardens and soft landscaping*
- *Installation of basic radon protection measures in accordance with BRE 211.*

Activity C1 - Installation of Correct level of Potable Water Supply Pipe

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

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

Activity C2 - Appropriate Materials Handling and Stockpiling to Allow Reuse of Excavated Soils

The contractor is to undertake a watching brief for materials which may potentially be contaminated during excavations of foundations and drainage. If suspect materials are encountered, the soils are to be stockpiled separately and Groundtech Consulting contacted immediately.

Any imported materials are to be tested by the contractor in accordance with this Remedial Specification to demonstrate they are suitable from a geotechnical and geo-environmental engineering perspective.

Activity C3 - Importation of Suitable Material

Any imported materials are to be tested by the contractor in accordance with this Remedial Specification to demonstrate they are suitable from a geo-environmental engineering perspective.

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

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

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

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

The results of geo-environmental testing for imported material are to be compared with the criteria presented in *Appendix 4*. If any of these thresholds are exceeded the material shall be considered unsuitable unless treatment, further testing and risk assessment shows it to be satisfactory.

Testing of the cover system and imported material should be undertaken in accordance with YALPAG cover system guidance as summarised below.

Type	Number of samples	Testing schedule
Virgin Quarried Material	*1 or 2 depending on the type of stone utilised*	*Standard metals/metalloids As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)*
Crushed Hardcore stone/brick	*Minimum 1 per 1000m^3*	*Standard metals/metalloids (As above) speciated PAH, Asbestos*
Greenfield Manufactured Soils	*Minimum of 3 or 1 per 250m^3 (whichever is greater)*	*Standard metals/metalloids (As above), speciated PAH, Asbestos*
Brownfield Screened Soils	*Minimum 6 or 1 per 100m^3 (whichever is greater)*	*Standard metals/ metalloids (As above), speciated PAH, TPH (CWG) Asbestos. Any additional analysis dependant on the history of the donor site*

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

Activity C4: Installation of the Cover System in areas of Soft Landscaping

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

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

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

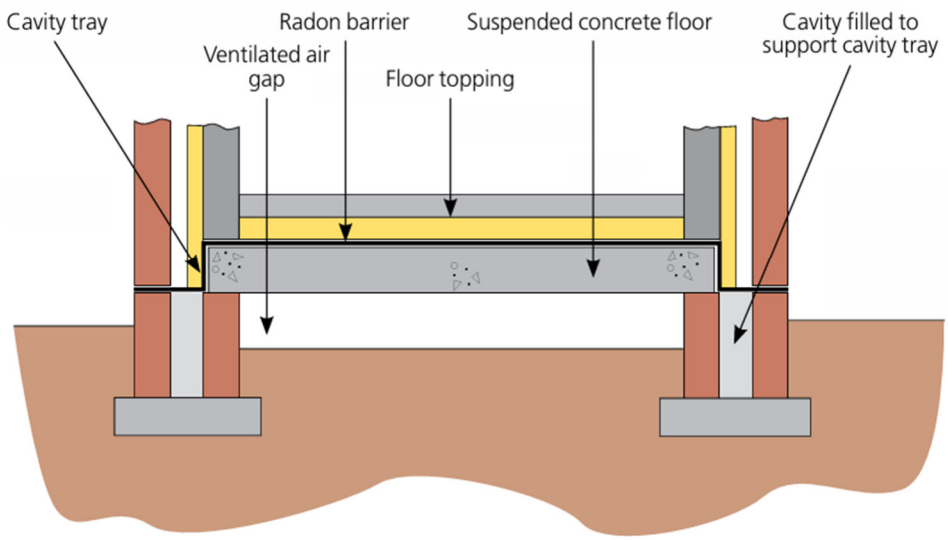
Specific Use	Requirements
Private gardens and soft landscaped areas	*The cover system should comprise a minimum of 450mm of topsoil and subsoil (minimum of 150mm of topsoil) where Made Ground is present. A nominal 150mm of topsoil should be places where natural ground is present at formation.*

Activity C5 - Installation of the correct level of Radon Protection Measures

Gas Monitoring has been completed by RSK Geosciences which classified the site as within Characteristic Situation 1 (CS1) in accordance with BS 8485:2019 (Modified Wilson and Card Classification) based on the results of the gas monitoring programme. A further assessment was undertaken by Groundtech Consulting which took into consideration the risk from mine gas and the risk was determined to be low. Therefore, no gas precaution measures are required with respect to permanent ground gases.

A site specific radon search has been completed by Orion Homes which has classified the site as within an area where between 3 and 5% of homes are above the action level, as such basic radon protection measures are required in foundations for the proposed dwellings at the site.

An example of the basic radon precautions required are shown in the extract below from BR211. The radon protection details are to be detailed by the architect or the Structural Engineer for regulatory approval.



Basic radon precautions to a suspended concrete floor from BR211

The radon precautions should be installed in accordance with BRE 211 and approved by building control.

6.0 SUPERVISION, VERIFICATION AND REPORTING

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

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

6.1 Site Supervision

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

6.2 Collection of Samples

All sampling, logging and testing of soils shall be undertaken in accordance with BS 5930:2020 'Code of Practice for Site Investigations' and BS 10175:2011+A2:2019 'Investigation of Potentially Contaminated Sites – Code of Practice'.

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

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

All testing should be undertaken at a laboratory which holds UKAS and MCERTS accreditation for the specific tests. Where it is not possible to obtain the testing of a material for a specific property to a UKAS or MCERTS accredited method, the contractor shall obtain permission from the consultant for the test to be completed at the proposed laboratory, before the test is undertaken.

6.3 Enabling Works Validation

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

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

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

- *Details of methodology and programme*
- *Decision records covering agreements with regulators*
- *Records of works undertaken, and associated validation/monitoring records obtained from the contractor as detailed above*
- *Final status of remediation and confirmation of remedial objectives to satisfy the planning conditions*
- *Site stripping and clearance activities undertaken during remediation*

- *Records of excavations, including:*
  - *Ordnance Datum survey of extents and depth (including a final composite base of excavation drawing)*
  - *Ordnance Datum survey of extents and depth of any residual features*
  - *Photographic record of each excavation*
- *Records if any ACMs are encountered during the works (type location and action)*
- *Records of laboratory analytical and in-situ field test results, including:*
  - *Laboratory results and location plan for each test*
  - *Copies of the certificates for geo-environmental testing*
- *Approximate quantities for all materials removed from the site*
- *Waste classification and management documentation, including copies of all consignment notes, in particular those relating to the hazardous waste regulations, details of waste facilities where materials were disposed of*
- *Final as-built survey of the site*

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

6.4 Construction Phase Works Verification

Potable Water Supply Pipe Installation

It is the responsibility of the ground works contractor to record photographic evidence of the installation of pipework. This photographic evidence is to be provided to Groundtech Consulting for inclusion in the Verification Report.

6.5 Cover System

Verification of cover system thickness is required. Testing of soils will be required in accordance with this Remedial Specification. Groundtech Consulting should be notified when the cover system has been placed and will undertake a visual inspection and inspection pits at a frequency of 1 pit per 2 plots for the proposed dwellings.

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

The cover system validation report will include:

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

The cover system will be validated in accordance with YALPAG and should meet any arboricultural requirements.

6.6 Radon Verification

Radon gas mitigation measures shall be installed by the ground works contractor in accordance with BRE211/CIRIA 665 and should be approved by building control.

7.0 REUSE OF SOILS AND MATERIALS MANAGEMENT

7.1 Waste Management Background

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

7.2 Proposed Reuse of Material

There will be an opportunity to reuse soils at the site following excavation, processing and treatment. Any excess or unsuitable soils will be disposed of. The following excavation, treatment and placement is proposed during the enabling works:

- *Excavate hardsurfacing/subsurface obstructions, if encountered, and crush to create a Class 6F2 material for reuse in the works*
- *Processing and placement of soils as set out this Remedial Specification*

The following excavation and placement is proposed during the construction works:

- *Excavation of foundations*
- *Excavation of drainage runs*
- *Placement of clean natural soils for use as Subsoil and Topsoil in garden areas*
- *Placement of 6F2 in road and pavements*

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

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

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

7.3 On Site Material Management

Stockpiles
Site won material for potential reuse will be stored on site in stockpiles, the existing topsoil is anticipated to be suitable for reuse onsite and should be stockpiled separately. The stockpiles are to be managed by the contractors during the relevant phases of work and will be subject to operational constraints at the time of stockpiling.

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

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

During the remediation works, materials will be excavated and consolidated into designated stockpiles, with the different soil types stockpiled in different clearly marked stockpiles. A record of the excavated quantities and reuse locations will also be maintained on site. A copy of all tracking forms and delivery tickets used for transportation of soils to site will be held at the site office.

Material to be removed off site, will be stockpiled separately away from those proposed for reuse. Contaminated material should be stockpiled on an impermeable membrane and covered to prevent leaching of contaminants until the soils are removed off site.

Confirmatory Testing for Material for On Site Reuse - Excavated Material
Material to be reused on the site should meet the geo-environmental requirements set out in this specification.

Confirmatory Testing for Material for Off-Site Disposal
Materials found to be out of specification are to remain on site in segregated stockpiles until such time that they can be disposed to a suitably licenced waste disposal facility.

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

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

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

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

8.0 CONTINGENCY PLAN AND AREAS OF UNEXPECTED CONTAMINATION

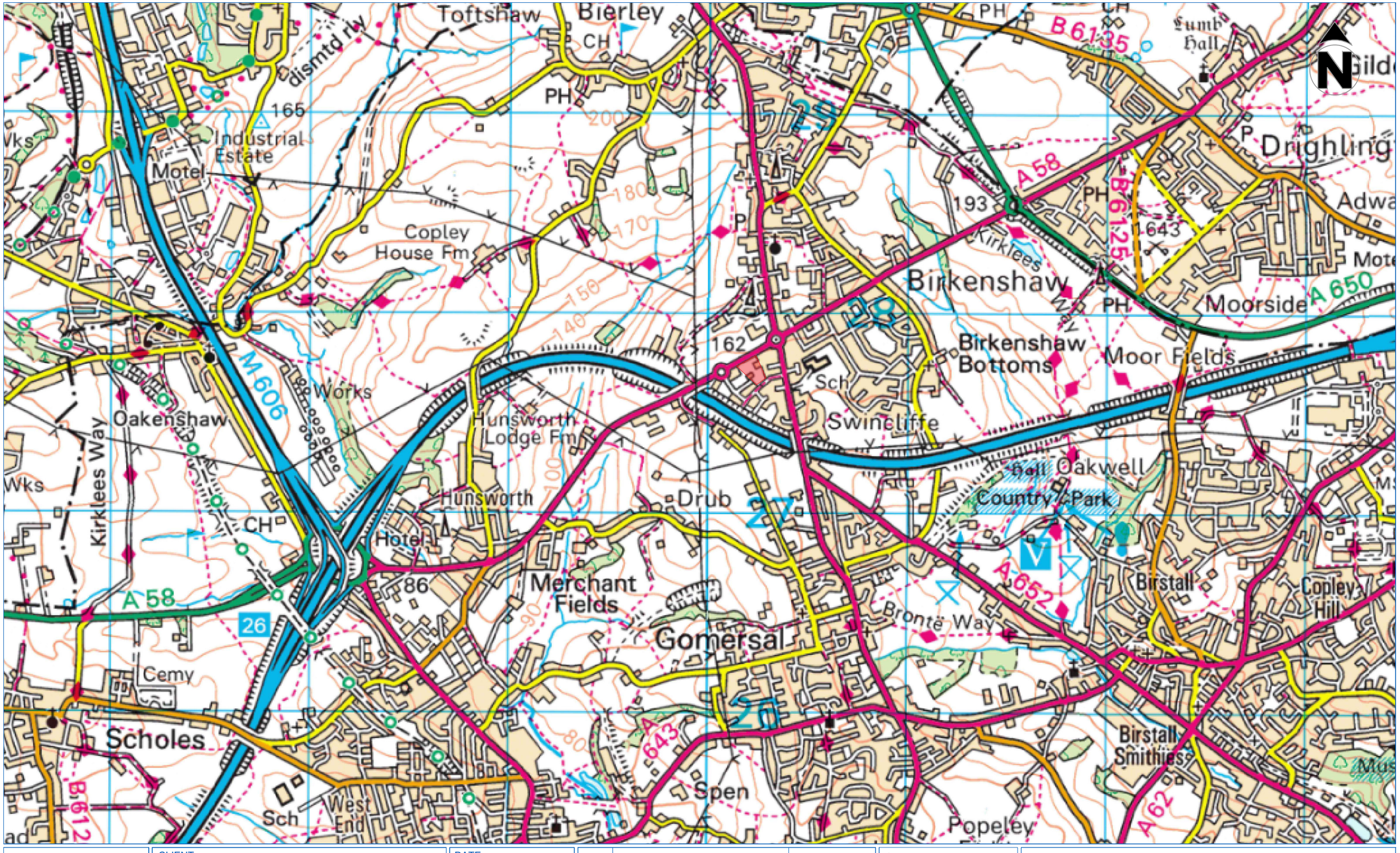
There is potential for areas of unexpected contamination to be present, due to the former use of the site. The strategy for unexpected contamination must be relayed to all site personnel during the enabling works phase and outline a clear allocation of responsibility for reporting and dealing with contamination.

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

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

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

APPENDIX 1 - Plans



GROUNDTECH CONSULTING	CLIENT: ORION HOMES	DATE: AUGUST 2024
	PROJECT TITLE: BIRKENSHAW	SCALE: NTS
	PLAN TITLE: PROJECT LOCATION PLAN	PLAN NUMBER: GRO-24208-P01

Rev.	Details	Date

Status	
Preliminary	
Draft	
Issued	●
For Comment	
Approved	

Notes

Site Location

SCHEDULE OF ACCOMMODATION

NAME	DESCRIPTION	BEDROOMS	SQ.FT	No.
BAMBURGH	TERRACE	3 BEDROOMS	1002	05
JEDBURGH	DETACHED	3 BEDROOMS	1002	02
GOSFORD	DETACHED	3 BEDROOMS	1161	02
ROTHBURY	DETACHED	4 BEDROOMS	1197	01
CHELTENHAM	DETACHED	4 BEDROOMS	1303	02
ARUNDEL	SEMI DETACHED	4 BEDROOMS	1318	04
WHARFEDALE	SEMI DETACHED	4 BEDROOMS	1391	02
			PRIVATE TOTAL	18
EDINBURGH	TERRACE	2 BEDROOMS	750	03
PAIGNTON	SEMI DETACHED	3 BEDROOMS	912	02
			AFFORDABLE TOTAL	05
			OVERALL SITE TOTAL	23

KEY:

- INDICATES AFFORDABLE HOUSING UNIT
- INDICATES CAR CHARGING POINT
- INDICATES BIN STORE
- INDICATES BIN COLLECTION POINT
- INDICATES TRAFFIC CALMING FEATURE
- INDICATES EXISTING TREES TO BE RETAINED
- INDICATES DRAINAGE EASEMENT
- INDICATES VISITOR PARKING SPACE

WHITEHALL ROAD WEST

2.4 x 43m vis splay

2.4 x 43m vis splay

El Sub Sta

LOCKGATE RISE

ELM

N

Revision notes:		
Rev:	Date:	Notes:
A	07.02.2024	Internal roads amended to be 5.5m wide - CD
B	24.04.2024	Plots 1 & 15 to 23 and drive to plots 20/21/23 positions amended - CD
C	13.05.2024	Turning head removed and plots 20 to 23 moved back to allow space for the SW attenuation tank to the front of the site. Turning head to plots 2 - 14 straightened. Plots 7 - 12 mirrored - CD
D	23.05.2024	Existing house aligned with topo, 4 visitor parking spaces added 1 to 6 moved - CD
E	30.05.2024	Amended to suit highway consultant comments - CD

Revision notes:		
Rev:	Date:	Notes:
F	06.06.2024	Amended to suit further highways consultant comments - CD
G	25.06.2024	Plots 18 & 19 swapped with 22 & 23, Affordable housing now plots 3 to 6 & 16, plot 19 parking amended and position of plots 5 to 8 amended - CD
H	26.06.2024	Road between plots 4 and 7 amended - CD
J	04.10.2024	Plots 2-14 repositioned & 2 Bedroom dwelling introduced. Easement & Bin collection points added. Bin store size increased. CC

Revision notes:		
Rev:	Date:	Notes:
..	..	..

Date: 17.09.2024

Project: Whitehall Road West, Birkenshaw

Scale @ A3: 1:500

Drawing Number: 2306/02/001

Revision: J

Drawn By: CC

Drawing Title: SITE PLAN

OrionHomes
SO GOOD TO COME HOME TO
Unit 5, Benton Office Park, Bennett Avenue, Horbury, Wakefield, WF4 5RA, Tel: 01924 831030

APPENDIX 2 - General Requirements

1. Compliance with Legislation and Standards

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

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

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

2. Licences, Permits and Consents

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

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

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

3. Health and Safety Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

In addition, it is recommended that:

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

4. Site Establishment and Security

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

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

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

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

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

5. Traffic Safety and Management

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

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

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

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

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

6. Welfare Facilities

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

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

7. Working Hours

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

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

8. Mobile Plant

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

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

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

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

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

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

9. Unexploded Ordnance (UXO)

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

10. Surveying

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

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

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

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

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

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

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

11. Testing

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

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

12. Offsite Disposal

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

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

13. Contamination

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

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

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

14. The Control of Noise, Vibration and Dust Nuisance

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

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

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

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

General

No fires shall be permitted on site.

Dust Mitigation

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

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

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

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

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

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

With regards to stockpiles:

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

Odour

In general terms the excavation works are not considered likely to give rise to any significant odour problems. However; possible 'hotspots' of hydrocarbon contamination cannot be discounted and it is advised that odours are assessed by twice daily inspections of all Site boundaries.

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

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

Noise

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

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

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

15. Asbestos in Soils

The Contractor must manage the risks in accordance with their legal requirements and will need to prepare appropriate health and safety documentation and obtain appropriate approvals, licences, consents and permits prior to commencement. No asbestos fibres or Asbestos Containing Materials (ACMs) have been identified on the site to date.

It should be noted that information presented in this document is provided to assist in managing the soil at the site. It is the responsibility of the contractor how the control measures associated with these risks are implemented and

recommend that an appropriate asbestos specialist assist with both the preparation of documents and licences and site supervision.

16. Water Quality Controls

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

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

17. Utilities

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

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

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

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

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

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

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

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

18. Damage to Property

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

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

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

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

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

19. Drawings and Supplied Information

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

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

20. Photographs

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

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

APPENDIX 3 - Remediation Options Appraisal

Introduction

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

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

Key Risk Drivers for Remedial Action

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

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

Remediation Options and Evaluation of Feasibility

Preliminary Assessment of Remediation Options
Investigation and risk assessment has concluded that the requires remediation to reduce the risk to receptors to an acceptable level.

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

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

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

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

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

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

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

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

Viable Remedial Options

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

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

Cover System

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

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

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

Materials Management

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

Disposal of excess or unsuitable soils

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

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

The watching brief will enable olfactory/visual contamination to be identified and can be effective, this method is combined with the disposal of unsuitable soils.

Applicability of Remediation Options and Initial Assessment – Soils

Remedial Activity	Effective on Asbestos	Effective on Metals	Effective on PAHs	Effective on TPH	Relative Cost	Relative Operational Time	Comments (Practicality/Sustainability/Durability)	Feasibility
Containment - Cover System	*n/a*	*Y*	*n/a*	*n/a*	*£*	*Weeks*	*The cover system should comprise a minimum of 450mm of topsoil and subsoil (minimum of 150mm of topsoil) where Made Ground is present.* *A nominal 150mm of topsoil should be places where natural ground is present at formation.* *Cover system to be inclusive of a minimum 150mm topsoil.*	*Y – in conjunction with materials management including raising of site levels so contaminants at a greater depth.*
Excavation and Disposal	*n/a*	*Y*	*n/a*	*n/a*	*££*	*Weeks to months*	*Removal of unsuitable material and risk.*	*Y – in conjunction with materials management.*
Containment - hydraulic barriers	*n/a*	*Y*	*n/a*	*n/a*	*£££*	*Months*	*Not Required and not cost beneficial for size of development.*	*n/a*
Containment - in ground barriers	*n/a*	*Y*	*n/a*	*n/a*	*£££*	*Months*	*Not Required and not cost beneficial for size of development.*	*n/a*
Soil flushing	*n/a*	*N*	*n/a*	*n/a*	*£££*	*Months*	*Not Required and not cost beneficial for size of development.*	*n/a*
Surface amendments	*n/a*	*Y*	*n/a*	*n/a*	*£££*	*Months*	*Not Required and not cost beneficial for size of development.*	*n/a*

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

APPENDIX 4 - Remedial Target Values

Remedial Target Values

Proposed End Use	Unit	Residential with Plant Uptake			Source
SOM	%	1	2.5	6	
Arsenic	mg/kg	37	37	37	LQM S4ULs
Beryllium	mg/kg	1.7	1.7	1.7	LQM S4ULs
Boron (water soluble)	mg/kg	290	290	290	LQM S4ULs
Cadmium	mg/kg	10	10	10	SGVs
Chromium (Total)	mg/kg	910	910	910	LQM S4ULs
Chromium (VI)	mg/kg	21	21	21	DEFRA C4SLs
Copper	mg/kg	2400	2400	2400	LQM S4ULs
Lead	mg/kg	200	200	200	DEFRA C4SLs
Organic Mercury	mg/kg	1.2	1.2	1.2	LQM S4ULs
Nickel	mg/kg	180	180	180	LQM S4ULs
Selenium	mg/kg	350	350	350	SGVs
Vanadium	mg/kg	410	410	410	LQM S4ULs
Zinc	mg/kg	3700	3700	3700	LQM S4ULs
Aliphatic EC 5 - 6	mg/kg	42	78	160	LQM S4ULs
Aliphatic EC 6 - 8	mg/kg	100	230	530	LQM S4ULs
Aliphatic EC 8 - 10	mg/kg	27	65	150	LQM S4ULs
Aliphatic EC 10 - 12	mg/kg	130 (48) vap	330 (118) vap	760 (283) vap	LQM S4ULs
Aliphatic EC 12 - 16	mg/kg	1100 (24) sol	2400 (59) sol	4300 (142) sol	LQM S4ULs
Aliphatic EC 16 - 35	mg/kg	65000 (8.48) f,sol	92000 (21) f,sol	110000 f	LQM S4ULs
Aliphatic EC 35 - 44	mg/kg	65000 (8.48) f,sol	92000 (21) f,sol	110000 f	LQM S4ULs
Aromatic EC 5 - 7	mg/kg	70	140	300	LQM S4ULs
Aromatic EC 7 - 8	mg/kg	130	290	660	LQM S4ULs
Aromatic EC 8 - 10	mg/kg	34	83	190	LQM S4ULs
Aromatic EC 10 - 12	mg/kg	74	180	380	LQM S4ULs
Aromatic EC 12 -16	mg/kg	140	330	660	LQM S4ULs
Aromatic EC 16 - 21	mg/kg	260 f	540 f	930 f	LQM S4ULs
Aromatic EC 21 - 35	mg/kg	1100 f	1500 f	1700 f	LQM S4ULs
Aromatic EC 35 - 44	mg/kg	1100 f	1500 f	1700 f	LQM S4ULs
Benzene	mg/kg	0.33	0.33	0.33	SGVs
Toluene	mg/kg	610	610	610	SGVs
Ethyl Benzene	mg/kg	350	350	350	SGVs
Xylene - o	mg/kg	250	250	250	SGVs
Xylene - m	mg/kg	240	240	240	SGVs
Xylene - p	mg/kg	230	230	230	SGVs
MTBE (methyl tert-butyl	mg/kg	49	84	160	CL:AIRE 2010
Acenaphthene	mg/kg	210	510	1100	LQM SAULs
Acenaphthylene	mg/kg	170	420	920	LQM S4ULs
Anthracene	mg/kg	2400	5400	11000	LQM S4ULs
Benz(a)anthracene	mg/kg	7.2	11	13	LQM S4ULs
Benzo(a)pyrene	mg/kg	2.2	2.7	5*	DEFRA C4SL*/LQM S4ULs
Benzo(b)fluoranthene	mg/kg	2.6	3.3	3.7	LQM S4ULs
Benzo(ghi)perylene	mg/kg	320	340	350	LQM S4ULs
Benzo(k)fluoranthene	mg/kg	77	93	100	LQM S4ULs
Chrysene	mg/kg	15	22	27	LQM S4ULs
Dibenz(ah)anthracene	mg/kg	0.24	0.28	0.3	LQM S4ULs
Fluoranthene	mg/kg	280	560	890	LQM S4ULs
Fluorene	mg/kg	170	400	860	LQM S4ULs
Indeno(123-cd)pyrene	mg/kg	27	36	41	LQM S4ULs
Naphthalene	mg/kg	2.3 f	5.6 f	13 f	LQM S4ULs
Phenanthrene	mg/kg	95	220	440	LQM S4ULs
Pyrene	mg/kg	620	1200	2000	LQM S4ULs
Phenol	mg/kg	420	420	420	SGVs
Asbestos	No fibres detected				

APPENDIX 5 – Site Specific Radon Search

Report of address search for radon risk

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Address searched: 17 Whitehall Road West, Birkenshaw, Bradford, BD11 2LS
Date of report: 5 December 2025

Guidance for existing properties

Is this property in a radon Affected Area? - Yes

A radon Affected Area is defined as where the radon level in at least one property in every hundred is estimated to be at or above the Action Level.

The estimated probability of the property being above the Action Level for radon is: 3-5%

The probability result is only valid for properties above ground. All basement and cellar areas are considered to be at additional risk from high radon levels.
The result may not be valid for buildings larger than 25 metres.
If this site if for redevelopment, you should undertake a GeoReport provided by the British Geological Survey.

This report informs you of the estimated probability that this particular property is above the Action Level for radon. This does not necessarily mean there is a radon problem in the property; the only way to find out whether it is above or below the Action Level is to carry out a radon measurement in an existing property.

Radon Affected Areas are designated by the UK Health Security Agency. UKHSA advises that radon gas should be measured in all properties within Radon Affected Areas.

If you are buying a currently occupied property in a Radon Affected Area, you should ask the present owner whether radon levels have been measured in the property. If they have, ask whether the results were above the Radon Action Level and if so, whether remedial measures were installed, radon levels were re-tested, and the results of re-testing confirmed the effectiveness of the measures.

Further information is available from UKHSA or https://www.ukradon.org

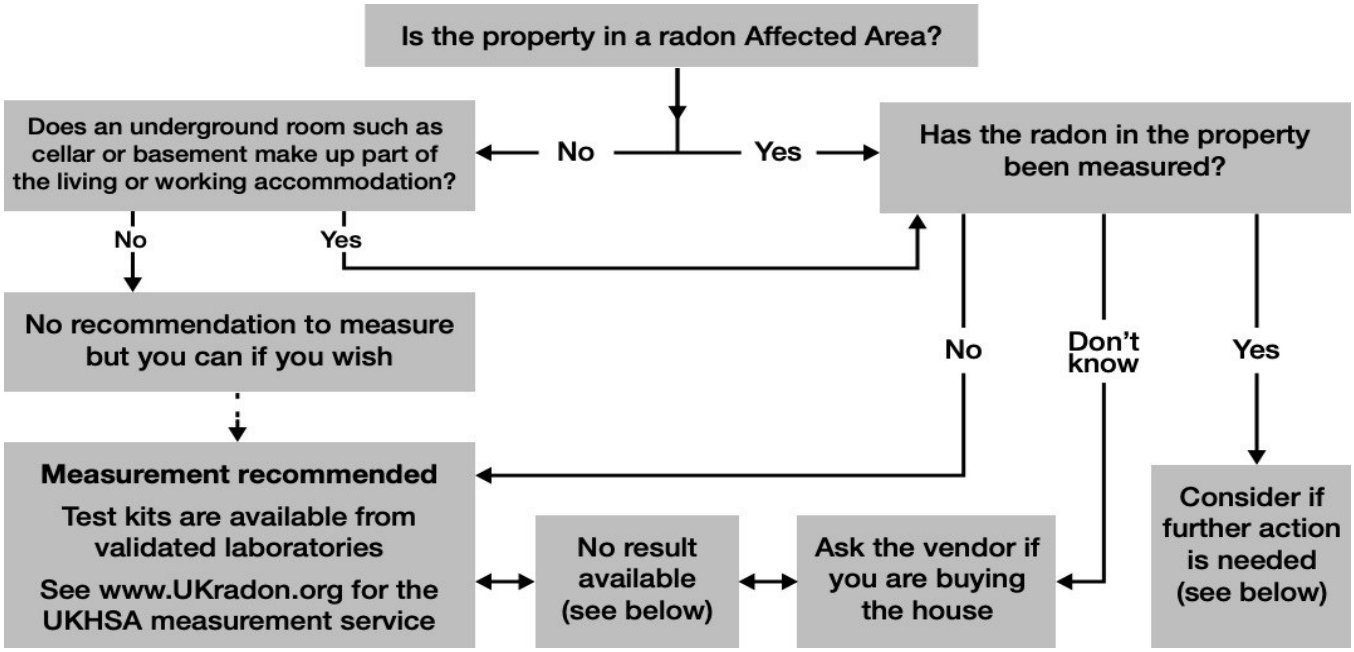
Guidance for new buildings and extensions to existing properties

What is the requirement under Building Regulations for radon protection in new buildings and extensions at the property location? - Basic Protection

If you are buying a new property in a Radon Affected Area, you should ask the builder whether radon protective measures were incorporated in the construction of the property.

See the Radon and Building Regulations for more details.

UKHSA guidance for occupiers and prospective purchases



Existing radon test results: There is no public record of individual radon measurements. Results of previous tests can only be obtained from the seller. Radon levels can be significantly affected by changes to the building or its use, particularly by alterations to the heating and ventilation which can also be affected by changes in occupier. If in doubt, test again for reassurance.

Radon Bond: This is simply a retained fund, the terms of which are negotiated between the purchaser and the vendor. It allows the conveyance of the property to proceed without undue delay. The purchaser is protected against the possible cost of radon reduction work and the seller does not lose sale proceeds if the result is low. Make sure the agreement allows enough time to complete the test, get the result and arrange the work if needed.

High Results: Exposure to high levels of radon increases the risk of developing lung cancer. If a test in a home gives a result at or above the Action Level of 200 Becquerels per cubic metre of air (Bq/m3), formal advice will be given to lower the level. Radon reduction will also be recommended if the occupants include smokers or ex-smokers when the radon level is at or above the Target Level of 100 Bq/m3; these groups have a higher risk. Information on health risks and radon reduction work is available from UKHSA. Guidance about radon reduction work is also available from some Local Authorities, the Building Research Establishment and specialist contractors.

UKHSA designated radon website:	https://www.ukradon.org
Building Research Establishment:	http://www.bre.co.uk/page.jsp?id=3137

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APPENDIX 6 - Limitations

Limitations

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

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

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

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

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

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

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

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

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

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

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