

Project Reference: GEO2024-6221

Date: 20.05.2026

Site: Land off Parkside, Cleator Moor (see GEO2024-6221)

Document: Technical Note – Mining and Geotechnical Summary

Introduction

Following the receipt of the attached comments made by a local resident of Cleator Moor, dated 7th October 2025, GEO have compiled this Technical Note (TN01) to address the concerns raised.

Desk based and targeted site intrusive works have been undertaken by GEO Environmental Engineering Limited (GEO) on behalf of Genesis Homes (North) Limited. A summary of these findings is given below although it is recommended that reference be made to the appropriate reports.

Previous Reports & Overview

GEO have completed the following documents for the site off Parkside in Cleator Moor, details of which are included below along with a brief summary of the findings of each report.

- Phase 1: Desk Top Study (Preliminary Environmental Risk Assessment), ref: 2024-6139, dated: 15.01.2024.
 - Historical map data indicates that the site has comprised undeveloped agricultural fields, therefore deep made ground and significant contamination was not anticipated.
 - Geological data indicates Glacial Till (firm and stiff gravelly clays with bands of sand and gravels) overlying solid strata comprising the Buttermere Formation (folded mudstone, siltstone and sandstone turbidite deposits) and the Frizington Limestone Formation (shales and limestones). The report indicated a negligible and very low risk of dissolution of soluble rocks respectively.
 - Reference to the published BGS geological maps and the GSR included as part of the report indicates the site is underlain by the Buttermere Formation which typically comprises sheared and folded mudstone, siltstone and sandstone turbidite deposits and is devoid of coal seams. Immediately north of the site and partially underlying the northeastern boundary is the strata of the Frizington Limestone Formation. This typically comprises shales and limestones. A review of the historical maps suggest that iron ore mining was undertaken within this strata north of the site area.
 - The GSR indicates that the site is located in an area where mineral veins may have been mined. The report includes the following comment with regards to mineral vein mining:

“Underground mine workings may have occurred in the past or current mines may be working at significant depth to modern engineering standards. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered.”
 - The report indicates a possible risk to the proposed development from possible mineral (iron ore) mining. A review of the geological and historical mining maps indicate that iron ore mining was located to the north of the site within the Frizington Limestone Formation.

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- A Coal Authority (CA) Consultants Mining Report was procured for the site, as the CA also keep records of iron ore mining. The report indicates that there is no known mining beneath or within the vicinity of the site. The CA report did not identify a risk of unrecorded mining. The CA report does not identify any other geological risks on or within the vicinity of the site.
- Based on the information presented within the report and obtained from the relevant bodies, the risk to the proposed development from coal or iron ore mining is currently considered negligible.
- The DTS indicated a very low to low geotechnical risk with the potential for some variable ground conditions.
- A negligible to very low risk was deemed appropriate with respect to possible ground contamination and ground gas. A negligible risk was deemed appropriate with respect to groundwater contamination, as the site exhibited no previous contaminative uses.
- The site is recorded as being on the edge of a radon affected area where full radon protection measures are required. Consultation with the Local Authority was recommended in this respect to determine appropriate protection measures. The report stated that *'it is likely that properties along the northeastern part of the site will require radon protection measures, but this should be confirmed'*.
- A ground investigation was recommended to determine the ground conditions to aid the design of foundations, roads and drainage and to determine any risks to the end users from contamination or ground gases (carbon dioxide and methane).

■ Phase 2: Ground Investigation Report, ref: 2024-6221, dated: 25.02.2025

- The site intrusive works comprised variable techniques including;
 - Mini percussion boreholes
 - Mechanically excavated trial pits
 - Dynamic probes
 - Dynamic Cone Penetrometer Tests
 - Gas and groundwater monitoring wells
- The ground conditions across the site presented themselves as topsoil overlying natural drift deposits of firm to stiff sandy gravelly clay. Across the western parts of the site, this was typically underlain by firm to stiff and stiff gravelly clay. Granular fractions were also encountered which comprised loose and medium dense clayey/silty sandy gravel / gravelly sand through the central parts of the site.
- A combination of shallow bedrock / weathered rock or stiff gravelly clay were encountered across the eastern parts of the site.
- Minor perched groundwater was noted although a shallow groundwater table is considered very unlikely. However, localised running sand and associated unstable ground should be anticipated. An allowance should be made for groundwater control measures (i.e. pumping equipment) and shoring, particularly during wetter periods of the year. Care should be taken when pumping to avoid undermining the surrounding ground by removing fines.

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- The use of soakaway drainage is not considered appropriate for the site.
- Geotechnical laboratory testing indicates clays of low and intermediate plasticity, with the modified plasticity indices suggest a minimum foundation depth of c.0.75m bgl. However, given the presence of existing mature trees/hedgerows on site, it is recommended that the foundations are designed in accordance with NHBC Standards (Chapter 4.2, "Building Near Trees"). Therefore, some over-deepening may be required.
- A concrete classification of DS-1 / AC-1 should be utilised.
- Based on the Human Health risk assessment above, none of the contaminants have been identified as posing a potential risk to human health with respect to a residential end use with plant uptake. As such, the topsoil present on site is not considered to pose a risk to human health or plants and remediation is not required.
- Following the completion of the ground gas monitoring the site falls into Characteristic Situation 1 (CS1) indicating that gas precautions are not necessary with respect to Carbon Dioxide and Methane.
- With respect to radon protection measures, it is recommended that the Local Authority are consulted in regard to which properties require radon protection measures.

The letter received by GEO includes many points of interest and GEO have answered these on the attached document, with GEO responses in red text.

Historical Mine Workings

The following BGS geological maps were utilised to verify the geological setting of the site as well as the locality of known mine entries and mining geohazards.

- Sheet NY01NW (Frizington), 1:10,000 Scale, Solid and Drift Edition (included in 1:50,000 Geological Sheet 28 (Whitehaven).
- Sheet NY01SW (Egremont), 1:10,000 Scale, Solid and Drift Edition (included in 1:50,000 Geological Sheet 28 (Whitehaven) and Sheet 37 (Gosforth).

These geological plans show that a conjectured major fault, known locally as the Henry Pit Fault, trends adjacent to the northern boundary and crosses through the far northeastern corner of the development site. The geology to the north of the fault is recorded to comprise various lithologies including

- Frizington Limestone Formation
- Eskett Limestone Formation
- Stainmore Formation

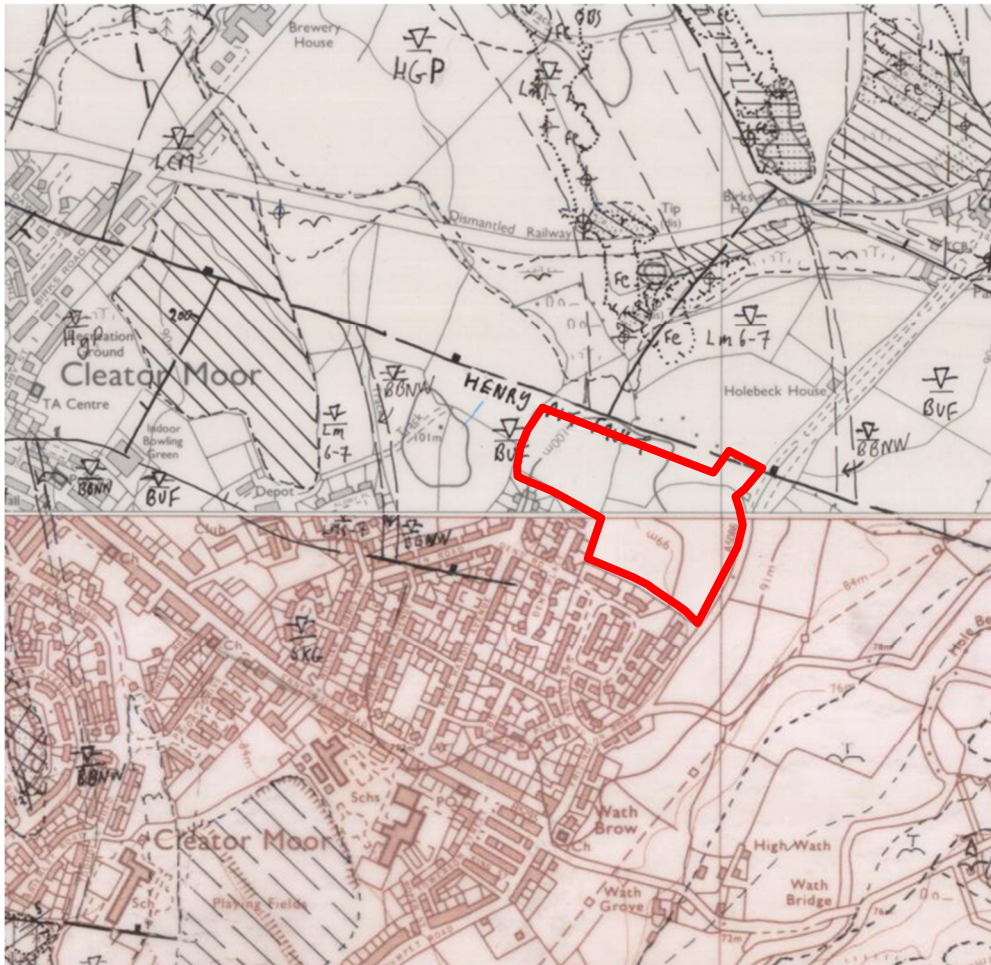
The formations named above are where potential and known ironstone workings are recorded to be present.

The majority of the development site is underlain by the Buttermere Formation (BUF) which typically comprises sheared and folded mudstone, siltstone and sandstones and is devoid of coal seams. These deposits are also devoid of the ironstone or haematite mineral veins, typically associated with the mining legacy which is present to the north of the site. This is confirmed by the geological map extract (NY01NW & NY01SW) included on the following page which shows the locality of the known recorded

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iron ore workings, all of which are present to the north and west of the site and within a different geological setting to the proposed development site.



Sheet NY01NW (Frizington)

Sheet NY01SW (Egremont)

Mine Entries

A lack of any mine entries has been noted on site during the intrusive investigation works, as well as the recent site walkover.

The BGS geological plans (copies above) have not recorded the presence of any mine entries on site, nor have they indicated mineral vein workings below the site.

The historical plans included as part of the Desk Top Study (DTS) report do not record any historical site activities either present on site or extending close to the site. A copy of an Ordnance Survey Map (dated 1842 – 1952) which was obtained online from the National Library of Scotland is included below. GEO have highlighted where mining activities have been historically recorded (i.e. shafts, mines, pits, quarries). The blue circle denotes the general area of the development site with a lack of shafts, mines, pits, quarries being recorded on site. This is further confirmed by the historical plans in Appendix III of the DTS.

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Maps home > Ordnance Survey > OS Six-inch England and Wales, 1842-1952



Given the proximity of these workings, the presence of the Henry Pit Fault and the geological setting present below the site, the historical legacy of iron ore mining is not considered to extend below the site and therefore no further investigation or assessments are considered necessary at this time.

Additional Comments

The Local Planning Authority have made the following comments with the Client asking GEO to make observations (email dated 22nd April 2026, direct from the Client)

LPA COMMENTS: A Shadow HRA has been prepared. This has received no objections from Natural England. Notwithstanding the lack of objections from Natural England, issues have been raised regarding the potential impact of the development upon the River Ehen by objectors and this is required to be addressed by Officers. Please can you review issue/potential for impact upon the River Ehen from mine water and from additional discharge from the accepting United Utilities Waste Water Treatment Plant.

Considering the concerns above, GEO have referred back to the previously completed P1 DTS and P2 GIR.

Given the lack of any historical development on the site, which appears to have remained for agricultural use, no specific concerns were raised with respect to the potential for groundwater contamination or Controlled Waters (i.e. sensitive receptors) due to a lack of any made ground or contamination risks present on site.

With respect to the River Ehen, although this feature is recorded to be c.326m east (at its closest point to the site) and is recorded to be a Site of Scientific Interest (SSSI) & Special Areas of Conservation (SAC) the risk from materials on site are not considered to represent a significant or unacceptable risk given that the site is covered by topsoil with a lack of any anthropogenic debris and no visual / olfactory

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evidence of hydrocarbon based contaminants. The risk to the River Ehen from the site is therefore considered negligible.

With respect to the impact of mine water on the River Ehen, as mine workings are not considered to extend below the site (see previous and attached comments) the Client cannot be assumed to be responsible for the impact of mine water on any Controlled Waters or the local environment.

However, GEO should make it aware that any mine water management, treatment and discharge responsibility typically falls on The Mining Remediation Authority and not the landowner.

With regards to the additional foul flows discharging via the United Utilities Waste Water Treatment Plant, UU are considered as the statutory body to have the responsibility to address this issue.

General Comments

Consideration must be made for variations to occur in the ground conditions between the exploratory hole locations for which GEO holds no responsibility and areas where limited access was available. It is therefore recommended that a “watching brief” and “observational technique” be applied to this site to ensure that if ground conditions appear to vary from those identified within the investigation report then advice should be sought from a suitably qualified and experienced Engineering Geologist, Geotechnical or Geo-Environmental Engineer.

The recommendations and opinions expressed in this report are based on the strata observed within the exploratory holes in addition to the results of the site and laboratory tests commissioned by GEO. Consequently, GEO takes no responsibility for conditions that have not been revealed or which occur between them. GEO takes no responsibility for the accuracy of third-party information provided by sub-contract drillers or laboratories.

The conclusions and recommendations are considered reasonable based on the available information. However, these cannot be guaranteed to gain regulatory approval. Therefore, the report should be passed to the appropriate regulatory authorities and/ or other key stakeholders including warranty providers in order to seek their approval of the findings prior to undertaking any works on site.

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