Ground Investigation Report (intrusive)

Land to rear of 141 Toftshaw Lane, Bradford

SOIL AND STRUCTURES

Ground Investigation Report (desk-based)

Land to rear of 141 Toftshaw Lane, Bradford

SOIL AND STRUCTURES

Report Status

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Contents

The Ground Investigation Report has been written with reference to various sources of information that are either appended or referenced throughout this Report.

Infoboxes ⓘ are also included throughout the Report intended to draw the reader's attention to key information.

Appointment

Soil and Structures Ltd were instructed by Belinda Starky (the Client) in July 2025 to prepare an intrusive Ground Investigation Report (*this Report*) for a parcel of land to the rear of 141 Toftshaw Lane, Bradford (*the Site*)

This Report has been prepared in support of the planned development of the Site for a residential end use.

Reliance on the advice presented herein rests solely with the Client.

Scope - General

In the ground everything is inter-related: from strength to pollution potential; through to, stability and drainage characteristics. This Report represents a desk-based assessment of ground conditions across the Site and provides advice on ground-related risk management. The Report also sets out how the groundworks completed as part of the development project will influence, and be influenced, by all these inter-related elements.

Scope and Legal Context - Specific

This Report presents advice with respect to all elements of ground engineering and considers all ground-related hazards as set out within the Ground Risk Register (Section 6.0).

The Report has also prepared in response to the conditioning of the planning application - *Decision Notice ref. 2021/62/94555/E* – conditions that relate to the historical hazards of 'contaminated land' and 'coal mining'.

The more specific, legal context of the advice given in this Report relates to an assessment of:

i) Potential ground-related hazards that may affect the development that is governed by health and safety law (various acts and regulations).

ii) The stability of the Site for its proposed end use. The assessment of 'stability' relates specifically to coal mining related hazards, e.g. mine entries and mine workings - *Condition 4 and 5 of the above application*.

iii) The suitability of the Site for its proposed end use that is rooted within national planning policy guidance (the National Planning Policy Framework) that is governed by planning law (various acts). The assessment of 'suitability' relates specifically to ground-related hazards of contamination, pollution and ground gases as set out within both the Environment Protection Act 1990 : Part 2A (2012) and Environment Agency guidance 'Land Contamination Risk Management' (LCRM) (2020) – *Condition 9 to 13 of the above application.*

In practice, this likely necessitates acceptance of this Report and its findings by the local planning authority's contaminated land team and the Mining Remediation Authority, two statutory consultees on the planning application (where the respective conditions are applied).

Fieldwork

The Report references intrusive investigation scoped and supervised by the Author of this Report.

Background to this Report

This Report is preceded by one ground-related report relating to the Site. The report, a Coal Mining Risk Assessment report (C0489) was prepared by Chevin Geoenviro Associates Ltd, dated October 2021.

1.0 The Site and Proposed Development

1.1 The Site

Location: The Site comprises an existing parcel land (c. 0.1 ha in area; red-line boundary) located to the rear of 141 Toftshaw Lane, Bradford - *Figure 1*.

Condition: At the point of fieldworks, demolition works were completed with ground beams for the proposed suspended slab in place – *Photograph 1*.

Access: At the point of issue, the Site was accessible off Toftshaw Lane via a single-track driveway.

Topography: the Site slopes from north to south at progressively shallower angles with Toftshaw Lane around 3 to 4 m higher than the southern edge of the planning boundary – *Figure 1*.

Utilities: Below ground utilities are reportedly present across the Site (power and water) following the demolition works. There is no evidence of overhead utility alignments on Site.

1.2 The Proposed Development

Development proposals: include for the demolition of the existing agricultural unit (stables and vehicle store) and construction of a detached dwelling (on the former footings) with associated hardstanding (driveway and footpath) – *Figure 2 – N.B. No soft landscaping is now planned as part of the development with the existing hardstanding planned to be retrained*.

> ⓘ ***Development works and risk:*** *An appreciation of the construction processes is essential for development-related risk assessments given the groundworks stand to meaningfully alter the level of risk, e.g. unstable slopes being removed by earthworks, or unsuitable material being exposed as part of the works.*

To enable this development, the following groundworks or ground-related works are likely to be required, N.B. listing is outline only.

> Preparation: Demolition of the former agricultural unit.

> Earthworks: No level changes are planned as part of the development work.

> Utility Excavations: Excavation of any drainage and other utility alignments.

> Foundations: No new foundations are planned with the former agricultural unit's shed planned to be re-used.

> Surfacing: Construction of new hardstanding surfaces (driveway and access path).

> ⓘ ***Human health risk profile:*** *Development of the Site would see a former agricultural building associated with a residential property redeveloped for a residential end use – an increase in sensitivity noting that, in the agricultural building having been primarily used for animals, the risk profile associated with this former use is low.*

Figure 1: Location Plan

> *Extract from location plan (appended)*
> *Red line = planning boundary*
> *Blue line = ownership boundary*
> *Site approximately centred on NGR 419085, 429587*
> *INSERT: Extract from development plan (appended) noting that the areas of proposed soft landscaping are no longer planned as part of the proposed development.*

2.0 Site Setting

*ⓘ **Background information**: The Site setting is mostly described within the Coal Mining Risk Assessment report (C0489) was prepared by Chevin Geoenviro Associates Ltd, dated October 2021 (referred to as 'the Chevin report').*

The commentary within this section supplements that presented within the above report with specific reference to the history and environmental setting of the Site.

2.1 History

Recorded history: Beyond open fields, the Site has been subject to two phases of use since the 1850s (the date of the earliest available ordnance survey mapping):

> *The first phase:* occurred between c. 1850s and the late 1990s when the Site was occupied by open fields and, from c. 1940s, by the garden attached to 141 Toftshaw Lane.

Evidence of potentially harmful or polluting material: Through this phase of use it is considered a unlikely that potentially harmful or polluting material would have been introduced into the Site's soils owing to the nature of the Site (dwelling).

Evidence of potentially gas generating material: Through this phase of use it is considered unlikely that material with the potential to generate gases would have been introduced into the Site's soils.

Evidence of unexploded ordnance (UXO): Bradford and the surrounding area was subject to isolated air raids during the Second World War[1] with an overall very low density of bombing. Furthermore, there is no evidence of the land having been put to military use or evidence of ruins on Site of immediately surrounding the Site in post-war mapping. Taken together, the likelihood of UXO being present on Site is considered unlikely.

Evidence of sub-structures: No evidence of structures is present on Site over this period.

> *The second phase:* occurred between c. 1990s to the present day when the Site was occupied by a stable block (present from late 1990s) across the eastern portion and, more recently, by an agricultural unit (present from c. 2015) across the western half.

Evidence of potentially harmful or polluting material: Through this phase of use it is considered a low likelihood that potentially harmful or polluting material would have been introduced into the Site's soils owing to the nature of the Site (dwelling).

Evidence of potentially gas generating material: Whilst the Site appears to have been terraced around this time (to form more level plateaus for former kennels and vehicle parking, it is considered unlikely that material with the potential to generate gases would have been introduced into the Site's soils. This material would have been geotechnically unsuitable as a fill.

Evidence of sub-structures: With the eastern stable block demolished, residual foundations may remain in the ground however no development work is planned over this portion of the Site (retained as an outdoor horse arena) with the former foundations of the agricultural unit are to be re-used for the proposed development.

The immediate surrounding area was, and remains, occupied by farmland with a large, former textile mill 200 m north of the Site (now an industrial estate) and Toftshaw Moor Colliery (350 m east) noted as two key industrial land uses.

The following **historical hazards** could adversely impact the Site – sub-structures (former foundations).

2.2 Geology

Apart from the comment on Radon below – commentary on the Site's geology is included within the Chevin report.

Radon: is emitted from naturally occurring uranium sources within a range of geologies. The Public Health England data indicates that between 3 to 5 % chance the Site is above the residential Action Level (200 Bq m^{-3})[2]. This translates to overall low to medium chance the Site is affected by radon.

The following **geological hazards** could adversely impact the Site - shrink-swell (weathered bedrock) and radon.

2.3 Mining Geology

Commentary on the Site's mining geology is included within the Chevin report.

Various **mining related hazards** are identified that could adversely impact the Site – potential unrecorded mine workings, and potential mine shafts (a 'background threat' in all minefield regions).

2.4 Hydrogeology & Hydrology

A water catchment is divided into two main elements; groundwater (hydrogeology); and surface water (hydrology). The groundwater regime is chiefly governed by the geology and the surface water regime controlled by the topography and surface cover. For any given site, these regimes are likely to influence each other and be influenced by off-site factors, e.g. groundwater levels being 'recharged' higher up a catchment.

The Site's groundwater regime is influenced by: the lack of superficial soils and the shallow dipping; interbedded sedimentary rocks (Secondary A aquifer; no Source Protection Zones) including named sandstone units, recorded and potentially unrecorded mine workings and lack of geological faults; and, the Site's southerly sloping topography.

The presence of hardstanding cover across most of the Site will currently limit infiltration to ground locally to the proposed dwelling.

The Site's surface water regime is influenced by: the predominance of hardstanding cover across the Site (with most water running off the Site towards the south; and/or draining to the existing drainage network; the outfall of which is unknown).

Surface water, river and reservoir flooding are recorded as being 'very low chance' events across the Site[3].

The nearest surface watercourse is High Royds Beck around 150 m south-east of the Site (culverted locally to the Site).

[1] *West Riding ARP Bomb map, 14th/15th March 1941 – Google My Maps*
[2] *UKradon - UK maps of radon*
[3] *https://www.gov.uk/check-long-term-flood-risk*

2.5 Environmental Setting

The environmental setting relates to land designations either on-site or within the surrounding area that have the potential to influence or present a risk to the proposed development.

Landfills (historic[4] and/or active[5]) are not recorded within 250 m of the Site, the distance across which viable pathways for gas migration are more likely.

Historic infilled land, e.g. ponds and quarries are not recorded on Site or within 100 m of Site (various sources).

Statutory protected areas, e.g. SSSI are not recorded on the Site[6].

Landfill gas (**historical hazard**) is not considered to represent a hazard to the Site based on the above commentary.

Photograph 2

View looking south-east from proposed driveway illustrating areas of raised hardstanding due to be kept as part of the proposed development

Photograph 1

View panning north to north-east from the Site's south-western corner with red line illustrating approximate planning

[4] *https://www.data.gov.uk/dataset/17edf94f-6de3-4034-b66b-004ebd0dd010/historic-landfill-sites1*
[5] *https://www.data.gov.uk/dataset/ad695596-d71d-4cbb-8e32-99108371c0ee/permitted-waste-sites-authorised-landfill-site-boundaries1*
[6] *https://magic.defra.gov.uk/MagicMap.aspx*

3.0 **Fieldworks –** Intrusive Investigation, Laboratory Testing and Monitoring

The intrusive investigation (Table 1) was designed in general accordance with guidance for site investigations[7] referencing; the Site setting, the anticipated ground conditions, access arrangements and responding to the revealed ground conditions, e.g. additional holes as and where required.

Comments on the scope of the fieldwork: Beyond general ground truthing, two key objectives of the intrusive investigation were to: i) confirm the bedrocks sequence beneath the Site and presence/absence of coal or coal mine workings noting the uncertainty with respect to the coal seam's presentation locally.

An assessment of the likely consistency of ground conditions is offered; however, it should be borne in mind that any ground investigation offers a snapshot of variations between exploratory hole positions cannot be ruled out.

Unexpected or unforeseen ground conditions may be encountered even when extensive investigation is completed. In this scenario, further investigation is not recommended.

Exploratory hole locations are illustrated on the Ground Model in Section 5.0 with descriptions of the materials encountered detailed within the following section, Section 4.0.

The exploratory hole logs are appended.

Permits: The ground investigation fieldworks were conducted under a permit issued by the Mining Remediation Authority (ref. 30219) on an 'area basis'.

Table 1: Scope and Rationale of the Intrusive Investigation

Activity	Ref.	Rationale
Exploratory Holes		
4 openhole rotary boreholes (56 mm dia.)	RO101 to RO104	To investigate the deeper geology across the Site and inform a revised assessment of risk associated with coal mining related hazards
Other		
Logging of soil arisings from exploratory holes.	All holes	To characterise: ground conditions; and support classification of materials present in the ground. Material descriptions are detailed in the notes on the Ground Model in Section 5.0, the accompanying exploratory hole logs and strata depths on the plan itself.
Down-the-hole camera survey	RO101 to RO104	To confirm the geological sequence within the openhole rotary boreholes.

Geotechnical samples were not obtained due to the depth of the formation relative to existing ground levels and conservative assumptions and local experience of the Author working within this geology.

Environmental samples were not obtained from the shallow soils due to the proposed retention of hardstanding across the Site and lack of evidence of potential harmful or polluting material

It should be borne in mind that various material streams will be generated by the planned works for which additional sampling may be required, e.g. to confirm waste classifications and/or confirm suitability for re-use.

Ground gas monitoring was completed within the rotary borehole cavities during drilling (monitoring flush arisings) and on completion with no detectable methane, carbon dioxide or hydrogen sulphide and no depleted oxygen detected.

No extended monitoring of ground gases was undertaken or proposed based on the absence of potentially degradable material within the ground or nearby sources of ground gas (refer to Section 2.5).

Fieldwork diary

1. The Client confirmed the retention of all existing external surfaces as part of the proposed development that, based on the lack of evidence of any potentially harmful or polluting material, e.g. oils or asbestos across the surface of the Site meant that the risk presented by this hazard was low (no evidence of the hazard on Site).

   Given the existing hard-standing is retained, this will remain as a physical barrier to any potentially harmful or polluting material beneath, in the unlikely event such material is present beneath these hard surfaces.

2. Evidence of a possible 'thin' coal seam was revealed around 3.5 m depth within RO101 (flecks of coal on arisings at this depth) with a subsequent down-the-hole camera survey confirming the presence of c. 1.0 m thick coal seam that, based on its quality and depth, was assessed as the Blocking Coal.

3. Additional rotary boreholes were completed to confirm the depth to, and condition of, the coal seam with the thickness and condition found to be consistent across each of the holes (when adjusting for elevation differences and dip direction / angle).

[7] *Code of practice for site investigations. BS 5930 (2015)*

4.0 Ground Conditions – Anticipated and Revealed

Anticipated ground conditions: Based on the Site setting the presence of four main materials were anticipated across the Site:

(1) Surface coverings, e.g. loosely laid sub-base deposits, over;

(2) Weathered Pennine Lower Coal Measure (bedrock) deposits (possibly clay dominated materials); over,

(3) Intact Pennine Lower Coal Measures (bedrock) including the Blocking Coal that was predicted to lie at 'shallow' depths beneath the Site within the Chevin report.

These materials were expected to be distributed similarly across the Site.

Revealed ground conditions: The intrusive investigation undertaken on Site broadly confirmed the anticipated conditions with one variation and five observations

> Variation 1: A coal seam c. 1.0 m thick was encountered at depths of between 3 to 4 m below ground level within RO101 to RO103 (same elevation) – Photographs 3 to 5 – and inferred at a depth of c. 5 to 6 m depth within RO104.
>
> As noted within Section 3.0, this coal seam was inferred to be the Blocking Coal based on its recorded thickness and bituminous presentation. This was a variation to the anticipated ground conditions given the coal seam was anticipated to be present at depths of between 10 to 15 m depth based on the outcrop position and the depth of the nearby mine entry (ref. 419429-011).

> Observation 2: Within the rotary boreholes, the intact bedrock was suggested to be sandstone and siltstone dominated sequence of rocks with typically 'slow/hard' drilling conditions.

> Observation 3: No evidence of coal mine workings was recorded within the Blocking Coal seam (4 boreholes across the Site; flush returns and intact drilling in all locations) or within 22.6 m of the ground surface within RO101 (where deeper seams within the geological sequence may have been encountered, e.g. Top Lousey).

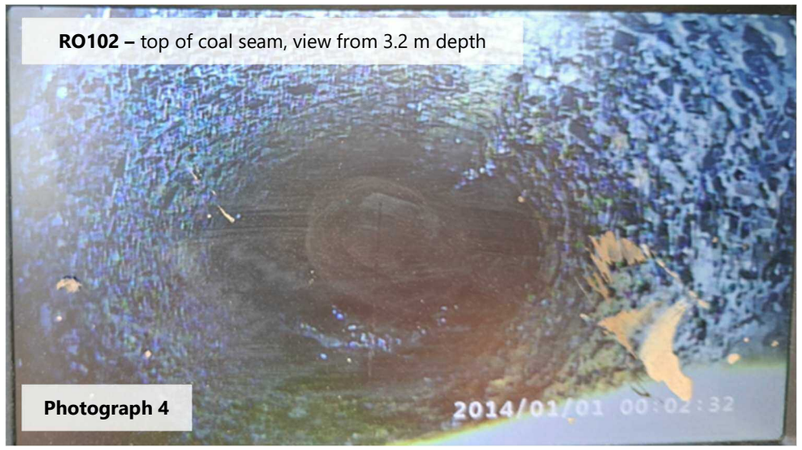
> *Observation 4:* No evidence of potentially harmful or polluting material was encountered on the surface of the Site or within the exploratory holes, e.g. stained flush arisings.

> *Observation 5:* Groundwater was inferred at a depth of 9.6 m of the ground surface within RO101 based on the water holding at this depth.

The Ground Model for the Site is presented in Section 4.0.

RO101 – base of coal seam, view from 3.5 m depth

Photograph 3



RO102 – top of coal seam, view from 3.2 m depth

Photograph 4

RO103 – top of coal seam, view from 3.2 m depth; drill flush in base

Photograph 5

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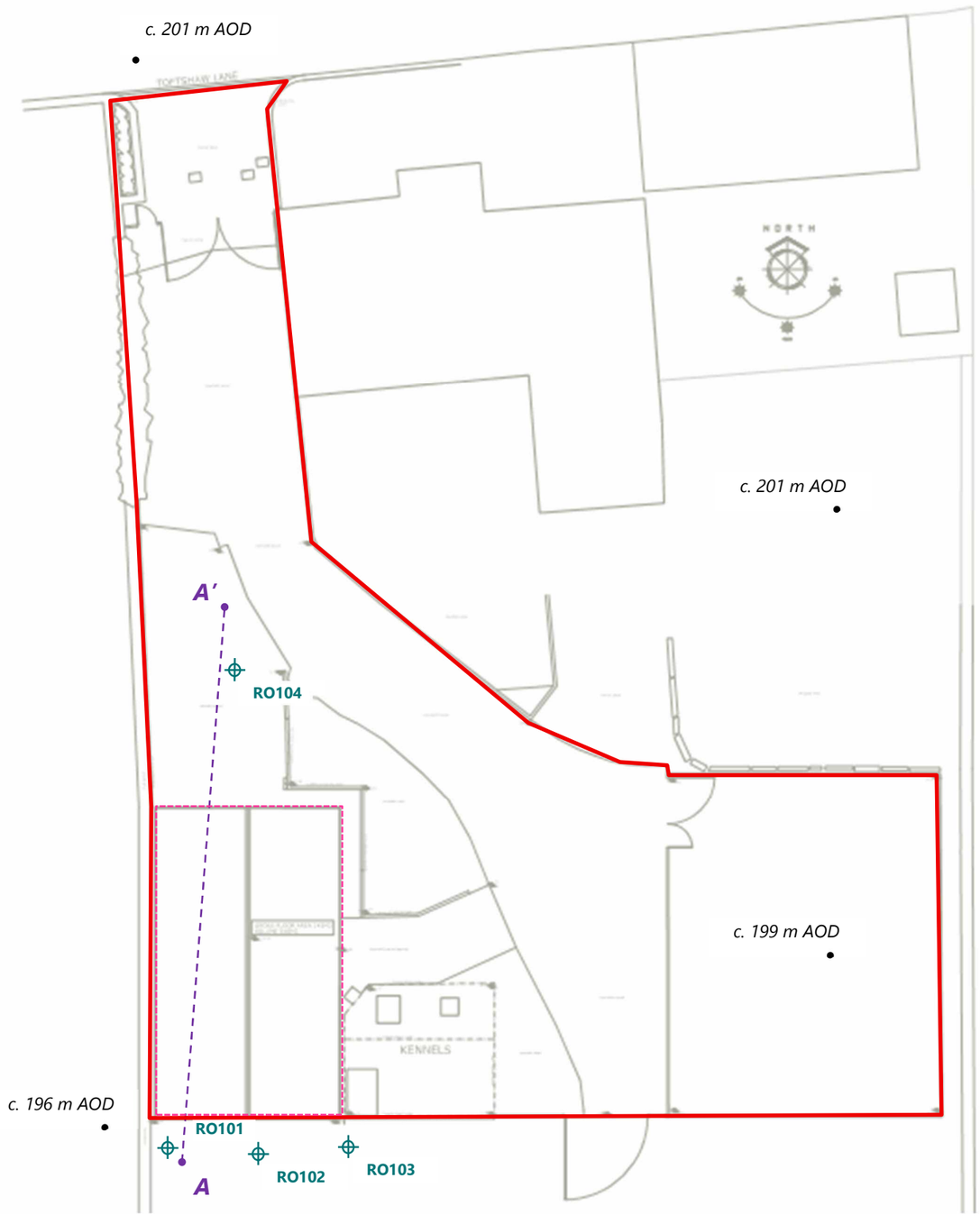
5.0 **Ground Model** – Plan



Key

- Site boundary (approximate)
- Approximate footprint of proposed structure (on footings of former shed)
- xx • Spot heights from satellite imagery
- Section line (refer to profile overleaf)

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- Rotary openhole borehole

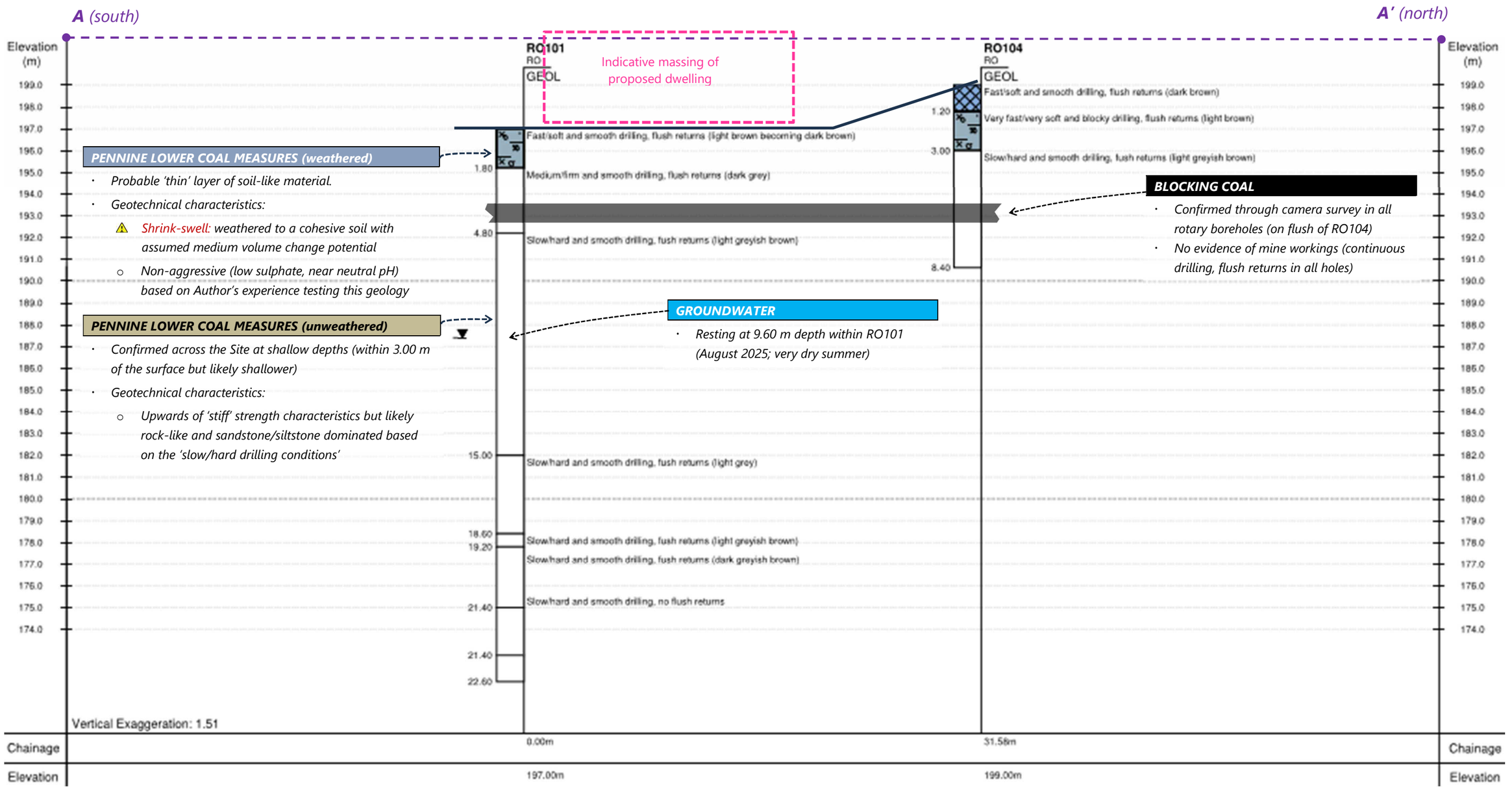
Bedrock geometry beneath the Site

N

45-59° Dip direction

0.9 to 1.5° Dip angle

5.0 **Ground Model** – Profile



Illustrative only – do not scale from this drawing – all depths indicative

6.0 **Ground Engineering** – Risk Management and Design Considerations

The main design considerations include, but are not limited to;

> Re-use of existing foundations

> Low imposed loads from the proposed, structure (residential dwelling)

> The anticipated presence of shallow bedrock deposits that, in general, will offer 'good support' noting the presence of more weathered, 'firm' material across shallow depths

ⓘ ***Ground-related hazards*:** Within Section 2.0, ground-related hazards were screened - is there evidence that they may adversely impact the proposed development?

In this section (Section 6.0) – Ground Engineering – the risk associated with these hazards is assessed in the context of the engineering disciplines that the hazards will influence. Where the level of risk is not tolerably low, advice is given on how to reduce the risk so far as is reasonably practicable.

In Section 7.0 – Ground Risk Register – a summary of those hazards presenting an unacceptable risk is presented with signposts to where the recommended risk management is presented.

In this scenario, the following ground-related hazards have been identified:

Historical hazards	Geological hazards	Mining hazards
~~⚠ Potentially polluting material~~	~~⚠ Slope instability~~	⚠ Surface instability (mine shafts)
~~⚠ Potentially harmful material~~	~~⚠ Collapsible soil~~	⚠ Ground gas (mine gas)
~~⚠ Made Ground (geotechnical hazards)~~	~~⚠ Running sand~~	⚠ Surface instability (shallow mining)
~~⚠ Sub-structures~~	⚠ Radon	~~⚠ Surface instability (opencast)~~
~~⚠ Ground gas (landfill or infilled land)~~	~~⚠ Ground dissolution~~	~~⚠ Coal outcrops~~
~~⚠ Unexploded Ordnance~~	⚠ Shrink-swell	~~⚠ Geological faults~~
⚠ ~~Aggressive geology (non-natural)~~	~~⚠ Ground gas (natural sources)~~	
	~~⚠ Aggressive geology (natural)~~	
	⚠ ~~Compressible soil~~	

It is important to note that, even where a hazard is screened out, this does not mean that it will not be encountered but rather, on the balance of evidence, a 'responsive' risk management strategy is recommended.

***Key watch-points for all groundworks*:**

ⓘ **Below ground utilities:** Utility strikes represent one of the highest background threats of injury, death and programme delays of all ground-related hazards. The investigation of existing utilities is typically work completed by utility specialists with reference within this Report included for completeness.

ⓘ **Excavation access:** Excavation collapses carry a high background threat of injury and death – even collapses within shallow excavations can pose a risk of harm. Personnel access into any excavations should therefore only be undertaken with adequate support and appropriate risk assessment. Advice on the general stability of excavations is therefore offered on a preliminary basis only within this Report. Further guidance is available[8].

ⓘ **Materials management.** For all scenarios, developing a strategy for management of materials/soils in advance of the works commencing is recommended to maximise recovery/reuse and maintain soil conditioning, e.g. not repeatedly handling or compacting Topsoil. In some scenarios, formalising this plan[9] will be required.

Preliminary advice on the re-use and recovery of materials is presented within this Report with indicative material classes given in accordance with Series 0600[10] of the Manual of Contract Documents for Highway Works.

For material re-use as an engineering or load-bearing fill the Engineer's approval will be required. Additional testing may be required to confirm grading and where necessary, a compaction regime.

ⓘ **Waste classification of excavation arisings.** The waste classification of soils is something that should be approached in a step-wise manner, in line with current guidance[11]:

Step 1: Confirming whether a soil is Hazardous or Non-Hazardous (through solid soil testing) followed by

Step 2: Waste acceptance criteria (WAC)testing only when and where off-Site disposal is confirmed as the fate for the material.

Groundworks contractors have access to waste brokerage firms and landfills directly where acceptance criteria can vary and, as such, are generally best placed to confirm waste classifications. The waste classification any material surplus to requirements (requiring disposal) will need to be agreed with the groundworks contractor in advance of works commencing. Advice on waste classification is therefore offered on a preliminary basis within this Report.

ⓘ **Construction workers health and safety.** Contractors working in the ground will be exposed to the soils and any materials contained within them throughout the duration of the works phase (demolition or construction). Based on the history of this plot and findings of the fieldworks, there is a low likelihood of there being chemically harmful the soils beneath the Site, e.g. oil-stained soils. This does not mean material of this nature will not be encountered, but rather, it is less likely. At this stage, if and where any potentially harmful material, e.g. oil-stained soils or asbestos containing material, was encountered within the soils on Site, this would be managed as an unforeseen encounter (Guidance Note annexed to this Report).

The appointed contractor should satisfy themselves of having in place suitable measures to protect workers and neighbours against the compounds detected within the Site soils.

[8] *CIRIA Report 97 - Trenching practice. 2nd edition*
[9] *https://claire.co.uk/projects-and-initiatives/dow-cop/28-framework-and-guidance/111-dow-cop-main-document*
[10] *https://www.standardsforhighways.co.uk/search/471049cb-7dd8-452a-81e6-fc8af7d31b91*
[11] *Classify different types of waste: your legal responsibilities - GOV.UK*

6.1 Groundworks

Excavations will be limited on Site (new drainage) given the re-use of existing sub-structures and utilities but, where required, are anticipated to encounter the following materials that, unless otherwise stated, are listed in a generalised, descending order from the surface.

> Made Ground (sub-base)

Existing sub-base deposits across the proposed driveway (mixed, crushed material).

> Pennine Lower Coal Measures (weathered bedrock)

Likely cohesive (clay) with medium strength characteristics.

⚠ Shrink-swell: as a cohesive soils, this material will be susceptible to both; i) softening and ii) shrink-swell with changes in moisture content. Both could give rise to excessive levels of settlement or longer-term subsidence related ground movement. The weathered bedrock is conservatively assessed to have a low volume change potential.

In the foundations having already been cast and no indication of subsidence having affected the former shed (higher imposed loads), the risk associated with shrink-swell effects on the existing footings is considered low.

> Pennine Lower Coal Measures (intact bedrock)

Interbedded sandstone, siltstone, mudstone, coal and fireclay with named sandstone units mapped across the Site.

⚠ Surface instability (mine shafts): no mine shafts are recorded on Site and therefore, on this basis, the hazard presented by mine shafts is considered unlikely to influence the proposed development.

It is however noted that, within the coalfield region, there are commonly more unrecorded than recorded mine shafts. Current guidance[12] offers a conservative estimate of the likelihood of encountering unrecorded mine entries but, in the Author's experience, it is more useful to consider this as a low likelihood 'background threat' within coalfield regions unless there is a history of 'early' (pre-1850) mine workings within an area and/or very shallow mineral deposits. In this scenario, the presence of nearby, mine entries (north-east of the Site) and a very shallow presentation of 'good quality' coal (possible bell pits) could increase the likelihood of unrecorded mine entries being present however; i) these mine entries are named and associated with the former colliery (main shafts) and; ii) given the lack of evidence of workings within four exploratory holes on the Site indicates that local workings within the Blocking Coal are unlikely to have extended this far west. Taken together it is considered unlikely unrecorded mine entries are present across the Site.

⚠ Surface instability (shallow mining): no evidence of shallow mine workings was recorded within 26.6 m of the ground surface within RO101 or within the Blocking Coal seam within the other three borehole positions.

With respect to the shallowest coal seam, i.e. the Blocking Coal, given the lack of evidence of mine workings within these four rotary boreholes, it appears this seam was not extracted/mined beneath the Site and therefore, the risk of mining related instability is acceptably low.

With respect to the deeper coal seams, e.g. the Top Lousey, given the lack of evidence of mine workings within RO101 and recorded seam separation between the Blocking Coal and Top Lousey (35 – 55 m[13]), the risk of mining related instability is acceptably low.

> Groundwater

The groundwater table is anticipated to remain deeper than 5 m below the finished floor level of the proposed structures noting that, the sloping nature of the Site may give rise to seasonal seepages from higher elevations.

Rainwater (surface water) may accumulate within excavations given the anticipated 'very poor' draining weathered mudrocks (siltstone and mudstone) present across the Site.

Earthworks (cut and fill) are not anticipated to be required with existing and proposed formation levels likely remaining similar.

6.2 Structural Engineering

***Proposed foundation*:** include for the reuse of existing foundations (installed at the time of the fieldworks):

As an indication, for centrally loaded liner (strip) footings up to 0.75 m wide that are formed at a minimum depth of 750 mm below ground level (shrink-swell) within the weathered bedrock deposits, a presumed bearing capacity of 100 kN/m^2 could be adopted as part of the foundation design (BS EN 1997-1 methodology based on a conservative estimate of the strength characteristics of the weathered bedrock but accounting for the increase in stiffness with depth).

The risk presented by shallow mine workings has been assessed as low – refer to Section 6.1.

***Proposed floor slab*:** include for the use of suspended beam and block floor (installed at the time of the fieldworks) that is understood to include for sub-floor ventilation:

⚠ Mine gas: no evidence of shallow mine workings was recorded within 26.6 m of the ground surface within RO101 or within the Blocking Coal seam within the other three borehole positions.

Similarly, no evidence of mine gas was recorded at the drill rig or within the borehole cavity on completion of the boreholes (since backfilled with bentonite).

Taken together, the risk presented by mine gas is considered low and no further assessment or risk reduction measures recommended.

⚠ Radon: 'basic radon protection' in accordance with current guidance[14] is recommended. In this scenario, this is likely to include for a continuous, well-sealed damp proof membrane across the full footprint of the dwelling.

The provision of sub-floor ventilation will offer inherent protection to all ground gases.

Retaining walls are not expected to be required as part of the proposed development however, it is noted that various existing earth retaining structures are present (gabions and king-post-style wooden retaining walls) that are to be kept as part of the proposed development.

[12] C758 Abandoned Mine Workings Manual
[13] *https://webapps.bgs.ac.uk/Memoirs/docs/B06077.html?*
[14] BRE 211 {2023} Radon: Guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects)

Whilst a condition survey of these structures was beyond the scope of this Report but, based on the height of the retained soils, a continual review of their performance

Buried concrete placed in all soils encountered as part of this investigation is recommended to be designed to suit DS-1 AC-1 classifications[15] based on the Author's experience of testing this geology locally.

For buried concrete design purposes, groundwater should be regarded as 'mobile' (groundwater anticipated to rest at least 5 m below finished floor level across the year).

6.3 Civil Engineering

Hard-standing based on the revealed ground conditions and likely formation levels (similar formation levels), the sub-grade is anticipated expected to comprise either residual sub-base or 'weathered bedrock' deposits. In both instances, this material is anticipated to offer 'good support' to new hardstanding with a preliminary CBR value of 5 % recommended.

Attention is drawn to:

- The potential presence of 'soft spots' that, where encountered, will likely require excavation and replacement with a suitable, well-compacted granular fill.

Drainage of the existing dwelling is anticipated to be controlled by drainage into the existing piped network with an unknown outfall (possible mains in road to north).

Outside of the proposed development footprints, hard landscaping is present throughout the proposed development area.

Drainage to ground is not recommended based on the revealed ground conditions (cohesive soils across shallow depths the drainage characteristics of which are anticipated to be 'very poor' with water flush 'held' within borehole cavities on completion (RO102 and RO103) and lack of space to include for drainage to ground features that are not above the proposed dwelling.

6.4 Landscaping

Soft landscaping: Outside of the proposed development footprints, hard landscaping is present throughout the proposed development area.

Based on these surfaces being kept as part of the proposed development, any shallow soils across the Site are effectively encapsulated by a 'hard' barrier.

If and where imported soil forming materials, i.e. Topsoil and sub-soil, is be required as part of the development works and should be sourced from a reputable supplier and tested 'at source' to confirm they are suitability for use. The suitability of the imported soil forming material will also need to be confirmed in line with the current guidance[16].

ⓘ ***Who is responsible for the landscaping design?*** *Where a 'cover system' or 'capping layer' is required to serve as a physical barrier between end users of the Site and chemically or physically unsuitable material below, then the thickness of the soft landscaping will be determined by the ground engineer / land quality consultant.*

Where a 'cover system' isn't required, the thickness of the soft landscaping will be determined by the landscape architect or architect. In any case, collaboration/consultation across both parties is recommended to ensure all objectives are met.

ⓘ ***Who decides if a material is suitable for use within soft landscaping?*** *The advice given within this Report relates to the chemical suitability of the Topsoil with respect to human health and not its suitability as a growing medium; that remains the role of the landscape architect.*

[15] BRE Special Digest 1 Concrete in aggressive ground

[16] *https://claire.co.uk/component/phocadownload/category/5-external-documents?download=987:a-regulator-s-guide-to-cover-systems-and-their-verification-2024*

7.0 **Ground Risk Register** – Construction Issue

Historical Hazards			
Hazard	***Background threat***	**Risk Rating**	**Risk Management**
Potentially polluting material	***High***	Low *(No evidence on Site)*	Responsive
Potentially harmful material	***Medium***	Low *(No evidence on Site)*	Responsive
Made Ground (geotechnical hazards)	***Medium***	Low *(No evidence on Site)*	Responsive
Sub-Structures	***Medium***	Low *(No evidence on Site)*	Responsive
Ground gas (landfill or infilled land)	***Low***	Low *(Very low ground gas risk; CS1)*	Responsive
Unexploded Ordnance	~~***Low***~~	Low *(No evidence on Site)*	Responsive
Aggressive geology (non-natural)	***Low***	Acceptably low *(Author's experience)*	Responsive

Geological Hazards			
Hazard	***Background threat***	**Risk Rating**	**Risk Management**
Slope instability	***High***	Low *(No evidence on Site)*	Responsive
Collapsible soil	***High***	Low *(No evidence on Site)*	Responsive
Running sand	***High***	Low *(No evidence on Site)*	Responsive
Radon	***High***	Medium (Evidence on Site)	**Basis protection** (refer to Section 6.2)
Ground dissolution	~~***Medium***~~	Low *(No evidence on Site)*	Responsive
Shrink-swell	***Medium***	Low (Evidence on Site but low risk)	**Min. foundation depth** (refer to Section 6.2)
Ground gas (natural sources)	***Medium***	Low *(No evidence on Site)*	Responsive
Aggressive geology (natural)	***Low***	Low *(Author's experience)*	Responsive
Compressible soil	***Low***	Low *(No evidence on Site)*	Responsive

Mining Hazards			
Hazard	***Background threat***	**Risk Rating**	**Risk Management**
Surface instability (mine shafts)	***High***	Low *(No evidence on Site)*	Responsive
Ground gas (mine gas)	***High***	Low *(None recorded in boreholes)*	Responsive
Surface instability (shallow mining)	***Medium***	Low *(None within critical depth)*	Responsive
Surface instability (opencast)	***Medium***	Low *(No evidence on Site)*	Responsive
Coal Outcrops	***Medium***	Low *(No evidence on Site)*	Responsive
Geological Faults	***Low***	Low *(No evidence on Site)*	Responsive

Background threat highlights the relative threats each hazard poses and represents a qualitative assessment of publicly available incident data, public perception and general commentary on harm and other impacts associated with the hazard. For example, whilst the consequence of an unexploded ordnance incident would be severe, no fatalities or injuries have occurred since 1949 and so the background threat is deemed 'low'. Similarly, collapsible ground is linked to excavation instability with annual fatalities due to excavation collapse (HSE data) meaning the background threat is deemed 'high'. Further details on this are available on request.

The inclusion of 'background threat' aims to help the reader better contextualise the risk and through that, take greater ownership of any recommended risk management. Proportionality is essential - being overprotective erodes the value of the process and adds unnecessary cost; being under protective exposes people and places to real risk.

Risk ratings can change as new information is made available. Where 'responsive' risk management is recommended this does not mean there is no risk but rather that groundwork operatives stay alert to the potential for unexpected or unforeseen ground conditions.

8.0 Conclusions and Recommendations

Based on available information and the scope of this Report (intrusive assessment) the ground conditions and associated, ground-related hazards on Site are considered well characterised and either consistent with that were anticipated or else, explained through further assessment/analysis.

It is reiterated that any ground investigation offers a snapshot of ground conditions from discrete exploratory hole positions and therefore variations cannot be ruled out.

8.1 Conclusions

> **Further assessment** is not recommended but may be required subject to any changes of the development proposals or else

> **Risk management** is recommended to reduce the risk of various hazards to low levels, a summary of which is presented in Section 7.0 and details of which presented in Section 6.0.

8.2 Recommendations

Recommended follow-on work includes:

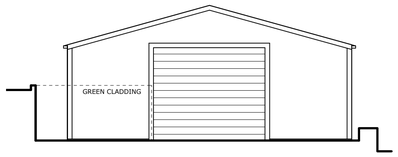
1. **Submission of this Report** to the project design team and other stakeholders, e.g. the Local Planning Authority and Building Control

Follow-on reporting is not recommended, e.g. Remediation Strategy, however, whilst not specifically referenced within the planning conditions, follow-up action is expected to be required for two specific measures, that generally will need to be reported to the Local Planning Authority. These include:

a. **Unexpected material** – if and where any material is encountered in the ground that differs from that described within this Report, it is recommended that either the Author of this Report is consulted or else a suitably qualified ground engineer is engaged to review the material. If and where this material is suspected to include potentially harmful or polluting material, e.g. oil-stained soils or discoloured soils, then it is recommended that the Local Planning Authority's contaminated land team are consulted to agree, in advance, a suitable, responsive strategy for dealing with the material.

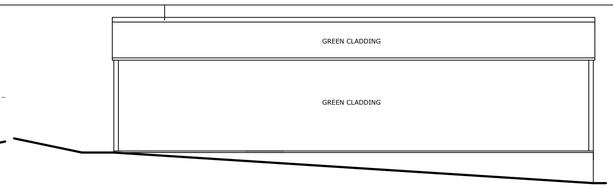
b. **Imported, soil forming material** – if and where any soil forming material is imported onto Site then, as detailed within Section 6.4, the chemical suitability of this material will need to be confirmed.

ⓘ ***Photographic diary of the groundworks:*** *It is recommended that a photographic record of any groundworks is maintained to document the physical condition and nature of the ground conditions across the Site. This information will serve as a valuable record for the project as well as any future groundworks on the Site.*

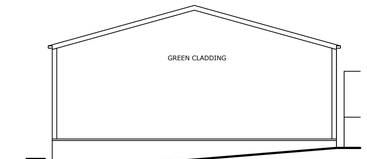


FRONT ELEVATION SCALE 1:100

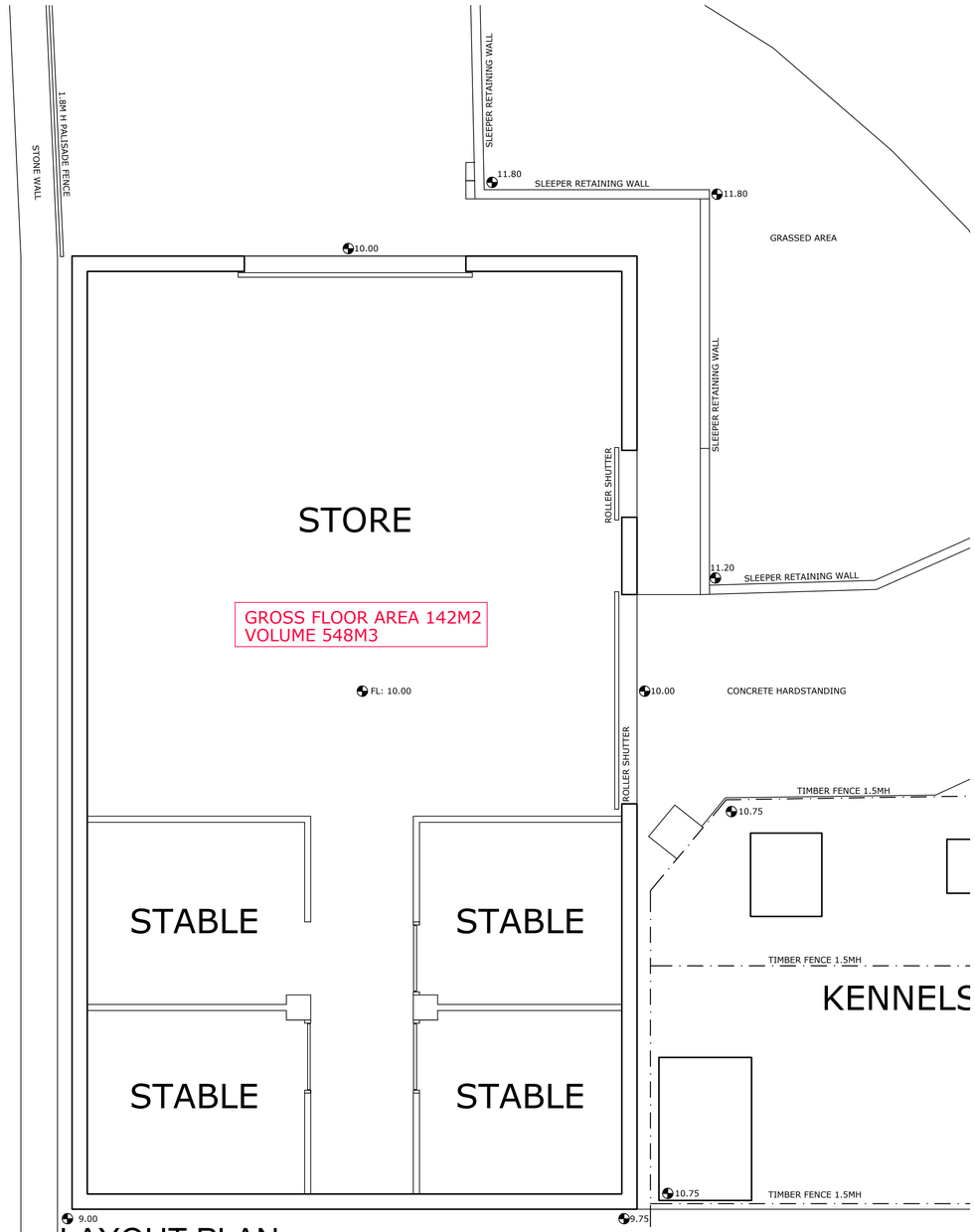
SIDE ELEVATION 1 SCALE 1:100



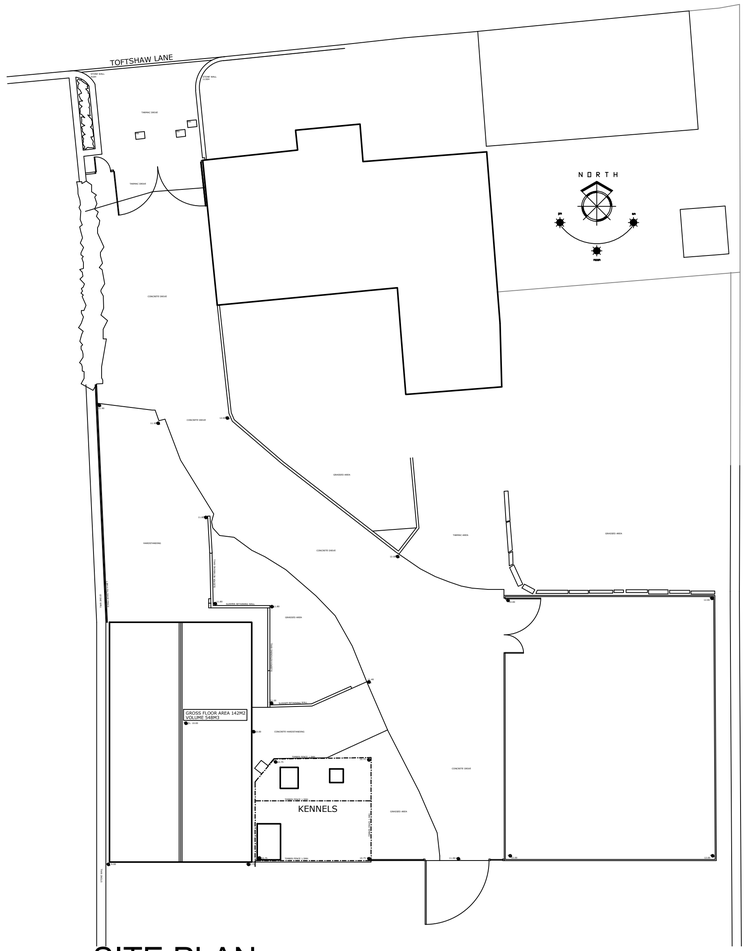
SIDE ELEVATION 2 SCALE 1:100



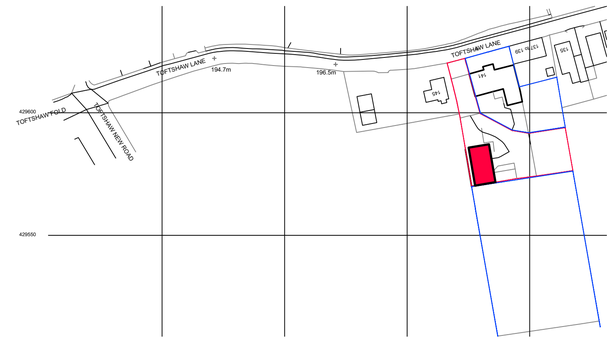
REAR ELEVATION SCALE 1:100



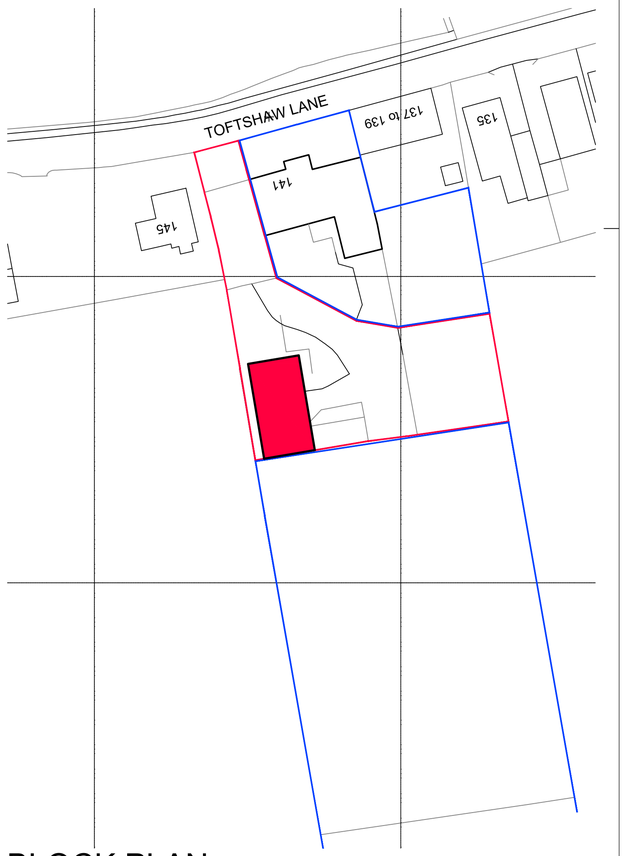
LAYOUT PLAN SCALE 1:50



SITE PLAN SCALE 1:200



LOCATION PLAN SCALE 1:1250



BLOCK PLAN SCALE 1:500

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Notes.

Revisions.

Date	Suffix	Description	Date	Suffix	Description

NYP ARCHITECTURAL SERVICES LIMITED
BBIC, Innovation Way, Barnsley, S75 1JL. Tel: 01226 200989. E-mail : scott@nypas.co.uk / stephen@nypas.co.uk

Project. 141 TOFTSHAW LANE BRADFORD, BD4-6QS		Client. BELINDA STARKY	
Drawing Title. SURVEY PLANS, ELEVATIONS & SITE PLAN		Date. SEPT 2021	Scale. AS INDICATED
	Ref. 102/127	Dwg. No. 01	Rev. B

SHEET SIZE A1

SITE PLAN SCALE 1:100

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Notes.

Revisions.

Date	Suffix	Description	Date	Suffix	Description

NYP ARCHITECTURAL SERVICES LIMITED
BBIC, Innovation Way, Barnsley, S75 1JL. Tel: 01226 200989. E-mail : scott@nypas.co.uk / stephen@nypas.co.uk

Project. 141 TOFTSHAW LANE BRADFORD, BD4-6QS		Client. BELINDA STARKY	
Drawing Title. PROPOSED SITE PLAN		Date. OCT 2021	Scale. AS INDICATED
	Ref. 102/127	Dwg. No. 03	Rev. A

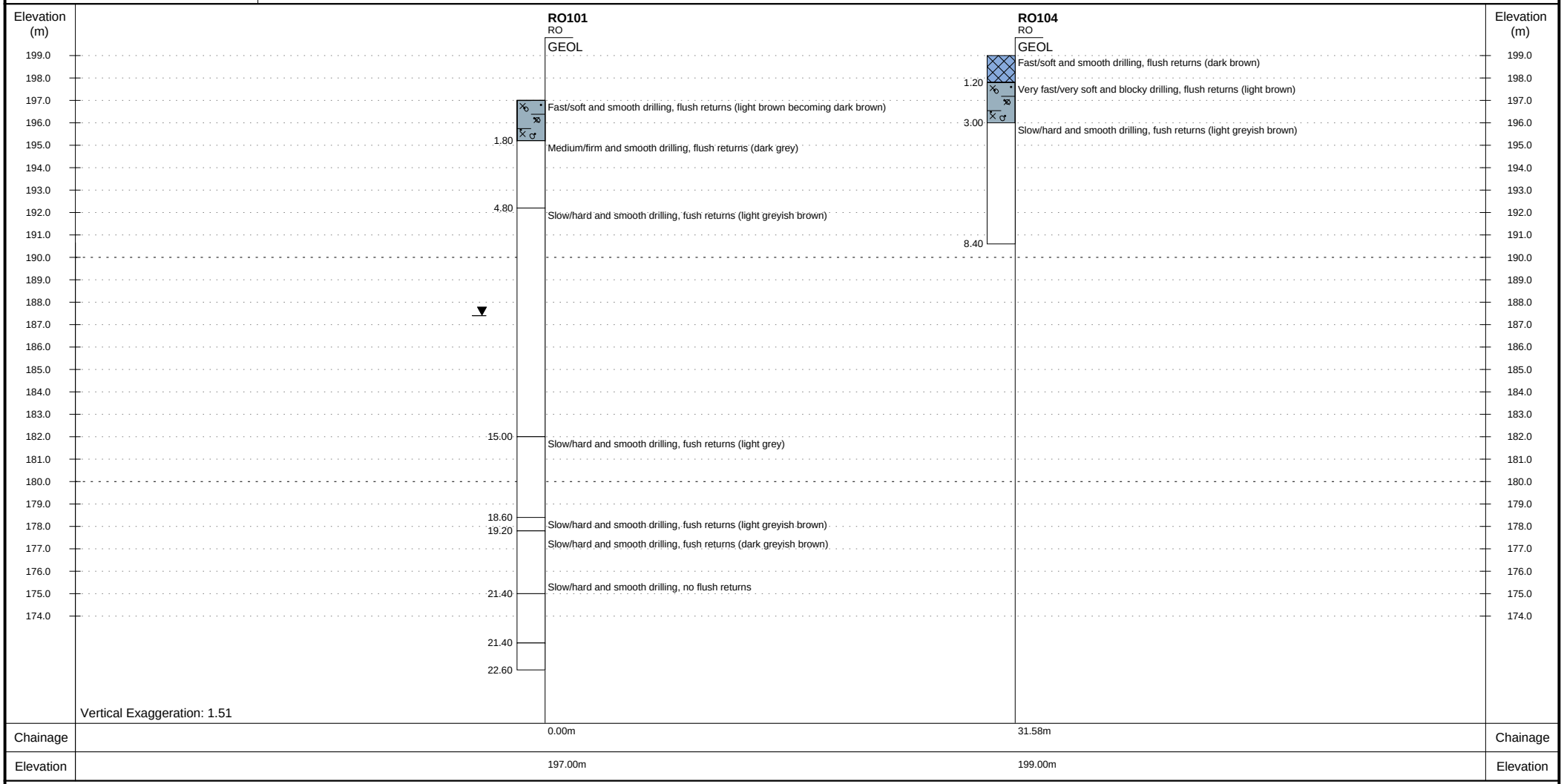
SHEET SIZE A1

SOIL AND STRUCTURES

Cross-Section A-A'

Project Name	Project No.	Vertical Scale	Horizontal Scale
Land to rear of 141 Toftshaw Lane, Bradford	20531	1:250	1:377

Client	Consultant	Contractor
Belinda Starky	Soil and Structures Ltd	Sandvik



MADE GROUND

CLAY

UNDETERMINED

WATER LEVELS

REST

STRIKE

Checked By: RB **Approved By:** RB **Status:** FINAL

Created using Pebble Geo

SOIL AND STRUCTURES

Key to exploratory hole symbols and abbreviations

SAMPLE TYPES

ACM - Asbestos sample
AMAL - Amalgamated sample
B - Bulk disturbed sample
BLK - Block sample
C - Core sample
CBR - CBR test sample
D - Disturbed sample
ES - Environmental sample
EW - Environmental water sample
G - Gas sample
J - Jar sample
L - Liner sample
TW - Pushed thin wall sample
U - Undisturbed sample
UT - Undisturbed thin wall sample
W - Water sample

IN-SITU TESTS

HV - Hand shear vane
HV(r) - Hand shear vane residual
PID - Photo ionisation detector
PP - Hand penetrometer
SPT - Standard penetration test
SPT(C) - SPT using cone

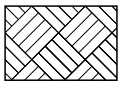
GROUNDWATER

Groundwater strike
Groundwater rest level

ROTARY CORE DETAILS

TCR - Total core recovery (%)
SCR - Solid core recovery (%)
RQD - Rock quality designation (%)
FI - Fracture index
NI - Non-intact core
AZCL - Assumed zone of core loss

LEGEND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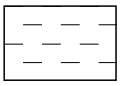
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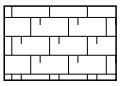
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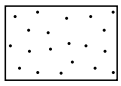
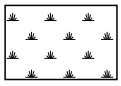

Sand backfill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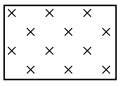
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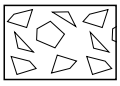
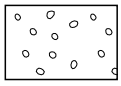
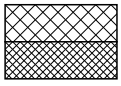
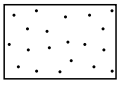
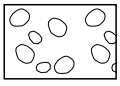
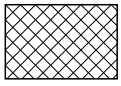

Breccia


Gravel backfill


Made ground [cohesive]


Sand


Conglomerate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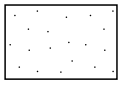
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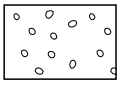
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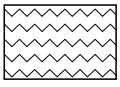
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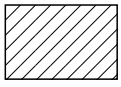
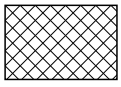
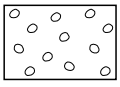
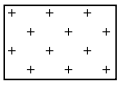
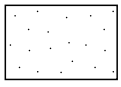

Bentonite


Wood


Cobbles


Igneous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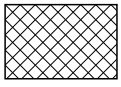
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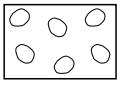
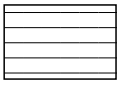
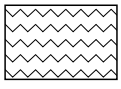

Boulders

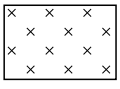

Grout


Bituminous material

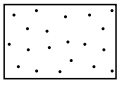

Mudstone


Plain pipe

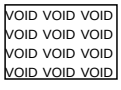

Gypsum


Siltstone


Coal


Sandstone


Slotted pipe



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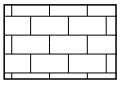
Limestone

SOIL AND STRUCTURES

Open Hole Log

RO101

Hole Type	Easting	Northing	Ground Level (m)	Scale
RO	419079.00	429569.00	197.00	1:100

Project Name	Project No.	Start Date	End Date
Land to rear of 141 Toftshaw Lane, Bradford	20531	2025-08-11	2025-08-11

Client	Consultant	Contractor
Belinda Starky	Soil and Structures Ltd	Sandvik

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Coring: Core Run	TCR (%)	SCR (%)	RQD (%)	Frac	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
											(1.80)		Fast/soft and smooth drilling, flush returns (light brown becoming dark brown) [LOWER COAL MEASURES, Residual soil grading into intact bedrock]
										195.20	1.80		Medium/firm and smooth drilling, flush returns (dark grey) [LOWER COAL MEASURES, No evidence of mine workings]
											(3.00)		*Black bituminous coal with vertical fissure (natural) and suspected 200 mm thick clay parting confirmed through camera survey (3.20 - 4.20m)* *Coal traces/flecks in flush (4.20 - 4.25m)*
										192.20	4.80		Slow/hard and smooth drilling, fush returns (light greyish brown) [LOWER COAL MEASURES, No evidence of mine workings] *Locally medium/firm, smooth drilling, flush returns (light grey) (5.50 - 6.00m)*
	▼										(10.20)		*Water level recorded within borehole on completion (after 60 mins)* *Flush returns (light grey) (9.00 - 10.80m)* *Flush returns (light brown) (11.50 - 12.00m)*
										182.00	15.00		Slow/hard and smooth drilling, fush returns (light grey) [LOWER COAL MEASURES, No evidence of mine workings]
											(3.60)		
										178.40	18.60		
											(0.60)		Slow/hard and smooth drilling, fush returns (light grey) [LOWER COAL MEASURES, No evidence of mine workings]
										177.80	19.20		
											(2.80)		Slow/hard and smooth drilling, fush returns (light greyish
											(2.20)		*Continued on next page*

Remarks

PURPOSE: Profiling deeper strata beneath the Site to inform assessment of coal mining related risk. TERMINATION: Target depth achieved - engineer decision. LOCATION: Surveyed using freeware on Site. GL: Estimated off Satellite imagery. STABILITY: Stable. GROUNDWATER: Encountered. OTHER: No evidence of potential harmful or polluting material. IN-SITU TESTING: Down-the-hole camera.

Method, Plant, Stability, Dimensions

0.00 - 22.60m RO
Stable

Logger

RB/LU

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Open Hole Log

RO101

Hole Type	Easting	Northing	Ground Level (m)	Scale
RO	419079.00	429569.00	197.00	1:100

Project Name	Project No.	Start Date	End Date
Land to rear of 141 Toftshaw Lane, Bradford	20531	2025-08-11	2025-08-11

Client
Belinda Starky

Consultant
Soil and Structures Ltd

Contractor
Sandvik

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Coring: Core Run	TCR (%)	SCR (%)	RQD (%)	Frac	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
													brown)
													[LOWER COAL MEASURES, No evidence of mine workings]
													Slow/hard and smooth drilling, fush returns (dark greyish brown)
										175.60	21.40		
										175.60	21.40		[LOWER COAL MEASURES, No evidence of mine workings]
											(1.20)		Slow/hard and smooth drilling, no flush returns
													[LOWER COAL MEASURES, No evidence of mine workings]
										174.40	22.60		
													End of Borehole at 22.60m

Remarks
PURPOSE: Profiling deeper strata beneath the Site to inform assessment of coal mining related risk. TERMINATION: Target depth achieved - engineer decision. LOCATION: Surveyed using freeware on Site. GL: Estimated off Satellite imagery. STABILITY: Stable. GROUNDWATER: Encountered. OTHER: No evidence of potential harmful or polluting material. IN-SITU TESTING: Down-the-hole camera.

Method, Plant, Stability, Dimensions
0.00 - 22.60m RO
Stable

Logger
RB/LU

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Open Hole Log

RO101

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
RO	419079.00	429569.00	197.00	1:100

Project Name	Project No.	Start Date	End Date
Land to rear of 141 Toftshaw Lane, Bradford	20531	2025-08-11	2025-08-11

Client	Consultant	Contractor
Belinda Starky	Soil and Structures Ltd	Sandvik

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
9.60				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
9.60	9.60	60	

Remarks

PURPOSE: Profiling deeper strata beneath the Site to inform assessment of coal mining related risk. TERMINATION: Target depth achieved - engineer decision. LOCATION: Surveyed using freeware on Site. GL: Estimated off Satellite imagery. STABILITY: Stable. GROUNDWATER: Encountered. OTHER: No evidence of potential harmful or polluting material. IN-SITU TESTING: Down-the-hole camera.

Method, Plant, Stability, Dimensions

0.00 - 22.60m RO
Stable

Logger

RB/LU

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Open Hole Log

RO101
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
RO	419079.00	429569.00	197.00	1:100

Project Name	Project No.	Start Date	End Date
Land to rear of 141 Toftshaw Lane, Bradford	20531	2025-08-11	2025-08-11

Client	Consultant	Contractor
Belinda Starky	Soil and Structures Ltd	Sandvik

Remarks
PURPOSE: Profiling deeper strata beneath the Site to inform assessment of coal mining related risk. TERMINATION: Target depth achieved - engineer decision. LOCATION: Surveyed using freeware on Site. GL: Estimated off Satellite imagery. STABILITY: Stable. GROUNDWATER: Encountered. OTHER: No evidence of potential harmful or polluting material. IN-SITU TESTING: Down-the-hole camera.

Method, Plant, Stability, Dimensions
0.00 - 22.60m RO
Stable

Logger
RB/LU

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Open Hole Log

RO102

Hole Type	Easting	Northing	Ground Level (m)	Scale
RO	419082.00	429571.00	197.00	1:100

Project Name	Project No.	Start Date	End Date
Land to rear of 141 Toftshaw Lane, Bradford	20531	2025-08-11	2025-08-11

Client
Belinda Starky

Consultant
Soil and Structures Ltd

Contractor
Sandvik

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Coring: Core Run	TCR (%)	SCR (%)	RQD (%)	Frac	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
											(1.80)		Fast/soft and smooth drilling, flush returns (light brown becoming dark brown) [LOWER COAL MEASURES, Residual soil grading into intact bedrock]
										195.20	1.80		Medium/firm and smooth drilling, flush returns (dark grey) [LOWER COAL MEASURES, No evidence of mine workings]
											(3.00)		*Black bituminous coal confirmed through camera survey - hole flooded below 3.8 m depth (3.20 - 3.80m)*
										192.20	4.80		*End of Borehole at 4.80m*

Remarks
PURPOSE: Profiling deeper strata beneath the Site to inform assessment of coal mining related risk. TERMINATION: Target depth achieved - engineer decision. LOCATION: Surveyed using freeware on Site. GL: Estimated off Satellite imagery. STABILITY: Stable. GROUNDWATER: Undetermined - water flush in hole. OTHER: No evidence of potential harmful or polluting material. IN-SITU TESTING: Down-the-hole camera.

Method, Plant, Stability, Dimensions
0.00 - 4.80m RO
Stable

Logger
RB/LU

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Open Hole Log

RO102
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
RO	419082.00	429571.00	197.00	1:100

Project Name	Project No.	Start Date	End Date
Land to rear of 141 Toftshaw Lane, Bradford	20531	2025-08-11	2025-08-11

Client	Consultant	Contractor
Belinda Starky	Soil and Structures Ltd	Sandvik

Remarks
PURPOSE: Profiling deeper strata beneath the Site to inform assessment of coal mining related risk. TERMINATION: Target depth achieved - engineer decision. LOCATION: Surveyed using freeware on Site. GL: Estimated off Satellite imagery. STABILITY: Stable. GROUNDWATER: Undetermined - water flush in hole. OTHER: No evidence of potential harmful or polluting material. IN-SITU TESTING: Down-the-hole camera.

Method, Plant, Stability, Dimensions
0.00 - 4.80m RO
Stable

Logger
RB/LU

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Open Hole Log

RO103

Hole Type	Easting	Northing	Ground Level (m)	Scale
RO	419084.00	429573.00	197.00	1:100

Project Name	Project No.	Start Date	End Date
Land to rear of 141 Toftshaw Lane, Bradford	20531	2025-08-11	2025-08-11

Client	Consultant	Contractor
Belinda Starky	Soil and Structures Ltd	Sandvik

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Coring: Core Run	TCR (%)	SCR (%)	RQD (%)	Frac	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
											(1.80)		Fast/soft and smooth drilling, flush returns (light brown becoming dark brown) [LOWER COAL MEASURES, Residual soil grading into intact bedrock]
										195.20	1.80		Medium/firm and smooth drilling, flush returns (dark grey) [LOWER COAL MEASURES, No evidence of mine workings]
											(3.00)		*Black bituminous coal confirmed through camera survey - hole flooded below 4.0 m depth (3.20 - 4.00m)*
										192.20	4.80		*End of Borehole at 4.80m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5 19.0 19.5 20.0

Remarks

PURPOSE: Profiling deeper strata beneath the Site to inform assessment of coal mining related risk. TERMINATION: Target depth achieved - engineer decision. LOCATION: Surveyed using freeware on Site. GL: Estimated off Satellite imagery. STABILITY: Stable. GROUNDWATER: Undetermined - water flush in hole. OTHER: No evidence of potential harmful or polluting material. IN-SITU TESTING: Down-the-hole camera.

Method, Plant, Stability, Dimensions

0.00 - 4.80m RO
Stable

Logger

RB/LU

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Open Hole Log

RO103
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
RO	419084.00	429573.00	197.00	1:100

Project Name	Project No.	Start Date	End Date
Land to rear of 141 Toftshaw Lane, Bradford	20531	2025-08-11	2025-08-11

Client	Consultant	Contractor
Belinda Starky	Soil and Structures Ltd	Sandvik

Remarks
PURPOSE: Profiling deeper strata beneath the Site to inform assessment of coal mining related risk. TERMINATION: Target depth achieved - engineer decision. LOCATION: Surveyed using freeware on Site. GL: Estimated off Satellite imagery. STABILITY: Stable. GROUNDWATER: Undetermined - water flush in hole. OTHER: No evidence of potential harmful or polluting material. IN-SITU TESTING: Down-the-hole camera.

Method, Plant, Stability, Dimensions		Logger
0.00 - 4.80m	RO	RB/LU
Stable		

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Open Hole Log

RO104

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
RO	419073.00	429600.00	199.00	1:100

Project Name	Project No.	Start Date	End Date
Land to rear of 141 Toftshaw Lane, Bradford	20531	2025-08-11	2025-08-11

Client
Belinda Starky

Consultant
Soil and Structures Ltd

Contractor
Sandvik

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Coring: Core Run	TCR (%)	SCR (%)	RQD (%)	Frac	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
											(1.20)		Fast/soft and smooth drilling, flush returns (dark brown) [LOWER COAL MEASURES, Suspected Made Ground]
										197.80	1.20		
											(1.80)		Very fast/very soft and blocky drilling, flush returns (light brown) [LOWER COAL MEASURES, Suspected residual soil grading into intact bedrock]
										196.00	3.00		
											(5.40)		Slow/hard and smooth drilling, fush returns (light greyish brown) [LOWER COAL MEASURES, No evidence of mine workings]
													Coal traces/flecks in flush (7.20 - 7.80m)
										190.60	8.40		*End of Borehole at 8.40m*

Remarks
PURPOSE: Profiling deeper strata beneath the Site to inform assessment of coal mining related risk. TERMINATION: Target depth achieved - engineer decision. LOCATION: Surveyed using freeware on Site. GL: Estimated off Satellite imagery. STABILITY: Unstable. GROUNDWATER: Undetermined - water flush in hole. OTHER: No evidence of potential harmful or polluting material. IN-SITU TESTING: None - hole collapsed at 2.4 m depth

Method, Plant, Stability, Dimensions
0.00 - 8.40m RO
Stable

Logger
RB/LU

Checked By: RB **Approved By:** RB **Status:** FINAL