

EXECUTIVE SUMMARY – CLEATOR MILLS, CLEATOR MOOR, CUMBRIA

Introduction	<p>Sirius Geotechnical Ltd (Sirius) were requested by Gleeson Regeneration Ltd. (Gleeson), to undertake a preliminary investigation of land at Cleator Mills, Cleator Moor, Cumbria (“the site”).</p> <p>In providing the following comments, Sirius has obtained and reviewed information contained in a Landmark Information Group (LIG) Envirocheck report. Publicly available online data covering the site and surrounding area, including aerial photographs, British Geological Survey (BGS), Environment Agency (EA) and Coal Authority data, have also been reviewed.</p> <p>In addition, Sirius has been provided with copies of a Flood Risk Assessment (FRA) prepared by RWO Ltd in April 2004, and a report detailing soakaway testing, prepared by GEO Environmental Engineering Ltd, dated October 2013. It is understood that Gleeson do not have reliance on those reports, and the information contained therein has been taken in good faith at this stage.</p> <p>Sirius has previously undertaken a walkover of the site, in January 2018.</p> <p>This summary is intended to provide a concise account of immediately available data, in advance of a detailed Phase II Geoenvironmental Appraisal, and is not intended to fully enable detailed design or discharge of regulatory conditions.</p>
Site Details	<p>The site is located approximately 1km south of Cleator Moor centre, to the south of Brookside, east of residential properties on Howthorne Fields and west of disused commercial/ manufacturing premises located west of the River Ehen.</p> <p>The site, which is irregularly shaped, with major dimensions of approximately 350m x 190m and an area of c. 4ha, comprises open grazing land interspersed with mature trees and hedgerows.</p> <p>Ground levels slope down from north to south across the site, with a total fall of c. 7m across the site.</p> <p>Surrounding land comprises a mix of residential, commercial, disused industrial/manufacturing premises and open land.</p>
Site History	<p>The site appears to have remained undeveloped, open land since at least the mid-1800s.</p> <p>Much of the surrounding area has remained rural/ semi urban with scattered residential developments to the north and west. Mill buildings are recorded to the south-east on first edition OS maps, with a wide mill race just beyond the eastern site boundary. Additional buildings are recorded east of the site in the 1950s and 1960s, with those new buildings and the former mill buildings being labelled as a factory. At some time between the 1960s and 1980s, the mill race was infilled, and the former course is now covered by an access road serving the factory buildings, which are now disused and in poor state of repair.</p>
Anticipated Ground Conditions	<p>Previous investigations have identified the site to be underlain by topsoil to depths of around 0.3m, underlain by natural deposits of sand and gravel with cobbles and boulders, extending to depths in excess of 2.0m.</p> <p>No made ground is recorded on BGS maps and, although small areas of made ground cannot be discounted it is likely that these will be limited in extent and thickness.</p> <p>Rockhead is conjectured to comprise Skiddaw Group strata, with nearby borehole records suggesting rockhead at depths in excess of 10m depth.</p>
Mining & Quarrying	<p>Based on a review of BGS mapping, the risk of surface instability resulting from past underground ironstone or coal workings is considered to be negligible.</p> <p>The site is not recorded to be underlain by ironstone or coal bearing strata.</p>
Landfill	<p>The closest recorded landfill to the site is located c. 360m west, at Jacktrees Road. This landfill is recorded to have been operated by the local authority since 1977, and to have received a range of generally non-putrescible wastes.</p>

Flooding	<p>The site is recorded by the EA to be at risk from flooding and extreme flooding (Flood Zones 2 and 3), with south-eastern parts of the site noted to benefit from flood defence. Additionally, BGS data suggests that the site has potential for groundwater flooding to occur at the surface throughout the entire site.</p> <p>An FRA prepared for the site previously, indicates that to mitigate flood risk, finished floor levels to proposed residential properties should be sited at a minimum elevation of 62.18m. This would require raising ground levels across the southern c80% of the site by up to 2.8m.</p> <p>It is noted that there are mature trees within the centre of the site, which may be subject to TPOs, and which could preclude raising of ground levels to mitigate flood risk. This may influence the development layout and should be discussed with the local authority.</p> <p>An updated flood risk assessment, on which Gleeson has reliance, should be obtained for the site.</p>
Foundations	<p>A sufficiently detailed and comprehensive Phase II geoenvironmental investigation will be required to confirm ground conditions across the site prior to detailed foundation design.</p> <p>Subject to confirmation of the bearing capacity of natural granular soils recorded at shallow depth during previous investigations, it is possible that shallow spread foundations bearing onto those soils may be suitable.</p> <p>However, it is recognised that in some parts of the site ground levels may require raising by up to 2.8m and this is expected to preclude the use of shallow/ trench fill spread foundations. Alternative founding techniques, for example raft foundations, or vibro-improvement following placement of fill to a suitable engineering specification, could be considered for such areas subject to a value engineering exercise.</p> <p>Clearly, where ground levels are raised only slightly, then trench fill foundations (if viable, subject to confirmation of bearing capacity of the natural soils) may remain the most cost effective solution, and the value engineering exercise should also consider the most effective depth of fill at which to transition between foundation types.</p>
Contamination	<p>At this stage, the worst case likelihood of a pollutant linkage is perceived as low to moderate.</p> <p>Whilst no potentially contaminating activity appears to have taken place on site, it is noted that adjacent land is subject to a Prosecution under the Environmental Protection Act (EPA) pertaining to the burning of controlled waste including asbestos. It is possible that air borne particulates resulting from such burning may have been deposited on the site and may be entrained in topsoil.</p>
Gas Risk	<p>At this stage, the likelihood of the site being affected by hazardous ground gases is considered to be moderate to high.</p> <p>Recorded landfill to the west of the site is considered unlikely to have any influence on the site. However, an infilled former mill race is recorded just beyond the eastern site boundary. Depending on the nature of infill, such materials could potentially generate gas and this may require consideration during any subsequent investigation.</p> <p>Available data indicates that at least part of the site will require installation of full radon protective measures. A review of available radon atlas maps suggests that this may affect c. 50% of the site area, in the west and north.</p>
Soakaways	<p>Infiltration rates reported following soakaway testing historically suggest soakaway testing may be viable. However, other factors, including the potential for flooding and/ or shallow groundwater will also need to be taken into consideration when determining viability for soakaway drainage.</p>