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MARCH 2021

GEOENVIRONMENTAL APPRAISAL

Of land at
CLEATOR MOOR ROAD, WHITEHAVEN, CUMBRIA

Prepared for
GLEESON REGENERATION LTD

QA Sheet

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PREPARED FOR:	**GLEESON REGENERATION LTD**
PREPARED BY:	Sirius Geotechnical Ltd Russel House Mill Road Langley Moor Durham DH7 8HJ
WRITTEN BY:	*Alastair Cook* *Principal Engineer* *05/03/2021*
REVIEWED AND APPROVED BY:	*John Morton* *Technical Associate* *05/03/2021*

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C8049/03	Exploratory Hole Location Plan	1:1000
C8049/04	Revised Conceptual Site Model	NTS

NTS: Not to Scale

APPENDIX B LANDMARK INFORMATION GROUP ENVIROCHECK REPORT

APPENDIX C COAL AUTHORITY MINING REPORT

APPENDIX D RISK ASSESSMENT METHODOLOGY

APPENDIX E EXPLORATORY HOLE LOGS AND FIELD TEST RESULTS

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EXECUTIVE SUMMARY

Introduction	Sirius Geotechnical Ltd was commissioned by Gleeson Regeneration Ltd, to undertake a geoenvironmental appraisal of land at Cleator Moor Road, Whitehaven, Cumbria. It is understood that consideration is being given to developing the site with residential properties.
Site Details	The site comprises an area of currently disused land with major dimensions of approximately 120m x 100m, located at National Grid Reference NX991170. Ground levels generally slope gently down to the south and west, although local steep west and south facing slopes up to circa 1.5m high are present along the western boundary, and in the south of the site. The majority of the site is surfaced with crushed stone, partly overgrown with self-seeded vegetation, with a surfaced access road along the southern boundary. Three large stockpiles are present in the west of the site, comprising crushed recycled aggregate, asphalt, and topsoil. A smaller, plastic sheet covered stockpile of unconfirmed material is present in the south-east corner. Some relict structures, assumed to be foundations to the former residential properties, are evident at the surface in a number of areas.
Site History	The site remained largely undeveloped open fields until the 1950s, when an industrial building, labelled as a Silk Mills, is shown to span the north-western boundary. Further development of the site and adjacent land to the north-west, with industrial textile mill buildings and associated infrastructure took place in the 1960s and 1970s, with some reprofiling evident to accommodate the development. An area of tanks is recorded in the western quarter of the site, and an above ground structure in a more central location is also anecdotally understood to have been an oil storage tank. The factory is understood to have closed in 2006, with buildings demolished in 2010. Adjacent land to the north has recently been developed with a care home.
Fieldwork	Excavation of 12 No. mechanically excavated trial pits and trenches to a maximum depth of 3.3m. Excavation of 14 No. trial trenches into stockpiles in the west of the site. Boring of 8 No. window sample boreholes to a maximum depth of 5.45m. Gas and groundwater monitoring wells were installed into 5 No. selected window sample holes and a programme of monitoring is ongoing. Fieldwork was restricted in the north-west corner of the site by the presence of stockpiles at the time of the investigation, and further confirmatory excavation in that area is recommended when access is available.
Laboratory Testing	Selected samples of soil were submitted for analysis of a range of metal, other inorganic and organic contaminants. Geotechnical testing was scheduled on selected samples. All testing was undertaken at MCERTS and/ or UKAS accredited laboratories.

Ground Conditions	Stockpiles of crushed granular material, asphalt and topsoil are present above ground in the north-west. A small, covered stockpile of unconfirmed white/ cream silty material in the south-east. Outwith stockpiles, made ground up to 0.6m thick was proven across the eastern half of the site. In the western half made ground is generally thicker at up to 1.1m thick typically. At one location, made ground was found to extent to in excess of 2.2m below ground. Made ground is variable, generally a mixture of reworked cohesive soil and granular material, associated with previous development. Where deeper in the west, made ground is noted to comprise almost exclusively of slag. Relict structures, associated with previous development were encountered locally across the site where buildings are recorded to be present historically. Below made ground, typically stiff medium and high strength glacial till was proven, extending to depths in excess of 5.45m in the east of the site, but substantially thinner, and locally absent in the south-west, where competent sandstone rockhead is present as shallow as 0.1m depth.
Ground Stability	Made ground and superficial soils should be assumed to be unstable in the short term within excavations, and appropriate support provided to all excavations. On the basis of the geological setting of the site and a review of the BGS data, the risk of surface instability resulting from collapse of historical underground coal workings is considered to be negligible.
Foundations and Floor Slabs	Across much of the site, conventional strip, locally shallow trench, foundations, taken down through made ground, relict structures and any low strength superficial soils, to bear onto the underlying natural medium and high strength glacial clays, or directly onto rockhead. Deeper foundations will be required at least locally in the west of the site, where an area of made ground in excess of 2m thick, and containing copious water has been encountered. Further investigation of the extents of this area is recommended when access beneath the stockpiles is practical. It is recommended that allowance is made at this stage for piling/ vibro improvement across say 5% of the site area at this stage. Where a combination of rock and soils are exposed in foundation excavations to individual structures, then the entirety of the foundation should be extended to bear onto rockhead. Foundations may require reinforcement locally, if superficial deposits of both clay and sand are encountered within foundation excavations. Subject to the requirements for heave protection associated with any proposed trees and the requirement for ground gas protective measures, ground bearing floor slabs may be appropriate for plots where made ground is less than 600mm thick i.e. in the east of the site. At this stage allowance should be made for suspended slabs throughout until completion of the ground gas risk assessment.
Sulphate Class	A Design Sulphate Class of DS-1 and an ACEC Class of AC-1 should be used for buried concrete structures in contact with both made ground and natural soils.
Contamination	Asbestos fibres in Stockpile 1 (granular material). Subject to further quantitative testing it may be viable, utilising control measures, to use the granular material in

	Stockpile 1 at depth and below hard surfaced areas beneath the development. Asbestos fibres and suspected coal tar binder in asphalt in Stockpile 2. This material is unlikely to be suitable for use within the development owing to risks to human health and controlled waters and it may require removal from site. The material may be classified as hazardous waste and may attract high disposal costs. High pH values (strongly alkaline conditions) have been identified in made ground across the site, which may present a human health risk. These could be mitigated by provision of an appropriate clean cover system. Subject to agreement with regulators, a limited thickness clean cover system, say 300mm thickness of clean clay and/ or topsoil may be sufficient to break associated pollutant linkages.
Asbestos	Microscopic asbestos fibres have been identified within the granular made ground in Stockpile 1, and in the asphalt in Stockpile 2. No asbestos products or fibres have been identified in the made ground across the site, or within the topsoil in Stockpile 3. Of particular note, the cement sheet fly tipped in the south of the site has not been found to contain asbestos. Notwithstanding the above, the site has been subject to previous development and demolition, which could give rise to the presence of asbestos containing materials within the soils. Groundworkers should remain vigilant for the presence of such materials when soils are exposed. If asbestos containing materials are encountered, or even suspected, then works should be stopped in that area, and further advice obtained from a suitably qualified and experienced asbestos surveyor.
Ground Gas	A programme of ground gas monitoring comprising six visits over a three-month period, is scheduled. Recommendations in respect of the requirement for gas protective measures will be issued under separate cover upon completion. At this stage, the results of two visits indicate CS1/2 ground gas conditions as defined by BS8584:2015. In light of the substantially incomplete programme of monitoring, an assumption for CS2 conditions is advised.
Invasive Species	No invasive species were identified during the investigation, however, an ecological survey should be carried out to confirm, or otherwise, the absence of this and any other invasive species.

The executive summary is an overview of the key findings and conclusions of the report. There may be other information contained in the body of the report which puts into context the findings of the executive summary. No reliance should be placed on the executive summary in isolation, particularly when deriving design detail/abnormal costs.

1. INTRODUCTION

Sirius Geotechnical Ltd (Sirius) was commissioned by Gleeson Regeneration Ltd to undertake a geoenvironmental appraisal of land at Cleator Moor Road, Whitehaven, Cumbria (the "site"). It is understood that consideration is being given to development for a residential with gardens end use.

The objectives of this appraisal were to:

- Establish the historical development of the site and surrounding area from a review of available plans;
- Establish the environmental setting of the site;
- Investigate shallow soil and groundwater conditions;
- Determine the potential risks posed by any ground contamination and provide outline recommendations on remedial measures to manage such risks;
- Establish the risks associated with hazardous ground gas;
- Evaluate whether past mining or other extractive industries could have an influence on the site;
- Provide outline advice relating to geotechnical issues associated with the site;
- Provide outline foundation recommendations.

The desk study element of this investigation includes an assessment of information provided by Landmark Information Group (Envirocheck Report), the British Geological Survey (BGS), the Coal Authority (CA) and/ or other referenced sources.

Fieldwork was undertaken on 7th and 8th December 2020, and on 14th January 2021 and comprised the mechanical excavation of 10 No. trial pits and 2 No. trial trenches to a maximum depth of 3.3m, the boring of 8 No. window sample boreholes to a maximum depth of 5.45m, and the excavation of 14 No. trenches into stockpiles in the west of the site.

Ground gas and groundwater monitoring wells were installed in 5 window sample boreholes and a programme of ground gas monitoring is ongoing at the time of writing.

This report, which was designed to meet the requirements of relevant current guidance, presents the factual information available during this appraisal, an interpretation of the data obtained and recommendations relevant to the defined objectives.

It has been assumed in the production of this report that the site is to be developed for a traditional residential low rise with private gardens end use. In addition, it is assumed that ground levels will not change significantly from those described in this report. If these are not the case, then amendments to the recommendations made in this report may be required.

Where the report refers to the potential presence of invasive plants (such as Japanese Knotweed) or asbestos-containing materials (ACMs), such observations are for information only and should be verified by a suitably qualified expert.

The comments and opinions presented in this report are based on the findings of the desk study, ground conditions encountered during intrusive investigation works performed by Sirius and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of strata, contamination or other spatially variable features between or beyond investigation positions is conjectural and given for guidance only. Confirmation of ground conditions between exploratory holes should be undertaken if deemed necessary.

Evaluation of ground gas and groundwater levels is based on observations made at the time of the investigation and monitoring visits. It should be noted that ground gas and groundwater levels and quality may vary due to seasonal and other effects.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview

Location	The site is located west of Cleator Moor Road to the south of a recently constructed care home, and north of Queens Close, approximately 2km south-east of Whitehaven town centre. A site location plan is enclosed as Drawing No. C8049/01 within Appendix A.
National Grid Reference (NGR)	NX 991 170
Topography and Features	Ground levels across the site generally slope gently down to the south and west, with a total fall of circa 5m across the site. Local steeper west and south facing slopes up to circa 1.5m high are present along the western boundary, and in the south of the site. The majority of the site is surfaced with crushed stone, partly overgrown with self-seeded vegetation, with a surfaced access road along the southern boundary. Three large stockpiles are present in the west of the site, comprising crushed recycled aggregate, asphalt, and topsoil. A smaller, plastic sheet covered stockpile of unconfirmed material is present in the south-east corner. A small pile of broken cement sheet is present as fly tipping, on the surfaced access road in the south of the site. Some relict structures, assumed to be foundations to the former residential properties, are evident at the surface in a number of areas.
Approximate Site Area	1.3 hectares.
Current Land Use	Disused former industrial land.

Invasive and Protected Species	No evidence of invasive of protected species was noted during the site walkover. A detailed survey should be carried out, by an appropriate ecologist, to confirm the absence, or otherwise, of any protected or invasive species.
Adjacent Land Uses	Care home to the north Private vegetated open space and disused former industrial land to the west. Residential properties to the south. Mixed amenity/ educational/ commercial residential properties beyond Cleator Moor Road to the east.

The main site features are shown on Drawing No. C8049/03 within Appendix A.

3. ENVIRONMENTAL SETTING

3.1. Introduction

Published environmental, geological and historical data relating to the site has been reviewed. A summary of relevant information is provided below. A copy of the Envirocheck Report is enclosed in Appendix B, and a copy of the Coal Authority report is enclosed in Appendix C.

3.2. Historical Development

Table 3.1 presents a summary of the site history from 1867 to date. It is not the intention of this report to describe in detail all of the changes that have occurred on or adjacent to the site, only those pertinent to the proposed development.

Table 3.1 Site History

Map Dates	On-Site Features	Off-Site Features (only features within 500m that may affect the site are listed)
1867 – 1880	The site comprises open undeveloped fields.	Surrounding land comprises open undeveloped fields, with Cleator Moor Road to the east.
1880 - 1957	No significant changes.	Hensingham Covered Reservoir is labelled on land to the north-west from 1880, although the structure is not drawn until the 1938 edition map. A school and residential properties are shown 190m to the south-west. Old quarries are recorded 190m to the north-west and 200m to the south.
1957 - 2000	The site is occupied by West Cumberland Silk Mills, initially comprising a small building spanning the northern boundary and extending toward the reservoir to the north. The mills are shown to have quickly been extensively developed into large structures occupying much of the site. Above ground tanks are recorded in the north-western quarter of the site. Verbal anecdotal information suggests a larger feature/ structure toward the centre of the site was also a large above ground fuel oil storage tank. The site and land to the north appear to have been at least partly reprofiled to accommodate the developments.	The mill buildings extend northward and cover the area previously occupied by a reservoir, and are labelled as a factory. Residential properties are shown to the south of the site by 1963. Factory buildings are also recorded 30m west, and 50m north-east, beyond Cleator Moor Road. Schools are recorded to the east, beyond Cleator Moor Road.

Map Dates	On-Site Features	Off-Site Features (only features within 500m that may affect the site are listed)
2000-2020	The former mill buildings and other structures within the site and across the northern boundary, including the above ground tanks, have been cleared and the site partly reprofiled. Following demolition, stockpiles of granular material, asphalt and topsoil have been placed in the west of the site; these are understood to have been derived from the site clearance, and the materials retained on site.	The area of former mill/ factory buildings to the north of the site has recently been developed with a care home facility. Factory buildings 30m west have recently been cleared, and the area presently remains disused.

3.3. Published Geological Information

A summary of available published geological information is provided in Table 3.2.

Table 3.2 Geological Summary

Sources of Information	BGS 1:50,000 scale geological map (Sheet 28, Solid and Drift Editions). CA mining report Reference 51001945105001, dated September 2018.
Made Ground	No made ground is recorded within the site boundary on geological mapping. However, extensive made ground is anticipated, particularly in the west of the site, associated with previous reprofiling of the site to accommodate industrial development. Whilst much of the made ground may comprise reworked natural soils, it is also possible, considering the past industrial use, that made ground may also include other, anthropogenic types of material. Extensive buried structures, possibly including basements/ cellars/ machinery access pits etc. could also be anticipated particularly in the north-west and south-western areas.
Superficial Deposits	Recorded to comprise glacial till. The thickness of superficial soils within the site is not recorded on the BGS map however superficial deposits in the area are anticipated to be relatively thin, or locally absent.

Solid Geology	The site spans three different geological blocks, divided by two approximately north-south oriented faults. The western circa 40% of the site is underlain by the Hensingham Grit Formation; the central circa 20% is underlain by undifferentiated Coal Measures strata, and the eastern circa 40% is underlain by St. Bees Sandstone.
Mining and Quarrying	**Coal Mining:** The site is not underlain at shallow depth by any significant, named, seams of coal. Furthermore, only a narrow strip toward the middle of the site is recorded to be underlain by Coal Measures strata, which is bounded by faults with a considerable off-set of strata across the fault, which is likely to have resulted in significant deformation and disturbance to the Coal Measures strata. The CA report states that the site is not within a surface area that could be affected by recorded past underground mining. The CA report also notes that there are no known coal mine entries within, or within 20m of, the boundary of the site. The potential for unrecorded shallow coal mining, or unrecorded mine entries, taking account the geological and historical setting of the area, is considered negligible. The risk of surface instability resulting from past underground coal workings is therefore considered to be negligible. **Other Mining:** The Envirocheck report states there is no hazard from non coal mining. **Quarries:** A number of small historical quarries are recorded within 200m of the site. However, no evidence of quarrying within or immediately adjacent to the site is shown on historical OS maps or BGS records.

3.4. Hydrology and Hydrogeology

A summary of available information pertaining to hydrology and hydrogeology is presented in Table 3.3 to Table 3.5, inclusive.

Table 3.3 Surface Water Features

	Presence/location	**Comments**
Classified Watercourses (within 500m)	NR	
Unclassified Watercourses (within 500m)	320m north-west	Small stream.
Licensed Surface Water Abstractions (within 1000m)	NR	
Other Surface Water Features (Canals, Ponds, Lakes, etc.) (within 250m)	NR	
Flood Risk Status	The site is not recorded to be at significant risk from flooding from rivers or the sea.	A Flood Risk Assessment (FRA) is considered likely to be required given the area of the site is >1ha.

NR – None recorded.

Table 3.4 Groundwater Occurrence and Abstraction

	Presence/location	Comments
Licensed Abstractions **(within 1000m)**	One, recorded 897m south of the site.	Licence recorded to have been cancelled.
Private Wells	None recorded within the site or nearby on historical maps.	
Source Protection Zones **(within 500m)**	NR	
Springs	None recorded within the site on historical maps.	
Groundwater flooding susceptibility (BGS data)	The majority of the site is recorded to have limited potential for groundwater flooding. A small area in the north-west corner of the site, at it's lowest elevation, is noted to have Potential for Groundwater Flooding of Property Situated Below Ground Level.	

NR - none recorded.

Table 3.5 Groundwater Vulnerability Status

	Environment Agency Classification
Superficial Aquifer Designation	The superficial deposits are classified as a Secondary (undifferentiated) Aquifer.
Bedrock Aquifer Designation	The majority of the site is recorded to be underlain by a Secondary A Aquifer. A small area in the east of the site (presumably that area underlain by St Bees Sandstone) is recorded to be underlain by a Principal Aquifer.

3.5. Landfilling and Waste Management

Information on waste management and related activities that could impact upon the site is summarised in Table 3.6.

Table 3.6 Waste Management Activities

	Presence / Location	Comments
Recorded Landfills **(within 500m and of relevance)**	NR	
Other Licensed Waste Management Facilities **(within 500m)**	NR	
Evidence of Fly-Tipping on Site?	Yes.	A small pile of broken cement sheet is present on the access road in the south-east of the site (possible asbestos containing material). Although unlikely to be fly tipped, a small stockpile, covered with plastic sheeting, is also present in the east of the site near to the access road.
Other Evidence of Waste Disposal on or within 250m of Site	NR	
Ground Gas Risk Assessment Required?	Yes.	Potential for generation of hazardous ground gas, and potentially nuisance/ hazardous vapours, from deep made ground and, if present, any hydrocarbon contamination associated with former storage tanks on site.

NR - none recorded

3.6. Radon Risk

The BGS and HPA "Indicative Atlas of Radon in England and Wales" and the assessment contained within the Envirocheck Report, indicate that the site lies within an area in which **no radon protective measures are required**.

3.7. Ecological Receptors

No designated ecological receptors are recorded to be located within 250m of the site.

3.8. Other

Other potentially contaminative activities or environmental constraints are listed below. The entries relate to activities within approximately 250m of the site, with the exception of COMAH facilities where the assessment is extended to a distance of approximately 1km from the site.

Table 3.7 Other Potentially Contaminative Activities

	Presence / Location	**Comments**
COMAH (within 1000m)	NR	
Discharge Consents (within 250m)	NR	
Pollution Incidents to Controlled Waters (within 250m)	NR	
Substantiated Pollution Incident Register (within 500m)	NR	
Contemporary Trade Entries (within 250m)	Three active entries.	The closest is located circa 110m north, and relates to Packaging Materials Manufacturers and Suppliers. The remaining two are circa 205m north-east and relate to garage services and tyre dealers.

4. PREVIOUS INVESTIGATION FINDINGS

Sirius has previously prepared a summary desk study report, based on a site inspection and review of BGS maps, a Landmark Information Group environmental data report and Coal Authority report, in December 2018. That document was intended to provide a high level overview of the likely site conditions and is not intended as a public or planning document. Notwithstanding, the environmental data report and Coal Authority report used in the preparation of that summary in December 2018 are included in this report. The findings of the summary report are largely described in greater detail, in the preceding sections of this report.

5. PRELIMINARY CONCEPTUAL SITE MODEL

Based on the information obtained during the desk study, a combined preliminary conceptual site model and conceptual exposure model (CSM) has been developed for the proposed future land use (residential with private gardens). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors to assess potential contaminant linkages.

A qualitative risk assessment has also been made of each contaminant linkage operating following the methodology described in Appendix D.

The preliminary CSM is presented in schematic form in Drawing No. C8049/02 in Appendix A.

In summary, the following potential contaminant linkages have been assessed as posing a potentially unacceptable level of risk (defined as being greater than “low” likelihood of pollutant linkage) in the proposed end-use:

- Ingestion, inhalation of dust and dermal contact with metals, organic and inorganic compounds including asbestos in made ground and/or shallow soils across the site associated with previous development and site clearance, presenting a moderate risk to end users and construction workers. This source is also considered to present a low to moderate risk to gardens, landscaping and construction products.

- Ingestion, inhalation of dust and dermal contact with metals, organic and inorganic compounds including asbestos in stockpiles of materials in the west of the site, presenting a low to moderate risk to end users and construction workers. This source is also considered to present a low to moderate risk to gardens, landscaping and construction products.

- Ingestion, inhalation of dust and dermal contact with metals, organic and inorganic compounds including asbestos in the covered stockpile in the south-east of the site, presenting a moderate risk to end users and construction workers. This source is also considered to present a moderate risk to gardens, landscaping and construction products.

- Inhalation of asbestos fibres in fragments of broken cement sheet at surface on the access road, presenting a moderate to high risk to construction workers and a moderate risk to end users.

- Ingestion, inhalation of dust and dermal contact with inorganic compounds associated with a potential localised hydrocarbon contamination associated with former above ground tanks in the west of the site, presenting a low to moderate risk to end users, a moderate risk to construction workers, and a moderate risk to gardens and landscaping.

- Localised hydrocarbon contamination, associated with former tanks, is also considered to present a moderate to high risk to construction materials, particularly buried plastics, and a low to moderate risk to controlled waters via leaching and/ or direct flow.

- Localised hydrocarbon contamination, associated with former tanks, is considered to present a low to medium risk to controlled waters within the Principal Aquifer of the St Bees. Sandstone, taking account the geological setting of the site and the geographical position of the former above ground tanks away from, and downslope of, the occurrence of that Principal Aquifer. The risk to surface waters is also considered low to moderate, taking account the distance between the site and the closest surface water course.

- Generation of hazardous ground gases/ vapours associated with made ground on and off-site, and potential hydrocarbon plumes, migrating vertically upwards, presenting a low to moderate risk to human health and the built environment.

6. FIELDWORK

6.1. Scope of Investigation

The information contained in this report is limited to areas of land accessible during the investigation within the site boundary, as indicated on the site plan presented in Appendix A as Drawing No. C8049/03.

The investigation, which was supervised by a Sirius Geoenvironmental Engineer, took place on 7th and 8th December 2020, and on 14th January 2021 and comprised:

- Mechanical excavation of 10 No. trial pits (TP1 top TP9 including TP1A) to a maximum depth of 3.3m below ground level (bgl);
- Mechanical excavation of 2 No trial trenches (TT20 and TT21) to a maximum depth of 1.4m bgl.
- Boring of 8 No. window sample boreholes WS1 to WS9 excluding WS3) to a maximum depth of 5.45m bgl; and
- Excavation of 14 No. trenches into larger stockpiles in the west of the site.

Permanent monitoring installations for combined groundwater and ground gas monitoring were installed within 5 window sample boreholes and a programme of ground gas and groundwater level monitoring is ongoing.

6.2. Exploratory Hole Locations

The exploratory hole locations were selected using the findings of the desk study and the subsequent creation of the preliminary conceptual site model, in order to achieve general site coverage, and to target specific areas of interest, as detailed in Table 6.1.

The principles given in BS 10175:2011+A2:2017 and BS EN 1997:2007 were followed when determining exploratory hole locations.

Fieldwork was restricted in the north-west corner of the site, where Stockpiles 1, 2 and 3 covered the site surface and precluded investigation of the underlying soils in that area. Further, confirmatory investigation is advisable in that area when access becomes possible, particularly in light of the findings of TP6 as discussed elsewhere.

Table 6.1 Exploratory Hole Rationale

Exploratory Hole	Rationale
TP1/1A, TP2	Assess presence of buried relict structures associated with former mill building
TP4, TP5, TP9	Confirming general conditions across site
WS5 to WS9	Installation of gas monitoring wells and confirmation of general conditions
TP3, TP6, TP7, WS1, WS2, WS4,	Investigation of former tanks and possible associated plume, and installation of monitoring wells into area of potential plume, downslope of former tanks.
TT20, TT21	Further investigation and delineation of deep made ground encountered in TP6, and relict structure adjacent to Stockpile 3.
TT1, TT3 to TT7	Investigation of Stockpile 1 (crushed granular material)
TT2, TT8 to TT10	Investigation of Stockpile 2 (asphalt)
TP8, TT11-TT14	Investigation of Stockpile 3 (tarmac)

Exploratory hole locations are shown on Drawing No. C8049/03 in Appendix A of this report.

6.3. Strata Description

Strata descriptions were logged in accordance with BS EB ISO14688:2018 -1 and -2. Detailed descriptions of strata and groundwater observations made during investigation works, together with samples recovered and the results of all *in situ* field testing, are presented on the Engineer's records in Appendix E. The depths of strata on the record sheets are recorded from current ground levels at each location, unless indicated otherwise.

6.4. Geotechnical Testing

Geotechnical laboratory testing on selected samples was carried out under subcontract by Professional Soils Laboratory (PSL), a UKAS-accredited laboratory.

Geotechnical and geochemical test results are included within Appendix F of this report.

6.5. Chemical Testing

Selected samples of the made ground and natural soils were tested for a range of potential contaminants under subcontract with Derwentside Environmental Testing Services (DETS), a UKAS and MCERTS-accredited laboratory.

The potential contaminants of concern identified by the preliminary conceptual site model, and based on observations during the intrusive investigation, were selected as the analytes for the samples recovered from the site. The results of soil and groundwater analysis, as received from the laboratory, are presented in Appendix F of this report.

7. GROUND CONDITIONS AND MATERIAL PROPERTIES

7.1. Strata Profile

A summary of the strata profile encountered is provided in Table 7.1.

Table 7.1 Strata Profile

Strata	Top Depth Range (Thickness Range)	Description and Comments
Stockpile 1	[circa 1325m^3]	Brown and grey very sandy fine and medium, predominantly coarse, angular gravel, and frequent cobbles, of concrete, brick and sandstone.
Stockpile 2	[circa 265m^3]	Asphalt arisings from former road/ car park surfacing.
Stockpile 3	[circa 540m^3]	Brown organic clayey silty slightly gravelly fine to coarse sand (Topsoil).
Covered Stockpile	[circa 50m^3]	This stockpile has only been inspected from one small exposure formed to recover a sample. The stockpile appears to comprise white and cream silt, and is suspected to be plaster or similar building product, possibly stripped from the walls of the former mill.
Made Ground	Ground Level (locally absent to >2.2m)	Typically ranging up to 1.1m thick, although 0.6m or less in the eastern half of the site and mainly of greater thickness in the west of the site. At one location in the west of the site (TP6), made ground was found to extend to in excess of 2.2m depth, although the full thickness could not be confirmed owing to instability of the excavation. The extent of this deeper area of made ground appears localised and may be associated with a former basement for example. Made ground composition varies considerably across the site, generally ranging from sandy gravel of brick, concrete and sandstone, to gravelly clay, with occasional cobbles. Locally, some inclusions of slag gravel and cobbles were noted. A thin (up to 0.1m) horizon of relict topsoil was noted in places, at or near to the base of the made ground. Within TP6, below 1.2m depth, made ground was principally comprised of gravel and cobbles of slag.

Strata	Top Depth Range (Thickness Range)	Description and Comments
Granular superficial strata	0.7m (0.7m)	Proven at one location only, in WS02 in the south-west of the site, between made ground and cohesive natural soils. Comprising loose clayey, gravely sand. Gravel includes sandstone and coal. The upper surface from 0.7m to 0.8m appears to have more organic content and is possibly a relict topsoil.
Cohesive Superficial Strata	Ground level – 1.4m (locally absent to >4.75m)	Generally increasing in thickness toward the east, and locally absent in the west. Typically comprising stiff medium and high strength sandy gravelly clay (glacial till). At one location, WS4 toward the middle of the site, the stiff glacial clay was underlain below 1.5m bgl, by soft medium strength grey sandy gravelly clay, noted to be locally laminated. This strata is indicative of a small area of glacio-lacustrine strata within the till.
Rockhead	0.1m to 2.0m (NP)	Proven only in a small number of exploratory holes, in the south-west former of the site only. Comprising competent intact sandstone. This stratum is noted to be very close to the surface in TP7, close to the location of TP6 in which made ground was anomalously proven to 2.2m depth.

NP – Full thickness not proven

7.2. Material Properties

Made Ground

Classification test results

Water soluble sulphate (SO_4^{2-}) analyses performed on nine samples of made ground (other than in stockpiles) recorded concentrations from 16mg/l to 450mg/l, together with recorded pH ranging from 6.7 to 11.6.

Owing to the generally limited thickness and variability of the made ground, and its assumed inherent unsuitability for use as an engineering material, strength testing has been limited to three in situ hand shear vane tests, undertaken within cohesive made ground soils. Those tests indicate

mass shear strengths of 32 to 60kN/m^2, although it must be recognised that the made ground is significantly variable in both composition and strength.

Natural Soils

Classification test results

Water soluble sulphate (SO_4^{2-}) analyses performed on eight samples of natural soils recorded concentrations from 10mg/l to 120mg/l, together with recorded pH ranging from 5.5 to 9.4.

Atterberg Limit determination undertaken on five samples indicate the material to be clay of low and intermediate plasticity, with liquid limits ranging from 34% to 41%, plastic limits ranging from 18% to 21%, and plasticity indices from 16% to 22%. The natural moisture content of the tested soils ranged from 13% to 26%.

A single sample of clay, recovered from beneath the stockpiled topsoil in TP8, indicates the shallow clay at that location to be of high plasticity with a liquid limit of 62%, plastic limit of 25% and plasticity index of 37%, with a natural moisture content of 37%. The variation noted in this sample may be as a consequence of the sample being recovered from relatively shallow depth below the natural ground surface (i.e. below the base of the stockpile) and some associated organic content as a consequence of proximity to the original surface.

Calculation of the modified Plasticity Index, in accordance with NHBC standards, indicates these soils to have a low and medium volume change potential. The Consistency Index (I_c) values for the samples tested ranged from 0.68 to 1.38 indicating the material to be firm to very stiff consistency.

Strength test results

Table 7.2 Summary of Hand Shear Vane Test Results

Depth (m bgl)	Number of tests	Minimum Result (kN/m^2)	Maximum Result (kN/m^2)	Median Result (kN/m^2)	Average Result (kN/m^2)	Indicative strength
0.0 – 1.0	9	51	120	67	80	Medium and high strength
1.0 – 2.0	8	81	120	120	111	High strength
2.0 – 3.0	1	120	-	-	-	High Strength

Table 7.3 Summary of Standard Penetration Test Results

Depth (m bgl)	Number of tests	Minimum N Value*	Maximum N Value*	Median N Value*	Average N Value*	Indicative strength (kN/m^2)
1.0	6	7	30	10	14	Low to very high (loose granular soil in WS2)
2.0	4	12	24	22	20	Medium and high
>3.0	5	21	40	23	27	High and very high

*Uncorrected N value given.
N/A – Statistical analysis on limited dataset is not appropriate.

In accordance with Eurocode 7, it is recognised that the use of in situ SPTs within cohesive soils have a low applicability for assessing undrained shear strength. In view of this, the results of the SPTs are considered only tentatively and greater emphasis is given to the results of hand shear vane test results to confirm undrained shear strengths.

7.3. Obstructions

A brick masonry wall extending to a depth of 0.6m, underlain by a suspected concrete strip footing was encountered in TP1A, which targeted the perimeter wall of the former mill building spanning the site boundary.

A suspected concrete slab was encountered at a depth of 0.4m in WS6, which was attempted to be drilled at two locations, within the south-west corner of the former mill building footprint.

It is noted that TP2 and WS7, also formed within the former footprint of that building, did not encounter any obstructions, and it is likely that the former floor slab and foundations have been at least in part grubbed up.

Relict concrete and brick spread foundations were encountered in the west of the site (TT21), which appear to be associated with the rectangular structure recorded in that area historically.

Competent sandstone rockhead was encountered in a number of exploratory holes in the south-west corner of the site. Rockhead was proven as shallow as 0.1m bgl at one location, and could present a significant obstruction to excavations for foundations, highways and service installations in that area.

However, rockhead at very shallow depth appears to be localised, with TT20 and TT21, formed nearby to the north-west, encountering made ground and natural soils to depths circa 1.3m bgl.

7.4. Ground Stability

With the exception of TP6, which was formed into deep made ground, excavations generally remained stable for the short period during which they were open during fieldwork.

However, excavations into the made ground and natural soils should be anticipated to become unstable if remaining open for any significant period of time.

7.5. Groundwater

Groundwater levels observed during the Sirius ground investigation and monitoring to date are summarised in Table 7.4 and 7.5.

Table 7.4 Summary of Groundwater Encountered During Fieldwork

Exploratory Hole	Depth Encountered (m bgl)	Description	Stratum
TP5	1.2	Groundwater ingress	Top of sandstone in southern corner.
TP6	1.5	Copious groundwater ingress	Deep made ground in west of site.
TP8	2.9	Groundwater ingress	Base of topsoil stockpile/ upper surface of natural strata at ground level in north-west corner
WS1	0.9	Groundwater ingress	Toward base of made ground in north-west of site.
WS2	0.9	Groundwater ingress	Natural sand in south-west of site.
WS4	1.2	Groundwater ingress	Natural clay, in the west of the site.
WS7	3.0	Groundwater ingress	Natural clay in the north of the site.

Table 7.5 Summary of Groundwater Encountered in Wells During Monitoring

Exploratory Hole	Depth to groundwater: Visit 1 (m bgl)	Depth to groundwater: Visit 2 (m bgl)
WS2	0.90	0.94
WS4	0.10	0.00 (Ground level)
WS7	0.47	0.43
WS8	0.00 (Ground level	0.78
WS9	2.26	2.20

7.6. Visual / Olfactory Evidence of Contamination

A hydrocarbon odour was observed in TP3 in the north-west of the site, near to the area of the former above ground tanks. This appears to be limited to a relict topsoil horizon at 0.50m to 0.55m bgl toward the base of made ground and overlying glacial clay.

A suspected hydrocarbon sheen was also noted on the groundwater present in the deep area of made ground encountered in TP6 in the west of the site, also in the vicinity of the former tanks.

Notwithstanding the above observations, no evidence of an extensive gross hydrocarbon plume emanating from the area of the former tanks was observed during the investigation. Notably, during the first round of gas and groundwater monitoring, groundwater samples were recovered from wells installed in the west of the site, no free product or sheen was observed during bailing or within the samples recovered.

Fragments of broken cement sheeting are present on the access road in the south-east of the site. Such materials would typically be suspected to be asbestos containing.

7.7. Ground Gas

Ground gas monitoring has been carried out on two occasions to date, and the results are summarised in Table 7.6. Full details of ground gas monitoring results are included in Appendix G.

Table 7.6 Summary of Gas Monitoring (2 visits only)

Well	Methane (range) %v/v	Carbon Dioxide (steady state) %v/v	Oxygen %v/v	Peak Flow (range) litres/hr	Steady Flow (range) litres/hr	Carbon Monoxide (PPM)	Hydrogen Sulphide (PPM)
WS2	ND to 4.8	ND to 8.8	12.3 to 19.5	ND to 0.3	ND to 0.1	ND to 7	ND
WS4*	NR	NR	NR	NR	NR	NR	NR
WS7	ND	ND	19.0 to 20.1	ND to 27.4**	ND to 1.4**	ND to 15	ND to 19
WS8	ND	4.1 to 4.4	17.1 to 17.3	3.4 to 119.4**	3.4 to 9.6**	20 to 170	17 to 32
WS9	ND	2.0 to 3.2	14.8 to 18.1	0.4 to 1.8	0.3 to 1.8	ND to 10	ND to 18

ND - Not Detected
* well flooded to surface and recharging with groundwater during monitoring
** well flooded and bailed during monitoring. High flows attributed to recharging groundwater within well.

8. RESULTS OF CHEMICAL TESTING

8.1. Assessment Methodology

Soil Data

Samples selected for testing were chosen using a simple random pattern to provide a relatively even spread across each of the identified averaging zones.

Numerous averaging zones have been identified, including induvial stockpiles of recycled granular soil; asphalt; and topsoil, together with widespread made ground across the site.

The relatively complex historical development and use of the site, and the variety of made ground, results in a multitude of potential 'averaging zones' some of which are spatially very small. It has not been practical to divide the site into averaging zones based on each end use or specific material type and only limited testing has been carried out on some soil types within limited spatial or volumetric occurrence. Therefore, for the purposes of the initial screening, all results within the made ground across the site have been screened as one unit. It is acknowledged that this approach may not be fully compliant with recently published current guidance, but is considered a pragmatic and practical approach to the initial assessment and screening of the site in the absence of voluminous test data for each individual material type.

The laboratory test data for the relevant soil strata were reviewed for completeness and consistency.

For each potential contaminant of concern, analytical data for soil samples were evaluated against the relevant Generic Assessment Criterion (GAC), taking account of the Soil Organic Matter (SOM) content. For this site, measured values were compared to GACs derived for a residential with private gardens end use. Source data for all GACs are provided in Appendix G.

For this site, it can be demonstrated that the use of benzo(a)pyrene as a surrogate marker for other Polycyclic Aromatic Hydrocarbons (PAHs) is appropriate.

If any samples recorded contaminant concentrations that exceeded that GAC, then statistical data evaluation in line with the methods described in CL:AIRE 2020: "Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration" has been applied to the dataset.

Groundwater Data

The Water Framework Directive (WFD) presents the concepts of 'prevent' and 'limit' in respect to Article 6 of Directive 2006/118/EC (The Groundwater 'Daughter' Directive or GWDD). Hazardous substances should be prevented from entering groundwater with an assessment point identified as the base of the unsaturated zone. The potential contamination at this site is however considered as originating from a potential historical input resulting from a previous source (which has now been removed) associated with previous activity which has now ceased. Focus therefore should be on identifying the risks associated with possible residual contamination remaining in the ground and, if necessary, limiting its further impact to controlled groundwater and controlled surface waters.

Potential Risk to Groundwaters

Drinking Water Quality Standards (DWS) have been used to assess the potential risk to aquifers which may be abstracted for potable supply. This approach protects any current abstractions together with the potential future exploitation of groundwater in line with the expectations of the WFD. The hierarchy of drinking water standards includes;

- UK Drinking Water Standards (The Water Supply (Water Quality) Regulations of England, Wales and Scotland);
- EC Drinking Water Directive 1998;
- WHO Drinking Water Guidelines 2017; and
- WHO Petroleum Products in Drinking Water 2008

Potential Risk to Surface waters

Given the significant distance (320m) between the site and the nearest recorded surface water course, and the evidence that no mobile NAPL has been observed at the site during the investigation, there is no evidence that the site poses a significant risk to surface waters, and no further action is deemed warranted in this respect.

8.2. Soil Analysis

The following tables present summaries of the analytical results obtained and their evaluation against the applicable GACs.

Table 8.1 Summary of Total Soil Concentrations – Stockpile 1 (Granular Soil)

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	Mean	Upper 2 way conf. level (95% conf.)	GAC (2.5% SOM)	No. of Samples >GAC
Metals						
Inorganic Arsenic	6	3.7-8.3			37	0
Cadmium	6	<0.1			11	0
Chromium (III)	6	8.3-14.0			910	0
Lead	6	7.9-14.0			200	0
Inorganic Mercury	6	<0.05-0.05			40	0
Selenium	6	<0.5			250	0
Copper	6	10-16			200	0
Nickel	6	7.2-17			130	0
Zinc	6	18-30			450	0
Inorganics						
pH	6	10.1-11.9			<5 or >9	6
Water Sol. Sulphate	6	0.024-0.085			0.5 g/l	0
Speciated PAH						
Acenaphthene	6	<0.1-0.3			490	0
Anthracene	6	<0.1-1.1			5300	0
Acenaphthylene	6	<0.1			400	0
Benzo(a)anthracene	6	0.3-3.8			B(a)P**	**
Benzo(b)fluoranthene	6	0.3-1.9			B(a)P**	**
Benzo(k)fluoranthene	6	0.2-1.5			B(a)P**	**
Benzo(g,h,i)perylene	6	0.1-0.9			B(a)P**	**
Benzo(a)pyrene	6	0.3-2.3	0.8		2.1	1
Chrysene	6	0.3-3.3			B(a)P**	**
Dibenzo(a,h)anthracene	6	<0.1-0.7			B(a)P**	**
Fluoranthene	6	0.7-6.8			560	0
Fluorene	6	<0.1-0.4			390	0
Indeno(1,2,3-cd)pyrene	6	0.3-1.4			B(a)P**	**
Naphthalene	6	<0.1			2.3	0
Pyrene	6	0.6-6.2			1200	0
Phenanthrene	6	0.3-3.2			220	0
Others						
Phenol	6	<0.3			190	0
TOC	6	1.9-2.4			3 w/w%	0
Asbestos	6	NAD/ Amosite			Fibres present	1

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	Mean	Upper 2 way conf. level (95% conf.)	GAC (2.5% SOM)	No. of Samples >GAC
Petroleum Hydrocarbons and related organics						
Aliphatic TPH >C5-C6	5	<0.01			41	0
Aliphatic TPH >C6-C8	5	<0.01			110	0
Aliphatic TPH >C8-C10	5	<0.01			31	0
Aliphatic TPH >C10-C12	5	<1.5			150	0
Aliphatic TPH >C12-C16	5	<1.2			1200	0
Aliphatic TPH >C16-C35	5	<4.9			70000	0
Aromatic TPH >C5-C7	5	<0.01			110	0
Aromatic TPH >C7-C8	5	<0.01			240	0
Aromatic TPH >C8-C10	5	<0.01			48	0
Aromatic TPH >C10-C12	5	<0.9			150	0
Aromatic TPH >C12-C16	5	<0.5			320	0
Aromatic TPH >C16-C21	5	<0.6			540	0
Aromatic TPH >C21-C35	5	<1.4			1500	0
Benzene	5	<0.01			0.13	0
Toluene	5	<0.01			240	0
Ethylbenzene	5	<0.01			62	0
m & p-Xylene	5	<0.01			67	0
Methyl Tert-Butyl Ether	5	<0.1			55	0

** Assessed using benzo(a)pyrene as a surrogate marker
Table based on a Residential with Gardens end use with a 2.5% Soil Organic Matter.
NAD = No Asbestos Detected
NA – Not Applicable.

Metals and Metalloids

No concentrations of metal determinands were recorded to exceed the relevant GAC.

Other Inorganic Analytes

One sample of the granular material returned a positive identification for asbestos fibres, described by the analyst as “Amosite present in Microscopic Asbestos Sheeting Board”.

No bulk asbestos or visual fragments of asbestos containing materials (e.g. cement sheets or fibre board) were observed within the material during fieldwork and it is possible that the material may not present a significant risk to construction workers or adjacent land users, provided basic

measures to mitigate dispersal of fibres are adopted during development. This will however require to be confirmed by further asbestos quantification testing prior to disturbance of the soils.

Based on this one positive result, it is reasonable to anticipate microscopic quantities of asbestos fibres will be present elsewhere within the granular material, and the presence of asbestos within the granular made ground across the site could potentially present a significant risk to human health following development if pathways between the material and end users/ workers remain active, for example if left exposed at the surface, or at shallow depth in gardens.

All six samples have returned pH values slightly above the adopted upper GAC. With consideration to the range of values detected, and in the context of the material type, pH is not considered likely to present a significant risk to end users following development.

Organics

One sample has returned a concentration of benzo(a)pyrene marginally in excess of the GAC. Whilst further statistical interpretation, in accordance with current CL:AIRE guidance, is difficult, owing to the relatively limited dataset on the small volume of this material, Sirius considers that, in light of the relatively limited exceedance and the general nature of this material, the recorded concentrations of benzo(a)pyrene are unlikely to present a significant risk to human health during or following development.

Table 8.2 Summary of Total Soil Concentrations – Stockpile 2 (Asphalt)

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	Mean	Upper 2 way conf. level (95% conf.)	GAC (2.5% SOM)	No. of Samples >GAC
Metals						
Inorganic Arsenic	3	2.6-2.8			37	0
Cadmium	3	0.2-0.3			11	0
Chromium (III)	3	4.7-5.6			910	0
Lead	3	8.1-29.0			200	0
Inorganic Mercury	3	<0.05-0.05			40	0
Selenium	3	<0.5-0.9			250	0
Copper	3	7.2-9.1			200	0
Nickel	3	3.7-5.0			130	0
Zinc	3	16-25			450	0
Inorganics						
pH	3	10.2-11.0			<5 or >9	3
Water Sol. Sulphate	3	0.036-0.087			0.5 g/l	0
Speciated PAH						
Acenaphthene	4	0.5-10.0			490	0
Anthracene	4	1-28			5300	0
Acenaphthylene	4	0.7-2.9			400	0
Benzo(a)anthracene	4	0.2-93			B(a)P**	**
Benzo(b)fluoranthene	4	0.2-62			B(a)P**	**
Benzo(k)fluoranthene	4	0.2-43			B(a)P**	**
Benzo(g,h,i)perylene	4	0.2-35			B(a)P**	**
Benzo(a)pyrene	4	1-71	50.8		2.1	3
Chrysene	4	0.9-87			B(a)P**	**
Dibenzo(a,h)anthracene	4	7.5-9.5			B(a)P**	**
Fluoranthene	4	0.1-200			560	0
Fluorene	4	0.14-15			390	0
Indeno(1,2,3-cd)pyrene	4	0.2-44			B(a)P**	**
Naphthalene	4	0.1-0.9			2.3	0
Pyrene	4	0.7-160			1200	0
Phenanthrene	4	0.7-110			220	0
Coronene	1	0.5			N/A	N/A
Others						
Phenol	4	0.3-1.1			190	0
TOC	3	1.6-8.9			3 w/w%	2
Asbestos	4	NAD/ Amosite			Fibres present	2
Petroleum Hydrocarbons and related organics						
Aliphatic TPH >C5-C6	3	<0.01			41	0
Aliphatic TPH >C6-C8	3	<0.01			110	0
Aliphatic TPH >C8-C10	3	<0.01			31	0

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	Mean	Upper 2 way conf. level (95% conf.)	GAC (2.5% SOM)	No. of Samples >GAC
Aliphatic TPH >C10-C12	3	<1.5			150	0
Aliphatic TPH >C12-C16	3	1.9-3.8			1200	0
Aliphatic TPH >C16-C35	3	36.2-73			70000	0
Aromatic TPH >C5-C7	3	<0.01			110	0
Aromatic TPH >C7-C8	3	<0.01			240	0
Aromatic TPH >C8-C10	3	<0.01			48	0
Aromatic TPH >C10-C12	3	<0.9-1.9			150	0
Aromatic TPH >C12-C16	3	2.2-34			320	0
Aromatic TPH >C16-C21	3	31-390			540	0
Aromatic TPH >C21-C35	3	170-880			1500	0
Benzene	3	<0.01			0.13	0
Toluene	3	<0.01			240	0
Ethylbenzene	3	<0.01			62	0
m & p-Xylene	3	<0.01			67	0
Methyl Tert-Butyl Ether	3	<0.01			55	0

** Assessed using benzo(a)pyrene as a surrogate marker
Table based on a Residential with Gardens end use with a 2.5% Soil Organic Matter.
NAD = No Asbestos Detected
NA – Not Applicable.

Samples of the stockpiled asphalt surfacing were recovered and subject to testing primarily intended to provide an initial appraisal of the possible presence of coal tar within the binding material across the site.

Asphalt is a manufactured product containing only aggregate and binder with some other minor components. The binders typically used in the production of asphalt are road tar (no longer used) or bitumen. Road tar is a complex mix of hydrocarbons derived from coal tar (although it contains fewer hazardous compounds than unrefined coal tar) whilst bitumen is derived from crude oil. Road tar was widely used up until the mid-1980's. Road tar and bitumen share some physical characteristics, but road tar can be differentiated from bitumen by the presence of particular polycyclic aromatic hydrocarbons (PAHs) as well as phenols and cresols. The constituent parts of both road tar and bitumen are miscible (hazardous compounds able mix readily together) and road tar contains compounds which are carcinogenic and potentially toxic to aquatic life. PAHs are generally only slightly soluble in water and are less likely to leach when present in an intact, bound

surface layer. Once broken up however, the increased surface area presents a higher risk of significant leaching to controlled waters. As such, suitable scenarios for the re-use of confirmed road tar bound asphalt within a residential development are limited due to risks to human health and controlled waters. This often results in road tar bound asphalt being considered as waste, known as Asphalt Waste Containing Coal Tar or AWCCT.

Classification of AWCCT is undertaken in accordance with EA Technical Guidance WM3 "Guidance on the Classification and assessment of Waste" (1st Edition V1.1), which states "Coal tar and many coal tar distillates are potentially carcinogenic hazardous substances. If the concentration of such materials is at or above 0.1% [i.e. 1000mg/kg] the waste would possess the hazardous property HP 7 carcinogenic.

"Coal tar is complex mix of hydrocarbon compounds which have to be added to together to determine the concentration of coal tar. Therefore the 0.1% concentration must be applied to all fractions of the coal tar. Assessments based on PAH's alone are not consistent with the legislation and cannot be used to classify a waste as non-hazardous."

"However, if the concentration of coal tar is known, Table 3 of the CLP uses benzo[a]pyrene (BaP) as a marker compound for carcinogenicity for certain coal tar entries. Where the concentration of BaP is less than 0.005% [i.e. 50mg/kg] of the concentration of the coal tar (rather than in the waste as a whole), the coal tar is not carcinogenic and does not need to be considered for HP7."

"Where the concentration of benzo[a]pyrene is at or above 50 ppm (mg/kg) in the black top alone (excluding other material) then the amount of coal tar should be considered to be sufficient (0.1% or more) for the material to be hazardous and thus coded 17 03 01."

On the basis of this guidance, the laboratory test results have been reviewed to characterise the asphalt as falling into one of the following waste classifications:

- 17 03 01 bituminous mixtures containing coal tar, or
- 17 03 02 bituminous mixtures other than those mentioned in 17 03 01

Elevated concentrations of PAHs, particularly benzo(a)pyrene, are recorded within the asphalt and are indicative of coal tar. This material may therefore be difficult or unsuitable to re-use within the site, is unlikely to be suitable to be recycled as asphalt and may be rejected by a recycling facility. The material may also attract elevated costs for disposal as classification 17 03 01.

In addition to the identified coal tar binder material, two of four samples of this material have also returned a positive identification of asbestos fibres, each described by the analyst as “Bundles of Amosite Fibres”. The presence of asbestos within a coated stone type product is not typical, and the recorded fibres may therefore be suggestive of an element of cross-contamination with asbestos products, possibly during demolition of the former structures if, for example, the asphalt remained as a hard surfaced ‘process’ area during site clearance prior to grubbing up and stockpiling.

The presence of asbestos fibres within the asphalt may present further risks to both construction/ maintenance works and, if remaining at surface, to end users, and could further increase disposal costs.

Table 8.3 Summary of Total Soil Concentrations – Stockpile 3 (Topsoil)

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	Mean	Upper 2 way conf. level (95% conf.)	GAC (2.5% SOM)	No. of Samples >GAC
Metals						
Inorganic Arsenic	5	19-25			37	0
Cadmium	5	0.2-0.3			11	0
Chromium (III)	5	15-28			910	0
Lead	5	65-180			200	0
Inorganic Mercury	5	0.12-0.18			40	0
Selenium	5	<0.5-0.7			250	0
Copper	5	27-55			200	0
Nickel	5	19-22			130	0
Zinc	5	55-580	161		450	1
Inorganics						
pH	5	7-8.2			<5 or >9	0
Water Sol. Sulphate	5	0.026-0.14			0.5 g/l	0
Speciated PAH						
Acenaphthene	5	<0.1-0.5			490	0
Anthracene	5	<0.1-0.3			5300	0
Acenaphthylene	5	<0.1-0.4			400	0
Benzo(a)anthracene	5	<0.1-1.6			B(a)P**	**
Benzo(b)fluoranthene	5	<0.1-2.6			B(a)P**	**
Benzo(k)fluoranthene	5	<0.1-2.2			B(a)P**	**
Benzo(g,h,i)perylene	5	<0.1-2.7			B(a)P**	**
Benzo(a)pyrene	5	<0.1-1.6			2.1	0
Chrysene	5	<0.1-3.5			B(a)P**	**
Dibenzo(a,h)anthracene	5	<0.1-0.2			B(a)P**	**

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	Mean	Upper 2 way conf. level (95% conf.)	GAC (2.5% SOM)	No. of Samples >GAC
Fluoranthene	5	<0.1-2.6			560	0
Fluorene	5	<0.1-2.1			390	0
Indeno(1,2,3-cd)pyrene	5	<0.1-0.4			B(a)P**	**
Naphthalene	5	<0.1-1.2			2.3	0
Pyrene	5	<0.1-1.4			1200	0
Phenanthrene	5	<0.1-0.9			220	0
Others						
Phenol	5	0.5-1.0			190	0
TOC	5	5.8-6.9			3 w/w%	5
Asbestos	5	NAD			Fibres present	0
Petroleum Hydrocarbons and related organics						
Aliphatic TPH >C5-C6	4	<0.01			41	0
Aliphatic TPH >C6-C8	4	<0.01			110	0
Aliphatic TPH >C8-C10	4	<0.01			31	0
Aliphatic TPH >C10-C12	4	<1.5			150	0
Aliphatic TPH >C12-C16	4	<1.2			1200	0
Aliphatic TPH >C16-C35	4	<4.9			70000	0
Aromatic TPH >C5-C7	4	<0.01			110	0
Aromatic TPH >C7-C8	4	<0.01			240	0
Aromatic TPH >C8-C10	4	<0.01			48	0
Aromatic TPH >C10-C12	4	<0.9			150	0
Aromatic TPH >C12-C16	4	<0.5			320	0
Aromatic TPH >C16-C21	4	<0.6			540	0
Aromatic TPH >C21-C35	4	<1.4			1500	0
Benzene	4	<0.01			0.13	0
Toluene	4	<0.01			240	0
Ethylbenzene	4	<0.01			62	0
m & p-Xylene	4	<0.01			67	0
Methyl Tert-Butyl Ether	4	<0.01			55	0

** Assessed using benzo(a)pyrene as a surrogate marker
Table based on a Residential with Gardens end use with a 2.5% Soil Organic Matter.
NAD = No Asbestos Detected
NA – Not Applicable.

Metals and Metalloids

One sample has returned a concentration of zinc slightly in excess of the GAC. Further statistical interpretation in accordance with current CL:AIRE guidance, is difficult, owing to the relatively limited dataset on the small volume of this material. However, it should be noted that the applied GAC for zinc is derived based on potential phytotoxic effects, based on the Sludge (Use in Agriculture) Regulations (SI 1263/1989). The human health GAC for zinc is considerably greater, at 3,700mg/kg. Comparison of the reported concentrations against this GAC clearly indicates that the tested material is unlikely to present a significant risk to human health.

The maximum concentration of zinc recorded could be indicative of a small risk to healthy plant growth although, considering the marginal exceedance of the GAC in only one sample, and the degree of mixing which can be expected to occur naturally as a consequence of excavation and spreading of the topsoil in garden/ landscaped areas, then this is considered unlikely.

Organics

All five samples of the topsoil have returned a concentration of TOC above the GAC. TOC is a measure of organic carbon within the material and is not a determinand that directly poses a risk to human health. Elevated values could be anticipated in soils with a high natural organic content, such as topsoil. These results are used to determine the classification of material for removal from site to a licensed disposal facility. The TOC is also used to derive the relevant SOM for the soils, necessary to derive an appropriate GAC for some organic determinands. TOC is therefore not considered further in respect of human health risk assessment.

Table 8.4 Summary of Total Soil Concentrations – Covered Stockpile

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (1% SOM)	No. of Samples >GAC
Metals				
Inorganic Arsenic	1	8.7	37	0
Cadmium	1	0.1	11	0
Chromium (III)	1	16	910	0
Lead	1	27	200	0
Inorganic Mercury	1	0.06	40	0
Selenium	1	<0.5	250	0
Copper	1	18	200	0
Nickel	1	15	130	0

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (1% SOM)	No. of Samples >GAC
Zinc	1	46	450	0
Inorganics				
pH	1	10.4	<5 or >9	1
Water Sol. Sulphate	1	0.84	0.5 g/l	1
Speciated PAH				
Acenaphthene	1	<0.1	200	0
Anthracene	1	0.1	2300	0
Acenaphthylene	1	0.1	170	0
Benzo(a)anthracene	1	0.1	B(a)P**	**
Benzo(b)fluoranthene	1	0.3	B(a)P**	**
Benzo(k)fluoranthene	1	0.2	B(a)P**	**
Benzo(g,h,i)perylene	1	0.3	B(a)P**	**
Benzo(a)pyrene	1	0.4	2.1	0
Chrysene	1	0.6	B(a)P**	**
Dibenzo(a,h)anthracene	1	<0.1	B(a)P**	**
Fluoranthene	1	0.3	280	0
Fluorene	1	0.1	170	0
Indeno(1,2,3-cd)pyrene	1	0.3	B(a)P**	**
Naphthalene	1	<0.1	1.0	0
Pyrene	1	0.5	620	0
Phenanthrene	1	0.5	95	0
Others				
Phenol	1	<0.3	110	0
TOC	1	1.8	3 w/w%	0
Asbestos	1	NAD	Fibres present	0
Petroleum Hydrocarbons and related organics				
Aliphatic TPH >C5-C6	1	<0.01	24	0
Aliphatic TPH >C6-C8	1	<0.01	53	0
Aliphatic TPH >C8-C10	1	<0.01	13	0
Aliphatic TPH >C10-C12	1	2	62	0
Aliphatic TPH >C12-C16	1	27	510	0
Aliphatic TPH >C16-C35	1		41000	
Aromatic TPH >C5-C7	1	<0.01	53	0
Aromatic TPH >C7-C8	1	<0.01	100	0
Aromatic TPH >C8-C10	1	<0.01	20	0
Aromatic TPH >C10-C12	1	<0.9	63	0
Aromatic TPH >C12-C16	1	<0.5	140	0

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (1% SOM)	No. of Samples >GAC
Aromatic TPH >C16-C21	1	<0.6	260	0
Aromatic TPH >C21-C35	1	<1.4	1100	0
Benzene	1	<0.01	0.063	0
Toluene	1	<0.01	100	0
Ethylbenzene	1	<0.01	26	0
m & p-Xylene	1	<0.01	28	0
o-Xylene				
Methyl Tert-Butyl Ether	1	<0.01	31	0

** Assessed using benzo(a)pyrene as a surrogate marker
Table based on a Residential with Gardens end use with a 2.5% Soil Organic Matter.
NAD = No Asbestos Detected
NA – Not Applicable.

Metals and Metalloids

No concentrations of metal determinands were recorded to exceed the relevant GAC.

Other Inorganic Analytes

The sample has returned a pH value which is slightly elevated (alkaline) above the upper GAC. In addition, a concentration of water soluble sulphate above the GAC has been recorded. The value/ concentration detected are unlikely to present a significant risk to human health, but could present a risk to concrete products which come into contact with this material.

Organics

No concentrations of organic determinands were recorded to exceed the relevant GAC.

Asbestos

No asbestos fibres were identified in the screened sample.

Anecdotal note

The results recorded, particularly the elevated water soluble sulphate and alkaline conditions, further support the on site observation that this material may be plaster or similar type product.

Table 8.5 Summary of Total Soil Concentrations – Made Ground and Relict Topsoil

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (2.5% SOM)	GAC (2.5% SOM)	No. of Samples >GAC
Metals					
Inorganic Arsenic	9	7.3-15.0	37		0
Cadmium	9	<0.1	11		0
Chromium (III)	9	4.1-31.0	910		0
Lead	9	9.2-28.0	200		0
Inorganic Mercury	9	<0.05-0.16	40		0
Selenium	9	<0.5-3.2	250		0
Copper	9	8.9-29.0	200		0
Nickel	9	3.4-25.0	130		0
Zinc	9	14-39	450		0
Inorganics					
pH	9	6.7-11.6	<5 or >9		3
Water Sol. Sulphate	9	0.016-0.45	0.5 g/l		0
Speciated PAH					
Acenaphthene	9	<0.1-1.3	490		0
Anthracene	9	<0.1-3.5	5300		0
Acenaphthylene	9	<0.1-4.4	400		0
Benzo(a)anthracene	9	<0.1-5.9	B(a)P**		**
Benzo(b)fluoranthene	9	<0.1-4.1	B(a)P**		**
Benzo(k)fluoranthene	9	<0.1-2.1	B(a)P**		**
Benzo(g,h,i)perylene	9	<0.1-1.6	B(a)P**		**
Benzo(a)pyrene	9	<0.1-4.1	2.1	4.9	2 (Stage 1 GAC) 0 (Stage 2 GAC)
Chrysene	9	<0.1-5.1	B(a)P**		**
Dibenzo(a,h)anthracene	9	<0.1-0.4	B(a)P**		**
Fluoranthene	9	<0.1-16.0	560		0
Fluorene	9	<0.1-1.8	390		0
Indeno(1,2,3-cd)pyrene	9	<0.1-2.3	B(a)P**		**
Naphthalene	9	<0.1	2.3		0
Pyrene	9	<0.1-13.0	1200		0
Phenanthrene	9	<0.1-13.0	220		0
Others					
Phenol	9	<0.3-0.3	190		0
TOC	9	0.8-1.7	3 w/w%		0
Asbestos	10	NAD	Fibres present		0
Petroleum Hydrocarbons and related organics					
Aliphatic TPH >C5-C6	2	<0.01	41		0
Aliphatic TPH >C6-C8	2	<0.01	110		0

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (2.5% SOM)	GAC (2.5% SOM)	No. of Samples >GAC
Aliphatic TPH >C8-C10	2	<0.01	31		0
Aliphatic TPH >C10-C12	2	<1.5	150		0
Aliphatic TPH >C12-C16	2	<1.2	1200		0
Aliphatic TPH >C16-C35	2	<4.9	70000		0
Aromatic TPH >C5-C7	2	<0.01	110		0
Aromatic TPH >C7-C8	2	<0.01	240		0
Aromatic TPH >C8-C10	2	<0.01	48		0
Aromatic TPH >C10-C12	2	<0.9	150		0
Aromatic TPH >C12-C16	2	<0.5	320		0
Aromatic TPH >C16-C21	2	<0.6	540		0
Aromatic TPH >C21-C35	2	<1.4	1500		0
Benzene	2	<0.01	0.13		0
Toluene	2	<0.01	240		0
Ethylbenzene	2	<0.01	62		0
m & p-Xylene	2	<0.01	67		0
o-Xylene					
Methyl Tert-Butyl Ether	2	<0.01	55		0

** Assessed using benzo(a)pyrene as a surrogate marker
Table based on a Residential with Gardens end use with a 2.5% Soil Organic Matter.
NAD = No Asbestos Detected
NA – Not Applicable.

Metals and Metalloids

No concentrations of metal determinands were recorded to exceed the relevant GAC.

Other Inorganic Analytes

Three of the nine samples of the made ground, including two of granular material and one of cohesive soil, have returned pH values in excess of the upper (alkaline) GAC value. All three samples returned pH values slightly in excess of 11.0, with a maximum of 11.6. At such maximum values, it is possible that these subsoil type materials could present a potential significant risk to end users through repeated and prolonged contact. The recorded concentrations are however

considered unlikely to present a significant risk to construction workers provided good hygiene and PPE are adopted during development.

Organics

Two samples of cohesive made ground, from TP6 and WS6, have returned have returned concentrations of benzo(a)pyrene in excess of the GAC, to a maximum concentration of 4.3mg/kg, above the Stage 1 GAC, although notably both results fall below Sirius' applied Stage 2 GAC of 4.9mg/kg.

The likely provenance of those PAHs within the granular made ground has been assessed based on a source signature double ratio plot. This method is carried out by comparison of the ratios of two pairs of PAHs; benzo(a)anthracene to chrysene, and fluoranthene to pyrene.

Based on the results of the double ratio plot, it would appear that the most likely source of the detected elevated PAHs is from unburnt coal fragments. Although no coal fragments were observed within the material in TP6 during excavation, coal fragments were noted in WS6 and it is reasonable to assume that some small fragments may not have been observed in TP6. The plot does not indicate a fuel, oil, or combustion (i.e. ash) source for either sample, and no evidence of such sources were observed within the material during excavation.

Coal derived PAHs are generally accepted to be less mobile and less of concern to human health than other sources i.e. petroleum hydrocarbons.

Further statistical interpretation of the current dataset is not considered appropriate, owing to the considerable variation in material types observed within the made ground which precludes adopting the made ground as a single averaging zone. However, with cognisance to the relatively limited number of samples of concern, the absence of any recorded values in excess of the Stage 2 GAC, and the observation that these values are more likely to be coal derived and thus of lower mobility and therefore lower likelihood of exposure to human health, these infrequent concentrations of benzo(a)pyrene within subsoils are considered unlikely to present a significant risk to human health.

Asbestos

No asbestos fibres were identified in the screened samples.

Table 8.6 Summary of Total Soil Concentrations – Natural Soil Near Surface

Determinand	No. of Samples Tested	Results (mg/kg unless specified)	GAC (2.5% SOM)	No. of Samples >GAC
Metals				
Inorganic Arsenic	1	12	37	
Cadmium	1	<0.1	11	
Chromium (III)	1	21	910	
Lead	1	17	200	
Inorganic Mercury	1	0.11	40	
Selenium	1	<0.5	250	
Copper	1	24	200	
Nickel	1	31	130	
Zinc	1	49	450	
Inorganics				
pH	8	5.5-9.4	<5 or >9	
Water Sol. Sulphate	8	0.01-0.12	0.5 g/l	
Speciated PAH				
Acenaphthene	1	<0.1	490	
Anthracene	1	<0.1	5300	
Acenaphthylene	1	<0.1	400	
Benzo(a)anthracene	1	<0.1	B(a)P**	**
Benzo(b)fluoranthene	1	<0.1	B(a)P**	**
Benzo(k)fluoranthene	1	<0.1	B(a)P**	**
Benzo(g,h,i)perylene	1	<0.1	B(a)P**	**
Benzo(a)pyrene	1	<0.1	2.1	
Chrysene	1	<0.1	B(a)P**	**
Dibenzo(a,h)anthracene	1	<0.1	B(a)P**	**
Fluoranthene	1	<0.1	560	
Fluorene	1	<0.1	390	
Indeno(1,2,3-cd)pyrene	1	<0.1	B(a)P**	**
Naphthalene	1	<0.1	2.3	
Pyrene	1	<0.1	1200	
Phenanthrene	1	<0.1	220	
Others				
Phenol	1	<0.3	190	
TOC	1	1.4	3 w/w%	
Asbestos	1	NAD	Fibres present	

** Assessed using benzo(a)pyrene as a surrogate marker
Table based on a Residential with Gardens end use with a 2.5% Soil Organic Matter.
NAD = No Asbestos Detected
NA – Not Applicable.

Metals and Metalloids

No concentrations of metal or metalloid determinands were recorded to exceed the relevant GAC.

Other Inorganic Analytes

No concentrations of other inorganic determinands were recorded to exceed the relevant GAC.

Asbestos

No asbestos fibres were identified in the screened sample.

Organics

No concentrations of organic determinands were recorded to exceed the relevant GAC.

Cement Sheet at Surface on Access Road

No asbestos fibres have been identified in two samples of the broken cement sheet fly tipped on the access road. This material **does not appear to be asbestos containing cement sheet**.

8.3. Groundwater Analysis

Error! Reference source not found. presents a summary of the analytical results obtained and their evaluation against the applicable GACs.

Table 8.7 Summary of Groundwater Analysis

Determinand	No. of Samples Tested	No. Samples Above Limit of Detection	Range of Results (µg/l unless specified)	GAC value (µg/l unless specified)	No. of Samples >GAC
Petroleum Hydrocarbons					
Aliphatic C_5 to C_6	3	1	<0.1-60	15,000*	0
Aliphatic C_6 to C_8	3	1	<0.1-15	15,000*	0
Aliphatic C_8 to C_{10}	3	1	<0.1-430	300*	1 (TP6)
Aliphatic C_{10}-C_{12}	3	1	<0.1-20,000	300*	1 (TP6)
Aliphatic C_{12}-C_{16}	3	1	<0.1-200,000	300*	1 (TP6)
Aliphatic C_{16}-$C2_{21}$	3	1	<0.1-200,000	300*	1 (TP6)
Aliphatic C_{21}-$C2_{35}$	3	1	<0.1-69,000	300*	1 (TP6)
Aromatic C_5 to C_7	3	0	<0.1	10*	0
Aromatic C_7 to C_8	3	0	<0.1	10*	0

Determinand	No. of Samples Tested	No. Samples Above Limit of Detection	Range of Results (µg/l unless specified)	GAC value (µg/l unless specified)	No. of Samples >GAC
Aromatic C_8 to C_{10}	3	0	<0.1	300*	0
Aromatic C_{10}-C_{12}	3	1	<0.1-11,000	90*	1 (TP6)
Aromatic C_{12}-C_{16}	3	1	<0.1-110,000	90*	1 (TP6)
Aromatic C_{16}-$C2_{21}$	3	1	<0.1-130,000	90*	1 (TP6)
Aromatic C_{21}-$C2_{35}$	3	1	<0.1-47,000	90*	1 (TP6)
Benzene	1	0	<1	10[#]	0
Toluene	1	0	<1	1[#]	0
Ethylbenzene	1	0	<1	700[#]	0
Xylenes	1	1	24	500[#]	0
MTBE	1	0	<1.0	200[#]	0
PAHs					
Anthracene	3	0	<1-<10		
Benzo(b)fluoranthene + Benzo(k)fluoranthene	3	0	<2-<20	0.1 (Sum of 4)[#]	0[1]
Benzo(ghi)perylene + indeno(123-cd)pyrene	3	0	<2-<20		
Benzo(a)pyrene	3	0	<1-<10	0.01[#]	0[1]

[#] GAC derived from UK DWS
* GAC derived from WHO guidelines
[1] CAG is lower than laboratory limit of detection. All results reported as lower than LOD.

Organics

Detectable concentrations of dissolved petroleum hydrocarbons were recorded only in the unfiltered 'grab sample' recovered during excavation of TP6, within a suspected infilled basement or similar feature in the west of the site. It must be recognised that such grab samples typically give a less accurate representation of true dissolved concentrations of contaminants than samples recovered from monitoring wells, owing to the entrainment of suspended debris and other matter within the sample during recovery. A cautious approach should therefore be taken to reviewing data obtained from such samples, although the considerably elevated concentrations of TPH recorded from that sample would still be considered a potential risk to controlled waters, if a migratory pathway is present. Based on samples recovered from nearby wells, there is no indication that these impacts extend beyond localised trapped perched water within the deep area of made ground observed in TP6.

No concentrations of petroleum hydrocarbons or PAHs in excess of the chosen GACs have been recorded in samples recovered from wells in nearby boreholes WS2 and WS4.

With consideration to the absence of any visible free product observed on recovered samples, or recorded within the wells during subsequent monitoring, the relatively limited occurrences of organic compounds in the groundwater beneath the site, other than TPH observed in the perched groundwater within made ground in TP6, and with cognisance to the distance to the closest surface water course and absence of any evident linkage, the risk to controlled waters is considered to be negligible.

9. REVISED CONCEPTUAL SITE MODEL

The preliminary combined conceptual site model and conceptual exposure model, developed from the desk study information and presented in Section 5, has been revised in light of the ground investigation and the chemical analysis results presented above.

The revised conceptual model has been developed for the proposed future land use (Residential with gardens). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors.

The revised conceptual model is presented in schematic form in Appendix A, Drawing No. C8049/05.

9.1. Summary of Residual Contaminant Linkages

The qualitative risk assessment of identified contaminant linkages has also been revised, following the methodology described in Appendix D.

In summary, the revised CSM has identified the following residual contaminant linkages (defined as being greater than “low” risk) that could result in an unacceptable risk in the proposed end-use:

- Dermal contact and inhalation of dusts with high (alkaline) pH values in made ground present across the site, presenting a potential moderate risk to end users and construction workers. However, risks presented to construction workers could be adequately reduced by wearing appropriate PPE and good soil management practices.

- Inhalation of dusts containing asbestos fibres contained in the granular made ground within Stockpile 1, presenting a potential high risk to construction workers, and a potential moderate risk to end users if these materials remain at surface or shallow depth following development. Further quantitative testing is required to confirm with further accuracy the potential risk to construction workers.

- Ingestion, inhalation of dusts and dermal contact with PAHs and asbestos fibres in asphalt/ coated stone within Stockpile 2, presenting a potential high risk to construction workers, and a potential high risk to end users if this material remains at surface or shallow depth following development.

- Leaching of PAHs within asphalt in Stockpile 2, presenting a moderate risk to controlled waters, including the Principal Aquifer in the east of the site. This risk to the Principal Aquifer may remain even if the material is placed at depth beneath the development.

- Dermal contact and inhalation of dusts with high (alkaline) pH values in the made ground within the covered stockpile in the south-east of the site, presenting a potential moderate risk to end users and construction workers. Risks presented to construction workers could be adequately reduced by wearing appropriate PPE and good soil management practices.

- Generation of hazardous ground gases (particularly carbon dioxide) associated with made ground on and off-site, presenting a low to moderate risk to human health and the built environment. This assessment is based on a limited dataset of 1/6 monitoring visits to the site, and may be revised following completion of the monitoring programme.

10. CONCLUSIONS AND RECOMMENDATIONS

10.1. General

This geoenvironmental appraisal has been performed for land at Cleator Moor Road, Whitehaven, Cumbria.

It has been assumed in the production of this report that the site is to be developed for a residential with gardens end use. In addition, it has been assumed that ground levels will not change significantly from those described in this report. If these are not the case, then amendments to the interpretation and conclusions in this report may be required.

10.2. Geotechnical

Mining and Quarrying

Based on published geological information, and data provided by the CA, the likelihood of past underground coal mining influencing surface stability at the site is considered to be low.

Inspection of historical plans has not revealed any evidence of quarrying or opencast workings beneath the site.

Foundations

On the basis that the site will be developed with standard house types designed by Gleeson, structural loads are anticipated to be relatively light i.e. in the order of 80kN/m run.

The investigation has identified made ground across the site, of generally up to 0.6m thick across the eastern half of the site, and typically up to 1.1m thick in the western half of the site. A deeper pocket/ area of made ground, at least 2.2m thick has been proven centrally within the western half of the site, although the full extent has not been proven at this stage, pending access beneath stockpiles.

Below made ground, strata largely comprised firm and stiff medium and high strength glacial clays, although locally loose sand was proven to 1.4m depth in the west of the site. Soft, medium strength clays were also observed at depth locally, also in the west of the site.

Superficial deposits are locally absent, with competent sandstone present immediately below made ground, at very shallow depth in the south-west of the site.

The made ground soils are unsuitable as bearing strata for structural loads due to the potential for excessive total and differential settlements. Structural loads associated with the proposed development should be extended through the made ground to bear onto underlying natural strata of adequate bearing capacity. These could include glacial clay which is at least medium strength, and the competent sandstone bedrock.

Across much of the site, it is anticipated that loads could be supported on conventional spread foundations, for example strip foundations in the eastern half of the site, and strip/ trench fill in the west.

The underlying cohesive soils are considered to have a characteristic undrained shear strength (C_u) of at least 50kN/m^2, up to 80kN/m^2 at typical founding depth of 0.9m bgl. By way of example, calculations indicate that a 0.6m wide strip bearing on the cohesive soils at a depth of 0.9m bgl, can impose a maximum line load of at least 80kN/m run. The application of such a pressure would keep settlements to 25mm or less. If greater structural loads are anticipated alternative foundation solutions may be required.

To mitigate against the effects of differential settlement, foundations should bear entirely upon on consistent soil type.

In the west of the site, natural deposits of loose sand have been identified to 1.4m depth. In such instances, it is recommended that foundations are extended in depth to penetrate the sand deposits, in order to mitigate the potential for differential settlements. Alternatively, foundations could span between cohesive and granular soils, if adequately reinforced to mitigate such differential settlement movements.

Rockhead should be expected at shallow depth in foundation excavations in the south-west of the site. Where competent bedrock is encountered in foundation excavations to induvial structures, then the entirety of the foundation to that structure should be extended to bear solely onto the bedrock. This is in order to mitigate potential differential settlements between the different materials.

The cohesive soils on this site have been found to be of medium volume change potential as defined in NHBC Standards, Chapter 4.2. Foundations placed into cohesive soils should be a minimum of 900mm deep (below finished or original ground levels, whichever is the lower), locally deepened within the zone of influence of proposed trees. The addition of trees to the site may cause heave of cohesive soils and heave protection measures should be adopted in foundation design where appropriate. Foundations bearing onto competent sandstone bedrock, in the south -

west of the site, may bear at shallower depths as such strata are more volumetrically stable and less affected by seasonal or tree influences.

The above calculations are based on theoretical foundations. Settlements of foundations upon granular and cohesive materials are dependent on foundation loading and dimensions. It is therefore recommended that foundation settlements are reviewed once final loading arrangements and foundation sizes are known.

A small area of the site around the anomalously deep made ground may require alternative foundation solutions and, subject to further investigation of that area following removal of the stockpiles, **vibro-improvement or piled foundations should be assumed for circa 5%** of the site area.

Foundations should be taken below a line drawn up at 45° from the base of any existing or proposed services.

The layout of foundations should consider any relict foundations, substructures or other potential obstructions on site.

It should be noted that any groundwater encountered may have an adverse effect on foundation construction and performance (such as softening/loosening of founding materials, instability of excavation walls, etc.), particularly in winter months. This should be considered when designing and constructing foundations.

Floors

Based on proven ground conditions and in accordance with current NHBC Standards, subject to exact proposals for reprofiling to accommodate development and requirements for ground gas protection measures, it is considered that ground bearing floor slabs could be utilised across much of the site, particularly in the eastern half of the site, where made ground is generally less than 600mm thick.

If ground bearing slabs are adopted, then any topsoil, and made ground within the proposed floor plan should be removed prior to construction of the floor, with any resultant void replaced with a chemically inert/ clean, well compacted hardcore.

Suspended floor slabs should be allowed for where made ground in excess of 600mm has been proven, for example in much of the west of the site, or if levels are raised across the site to accommodate development.

Suspended floor slabs may also be necessary to mitigate ground gas risk, which will be discussed further on completion of the ground gas monitoring programme. At this stage, until the final ground gas risk assessment and associated recommendations are issued, in light of the interim gas recommendations, it would be prudent to allow for suspended slabs throughout the site.

Sulphate Attack

Based on the samples tested, a Design Sulphate Class of DS-1 and an ACEC Class of AC-1 should be used for buried concrete structures in contact with both 'in situ' made ground and natural soils.

Groundworks, Excavation Stability and Groundwater Dewatering

Excavation across much of the site area should generally be possible with standard plant. The presence of relict former structures particularly in the north-east quarter of the site, and from shallow rockhead and local relict structures in the west of the site may present obstacles to excavation with light plant, and the use of a hydraulic or pneumatic breaker is likely to be required to progress excavations through such structures/ features. If extensive excavation which can reasonably be expected to intersect rockhead, is expected in the south-west of the site, then consideration should be given to the use of more substantial plant and allowance for 'ripping' of the stone may be necessary.

Excavations into all made ground and the underlying natural soils should be assumed to be unstable. No personnel entry into unsupported excavations shall be allowed without an appropriate risk assessment. Reference to CIRIA report 97 (1983) should be made to establish suitable means of support or battering of excavation sides.

Based on the results of this investigation, significant groundwater seepages or inflows within shallow excavations (<2.0m) across the majority of the site are considered unlikely, although some seepages may occur. It should be possible to deal with seepages over much of the site area through normal site pumping practices for any shallow excavations open for short periods of time.

Within the west of the site, more substantial groundwater should be anticiapted at depths below circa 1m bgl. Considerable groundwater should be anticipated in the area of TP6, where a backfilled basement or similar feature appears to be present. In such areas, a point dewatering system may be required, although the programmed further monitoring of installed wells may provide further guidance on the likelihood of this requirement.

Disposal/discharge of water pumped from sumps or dewatering systems will require appropriate treatment/consent and particularly attention is drawn to the results of sampling of groundwater in the west of the site.

It is recommended that an adequate drainage system for surface water be installed by a competent contractor in order to prevent surface water ponding or collecting both during and post construction, as this may lead to deterioration of the founding stratum.

To reduce the possibility of softening or swelling of cohesive soils at the base of foundation trenches, these should be suitably blinded with concrete.

There are opportunities to re-use materials on site thereby limiting disposal of waste soils/ materials. It is recommended that an evaluation of the cut/ fill balance of the site is undertaken and the extent of earthworks assessed in more detail. Re-use of soils should be undertaken in accordance with the Definition of Waste Code of Practice. It is recommended that an Earthworks Strategy is prepared for the site, alongside a Material Management Plan (MMP), where recovered or currently stockpiled materials are being considered for re-use either on or off-site.

Pavements and Highways

The CBR of any made ground and low strength soils should be assumed to be <2.5%. Highways Agency document HD25 Interim Advice Note 73/06 Revision 1 (2009) states that where a subgrade has a CBR lower than 2.5%, it is considered unsuitable support for a pavement foundation since it would tend to deform under construction traffic, and must be improved.

It is possible that in some areas, notably where natural soils have been encountered at or near surface (TP1, 4, 9 WS5, WS7, WS9, in the eastern half of the site) that natural glacial clay will be present at formation level. Based on the results of the laboratory testing undertaken on natural cohesive soils, a CBR value of 3% could be assumed for preliminary pavement design within these soils at this stage.

In the south-west corner of the site, in particular near to TP7, sandstone rockhead may be expected at least locally at formation level. Where such strata is exposed at formation level, then a CBR value of at least 20% may be applied to the in situ natural sandstone.

It is recommended that in-situ CBR testing is carried out following completion of the enabling works, when final site levels will be known.

All road design should be discussed with the relevant local authority if highways are to be subject to a Section 38 agreement.

10.3. Asbestos-Containing Materials

Laboratory testing has identified trace quantities of asbestos fibres within the granular material in Stockpile 1, and in/ on the asphalt in Stockpile 2. If left present within the development at shallow depth or at surface, these materials may present a risk to end users. They may also present a risk to construction workers, although subject to further quantification testing, the risks to construction workers may effectively be managed using PPE.

The cement sheet fragments fly tipped on the access road in the south-east of the site does not appear to be asbestos containing.

Notwithstanding the absence of any observed asbestos materials within ground (excluding stockpile) during the investigation, it is recognised that the site has been subject to previous development and demolition, which could give rise to the presence of asbestos products locally within the made ground soils, or as shuttering adjacent to/ beneath former structures. Groundworkers should remain vigilant for the presence of such materials when soils are exposed.

If asbestos containing materials are encountered, or even suspected, then works should be stopped in that area, and further advice obtained from a suitably qualified and experienced asbestos surveyor.

10.4. Soil and Groundwater Contamination

Risk Evaluation for the Proposed Land Use (Residential with gardens)

The revised conceptual site model indicates that potentially unacceptable contaminant linkages exist for both site end-users and controlled waters. Contaminant linkages assessed as a Low or Negligible risk are not considered significant or requiring remedial action, and are not discussed further.

Human Health Receptors

Asbestos fibres recorded within the granular material in Stockpile 1, and in the asphalt in Stockpile 2, pose potentially unacceptable risks to site end users. These materials should not remain present at shallow depth beneath finished ground level in gardens or landscaped areas within the proposed development.

The presence of fibres may also present a risk to construction/ maintenance workers, and could potentially result in cross-contamination of other materials during development if not managed appropriately. Further quantitative testing should be carried out to identify the potential risks to construction workers during handling of the materials during development.

In addition to asbestos fibres, based on laboratory testing, the asphalt in Stockpile 2 appears to contain a coal tar/ road tar binder, with very high concentrations of PAHs, particularly benzo(a)pyrene, recorded in a majority of the samples tested. These PAHs are also likely to present a significant risk to end users, and this material should not remain at surface or at shallow depth beneath gardens/ landscaped areas following development.

High (alkaline) pH values have also been recorded within the general made ground, and within the covered stockpiled material in the south-east. These highly alkaline values may also present a risk to human health via dermal contact and dust inhalation, if the materials are present at or near to surface level in garden areas following development.

Consideration may also need to be taken in respect of working practices and the protection of site workers and adjacent land users against dispersion of asbestos fibres during any earthworks.

Controlled Waters Receptors

Elevated concentrations of petroleum hydrocarbons have been recorded in a single grab sample of groundwater perched within a small area of deep made ground in the west of the site. That sample was recovered from turbid water within the excavation and can be expected to contain a high proportion of suspended sediment with adsorbed organic matter. The concentrations recorded in this sample are therefore not considered representative of the true dissolved concentrations of hydrocarbons within the wider groundwater body across the site, which are considered to be more accurately represented by high quality samples recovered following development of wells in WS2 and WS4 located in the area.

Considering the absence of any evidence of free product on the groundwater, the low concentrations of organics detected in samples recovered from WS2 and WS4 and in particular, the significant distance to the nearest surface water course, the risk to surface waters is considered to be low.

Concentrations of key organic contaminants in samples recovered from WS2 and WS4 have been shown to be below the relevant assessment criteria and/ or below the achievable laboratory limits

of detection, and groundwater within the site is considered to present a low risk to controlled waters within the underlying aquifer.

Utilities

It is recommended that the results of the chemical testing and details of the proposed remedial works are provided to the appropriate utility companies to determine the necessity for service protection.

Based on the results of testing, it is possible that upgraded water supply pipes may be required.

Construction and Maintenance Workers

Contamination may pose a short-term (acute) or long-term (chronic) risk to workers during construction and maintenance. The potential risks must be specifically assessed as part of the health and safety evaluation for the works to be performed in accordance with prevailing legislation. Site practices must conform to the specific legislative requirements and follow appropriate guidance (e.g., HSE, 1991; CIRIA, 1996).

On the basis of the results obtained, the principal potential exposure risks to workers may arise from asbestos fibres within the granular made ground in Stockpile 1 and asphalt in Stockpile 2, together with highly alkaline made ground soils across the site and in the covered stockpile in the south-east of the site.

However, the risks can be readily adequately mitigated by appropriate PPE and hygiene precautions and good working and soil management practices. It is recommended that procedures outlined in the HSE document “Protection of Workers and the General Public during Remediation of Contaminated Land” be followed. There will be a requirement to comply with the COSHH (Control of Substances Hazardous to Health) Regulations and the CDM (Construction Design and Management 2007) Regulations during any works.

This report should be forwarded to any organisations undertaking groundworks in order for them to assess the risk to their personnel.

Given that depleted concentrations of oxygen was recorded during ground gas monitoring, precautions should also be taken to protect workers entering and/or working in confined spaces.

Outline Remediation Requirements

Owing to the presence of elevated PAHs indicating coal tar/ road tar based binder (AWCCT), and the presence of asbestos fibres within the asphalt in Stockpile 2, and in light of the shallow groundwater, shallow rockhead and presence of a Principal Aquifer variously beneath the site, this material is considered unsuitable to remain within the proposed development, and it is recommended that it is removed from site to an appropriate disposal facility. Further discussion regarding the appropriate disposal of AWCCT is provided in greater detail below. However, this material is anticipated to be classified as Hazardous Waste.

Trace asbestos fibres have also been recorded in the granular material in Stockpile 1 and this material is unlikely to be suitable to remain at shallow depth in garden areas, landscaping or around services. It might however be acceptable to use the material as sub-base beneath highways and other paved areas. This would require significant further testing including quantitative analysis, to confirm precise quantities of asbestos within the material.

The covered stockpile of unconfirmed material, suspected to be old plaster, has returned high pH values which could present risks to human health. In light of the nature of this material, it's unknown origin, and the potential risks to human health, it would be prudent to remove the stockpile from site to an appropriate disposal facility at an early stage during development preparatory works.

High pH values have also been recorded within the general made ground across the site, and which could potentially present a risk to human health, particularly end users, through inhalation and dermal contact. Whilst it is recommended that this made ground also does not remain at surface following demolition, the high pH values do not necessarily dictate the use of a full 600mm thick clean cover system. With cognisance to the exposure pathways present to end users, then the use of a limited thickness cover system, for example comprising 300mm of clean clay and/ or topsoil may be considered sufficient to adequately mitigate the risks. It is however recommended that this is discussed in detail, and agreed with relevant regulators, in advance of development.

The remedial approaches outlined above are considered to be a practical and sustainable approach and the selection of the preferred solution is likely to be informed by a value engineering exercise. However, the preferred option should be discussed with, and agreed by, the local authority and NHBC, prior to further action. A remediation strategy report should be a produced and agreed with the regulatory authorities prior to commencement of remediation and/ or preparatory works.

The above recommendations comprise a general outline of possible or likely works. A Remediation Strategy report will need to be produced and agreed with the regulatory authorities prior to commencement of remediation.

It is possible that areas of more significant contamination, not identified to date, may be encountered on site during excavation and construction works. If any areas of noxious, odorous, brightly coloured, fibrous, liquid or other potential contamination are encountered, then further advice should be sought from a suitably qualified consultant.

10.5. Ground Gas

The programme of ground gas monitoring has not yet been concluded and the following comments must be taken as preliminary only, and subject to change following completion of the monitoring.

The results to date have revealed maximum steady state carbon dioxide concentrations of up to 8.8% v/v, and methane concentrations of up to 4.8%.

Flow rates in some wells are considered to be artificially elevated as a consequence of shallow groundwater within monitoring wells, which is noted to be above the top of the screened response zone, confining the gas within a sealed upper section of the well. A realistic peak and steady state flow of 3.4l/hr has been recorded.

In addition, carbon monoxide of up to 170ppm, and hydrogen sulphide of up to 32ppm have been recorded during the monitoring, although it is not yet clear if these values are truly representative of typical concentrations in the ground.

Based on these data, the site could be characterised as CS2 as defined in Table 2 of BS8485:2015. However, with consideration to the limited dataset at this stage, and in particular the concentrations of carbon dioxide recorded to date, then it would be prudent for budgetary purposes at this stage to characterise the site as falling within Characteristic Situation 2 (CS2).

Table 4 of BS8485:2015 indicates that CS2 conditions require a minimum gas protection score of 3.5 for a residential end-use. This score may be achieved, for example, by a passive sub-floor void of suitable design and installation of a suitable gas resistant membrane, installed and verified in accordance with the requirements of BS8485:2015.

Slightly depleted concentrations of oxygen have been detected. In light of the depleted oxygen concentrations, it is recommended that controls are adopted for all areas of the site, in order to ensure all works in which site workers will access or enter underground structures, chambers,

culverts or similar, or where man entry into excavations is possible. It is considered such measures are necessary to ensure such works are in strict adherence with confined spaces regulations in place at the time of the works.

The above indicative assessment must be regarded as interim. A further five ground gas monitoring visits are planned and the full results, and an interpretation of these, will be issued as an addendum letter on completion of the monitoring programme.

Radon protection measures are not required by current guidance for the proposed development on this site.

10.6. Invasive and Protected Species

No evidence of invasive plant species was observed during the fieldworks. Notwithstanding, it is recommended that an ecological survey be undertaken by an appropriate specialist, to confirm or otherwise the absence of any invasive, sensitive or protective species across the site.

10.7. Waste and Resource Management (Soils)

Where possible it is encouraged that site won soils should be re-used if possible. Consideration should be given to the preparation of a Materials Management Plan (MMP), in accordance with Definition of Waste Code of Practice (DOWCOP) framework, to facilitate possible reuse of suitable site won soils either within this site, or at other sites (if clean and naturally occurring).

Any surplus or unsuitable materials are considered to be waste and should be classified and disposed of in accordance with current UK Waste Legislation and Duty of Care Regulations.

Soils should be disposed of to an appropriately licenced waste facility and should be adequately classified in accordance with Environment Agency Technical Guidance Document WM3, dated 2015, prior to disposal. Waste soils may also require Waste Acceptance Criteria (WAC) testing.

10.8. Re-use and Disposal of AWCCT

On the basis that the asphalt containing coal tar is not considered chemically or texturally suitable to be re-used within the development it may not be possible to demonstrate sufficiently that is it not a waste in accordance with the Definition of Waste Code of Practice. As such there may be strict regulatory controls which apply, to enable the re-use of AWCCT in construction, necessitating either the deployment of a bespoke or standard rules environmental permit. AWCCT is not included as an appropriate waste to re-use under any current UK Waste Exemptions.

AWCCT can be re-used as sub-base within estate footpaths if undertaken in accordance with Regulatory Position Statements 075 and 157, although in this instance, attention is also drawn to the presence of disperse asbestos fibres within the stockpiled material, which may preclude the re-use of this material.

Re-use of AWCCT for any other end use scenario will require the application for a bespoke Environmental Permit and risk assessment.

The above relates to "bituminous mixtures containing coal tar" (EWC code 17 03 01*). Other options are available for reuse of non-hazardous bituminous mixtures not containing coal tar (EWC code 17 03 02), such as a U1 Waste Exemption which allows for up to 1,000 tonnes of 17 03 02 to be used to build tracks, paths, bridleways or car parks (processing of the material is required to enable its re-use).

Indicative AWCCT Classification

The results obtained from the material in Stockpile 2 are indicative of "bituminous mixtures containing coal tar" (EWC code 17 03 01*). EWC code 17 03 01* is hazardous waste. The waste classification provided in this assessment is indicative and based on the interpretation of chemical test data recorded. Waste receiving facilities can have alternative thresholds for the waste they receive and their classification of the AWCCT may differ from the one presented in this report.

Disposal of hazardous waste must be undertaken in accordance with the Hazardous Waste (England and Wales) Regulations 2005, the Waste (England and Wales) Regulations 2011 and the EU Revised Waste Framework Directive. The following parties have responsibilities known as Duty of Care:

- The waste producer or holder.
- Principal Contractor organising disposal of the waste.
- Waste Carrier (haulage operator).
- Consignee (party receiving the waste).

Further guidance is available the Waste Duty of Care: code of practice available at https://www.gov.uk/government/publications/waste-duty-of-care-code-of-practice.

The Waste Carrier must hold a valid licence to carry the specific waste being transported.

The Waste Producer must keep copies of the following documentation:

- Consignment notes (these are applicable to each load).
- Consignee returns (these are the receipts provided by the waste receiving facility to confirm the type and volume of waste received).
- Any related documents which support the waste classification and description.

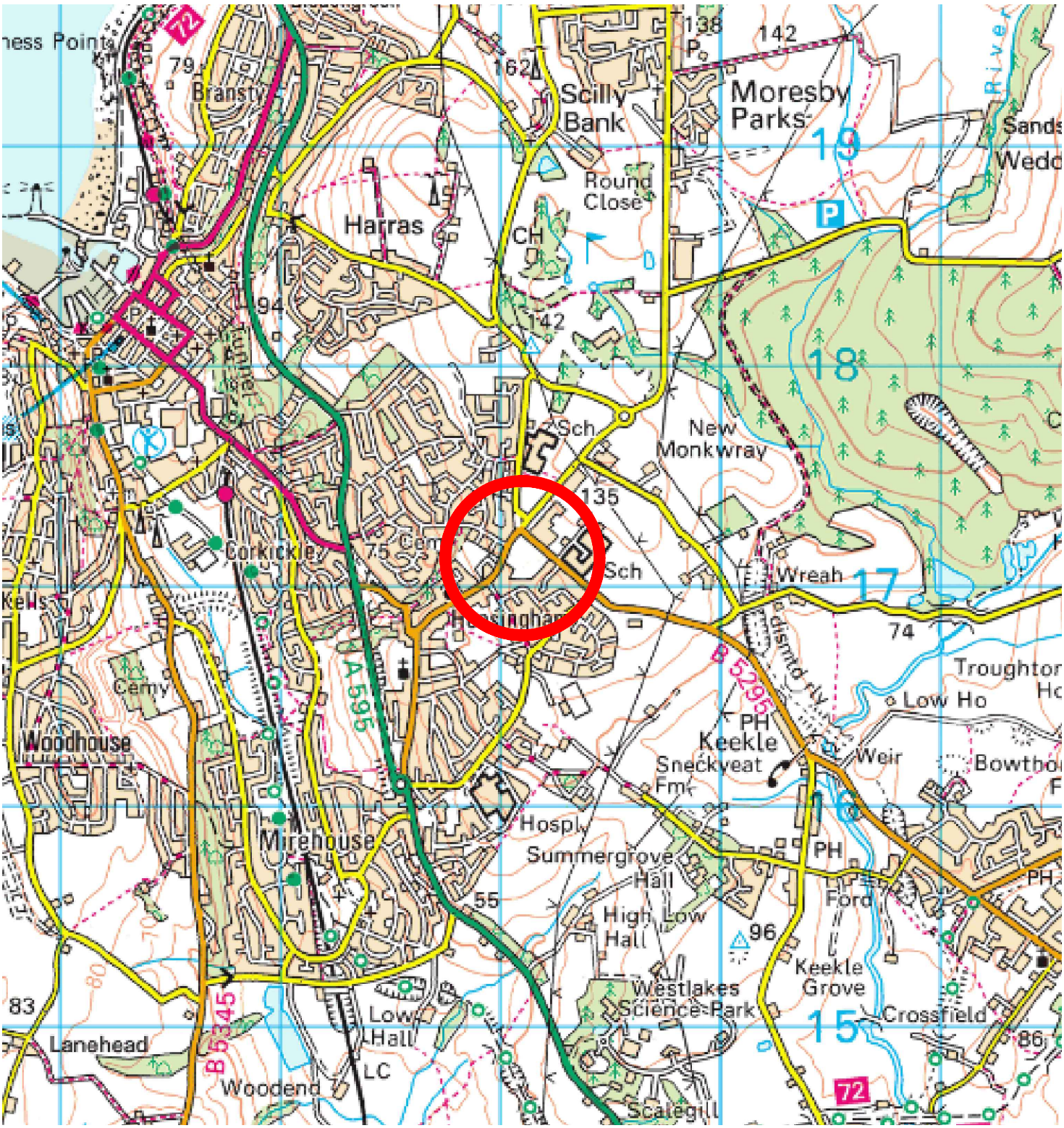
The principals of Duty of Care still apply for the disposal of non-hazardous waste. Consignment Notes are not required although the waste producer must still keep an accurate record of the waste being removed from site and where it is disposed to. The Waste Carrier should still provide receipts for each load and a counterpart receipt should be provided by the waste receiving facility.

11. REGULATORY APPROVALS

The conclusions and recommendations presented above are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and, therefore, the report should be passed to the appropriate regulatory authorities and/or other relevant organisations for their comment and approval prior to undertaking any works on site.

APPENDIX A

FIGURES AND DRAWINGS



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NOTES

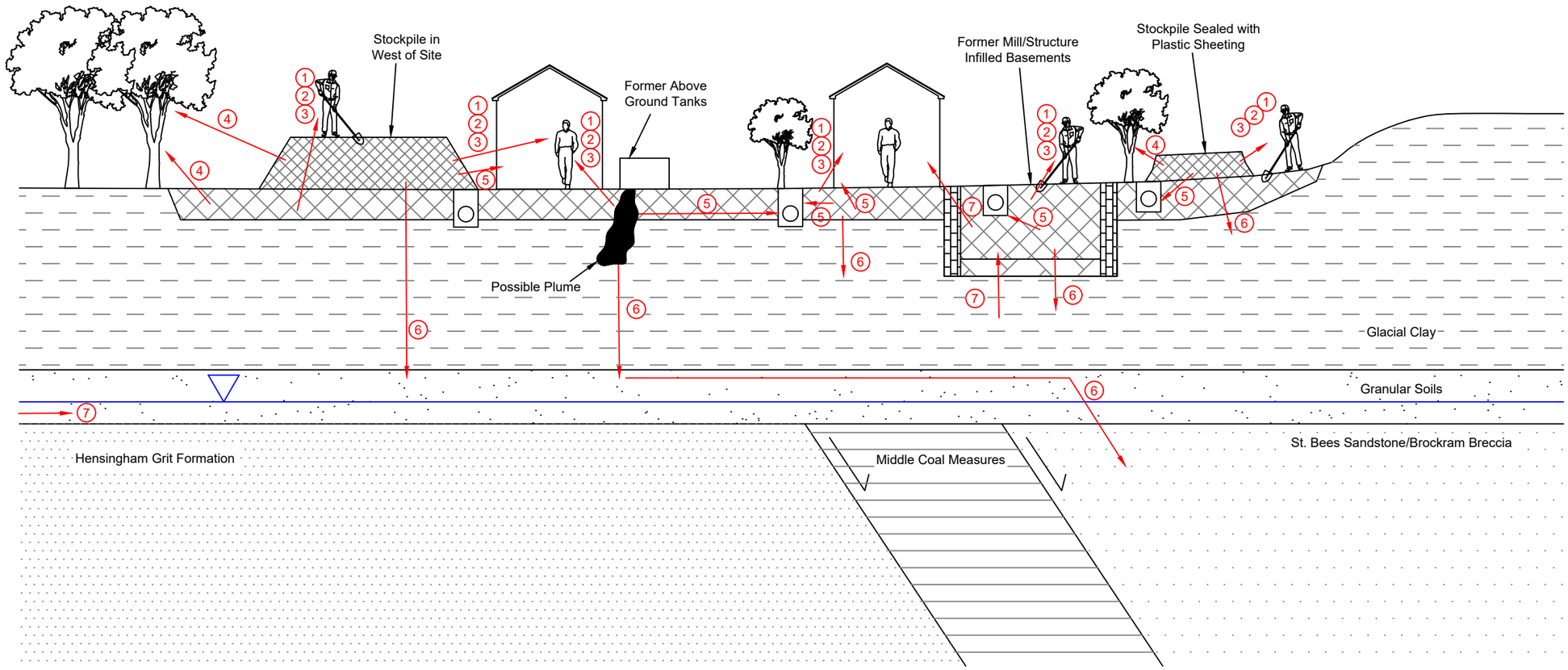
Site Location

REVISION	
0	For Information
A	>>
B	>>
C	>>
D	>>

SIRIUS GEOTECHNICAL LTD
Russel House,
Mill Road,
Langley Moor,
Durham DH7 8HJ
www.thesiriusgroup.com
TEL: 0191 378 9972
FAX: 0191 378 1537

CLIENT	DRAWING NO.	REVISION NO.
Gleeson Developments Ltd	C8049/01	0
SITE: Cleator Moor Road, Whitehaven, Cumbria	DRAWN BY: MF	APPROVED BY: APC
DRAWING TITLE: Site Location Plan	DATE: December 2020	SCALE: 1:25,000

A4



Contamination Source	Contamination Pathways	Potential Receptors	Likelihood of Significant Pollutant Linkage
Metals, PAHs, organic and inorganic contaminants including asbestos in general **made ground** across site, including anticipated demolition filled basements, associated with previous use as a mill	1. Direct and indirect ingestion 2. Inhalation of contaminated particles / dust/ vapours 3. Dermal contact	End users	Moderate
		Construction workers	Moderate
	4. Plant uptake	Gardens and landscaping	Low to moderate
	5. Direct contact with construction materials	Construction products including buried concrete and plastic	Low to moderate
	6. Leaching	Controlled waters – rivers and groundwater	Low
Metals, PAHs, organic and inorganic contaminants including asbestos in made ground within **stockpiles**, particularly in unknown stockpile adjacent to eastern boundary	1. Direct and indirect ingestion 2. Inhalation of contaminated particles / dust/ vapours 3. Dermal contact	End users	Low to moderate (Moderate for covered stockpile)
		Construction workers	Low to moderate (Moderate for covered stockpile)
	4. Plant uptake	Gardens and landscaping	Low to moderate (Moderate for covered stockpile)
	5. Direct contact with construction materials	Construction products including buried concrete and plastic	Low to moderate (Moderate for covered stockpile)
	6. Leaching	Controlled waters	Low
Asbestos fibres in fragments of broken **cement sheet** at surface on road in south-east	2. Inhalation of fibres released during disturbance of materials	Construction workers	Moderate to high
		End users	Moderate
Localised hydrocarbon plumes associated with **former tanks** in west of site	1. Direct and indirect ingestion 2. Inhalation of contaminated particles / dust/ vapours 3. Dermal contact	End users	Low to moderate
		Construction workers	Moderate
	4. Plant uptake	Gardens and landscaping	Low to moderate
	5. Direct contact with construction materials	Construction products including buried concrete and plastic	Moderate to high
	6. Leaching	Controlled waters	Low to moderate
Generation of hazardous gasses in made ground soils both on site and offsite	7. Migration through permeable soils and accumulation in confined spaces	End users (explosion/ asphyxiation)	Low to moderate
		Construction workers (asphyxiation)	Low to moderate
		Built Environment (explosion)	Low to moderate

NOTES

REVISION		BY	DATE
0	For Information	MF	15/12/20
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

SIRIUS GEOTECHNICAL LTD
Russel House,
Mill Road,
Langley Moor,
Durham DH7 8HJ
www.thesiriusgroup.com
TEL: 0191 378 9972
FAX: 0191 378 1537

CLIENT

Gleeson Developments Ltd.

SITE

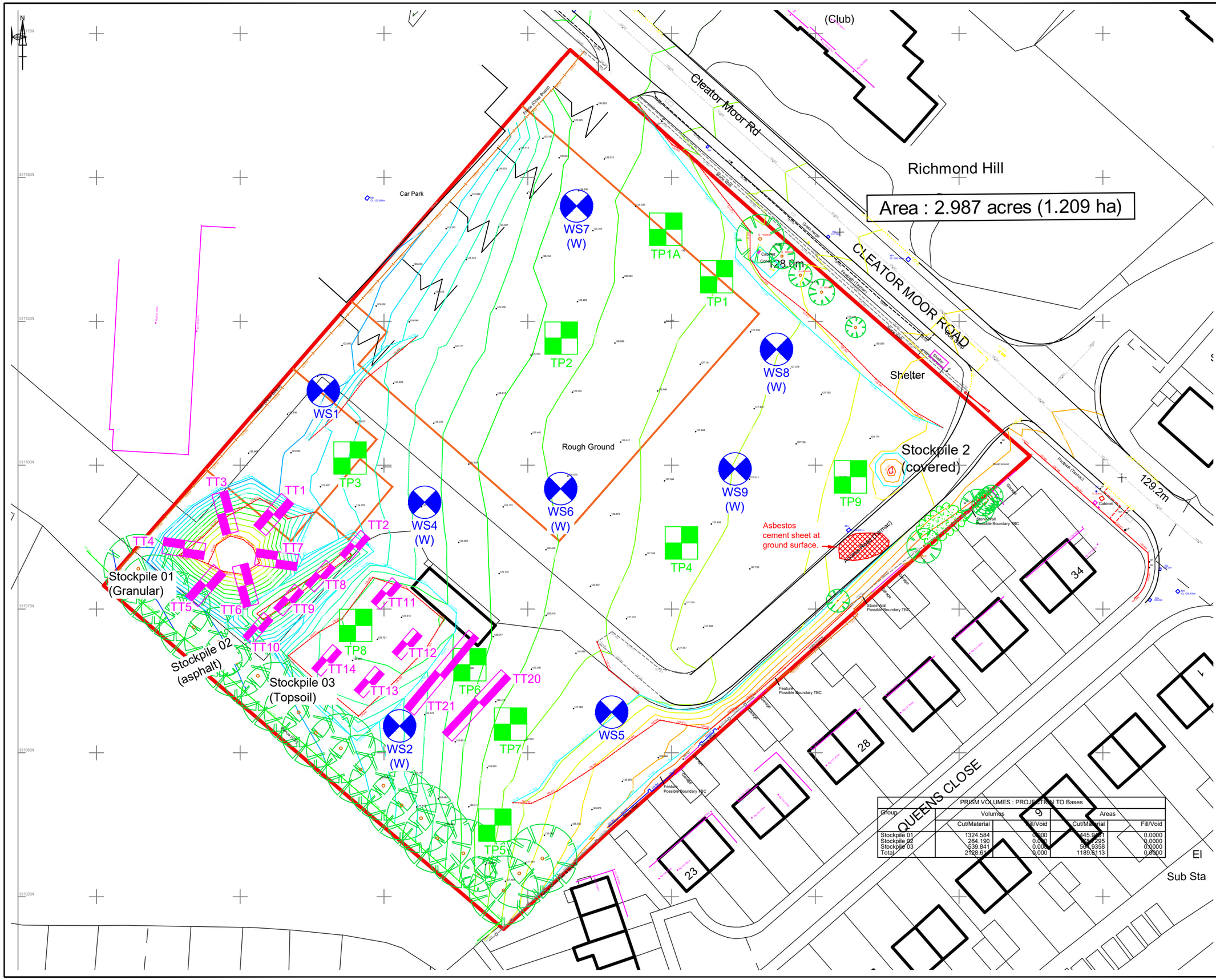
Cleator Moor Road,
Whitehaven,
Cumbria

DRAWING TITLE

Preliminary Conceptual Site Model

DRAWING NO.	REVISION NO.
C8049/02	0
DRAWN BY: MF	APPROVED BY: APC

DATE	SCALE	PAPER SIZE
December 2020	NTS	A3



Group	PRISM VOLUMES : PROJECTION TO Bases			
	Volumes		Areas	
	Cut/Material	Fill/Void	Cut/Material	Fill/Void
Stockpile 01	1324.584	0.000	445.9681	0.0000
Stockpile 02	264.190	0.000	679.1295	0.0000
Stockpile 03	539.841	0.000	564.9358	0.0000
Total	2128.615	0.000	1689.6113	0.0000

NOTES

- Site Boundary
- Trial Pit
- Window Sample Borehole (with Well)
- Trial Trench
- Former Building Footprint

REVISION		BY	DATE
0	For Information	MF	14/12/20
A	Additional stockpile sampling	APC	15/01/21
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

SIRIUS GEOTECHNICAL LTD
Russel House,
Mill Road,
Langley Moor,
Durham DH7 8HJ
www.thesiriusgroup.com
TEL: 0191 378 9972
FAX: 0191 378 1537

CLIENT

Gleeson Developments Ltd

SITE

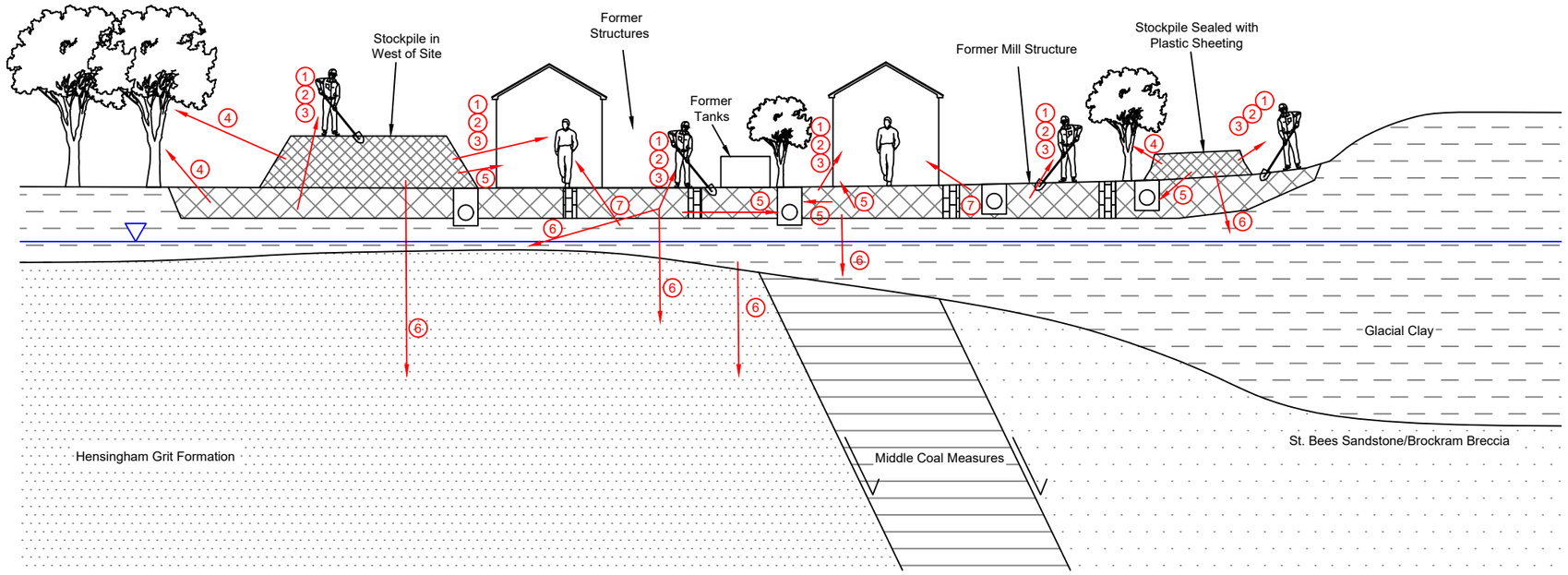
Cleator Moor Road, Whitehaven, Cumbria

DRAWING TITLE

Exploratory Hole Location Plan

DRAWING NO.	REVISION NO.
C8049/03	0
DRAWN BY: MF/DG	APPROVED BY: APC

DATE	SCALE	PAPER SIZE
December 2020	NTS	A3



Contamination Source	Contamination Pathways	Potential Receptors	Likelihood of Significant Pollutant Linkage
High (alkaline) pH values in general **made ground** across site.	1. Direct and indirect ingestion 2. Inhalation of contaminated particles / dust/ vapours 3. Dermal contact	End users	Moderate
		Construction workers	Moderate
	4. Plant uptake	Gardens and landscaping	Low
	5. Direct contact with construction materials	Construction products including buried concrete and plastic	Low
	6. Leaching	Controlled waters – rivers and groundwater	Low
High pH values and asbestos fibres within granular material in Stockpile 1	1. Direct and indirect ingestion 2. Inhalation of contaminated particles / dust/ vapours 3. Dermal contact	End users	Low to moderate
		Construction workers	Low to moderate
	4. Plant uptake	Gardens and landscaping	Low
	5. Direct contact with construction materials	Construction products including buried concrete and plastic	Low
	6. Leaching	Controlled waters	Low
PAHs and asbestos in asphalt within Stockpile 2	1. Direct and indirect ingestion 2. Inhalation of contaminated particles / dust/ vapours 3. Dermal contact	End users	Moderate
		Construction workers	Moderate
	4. Plant uptake	Gardens and landscaping	Low
	5. Direct contact with construction materials	Construction products including buried concrete and plastic	Moderate
	6. Leaching	Controlled waters	Low to moderate
Metals, PAHs, organic and inorganic contaminants including asbestos in made ground within topsoil in Stockpile 3	1. Direct and indirect ingestion 2. Inhalation of contaminated particles / dust/ vapours 3. Dermal contact	End users	Low
		Construction workers	Low
	4. Plant uptake	Gardens and landscaping	Low
	5. Direct contact with construction materials	Construction products including buried concrete and plastic	Low
	6. Leaching	Controlled waters	Low
High pH values in material in unknown material in Covered Stockpile	1. Direct and indirect ingestion 2. Inhalation of contaminated particles / dust/ vapours 3. Dermal contact	End users	Moderate
		Construction workers	Moderate
	4. Plant uptake	Gardens and landscaping	Low
	5. Direct contact with construction materials	Construction products including buried concrete and plastic	Low
	6. Leaching	Controlled waters	Low
Asbestos fibres in fragments of broken cement sheet at surface on road in south-east	2. Inhalation of fibres released during disturbance of materials	Construction workers	Low
		End users	Low
Localised hydrocarbon impacted soils at shallow depth in west of site	1. Direct and indirect ingestion 2. Inhalation of contaminated particles / dust/ vapours 3. Dermal contact	End users	Low
		Construction workers	Low
	4. Plant uptake	Gardens and landscaping	Low
	5. Direct contact with construction materials	Construction products including buried concrete and plastic	Low
	6. Leaching	Controlled waters	Low
Generation of hazardous gasses in made ground soils both on site and offsite	7. Migration through permeable soils and accumulation in confined spaces	End users (explosion/ asphyxiation)	Low to moderate
		Construction workers (asphyxiation)	Low to moderate
		Built Environment (explosion)	Low to moderate

NOTES

REVISION		BY	DATE
0	For Information	MF	02/02/21
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

SIRIUS GEOTECHNICAL LTD
Russel House,
Mill Road,
Langley Moor,
Durham DH7 8HJ
www.thesiriusgroup.com
TEL: 0191 378 9972
FAX: 0191 378 1537

CLIENT

Gleeson Developments Ltd.

SITE

Cleator Moor Road,
Whitehaven,
Cumbria

DRAWING TITLE

Revised Conceptual Site Model

DRAWING NO.	REVISION NO.
C8049/04	0
DRAWN BY: MF	APPROVED BY: APC

DATE	SCALE	PAPER SIZE
February 2021	NTS	A3

APPENDIX B

LIG ENVIROCHECK REPORT

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
180465108_1_1

Customer Reference:
17526/C8049/DG

National Grid Reference:
299150, 517100

Slice:
A

Site Area (Ha):
1.31

Search Buffer (m):
1000

Site Details:

Cleator Moor Road
Whitehaven

Client Details:

S Howson
Sirius Geotechnical Ltd
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

Contents

Report Section	Page Number
Summary	-
Agency & Hydrological	1
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Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.
In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Contents

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 3			3	9
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 6		1		
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 6		Yes		
Pollution Incidents to Controlled Waters	pg 6			4	10
Prosecutions Relating to Authorised Processes	pg 8				1
Registered Radioactive Substances	pg 8				14
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register	pg 11				1
Water Abstractions	pg 11				(*3)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 12	Yes	n/a	n/a	n/a
Drift Deposits	pg 12	1	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 12	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 12	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 12			9	48

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
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Historical Landfill Sites	pg 19			2	1
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 19	2	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Registered Landfill Sites	pg 20			1	1
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites	pg 20				1
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 21	Yes	n/a	n/a	n/a
BGS Recorded Mineral Sites	pg 21		2	1	7
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas	pg 22	Yes	n/a	n/a	n/a
Mining Instability	pg 22	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 22	Yes	Yes	n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 23	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 23		Yes	n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 23	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 23	Yes		n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 23	Yes		n/a	n/a
Radon Potential - Radon Affected Areas	pg 23	Yes	n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
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Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (W)	0	1	299100 517098
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (SW)	0	1	299154 517098
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SE (E)	0	1	299200 517098
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (W)	0	1	299150 517098
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SE (SE)	15	1	299200 517050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (N)	24	1	299150 517200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (W)	25	1	299050 517100
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (SW)	42	1	299050 517050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (W)	81	1	299000 517050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (SW)	112	1	299000 517000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (NW)	126	1	299050 517250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NW (N)	134	1	299100 517300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NW (NW)	166	1	298950 517200
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (NW)	197	1	299000 517300
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (SW)	220	1	298950 516900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (NW)	234	1	298950 517300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (N)	246	1	299050 517400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (NW)	271	1	299000 517400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A12SE (W)	272	1	298800 517098
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SW (N)	292	1	299050 517450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (W)	294	1	298800 517200
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SE (SE)	301	1	299350 516800

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (NW)	302	1	298950 517400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (NW)	317	1	298800 517250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (W)	322	1	298750 517100
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NW (S)	324	1	299100 516700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A12SE (W)	324	1	298750 517050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (NW)	341	1	298850 517350
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (SE)	371	1	299400 516750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SE (SW)	372	1	298750 516900
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (NW)	373	1	298850 517400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (W)	377	1	298700 517150
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12NE (NW)	386	1	298750 517300
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SW (N)	423	1	299154 517600
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (SE)	442	1	299450 516700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SE (W)	461	1	298650 516900
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NW (S)	471	1	299150 516550
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SE (N)	475	1	299200 517650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A12SE (W)	480	1	298600 517000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SE (SW)	484	1	298650 516850

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Discharge Consents** Operator: United Utilities Water Plc (?) Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Winston Drive Hensingham Cso 02632 Winston Drive, ., Whitehaven, Cumbria, Ca28 8rb Authority: Environment Agency, North West Region Catchment Area: Ehen Reference: 017480428 Permit Version: 1 Effective Date: 7th March 2005 Issued Date: 7th March 2005 Revocation Date: 7th May 2018 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Snebra Beck **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A12SE (W)	456	2	298640 516940
1	**Discharge Consents** Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Winston Drive Hensingham Cso 02632 Winston Drive, ., Whitehaven, Cumbria, Ca28 8rb Authority: Environment Agency, North West Region Catchment Area: Ehen Reference: 01COP0005 Permit Version: 1 Effective Date: 1st January 1995 Issued Date: 1st January 1995 Revocation Date: 6th March 2005 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Snebra Ghyll **Status: Consent revoked or revised: New Consent issued (Section 37(1))** Positional Accuracy: Located by supplier to within 100m	A12SE (W)	456	2	298640 516940
1	**Discharge Consents** Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Winston Drive Hensingham Cso 02632 Winston Drive, ., Whitehaven, Cumbria, Ca28 8rb Authority: Environment Agency, North West Region Catchment Area: Ehen Reference: 017480428 Permit Version: 2 Effective Date: 8th May 2018 Issued Date: 8th May 2018 Revocation Date: Not Supplied Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Snebra Beck **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A12SE (W)	469	2	298630 516930
2	**Discharge Consents** Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Ribton Moorside Cso 130 Main Street, Hensingham, Whitehaven, Cumbria, Ca28 8px Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 017480288 Permit Version: 3 Effective Date: 1st April 2018 Issued Date: 12th March 2018 Revocation Date: Not Supplied Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Culverted Sec Of Snebra Beck **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A12SE (W)	567	2	298540 516890

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	**Discharge Consents** Operator: United Utilities Water Plc (?) Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Ribton Moorside Cso 130 Main Street, Hensingham, Whitehaven, Cumbria, Ca28 8px Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 017480288 Permit Version: 2 Effective Date: 4th March 2005 Issued Date: 4th March 2005 Revocation Date: 31st March 2018 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Snebra Beck **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A12SE (W)	567	2	298540 516890
2	**Discharge Consents** Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Ribton Moorside Cso 130 Main Street, Hensingham, Whitehaven, Cumbria, Ca28 8px Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 01COP0085 Permit Version: 1 Effective Date: 1st January 1995 Issued Date: Not Supplied Revocation Date: 1st January 1995 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Snebra Beck **Status: Consent revoked or revised: New Consent issued (Section 37(1))** Positional Accuracy: Located by supplier to within 100m	A12SE (W)	580	2	298530 516880
2	**Discharge Consents** Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Ribton Moorside Cso 130 Main Street, Hensingham, Whitehaven, Cumbria, Ca28 8px Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 017480288 Permit Version: 1 Effective Date: 30th September 1994 Issued Date: Not Supplied Revocation Date: 3rd March 2005 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Snebra Beck **Status: Consent revoked or revised: New Consent issued (Section 37(1))** Positional Accuracy: Located by supplier to within 100m	A12SE (W)	582	2	298530 516875
3	**Discharge Consents** Operator: Copeland Athletic Stadium Trust Property Type: SPORT, AMUSEMENT+RECREATION/GOLF CLUB/GYM/THEME PK/SPA Location: Copeland Athletic Stadium Swo, Hensingham, Whitehaven, Cumbria Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 017490151 Permit Version: 1 Effective Date: 1st October 1994 Issued Date: Not Supplied Revocation Date: 1st October 1994 Discharge Type: Discharge Of Other Matter-Surface Water Discharge Environment: Freshwater Stream/River Receiving Water: Trib River Keekle **Status: Authorisation revoked** Positional Accuracy: Located by supplier to within 100m	A8SE (S)	747	2	299430 516330

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Discharge Consents** Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Snebra Whitehaven Cso 023b2 145 Whinlatter Road, ., Whitehaven, Cumbria, Ca28 8dy Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 01COP0039 Permit Version: 1 Effective Date: 1st January 1995 Issued Date: Not Supplied Revocation Date: 29th March 2004 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Snebra Ghyll **Status: Authorisation revoked** Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	841	2	298310 516730
5	**Discharge Consents** Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Snebra Whitehaven Cso 023b2 145 Whinlatter Road, ., Whitehaven, Cumbria, Ca28 8dy Authority: Environment Agency, North West Region Catchment Area: Ehen Reference: 01cop0039 Permit Version: 3 Effective Date: 8th May 2018 Issued Date: 8th May 2018 Revocation Date: Not Supplied Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Trib Of Pow Beck **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	944	2	298210 516700
5	**Discharge Consents** Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Snebra Whitehaven Cso 023b2 145 Whinlatter Road, ., Whitehaven, Cumbria, Ca28 8dy Authority: Environment Agency, North West Region Catchment Area: Ehen Reference: 01cop0039 Permit Version: 2 Effective Date: 30th March 2004 Issued Date: 30th March 2004 Revocation Date: 7th May 2018 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge Environment: Freshwater Stream/River Receiving Water: Trib Of Pow Beck **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	944	2	298210 516700
6	**Discharge Consents** Operator: Malcolm Bentley Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Fair View High Wreah, Hensingham, Whitehaven, Cumbria, Ca28 8xx Authority: Environment Agency, North West Region Catchment Area: Ehen Reference: 017590429 Permit Version: 1 Effective Date: 12th May 2005 Issued Date: 12th May 2005 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Keekle **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A15NW (E)	986	2	300220 517190

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
7	**Local Authority Pollution Prevention and Controls** Name: Mason Auto Repairs Location: Moresby Road, Hensingham, WHITEHAVEN, Cumbria, CA28 8TU Authority: Copeland Borough Council, Environmental Health Department Permit Reference: CBC/95/004 Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG1/1Waste oil burners, less than 0.4MW net rated thermal input **Status: Authorisation revoked** Positional Accuracy: Manually positioned to the road within the address or location	A13NE (N)	204	3	299190 517377
	Nearest Surface Water Feature	A13NE (E)	242	-	299469 517173
8	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Oils - Diesel (Including Agricultural) Note: Pow Beck Tributary Incident Date: 11th February 1993 Incident Reference: 93120015 Catchment Area: Irish Sea Coastal Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NE (W)	272	2	298800 517100
9	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Cumbria Authority: Environment Agency, North West Region Pollutant: Organic Wastes: Other Note: Priest Gill Tributary; Fish Proccess Effluent Incident Date: 17th September 1996 Incident Reference: 96210075 Catchment Area: Ehen Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18SE (NE)	407	2	299400 517500
10	**Pollution Incidents to Controlled Waters** Property Type: Private Sewage (Non-PLC): Sewerage Systems Location: Cumbria Authority: Environment Agency, North West Region Pollutant: Storm Sewage Note: Snebri Beck; Fish Waste Incident Date: 17th September 1996 Incident Reference: 96120104 Catchment Area: Irish Sea Coastal Receiving Water: Not Given Cause of Incident: Miscellaneous/Other Pollution Type Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12SE (SW)	416	2	298700 516900
11	**Pollution Incidents to Controlled Waters** Property Type: Domestic/Residential Location: HENSINGHAM Authority: Environment Agency, North West Region Pollutant: Sewage - Wrong Connection Note: Stream Polluted With Sewage; Unnamed Tributary Of Snebra Beck; Probable Wrong Connection Incident Date: 18th April 1997 Incident Reference: 97120037 Catchment Area: Irish Sea Coastal Receiving Water: Freshwater Stream/River Cause of Incident: Wrong Connection Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12SE (W)	480	2	298600 517000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
12	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Cumbria Authority: Environment Agency, North West Region Pollutant: Not Given Note: None Pollution Found Incident Date: 6th April 1992 Incident Reference: 92120030 Catchment Area: Irish Sea Coastal Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14SW (E)	505	2	299700 516900
13	**Pollution Incidents to Controlled Waters** Property Type: Private Sewage (Non-PLC): Sewerage Systems Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Unknown Sewage Note: Snebro Beck Incident Date: 21st April 1993 Incident Reference: 93120052 Catchment Area: Irish Sea Coastal Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12SE (W)	507	2	298600 516900
14	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Oils - Unknown Note: Pow Beck Tributary Incident Date: 3rd June 1991 Incident Reference: 91120047 Catchment Area: Irish Sea Coastal Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12SE (SW)	552	2	298600 516800
15	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Cumbria Authority: Environment Agency, North West Region Pollutant: Organic Wastes: Other Note: Priest Beck; Anoxic Sediment Incident Date: 19th September 1996 Incident Reference: 96210073 Catchment Area: Ehen Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A19SW (NE)	628	2	299500 517700
16	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Cumbria Authority: Environment Agency, North West Region Pollutant: Not Given Note: Keekle Tributary; None Pollution Found Incident Date: 13th May 1993 Incident Reference: 93210036 Catchment Area: Ehen Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A9SW (SE)	769	2	299600 516400
17	**Pollution Incidents to Controlled Waters** Property Type: Private Sewage (Non-PLC): Sewerage Systems Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Storm Sewage Note: Snebro Beck; Sewage Debris Incident Date: 24th June 1994 Incident Reference: 94120063 Catchment Area: Irish Sea Coastal Receiving Water: Not Given Cause of Incident: Miscellaneous/Other Pollution Type Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12SW (W)	823	2	298300 516800

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
18	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Oils - Other Fuel Oil Note: Keekle Tributary Incident Date: 25th March 1993 Incident Reference: 93210024 Catchment Area: Ehen Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A9SW (SE)	852	2	299600 516300
19	**Pollution Incidents to Controlled Waters** Property Type: Connection To Surface Drains Location: Cumbria Authority: Environment Agency, North West Region Pollutant: Sewage Debris/Litter Note: Un Named Stream; Domestic Sewage Incident Date: 20th June 1996 Incident Reference: 96120066 Catchment Area: Irish Sea Coastal Receiving Water: Not Given Cause of Incident: Wrong Connection Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	875	2	298300 517500
20	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Miscellaneous - Inert Suspended Solids Note: River Ehen Incident Date: 4th August 1994 Incident Reference: 94210081 Catchment Area: Ehen Receiving Water: Not Given Cause of Incident: High Flow Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14SE (E)	886	2	300100 516900
21	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 11th March 1992 Incident Reference: 92120019 Catchment Area: Irish Sea Coastal Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7SE (SW)	986	2	298600 516200
22	**Prosecutions Relating to Authorised Processes** Location: West Cumberland Hospital, Homewood, WHITEHAVEN, Cumbria, CA28 8JG Prosecution Text: Ref AR1213, Transfer of waste off site without authorisation. Prosecution Act: RSA60 Hearing Date: 30th March 1994 Verdict: Guilty Fine: 1 Costs: 1000 Positional Accuracy: Manually positioned to the address or location	A8SW (S)	930	2	298940 516115
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital, Homewood, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: AV1700 Dated: 28th May 1997 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Minor variation to authorisation under RSA **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Unknown	A8SW (S)	924	2	298945 516120

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital, Homewood, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: AJ0566 Dated: 16th July 1993 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Minor variation to authorisation under RSA **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Unknown	A8SW (S)	925	2	298940 516120
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: Homewood, Hensingham, Whitehaven, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: Bw5705 Dated: 1st December 2003 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Minor variation to authorisation under RSA **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Automatically positioned to the address	A8SW (S)	929	2	298940 516115
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: Homewood, Hensingham, Whitehaven, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: Bl4931 Dated: 22nd August 2001 Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Description: Minor variation to a registration under the Act of an open source which is also the subject of an authorisation **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Automatically positioned to the address	A8SW (S)	929	2	298940 516115
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: Homewood, Hensingham, Whitehaven, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: Bl4966 Dated: 22nd August 2001 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Minor variation to authorisation under RSA **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Automatically positioned to the address	A8SW (S)	929	2	298940 516115
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital,,, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: CD1967 Dated: 23rd December 2008 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Minor variation to authorisation under RSA **Status: Application has been authorised and any conditions apply to the operator** Positional Accuracy: Automatically positioned to the address	A8SW (S)	930	2	298940 516115
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital,,, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: CC7650 Dated: 18th August 2008 Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Description: Substantial variation to a registration under the Act of an open source which is also the subject of an authorisation **Status: Application has been authorised and any conditions apply to the operator** Positional Accuracy: Manually positioned to the address or location	A8SW (S)	930	2	298939 516114

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: Homewood, Hensingham, Whitehaven, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: CA5486 Dated: 29th June 2006 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Minor variation to authorisation under RSA **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Automatically positioned to the address	A8SW (S)	930	2	298940 516115
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital,,, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: Bz7364 Dated: 22nd November 2005 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Minor variation to authorisation under RSA **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Manually positioned to the address or location	A8SW (S)	930	2	298939 516114
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital,,, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: Bz7372 Dated: 22nd November 2005 Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Description: Minor variation to a registration under the Act of an open source which is also the subject of an authorisation **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Manually positioned to the address or location	A8SW (S)	930	2	298940 516114
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: AU6498 Dated: 27th October 1996 Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Description: Minor variation to a registration under the Act of an open source which is also the subject of an authorisation **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Unknown	A8SW (S)	931	2	298935 516115
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital, Homewood, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: AS5911 Dated: 13th November 1995 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Initial variation to an authorisation under RSA **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Unknown	A8SW (S)	934	2	298940 516110
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital, Homewood, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: AR1213 Dated: 5th May 1995 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Minor variation to authorisation under RSA **Status: Authorisation has expired** Positional Accuracy: Unknown	A8SW (S)	936	2	298935 516110

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
23	**Registered Radioactive Substances** Name: North Cumbria University Hospitals Nhs Trust Location: West Cumberland Hospital, Homewood, WHITEHAVEN, Cumbria, CA28 8JG Authority: Environment Agency, North West Region Permit Reference: AG6761 Dated: 2nd March 1993 Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Description: Authorisation under RSA **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Automatically positioned to the address	A8SW (S)	939	2	298940 516105
24	**Substantiated Pollution Incident Register** Authority: Environment Agency - North West Region, North Area Incident Date: 26th July 2016 Incident Reference: 1456565 Water Impact: Category 4 - No Impact Air Impact: Category 4 - No Impact Land Impact: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 10m Pollutant: General Biodegradable Materials And Wastes: Vegetable Cuttings And Deposits Pollutant: Inert : Construction / Demolition Material	A18NW (N)	951	2	298967 518109
	Water Abstractions Operator: Keir Mining Licence Number: 2774004005 Permit Version: Not Supplied Location: Priestgill Beck, Hensingham, WHITEHAVEN, Cumbria Authority: Environment Agency, North West Region Abstraction: Industrial: Coal Washing Abstraction Type: Not Supplied Source: Surface Daily Rate (m3): 327 Yearly Rate (m3): 25639 Details: Additional Purpose: Coal washing; Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A19NW (NE)	1047	2	299800 518000
	Water Abstractions Operator: Keir Construction Limited Licence Number: 2774004006 Permit Version: Not Supplied Location: Borehole, Keekle Open Cast Coal Site, Hensingham, WHITEHAVEN, Cumbria Authority: Environment Agency, North West Region Abstraction: Industrial: Coal Washing Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 32 Yearly Rate (m3): 11365 Details: Additional Purpose: Coal washing; Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A19NE (NE)	1111	2	299900 518000
	Water Abstractions Operator: Whitehaven Brick & Tile Co Ltd Licence Number: 2774002003 Permit Version: Not Supplied Location: Inland Water At Fire Brick Works, WHITEHAVEN, Cumbria Authority: Environment Agency, North West Region Abstraction: Manufacturing Abstraction Type: Not Supplied Source: Surface Daily Rate (m3): 1 Yearly Rate (m3): 455 Details: Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(W)	1813	2	297300 516700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise Map Sheet: Sheet 6 South West Cumbria Scale: 1:100,000	A13SW (SW)	0	2	299154 517098
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise Map Sheet: Sheet 6 South West Cumbria Scale: 1:100,000	A13NE (NE)	0	2	299201 517118
	Drift Deposits Drift Deposit: Low permeability drift deposits occuring at the surface and overlying Major and Minor Aquifers are head, clay-with-flints, brickearth, peat, river terrace deposits and marine and estuarine alluvium Map Sheet: Sheet 6 South West Cumbria Scale: 1:100,000	A13SW (SW)	0	2	299154 517098
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	A13NE (E)	0	1	299204 517118
	Bedrock Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A13SW (SW)	0	1	299154 517098
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - Undifferentiated	A13SW (SW)	0	1	299154 517098
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
25	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 233.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12NE (W)	293	4	298817 517232
26	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 70.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12NE (W)	293	4	298817 517232
27	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 103.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A13NW (NW)	314	4	298840 517298
28	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 57.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SE (W)	319	4	298758 517029

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
29	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 48.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SE (W)	373	4	298702 517040
30	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 75.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SE (W)	406	4	298674 517002
31	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 42.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SE (W)	455	4	298642 516938
32	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 282.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A9NW (SE)	485	4	299544 516726
33	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 92.3 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SE (W)	496	4	298607 516915
34	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 65.7 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SE (SW)	562	4	298591 516795
35	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 227.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Snebra Beck Catchment Name: Ehen-Calder Primacy: 1	A12SE (W)	586	4	298519 516890
36	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A8NE (SE)	601	4	299459 516508
37	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 75.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A8NE (SE)	604	4	299463 516507

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
38	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 494.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A19SW (NE)	607	4	299565 517623
39	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 65.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SE (SW)	612	4	298528 516805
40	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 51.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SW (SW)	672	4	298466 516796
41	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A9NW (SE)	678	4	299509 516448
42	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 156.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A9NW (SE)	684	4	299513 516444
43	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 176.5 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A14NE (E)	684	4	299884 517325
44	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 623.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A14SE (SE)	708	4	299871 516786
45	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 82.0 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SW (W)	716	4	298417 516795
46	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 117.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A8SE (S)	763	4	299446 516320

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
47	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 69.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A18NE (N)	772	4	299243 517943
48	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 12.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SW (W)	786	4	298311 516889
49	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 18.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A12SW (W)	793	4	298307 516878
50	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 53.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A7NW (SW)	794	4	298372 516712
51	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 12.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A7NW (SW)	798	4	298348 516752
52	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 168.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Snebra Beck Catchment Name: Ehen-Calder Primacy: 1	A12SW (W)	801	4	298303 516862
53	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 79.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A17SW (NW)	803	4	298437 517580
54	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 325.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A7NW (SW)	810	4	298336 516748
55	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 6.7 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A9SW (SE)	838	4	299600 516317

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
56	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 376.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A14NE (E)	840	4	300012 517426
57	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 32.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A17SW (NW)	840	4	298368 517546
58	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 28.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A18NE (N)	841	4	299254 518012
59	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 18.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A9SW (SE)	844	4	299606 516313
60	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 42.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A17SW (NW)	847	4	298345 517523
61	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 401.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A9SW (SE)	848	4	299620 516318
62	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 68.9 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A17SW (NW)	853	4	298320 517490
63	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 169.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A14NE (E)	859	4	300038 517412
64	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 26.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A18NE (N)	868	4	299249 518040

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
65	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A17SW (W)	870	4	298275 517438
66	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 1.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A17SW (W)	873	4	298273 517439
67	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 187.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A19NW (NE)	874	4	299661 517888
68	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 149.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A17SW (W)	874	4	298272 517438
69	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 41.2 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A18NE (N)	887	4	299259 518058
70	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 60.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 2	A18NE (N)	920	4	299367 518072
71	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 12.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A18NE (N)	928	4	299267 518098
72	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 50.8 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A14NE (E)	934	4	300152 517287
73	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 40.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A18NE (N)	939	4	299274 518108

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
74	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 311.5 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Snebra Beck Catchment Name: Ehen-Calder Primacy: 1	A12SW (W)	949	4	298173 516780
75	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 321.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A15NW (E)	957	4	300183 517247
76	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 20.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A23SE (N)	965	4	299308 518129
77	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 148.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A19NW (NE)	972	4	299609 518035
78	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 230.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A23SE (N)	976	4	299326 518137
79	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 40.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A17SW (NW)	979	4	298287 517672
80	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 62.1 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A17SW (NW)	991	4	298255 517648
81	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 110.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ehen-Calder Primacy: 1	A19NW (NE)	998	4	299660 518036

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
82	**BGS Recorded Landfill Sites** Site Name: Overend Tip Location: Hensingham, WHITEHAVEN, Cumbria Authority: British Geological Survey, National Geoscience Information Service Ground Water: Information not available Surface Water: Information not available Geology: N/A Positional Accuracy: Positioned by the supplier Boundary Accuracy: Good	A8NW (S)	358	-	299004 516693
83	**Historical Landfill Sites** Licence Holder: Copeland Borough Council Location: Overend Road, Overend, Hensingham, Whitehaven, Cumbria Name: Overend Quarry Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD07856 First Input Date: 31st December 1942 Last Input Date: 31st December 1988 Specified Waste Type: Deposited Waste included Inert Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 0900/0173 BGS Ref: Not Supplied Other Ref: 22	A8NW (S)	357	2	299001 516695
84	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Hensingham, Whitehaven, Cumbria Name: Overend Tip Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD32010 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste Type: Not Supplied EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: Not Supplied BGS Ref: 25 Other Ref: Not Supplied	A8NW (S)	358	2	299005 516693
85	**Historical Landfill Sites** Licence Holder: Eden Construction Limited Location: Adjacent to Snebra Ghyll, Hensingham, Whitehaven, Cumbria Name: Land off Hensingham Road Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD07855 First Input Date: 6th July 1991 Last Input Date: 7th October 1992 Specified Waste Type: Deposited Waste included Inert Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 0900/0008 BGS Ref: Not Supplied Other Ref: 153	A12SE (W)	585	2	298507 516936
	Local Authority Landfill Coverage Name: Copeland Borough Council - Has supplied landfill data		0	3	299154 517098
	Local Authority Landfill Coverage Name: Cumbria County Council - Had landfill data but passed it to the relevant environment agency		0	5	299154 517098

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
86	**Registered Landfill Sites** Licence Holder: Copeland B.C Licence Reference: 22 Site Location: Overend Quarry, Overend Road, Whitehaven, Cumbria Licence Easting: Not Supplied Licence Northing: Not Supplied Operator Location: Town Hall, Whitehaven, Cumbria Authority: Environment Agency - North West Region, North Area Site Category: Landfill Max Input Rate: Undefined Waste Source Restrictions: No known restriction on source of waste Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 31st August 1977 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Positioned by the supplier Boundary Accuracy: Moderate Authorised Waste: Gulley Emptyings Road Sweepings/Litter	A8NW (S)	423	2	299130 516599
87	**Registered Landfill Sites** Licence Holder: Eden Construction Ltd Licence Reference: 153/M1 Site Location: Hensingham Road, Snebra Ghyll, Hensingham, Whitehaven, Cumbria Licence Easting: 298450 Licence Northing: 516950 Operator Location: Durranhill, CARLISLE, Cumbria, CA1 3NR Authority: Environment Agency - North West Region, North Area Site Category: Landfill Max Input Rate: Large (Equal to or greater than 75,000 and less than 250,000 tonnes per year) Waste Source Restrictions: Waste produced/controlled by licence holder Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st June 1991 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste: H'Core,Concrete,Brick,Slate,Glass,Cera Inert Mat'L Consisting Of Soil,Sand,Clay,Stone Prohibited Waste: Animal Flesh Clinical - As In Coll/Disp.Regs Of '88 Difficult Wastes As In Doe Wmp No.26 Foodstuffs Leachate Forming Mat'Ls Incl. Liquid Wastes Metal Objects Paper/Cardboard Waste Plasterboard/Plaster Plastic Objects Sawdust Special Wastes Textiles Vegetable Matter Wood/Timber	A12SW (W)	636	2	298450 516950
88	**Registered Waste Treatment or Disposal Sites** Licence Holder: West Cumbria Health Care Nhs Trust Licence Reference: 232 Site Location: West Cumberland Hospital, WHITEHAVEN, Cumbria, CA28 9JG Operator Location: As Site Address Authority: Environment Agency - North West Region, North Area Site Category: Storage Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Site exempt from licenceExempt Dated: 1st October 1993 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Quality: Not Supplied Authorised Waste: Clin.Waste Grps Aa,B,C,B,C,D,E Prohibited Waste: Animal Carcasses From Vets/Sim'R Prems Waste N.O.S.	A8SW (S)	953	2	298900 516100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Yoredale Group	A13SW (SW)	0	1	299154 517098
89	**BGS Recorded Mineral Sites** Site Name: Bedlam Gill Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 98351 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Hensingham Grit Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A13NW (NW)	200	1	299000 517305
90	**BGS Recorded Mineral Sites** Site Name: Overend Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 98345 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Hensingham Grit Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A13SW (S)	203	1	299115 516820
91	**BGS Recorded Mineral Sites** Site Name: Overend Quarry Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 16707 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: First Limestone (Cumbria) Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A8NW (S)	439	1	298980 516615
92	**BGS Recorded Mineral Sites** Site Name: Hensingham Common Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 98352 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Whitehaven Sandstone Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A18SE (NE)	515	1	299460 517590
93	**BGS Recorded Mineral Sites** Site Name: Overend Quarry Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 98346 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Second Limestone (Cumbria) Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A8NE (S)	601	1	299225 516425

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
94	**BGS Recorded Mineral Sites** Site Name: Overend Quarry Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 16708 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: First Limestone (Cumbria) Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A8SW (S)	632	1	299120 516390
95	**BGS Recorded Mineral Sites** Site Name: Overend Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 98350 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Eskett Limestone Formation Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A8SE (SE)	703	1	299475 516400
96	**BGS Recorded Mineral Sites** Site Name: Litt'S Pond Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 98347 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Second Limestone (Cumbria) Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A8SE (S)	843	1	299425 516225
97	**BGS Recorded Mineral Sites** Site Name: Overend Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 98348 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: First Limestone (Cumbria) Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A8SE (S)	845	1	299345 516200
98	**BGS Recorded Mineral Sites** Site Name: Netherend Location: Not Supplied Source: British Geological Survey, National Geoscience Information Service Reference: 98349 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: First Limestone (Cumbria) Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A9SW (SE)	931	1	299555 516185
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A13SW (SW)	0	6	299154 517098
	Mining Instability Mining Evidence: Inconclusive Coal Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A13SW (SW)	0	-	299154 517098
	Non Coal Mining Areas of Great Britain Risk: Highly Unlikely Source: British Geological Survey, National Geoscience Information Service	A13NE (E)	0	1	299161 517101

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Non Coal Mining Areas of Great Britain Risk: Highly Unlikely Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	1	1	299179 517050
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	299154 517098
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	299154 517098
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	299154 517098
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	130	1	299239 516930
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	202	1	299233 516839
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	299154 517098
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	234	1	298913 517261
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	299154 517098
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	174	1	299013 517281
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	234	1	298913 517261
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	299154 517098
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	174	1	299013 517281
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	299151 517100
	Radon Potential - Radon Affected Areas Affected Area: The property is in an Intermediate probability radon area (1 to 3% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	299154 517098
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	0	1	299151 517100
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	299154 517098

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99	**Contemporary Trade Directory Entries** Name: Sekers Fabrics Ltd Location: The Silk Mill, Main Street, Hensingham, Whitehaven, Cumbria, CA28 8QT Classification: Textile Manufacturing **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	46	-	299079 517164
99	**Contemporary Trade Directory Entries** Name: Sekers Fabrics Location: The Silk Mill, Main Street, Hensingham, WHITEHAVEN, Cumbria, CA28 8QT Classification: Upholstery Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	46	-	299079 517164
100	**Contemporary Trade Directory Entries** Name: G & M Supplies Ltd Location: Ivy Mill, Main Street, Hensingham, Whitehaven, Cumbria, CA28 8TP Classification: Catering Equipment **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (W)	74	-	298998 517077
101	**Contemporary Trade Directory Entries** Name: Smurfit Kappa Location: Richmond Works, Moresby Road, Hensingham, Whitehaven, Cumbria, CA28 8TS Classification: Packaging Materials Manufacturers & Suppliers **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NE (N)	107	-	299191 517277
102	**Contemporary Trade Directory Entries** Name: Mason'S Auto Repairs Location: Moresby Road, Hensingham, Whitehaven, Cumbria, CA28 8TU Classification: Garage Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NE (NE)	205	-	299326 517299
103	**Contemporary Trade Directory Entries** Name: Haven Tyre Centre Location: Masons Yard, Moresby Road, Hensingham, Whitehaven, Cumbria, CA28 8TU Classification: Tyre Dealers **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NE (NE)	207	-	299283 517338
104	**Contemporary Trade Directory Entries** Name: Speedy Location: Sneckyeat Road Industrial Estate, Whitehaven, Cumbria, CA28 8PF Classification: Lifting Equipment **Status: Active** Positional Accuracy: Automatically positioned to the address	A8SW (S)	680	-	299028 516352
104	**Contemporary Trade Directory Entries** Name: Print Express Location: Unit 1, Sneckyeat Road Industrial Estate, Whitehaven, Cumbria, CA28 8PF Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SW (S)	718	-	299004 516317
105	**Contemporary Trade Directory Entries** Name: Irving Ironing & Laundry Services Location: Unit 3f, Sneckyeat Road Industrial Estate, Whitehaven, Cumbria, CA28 8PF Classification: Ironing & Home Laundry Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A8SW (S)	698	-	299105 516324
105	**Contemporary Trade Directory Entries** Name: Sneckyeet Garage Location: Sneckyeat Road Industrial Estate, Whitehaven, Cumbria, CA28 8PF Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SW (S)	719	-	299078 516306
105	**Contemporary Trade Directory Entries** Name: Lakeland Fluid Power Ltd Location: Unit 9a-9b, Sneckyeat Road Industrial Estate, Whitehaven, CA28 8PF Classification: Pneumatic Systems & Equipment **Status: Active** Positional Accuracy: Automatically positioned to the address	A8SW (S)	761	-	299065 516264

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
105	**Contemporary Trade Directory Entries** Name: Robson'S Bodyworks Location: Unit 2A, Sneckyeat Road Industrial Estate, Whitehaven, Cumbria, CA28 8PF Classification: Car Body Repairs **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SW (S)	763	-	299065 516263
105	**Contemporary Trade Directory Entries** Name: R S B Auto-Body Repairers & Refinishers Location: Unit 2A, Sneckyeat Road Industrial Estate, Whitehaven, Cumbria, CA28 8PF Classification: Car Body Repairs **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SW (S)	763	-	299065 516263
106	**Contemporary Trade Directory Entries** Name: A C Reid Engineering Location: Unit 6, Sneckyeat Road Industrial Estate, Whitehaven, Cumbria, CA28 8PF Classification: Precision Engineers **Status: Active** Positional Accuracy: Automatically positioned to the address	A8SW (S)	771	-	299097 516252
106	**Contemporary Trade Directory Entries** Name: A C Reid Location: Unit 6-7,Sneckyeat Rd Ind Est, Whitehaven, Cumbria, CA28 8PF Classification: Engineering Machine Services **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A8SW (S)	771	-	299096 516252
107	**Contemporary Trade Directory Entries** Name: West Cumbria Mining Location: Unit 10d, Sneckyeat Road Industrial Estate, Whitehaven, CA28 8PF Classification: Metals - Mining **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SE (S)	792	-	299178 516229
107	**Contemporary Trade Directory Entries** Name: Whiteline Tyres Ltd Location: Unit 10h, Sneckyeat Road Industrial Estate, Whitehaven, CA28 8PF Classification: Tyre Dealers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SE (S)	793	-	299178 516229
108	**Contemporary Trade Directory Entries** Name: Poly Pack Cumbria Location: Unit 7c, Sneckyeat Road Industrial Estate, Whitehaven, Cumbria, CA28 8PF Classification: Polythene & Plastic Sheeting Supplies **Status: Active** Positional Accuracy: Automatically positioned to the address	A8SW (S)	818	-	299065 516207
108	**Contemporary Trade Directory Entries** Name: Weathermaster Location: Unit 7d, Sneckyeat Road Industrial Estate, Whitehaven, Cumbria, CA28 8PF Classification: PVC-U Products - Manufacturers & Suppliers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SW (S)	824	-	299074 516200
109	**Contemporary Trade Directory Entries** Name: Ward 4 Original Site Location: Homewood, Hensingham, Whitehaven, CA28 8JG Classification: Hospitals **Status: Active** Positional Accuracy: Automatically positioned to the address	A8SW (S)	929	-	298940 516115
109	**Contemporary Trade Directory Entries** Name: West Cumberland Hospital Location: Homewood, Hensingham, Whitehaven, Cumbria, CA28 8JG Classification: Hospitals **Status: Active** Positional Accuracy: Automatically positioned to the address	A8SW (S)	929	-	298940 516115
110	**Contemporary Trade Directory Entries** Name: Elliot & Black Location: Unit 1, Red Lonning Industrial Estate, Red Lonning Ind Est, Whitehaven, Cumbria, CA28 6SJ Classification: Blinds, Awnings & Canopies **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A23SW (N)	984	-	298971 518144

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
110	**Contemporary Trade Directory Entries** Name: Lakeland Spring Soft Drinks Ltd Location: Unit 1, Red Lonning Industrial Estate, Whitehaven, Cumbria, CA28 6SJ Classification: Soft Drinks - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A23SW (N)	984	-	298971 518144

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Allerdale Borough Council - Environmental Protection	March 2015	Annual Rolling Update
Copeland Borough Council - Environmental Health Department	October 2014	Annual Rolling Update
Discharge Consents		
Environment Agency - North West Region	July 2018	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - North West Region	March 2013	As notified
Integrated Pollution Controls		
Environment Agency - North West Region	October 2008	Variable
Integrated Pollution Prevention And Control		
Environment Agency - North West Region	July 2018	Quarterly
Local Authority Integrated Pollution Prevention And Control		
Copeland Borough Council - Environmental Health Department	February 2015	Variable
Allerdale Borough Council - Environmental Protection	June 2016	Variable
Local Authority Pollution Prevention and Controls		
Copeland Borough Council - Environmental Health Department	February 2015	Annual Rolling Update
Allerdale Borough Council - Environmental Protection	June 2016	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements		
Copeland Borough Council - Environmental Health Department	February 2015	Variable
Allerdale Borough Council - Environmental Protection	June 2016	Variable
Nearest Surface Water Feature		
Ordnance Survey	September 2017	
Pollution Incidents to Controlled Waters		
Environment Agency - North West Region	January 2000	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - North West Region	March 2013	As notified
Prosecutions Relating to Controlled Waters		
Environment Agency - North West Region	March 2013	As notified
Registered Radioactive Substances		
Environment Agency - North West Region	January 2015	
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register		
Environment Agency - North West Region - North Area	July 2018	Quarterly
Water Abstractions		
Environment Agency - North West Region	July 2018	Quarterly
Water Industry Act Referrals		
Environment Agency - North West Region	October 2017	Quarterly
Groundwater Vulnerability		
Environment Agency - Head Office	April 2015	Not Applicable
Drift Deposits		
Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations		
British Geological Survey - National Geoscience Information Service	August 2015	As notified
Superficial Aquifer Designations		
British Geological Survey - National Geoscience Information Service	August 2015	As notified

Agency & Hydrological	Version	Update Cycle
Source Protection Zones Environment Agency - Head Office	January 2018	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2018	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2018	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	May 2018	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	May 2018	Quarterly
Flood Defences Environment Agency - Head Office	May 2018	Quarterly
OS Water Network Lines Ordnance Survey	May 2018	Quarterly
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	As notified
Waste	**Version**	**Update Cycle**
BGS Recorded Landfill Sites British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites Environment Agency - Head Office	July 2018	Quarterly
Integrated Pollution Control Registered Waste Sites Environment Agency - North West Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries) Environment Agency - North West Region - North Area	July 2018	Quarterly
Licensed Waste Management Facilities (Locations) Environment Agency - North West Region - North Area	July 2018	Quarterly
Local Authority Landfill Coverage Allerdale Borough Council - Environmental Protection Copeland Borough Council - Environmental Health Department Cumbria County Council - Economy And Environment Department	 May 2000 May 2000 May 2000	 Not Applicable Not Applicable Not Applicable
Local Authority Recorded Landfill Sites Allerdale Borough Council - Environmental Protection Copeland Borough Council - Environmental Health Department Cumbria County Council - Economy And Environment Department	 May 2000 May 2000 May 2000	 Not Applicable Not Applicable Not Applicable
Registered Landfill Sites Environment Agency - North West Region - North Area	March 2003	Not Applicable
Registered Waste Transfer Sites Environment Agency - North West Region - North Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites Environment Agency - North West Region - North Area	March 2003	Not Applicable

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH) Health and Safety Executive	April 2018	Bi-Annually
Explosive Sites Health and Safety Executive	March 2017	Variable
Notification of Installations Handling Hazardous Substances (NIHHS) Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements Copeland Borough Council - Planning Cumbria County Council - Development Control Lake District National Park Allerdale Borough Council	 February 2016 February 2016 February 2016 March 2014	 Variable Variable Variable Variable
Planning Hazardous Substance Consents Copeland Borough Council - Planning Cumbria County Council - Development Control Lake District National Park Allerdale Borough Council	 February 2016 February 2016 February 2016 January 2016	 Variable Variable Variable Variable
Geological	**Version**	**Update Cycle**
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	May 2018	Bi-Annually
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	As notified
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified

Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	May 2018	Quarterly
Fuel Station Entries Catalist Ltd - Experian	August 2018	Quarterly
Gas Pipelines National Grid	July 2014	
Underground Electrical Cables National Grid	December 2015	
Sensitive Land Use	**Version**	**Update Cycle**
Ancient Woodland Natural England	August 2018	Bi-Annually
Areas of Outstanding Natural Beauty Natural England	August 2018	Bi-Annually
Environmentally Sensitive Areas Natural England	January 2017	
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	August 2018	Bi-Annually
Marine Nature Reserves Natural England	January 2018	Bi-Annually
National Nature Reserves Natural England	August 2018	Bi-Annually
National Parks Natural England	April 2017	Bi-Annually
Nitrate Vulnerable Zones Environment Agency - Head Office Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	December 2017 October 2015	Bi-Annually
Ramsar Sites Natural England	August 2018	Bi-Annually
Sites of Special Scientific Interest Natural England	February 2018	Bi-Annually
Special Areas of Conservation Natural England	August 2018	Bi-Annually
Special Protection Areas Natural England	August 2018	Bi-Annually

Data Suppliers

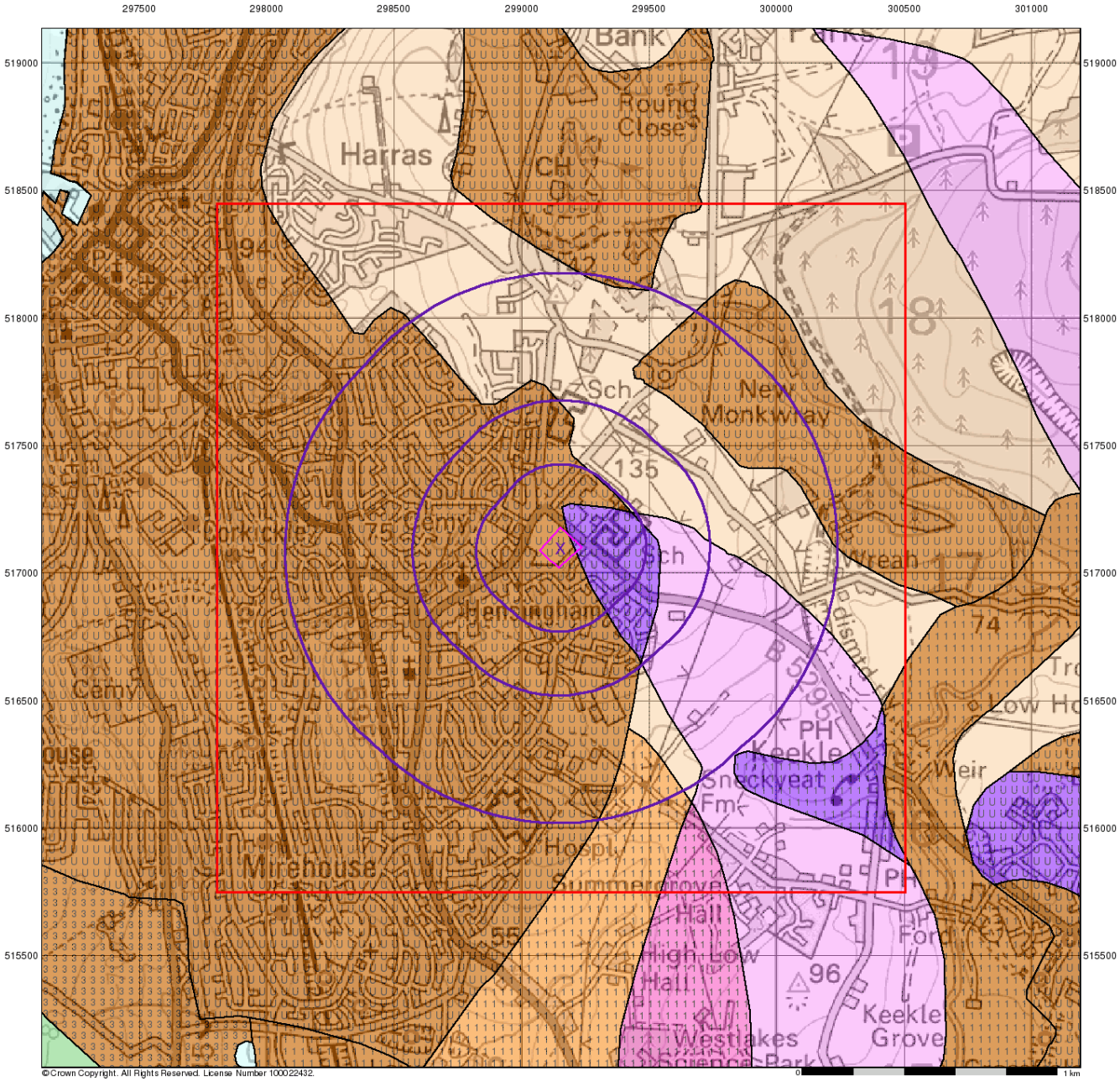
A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	
2	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	
3	**Copeland Borough Council - Environmental Health Department** P O Box 19, Council Offices, Catherine Street, Whitehaven, Cumbria, CA28 7NY	
4	**Ordnance Survey** Adanac Drive, Southampton, Hampshire, SO16 0AS	
5	**Cumbria County Council - Economy And Environment Department** Citadel Chambers, Citadel Row, Carlisle, Cumbria, CA3 8SG	
6	**The Coal Authority - Property Searches** 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	
7	**Natural England** County Hall, Spetchley Road, Worcester, WR5 2NP	
8	**Environment Agency - Head Office** Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.



Groundwater Vulnerability

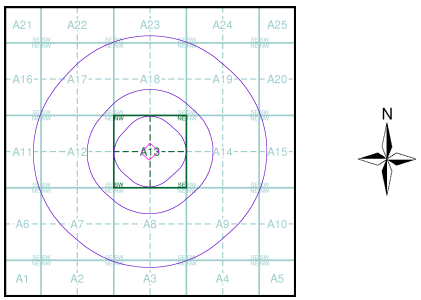
General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice
Map ID

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice A



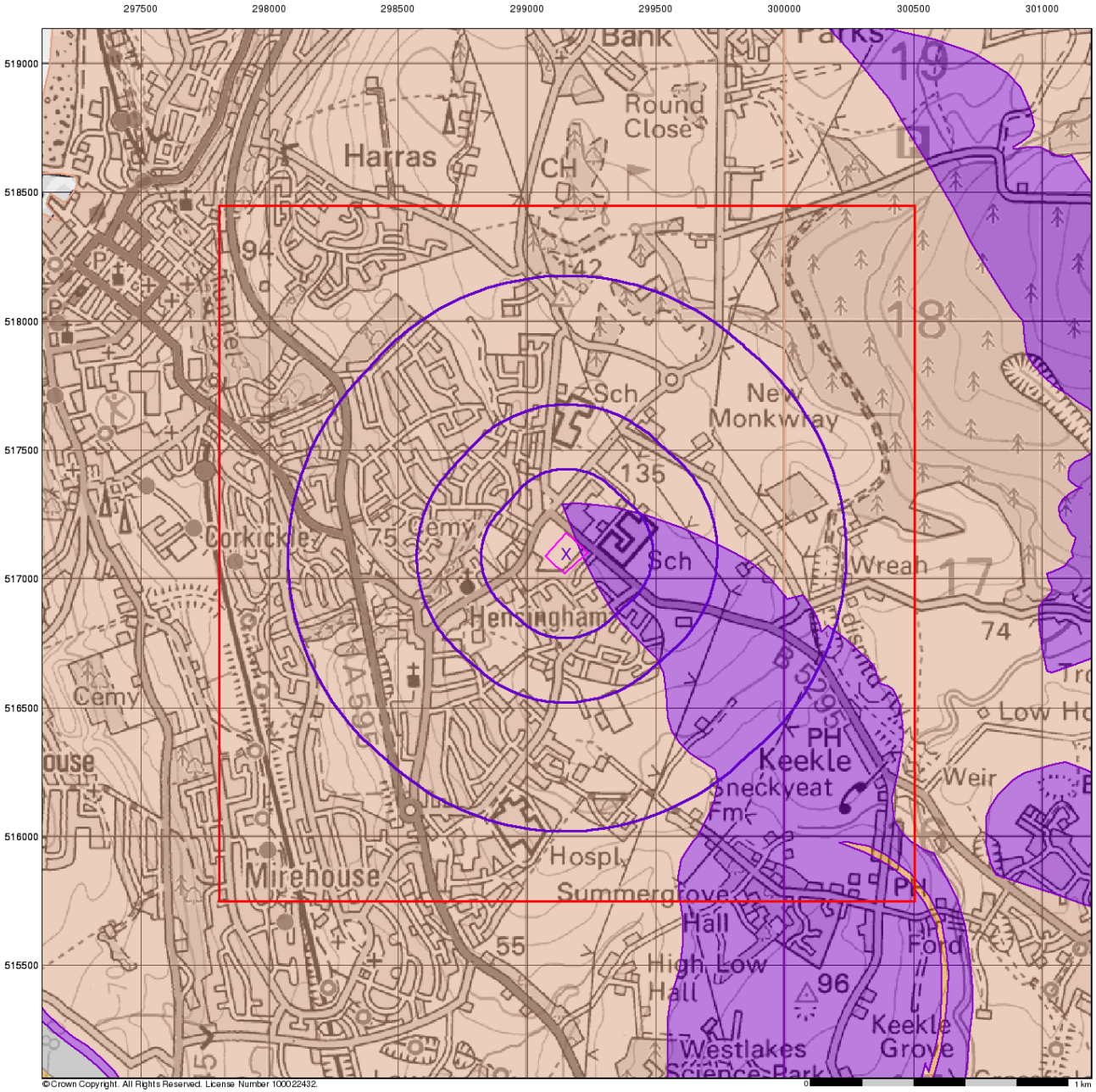
Order Details

Order Number: 180465108_1_1
Customer Ref: 17526/C8049/DG
National Grid Reference: 299150, 517100
Slice: A
Site Area (Ha): 1.31
Search Buffer (m): 1000

Site Details

Cleator Moor Road, Whitehaven

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Bedrock Aquifer Designation

General

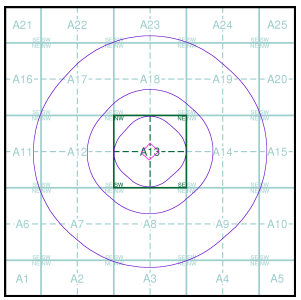
Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice
Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



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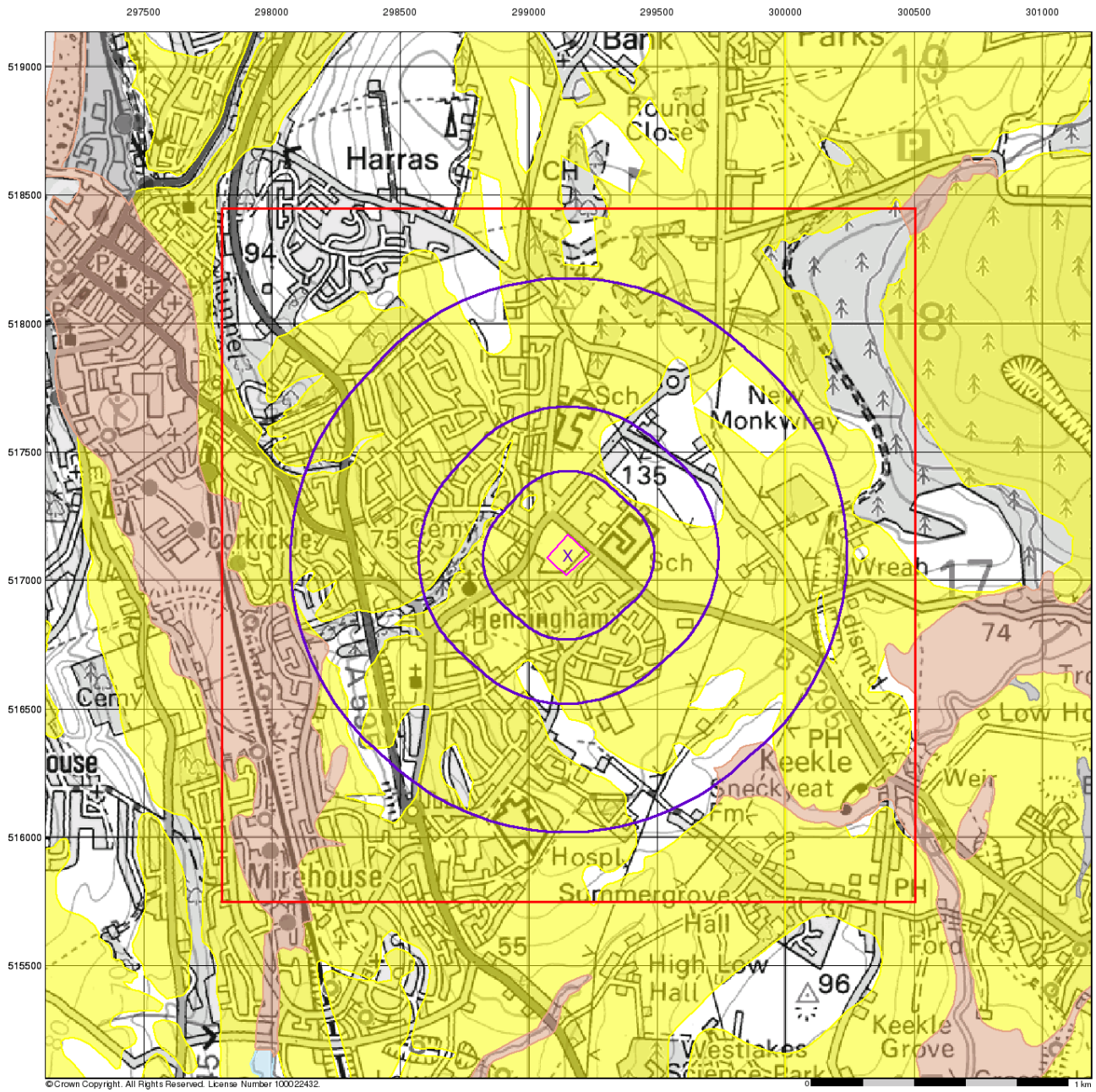


Superficial Aquifer Designation

General

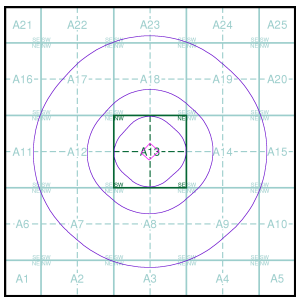
Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice
Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



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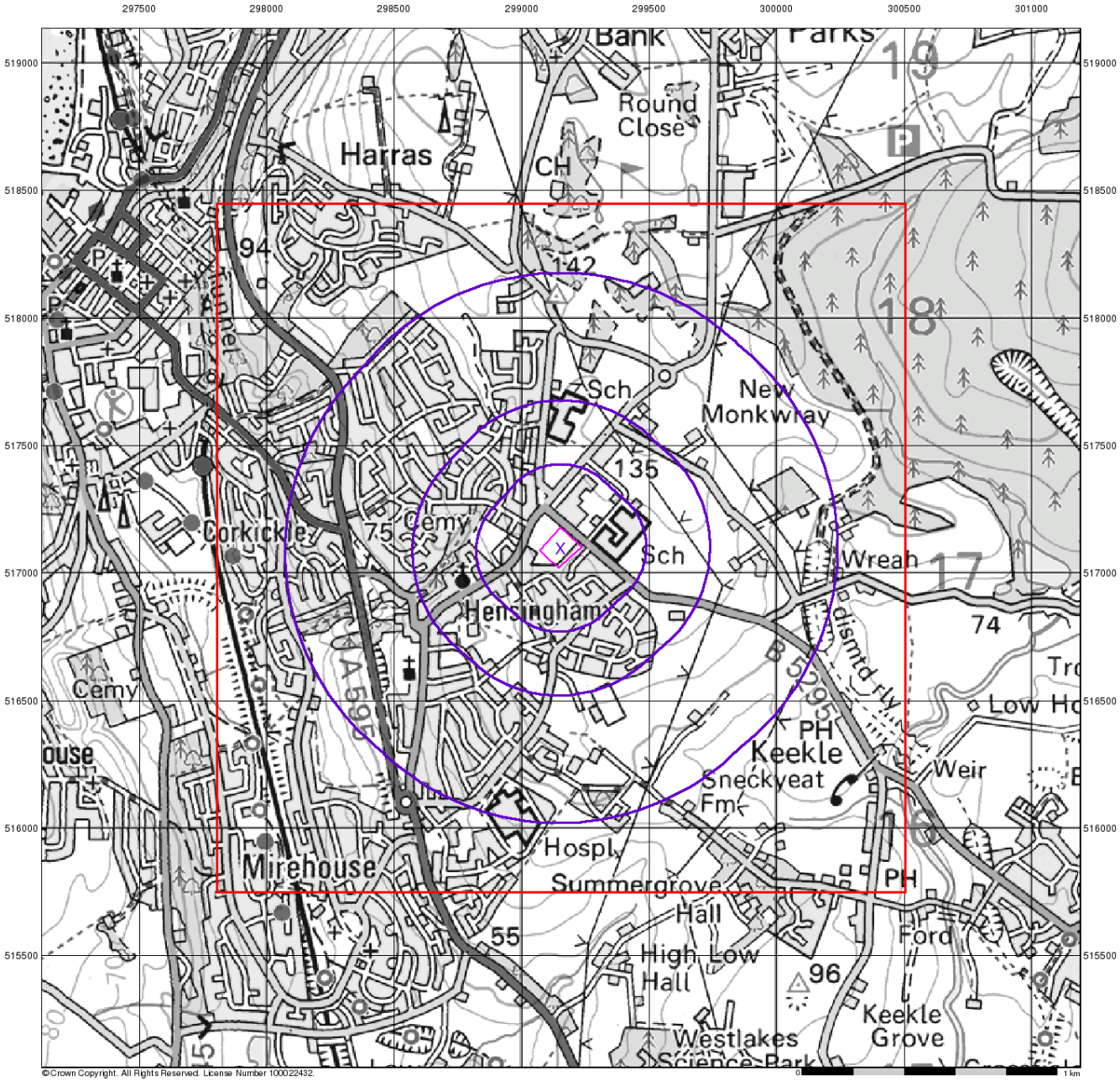


Source Protection Zones

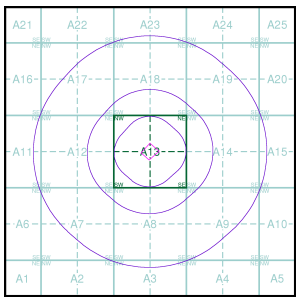
General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice
Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Site Sensitivity Context Map - Slice A



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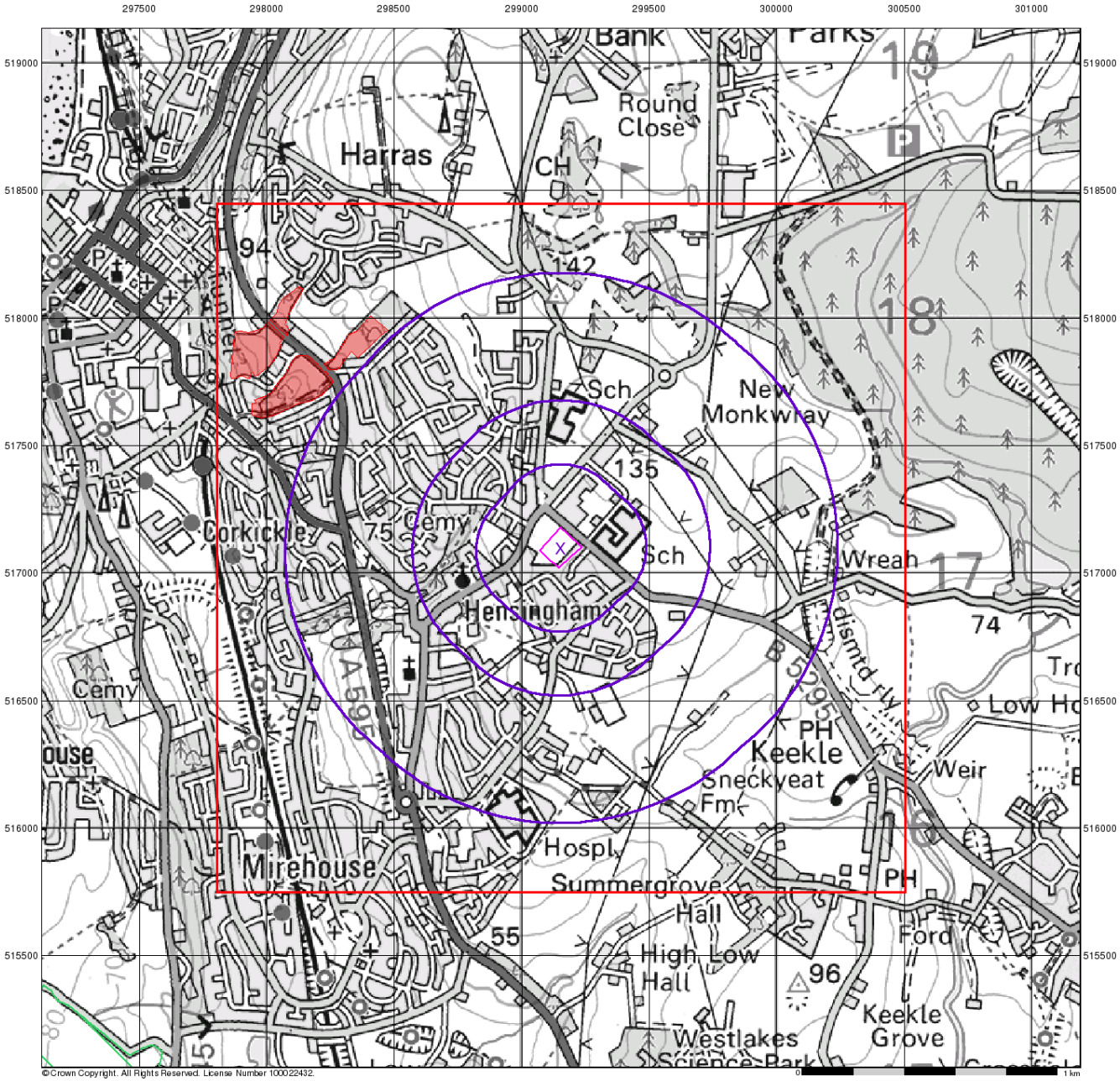


Sensitive Land Uses

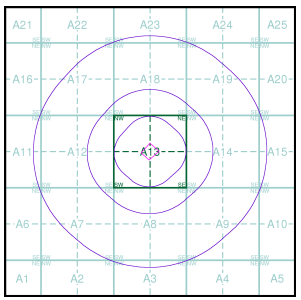
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice A



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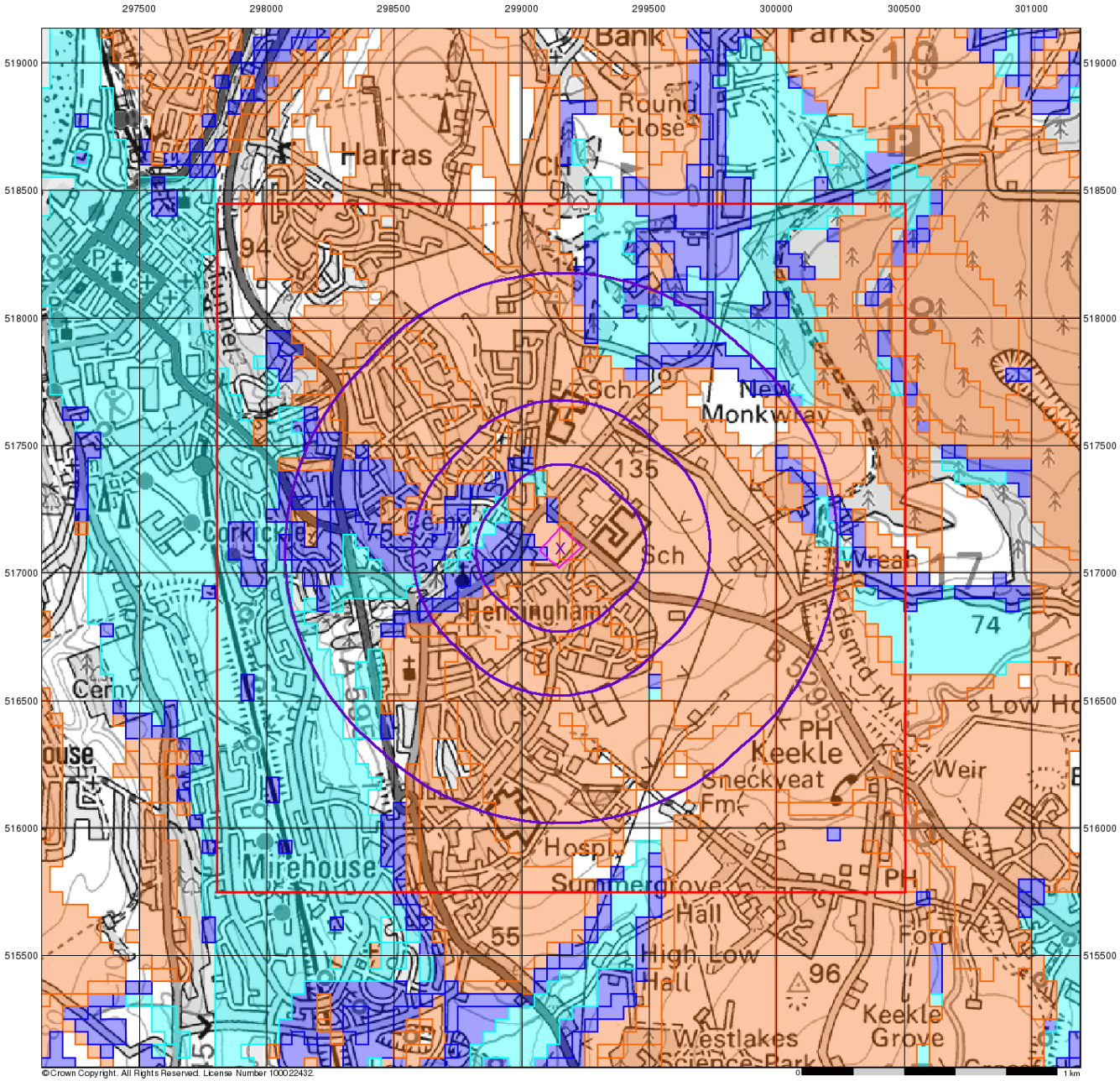


BGS Flood GFS Data

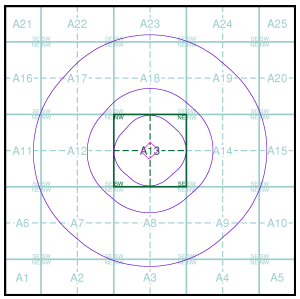
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice

Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice A



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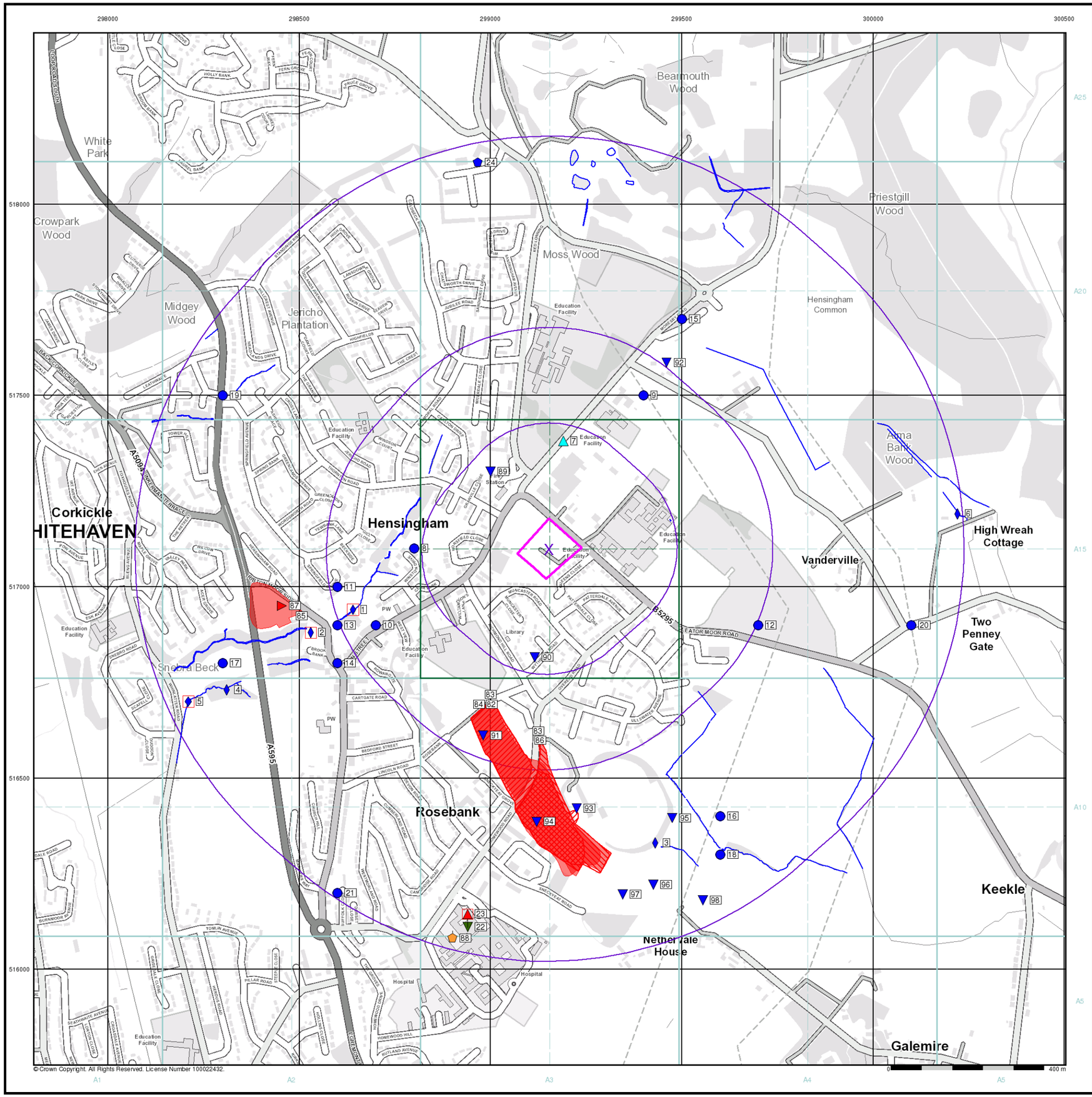


General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

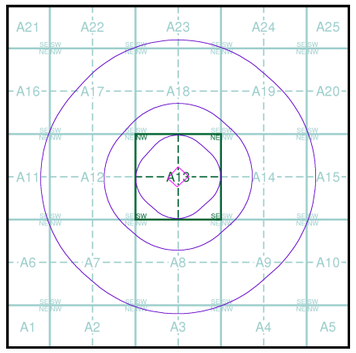
Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Slice A



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Order Details

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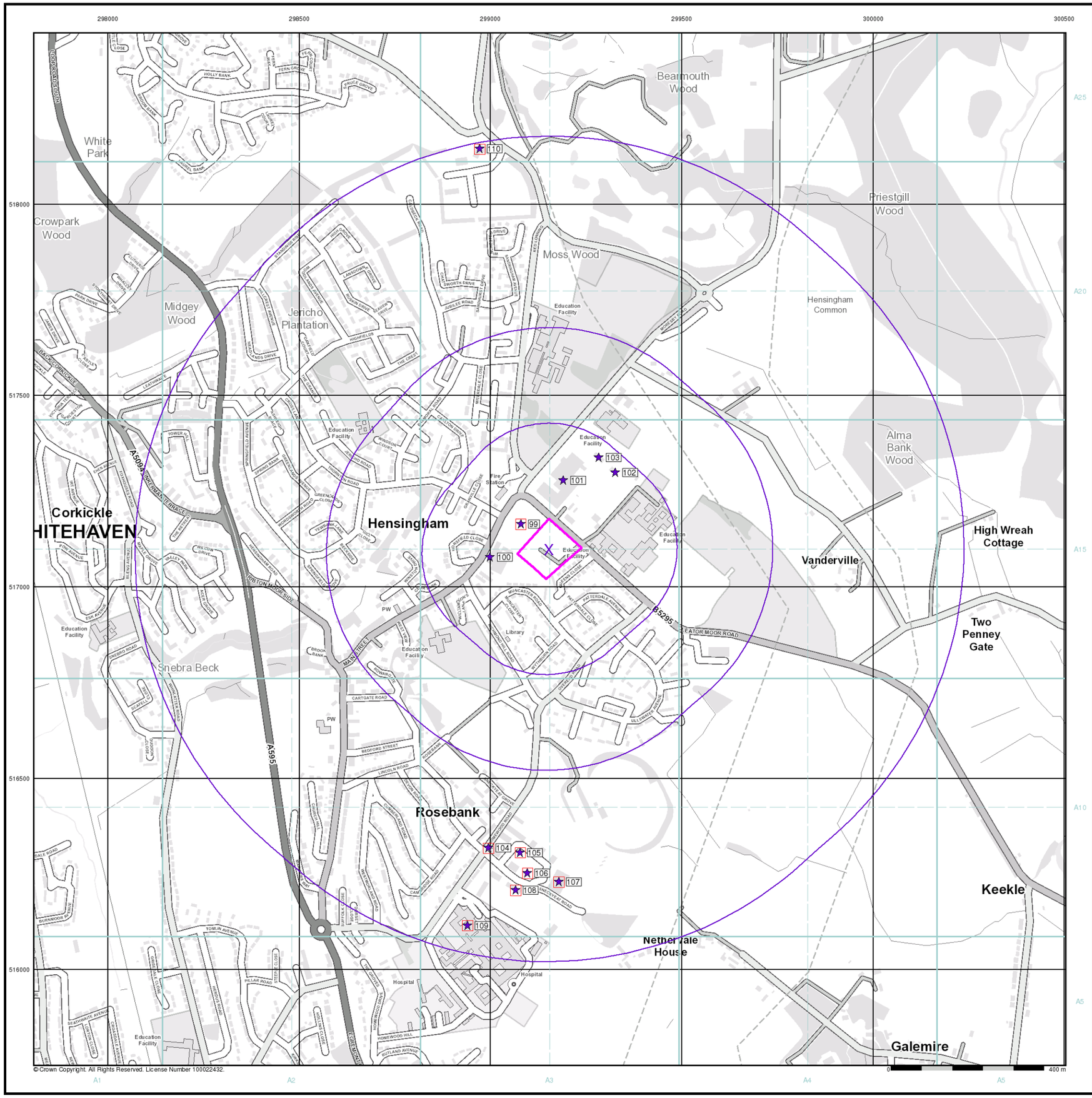

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sirius

Industrial Land Use Map

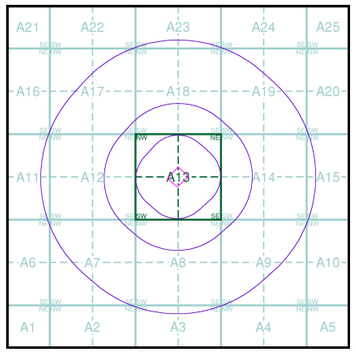
General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice
Map ID

Industrial Land Use

Contemporary Trade Directory Entry
Fuel Station Entry
Gas Pipeline
Underground Electrical Cables

Industrial Land Use Map - Slice A



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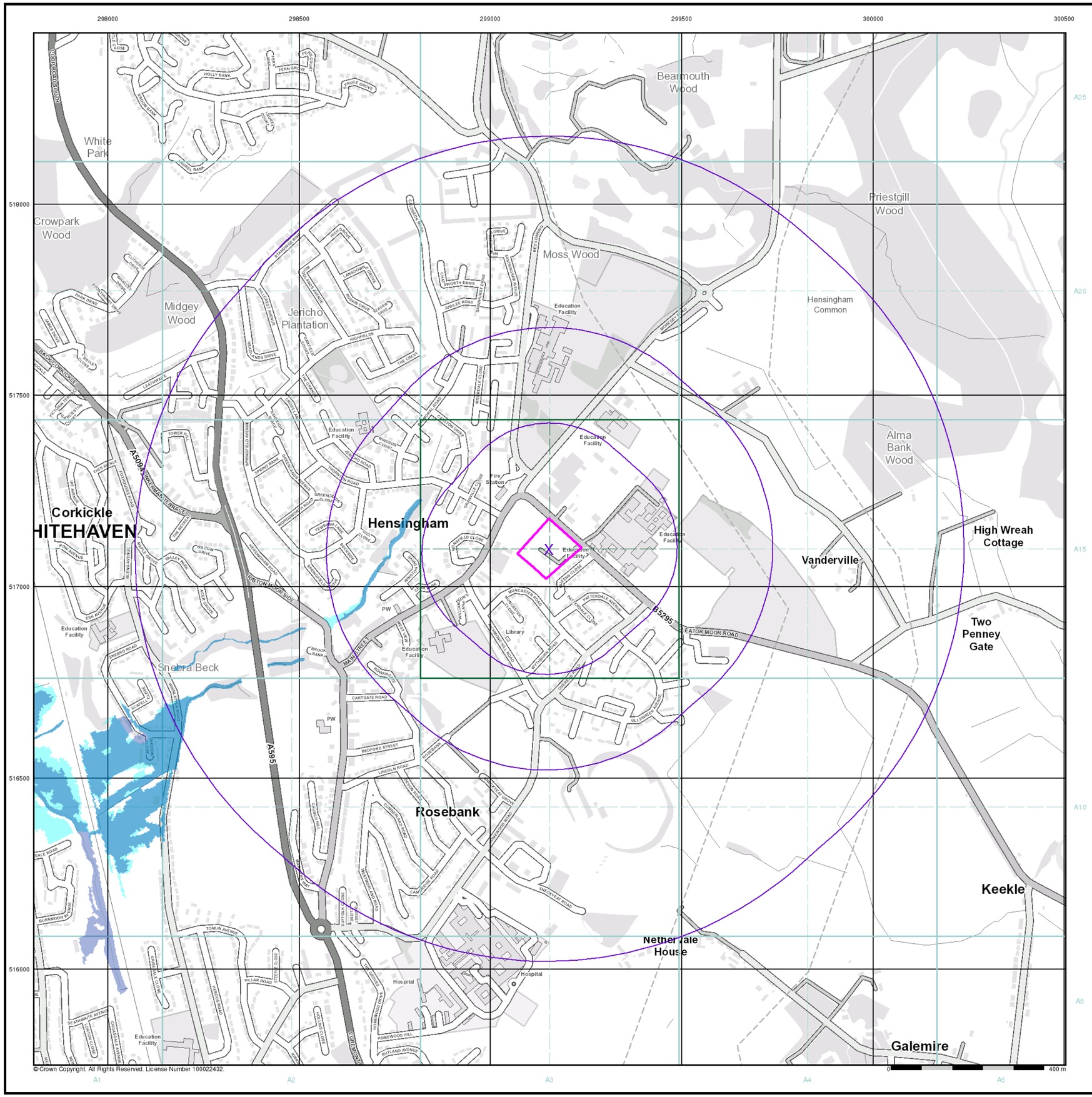


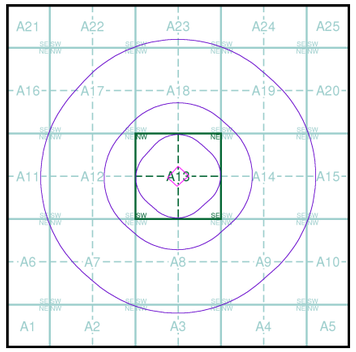
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

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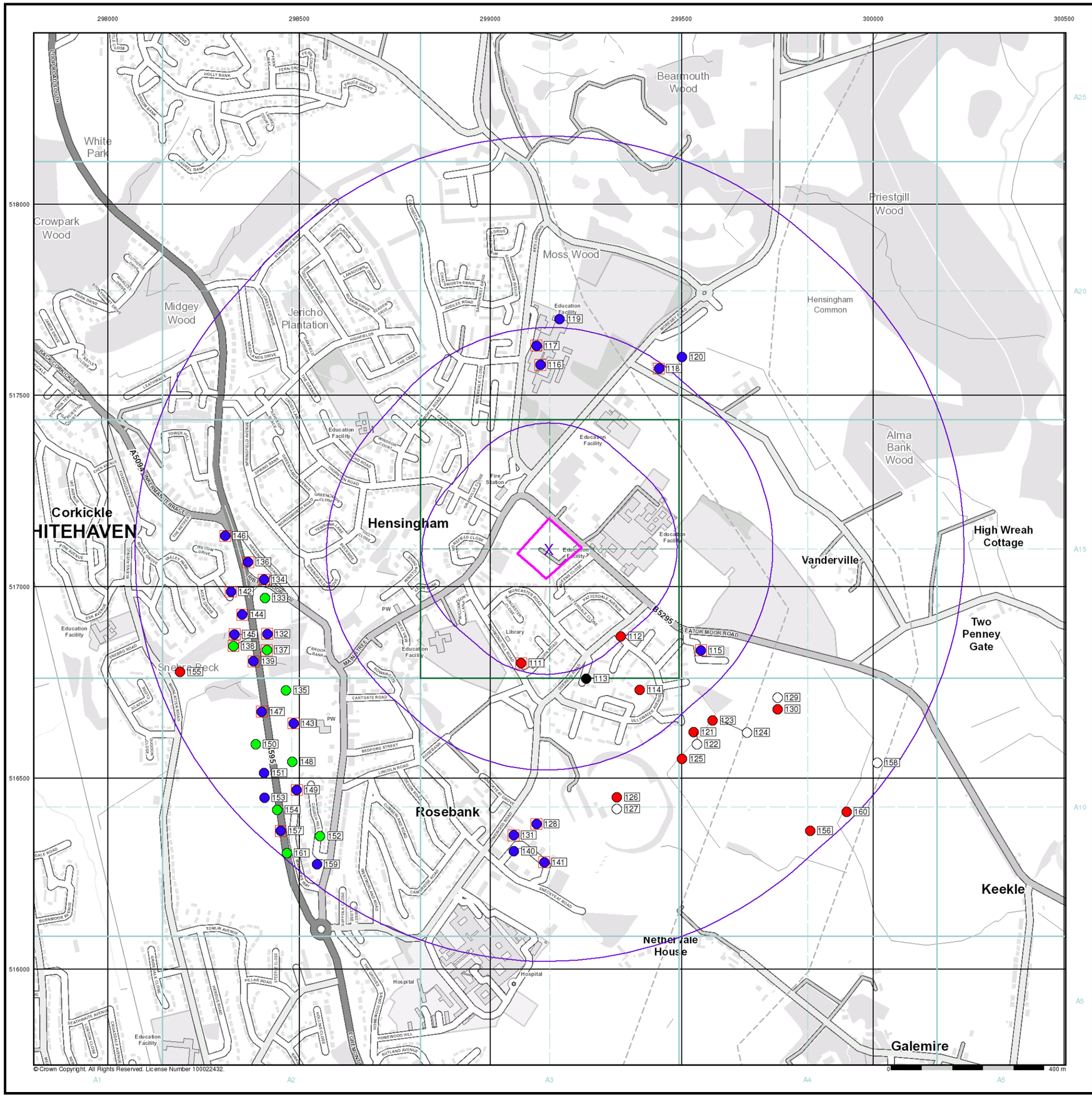


General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

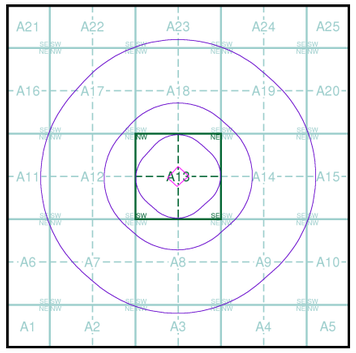
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



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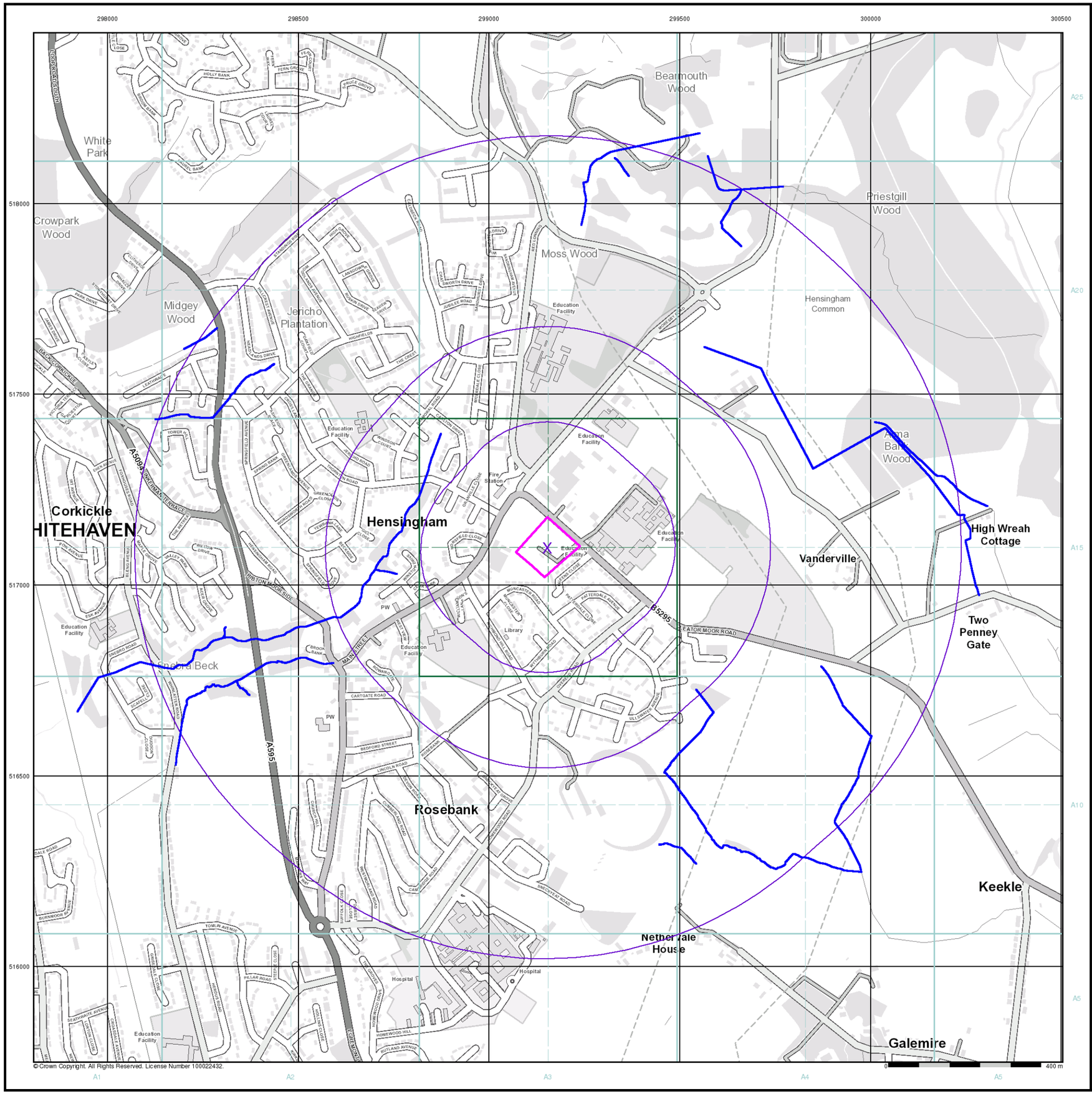


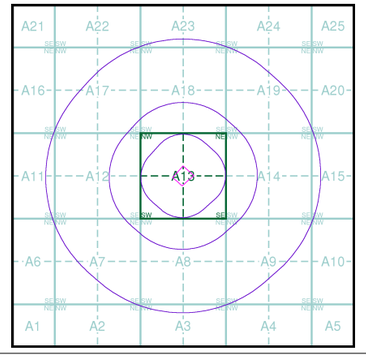
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

OS Water Network Data

- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

OS Water Network Map - Slice A



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Historical Mapping Legends

Ordnance Survey County Series 1:10,560

- Gravel Pit
- Sand Pit
- Other Pits
- Quarry
- Shingle
- Orchard
- Osiers
- Reeds
- Marsh
- Mixed Wood
- Deciduous
- Brushwood
- Fir
- Furze
- Rough Pasture
- Arrow denotes flow of water
- Trigonometrical Station
- Site of Antiquities
- Bench Mark
- Pump, Guide Post, Signal Post
- Well, Spring, Boundary Post
- ·285 Surface Level
- Sketched Contour
- Instrumental Contour
- Main Roads (Fenced / Un-Fenced)
- Minor Roads (Fenced / Un-Fenced)
- Sunken Road
- Raised Road
- Road over Railway
- Railway over River
- Railway over Road
- Level Crossing
- Road over River or Canal
- Road over Stream
- Road over Stream
- County Boundary (Geographical)
- County & Civil Parish Boundary
- Administrative County & Civil Parish Boundary
- Co. Boro. Bdy. County Borough Boundary (England)
- Co. Burgh Bdy. County Burgh Boundary (Scotland)
- R.D. Bdy. Rural District Boundary
- Civil Parish Boundary

Ordnance Survey Plan 1:10,000

- Chalk Pit, Clay Pit or Quarry
- Gravel Pit
- Sand Pit
- Disused Pit or Quarry
- Refuse or Slag Heap
- Lake, Loch or Pond
- Dunes
- Boulders
- Coniferous Trees
- Non-Coniferous Trees
- Orchard
- Scrub
- Coppice
- Bracken
- Heath
- Rough Grassland
- Marsh
- Reeds
- Saltings
- Building
- Direction of Flow of Water: Shingle, Sand
- Glasshouse
- Pylon
- Sloping Masonry
- Electricity Transmission Line
- Pole
- Cutting
- Embankment
- Standard Gauge Multiple Track
- Road Under, Road Over, Level Crossing, Foot Bridge
- Standard Gauge Single Track
- Siding, Tramway or Mineral Line
- Narrow Gauge
- Geographical County
- Administrative County, County Borough or County of City
- Municipal Borough, Urban or Rural District, Burgh or District Council
- Borough, Burgh or County Constituency — Shown only when not coincident with other boundaries
- Civil Parish — Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

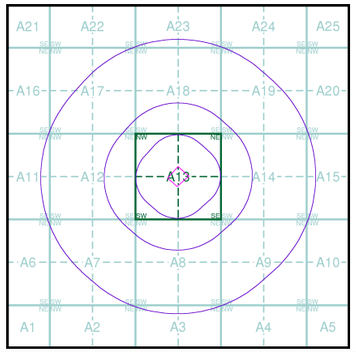
1:10,000 Raster Mapping

- Gravel Pit
- Refuse tip or slag heap
- Rock
- Rock (scattered)
- Boulders
- Boulders (scattered)
- Shingle
- Mud
- Sand
- Sand Pit
- Slopes
- Top of cliff
- General detail
- Underground detail
- Overhead detail
- Narrow gauge railway
- Multi-track railway
- Single track railway
- County boundary (England only)
- Civil, parish or community boundary
- District, Unitary, Metropolitan, London Borough boundary
- Constituency boundary
- Area of wooded vegetation
- Non-coniferous trees
- Non-coniferous trees (scattered)
- Coniferous trees
- Coniferous trees (scattered)
- Positioned tree
- Orchard
- Coppice or Osiers
- Rough Grassland
- Heath
- Scrub
- Marsh, Salt Marsh or Reeds
- Water feature
- Flow arrows
- MHW(S) Mean high water (springs)
- MLW(S) Mean low water (springs)
- Telephone line (where shown)
- Electricity transmission line (with poles)
- BM 123.45 m Bench mark (where shown)
- Triangulation station
- Point feature (e.g. Guide Post or Mile Stone)
- Pylon, flare stack or lighting tower
- Site of (antiquity)
- Glasshouse
- General Building
- Important Building

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Cumberland	1:10,560	1867	2
Cumberland	1:10,560	1900	3
Cumberland	1:10,560	1926	4
Cumberland	1:10,560	1938	5
Ordnance Survey Plan	1:10,000	1957	6
Ordnance Survey Plan	1:10,000	1971 - 1979	7
Ordnance Survey Plan	1:10,000	1993	8
10K Raster Mapping	1:10,000	2000	9
Street View	Variable		10

Historical Map - Slice A



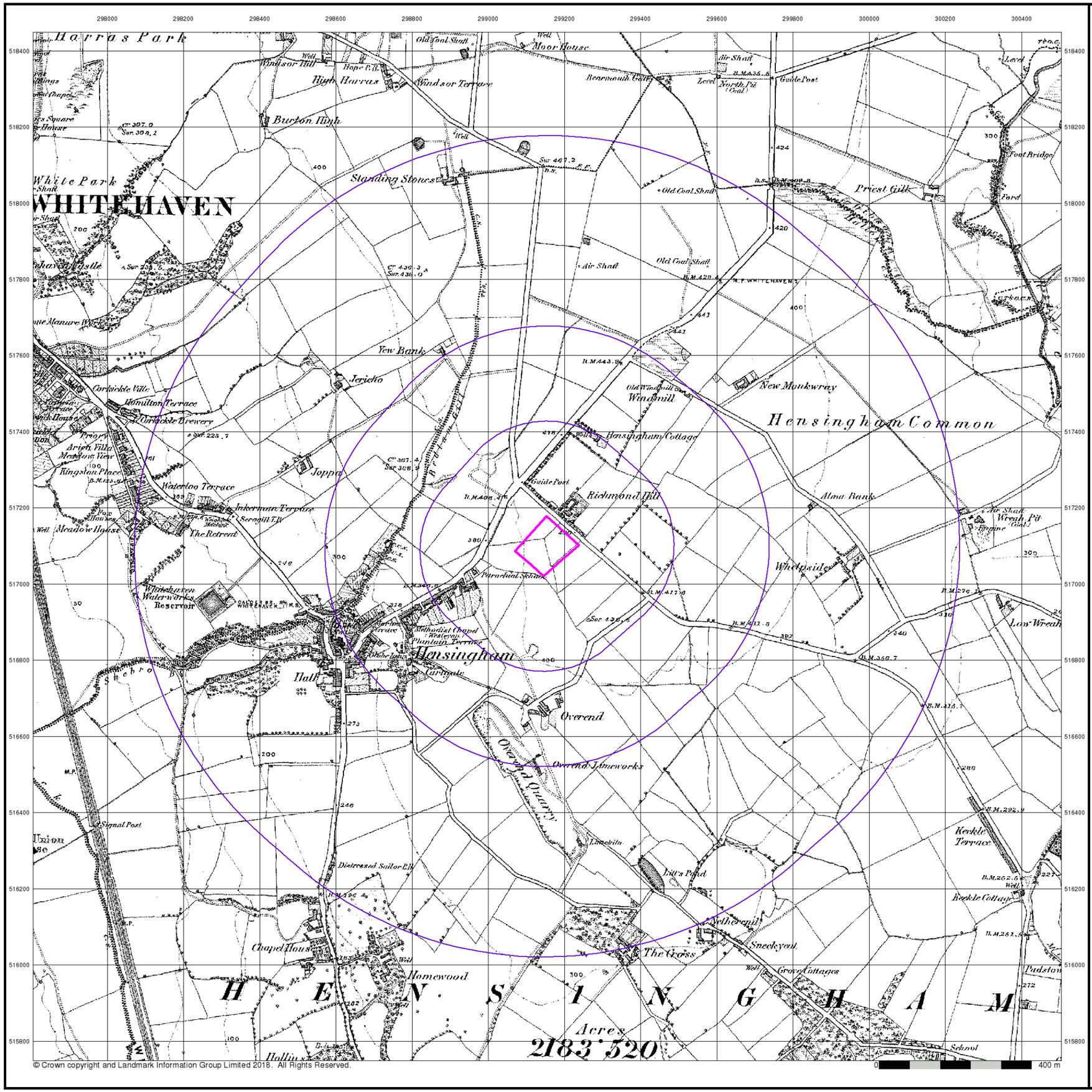
Order Details

Order Number: 180465108_1_1
Customer Ref: 17526/C8049/DG
National Grid Reference: 299150, 517100
Slice: A
Site Area (Ha): 1.31
Search Buffer (m): 1000

Site Details

Cleator Moor Road, Whitehaven

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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0 400 m

Cumberland

Published 1867

Source map scale - 1:10,560

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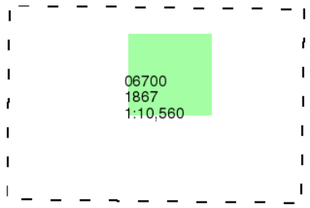
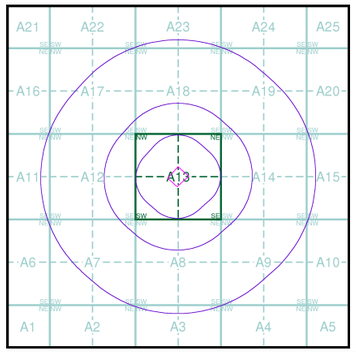
Map Name(s) and Date(s)



Historical Map - Slice A



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Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	1000

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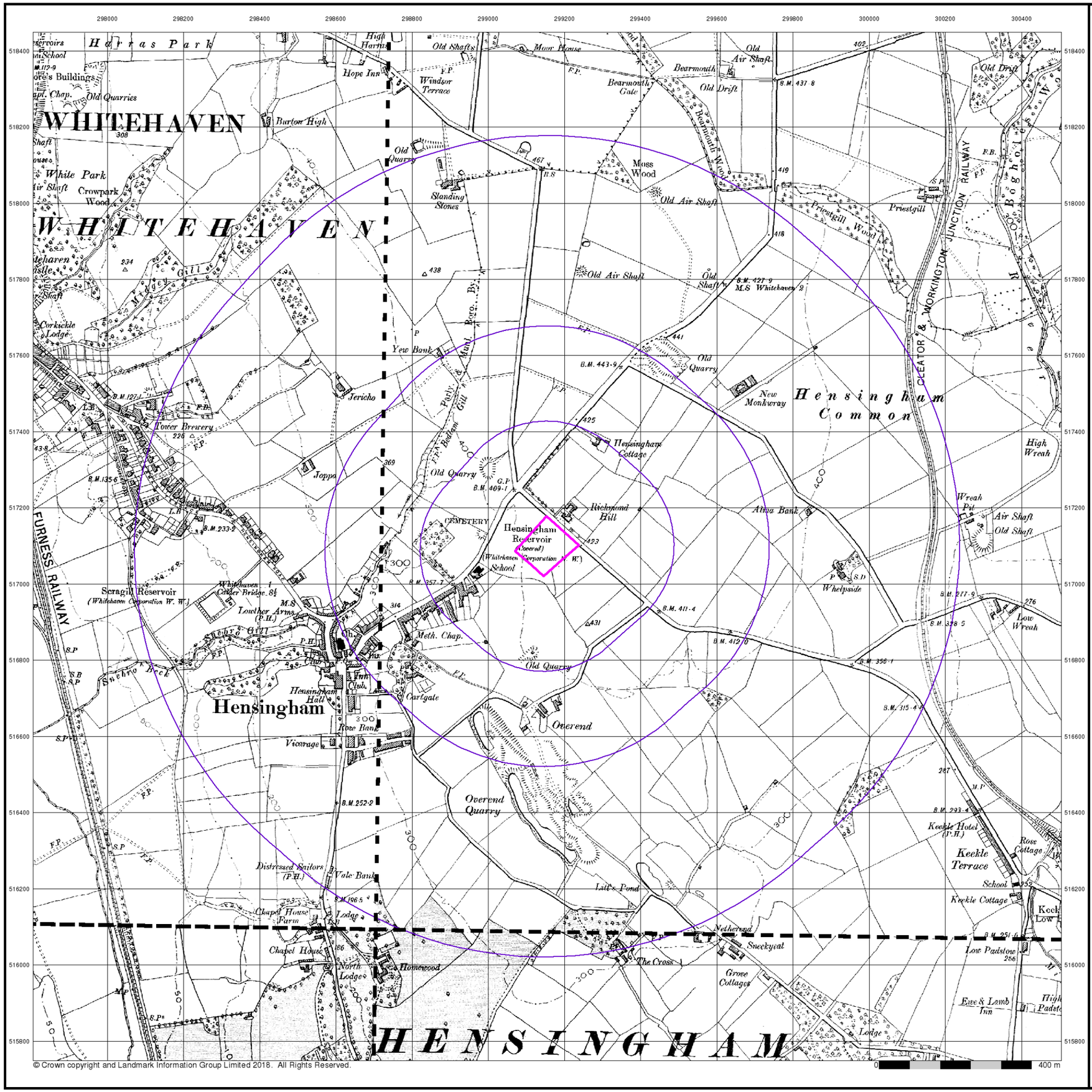


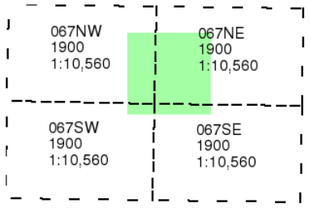
Cumberland

Published 1900

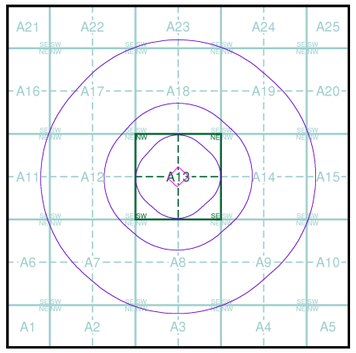
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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Order Details

Order Number:	180465108_1_1
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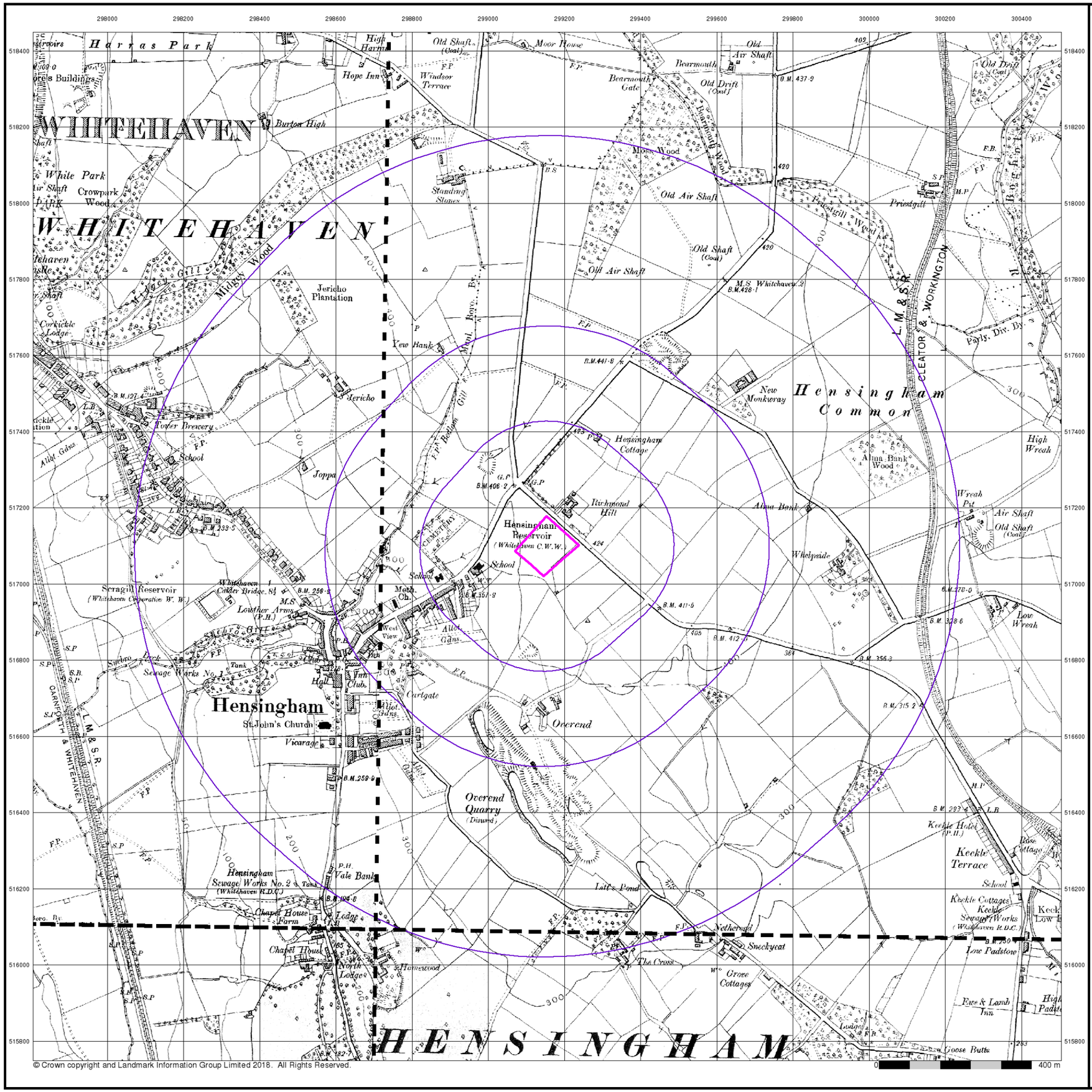

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Cumberland

Published 1926

Source map scale - 1:10,560

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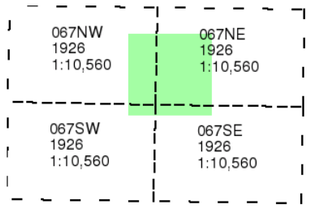
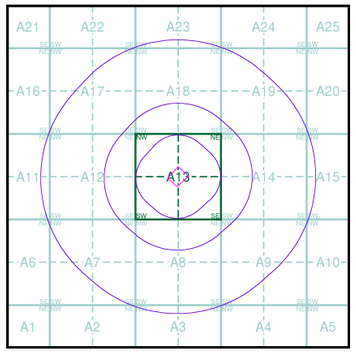
Map Name(s) and Date(s)



Historical Map - Slice A



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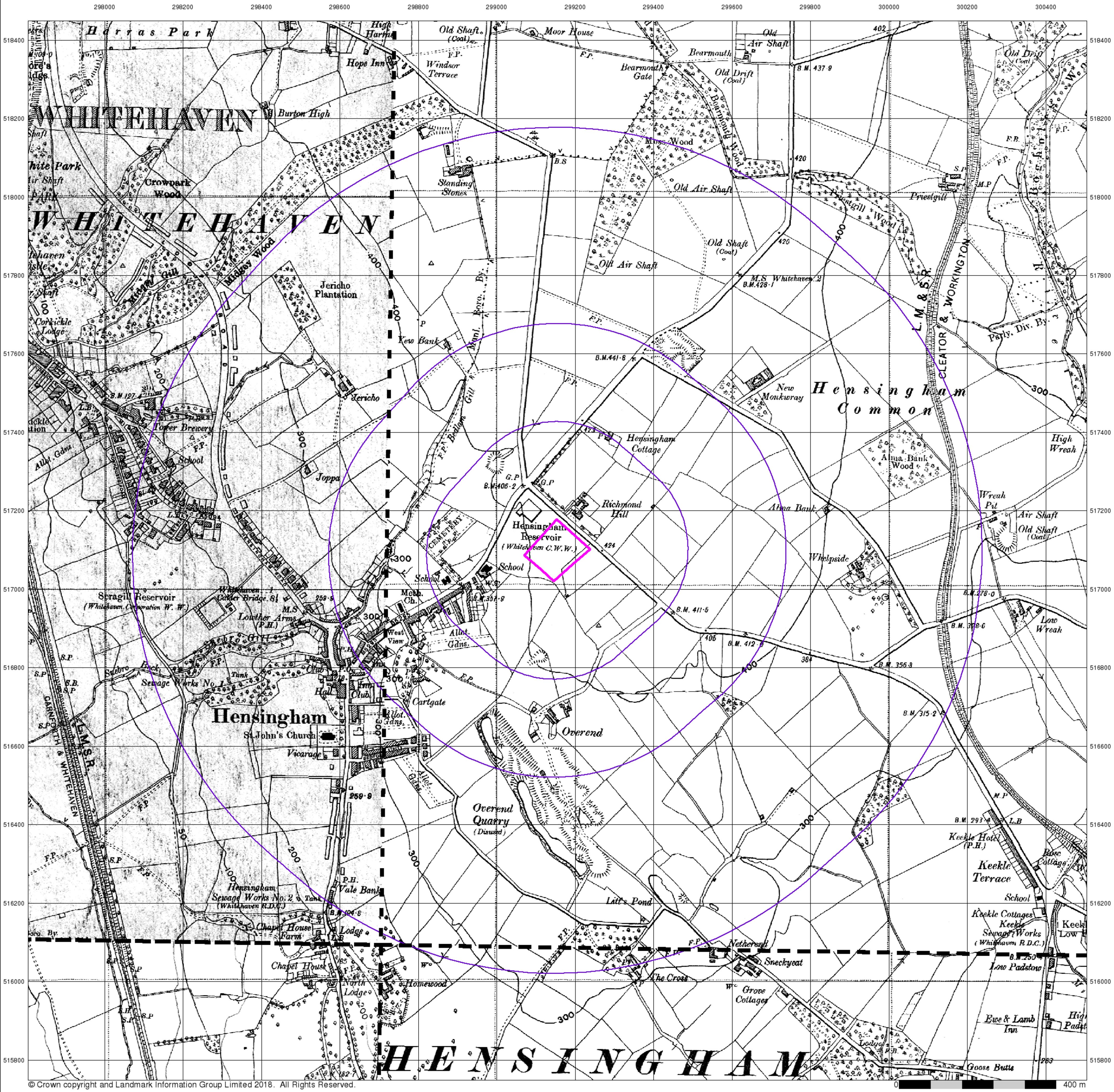

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Cumberland

Published 1938

Source map scale - 1:10,560

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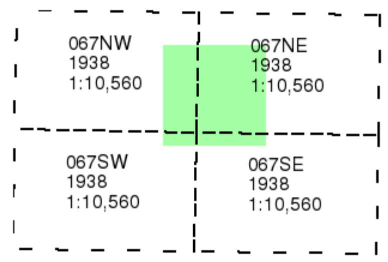
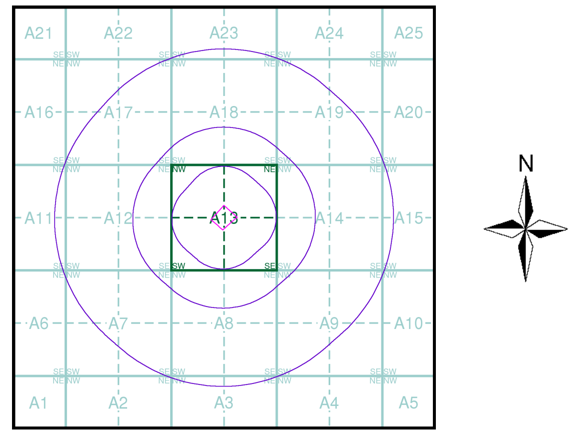
Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 180465108_1_1
Customer Ref: 17526/C8049/DG
National Grid Reference: 299150, 517100
Slice: A
Site Area (Ha): 1.31
Search Buffer (m): 1000

Site Details

Cleator Moor Road, Whitehaven

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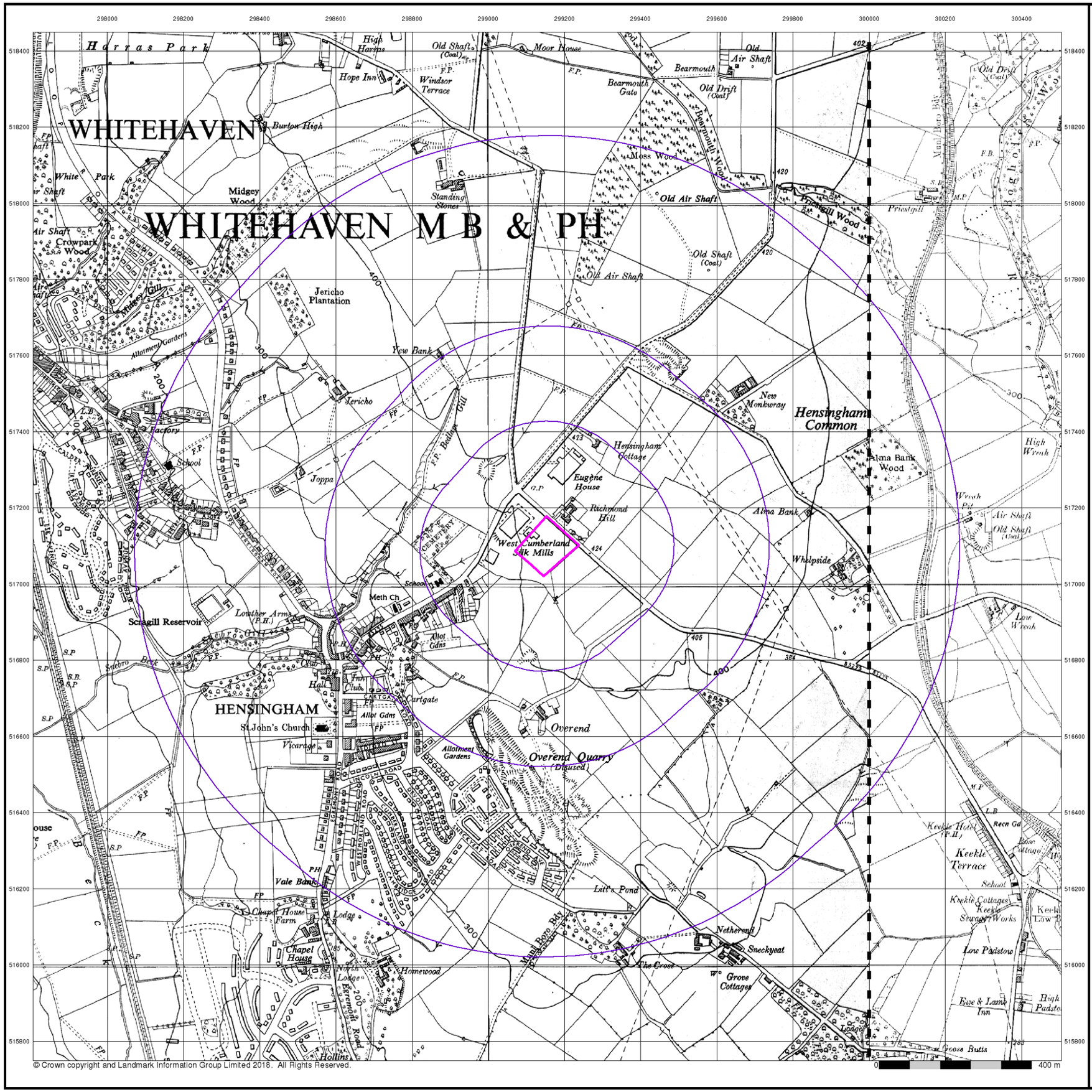

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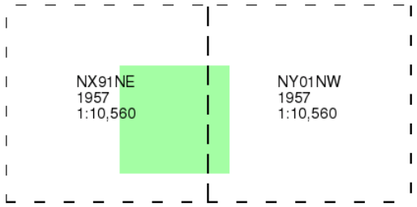
Ordnance Survey Plan

Published 1957

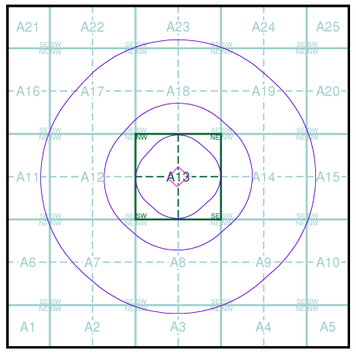
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	1000

Site Details

Cleator Moor Road, Whitehaven

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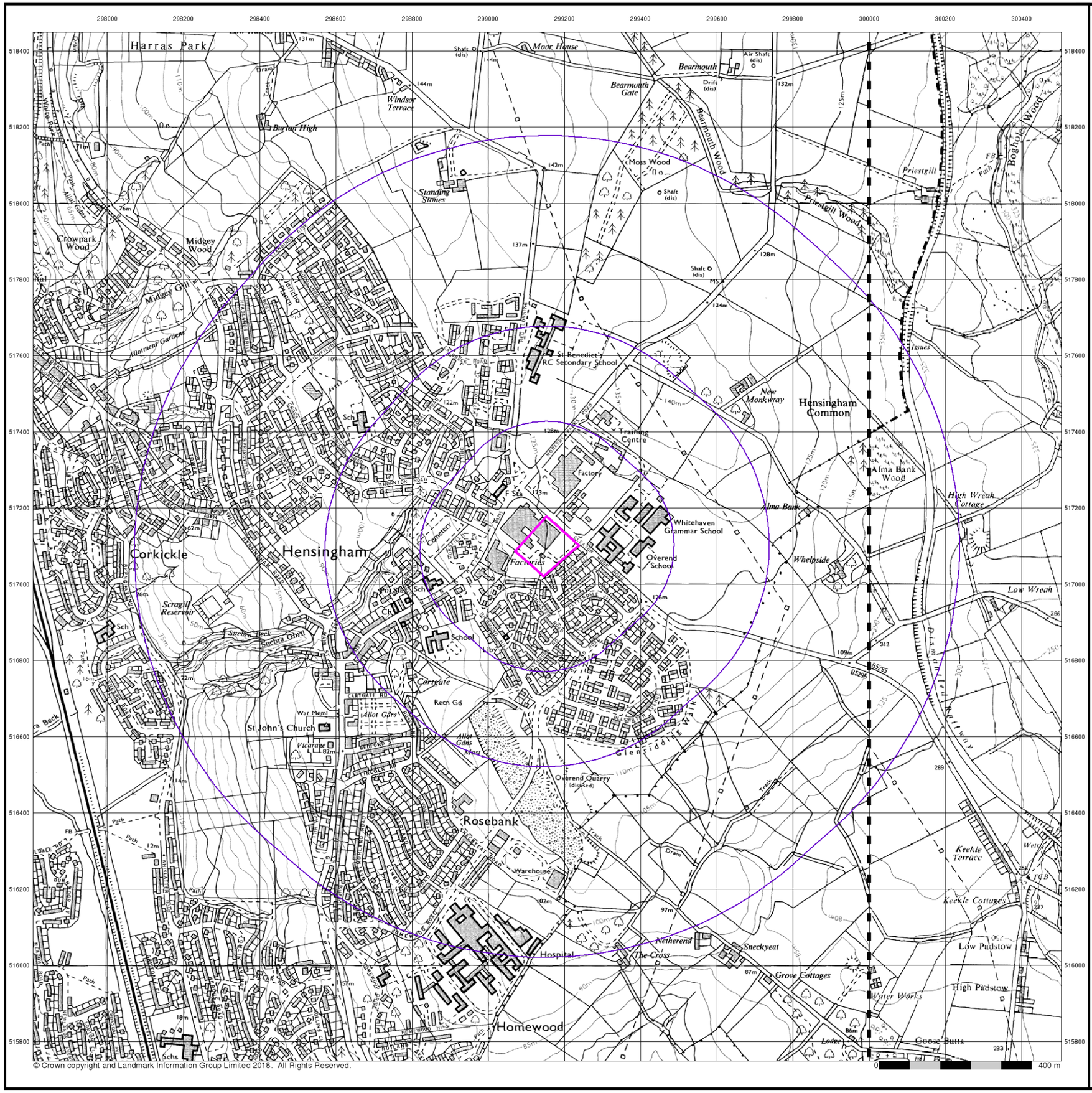

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Ordnance Survey Plan

Published 1971 - 1979

Source map scale - 1:10,000

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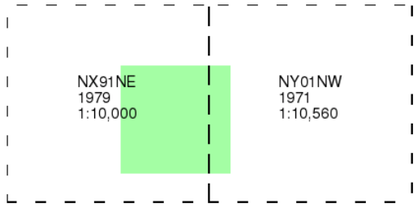
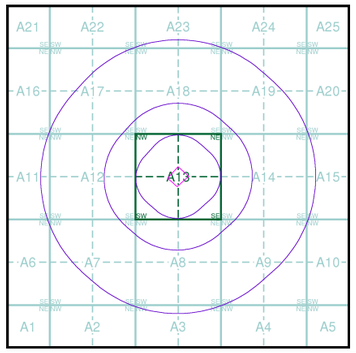
Map Name(s) and Date(s)



Historical Map - Slice A



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Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	1000

Site Details

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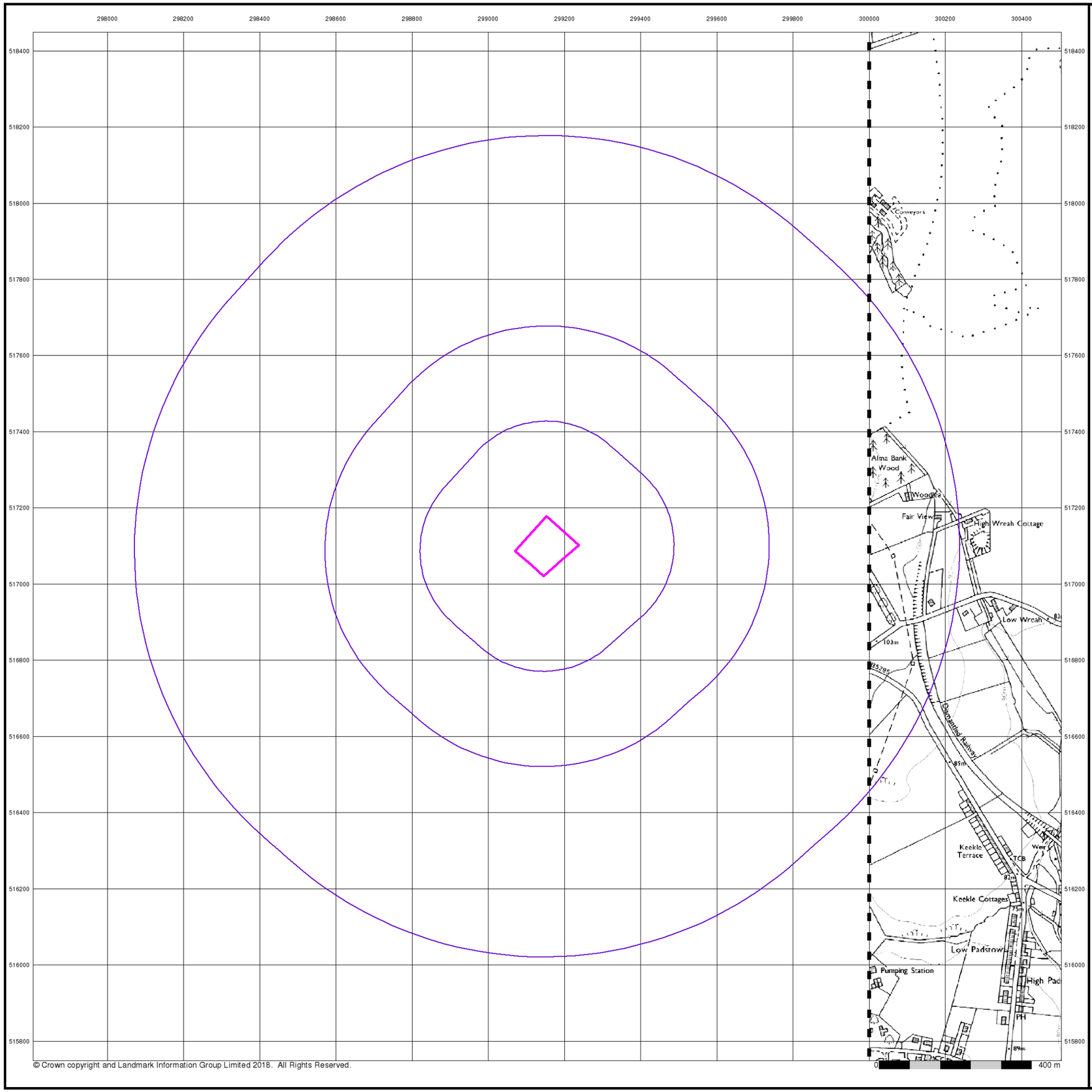

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Ordnance Survey Plan

Published 1993

Source map scale - 1:10,000

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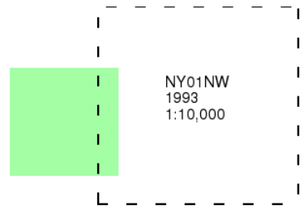
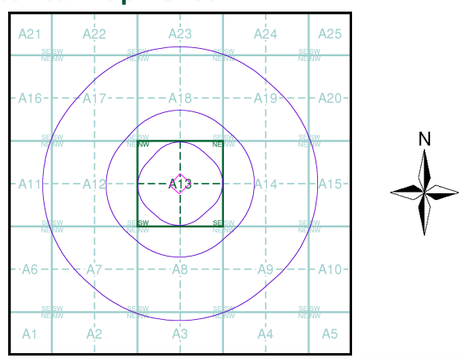
Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
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Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	1000

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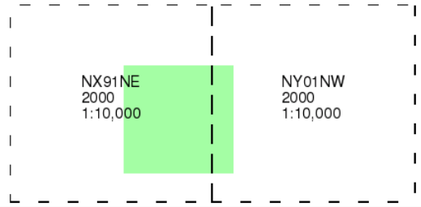
10k Raster Mapping

Published 2000

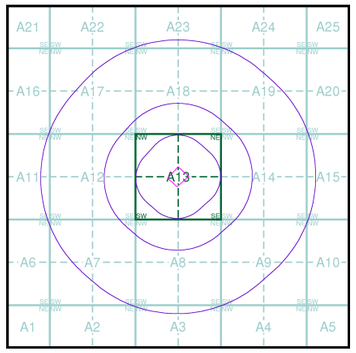
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	1000

Site Details

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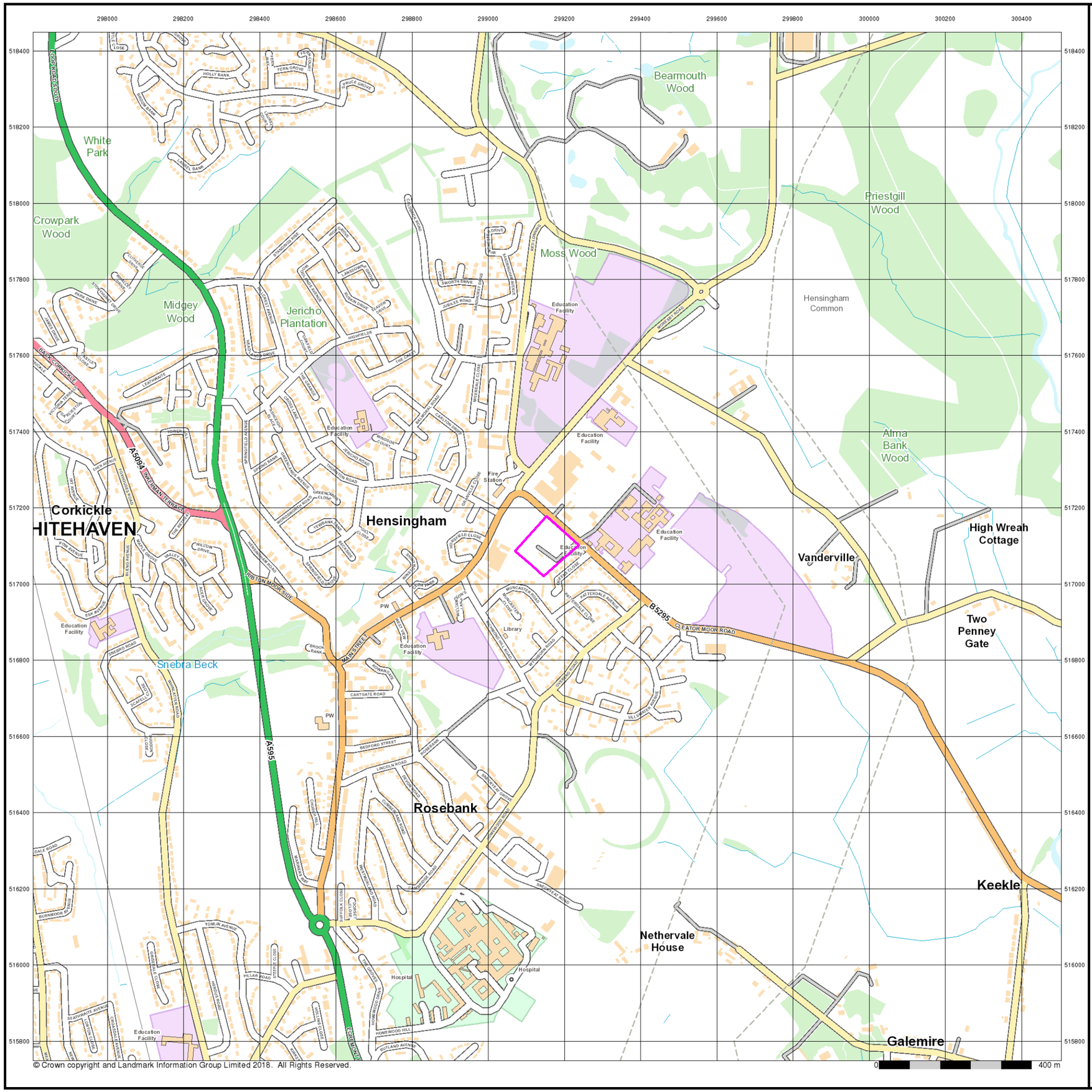


Street View

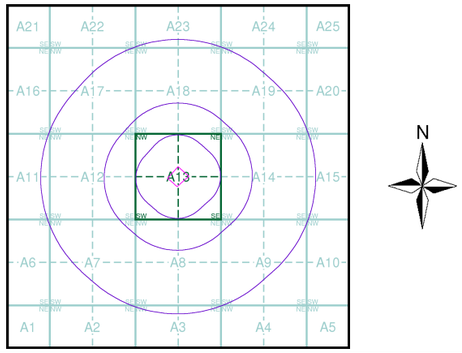
Published 2018

Source map scale - 1:10,000

Street View is a street-level map for the whole of Great Britain produced by the Ordnance Survey. These maps are provided at a nominal scale of 1:10,000

Map Name(s) and Date(s)

Street View Map - Slice A



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Site Details

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Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

Quarry
Gravel Pit
Sand Pit
Clay Pit
Shingle
Refuse Heap
Sloping Masonry
Flat Rock
Marsh
Reeds
Osiers
Rough Pasture
Furze
Wood
Mixed Wood
Brushwood
Orchard
Fir
Ford
Stepping Stones
Ferry
Waterfall
Lock

Trig. Station
507 Altitude at Trig. Station
B.M.325·9 Bench Mark
342 Surface Level
Arrow denotes flow of water
Antiquities (site of)

Cutting
Embankment
Railway crossing Road
Level Crossing
Road crossing Railway
Railway crossing River or Canal
Road over single stream
Road over River or Canal

County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

Inactive Quarry, Chalk Pit or Clay Pit
or
Active Quarry, Chalk Pit or Clay Pit
Rock
Boulders
Cliff
Slopes
Top
Top
Roofed Building
Glazed Roof Building
Top
Sloping Masonry
Archway
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
B M Bench Mark
Antiquity (site of)
Cave Entrance
Triangulation Station
Electricity Pylon
E T L Electricity Transmission Line

County Boundary (Geographical)
County & Civil Parish Boundary
Civil Parish Boundary
Admin. County or County Bor. Boundary
L B Bdy London Borough Boundary
Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250

Cliff
Slopes
Top
Top
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Positioned Boulder
Scree
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Triangulation Station
Antiquity (site of)
E T L Electricity Transmission Line
Electricity Pylon
BM 291.60m Bench Mark
Buildings with Building Seed
Roofed Building
Glazed Roof Building

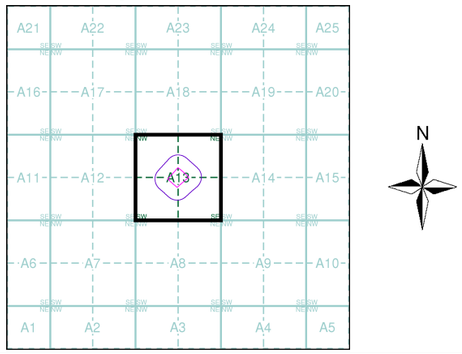
Civil parish/community boundary
District boundary
County boundary
Boundary post/stone
Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Cumberland	1:2,500	1880	2
Cumberland	1:2,500	1899	3
Cumberland	1:2,500	1925	4
Ordnance Survey Plan	1:1,250	1961 - 1973	5
Ordnance Survey Plan	1:2,500	1963	6
Ordnance Survey Plan	1:1,250	1968 - 1983	7
Ordnance Survey Plan	1:2,500	1969 - 1970	8
Additional SIMs	1:1,250	1989	9
Additional SIMs	1:2,500	1989	10
Large-Scale National Grid Data	1:1,250	1994	11

Historical Map - Segment A13



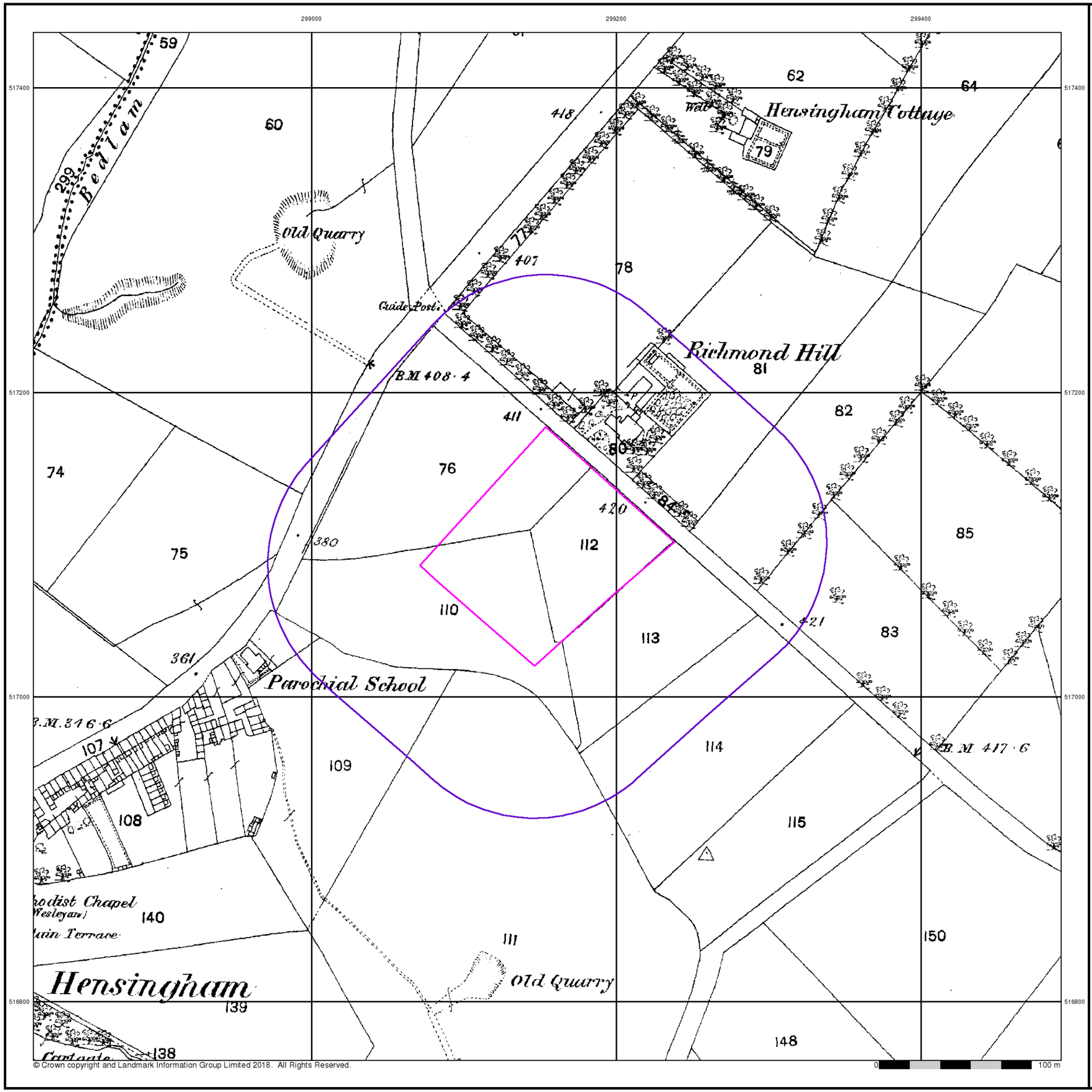
Order Details

Order Number: 180465108_1_1
Customer Ref: 17526/C8049/DG
National Grid Reference: 299150, 517100
Slice: A
Site Area (Ha): 1.31
Search Buffer (m): 100

Site Details

Cleator Moor Road, Whitehaven

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Cumberland

Published 1880

Source map scale - 1:2,500

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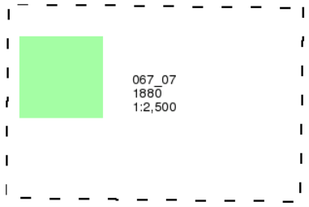
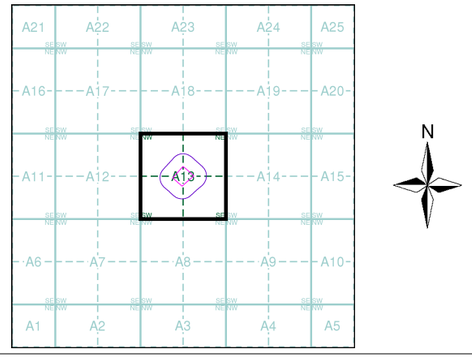
Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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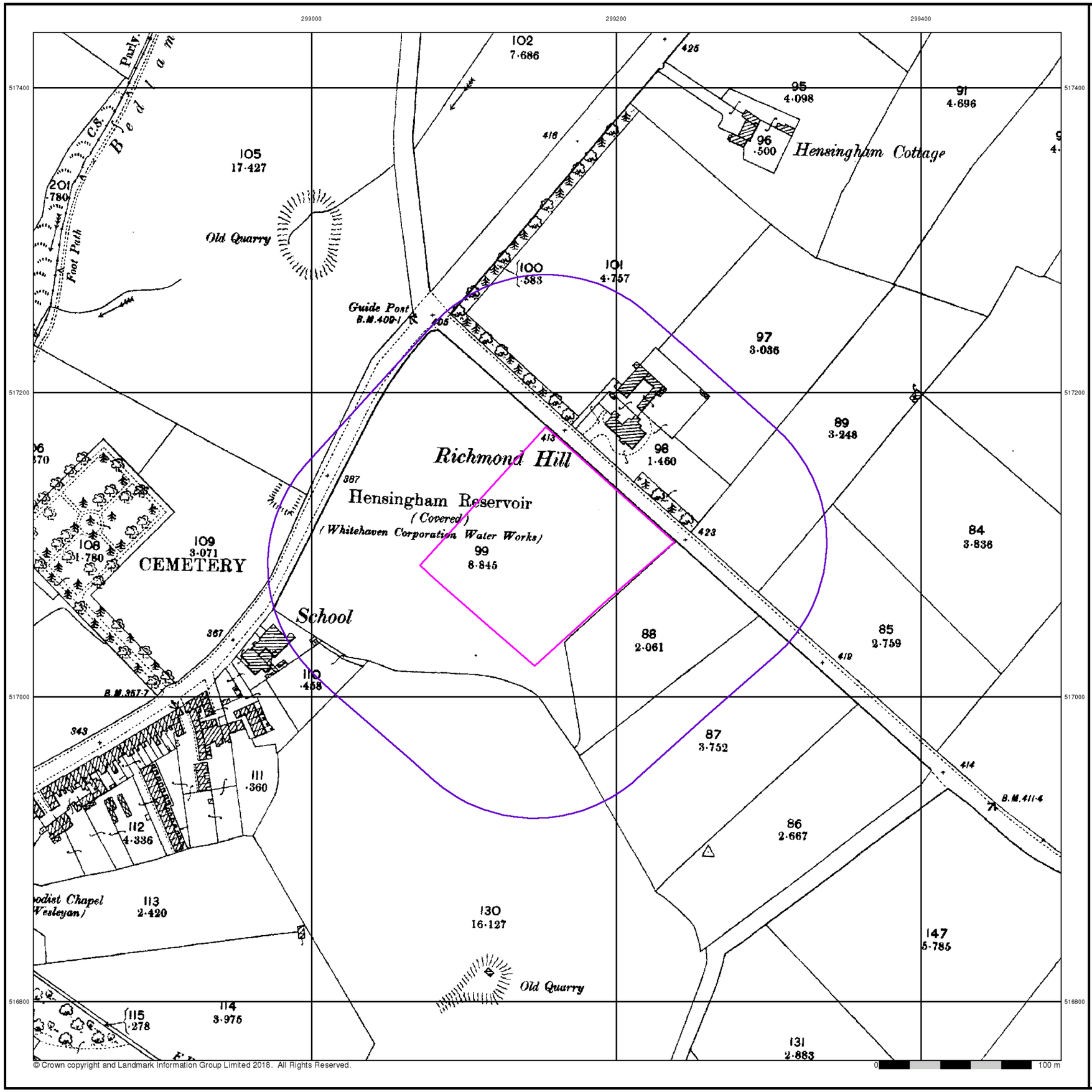

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Cumberland

Published 1899

Source map scale - 1:2,500

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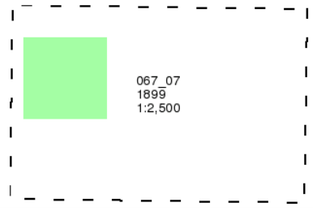
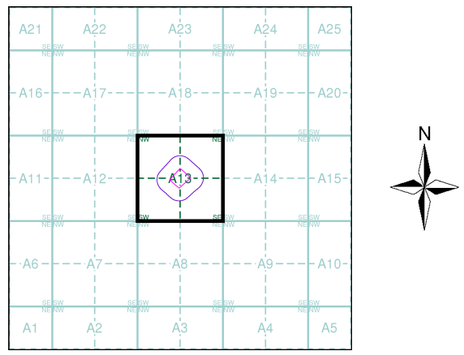
Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
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Slice:	A
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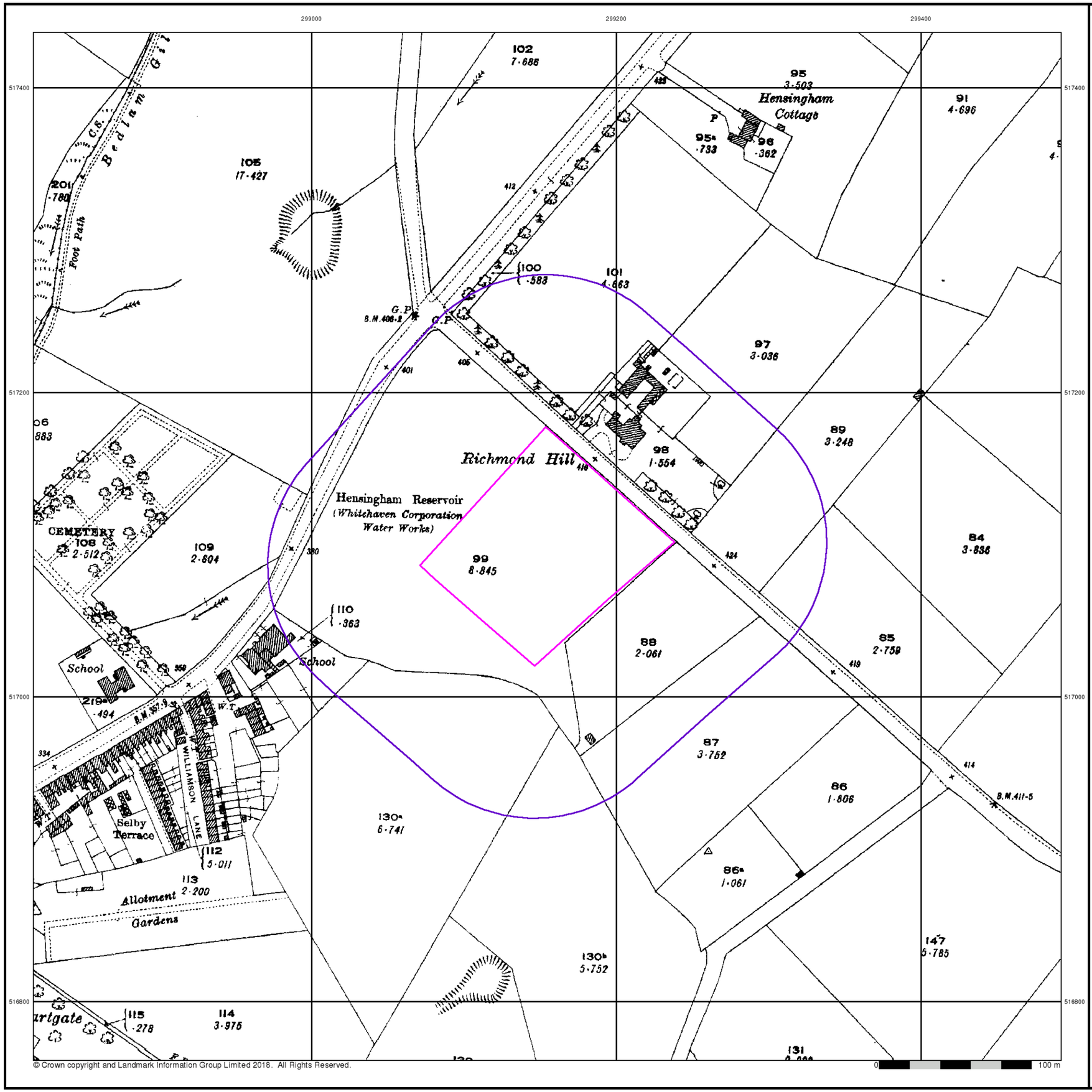

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0 100 m

Cumberland

Published 1925

Source map scale - 1:2,500

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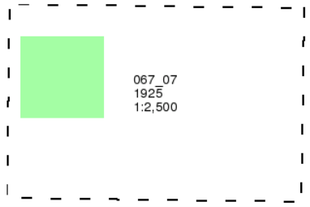
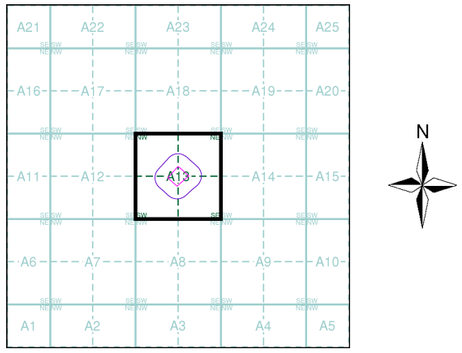
Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
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Slice:	A
Site Area (Ha):	1.31
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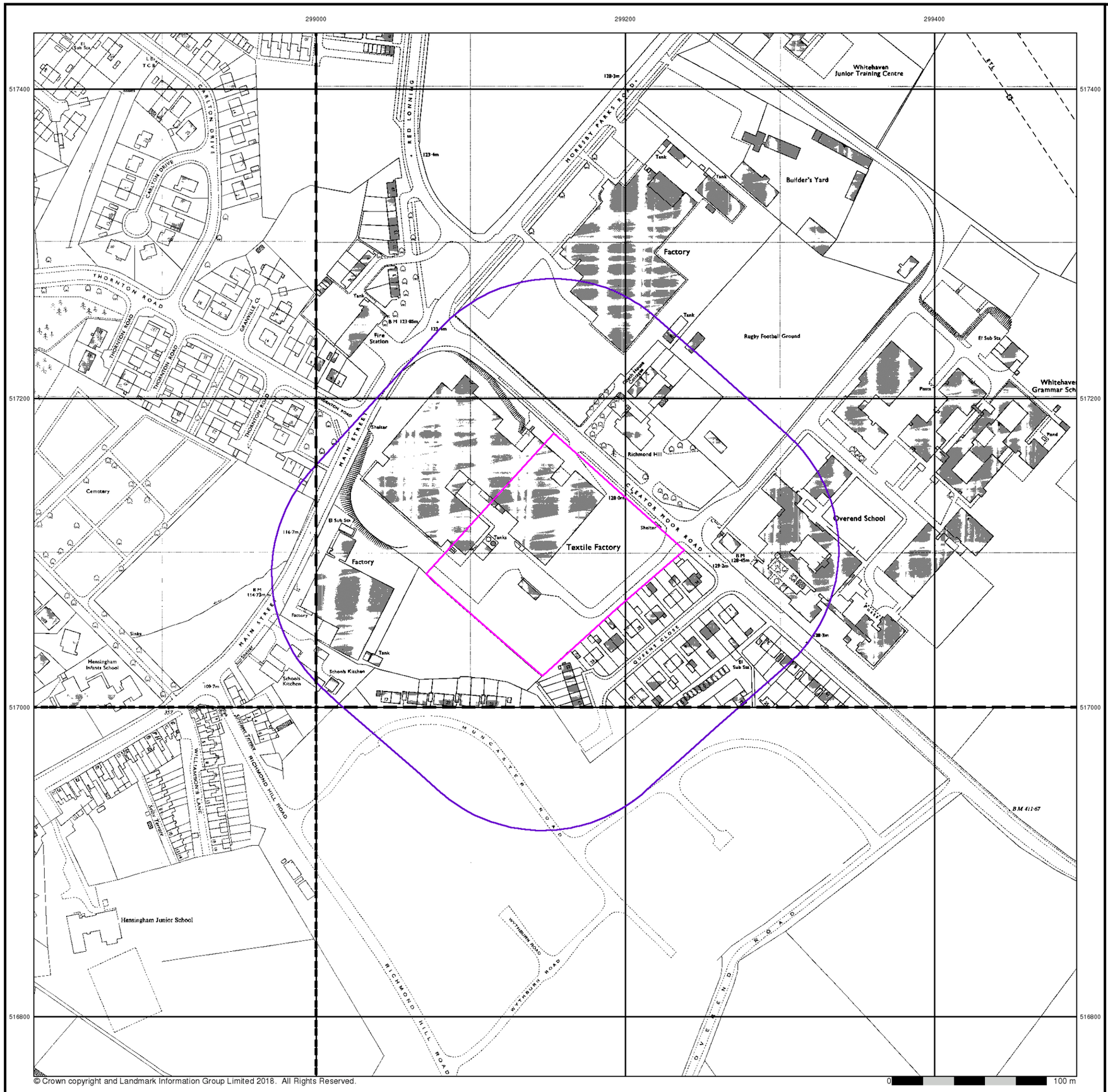

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Ordnance Survey Plan

Published 1961 - 1973

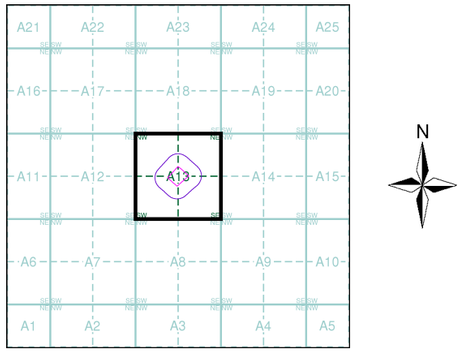
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

NX9817SE 1973 1:1,250	NX9917SW 1973 1:1,250
NX9816NE 1961 1:1,250	NX9916NW 1961 1:1,250

Historical Map - Segment A13



Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	100

Site Details

Cleator Moor Road, Whitehaven

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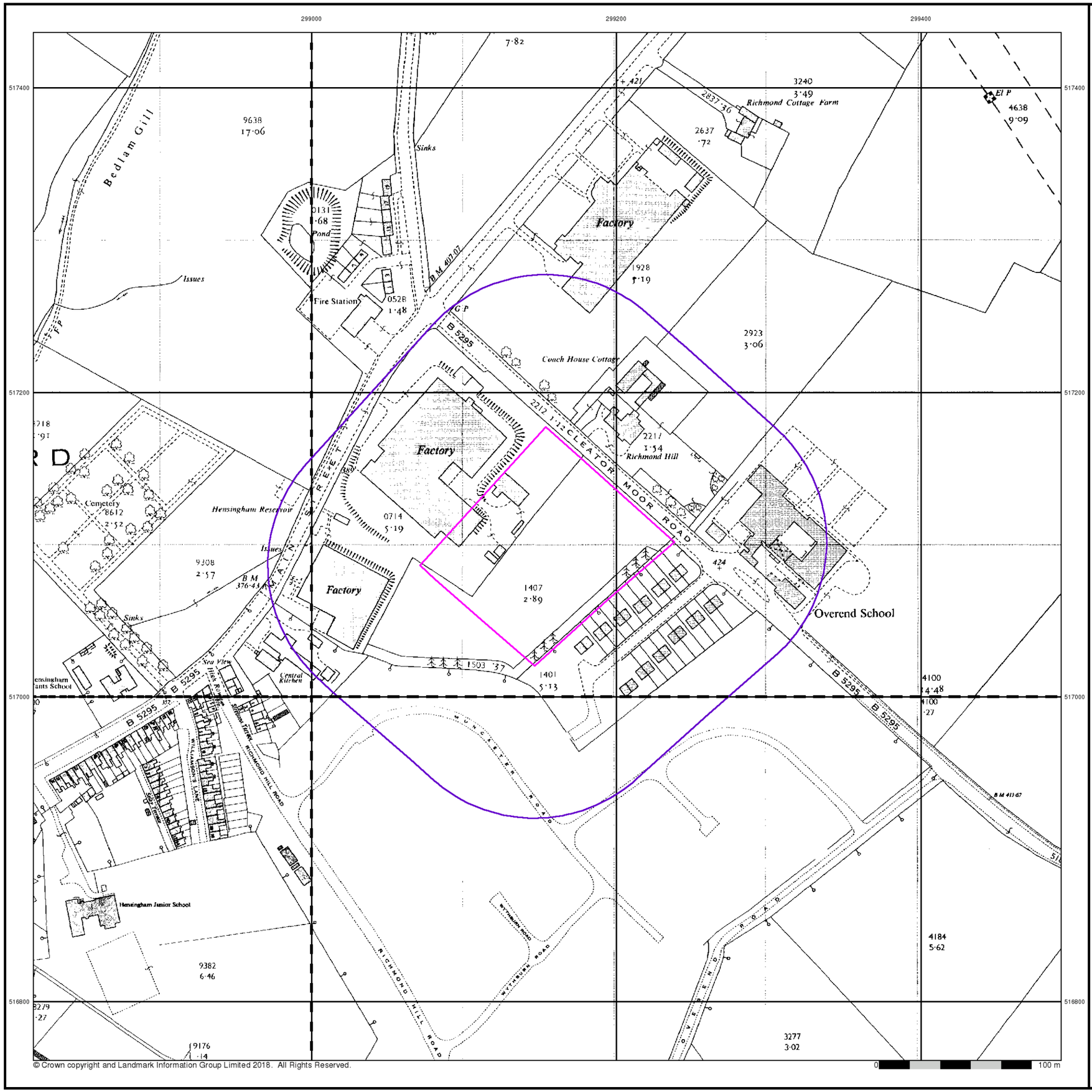


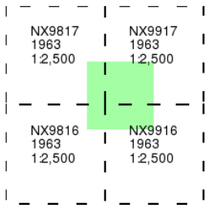
Ordnance Survey Plan

Published 1963

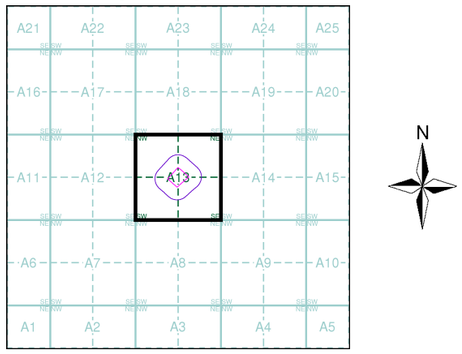
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	100

Site Details

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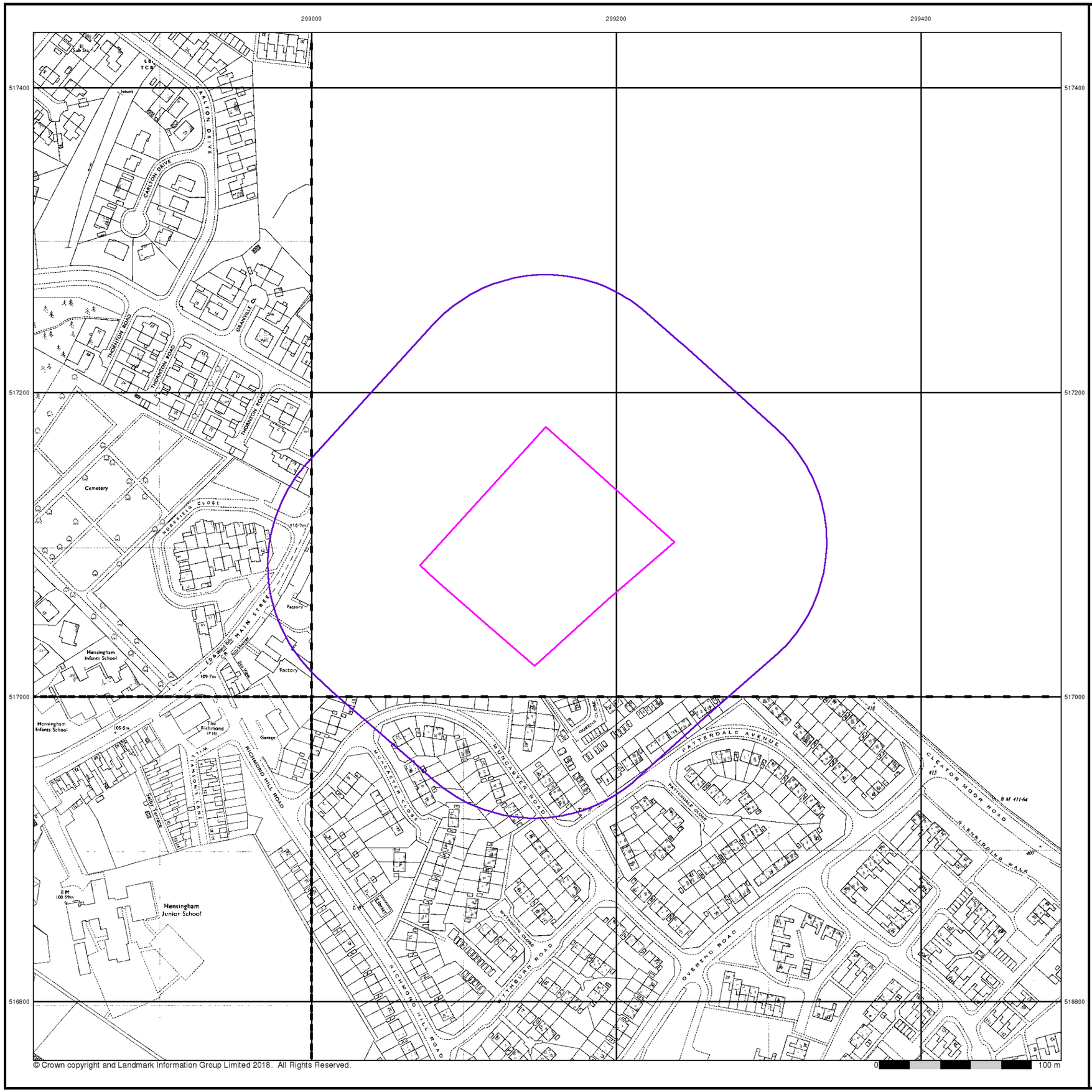

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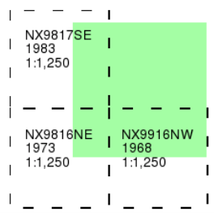
Ordnance Survey Plan

Published 1968 - 1983

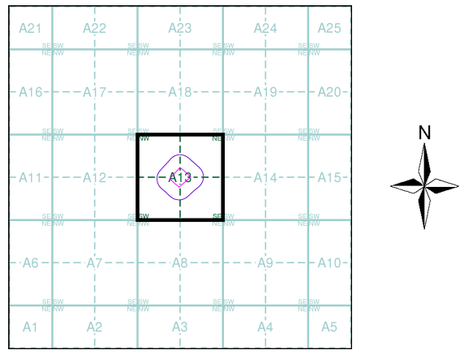
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	100

Site Details

Cleator Moor Road, Whitehaven

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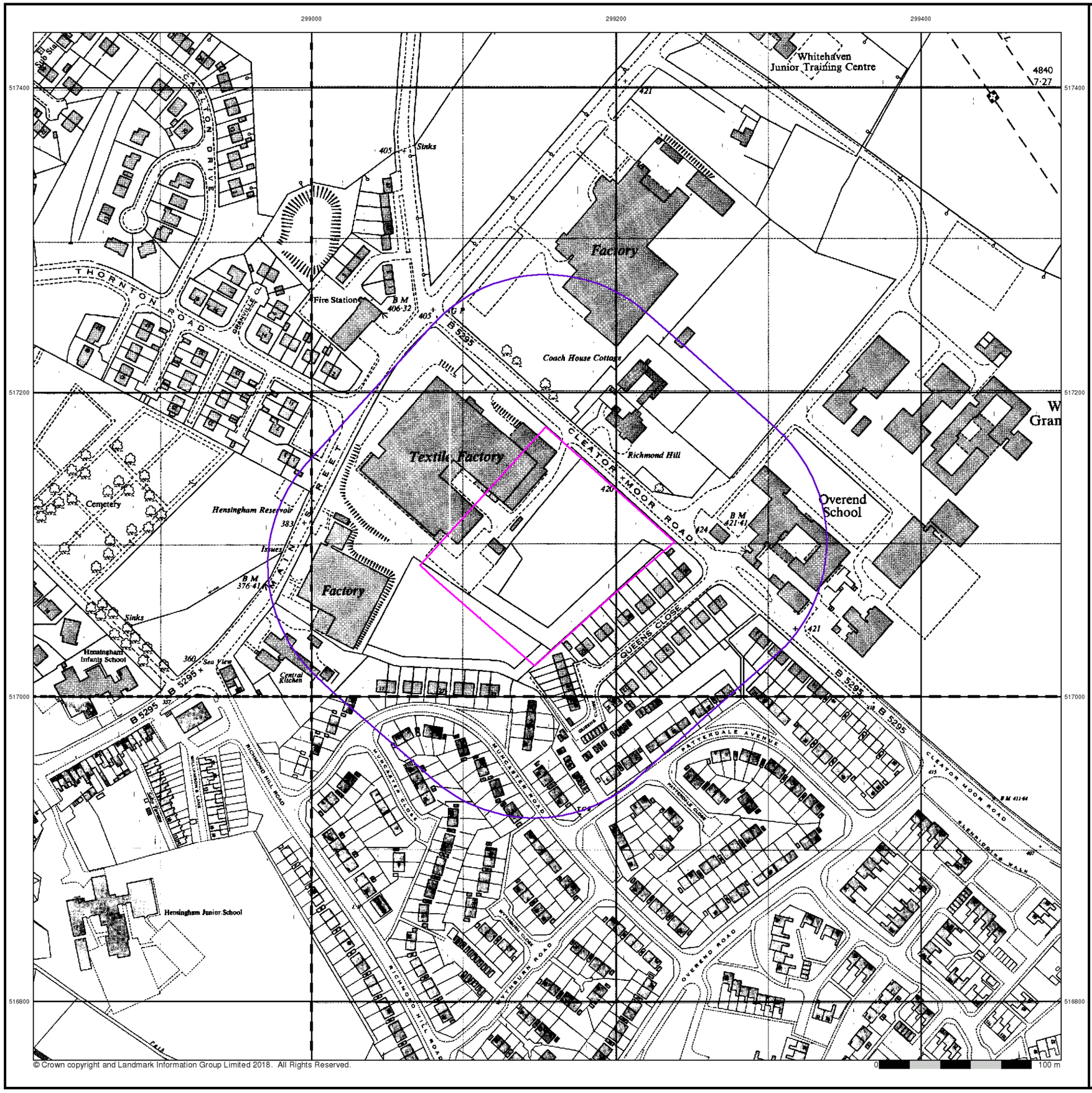
Web: www.envirocheck.co.uk



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0 100 m

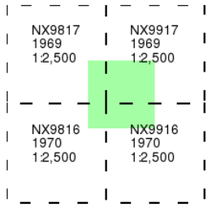
Ordnance Survey Plan

Published 1969 - 1970

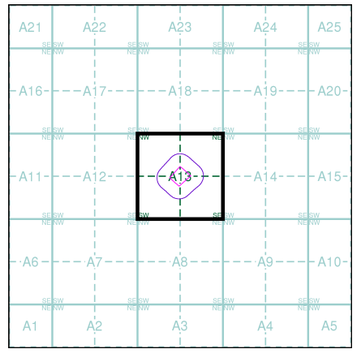
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



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Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	100

Site Details

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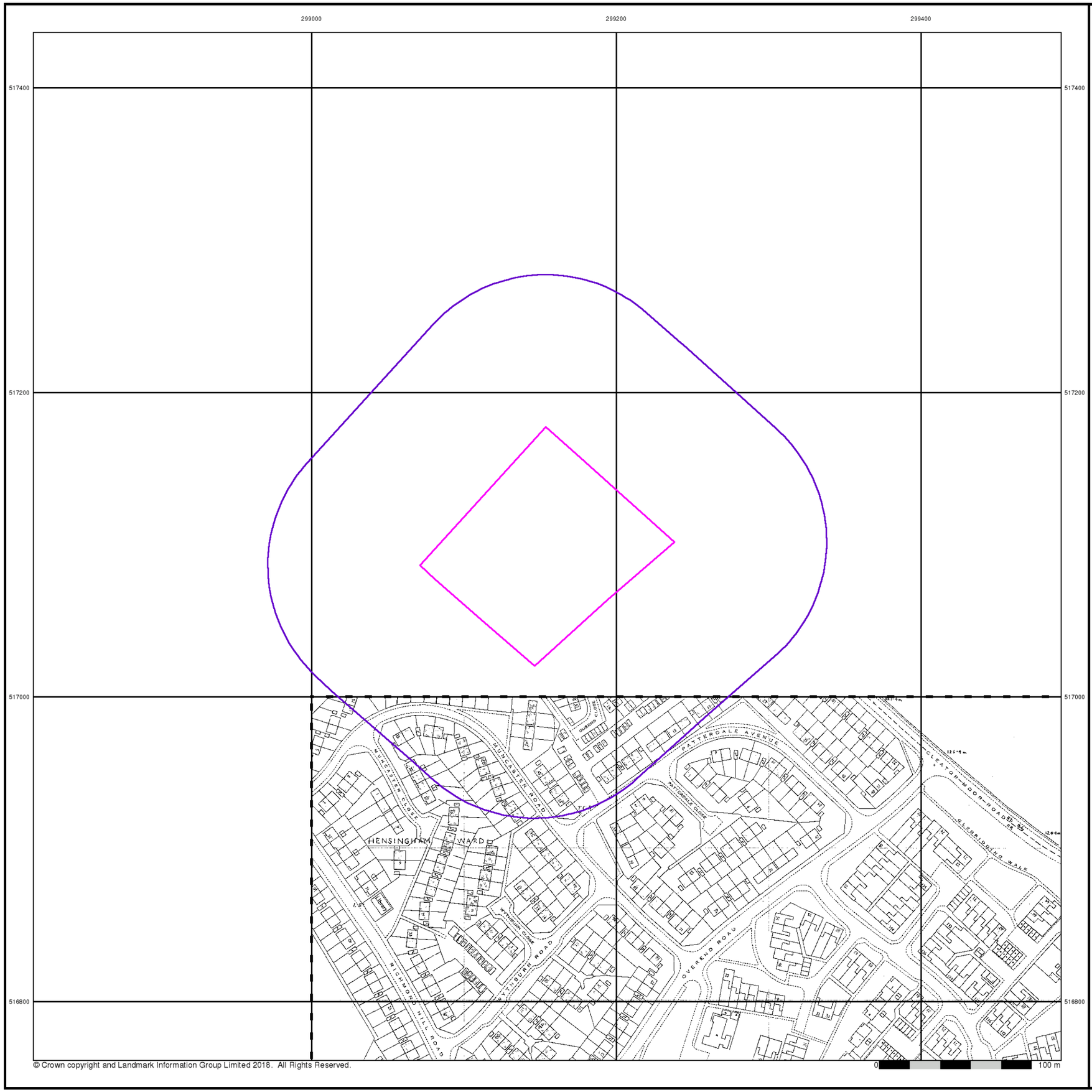

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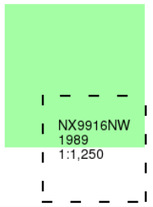
Additional SIMs

Published 1989

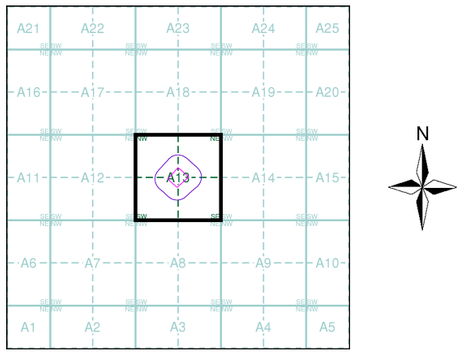
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	100

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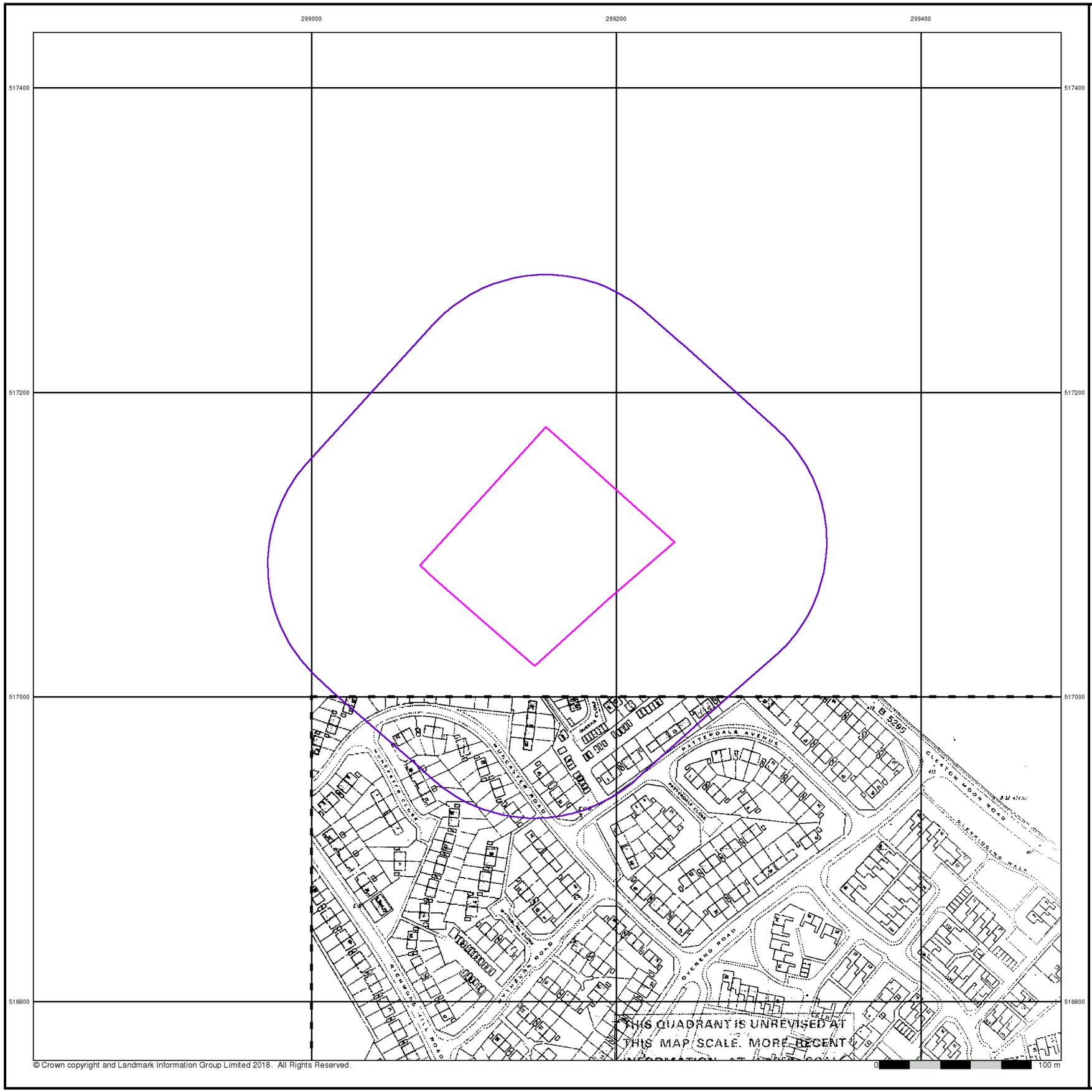

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Additional SIMs

Published 1989

Source map scale - 1:2,500

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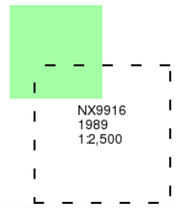
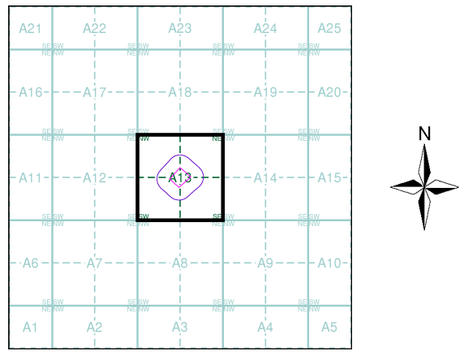
Map Name(s) and Date(s)



Historical Map - Segment A13



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Slice:	A
Site Area (Ha):	1.31
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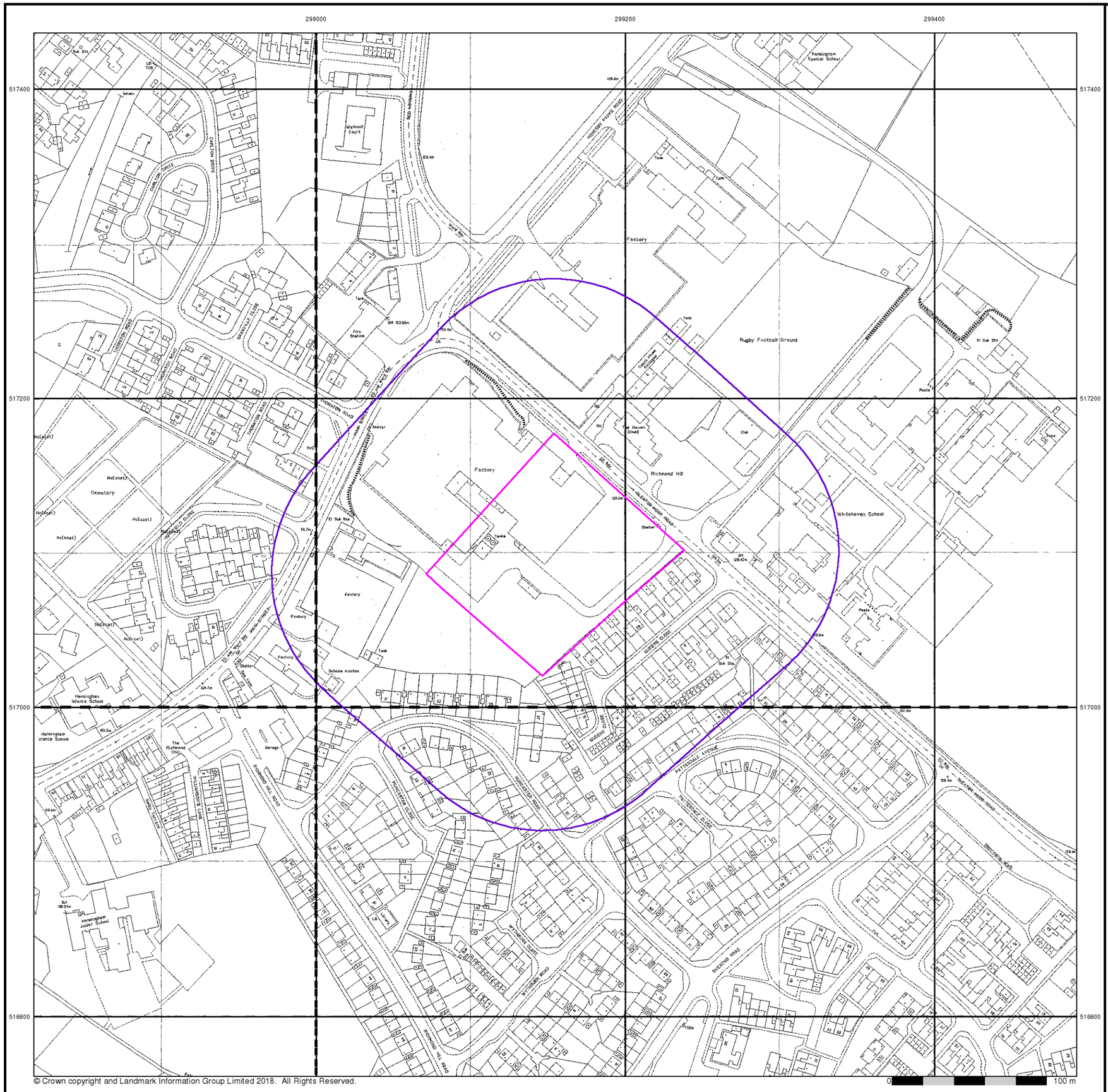
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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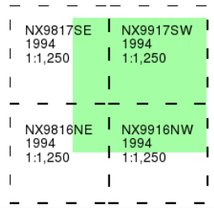
Large-Scale National Grid Data

Published 1994

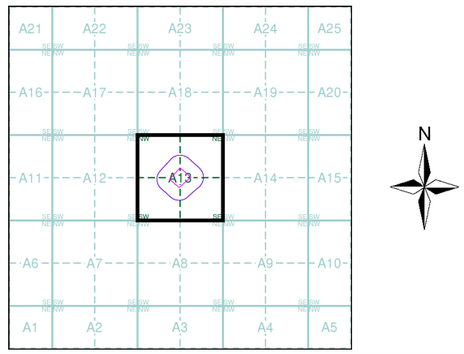
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Slice:	A
Site Area (Ha):	1.31
Search Buffer (m):	100

Site Details

Cleator Moor Road, Whitehaven

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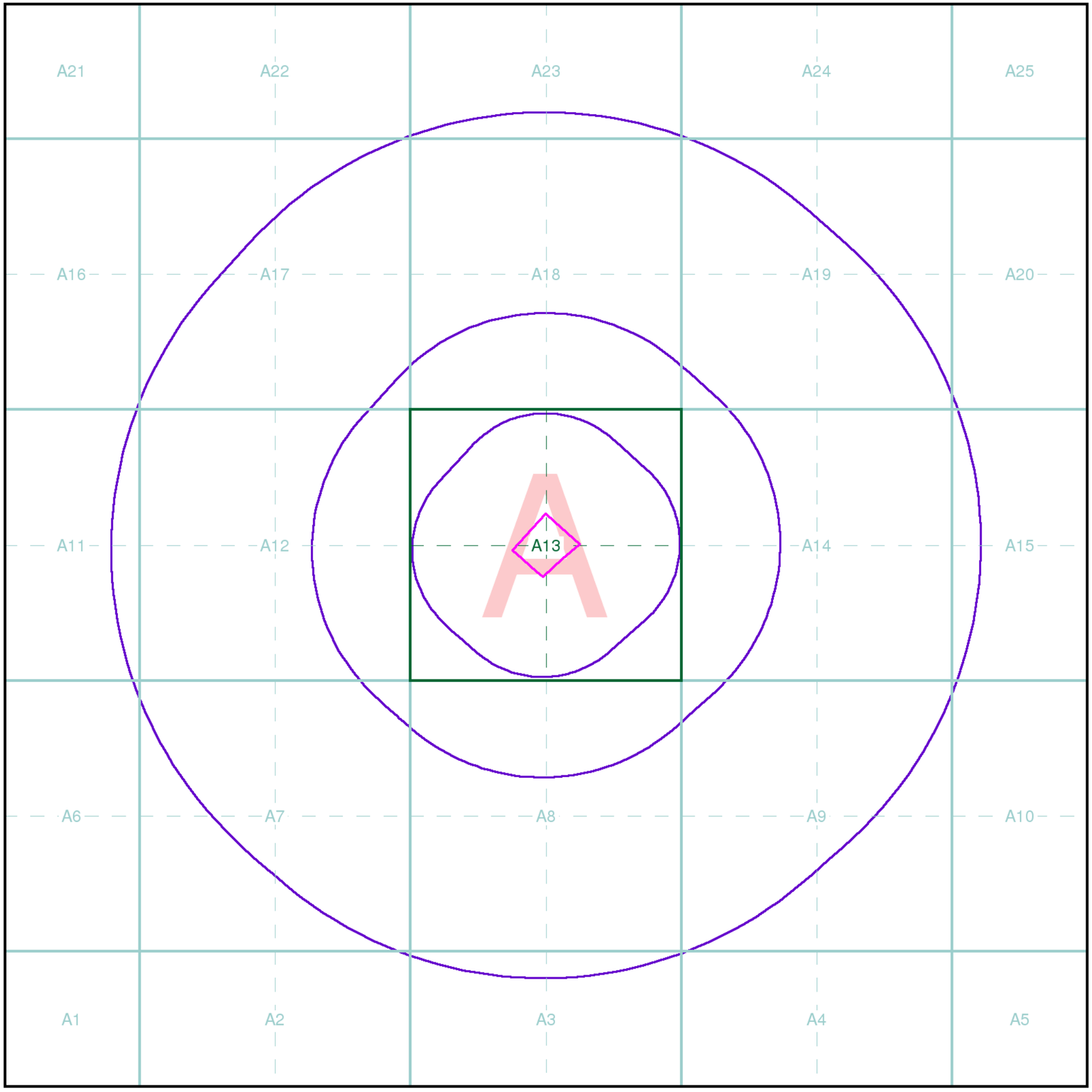
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:

Envirocheck reports are compiled from 136 different sources of data.

Client Details

S Howson, Sirius Geotechnical Ltd, 4245 Park Approach, Thorpe Park, Leeds, LS15 8GB

Order Details

Order Number:	180465108_1_1
Customer Ref:	17526/C8049/DG
National Grid Reference:	299150, 517100
Site Area (Ha):	1.31
Search Buffer (m):	1000

Site Details

Cleator Moor Road, Whitehaven

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APPENDIX C

COAL AUTHORITY MINING REPORT RISK ASSESSMENT

The Coal Authority

Resolving the impacts of mining

CON29M Non-Residential Mining Report

CLEATOR MOOR ROAD
WHITEHAVEN
CUMBRIA

Date of enquiry:	20 September 2018
Date enquiry received:	20 September 2018
Issue date:	20 September 2018
Our reference:	51001945105001
Your reference:	17527/C8049/DG

CON29M Non-Residential Mining Report

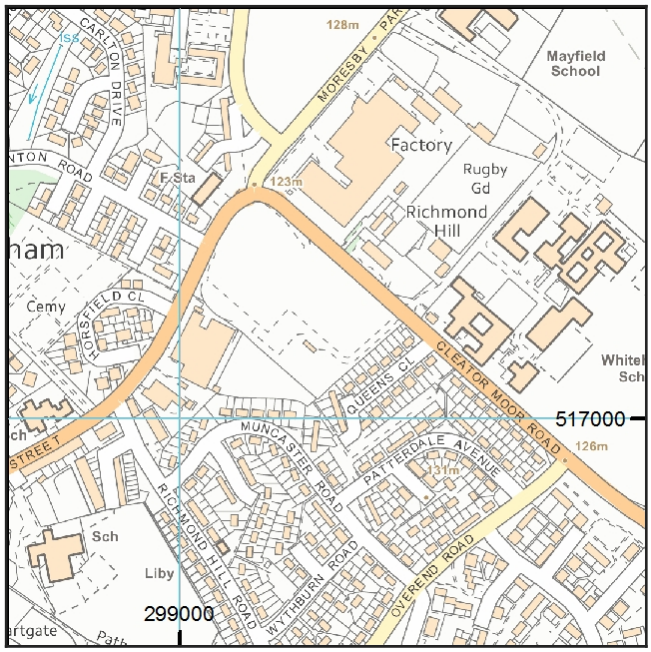
This report is based on, and limited to, the records held by the Coal Authority, at the time we answer the search.

Client name

SIRIUS GEOTECHNICAL & ENVIRONMENTAL LTD

Enquiry address

CLEATOR MOOR ROAD, WHITEHAVEN, CUMBRIA



Approximate position of property

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How to contact us

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

/company/the-coal-authority
/thecoalauthority
/coalauthority

Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	No
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	No
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is not within a surface area that could be affected by recorded past underground mining.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

5. Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10. Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Withdrawal of support

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13. Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Additional remarks

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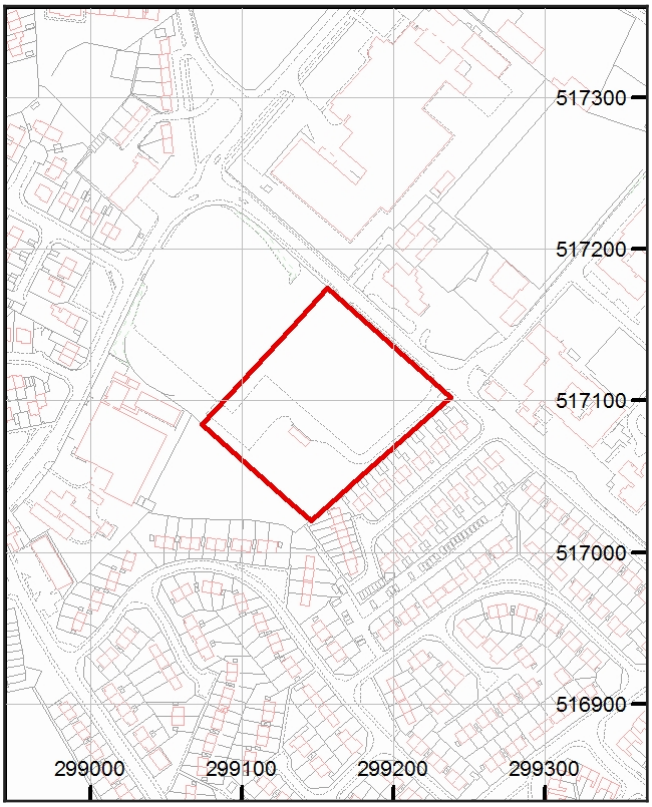
Alternative formats

If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



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Nottinghamshire
NG18 4RG

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APPENDIX D

RISK ASSESSMENT METHODOLOGY

Qualitative Risk Assessment Methodology

The approach adopted by Sirius for the qualitative assessment of risk is based upon that given in Annex 4 of NHBC-Environment Agency-CIEH "Guidance for the Safe Development of Housing on Land Affected by Contamination" (2008) and is consistent with other current guidance.

The risk posed by viable contaminant linkages is based upon the consideration of both:

a) the magnitude of the potential consequence (i.e. its severity); and,

b) the probability (likelihood) of that consequence being realised.

The classifications used in this report for consequence and probability are given in Tables 1 and 2, respectively. The derived risk classifications are defined in Table 3.

Where there is no viable contaminant linkage there is no potential risk.

Table 1. Classification of Consequence

Classification	Definition
Severe	Contaminant concentrations at the receptor that are likely to result in "significant harm" to human health (as defined in Part 2A of the Environmental Protection Act 1990). Major pollution of controlled waters that could have persistent and/or extensive effects on water quality, for example fish kills, closure of an abstraction, or substantial deterioration in quality of the receiving water body. Major impact on receptor amenity value or major damage to agriculture or commerce. Major damage to an ecosystem that is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations at the receptor that might result in "significant harm" to human health (as defined in Part 2A of the Environmental Protection Act 1990). A pollution incident that has significant effect on water quality or abstraction potential. An incident that has a marked effect on receptor amenity value, agriculture or commerce. Damage to an ecosystem that may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.

Classification	Definition
Mild	Potential human health impact at the receptor point but unlikely to be classified as "significant harm" (as defined in Part 2A of the Environmental Protection Act 1990). Pollution of water that will have a small or short-lived effect on water quality and marginal effects on its amenity or resource value or its use in agriculture or commerce. Minor or short-lived damage to ecosystems, which is unlikely to result in a substantial adverse change Minor damage to crops, buildings or property
Minor	No potential measurable detrimental human health impacts at the receptor point. Impact on water that will have no or minimal effect on water quality or use. No or minor and easily repairable effects on buildings, structures and services.

Table 2. Classification of Probability

Classification	Definition
High	An impact is already occurring or is very likely in the short-term and almost inevitable over the long-term.
Medium	It is probable that an event would occur. This is not inevitable but possible in the short-term and likely over the long-term.
Low	Circumstances are possible under which an event could occur. However, it is by no means certain that an event will take place, even over the long-term.
Unlikely	Circumstances are such that it is improbable that an event would occur even over the very long-term.

Table 3. Risk Classification

	Consequence			
Probability	***Severe***	***Medium***	***Mild***	***Minor***
High	Very High	High	Moderate	Low
Medium	High	Moderate	Low to Moderate	Low
Low	Moderate	Low to Moderate	Low	Very Low
Unlikely	Low to Moderate	Low	Very Low	Negligible

Table 4 provides a context for interpretation of the risk classification categories. The definitions provided are based on those given in CIRIA (2001) "Contaminated Land Risk Assessment. A Guide to Good Practice", Report C552.

Table 4. Interpretation of Risk Classification Categories

Risk Classification	Definition
Very High	There is a high probability that severe harm to one or more identified receptors could occur or there is evidence that this is already happening. This risk is likely to result in a substantial liability. Urgent investigation and remediation are likely to be required.
High	Harm is likely to be caused to one or more identified receptors. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could be caused to one or more identified receptors. However, it is relatively unlikely that such harm would be severe. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low	It is possible that harm could be caused to one or more identified receptors but it is likely that this harm, if realised, would normally be mild. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are unlikely to be required.
Very Low	There is a low probability that harm could be caused to one or more identified receptors. In the event of such harm being realised, it is likely to be mild, at worst. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are very unlikely to be required.
Negligible	It is unlikely that harm could be caused to one or more identified receptors. In the event of harm being realised, it is likely to be minor. No further investigation is considered necessary to assess risk or environmental liability. Remedial works are not expected.

APPENDIX E

EXPLORATORY HOLE RECORDS

TRIAL PIT RECORD

Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 08/12/2020
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.	Scale: 1:25

TP No. **TP01** Sheet 1 of 1

Logged By: DG | Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.20			MADE GROUND: Brown and grey clayey very sandy angular fine to coarse gravel of concrete, slag, sandstone and brick. Medium content of angular cobbles of brick and concrete.	0.30			
D	0.70	85.0		Stiff high strength orange brown and brown sandy gravelly CLAY of intermediate plasticity. Gravel is rounded and subrounded fine to coarse sandstone, limestone and occasional slate.	0.90			
D	1.70	120.0	1	Stiff high strength grey brown very sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular and subrounded fine to coarse sandstone. Low content of subangular sandstone cobbles.				
			2	*From 1.5m to 2.5m: Medium content of subrounded sandstone cobbles and boulders.*				
				End of trial pit at 2.50m	2.50			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Pit remained stable. 3. Hand shear vane values of 120kPa are at the limit of the equipment used and should be considered as under representative. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299182.84

Northing: 517132.74

Fig No. TP01

TRIAL PIT RECORD

TP No. **TP01A**
Sheet 1 of 1

Site:	Cleator Moor Road, Whitehaven
Client:	Gleeson Developments Ltd
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.

Contract No: C8049

Date: 08/12/2020

Scale: 1:25

Logged By: DG

Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Brick masonry.				
				MADE GROUND: Concrete footing.	0.60			
				End of trial pit at 0.60m	0.61			
			1					
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Pit remained stable. 3. Pit excavated down the sides of a NE-SW oriented brick wall. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299174.00

Northing: 517141.00

Fig No.

TP01A

TRIAL PIT RECORD

TP No. **TP02**
Sheet 1 of 1

Site: Cleator Moor Road, Whitehaven	Contract No: C8049
Client: Gleeson Developments Ltd	Date: 08/12/2020
Method: Pit excavated with a JCB3CX using a 600mm toothed bucket.	Scale: 1:25
	Logged By: DG / Checked By:

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.20			MADE GROUND: Stiff brown slightly sandy slightly gravelly clay of high plasticity (field estimate). Gravel is angular to subangular fine to coarse sandstone with occasional brick and concrete.	0.50			
D ES	1.00 1.00	120.0	1	Stiff high strength brown mottled grey sandy gravelly CLAY of low plasticity. Gravel is subangular to rounded fine to coarse sandstone with occasional coal, limestone and slate.				
D	1.80		2	*From 1.5m to 2.5m: Becomes friable and with a low content of subrounded sandstone cobbles and boulders.*				
D	2.40			End of trial pit at 2.50m	2.50			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Pit remained stable. 3. Hand shear vane values of 120kPa are at the limit of the equipment used and should be considered as under representative. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299156.00

Northing: 517122.00

Fig No. TP02

TRIAL PIT RECORD

Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 08/12/2020
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.	Scale: 1:25

TP No. **TP03** Sheet 1 of 1

Logged By: DG | Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
D	0.30			MADE GROUND: Brown and grey sandy angular fine to coarse gravel of concrete and brick. Medium content of angular brick and concrete cobbles. Occasional fragments of plastic sheet and steel rebar.				
ES	0.50 - 0.55			Dark grey silty sandy CLAY (relict topsoil). Odour of hydrocarbons.	0.50			
				Stiff medium strength grey sandy gravelly CLAY of intermediate plasticity. Gravel is subangular to rounded fine to coarse sandstone and coal.	0.55			
D	0.90	60.0	1	Stiff medium strength orange brown sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone and coal.	0.70			
D	1.70	120.0		Stiff high strength brown sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone with occasional coal, limestone and slate.	1.60			
			2	*From 2.0m to 2.9m: Becomes friable.*				
D	2.70							
				End of trial pit at 2.90m	2.90			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Pit remained stable. 3. Hand shear vane values of 120kPa are at the limit of the equipment used and should be considered as under representative. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299119.00

Northing: 517101.00

Fig No. TP03

TRIAL PIT RECORD

TP No.	**TP04** Sheet 1 of 1	
Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 08/12/2020
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.	Scale: 1:25
		Logged By: DG / Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.10			Stiff high strength grey brown very sandy gravelly CLAY of intermediate plasticity. Gravel is subangular and subrounded fine to coarse sandstone. Low content of subangular sandstone cobbles.				
				From 0.5m to 2.9m: Becomes friable and with a low content of subrounded sandstone cobbles and boulders.				
D	0.80							
			1					
		120.0						
				From 1.5m to 2.9m: Becomes very stiff.				
D	1.90							
			2					
				End of trial pit at 2.90m	2.90			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Pit remained stable. 3. Hand shear vane values of 120kPa are at the limit of the equipment used and should be considered as under representative. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299176.73

Northing: 517086.49

Fig No. TP04

TRIAL PIT RECORD

TP No. **TP05**
Sheet 1 of 1

Site:	Cleator Moor Road, Whitehaven
Client:	Gleeson Developments Ltd
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.

Contract No: C8049
Date: 08/12/2020
Scale: 1:25
Logged By: DG
Checked By:

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.30			MADE GROUND: Firm brown slightly sandy slightly gravelly clay of high plasticity (field estimate). Gravel is angular to subangular fine to coarse sandstone with occasional brick and concrete.	0.70			
D	1.00		1	MADE GROUND: Orange brown and grey very clayey silty slight gravelly fine to coarse SAND. Gravel is subangular to rounded fine to coarse sandstone and occasional coal. *From 0.7m to 0.8m: Discontinuous layer of dark grey clayey silty fine to coarse sand (relict topsoil).*	0.90			
				Stiff grey brown very sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular and subrounded fine to coarse sandstone. High content of subangular sandstone cobbles.	1.20			
				Grey brown silty fine to coarse SANDSTONE.	1.30			
				End of trial pit at 1.30m				
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater observed at 1.2m - pit flooded. 2. Pit remained stable. 3. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299144.00

Northing: 517037.00

Fig No. TP05

TRIAL PIT RECORD

Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 08/12/2020
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.	Scale: 1:25

TP No. **TP06** Sheet 1 of 1

Logged By: DG | Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.20 - 0.30			MADE GROUND: Firm brown slightly sandy slightly gravelly clay of high plasticity (field estimate). Gravel is angular to subangular fine to coarse sandstone with occasional brick and concrete.	0.70			
D	0.80			MADE GROUND: Orange brown and grey very clayey silty fine to coarse SAND. Medium content of subangular sandstone cobbles.	1.20			
ES	1.30 - 1.40			MADE GROUND: Grey sandy angular fine to coarse gravel of slag. Medium content of angular cobbles of slag. Oily sheen on groundwater within this strata.				
W	1.50			*At 1.5m: 100mm ceramic drain.*				
				End of trial pit at 2.20m	2.20			

1 2 3 4 5

Remarks and Groundwater Observations

1. Groundwater observed at 1.5m - pit flooded. 2. Pit remained stable. 3. Pit terminated on cobbles and boulders of slag. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299136.00

Northing: 517068.00

Fig No. TP06

TRIAL PIT RECORD

TP No. **TP07**
Sheet 1 of 1

Site:	Cleator Moor Road, Whitehaven
Client:	Gleeson Developments Ltd
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.

Contract No: C8049
Date: 08/12/2020
Scale: 1:25
Logged By: DG
Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.00 - 0.10			MADE GROUND: Stiff brown slightly sandy slightly gravelly clay of high plasticity (field estimate). Gravel is angular to subangular fine to coarse sandstone with occasional brick and concrete.	0.10			
				Grey brown silty fine to coarse SANDSTONE.				
				End of trial pit at 0.50m	0.50			

1
2
3
4
5

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Pit remained stable. 3. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299147.00

Northing: 517055.00

Fig No.

TP07

TRIAL PIT RECORD

TP No. **TP08**
Sheet 1 of 1

Site:	Cleator Moor Road, Whitehaven
Client:	Gleeson Developments Ltd
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.

Contract No: C8049
Date: 08/12/2020
Scale: 1:25
Logged By: DG
Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.50			MADE GROUND: Soft to firm low strength brown slightly gravelly SAND and sandy CLAY with rootlets. Gravel is fine subangular to subrounded of sandstone and mudstone. Occasional fragments of plastic and brick. (Stockpile 03: TOPSOIL)				
			1					
			2					
				From 2.8m to 2.9m: Cobbles of sandstone and fragments of plastic sheet.				
D	3.00	57.0	3	Stiff medium strength orange brown mottled grey sandy slightly gravelly CLAY of high plasticity. Gravel is subangular to rounded fine to coarse sandstone and coal.	2.90			
				End of trial pit at 3.30m	3.30			
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater observed at 2.9m. 2. Pit remained stable. 3. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299129.00

Northing: 517099.00

Fig No.

TP08

TRIAL PIT RECORD

TP No. **TP09**
Sheet 1 of 1

Site: Cleator Moor Road, Whitehaven	Contract No: C8049
Client: Gleeson Developments Ltd	Date: 08/12/2020
Method: Pit excavated with a JCB3CX using a 600mm toothed bucket.	Scale: 1:25

Logged By: DG | Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.20			MADE GROUND: Stiff brown slightly sandy slightly gravelly clay of high plasticity (field estimate). Gravel is angular to subangular fine to coarse sandstone with occasional brick and concrete.	0.30			
D	0.70	99.0		Stiff high strength grey and brown very sandy gravelly CLAY of intermediate plasticity. Gravel is subangular and subrounded fine to coarse sandstone.				
			1	*From 1.0m to 2.8m: Becomes friable and with a low content of subrounded sandstone cobbles and boulders.*				
D	1.50							
			2					
D	2.50							
				End of trial pit at 2.80m	2.80			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Pit remained stable. 3. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299206.11

Northing: 517097.96

Fig No. TP09

TRIAL PIT RECORD

TP No.	**TT01** Sheet 1 of 1	
Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 08/12/2020
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.	Scale: 1:25
		Logged By: DG / Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	1.00		1	MADE GROUND: Brown and grey sandy angular fine to coarse GRAVEL AND COBBLES of concrete, brick and sandstone. Occasional plastic fragments and bags. (Stockpile 01: Processed demolition rubble)				
			2	End of trial pit at 2.00m	2.00			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Excavated through edge of Stockpile 01.

GL (m AOD)

Easting:

Northing:

Fig No.

TT01

TRIAL PIT RECORD

TP No.	**TT02** Sheet 1 of 1	
Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 08/12/2020
Method:	Pit excavated with a JCB3CX using a 600mm toothed bucket.	Scale: 1:25
		Logged By: DG / Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	1.00		1	MADE GROUND: GRAVEL AND COBBLES of coated stone/ asphalt (STOCKPILE 02 - ASPHALT)				
			2	End of trial pit at 2.00m	2.00			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Excavated through edge of Stockpile 02

GL (m AOD)

Easting:

Northing:

Fig No.

TT02

TRIAL PIT RECORD

TP No.	**TT03** Sheet 1 of 1	
Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket.	Scale: 1:25
		Logged By: AB / Checked By:

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Brown grey cobbly sandy GRAVEL (DEMOLITION RUBBLE) with a medium half brick, quarter brick and high concrete cobble content (50%) approximately 100mm in size. Gravel is fine to coarse angular concrete, brick with occasional plastic fragments and bags. (Rubble Stockpile).				
			1					
			2	End of trial pit at 2.00m	2.00			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT03

TRIAL PIT RECORD

TP No.	**TT04** Sheet 1 of 1	
Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25
		Logged By: AB / Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Brown and grey sandy angular fine to coarse GRAVEL AND COBBLES of concrete, brick and sandstone. Occasional plastic fragments and bags. (Stockpile 01: Processed demolition rubble)				
			1					
				End of trial pit at 1.80m	1.80			
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT04

TRIAL PIT RECORD

		TP No.	**TT05** Sheet 1 of 1
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
		Logged By: AB	Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Brown and grey sandy angular fine to coarse GRAVEL AND COBBLES of concrete, brick and sandstone. Occasional plastic fragments and bags. (Stockpile 01: Processed demolition rubble)				
			1					
			2	End of trial pit at 2.00m	2.00			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT05

TRIAL PIT RECORD

		TP No.	**TT06** Sheet 1 of 1
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
		Logged By: AB	Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Brown and grey sandy angular fine to coarse GRAVEL AND COBBLES of concrete, brick and sandstone. Occasional plastic fragments and bags. (Stockpile 01: Processed demolition rubble)				
			1					
				End of trial pit at 1.50m	1.50			
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT06

TRIAL PIT RECORD

TP No.	**TT07** Sheet 1 of 1		
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
Logged By:	AB	Checked By:	

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Brown and grey sandy angular fine to coarse GRAVEL AND COBBLES of concrete, brick and sandstone. Occasional plastic fragments and bags. (Stockpile 01: Processed demolition rubble)				
			1					
			2					
				End of trial pit at 2.20m	2.20			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT07

TRIAL PIT RECORD

		TP No.	**TT08** Sheet 1 of 1
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
		Logged By: AB	Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: GRAVEL AND COBBLES of coated stone/ asphalt (STOCKPILE 02 - ASPHALT)				
			1					
				End of trial pit at 1.20m	1.20			
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT08

TRIAL PIT RECORD

TP No.	**TT09** Sheet 1 of 1	
Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25
		Logged By: AB / Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: GRAVEL AND COBBLES of coated stone/ asphalt (STOCKPILE 02 - ASPHALT)				
			1					
				End of trial pit at 1.50m	1.50			
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT09

TRIAL PIT RECORD

		TP No.	**TT10** Sheet 1 of 1
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
		Logged By: AB	Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: GRAVEL AND COBBLES of coated stone/ asphalt (STOCKPILE 02 - ASPHALT)				
			1					
				End of trial pit at 1.50m	1.50			
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT10

TRIAL PIT RECORD

		TP No.	**TT11** Sheet 1 of 1
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
		Logged By: AB	Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
		33.0	1	MADE GROUND: Soft to firm low strength brown slightly gravelly SAND and sandy CLAY with rootlets. Gravel is fine subangular to subrounded of sandstone and mudstone. Occasional fragments of plastic and brick. (Stockpile 03: TOPSOIL)				
				End of trial pit at 1.50m	1.50			
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT11

TRIAL PIT RECORD

		TP No.	**TT12** Sheet 1 of 1
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
		Logged By: AB	Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
		27.0		MADE GROUND: Soft to firm low strength brown slightly gravelly SAND and sandy CLAY with rootlets. Gravel is fine subangular to subrounded of sandstone and mudstone. Occasional fragments of plastic and brick. (Stockpile 03: TOPSOIL)				
				End of trial pit at 1.20m	1.20			

1
2
3
4
5

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT12

TRIAL PIT RECORD

TP No.	**TT13** Sheet 1 of 1		
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
Logged By:	AB	Checked By:	

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
		39.0	1	MADE GROUND: Soft to firm low strength brown slightly gravelly SAND and sandy CLAY with rootlets. Gravel is fine subangular to subrounded of sandstone and mudstone. Occasional fragments of plastic and brick. (Stockpile 03: TOPSOIL)				
				End of trial pit at 1.50m	1.50			
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT13

TRIAL PIT RECORD

		TP No.	**TT14** Sheet 1 of 1
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
		Logged By: AB	Checked By:

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Soft to firm low strength brown slightly gravelly SAND and sandy CLAY with rootlets. Gravel is fine subangular to subrounded of sandstone and mudstone. Occasional fragments of plastic and brick. (Stockpile 03: TOPSOIL)				
			1					
				End of trial pit at 1.50m				
			2		2.00			
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater not observed. 2. Trench remained stable. 3. Material unsuitable for HSV's.

GL (m AOD)

Easting:

Northing:

Fig No.

TT14

TRIAL PIT RECORD

TP No. **TT20**
Sheet 1 of 1

Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale:	1:25

Logged By: AB | Checked By:

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
		22.0		MADE GROUND: Soft low strength orangish brown gravelly slightly sandy CLAY of low plasticity (Field estimate) with rootlets. Gravel is fine to coarse angular to subrounded sandstone, mudstone, with fragments of brick and concrete. (Topsoil).	0.10			
				MADE GROUND: Soft and firm, friable brown sandy very clayey subangular to angular GRAVEL and COBBLES. Gravel is of sandstone and mudstone. Cobbles are of concrete and brick.	0.90			
		42.0	1	Firm low strength orange brown mottled grey sandy slightly gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone, mudstone and coal.	1.20			
				End of trial pit at 1.20m				
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Groundwater seepage observed at 0.5m. 2. Slight instability of pit walls due to clay-bound gravel material.
3. Maximum depth of 1.1m of the clay bound demolition rubble shown at central 2m section of trench.

GL (m AOD)
Easting:
Northing:

Fig No.
TT20

TRIAL PIT RECORD

		TP No.	**TT21** Sheet 1 of 1
Site:	Cleator Moor Road, Whitehaven	Contract No:	C8049
Client:	Gleeson Developments Ltd	Date:	14/01/2021
Method:	Trench excavated with a 8T tracked 360 with a 600mm toothed bucket	Scale: 1:25	
		Logged By: AB	Checked By:

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
		26.0		MADE GROUND: Soft low strength orangish brown gravelly slightly sandy CLAY of low plasticity (field estimate) with rootlets. Gravel is fine to coarse angular to subrounded sandstone, mudstone with fragments of brick and concrete. (Topsoil).	0.30			
			1	MADE GROUND: Soft and firm, friable brown sandy very clayey subangular to angular GRAVEL and COBBLES. Gravel is of sandstone and mudstone. Cobbles are of concrete and brick.	1.10			
		51.0		Firm to stiff medium strength orange brown mottled red and grey slightly gravelly sandy CLAY of high plasticity (field estimate). Gravel is sub angular to rounded fine to coarse sandstone, mudstone and coal. *At 1.2m: Hit ceramic land drain, flooding pit, within southern 2m section of trench.*	1.40			
			2	End of trial pit at 1.40m				
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Hit land drain at 1.2m in southern section of trench - pit flooded. 2. Slight instability of pit walls due to clay-bound gravel material. 3. Depth of made ground varies along length of trench, to maximum depth of 1.2m. 4. Pit excavated down to two sets of NW-SE orientated brick walls (posible foundations) at northern end of trench.

GL (m AOD)

Easting:

Northing:

Fig No. TT21

WINDOW SAMPLING RECORD

Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 07/12/2020
Method:	Tracked window sampler rig.	Scale: 1:25

BH No. **WS01** Sheet 1 of 1

Logged By: DG | Checked By:

Driller: Rotadrill Ltd.

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
D	0.40 - 0.50			MADE GROUND: Stiff brown very sandy gravelly clay of high plasticity (field estimate). Gravel is angular to subangular fine to coarse concrete, slag, sandstone and brick. Cobbles of slag.				
ES	0.80 - 1.00			MADE GROUND: Medium dense brown very clayey sandy gravel of angular and subangular fine to coarse slag and concrete. Cobbles of slag.	0.80			
		N=9 (1,3/2,2,3,2)	1	Stiff high strength brown sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone with occasional coal, limestone and slate.	1.10			
D	1.50 - 1.60							
		92.0						
		81.0 N=22 (2,3/5,5,6,6)	2					
				End of Borehole at 2.45m	2.45			
			3					
			4					
			5					

Remarks and Groundwater Observations:

1. Groundwater observed at 0.9m. 2. Borehole was unstable. 3. Due to the relatively small size of the recovered samples hand shear vane results are likely to be under representative. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299114.00

Northing: 517112.00

Fig No. WS01

WINDOW SAMPLING RECORD

Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 07/12/2020
Method:	Tracked window sampler rig.	Scale: 1:25

BH No. **WS02**
Sheet 1 of 1

Logged By: DG | Checked By:
Driller: Rotadrill Ltd.

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
ES	0.30	32.0		MADE GROUND: Firm low strength orange brown slightly sandy slightly gravelly clay of high plasticity (field estimate). Gravel is angular to subangular fine to coarse sandstone with occasional brick and concrete.				
D	0.70 - 0.80			Loose brown slightly clayey very silty slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse sandstone and occasional coal. Occasional lenses up to approximately 25mm where material has a high proportion of fine coal sand.	0.70			
		N=7 (1,1/1,2,2,2)	1	*From 0.7m to 0.8m: Material is dark grey and with root fragments - relict topsoil.*				
D	1.30 - 1.40			Stiff medium strength brown mottled grey very sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone and coal.	1.40			
		5.0						
ES	1.80 - 1.90			*From 1.9m to 2.0m: Material is high strength.*				
		115.0						
		0 (75 for 70mm/,,,)	2	Brown fine to coarse silty SANDSTONE.	2.00			
				End of Borehole at 2.12m	2.12			
			3					
			4					
			5					

Remarks and Groundwater Observations:

1. Groundwater observed at 0.9m. 2. Due to the relatively small size of the recovered samples hand shear vane results are likely to be under representative. 3. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299127.00

Northing: 517054.00

Fig No. WS02

WINDOW SAMPLING RECORD

Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 07/12/2020
Method:	Tracked window sampler rig.	Scale: 1:25

BH No. **WS04** Sheet 1 of 1

Logged By: DG | Checked By:

Driller: Rotadrill Ltd.

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
ES	0.20 - 0.30			MADE GROUND: Soft to firm grey brown very sandy gravelly CLAY of high plasticity (field estimate). Gravel is angular to subangular fine to coarse sandstone with occasional brick and concrete.				
				From 0.6m to 0.7m: Cobbles of brick.				
					0.70			
D	0.80 - 0.90			Brown very clayey silty fine to medium SAND. Root fragments (Relict topsoil).	0.80			
		67.0 N=7 (1,2/1,2,2,2)	1	Stiff medium strength brown sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone and coal.				
					1.50			
				Soft grey sandy slightly gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone and coal.				
ES	1.80 - 1.90							
		N=12 (4,4/2,4,3,3)	2	*From 2.0m to 2.3m: No recovery.*				
D	2.50 - 2.70			*From 2.5m to 2.8m: Becomes slightly gravelly and occasionally poorly laminated.*				
		50 (6,9/50 for 280mm)		End of Borehole at 2.82m	2.82			
			3					
			4					
			5					

Remarks and Groundwater Observations:

1. Groundwater observed at 1.2m. 2. Due to the relatively small size of the recovered samples hand shear vane results are likely to be under representative. 3. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299132.00

Northing: 517093.00

Fig No. WS04

WINDOW SAMPLING RECORD

BH No. **WS05**
Sheet 1 of 1

Site: Cleator Moor Road, Whitehaven	Contract No: C8049
Client: Gleeson Developments Ltd	Date: 07/12/2020
Method: Tracked window sampler rig.	Scale: 1:25
	Logged By: DG / Checked By:
	Driller: Rotadrill Ltd.

SAMPLE DETAILS / STRATA RECORD

Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
ES	0.00 - 0.10			Stiff high strength brown sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone with occasional coal, limestone and slate.				
D	0.50 - 0.60	120.0						
			1	Brown fine to coarse silty SANDSTONE.	1.00			
				End of Borehole at 1.05m	1.05			
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations:

1. Groundwater not observed. 2. Due to the relatively small size of the recovered samples hand shear vane results are likely to be under representative. 3. Test results of 120kPa are at the limit of the equipment used and are likely to be under representative. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299165.00

Northing: 517056.00

Fig No. WS05

WINDOW SAMPLING RECORD

BH No. **WS06**
Sheet 1 of 1

Site:	Cleator Moor Road, Whitehaven
Client:	Gleeson Developments Ltd
Method:	Tracked window sampler rig.

Contract No: C8049
Date: 07/12/2020
Scale: 1:25

Logged By: DG
Checked By:
Driller: Rotadrill Ltd.

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
ES	0.30 - 0.40			MADE GROUND: Stiff red brown and grey sandy gravelly clay of medium plasticity (field estimate). Gravel is angular to rounded fine to coarse sandstone with occasional coal and concrete. Fragments of plastic sheet.	0.40			
				End of Borehole at 0.40m				

1
2
3
4
5

Remarks and Groundwater Observations:

1. Groundwater not observed. 2. Borehole refused on concrete. 3. Redrilled 1.5m to the north - same strata and refusal at 0.4m. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299155.00

Northing: 517095.00

Fig No.
WS06

WINDOW SAMPLING RECORD

Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 07/12/2020
Method:	Tracked window sampler rig.	Scale: 1:25

BH No. **WS07** Sheet 1 of 2

Logged By: DG | Checked By:

Driller: Rotadrill Ltd.

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Brown and grey sandy gravel of angular fine to coarse concrete and brick. Cobbles of concrete and brick.	0.30			
ES	0.50 - 0.60			Stiff medium strength brown mottled grey sandy gravelly CLAY of medium plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone with occasional coal, limestone and slate.				
D	0.80 - 0.90	51.0 55.0 N=10 (1,2/2,2,3,3)	1	*From 1.0m to 5.45m: Grey mottling absent.*				
D	1.80 - 1.90	120.0 N=21 (3,3/4,5,6,6)	2	*From 1.8m: High strength.*				
D	2.80 - 2.90	120.0 N=22 (4,4/4,5,6,7)	3					
D	3.80 - 3.90	N=29 (4,6/6,7,8,8)	4					
D	4.80 - 4.90		5					

Continued next sheet

Remarks and Groundwater Observations:

1. Groundwater observed at 3.0m. 2. Due to the relatively small size of the recovered samples hand shear vane results are likely to be under representative. 3. Test results of 120kPa are at the limit of the equipment used and are likely to be under representative. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299158.00

Northing: 517144.00

Fig No. WS07

WINDOW SAMPLING RECORD

BH No. **WS07**
Sheet 2 of 2

Site: Cleator Moor Road, Whitehaven	Contract No: C8049
Client: Gleeson Developments Ltd	Date: 07/12/2020
Method: Tracked window sampler rig.	Scale: 1:25
	Logged By: DG / Checked By:
	Driller: Rotadrill Ltd.

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
		N=40 (7,6/8,11,10,11)		Stiff medium strength brown mottled grey sandy gravelly CLAY of medium plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone with occasional coal, limestone and slate.				
				End of Borehole at 5.45m	5.45			
			6					
			7					
			8					
			9					
			10					

Remarks and Groundwater Observations:

1. Groundwater observed at 3.0m. 2. Due to the relatively small size of the recovered samples hand shear vane results are likely to be under representative. 3. Test results of 120kPa are at the limit of the equipment used and are likely to be under representative. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299158.00

Northing: 517144.00

Fig No.

WS07

WINDOW SAMPLING RECORD

Site:	Cleator Moor Road, Whitehaven	Contract No: C8049
Client:	Gleeson Developments Ltd	Date: 07/12/2020
Method:	Tracked window sampler rig.	Scale: 1:25

BH No. **WS08** Sheet 1 of 1

Logged By: DG | Checked By:

Driller: Rotadrill Ltd.

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
ES	0.10 - 0.20			MADE GROUND: Firm medium strength orange brown and grey very sandy gravelly clay of high plasticity (field estimate). Gravel is angular to subangular fine to coarse concrete, sandstone and brick.				
		60.0						
		60.0						
D	0.70 - 0.80			Stiff high strength brown sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone with occasional coal, limestone and slate.	0.60			
		N=18 (2,3/3,4,6,5)	1					
D	1.70 - 1.80							
		21 (4,4/21 for 170mm)	2					
D	2.60 - 2.70							
		N=23 (5,4/5,6,6,6)	3					
				End of Borehole at 3.45m	3.45			
			4					
			5					

Remarks and Groundwater Observations:

1. Groundwater not observed. 2. Due to the relatively small size of the recovered samples hand shear vane results are likely to be under representative. 3. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299193.00

Northing: 517120.00

Fig No. WS08

WINDOW SAMPLING RECORD

BH No. **WS09**
Sheet 1 of 1

Site: Cleator Moor Road, Whitehaven	Contract No: C8049
Client: Gleeson Developments Ltd	Date: 07/12/2020
Method: Tracked window sampler rig.	Scale: 1:25
	Logged By: DG / Checked By:
	Driller: Rotadrill Ltd.

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
ES	0.00 - 0.10			MADE GROUND: Soft orange brown and grey very sandy gravelly clay of high plasticity (field estimate). Gravel is angular to subangular fine to coarse concrete, sandstone and brick.	0.15			
		120.0		Stiff high strength brown sandy gravelly CLAY of high plasticity (field estimate). Gravel is subangular to rounded fine to coarse sandstone with occasional coal, limestone and slate.				
D	0.70 - 0.80							
		N=30 (6,6/7,8,7,8)	1					
D	1.60 - 1.70							
		N=24 (5,5/6,5,6,7)	2					
D	2.60 - 2.70							
		N=21 (3,4/4,5,6,6)	3					
				End of Borehole at 3.45m	3.45			
			4					
			5					

Remarks and Groundwater Observations:

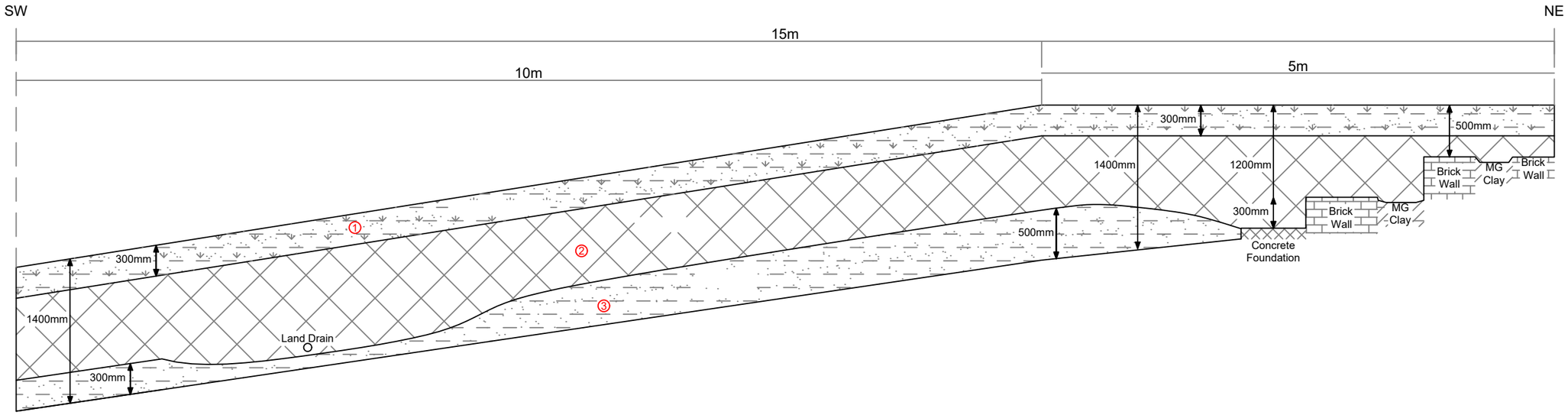
1. Groundwater not observed. 2. Due to the relatively small size of the recovered samples hand shear vane results are likely to be under representative. 3. Test results of 120kPa are at the limit of the equipment used and are likely to be under representative. 4. Hand shear vane values shown are the average of 3 tests.

GL (m AOD)

Easting: 299186.00

Northing: 517099.00

Fig No. WS09



① MADE GROUND: Soft low strength orangish brown gravelly slightly sandy CLAY of low plasticity with rootlets. (Topsoil)

② MADE GROUND: Soft and firm friable brown sandy very clayey subangular to angular GRAVEL AND COBBLES

③ Firm to stiff medium strength orange brown mottled red and grey gravelly sandy CLAY.

NOTES

REVISION		BY	DATE
0	For Information	MF	02/02/21
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

SIRIUS GEOTECHNICAL LTD
Russel House,
Mill Road,
Langley Moor,
Durham DH7 8HJ
www.thesiriusgroup.com
TEL: 0191 378 9972
FAX: 0191 378 1537

CLIENT

Gleeson Developments Ltd

SITE

**Cleator Moor Road,
Whitehaven,
Cumbria**

DRAWING TITLE

Trial Trench 21

DRAWING NO.	REVISION NO.
C8049/TT21	0

DRAWN BY	APPROVED BY
MF	APC

DATE	SCALE	PAPER SIZE
February 2021	NTS	A3

APPENDIX F

LABORATORY TEST RESULTS

Certificate of Analysis

Certificate Number	20-25807	*Issued:*	23-Dec-20
Client	Sirius Geotechnical & Environmental Russel House Suite 2 Mill Road Langley Moor DH7 8HJ		
Our Reference	20-25807		
Client Reference	C8049		
Order No	20710/C8049/APC		
Contract Title	Cleator Moor Road, Whitehaven		
Description	23 Soil samples, 1 Leachate sample, 1 Water sample, 1 Misc sample.		
Date Received	16-Dec-20		
Date Started	16-Dec-20		
Date Completed	23-Dec-20		
Test Procedures	Identified by prefix DETSn (details on request).		
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.		

Approved By

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

Sample ID	Depth	Lab No	Completed	Matrix Description
Covered SP2		1778005	23/12/2020	Brown gravelly SAND including odd rootlets
TT1/Stockpile 1	1	1778006	23/12/2020	Dark brown gravelly, sandy CLAY
TP1	0.2	1778009	23/12/2020	Grey very gravelly SAND
TP2	0.2	1778010	23/12/2020	Brown sandy CLAY
TP4	0.1	1778013	23/12/2020	Dark brown gravelly, sandy CLAY
TP5	0.3	1778014	23/12/2020	Brown slightly gravelly, sandy CLAY including odd rootlets
TP6	0.20-0.30	1778015	23/12/2020	Brown slightly gravelly, sandy CLAY
TP6	1.30-1.40	1778016	23/12/2020	Grey very gravelly SAND (Possible made ground - slag)
TP7	0.00-0.10	1778018	23/12/2020	Brown sandy CLAY including odd rootlets
TP8	0.5	1778019	23/12/2020	Dark brown sandy CLAY including odd rootlets
TP9	0.2	1778020	23/12/2020	Brown gravelly, sandy CLAY including odd rootlets
WS2	0.3	1778021	23/12/2020	Brown gravelly, sandy CLAY including odd rootlets
WS6	0.30-0.40	1778022	23/12/2020	Brown gravelly, sandy CLAY

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778005	1778006	1778007	1778009	1778010	1778012
			.Sample ID	Covered SP2	TT1/Stockpile 1	TT2/Stockpile 2	TP1	TP2	TP3
			Depth		1.00	1.00	0.20	0.20	0.50-0.55
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	8.7	3.7		9.6	7.3	
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	< 0.1		< 0.1	< 0.1	
Chromium	DETSC 2301#	0.15	mg/kg	16	8.8		4.1	9.5	
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0		< 1.0	< 1.0	
Copper	DETSC 2301#	0.2	mg/kg	18	12		17	11	
Lead	DETSC 2301#	0.3	mg/kg	27	11		12	14	
Mercury	DETSC 2325#	0.05	mg/kg	0.06	< 0.05		0.16	0.06	
Nickel	DETSC 2301#	1	mg/kg	15	7.2		4.3	7.7	
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5		2.8	< 0.5	
Zinc	DETSC 2301#	1	mg/kg	46	18		22	14	
Inorganics									
pH	DETSC 2008#		pH	10.4	11.9		11.4	7.8	
Total Organic Carbon	DETSC 2084#	0.5	%	1.8	2.0		1.1	1.7	
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	840	24		320	52	
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.45	0.35		2.0	0.05	
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01					< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01					< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01					< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	2.0					< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	27					< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	77					< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	96					< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	200					< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01					< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01					< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01					< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9					< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5					< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6					< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4					< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10					< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	200					< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01					< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01					< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01					< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01					< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01					< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778005	1778006	1778007	1778009	1778010	1778012
			.Sample ID	Covered SP2	TT1/Stockpile 1	TT2/Stockpile 2	TP1	TP2	TP3
			Depth		1.00	1.00	0.20	0.20	0.50-0.55
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.1	< 0.1	< 0.1	
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	2.9	< 0.1	< 0.1	
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	0.1	0.5	< 0.1	< 0.1	
Fluorene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	0.4	< 0.1	< 0.1	
Phenanthrene	DETSC 3301	0.1	mg/kg	0.5	1.3	0.7	< 0.1	< 0.1	
Anthracene	DETSC 3301	0.1	mg/kg	0.1	0.3	1.0	< 0.1	< 0.1	
Fluoranthene	DETSC 3301	0.1	mg/kg	0.3	1.6	0.1	< 0.1	< 0.1	
Pyrene	DETSC 3301	0.1	mg/kg	0.5	1.2	0.7	< 0.1	< 0.1	
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.1	0.6	0.2	< 0.1	< 0.1	
Chrysene	DETSC 3301	0.1	mg/kg	0.6	0.7	0.9	< 0.1	< 0.1	
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.3	0.4	0.2	< 0.1	< 0.1	
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.2	0.3	0.2	< 0.1	< 0.1	
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.4	0.6	1.0	< 0.1	< 0.1	
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.3	0.3	0.2	< 0.1	< 0.1	
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.3	0.2	0.2	< 0.1	< 0.1	
Coronene	DETSC 3301*	0.1	mg/kg			0.5			
PAH Total	DETSC 3301	1.6	mg/kg	4.1	7.9	9.8	< 1.6	< 1.6	
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3		0.3	< 0.3	

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778013	1778014	1778015	1778016	1778018	1778019
			.Sample ID	TP4	TP5	TP6	TP6	TP7	TP8
			Depth	0.10	0.30	0.20-0.30	1.30-1.40	0.00-0.10	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	12	11	11	13	12	22
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1	0.3
Chromium	DETSC 2301#	0.15	mg/kg	21	18	17	31	22	19
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	24	22	22	8.9	26	39
Lead	DETSC 2301#	0.3	mg/kg	17	28	13	13	12	72
Mercury	DETSC 2325#	0.05	mg/kg	0.11	< 0.05	0.05	0.12	< 0.05	0.15
Nickel	DETSC 2301#	1	mg/kg	31	14	18	3.4	25	21
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	3.2	< 0.5	0.7
Zinc	DETSC 2301#	1	mg/kg	49	25	29	25	39	55
Inorganics									
pH	DETSC 2008#		pH	9.4	7.3	11.2	11.6	7.2	8.2
Total Organic Carbon	DETSC 2084#	0.5	%	1.4	1.5	1.1	< 0.5	1.0	5.9
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	120	19	81	450	26	140
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.10	0.02	0.13	0.87	0.03	0.13
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg				< 0.01		
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg				< 0.01		
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg				< 0.01		
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg				< 1.5		
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg				< 1.2		
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg				< 1.5		
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg				< 3.4		
Aliphatic C5-C35	DETSC 3072*	10	mg/kg				< 10		
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg				< 0.01		
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg				< 0.01		
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg				< 0.01		
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg				< 0.9		
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg				< 0.5		
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg				< 0.6		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg				< 1.4		
Aromatic C5-C35	DETSC 3072*	10	mg/kg				< 10		
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg				< 10		
Benzene	DETSC 3321#	0.01	mg/kg				< 0.01		
Ethylbenzene	DETSC 3321#	0.01	mg/kg				< 0.01		
Toluene	DETSC 3321#	0.01	mg/kg				< 0.01		
Xylene	DETSC 3321#	0.01	mg/kg				< 0.01		
MTBE	DETSC 3321	0.01	mg/kg				< 0.01		

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778013	1778014	1778015	1778016	1778018	1778019
			.Sample ID	TP4	TP5	TP6	TP6	TP7	TP8
			Depth	0.10	0.30	0.20-0.30	1.30-1.40	0.00-0.10	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	0.7	0.2	4.4	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	0.8	1.3	0.3	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	1.8	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	13	< 0.1	< 0.1	0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	3.5	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	2.1	16	0.2	< 0.1	0.5
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.8	13	0.2	< 0.1	0.4
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	5.9	< 0.1	< 0.1	0.2
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	5.1	< 0.1	< 0.1	0.4
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	3.0	< 0.1	< 0.1	0.2
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	2.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	4.1	< 0.1	< 0.1	0.2
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	2.3	< 0.1	< 0.1	0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.4	< 0.1	< 0.1	0.2
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	1.6	< 0.1	< 0.1	0.2
Coronene	DETSC 3301*	0.1	mg/kg						
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	4.4	74	5.1	< 1.6	2.7
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	0.9

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778020	1778021	1778022	1778023	1778024	1778025
			.Sample ID	TP9	WS2	WS6	TP05	WS1	WS2
			Depth	0.20	0.30	0.30-0.40	1.00	1.50-1.60	1.30-1.40
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/12/2020	07/12/2020	07/12/2020	07/12/2020	07/12/2020	07/12/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	14	15	7.9			
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Chromium	DETSC 2301#	0.15	mg/kg	20	19	16			
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0			
Copper	DETSC 2301#	0.2	mg/kg	26	29	20			
Lead	DETSC 2301#	0.3	mg/kg	14	23	9.2			
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.07	< 0.05			
Nickel	DETSC 2301#	1	mg/kg	13	13	16			
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5			
Zinc	DETSC 2301#	1	mg/kg	25	24	25			
Inorganics									
pH	DETSC 2008#		pH	7.5	7.6	6.7	6.9	8.5	6.9
Total Organic Carbon	DETSC 2084#	0.5	%	0.9	1.5	0.8			
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	16	26	20	11	59	15
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.02	0.03	0.02			
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg						
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg						
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg						
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg						
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg						
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg						
Aliphatic C5-C35	DETSC 3072*	10	mg/kg						
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg						
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg						
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg						
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg						
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg						
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg						
Aromatic C5-C35	DETSC 3072*	10	mg/kg						
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg						
Benzene	DETSC 3321#	0.01	mg/kg						
Ethylbenzene	DETSC 3321#	0.01	mg/kg						
Toluene	DETSC 3321#	0.01	mg/kg						
Xylene	DETSC 3321#	0.01	mg/kg						
MTBE	DETSC 3321	0.01	mg/kg						

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778020	1778021	1778022	1778023	1778024	1778025
			.Sample ID	TP9	WS2	WS6	TP05	WS1	WS2
			Depth	0.20	0.30	0.30-0.40	1.00	1.50-1.60	1.30-1.40
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	08/12/2020	07/12/2020	07/12/2020	07/12/2020	07/12/2020	07/12/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1			
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.1			
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.8			
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	1.0			
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	0.4	7.1			
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.1	1.9			
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.6	9.7			
Pyrene	DETSC 3301	0.1	mg/kg	0.1	0.4	7.4			
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.3	3.5			
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	0.2	2.9			
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.2	1.7			
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.1	1.2			
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.2	2.3			
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.1	1.2			
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.3			
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	0.1	1.1			
Coronene	DETSC 3301*	0.1	mg/kg						
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	2.8	43			
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3			

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778026	1778027	1778028	1778029
			.Sample ID	WS4	WS5	WS7	WS9
			Depth	0.80-0.90	0.50-0.60	0.80-0.90	0.70-0.80
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	07/12/2020	07/12/2020	07/12/2020	07/12/2020
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg				
Cadmium	DETSC 2301#	0.1	mg/kg				
Chromium	DETSC 2301#	0.15	mg/kg				
Chromium, Hexavalent	DETSC 2204*	1	mg/kg				
Copper	DETSC 2301#	0.2	mg/kg				
Lead	DETSC 2301#	0.3	mg/kg				
Mercury	DETSC 2325#	0.05	mg/kg				
Nickel	DETSC 2301#	1	mg/kg				
Selenium	DETSC 2301#	0.5	mg/kg				
Zinc	DETSC 2301#	1	mg/kg				
Inorganics							
pH	DETSC 2008#		pH	7.6	5.5	7.1	6.5
Total Organic Carbon	DETSC 2084#	0.5	%				
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	24	27	36	10
Sulphate as SO4, Total	DETSC 2321#	0.01	%				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg				
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg				
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg				
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg				
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg				
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg				
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg				
Aliphatic C5-C35	DETSC 3072*	10	mg/kg				
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg				
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg				
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg				
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg				
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg				
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg				
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg				
Aromatic C5-C35	DETSC 3072*	10	mg/kg				
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg				
Benzene	DETSC 3321#	0.01	mg/kg				
Ethylbenzene	DETSC 3321#	0.01	mg/kg				
Toluene	DETSC 3321#	0.01	mg/kg				
Xylene	DETSC 3321#	0.01	mg/kg				
MTBE	DETSC 3321	0.01	mg/kg				

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778026	1778027	1778028	1778029
			.Sample ID	WS4	WS5	WS7	WS9
			Depth	0.80-0.90	0.50-0.60	0.80-0.90	0.70-0.80
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	07/12/2020	07/12/2020	07/12/2020	07/12/2020
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg				
Acenaphthylene	DETSC 3301	0.1	mg/kg				
Acenaphthene	DETSC 3301	0.1	mg/kg				
Fluorene	DETSC 3301	0.1	mg/kg				
Phenanthrene	DETSC 3301	0.1	mg/kg				
Anthracene	DETSC 3301	0.1	mg/kg				
Fluoranthene	DETSC 3301	0.1	mg/kg				
Pyrene	DETSC 3301	0.1	mg/kg				
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg				
Chrysene	DETSC 3301	0.1	mg/kg				
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg				
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg				
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg				
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg				
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg				
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg				
Coronene	DETSC 3301*	0.1	mg/kg				
PAH Total	DETSC 3301	1.6	mg/kg				
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg				

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Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778005	1778012	1778016
			.Sample ID	Covered SP2	TP3	TP6
			Depth		0.50-0.55	1.30-1.40
			Other ID			
			Sample Type	SOIL	SOIL	SOIL
			Sampling Date	08/12/2020	08/12/2020	08/12/2020
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
SVOCs						
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Naphthalene	DETSC 3433	0.1	mg/kg		< 0.1	
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3433	0.1	mg/kg		< 0.1	
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3433	0.1	mg/kg		< 0.1	
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3433	0.1	mg/kg		< 0.1	
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3433	0.1	mg/kg		< 0.1	
Anthracene	DETSC 3433	0.1	mg/kg		< 0.1	
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3433	0.1	mg/kg		0.2	

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Soil VOC/SVOC Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1778005	1778012	1778016
			.Sample ID	Covered SP2	TP3	TP6
			Depth		0.50-0.55	1.30-1.40
			Other ID			
			Sample Type	SOIL	SOIL	SOIL
			Sampling Date	08/12/2020	08/12/2020	08/12/2020
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Pyrene	DETSC 3433	0.1	mg/kg		0.2	
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3433	0.1	mg/kg		0.2	
Chrysene	DETSC 3433	0.1	mg/kg		0.2	
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3433	0.1	mg/kg		< 0.1	
Benzo(k)fluoranthene	DETSC 3433	0.1	mg/kg		< 0.1	
Benzo(a)pyrene	DETSC 3433	0.1	mg/kg		< 0.1	
Indeno(123cd)pyrene	DETSC 3433	0.1	mg/kg		< 0.1	
Dibenzo(ah)anthracene	DETSC 3433	0.1	mg/kg		< 0.1	
Benzo(ghi)perylene	DETSC 3433	0.1	mg/kg		< 0.1	
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

Lab No	1778017
.Sample ID	TP6
Depth	1.50
Other ID	
Sample Type	WATER
Sampling Date	08/12/2020
Sampling Time	n/s

Test	Method	LOD	Units	
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	60
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	15
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	430
Aliphatic C10-C12	DETSC 3072*	1	ug/l	20000
Aliphatic C12-C16	DETSC 3072*	1	ug/l	200000
Aliphatic C16-C21	DETSC 3072*	1	ug/l	200000
Aliphatic C21-C35	DETSC 3072*	1	ug/l	69000
Aliphatic C5-C35	DETSC 3072*	10	ug/l	490000
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	11000
Aromatic C12-C16	DETSC 3072*	1	ug/l	110000
Aromatic C16-C21	DETSC 3072*	1	ug/l	130000
Aromatic C21-C35	DETSC 3072*	1	ug/l	47000
Aromatic C5-C35	DETSC 3072*	10	ug/l	300000
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	790000
Benzene	DETSC 3322	1	ug/l	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0
Xylene	DETSC 3322	1	ug/l	24
MTBE	DETSC 3322	1	ug/l	< 1.0
SVOCs				
Phenol	DETSC 3434*	1	ug/l	< 10.0
Aniline	DETSC 3434*	1	ug/l	< 10.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 10.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 10.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 10.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 10.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 10.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 10.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 10.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 10.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 10.0
Naphthalene	DETSC 3434*	1	ug/l	< 10.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 10.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 10.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 10.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 10.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 10.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 10.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

Lab No	1778017
.Sample ID	TP6
Depth	1.50
Other ID	
Sample Type	WATER
Sampling Date	08/12/2020
Sampling Time	n/s

Test	Method	LOD	Units	
2-Nitroaniline	DETSC 3434*	1	ug/l	< 10.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 10.0
Acenaphthylene	DETSC 3434*	1	ug/l	< 10.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 10.0
Acenaphthene	DETSC 3434*	1	ug/l	< 10.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 10.0
Dibenzofuran	DETSC 3434*	1	ug/l	20
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 10.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 10.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 10.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 10.0
Fluorene	DETSC 3434*	1	ug/l	< 10.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 10.0
Diphenylamine	DETSC 3434*	1	ug/l	< 10.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 10.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 10.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 10.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 10.0
Phenanthrene	DETSC 3434*	1	ug/l	< 10.0
Anthracene	DETSC 3434*	1	ug/l	< 10.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 10.0
Fluoranthene	DETSC 3434*	1	ug/l	27
Pyrene	DETSC 3434*	1	ug/l	29
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 10.0
Benzo(a)anthracene	DETSC 3434*	1	ug/l	< 10.0
Chrysene	DETSC 3434*	1	ug/l	< 10.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 10.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 10.0
Benzo(b)fluoranthene	DETSC 3434*	1	ug/l	< 10.0
Benzo(k)fluoranthene	DETSC 3434*	1	ug/l	< 10.0
Benzo(a)pyrene	DETSC 3434*	1	ug/l	< 10.0
Indeno(123cd)pyrene	DETSC 3434*	1	ug/l	< 10.0
Dibenzo(ah)anthracene	DETSC 3434*	1	ug/l	< 10.0
Benzo(ghi)perylene	DETSC 3434*	1	ug/l	< 10.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 10.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 10.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 10.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 10.0
Azobenzene	DETSC 3434*	1	ug/l	< 10.0
Carbazole	DETSC 3434*	1	ug/l	< 10.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 10.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

Lab No	1778030
.Sample ID	TT2/Stockpile 2
Depth	1.00
Other ID	
Sample Type	LEACHATE
Sampling Date	08/12/2020
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
Leachate 2:1 250g Non-WAC	DETSC 1009*			Y
Phenols				
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 20-25807
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

Lab No	Sample ID	Sample Location	Material Type*	Result	Comment*	Analyst
1778005	Covered SP2		SOIL	NAD	none	Darryl Fletcher
1778006	TT1/Stockpile 1 1.00		SOIL	NAD	none	Darryl Fletcher
1778008	Cement Sheet		Cement	NAD	none	Darryl Fletcher
1778009	TP1 0.20		SOIL	NAD	none	Darryl Fletcher
1778010	TP2 0.20		SOIL	NAD	none	Darryl Fletcher
1778011	TP3 0.30		SOIL	NAD	none	Darryl Fletcher
1778013	TP4 0.10		SOIL	NAD	none	Darryl Fletcher
1778014	TP5 0.30		SOIL	NAD	none	Darryl Fletcher
1778015	TP6 0.20-0.30		SOIL	NAD	none	Darryl Fletcher
1778016	TP6 1.30-1.40		SOIL	NAD	none	Darryl Fletcher
1778018	TP7 0.00-0.10		SOIL	NAD	none	Darryl Fletcher
1778019	TP8 0.50		SOIL	NAD	none	Darryl Fletcher
1778020	TP9 0.20		SOIL	NAD	none	Darryl Fletcher
1778021	WS2 0.30		SOIL	NAD	none	Darryl Fletcher
1778022	WS6 0.30-0.40		SOIL	NAD	none	Darryl Fletcher

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 20-25807
Client Ref C8049
Contract Cleator Moor Road, Whitehaven

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1778005	Covered SP2 SOIL	08/12/20	PT 1L	pH + Conductivity (7 days)	Aliphatics/Aromatics, BTEX, Naphthalene, PAH FID, SVOC
1778006	TT1/Stockpile 1 1.00 SOIL	08/12/20	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1778007	TT2/Stockpile 2 1.00 SOIL	08/12/20	GJ 250ml, PT 1L		
1778008	Cement Sheet MISC	08/12/20	PT 1L		
1778009	TP1 0.20 SOIL	08/12/20	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1778010	TP2 0.20 SOIL	08/12/20	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1778011	TP3 0.30 SOIL	08/12/20	PT 1L		
1778012	TP3 0.50-0.55 SOIL	08/12/20	GJ 250ml, GJ 60ml		
1778013	TP4 0.10 SOIL	08/12/20	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1778014	TP5 0.30 SOIL	08/12/20	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1778015	TP6 0.20-0.30 SOIL	08/12/20	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1778016	TP6 1.30-1.40 SOIL	08/12/20	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1778017	TP6 1.50 WATER	08/12/20	GB 1L	Aliphatics/Aromatics (4 days), SVOC (7 days)	
1778018	TP7 0.00-0.10 SOIL	08/12/20	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1778019	TP8 0.50 SOIL	08/12/20	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1778020	TP9 0.20 SOIL	08/12/20	GJ 250ml x2, PT 1L	pH + Conductivity (7 days)	
1778021	WS2 0.30 SOIL	07/12/20	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1778022	WS6 0.30-0.40 SOIL	07/12/20	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1778023	TP05 1.00 SOIL	07/12/20	PT 1L	pH + Conductivity (7 days)	
1778024	WS1 1.50-1.60 SOIL	07/12/20	PT 1L	pH + Conductivity (7 days)	
1778025	WS2 1.30-1.40 SOIL	07/12/20	PT 1L	pH + Conductivity (7 days)	
1778026	WS4 0.80-0.90 SOIL	07/12/20	PT 1L	pH + Conductivity (7 days)	
1778027	WS5 0.50-0.60 SOIL	07/12/20	PT 1L	pH + Conductivity (7 days)	
1778028	WS7 0.80-0.90 SOIL	07/12/20	PT 1L	pH + Conductivity (7 days)	
1778029	WS9 0.70-0.80 SOIL	07/12/20	PT 1L	pH + Conductivity (7 days)	
1778030	TT2/Stockpile 2 1.00 LEACHATE	08/12/20	GJ 250ml, PT 1L		

Key: P-Plastic T-Tub G-Glass J-Jar B-Bottle

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Information in Support of the Analytical Results

Our Ref 20-25807
Client Ref C8049
Contract Cleator Moor Road, Whitehaven

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Certificate of Analysis

Certificate Number	20-26060	*Issued:*	24-Dec-20
Client	Sirius Geotechnical & Environmental Russel House Suite 2 Mill Road Langley Moor DH7 8HJ		
Our Reference	20-26060		
Client Reference	C8049		
Order No	20718/C8049/AB		
Contract Title	Cleator Moor Road, Whitehaven		
Description	2 Water samples.		
Date Received	18-Dec-20		
Date Started	18-Dec-20		
Date Completed	24-Dec-20		
Test Procedures	Identified by prefix DETSn (details on request).		
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.		

Approved By

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Water Samples

Our Ref 20-26060
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1779627	1779628
			.Sample ID	WS2	WS4
			Depth	1.40	0.50
			Other ID		
			Sample Type	WATER	WATER
			Sampling Date	15/12/2020	15/12/2020
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10
SVOCs					
Phenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 10.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Naphthalene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Acenaphthylene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Acenaphthene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis
Water Samples

Our Ref 20-26060
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1779627	1779628
			.Sample ID	WS2	WS4
			Depth	1.40	0.50
			Other ID		
			Sample Type	WATER	WATER
			Sampling Date	15/12/2020	15/12/2020
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 10.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Fluorene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 10.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Phenanthrene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Anthracene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Fluoranthene	DETSC 3434*	1	ug/l	< 1.0	13
Pyrene	DETSC 3434*	1	ug/l	< 1.0	14
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Benzo(a)anthracene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Chrysene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	3.0	< 10.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Benzo(b)fluoranthene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Benzo(k)fluoranthene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Benzo(a)pyrene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Indeno(123cd)pyrene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Dibenzo(ah)anthracene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Benzo(ghi)perylene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 10.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 10.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 10.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 10.0

Key: * -not accredited. n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 20-26060
Client Ref C8049
Contract Cleator Moor Road, Whitehaven

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1779627	WS2 1.40 WATER	15/12/20	GJ 1L, GJ 60ml, GV		
1779628	WS4 0.50 WATER	15/12/20	GJ 500ml, GJ 60ml, GV		

Key: G-Glass J-Jar V-Vial

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	21-00829	*Issued:*	22-Jan-21
Client	Sirius Geotechnical & Environmental Russel House Suite 2 Mill Road Langley Moor DH7 8HJ		
Our Reference	21-00829		
Client Reference	C8049		
Order No	20787/C8049/JWM		
Contract Title	Cleator Moor Road, Whitehaven		
Description	12 Soil samples, 1 Misc sample.		
Date Received	18-Jan-21		
Date Started	18-Jan-21		
Date Completed	22-Jan-21		
Test Procedures	Identified by prefix DETSn (details on request).		
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.		

Approved By

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 21-00829
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
TT03	S1	2	1787712	22/01/2021	Dark brown gravelly, SAND
TT04	S1	1.8	1787713	22/01/2021	Dark brown gravelly, SAND
TT05	S1	2	1787714	22/01/2021	Dark brown gravelly, SAND
TT06	S1	1.5	1787715	22/01/2021	Dark brown gravelly, SAND
TT07	S1	2.2	1787716	22/01/2021	Dark brown gravelly, SAND
TT08	S2	1.2	1787717	22/01/2021	Dark brown gravelly, SAND
TT09	S2	1.5	1787718	22/01/2021	Dark brown gravelly, SAND
TT10	S2	1.5	1787719	22/01/2021	Dark brown gravelly, SAND
TT11	S3	1.5	1787720	22/01/2021	Dark brown very sandy CLAY including some rootlets
TT12	S3	1.2	1787721	22/01/2021	Dark brown gravelly, very sandy CLAY
TT13	S3	1.5	1787722	22/01/2021	Dark brown very sandy CLAY including some rootlets
TT14	S3	2	1787723	22/01/2021	Dark brown very sandy CLAY including some rootlets

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 21-00829
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1787712	1787713	1787714	1787715	1787716	1787717
			.Sample ID	TT03	TT04	TT05	TT06	TT07	TT08
			Depth	2.00	1.80	2.00	1.50	2.20	1.20
			Other ID	S1	S1	S1	S1	S1	S2
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	4.6	4.9	8.3	5.1	4.1	2.8
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg	10	14	11	11	8.3	5.6
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	14	12	16	13	10	9.1
Lead	DETSC 2301#	0.3	mg/kg	14	14	12	8.8	7.9	8.1
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.05
Nickel	DETSC 2301#	1	mg/kg	10	17	11	9.0	7.3	5.0
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.7
Zinc	DETSC 2301#	1	mg/kg	23	30	30	27	24	16
Inorganics									
pH	DETSC 2008#		pH	11.5	10.1	11.3	11.6	11.6	11.0
Total Organic Carbon	DETSC 2084#	0.5	%	2.2	2.2	2.3	1.9	2.4	1.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	45	85	59	46	66	36
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.51	0.35	0.35	0.41	0.40	0.24
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	3.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	6.0
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	67
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	77
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	13
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	270
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	770
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	1100
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	1100
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 21-00829
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1787712	1787713	1787714	1787715	1787716	1787717
			.Sample ID	TT03	TT04	TT05	TT06	TT07	TT08
			Depth	2.00	1.80	2.00	1.50	2.20	1.20
			Other ID	S1	S1	S1	S1	S1	S2
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.8
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	0.3	< 0.1	< 0.1	< 0.1	5.0
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	0.4	< 0.1	0.1	0.1	7.6
Phenanthrene	DETSC 3301	0.1	mg/kg	0.4	3.2	0.4	0.9	0.3	70
Anthracene	DETSC 3301	0.1	mg/kg	0.1	1.1	< 0.1	0.2	0.1	18
Fluoranthene	DETSC 3301	0.1	mg/kg	0.7	6.8	1.4	1.6	0.8	170
Pyrene	DETSC 3301	0.1	mg/kg	0.6	6.2	1.0	1.3	0.6	140
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.4	3.8	0.5	0.8	0.3	93
Chrysene	DETSC 3301	0.1	mg/kg	0.3	3.3	0.5	0.7	0.3	87
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.3	1.9	0.6	0.5	0.4	62
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.3	1.5	0.3	0.4	0.2	43
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.3	2.3	0.4	0.6	0.4	69
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.5	1.4	0.4	0.5	0.4	44
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.4	0.7	0.7	0.3	0.5	9.5
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.3	0.9	0.3	0.4	0.1	35
PAH Total	DETSC 3301	1.6	mg/kg	4.7	34	6.6	8.4	4.5	850
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	1.1

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 21-00829
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1787718	1787719	1787720	1787721	1787722	1787723
			.Sample ID	TT09	TT10	TT11	TT12	TT13	TT14
			Depth	1.50	1.50	1.50	1.20	1.50	2.00
			Other ID	S2	S2	S3	S3	S3	S3
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	2.6	2.7	25	20	19	22
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.3	0.2	0.2	0.2	0.2
Chromium	DETSC 2301#	0.15	mg/kg	4.7	5.3	28	15	17	18
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	7.2	7.3	55	27	42	30
Lead	DETSC 2301#	0.3	mg/kg	11	29	83	180	88	65
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.12	0.18	0.14	0.15
Nickel	DETSC 2301#	1	mg/kg	3.7	4.7	19	20	19	22
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	0.9	< 0.5	0.6	0.5	0.6
Zinc	DETSC 2301#	1	mg/kg	25	17	55	56	59	580
Inorganics									
pH	DETSC 2008#		pH	10.2	10.3	7.7	7.9	7.5	7.0
Total Organic Carbon	DETSC 2084#	0.5	%	8.9	4.2	6.9	5.8	6.1	6.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	36	87	45	26	37	26
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.05	0.16	0.12	0.09	0.10	0.09
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	3.8	1.9	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	8.9	3.2	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	56	33	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	70	39	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	1.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	34	2.2	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	390	31	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	880	170	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	1300	210	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	1400	240	< 10	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

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Summary of Chemical Analysis
Soil/Misc Samples

Our Ref 21-00829
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

			Lab No	1787718	1787719	1787720	1787721	1787722	1787723
			.Sample ID	TT09	TT10	TT11	TT12	TT13	TT14
			Depth	1.50	1.50	1.50	1.20	1.50	2.00
			Other ID	S2	S2	S3	S3	S3	S3
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	0.7	0.9	1.2	0.4	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.7	1.5	0.4	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	9.9	10	0.5	0.2	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	15	14	2.1	0.5	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	110	83	0.9	0.6	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	28	24	0.3	0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	200	200	2.6	1.3	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	150	160	1.4	0.4	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	85	89	1.6	0.5	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	77	73	3.5	0.5	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	51	57	2.6	0.4	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	35	41	2.2	0.3	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	62	71	1.6	0.5	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	38	41	< 0.1	0.4	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	7.5	8.7	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	31	33	2.7	< 0.1	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	890	910	24	6.1	< 1.6	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.3	0.9	0.9	0.5	0.7	1.0

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 21-00829
Client Ref C8049
Contract Title Cleator Moor Road, Whitehaven

Lab No	Sample ID	Sample Location	Material Type*	Result	Comment*	Analyst
1787712	TT03 S1 2.00		SOIL	Amosite	Amosite present in Microscopic Asbestos Sheeting Board	Darryl Fletcher
1787713	TT04 S1 1.80		SOIL	NAD	none	Darryl Fletcher
1787714	TT05 S1 2.00		SOIL	NAD	none	Darryl Fletcher
1787715	TT06 S1 1.50		SOIL	NAD	none	Darryl Fletcher
1787716	TT07 S1 2.20		SOIL	NAD	none	Darryl Fletcher
1787717	TT08 S2 1.20		SOIL	Amosite	Bundles of Amosite Fibres	Darryl Fletcher
1787718	TT09 S2 1.50		SOIL	NAD	none	Darryl Fletcher
1787719	TT10 S2 1.50		SOIL	Amosite	Bundle of Amosite Fibres	Darryl Fletcher
1787720	TT11 S3 1.50		SOIL	NAD	none	Darryl Fletcher
1787721	TT12 S3 1.20		SOIL	NAD	none	Darryl Fletcher
1787722	TT13 S3 1.50		SOIL	NAD	none	Darryl Fletcher
1787723	TT14 S3 2.00		SOIL	NAD	none	Darryl Fletcher
1787724	AC01		Cement	NAD	none	Darryl Fletcher

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-00829
Client Ref C8049
Contract Cleator Moor Road, Whitehaven

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1787712	TT03 2.00 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787713	TT04 1.80 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787714	TT05 2.00 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787715	TT06 1.50 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787716	TT07 2.20 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787717	TT08 1.20 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787718	TT09 1.50 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787719	TT10 1.50 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787720	TT11 1.50 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787721	TT12 1.20 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787722	TT13 1.50 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787723	TT14 2.00 SOIL	14/01/21	GJ 250ml, GJ 60ml, PT 1L		
1787724	AC01 MISC	14/01/21	PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

LABORATORY REPORT

4043

Contract Number: PSL21/0035

Report Date: 27 January 2021

Client's Reference: C8049

Client Name: Sirius Durham
Suite 2, Russel House
Mill Road
Langley Moor
Durham
DH7 8HJ

For the attention of: Alastair Cook

Contract Title: Cleator Moor Road, Whitehaven

Date Received: 17/12/2020
Date Commenced: 17/12/2020
Date Completed: 27/1/2021

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins (Director)	R Berriman (Quality Manager)	S Royle (Laboratory Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	H Daniels (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP1		D	0.70		Brown slightly gravelly sandy CLAY.
TP2		D	1.00		Brown slightly gravelly very sandy CLAY.
TP3		D	0.90		Brown slightly gravelly sandy CLAY.
TP4		D	0.80		Brown slightly gravelly sandy CLAY.
TP8		D	3.00		Brown slightly gravelly slightly sandy CLAY.
TP9		D	0.70		Brown slightly gravelly sandy CLAY.

SUMMARY OF SOIL CLASSIFICATION TESTS

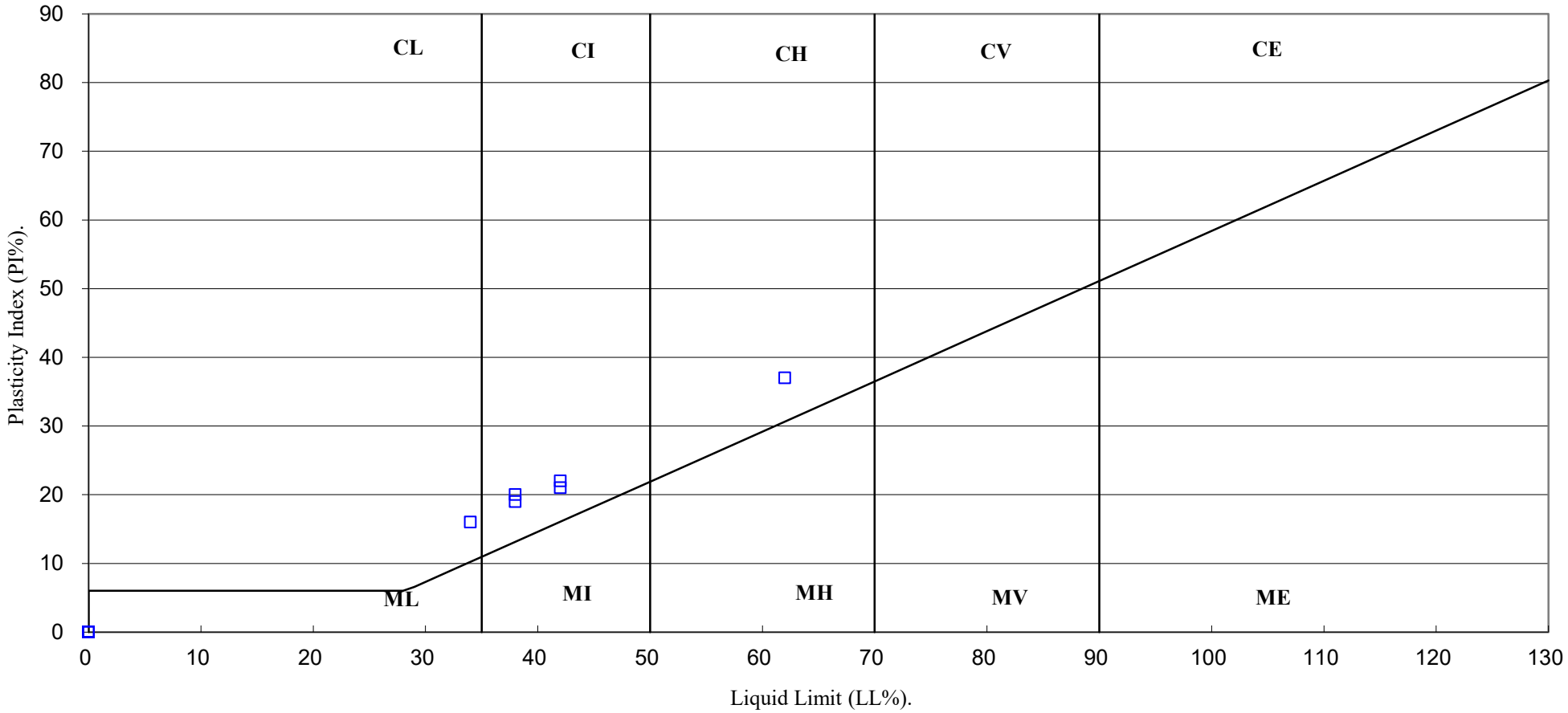
(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP1		D	0.70		17			38	18	20	95	Intermediate Plasticity CI
TP2		D	1.00		13			34	18	16	96	Low Plasticity CL
TP3		D	0.90		26			42	20	22	95	Intermediate Plasticity CI
TP4		D	0.80		13			42	21	21	96	Intermediate Plasticity CI
TP8		D	3.00		37			62	25	37	96	High Plasticity CH
TP9		D	0.70		20			38	19	19	94	Intermediate Plasticity CI

SYMBOLS : NP : Non Plastic * : Liquid Limit and Plastic Limit Wet Sieved.

UKAS TESTING 4043	PSL Professional Soils Laboratory	Cleator Moor Road, Whitehaven	Contract No: PSL21/0035
			Client Ref: C8049

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Cleator Moor Road, Whitehaven	Contract No:
			PSL21/0035
			Client Ref:
			C8049

APPENDIX G

SIRIUS GENERIC ASSESSMENT CRITERIA

GAC VALUES FOR CONTROLLED WATERS IN ENGLAND AND WALES

Parameter	GAC (µg/l, unless stated)			Notes
	Inland waters		Coastal and transition waters	
	EQS	DWS	EQS	
Metals and metalloids (dissolved)				
Arsenic	50	10	25	1
Cadmium	See separate table	5	0.2	1, 2
Chromium (total)	4.7	50	N.A.	1, 3
Copper	1.0 (bioavailable)	2000	3.76	1, 4
Lead	1.2 (bioavailable)	10	1.3	1, 4
Mercury	0.07	1.0	0.07	1, 4, 5
Nickel	4.0 (bioavailable)	20	8.6	1, 4
Zinc	10.9 (bioavailable) + background	5000	6.8 + background	1, 4, 6
Misc. inorganics				
Ammonia (total, as N)	See separate table	N.A.	N.A.	7
Ammonia (total, as $NH4^+$)	N.A.	500	N.A.	
Ammonia (un-ionised (NH3), as N)	N.A.	N.A.	21	7
Cyanide (free)	10	50	10	
Sulphate	N.A.	250 mg/l	N.A.	8
Petroleum hydrocarbons and related				
TPH (speciated analysis) *per fraction*	10	10	10	9, 10
Benzene	10	1.0	8	
Toluene	74	700	74	11
Xylenes (sum)	N.A.	500	N.A.	11
MTBE	2600	200	2600	12, 13
PAHs				
Anthracene	0.1	N.A.	0.1	
Benzo(b)fluoranthene + Benzo(k)fluoranthene (sum)	N.A.	Sum of 4 = 0.1	N.A.	
Benzo(g,h,i)perylene + indeno(1,2,3-c,d)pyrene (sum)	N.A.		N.A.	
Benzo(a)pyrene	1.7E-04	0.01	1.7E-04	
Fluoranthene	0.0063	N.A.	0.0063	
Naphthalene	2.0	N.A.	2.0	
Phenol				
Phenol	7.7	N.A.	7.7	
Chlorinated organics				
Dichloromethane	20	N.A.	20	
Trichloromethane (chloroform)	2.5	100	2.5	14
Tetrachloromethane (carbon tetrachloride)	12	3.0	12	
1,2-dichloroethane (1,2-DCA)	10	3.0	10	

Cadmium - inland waters EQS	
Hardness (as mg/l CaCO3)	**EQS (µg/l)**
<40	0.08
40-50	0.08
50-100	0.09
100-200	0.15
>=200	0.25

Ammonia - inland waters EQS		
Alkalinity (as mg/l CaCO3)	**Altitude**	**EQS (µg/l)**
<10	Any	300
10-50	Any	300
50-100	<80m	600
50-100	>80m	300
100-200	<80m	600
100-200	>80m	300
>200	Any	600

Parameter	GAC (µg/l, unless stated)			Notes
	Inland waters		Coastal and transition waters	
	EQS	DWS	EQS	
1,1,1-trichloroethane (1,1,1-TCA)	100	N.A.	100	
1,1,2-trichloroethane (1,1,2-TCA)	400	N.A.	300	
Trichloroethene (TCE)	10	Sum of 2 = 10	10	
Tetrachloroethene (PCE)	10		10	
Vinyl chloride	N.A.	0.5	N.A.	

Notes referenced in table:

1. Metals and metalloid EQS relate to dissolved contamination only (i.e. analysis of filtered samples).
2. Inland waters EQS for cadmium is dependent upon hardness or alkalinity of the receiving surface water. See separate table.
3. Separate EQS standards exist for Cr III and CrVI in fresh water. The fresh water Cr III has been value adopted as the screening value for total Cr analysis as it is normally the predominant form in solution. Specific EQS for Cr VI (3.4µg/l in freshwater; 0.6µg/l in transition and coastal waters) must be applied where relevant.
4. The bioavailable concentration of copper, nickel and zinc in fresh water is dependent upon the pH, DOC and calcium data for the receiving surface water. These data should be collected whenever possible to calculate an equivalent GAC for total metal concentration using the UKTAG m-BAT spreadsheet model. Although the standard indicates that lead should be assessed on a bioavilable basis, no tool is currently avaiable and this criterion should be applied as-is for screening purposes.
5. The value for mercury is the Maximum Acceptable Concentration (MAC) as no annual average EQS is specified in the legislation.
6. The EQS for zinc may be adjusted for the ambient uncontaminated background concentration in the receiving surface water where data are available.
7. EQS for ammonia in inland waters depends on the hardness and altitude of the receiving water body - see separate table. The criteria given here are based on the attainment of "good" chemical quality in the water body.
8. No EQS for sulphate appears in the referenced legislation.
9. No concentration-based EQS values currently exist for TPH. In the absence of specific criteria, our recent discussions with the Environment Agency have led us to adopt 10µg/l *for each individual fraction* determined by speciated TPH (TPHCWG) analysis.
10. No concentration-based DWS exists for TPH. A sum TPH concentration of 200µg/l defines the DW2 Class threshold limit in the Surface Water (Abstraction for Drinking Water) (Classification) Regulations 1996; DW2 waters are generally suitable for abstraction as drinking water supplies, subject to standard filtration and chemical treatment. We therefore consider that the 10µg/l criterion *for each fraction* provides a reasonable and proportionate basis for the initial assessment of risk posed to off-site groundwater and/or surface water potable abstractions that may be impacted at a downgradient abstraction point by TPH contamination originating from the site.
11. The drinking water-based criteria are from World Health Organisation (WHO) Guidelines for Drinking Water Quality, 2008. Taint may result at lower concentrations.
12. The "EQS" given here for MTBE is the PNEC value for fresh and sea water life given in: EU Risk Assessment Report (2002) MTBE, 3rd Priority List, volume 19.
13. DWS for MTBE is a 5-fold dilution of the USEPA (1997) Drinking Water Advisory value for taint, EPA-822-F-97-009. Toxicological thresholds are significantly higher.
14. Sum trihalomethanes limit for drinking water is 100µg/l but chloroform is only compound of this class normally encountered at contaminated sites.

Sources and general comments

Unless otherwise stated, EQS-based GACs are annual average surface water quality criteria given in Table 1 within Part 3 (Priority Substances) or long-term average criteria given in Table 1 within Part 2 (Specific Pollutants) of The Water Framework Directive (Standards and Classification) Directions (England and Wales), 2015.

Unless otherwise stated, drinking water standard-based GACs are taken from the Water Supply (Water Quality) Regulations 2016, and relate to concentration at the supply point and/or consumers' taps.

This list presents recommended GAC values for commonly monitored analytes but is not exhaustive. See the above-referenced legislation for the full lists of criteria.

SIRIUS GENERIC ASSESSMENT CRITERIA

Context

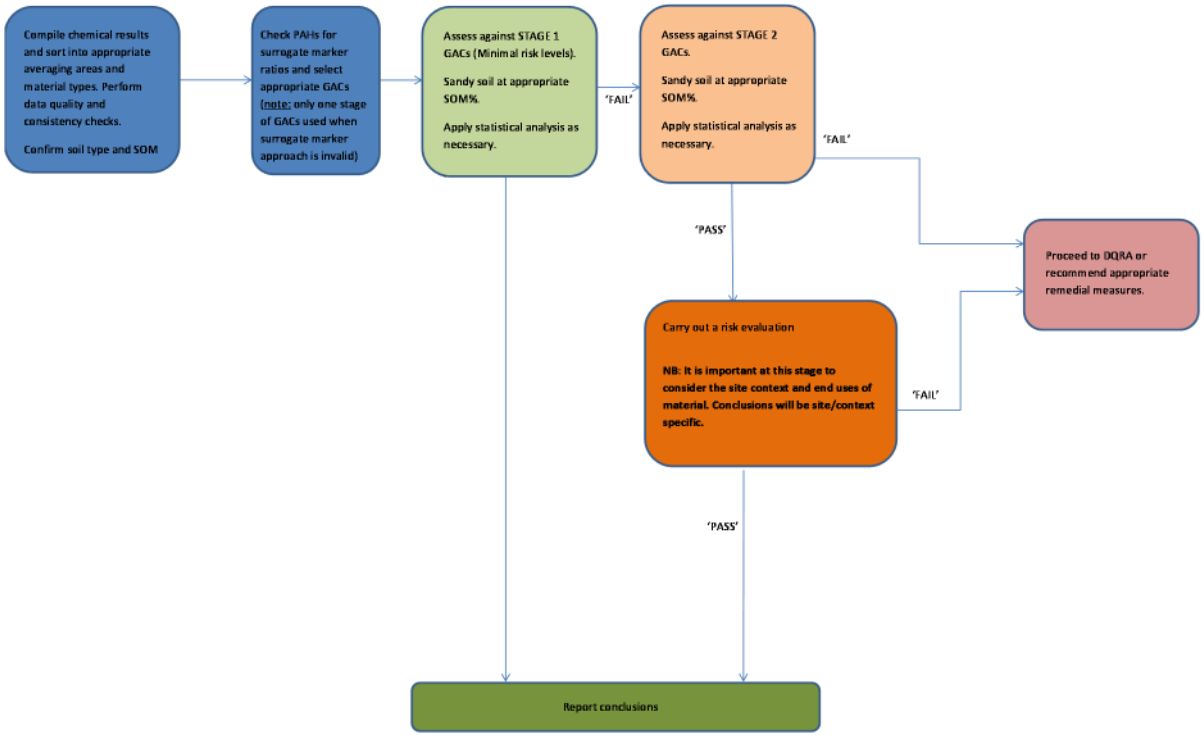
The framework for conducting site investigations, risk assessments and undertaking any necessary remedial works in the UK is provided by Environment Agency report CLR11 "Model Procedures for the Management of Contaminated Land". This presents a phased approach to risk assessment, involving: identification and qualitative assessment of potential pollutant linkages (source-pathway-receptor relationships) by means of a Conceptual Site Model; Generic Quantitative Risk Assessment (GQRA) of potentially significant pollutant links by comparing contaminant concentrations with appropriate Generic Assessment Criteria (GAC) values; and, if required, a Detailed Quantitative Risk Assessment (DQRA) based on site-specific conditions.

Assessment of Risk to Human Health

Introduction

A staged approach to GQRA has been adopted by Sirius for the evaluation of soil concentration data, as shown schematically in Figure 1.

Figure 1. GQRA Process.



The first stage of GQRA comprises assessment of the data against GAC values derived using toxicological parameter values based on "minimum risk". Any contaminants exceeding their GACs at this stage are further assessed against Stage 2 GACs, which have been derived using Low Level of Toxicological Concern (LLTC) criteria, where these are available.

With appropriate justification, a contaminant concentration that does not exceed the relevant Stage 2 GAC value may be considered to indicate that the land is "suitable for use". The appropriate use of LLTC-based criteria within the planning regime is considered reasonable by government agencies, as most recently highlighted in the letter (dated 3rd September 2014) to all local authorities from Lord de Mauley, Parliamentary Under Secretary at DEFRA.

A narrative "risk evaluation" must therefore accompany any Stage 2 assessment to justify the conclusions drawn. Where appropriate, this may provide a basis for eliminating from further consideration those contaminants whose concentrations do not exceed the applicable Stage 2 GAC value.

For the specific case of lead, the Category 4 Screening Level criteria given in CL:AIRE (2014)[1] have been adopted directly as GACs, as these are considered to be based on expert interpretation of current toxicological evidence.

In some areas, background concentrations of lead, other metals and metalloids, and/or individual PAHs may exceed their respective GACs and it may be appropriate to consider relative site and background concentration data as part of a more detailed assessment of the data.

Derivation of GACs

Except where otherwise stated, GACs have been derived by Sirius using CLEA version 1.071.

The GAC values have been derived for a sandy soil type, which will be conservative for the majority of soils (including made ground) encountered on historically contaminated sites. For organic contaminants of concern, criteria have been derived for a number of Soil Organic Matter (SOM) contents.

Genotoxic PAHs are assessed by the "Surrogate Method" using benzo(a)pyrene. Further information on this approach is given below.

Unless specifically stated, chemical properties and Health Criteria Values (HCVs) were obtained from:

- Environment Agency Science Report SC050021 series;
- Nathanail *et al*. (2009) "The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment", 2nd edition, Land Quality Press, Nottingham;
- CL:AIRE - AGS - EIC (2010) "Soil Generic Assessment Criteria for Human Health Risk Assessment". CL:AIRE, London.

GACs for arsenic, benzene, benzo(a)pyrene, cadmium and chromium (VI) have been derived using the

[1] CL:AIRE (2014) "Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination", Report SP1010, rev. 2.

Low Level of Toxicological Concern (LLTC) criteria given in CL:AIRE (2013). These criteria are considered a reasonable basis for assessment as they are still highly precautionary and definitely do not approach an intake level that could be defined as approaching Significant Possibility of Significant Harm to human health in the context of Part 2A of the Environmental Protection Act 1990. It must be further understood that the GACs derived will still incorporate a residual level of conservatism resulting from the exposure parameters used and the assumptions inherent in the model algorithms.

GACs for Genotoxic PAHs

Our approach to the assessment of genotoxic PAHs retains the use of benzo(a)pyrene as a surrogate marker. This approach for genotoxic PAHs is recommended by the HPA (2010)[2], which we consider to be the authoritative current guidance produced by a UK expert body and note that it was retained in the DEFRA Category 4 Screening Levels project (CL:AIRE, 2014).

The surrogate marker approach allows the assessment of the combined carcinogenic risk associated with all genotoxic PAHs[3] present as a mixture within soil, even though detailed toxicological information for many of the individual compounds may be lacking. The approach is based on determining the risk posed by the genotoxic PAH mixture using the concentration of benzo(a)pyrene present as an indicator.

To use the GAC for benzo(a)pyrene as a surrogate marker, a number of requirements must be met (HPA, 2010):

- Benzo(a)pyrene must be present in all soil samples containing genotoxic PAHs for which this method of assessment is being used;
- A similar profile of the genotoxic PAHs relative to benzo(a)pyrene should be present in all of the samples being assessed;
- The PAH profile of PAHs in the soil samples should be similar to that present in the pivotal toxicity study on which toxicological criterion for benzo(a)pyrene was based (Culp et al., 1998[4]). Table 1 provides the basis for defining the acceptable range.

Data indicate that contaminated soils in the UK generally meet these criteria[5] but the assessor must review their dataset before adopting this approach. If the above criteria are not met, then the surrogate marker approach must not be adopted and individual GAC or SSAC values are to be applied.

[2] HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5.
[3] The genotoxic PAHs included in the USEPA PAH 16 analysis reported by analytical labs are: benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo(a)pyrene, chrysene, dibenz[a,h]anthracene and indeno[1,2,3-c,d]pyrene.
[4] Culp, S. *et al*. (1998) Carcinogenesis, 19, 117-124.
[5] Bull, S. & Collins, C. (2013) Environ. Geochem. Health, 31, 101-109.

Table 1. Profile of Genotoxic PAHs Relative to Benzo(a)pyrene that are Considered Acceptable for Application of Benzo(a)pyrene as a Surrogate Marker.

PAH	Acceptable Ratio of PAH Concentration to Benzo(a)pyrene for Application of Surrogate Marker Assessment	
	Lower Limit	Upper Limit
Benz[a]anthracene	0.12	12.43
Benzo[b]fluoranthene	0.11	10.85
Benzo[k]fluoranthene	0.04	3.72
Benzo[g,h,i]perylene	0.08	8.22
Chrysene	0.12	11.61
Dibenz[a,h]anthracene	0.01	1.38
Indeno[1,2,3-c,d]pyrene	0.07	7.27

For further information see: HPA (2010).

Soil Criteria Set for Purposes Other Than Human Health Protection

The Sirius GACs for sulphate, total organic carbon (TOC) and calorific value are set on basis of risks other than human health and their exceedance does not indicate a potential risk to future site users:

- The GAC for sulphate content is based on potential detrimental effects on buried concrete[6] and must be assessed with reference to the soil pH;
- The GAC for TOC content is provided for indicative assessment of disposal options if off-site landfill of soil were to be considered. This GAC is set at the 'Inert' waste threshold and should be considered as being applied for information purposes only;
- The GAC for calorific value is set to assist in an initial assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

Assessment criteria more stringent than those for human health may be set for specific purposes, for example, elimination of nuisance odours or ensuring that potentially mobile free-phase organic products are not present.

Controlled Waters

The Environment Agency's "Remedial Targets Methodology" (2006) provides a framework for assessing the potential for pollution of controlled waters and for deriving remedial target concentrations in soil and groundwater.

There are no generic groundwater or surface water quality standards that are applicable to all sites. Drinking Water Standards and Environmental Quality Standards (EQS) are used by Sirius as assessment criteria where they are appropriate to the contaminant linkages under consideration. Given that these standards apply at the receptor point, this is a conservative approach for samples collected at a source or along a transport pathway.

[6] BRE (2005) "Concrete in Aggressive Ground", Special Digest No. 1; 3rd Edition.

Soil Leachability

Sirius specifies that the analytical laboratory undertakes leachate preparation by BS EN 12475-2:2002. Where specific circumstances require a different method to be used, then this will be explained and justified within the report body text.

The results of leachate analysis are compared to the relevant GAC values for controlled waters.

The Sirius Group
Stage 1 Generic Assessment Criteria for Soils

Revision: 24 January 2020

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Metals/Metalloids										
Arsenic (inorganic)	37			40			630			[1]
Cadmium	11			85			190			[2]
Chromium (III)	910			4000			8600			
Chromium (VI)	6.0			6.1			33			[3]
Copper	200			7100			68000			[4]
Lead	200			310			2300			[5]
Mercury (inorganic)	40			56			1100			[6]
Nickel	130			180			980			[7]
Selenium	250			430			12000			
Vanadium	410			1200			9000			
Zinc	450			40000			750000			[4]
Other Inorganics										
pH	<5 or >9			<5 or >9			<5 or >9			
Total Sulphate	2400			2400			2400			[8]
Water-Soluble Sulphate	0.5 g/l			0.5 g/l			0.5 g/l			[8]
Free Cyanide	34			34			1400			[9]
Organics										
PAHs										
Acenaphthene	200	490	920	2000	3600	4900	75000	92000	100000	
Acenaphthylene	170	400	760	2000	3600	4900	76000	93000	100000	
Anthracene	2300	5300	9400	30000	34000	36000	520000	540000	540000	[10]
Benzo(a)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(a)pyrene	2.1	2.1	2.2	2.3	2.3	2.3	27	27	27	[11]
Benzo(b)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(k)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(g,h,i)perylene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Chrysene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Dibenzo(a,h)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Fluoranthene	280	560	820	1500	1600	1600	23000	23000	23000	
Fluorene	170	390	730	2200	3400	4000	60000	67000	70000	
Indeno(1,2,3-c,d)pyrene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Naphthalene	1.0	2.3	4.6	1.0	2.4	4.7	110	260	510	
Phenanthrene	95	220	380	1300	1400	1500	22000	22000	23000	
Pyrene	620	1200	1900	3700	3800	3800	54000	54000	54000	
BTEX and related										
Benzene	0.063	0.13	0.24	0.16	0.30	0.38	15	28	49	
Toluene	100	240	460	370	830	1100	33000	68000	110000	
Ethylbenzene	26	62	120	34	81	110	3200	7400	14000	
Xylenes (total)	28	67	130	33	78	110	3200	7700	15000	[12]
1,2,4-trimethylbenzene	0.22	0.53	1.1	0.24	0.58	1.2	39	93	170	
Iso-propylbenzene	6.6	16	32	6.8	17	33	1300	3100	6100	
Propylbenzene	21	51	100	23	57	110	3800	9100	17000	
Styrene	6.9	16	32	21	49	93	3100	6100	9500	
TPH										
Aliphatic EC 5-6	24	41	68	24	41	68	2400	4100	6900	
Aliphatic EC >6-8	53	110	210	53	110	210	5300	11000	21000	
Aliphatic EC >8-10	13	31	61	13	31	61	1300	3100	6000	
Aliphatic EC >10-12	62	150	300	62	150	300	6100	15000	28000	
Aliphatic EC >12-16	510	1200	2300	510	1200	2300	43000	72000	85000	
Aliphatic EC >16-35	41000	70000	90000	42000	70000	90000	>1E6	>1E6	>1E6	[13]
Aromatic EC >5-7	53	110	200	150	300	538	15000	28000	48000	
Aromatic EC >7-8	100	240	460	370	820	1500	33000	68000	110000	
Aromatic EC >8-10	20	48	94	22	54	100	2200	5200	9800	
Aromatic EC >10-12	63	150	290	120	290	560	11000	22000	30000	
Aromatic EC >12-16	140	320	570	1100	1900	2200	35000	37000	37000	
Aromatic EC >16-21	260	540	840	1800	1900	1900	28000	28000	28000	
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	28000	28000	28000	

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Chlorinated Organics										
Chlorobenzene	0.19	0.44	0.86	0.19	0.45	0.87	31	71	140	
Dichloromethane (DCM)	0.47	0.78	1.2	1.2	1.7	2.4	250	340	470	
1,1-dichloroethane (DCA)	1.4	2.4	4.0	1.4	2.4	4.1	260	420	690	
1,2-dichloroethane (DCA)	0.0031	0.0048	0.0076	0.0035	0.0053	0.0084	0.34	0.51	0.81	
1,1-dichloroethene (DCE)	0.15	0.26	0.45	0.15	0.26	0.46	24	43	74	
cis-1,2-dichloroethene (DCE)	0.066	0.12	0.20	0.069	0.12	0.21	14	23	38	
trans-1,2-dichloroethene (DCE)	0.11	0.21	0.38	0.12	0.22	0.39	21	37	65	
Pentachlorophenol	0.21	0.52	1.0	27	30	31	400	400	400	
1,1,1,2-tetrachloroethane	0.56	1.3	2.6	0.63	1.5	2.9	59	140	270	
1,1,2,2-tetrachloroethane	0.98	2.1	4.0	1.6	3.4	6.3	150	310	570	
Tetrachloroethene (PCE)	0.074	0.17	0.32	0.07	0.17	0.33	10	23	45	
Tetrachloromethane (CT)	0.011	0.024	0.046	0.011	0.024	0.046	1.6	3.6	6.9	
1,1,1-trichloroethane (TCA)	3.7	7.8	15	3.8	7.9	15	370	770	1400	
1,1,2-trichloroethane (TCA)	0.39	0.85	1.6	0.51	1.1	2.0	89	180	320	
Trichloroethene (TCE)	0.0070	0.015	0.028	0.0071	0.015	0.028	1.5	2.8	44	
Trichloromethane (CF)	0.43	0.80	1.4	0.48	0.89	53	98	170	300	
Vinyl Chloride	0.00034	0.00045	0.00062	0.00037	0.00048	0.00066	0.038	0.049	0.068	
Miscellaneous Organics										
Carbon disulphide	0.066	0.13	0.25	0.066	0.13	0.25	6.7	14	25	
Di-(2-ethylhexyl)-phthalate	290	660	1100	3900	4000	4100	85000	85000	8600	
MTBE	31	55	94	39	68	120	7400	12000	19000	
Phenol	110	190	330	420	440	440	440			[14]
Methylphenols (cresols), total	78	170	330	5600	8200	9900	160000	170000	18000	[15]
2,4-dimethylphenol (m-xylenol)	18	43	82	200	430	720	15000	23000	28000	
Other Parameters										
TOC	3% w/w			3% w/w			3% w/w			[16]
Calorific Value	2 MJ/kg			2 MJ/kg			2 MJ/kg			[17]
Asbestos	Fibres present			Fibres present			Fibres present			

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Except where otherwise stated, criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) "Updated Technical Background to the CLEA Model", report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al., (2015). No correction has been made for the "Top Two" crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from:
• Environment Agency Science Report SC050021 Series;
• Nathanail et al. (2015);
• CL:AIRE-AGS-EIC (2010).

Footnotes

[1] Based on oral GAC as this is the lower GAC and reflects a cancer risk many orders of magnitude greater than for inhalation.

[2] Determined for lifetime exposure. Plant uptake concentration factors applied were as given in CL:AIRE (2014). The GAC values are based on data for soils having a pH value in the range 6-8; caution should be applied in applying them at pH values outside this range, especially at pH values <5.

[3] Both oral and inhalation HCVs are based on local toxicological effects and therefore the lowest (oral) GAC value is adopted.

[4] For the Residential with Homegrown Produce land use, the GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989); these criteria may also be applied in any land use where plants are to be grown. The equivalent GAC values for human health protection in the Residential with Homegrown Produce land use are around an order of magnitude greater.

[5] The Category 4 Screening Levels for lead defined in CL:AIRE (2013) have been adopted directly to provide an acceptable basis for initial assessment of data. Where background concentrations of lead exceed the GAC value, then site-specific evaluation will be required.

[6] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: "…the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low" (Environment Agency report SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[7] Toxicological effects by inhalation are localised, therefore the lower of the GAC values for oral and inhalation HCVs have been adopted.

[8] BRE (2005). Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[9] GAC calculated for acute risk. Further information can be provided upon request.

[10] The genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene) are routinely assessed using benzo(a)pyrene as a surrogate (HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5). Separate information on this approach is provided.

[11] Calculated using a 'minimum risk' oral index dose derived from the application of a 10,000x safety factor to the BMD10 presented in CL:AIRE (2014) for benzo(a)pyrene as a surrogate marker and the inhalation index dose specified in CL:ARE (2014) and Nathanail *et al*. (2015). As a conservative measure, the GAC is based on combined exposure pathways to account for systemic carcinogenic effects. Further information on the derivation can be provided upon request.

[12] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[13] "No GAC" indicates that no value has been specified for this land use as the TDSI cannot be exceeded at achievable soil concentrations.

[14] 440mg/kg is the minimum concentration that is protective for direct skin contact with phenol (See Environment Agency SR050021/Phenol SGV) and is adopted where GACs for chronic exposure are higher.

[15] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[16] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the 'Inert' waste threshold and should be considered as for information purposes only.

[17] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

APPENDIX H

GAS MONITORING RECORDS

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client:	Gleeson Developments Ltd	**Job No:**	C8094		
Site:	Cleator Moor Road, Whitehaven	**Visit No:**	1 **of** 6		
Date:	15/12/2020	**Operator:**	AB	**Project Manager:**	APC

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS2	**ND**	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	19.5	19.7	NR	NR	ND	ND	ND	ND	0.0001	0.0001	0.90	2.00			Natural sand and clay	Bailed to 1.41m and sampled.
WS4	**NR**	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.10	2.80			Natural clay	Sampled. Oily sheen visible on surface. Could not bail well, recharged immediately to near ground level. Water entered monitor when monitoring.
WS7	**ND**	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	20.1	20.1	NR	NR	27.4	1.4	7.0	25	0.0274	0.0014	0.47	3.00			Natural clay	Bailed to 2.08m
WS8	**ND**	ND	ND	ND	4.8	**4.4**	170	98	30	25	17.1	19.0	NR	NR	119.4	9.6	90.0	59	0.1194	0.4224	0.00	3.00			Natural clay	Bailed to 2.13m
WS9	**ND**	ND	ND	ND	3.4	**3.2**	ND	ND	ND	ND	14.8	15.4	NR	NR	0.4	0.3	1.0	2	0.0004	0.0096	2.26	3.00			Natural clay	
Max	**ND**	**ND**	**ND**	**ND**	**4.8**	**4.4**	**170**	**98**	**30**	**25**	**20.1**	**20.1**	**NR**	**NR**	**119.4**	**9.6**	**90.0**	**59**	**0.1194**	**0.4224**	**2.26**			**NR**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**14.8**	**15.4**	**NR**	**NR**	**0.4**	**0.3**	**ND**	**ND**	**0.0001**	**0.0001**	**0.00**			**NR**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equipment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry	X	Moist		Wet		Snow		Frozen
Wind:		Calm	X	Light		Moderate		Strong		
Cloud cover:		None		Slight	X	Cloudy		Overcast		
Precipitation:		None	X	Slight		Moderate		Heavy		
Time monitoring performed:			13:10	Start			15:00	End		
Barometric pressure (mbar):			999	Start			1000	End		
Pressure trend (Daily):				Falling		Steady	X	Rising		
Source:	The Weather Channel									
Air Temperature (Deg. C):			8	Before			7	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GFM436 - 12746

Gas Range: **CH_4** 0-100% **CO_2** 0-100% **O_2** 0-25%

Gas Flow range: +100 to -60 l/hr

Differential Pressure: +1250/-1250 Pa

Date of last external calibration: 26/03/2020 **Date of last in-house calibration:** ########

Date of next external calibration 21/03/2021

Ambient air check: **CH_4** 0 **CO_2** 0 **O_2** 19.8

PID: MiniRae 3000 (PGM7320) - 592-917787

Calibrated range: 0-100ppm

Calibration gas: Isobutylene

Response time: >3 seconds

Accuracy: (+/-) 2%

Date of last external calibration: 31/01/2020 **Date of last in-house calibration:** ########

Date of next external calibration 01/02/2021

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client:	Gleeson Developments Ltd	**Job No:**	C8094		
Site:	Cleator Moor Road, Whitehaven	**Visit No:**	2	**of**	6
Date:	14/01/2021	**Operator:**	JWM	**Project Manager:**	APC

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS2	**4.8**	4.8	>100	>100	8.8	**8.8**	7	7	ND	ND	12.3	12.3	ND	ND	0.3	0.1	1.0	0	0.0144	0.0088	0.91	2.00			Natural sand and clay	Bailed to 1.68m, well monitored at 1.1m water level
WS4	**NR**	NR	NR	NR	NR	**NR**	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	0.00	2.80			Natural clay	Attempted bailing, water recharged to surface immediately, no data recorded as water entered monitor
WS7	**ND**	ND	ND	ND	ND	**ND**	15	7	ND	ND	19.0	19.1	ND	ND	ND	ND	ND	ND	0.0001	0.0001	0.43	3.00			Natural clay	Bailed to 2.39m, well monitored at 1.95m, bubbling observed around observation pipe during post bailing monitoring
WS8	**ND**	ND	ND	ND	4.1	**3.4**	20	NR	ND	ND	17.3	17.7	0.2	ND	3.4	3.4	22.0	41	0.0034	0.1156	0.78	3.00			Natural clay	Bailed to 2.34m, well monitored at 1.63m, no steady recording for carbon monoxide as the readings did not settle
WS9	**ND**	ND	ND	ND	2.0	**2.0**	10	7	ND	ND	18.1	18.3	ND	ND	1.8	1.8	19.0	101	0.0018	0.0360	2.20	3.00			Natural clay	
Max	**4.8**	**4.8**	**ND**	**ND**	**8.8**	**8.8**	**20**	**7**	**ND**	**ND**	**19.0**	**19.1**	**0.2**	**ND**	**3.4**	**3.4**	**22.0**	**101**	**0.0144**	**0.1156**	**2.20**			**NR**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**7**	**7**	**ND**	**ND**	**12.3**	**12.3**	**ND**	**ND**	**0.3**	**0.1**	**ND**	**ND**	**0.0001**	**0.0001**	**0.00**			**NR**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry		Moist	X	Wet		Snow		Frozen
Wind:	X	Calm		Light		Moderate		Strong		
Cloud cover:		None		Slight	X	Cloudy		Overcast		
Precipitation:		None		Slight	X	Moderate		Heavy		
Time monitoring performed:			8.30	Start			13.10	End		
Barometric pressure (mbar):			1016	Start			1019	End		
Pressure trend (Daily):				Falling		Steady	X	Rising		
Source:	The Weather Channel									
Air Temperature (Deg. C):				Before				After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GFM436 - 12746

Gas Range: **CH_4** 0-100% **CO_2** 0-100% **O_2** 0-25%

Gas Flow range: +100 to -60 l/hr

Differential Pressure: +1250/-1250 Pa

Date of last external calibration: 26/03/2020 **Date of last in-house calibration:** 05/01/2021

Date of next external calibration: 21/03/2021

Ambient air check: **CH_4** 0 **CO_2** 0 **O_2** 20.2 During ambient air checks CO readings fluctuated ranging from -68 to +80

PID: MiniRae 3000 (PGM7320) - 592-917787

Calibrated range: 0-100ppm

Calibration gas: Isobutylene

Response time: >3 seconds

Accuracy: (+/-) 2%

Date of last external calibration: 31/01/2020 **Date of last in-house calibration:** 05/01/2021

Date of next external calibration: 01/02/2021

Sirius Geotechnical Ltd.

Russel House
Mill Road
Langley Moor
Durham
DH7 8HJ

4245 Park Approach
Century Way
Thorpe Park
Leeds
LS15 8GB

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