

**NORTH ASSOCIATES (CUMBRIA) LTD
NORTH HOUSE
KINGSTOWN
CARLISLE
CUMBRIA
CA6 4BY**

COAL MINING RISK ASSESSMENT REPORT

for land at

**HARRAS MOOR
WHITEHAVEN
CUMBRIA**



ELLIOTT
Environmental Surveyors

**Prepared by:
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**Project No: EES16-199
23rd December 2016**

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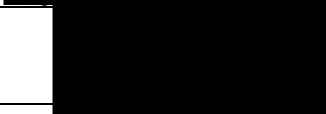
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The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry practices. The report takes into consideration potential legacy risks from coal mining to the proposed development. Elliott Environmental Surveyors Ltd (EES) professional interpretation relies solely on the information made available by the client and other data which is stated in the report and the implications of the findings on the proposed use of the site.

Every care has been taken to ensure that the interpretation of the site condition is based on all known data collected and as such is not a guarantee that the site is free of legacy risks from coal mining, or other unidentified hazardous or potentially hazardous materials.

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Survey and Report by:	J C Cooper Certificated Mine Surveyor	Signed:	
Approved By:	T Elliott CEnv FRICS	Signed:	
Date:	23 rd December 2016		

1. INTRODUCTION

This report has been commissioned by Mr John Blue, North Associates, North House, Kingstown, Carlisle, Cumbria CA6 4BY prior to development of the land at Harras Moor, Whitehaven, Cumbria.

The Phase 1 Preliminary Environmental Risk Assessment carried out by GEO Environmental Engineering, Ref 2015-1558 and dated 29 July 2015, contained a Non Residential Coal Authority Report which confirmed that parts of the site lie within the restored Moresby and Keekle Opencast Site, with areas designated as high risk for development by the Coal Authority.

A Preliminary Coal Mine Risk Assessment carried out by Elliott Environmental Surveyors, Ref EES15-174 and dated 7th March 2016 recommended that intrusive investigation be undertaken to locate the limit of the excavation of the opencast to the east and south within the proposed Development Area.

This report provides a detailed review of the available data, including the site investigation, which has previously been carried out to fully define the extent of the opencast workings, and by using that information, an assessment of the risks to the proposed development from the mining legacy.

Site Address: **HARRAS MOOR
NORTH OF HARRAS ROAD
WHITEHAVEN
CUMBRIA**

1.1. Site Description

The site has an area of 5.64ha and is located to the east of Whitehaven, north of Harras Road.

Currently the site comprises rough grazing farmland which slopes generally (to the south west towards Whitehaven and to the southeast) with an elevation of approximately 143m above Ordnance Datum (aod).

A location plan of the site is attached in Appendix 1.

A copy of the Proposed Development Plan is attached in Appendix 4.

1.2 Site History

A brief review of the historical information relating to the site is as follows:

In 1874 the site was in agricultural use with the Old Racecourse to the north. There was an old coal shaft shown to near the eastern boundary of the site and an old coal shaft to the east, with North Pit and shaft to the west.

By 1899 the Racecourse was shown as removed and the North Pit was labelled disused.

By 1962 the old shaft on site was labelled disused, with the other shafts removed.

By 1980 site was shown as being included in the Moresby and Keekle Opencast Coal Site operated by British Coal.

Excavation of coal commenced in November 1980 and was completed in February 1987 with the Completion Plans for the site being drawn in 1991.

2. SUMMARY OF COAL REPORT

The Coal Authority Mining Report supplied is attached in Appendix 2. This shows the site to be within the likely zone of influence of workings in two seams of coal at depths of 130 to 200m depth, with the latest date of workings being 1961. Any ground movement from these coal workings should have stopped by now.

It also confirms the following:

The site is not in the likely zone of influence of any present underground coal working.

The site does not lie within an area for which the Coal Authority is determining whether to grant a licence to remove coal by underground methods.

The site is not within the area for which a licence to remove or otherwise work coal by underground methods.

The site is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal are present within the local area which could be potentially worked in the future.

No notice of the risk of the land being affected by subsidence has been given under Section 46 of the Coal Mining Subsidence Act 1991.

Within, or within 20 metres of, the boundary of the site there is one mine entry, the approximate position of which are shown on the Coal Authority plan attached to the report.

The shaft (no 298518-003) is located in an area that has been worked as part of an opencast site. There are no details of any treatment but it is likely that the shaft has been partially or totally removed.

The Authority is not aware of any evidence of damage due to geological faults affected by coal mining.

In terms of surface coal mining, the Coal Authority report states that the site does lie within the boundary of an opencast site from which coal has been removed in the past.

The site does not lie within 200m of an opencast site from which coal is currently being removed; nor does it lie within 800m of the boundary of any opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods, or within 800m of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

The Coal Authority has not received a damage notice or claim for the site, or any property within 50m, since 31st October 1994 and there is no current "Stop Notice" delaying the start of any works, nor is the Authority aware of any request having been made to carry out preventative works before coal is worked under Section 33 of the Coal Mining Subsidence Act 1991.

Additionally there is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the site and the site has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures. The site

is not in an area for which a notice of entitlement to withdraw support has been published and the site is not in an area for which a notice has been given under Section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

The site is not in an area for which 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.

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

3. REVIEW OF ENVIRONMENTAL AND MINING DATA

3.1. Geology and Coal Mining

The site is located over the Pennine Middle Coal Measures of the Carboniferous period which consist of coal seams, mudstone, shale and sandstone as indicated in the BGS boreholes nearby.

Coal Mine Abandonment Plans for Moresby and Keekle Opencast were examined for the area and are included in Appendix 3.

A plan showing the position of the coal seam outcrops, geological and coal mining information on site and the surrounding area is shown in Appendix 3. This information has been obtained from British Geological Survey 1/10000 Sheet NX 91 NE and Coal Authority interactive mapping data.

Mapping information of the site indicates that the superficial deposits are Devensian Till – Diamicton.

The site is crossed by a series of minor geological faults running generally in a north west to south east direction, and throwing down to the north.

The disused Shaft (no 298518-003), shown on the Coal Authority Plans, does not have any details of the works, if any, that were carried out to make it safe but it is likely that the shaft was partially or totally removed during opencast operations.

The site is underlain by four seams of shallow coal worked as part of the Moresby and Keekle Opencast, the Unnamed G, Unnamed E, Brassy and Unnamed C seams. The remaining seams in the sequence, the Black Metal to the Six Quarter seams were unworked by opencast methods.

From BGS information the Unnamed G seam is up to 0.75m thick in the area; the Unnamed E seam is 0.2m thick; the Brassy seam is up to 0.85m thick; with the Unnamed C seam being up to 0.4m thick.

Abandonment plan information shows old deep mine workings in the Unnamed G seam in the centre of the site 95m north east of the proposed Development Area. These workings are probably associated with the Shaft (no 298518-003) and are limited in area.

The seams formerly outcropped beneath the site dipping steeply to the west and are still in place beneath in the area to the south.

Excavation of coal commenced in November 1980 and was completed by February 1987 with the Completion Plans for the site being drawn in 1991. Excavation of overburden and coal was carried out to a depth of approximately 40m beneath the site. The void was backfilled, the sub soil and top soil replaced and a drainage system installed.

The British Coal-mapped limit of coal extraction of the opencast is shown on the Proposed Development and Mining Plan in Appendix 4. This has also been updated following the subsequent site investigation to show the limits of excavation i.e. ground disturbance.

The much deeper mined seams as shown on the Earl of Lonsdale's Plan, obtained for other purposes, are extensive beneath the whole area.

4. SITE INVESTIGATION

A site investigation was carried out on 23rd March 2016 in the west to southern section of the site under the supervision of J C Cooper (EES), Mining & Environmental Surveyor.

The purpose of the investigation was to accurately map the edge of the area backfilled with overburden as part of the restoration following opencast coal operations in the vicinity of the proposed Development Area. A series of trial trenches were excavated using a tracked excavator around the western and southern boundary of the mapped opencast operations, using topographically surveyed information taken from the opencast abandonment plans and underdrainage plans. The trial pit logs are shown in Appendix 6. The positions of the trial pits are shown in Appendix 7 and photographs are included in Appendix 9. The underdrainage plan is included in Appendix 8.

Examination of the area revealed a slight change in level and ground condition across the line of the supposed edge i.e. some settlement of the backfilled and restored ground has occurred.

In each trial pit the topsoils were removed and excavation carried out to a depth of 3.0m, extending the pit lengthwise until the overburden backfill edge was encountered.

In general the unworked ground was logged as stiff to very stiff clay with no sand, gravel, cobbles or boulders present. The base of the clay was only encountered in TP4 where at over 3.0m below surface it was underlain by red, weathered shale. This material is deemed to be of low permeability.

The infilled clay / subsoil averaged over 1.75m thick below 0.15 - 0.2m of topsoil and again was logged as compact stiff clay with occasional bricks, cobbles and boulders. The clay was wet in TP4, coinciding with the edge of a transient surface pond and stoniest in TP5. The breakline between the red / brown very stiff clay (natural ground) and the yellow / brown stiff clay (restored subsoil and clay backfill) was clearly visible in TP1.

The underlying opencast overburden backfill encountered in all pits consisted of broken sandstone and shale with some clay.

In all pits the edge of the overburden backfill was mapped and this information was used to plot the inferred line of overburden fill as shown on the Trial Pit Information and Proposed Development Plan in Appendix 6. An estimate of the position of the opencast limit of excavation was made using the thickness of infilled clay and from this a line was also plotted on the plan in Appendix 6 at a distance 2.6m to the south and west of the overburden fill line.

In all pits the field under-drainage was encountered, being identified by the gravel infill above the drains. In all cases the drains were avoided and not damaged during the investigation.

All trial pits were logged and then backfilled on completion.

5. RISK ASSESSMENT OF THE PROPOSED DEVELOPMENT AREA

As a consequence of the Preliminary Coal Mine Risk Assessment and the subsequent Site Investigation work it was decided to zone the Development Area in relation to Coal Mine Risk Assessment.

Zone A is located within the area of the site excavated for the extraction of coal and subsequently backfilled with overburden and restored with replacement of soils.

Zone B is located within the former opencast where the underlying rock strata have not been excavated or disturbed.

A plan showing the position of the Zones is shown at Appendix 5.

Risk Assessment Zone A

Coal Mining Issue	Identified Hazard	Risk assessment	Risk Rating
Mine Entries	Yes	Shaft (no 298518-003) is located within the site boundary but it is likely that the shaft has been partially / totally removed during opencast operations.	Low
Recorded Coal Workings	Yes	Three seams worked beneath the site. The site is in the likely zone of influence from three seams at depths of 130-180m last worked in 1961.	Low
Present Underground Coal Workings	No	None noted in Coal report.	Low
Unrecorded workings in shallow seams	Yes	None noted in Coal Abandonment Plans although old workings were recorded in Unnamed G Seam to the north of the proposed Development Area.	Low
Gas Emissions	Yes	None noted in Coal report. Zone A includes areas of backfilled excavation associated with the opencast.	Medium / High
Coal Mining Faults Or Fissures	No	Minor geological faults cross the site	Low
Recorded Surface Hazard	No	None noted in Coal report.	Low
Coal Authority Surface Hazard Call Out Procedures	No	None noted in Coal report.	Low
Past Opencast Workings	No	The site lies within the boundary of a former (and restored) opencast coal site. Zone A includes areas of backfilled excavation associated with the opencast.	High
Current Opencast Workings	No	The site is not within 200m of an opencast operation from which coal is currently being removed	Low

Risk Assessment Zone B

Coal Mining Issue	Identified Hazard	Risk assessment	Risk Rating
Mine Entries	No	Shaft (no 298518-003) is located 147m from Zone B and it is likely that the shaft has been partially/totally removed during opencast operations.	Low
Recorded Coal Workings	Yes	Three seams worked beneath the site. The site is in the likely zone of influence from three seams at depths of 130-180m last worked in 1961.	Low
Present Underground Coal Workings	No	None noted in Coal report.	Low
Un recorded workings in shallow seams	Yes	None noted in Coal Abandonment Plans although old workings were recorded in Unnamed G Seam to the north of the proposed Development Area.	Low
Gas Emissions	Yes	None noted in Coal report. Shallow coal seams are not noted as worked on the opencast abandonment plans, and the overlying drift has been confirmed to be of low permeability.	Low
Coal Mining Faults Or Fissures	No	Minor geological faults cross the site	Low
Recorded Surface Hazard	No	None noted in Coal report.	Low
Coal Authority Surface Hazard Call Out Procedures	No	None noted in Coal report.	Low
Past Opencast Workings	No	The site lies within the boundary of an opencast site. The proposed Development Area has been confirmed to lie outside of the backfilled area associated with the opencast.	Low
Current Opencast Workings	No	The site is not within 200m of an opencast operation from which coal is currently being removed	Low

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. ZONE A

The Coal Authority Mining Report records seams worked by underground methods at depths of 130m - 200m last worked in 1961. These workings pose a low risk for the proposed Development Area.

Similarly the shaft is located 147m north east of the proposed Development Area and it is likely that the shaft has been partially / totally removed during opencast operations.

This again poses a low risk to the proposed Development Area.

Abandonment plan information shows old deep mine workings in the Unnamed G seam 95m NE of the proposed Development Area removed during the Opencast Operations. These workings are probably associated with the Shaft (no 298518-003) and are limited in area.

The backfilled opencast workings throughout the site could increase the risk to the development from gas emissions from the infilled ground. The underlying opencast overburden backfill encountered in all pits consisted of broken sandstone and shale with some clay although some carbonaceous material may be present. In order to adequately determine the risks posed to the zone from possible gas emissions a gas risk assessment should be carried out involving the installation of gas monitoring wells, a programme of monitoring assessment and reporting of the results. Therefore, prior to a programme of gas monitoring, the risk would be deemed to be Medium – High.

The backfilled opencast workings throughout the site could potentially also impact on the stability of the proposed Development Area. The ground beneath the proposed Development Area has been excavated in areas to a depth of 40m and later backfilled. Although settlement of the ground will have occurred in the 25-30 years since the excavation occurred, it is possible that there may be some further settlement.

This could be especially important for any structures / items that may encounter differential settlement between Zone A (excavated areas) and Zone B (undisturbed ground). The underlying opencast overburden backfill encountered in all pits consisted of broken sandstone and shale with some clay. In order to better determine the risks posed to the development in this area from ground stability a suitable geotechnical assessment should be carried out to assist in the detailed design process. Therefore the risk prior to geotechnical investigation and assessment would be deemed to be Medium to High.

Prior to the investigation work being carried out, the risk assessment of mining-related issues was therefore considered to be **Medium to High**.

These investigations could be carried out as part of reserved matters.

6.2. ZONE B

The Coal Authority Mining Report records seams worked by underground methods at depths of 130m - 200m last worked in 1961. These workings pose a low risk for the proposed Zone B.

Similarly the shaft is located 147m north east of the proposed Development Area and again poses a low risk to Zone B.

The superficial deposits beneath the proposed Development Area are stiff clay. This material is likely to be of low permeability which gives a low risk of mine gas emissions into the proposed Development Area. No worked shallow seams are indicated under or near the proposed Development Area on the abandonment plans, whereas they are shown further northeast of the opencasted area. These coal seams also dip steeply down to the west and no further seams outcrop under the Development Area or other land not opencasted i.e. under the western part of the site.

The edge of the overburden backfilled opencast workings was found to be north and east of Zone B. Therefore there is a low risk to the proposed development from the old opencast workings.

In summary, the site investigation has confirmed that the investigation of the edge of the opencast was outside, north and east of Zone B, therefore the refined risk assessment of mining related issues is considered to be **Low**, for development in this area.

APPENDIX 1 - SITE LOCATION PLAN

Location Map

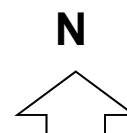


Project Code: EES16-199

Version Status: Final

Drawn by: J C Cooper
Reviewed by: R Hopgood
Approved by: T Elliott

 **Site**



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ELLIOTT
Environmental Surveyors

APPENDIX 2 - COAL AUTHORITY INFORMATION



Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

CURTIS EVANS
4 CULGARTH AVENUE
COCKERMOUTH
CA13 9PL

Our reference: **51000943796001**
Your reference: **GEO2015-1558**
Date of your enquiry: **20 July 2015**
Date we received your enquiry: **20 July 2015**
Date of issue: **20 July 2015**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

1 HARRAS DYKE, HARRAS DYKE, HARRAS MOOR, WHITEHAVEN, CA28 6SH

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

The property is in the likely zone of influence from workings in 2 seams of coal at 130m to 200m depth, and last worked in 1961.

Any ground movement from these coal workings should have stopped by now.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

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

The property is not in an area that is likely to be affected at the surface from any planned future workings.

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

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

Within, or within 20 metres of, the boundary of the property there is 1 mine entry, the approximate position of which is shown on the attached plan.

Our records disclose the following information:

298518-003. The shaft is located in an area that has been worked by opencast mining operations. There are no details of any treatment but it is likely that the shaft has been partially or totally removed..

For an additional fee, the Coal Authority will provide a supplementary Mine Entry Interpretive Report. The report will provide a separate assessment for the mine entry (entries) referred to in this report. It will give details based on information in the Coal Authority's possession, together with an opinion on the likelihood of mining subsidence damage arising from ground movement as a consequence of the existence of the mine entry/entries. It will also give details of the remedies available for subsidence damage where the mine entry was sunk in connection with coal mining. Please note that it may not be possible to produce a report if the main building to the property cannot be identified from Coal Authority plans (ie. for development sites and new build).

For further advice on how to order this additional information visit www.groundstability.com or telephone 0345 7626 848.

Coal mining geology

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

Opencast coal mining

Past

The property is within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

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

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

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.

Coal mining subsidence

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

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

The 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.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

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.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

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

Working facilities orders

The property is not in an area for which 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.

Payments to owners of former copyhold land

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

Comments on Coal Authority information

The attached plan shows the approximate location of the disused mine entry/entries referred to in this report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence act 1991*). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and the obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0345 762 6848.

If you wish to discuss the relevance of any of the information contained in this report you should seek the advice of a qualified mining engineer or surveyor. If you or your adviser wish to examine the source plans from which the information has been taken these are normally available at our Mansfield office, free of charge, by prior appointment, telephone 01623 637225. Should you or your adviser wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). Our emergency telephone number at all times is 01623 646333.

*Note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

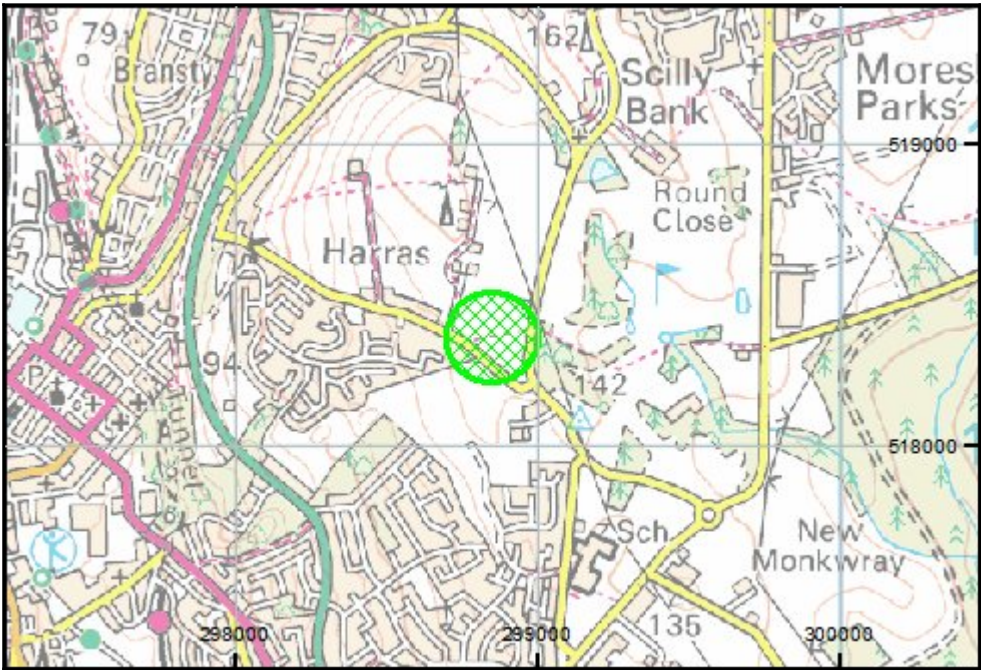
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Issued by:	The Coal Authority, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG
Tax Point Date:	20 July 2015
Issued to:	CURTIS EVANS 4 CULGARTH AVENUE COCKERMOUTH CA13 9PL
Property Search for:	1 HARRAS DYKE, HARRAS DYKE, HARRAS MOOR, WHITEHAVEN, CA28 6SH
Reference Number:	51000943796001
Date of Issue:	20 July 2015
Cost:	£59.00
VAT @ 20%:	£11.80
Total Received:	£70.80
VAT Registration	598 5850 68

Location map



Approximate position of property



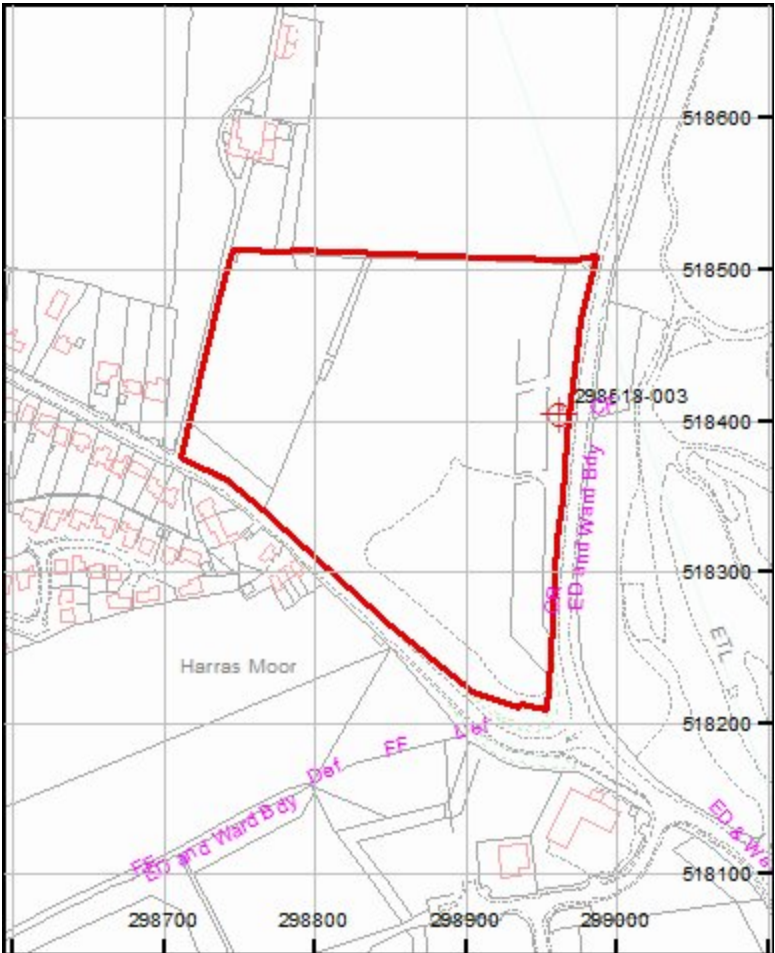
Enquiry boundary

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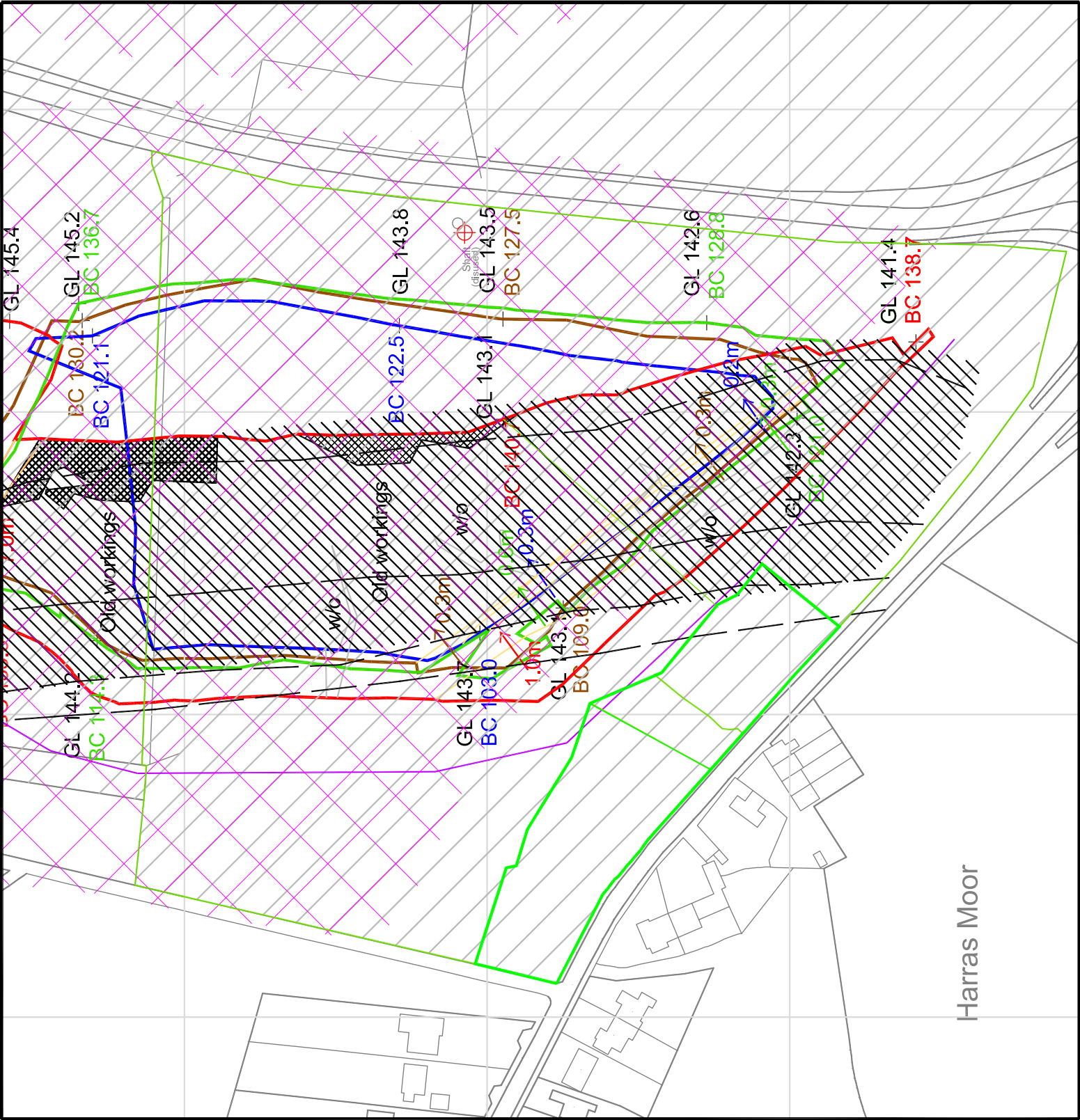
Key

Approximate position of enquiry boundary shown

Disused Adit or Mineshaft



APPENDIX 3 – GEOLOGICAL AND MINING INFORMATION INCLUDING ABANDONMENT PLANS



Harras Moor

GEOLOGY AND MINING INFORMATION

HARRAS MOOR

Site Boundary

Neighbouring Development Boundary

Extent of opencast excavation (from site investigation March 2016)

Mine Shaft

Infilled area from BGS Plan

Area of opencast from BGS Plan

CA area of high risk for development

Seams Worked by Opencast

Unnamed G

Unnamed E

Brassy

Unnamed C

Old deep mined workings

Ground Level

Bottom of Coal Level

BC 142.6

BC 138.7

Version number: 1

Version state: Revised

Design by: J C Cooper

Drawn by: J C Cooper

Reviewed by: T Elliott

Approved by: T Elliott

Drawing ref: Harras Dyke

File ref: EES16-199

Ghd ref: 298850.518450

Date: 22.12.16

Date: 22.12.16

Date: 22.12.16

Date: 22.12.16

N

Scale @A3 1:1250

Geological Information shown from BGS 1:10000 Plan and Mining Information from CA Abandonment Plan Cat No 1454 sheet 3 of 7

ELLIOTT

Environmental Surveyors

Mallan House

Bridge End

Hexham

Northumberland

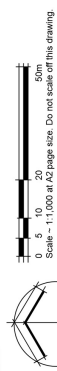
NE45 9DD

Tel: 01434 609345

Fax: 01434 609344

APPENDIX 4 – PROPOSED DEVELOPMENT PLAN

Based on:
topographic survey prepared
by Atlantic Geomatics, July 2015



Key

- Phase 2 Site boundary
- Phase 2 proposal
- Phase 1 proposal (shown later)
- Existing utility easements: avoid building over these
- Existing pylon and stand off area
- Existing mine shaft and stand off area
- Safeguarded area for potential Eastern Relief Road
- Existing footpaths
- Proposed or re-routed footpaths
- Proposed roads within site
- Proposed open space within site
- Proposed SUDs features
- Proposed planting
- Existing or relocated stone wall



R 02	09.12.2016	red line corrected
R 01	08.10.2016	boundary line adjusted
R 00	07.10.2016	original drawing
revision date		notes
drawing number		09

drawing name
Phase 2: Illustrative layout

project
Housing at Harras Moor

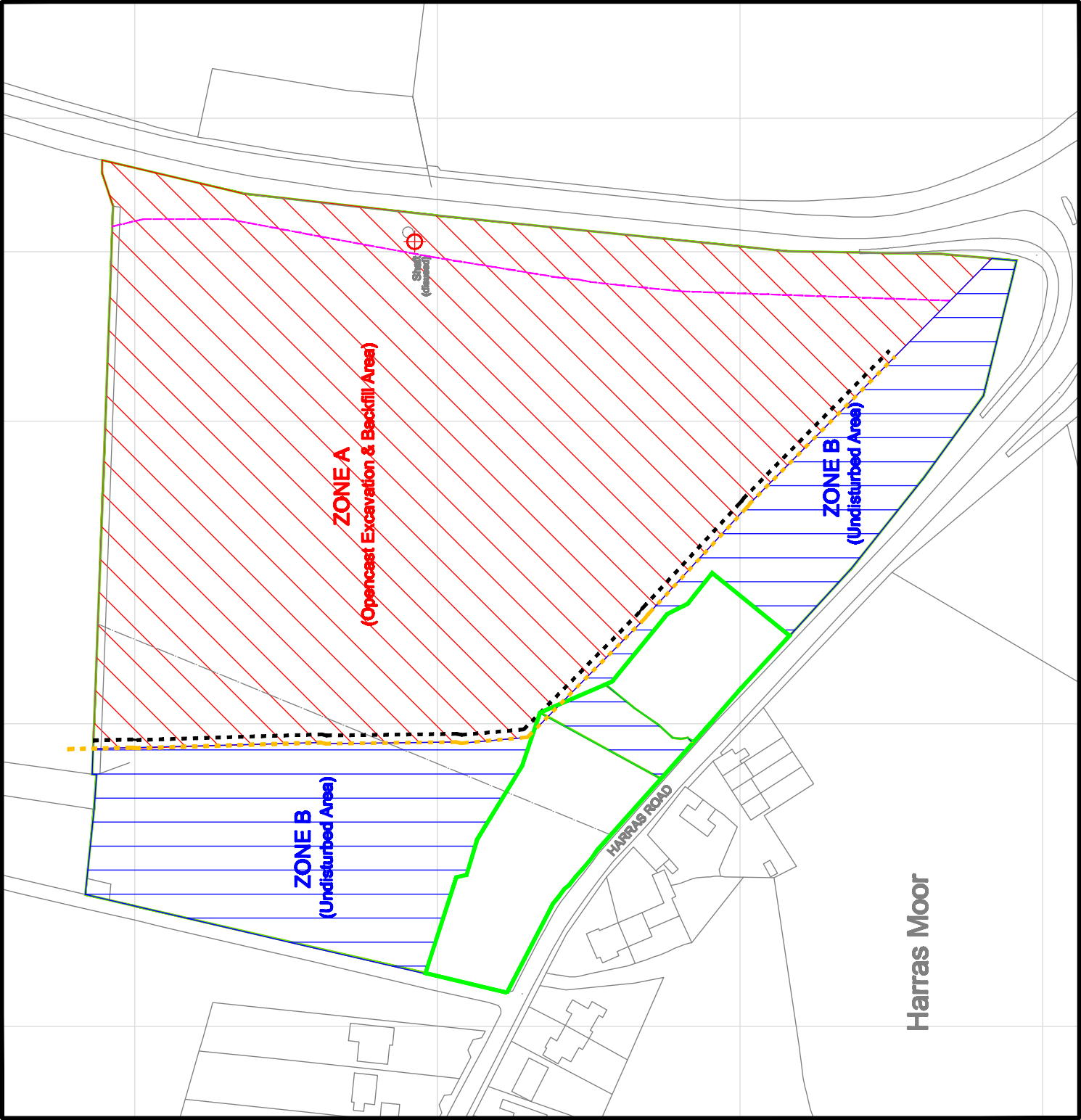
client
North Associates

TAYLOR & HARDY

NORTH
ASSOCIATES

Eden Environment Ltd
www.edenenvironment.com

APPENDIX 5 – COAL MINE RISK ASSESSMENT ZONE AREAS PLAN



**COAL MINE RISK ASSESSMENT
ZONE AREAS**

HARRAS MOOR

- Site Boundary
- Neighbouring Development Boundary
- Position of Opencast overburden fill inferred from trial pits
- Position of Opencast Limit of Excavation from trial pits
- Estimated eastern boundary of Opencast
- Zone A
- Zone B

Version number: 1	Version state: Final
Design by: J C Cooper Drawn by: J C Cooper Reviewed by: T Elliott Approved by: T Elliott Drawing title: Harras Moor Zone A and Zone B File ref: EES16-105 Grid ref: 200800,101400	Date: 22.12.16 Date: 22.12.16 Date: 22.12.16 Date: 22.12.16 Drawing title: Harras Moor Zone A and Zone B File ref: EES16-105 Grid ref: 200800,101400

Scale @A3 1:1250

Mining Information from CA Abandonment Plan Cat No 1454 sheet 3 of 7



ELLIOTT
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Fax No: 01434 603044

APPENDIX 6 – SITE INVESTIGATION TRIAL PIT LOGS

SITE INVESTIGATION
TRIAL PIT LOGS

HARRAS MOOR

Version number: 1Version state: Final

Design by: J C Cooper
Drawn by: J C Cooper
Reviewed by: T Elliott
Approved by: T Elliott
Drawing ref:Harras Moor TP Sections
File ref: EES16-199
Ghd ref: 298850.518450

Date:25.03.16
Date:25.03.16
Date:22.12.16
Date:22.12.16
TP Sections

Scale @A3 1:100

N

See Site Investigation Trial Pit Plan for location of pits

ELLIOTT

Environmental Surveyors

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Bridge End
Hexham
Northumberland
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Tel: 01434 609245
Fax: 01434 609344

Orange line of excavation

Break line between Redbrown very stiff CLAY and backfilled CLAY visible.

0.20m

Redbrown very stiff CLAY
2.0m

10.20m

1.60m

Rushes and grass on grey/brown wet TOPSOIL with occasional coal fragments.

Yellow/brown stiff CLAY (reworked backfill) with occasional red brick.

Grey/brown mixed sandstone and shale with occasional clay (OPENCAST BACKFILL).

TP1

Orange line of excavation

0.15m

Redbrown very stiff CLAY
2.0m

0.15m

Rushes and grass on grey/brown wet TOPSOIL with occasional coal fragments.

Yellow/brown stiff CLAY (reworked backfill) with large sub rounded cobbles and occasional red brick.

Grey/brown mixed sandstone and shale with occasional clay (OPENCAST BACKFILL).

TP2

Orange line of excavation

0.15m

Redbrown very stiff CLAY
2.65m

0.15m

Rushes and grass on grey/brown wet TOPSOIL with occasional coal fragments.

Yellow/brown stiff CLAY (reworked backfill) with large sub rounded cobbles and occasional red brick.

Grey/brown mixed sandstone and shale with occasional clay (OPENCAST BACKFILL).

TP3

Orange line of excavation

0.18m

Orange brown stiff CLAY
2.9m

0.18m

Rushes and grass on grey/brown wet TOPSOIL with occasional coal fragments.

Yellow/brown wet CLAY (reworked backfill) with occasional red brick.

Grey/brown mixed sandstone and shale with occasional clay (OPENCAST BACKFILL).

TP4

Orange line of excavation

0.20m

Redbrown stiff CLAY
2.0m

0.20m

Rushes and grass on grey/brown wet TOPSOIL with occasional coal fragments.

Yellow/brown/grey/orange stiff CLAY (reworked backfill) with large sub rounded cobbles and occasional boulder

Grey/brown mixed sandstone and shale with occasional clay (OPENCAST BACKFILL).

TP5

APPENDIX 7 – TRIAL PIT PLAN WITH UPDATED MINING INFORMATION PLAN

The map displays Harras Moor with several paths and points of interest. A green line outlines the perimeter of the moor. A blue path runs along the top and left sides. A red path runs along the bottom and right sides. A brown path runs along the top and right sides. A dashed black line runs diagonally across the lower right. Five points are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. A north arrow is located in the upper right corner. The text 'Harras Moor' is written vertically on the right side.

The map displays Harras Moor with several distinct paths: a green boundary, a blue path, a red path, and a brown path. A dashed line, possibly a fence or boundary, runs diagonally from the bottom left towards the top right. Five specific points are highlighted with red circles and labeled TP1, TP2, TP3, TP4, and TP5. A north arrow is positioned in the upper right area. The text 'Harras Moor' is oriented vertically on the right side of the map.

The map displays a proposed development area on Harras Moor, outlined in green. A grid is overlaid on the map. A north arrow is located in the upper right corner, and a scale bar is in the upper left corner. Five trial pits are marked with red circles and labels: TP1, TP2, TP3, TP4, and TP5. A dashed line runs horizontally across the middle of the map. The map also shows existing buildings and roads.

The map displays Harras Moor with several distinct paths: a green boundary, a blue path, a red path, and a brown path. A dashed line, likely a boundary or survey line, runs diagonally from the bottom left towards the top right. Five specific points are identified and labeled in red circles: TP1, TP2, TP3, TP4, and TP5. TP1, TP2, and TP3 are located along the dashed line in the lower-left quadrant. TP4 and TP5 are located further up the dashed line towards the top right. A north arrow is positioned in the upper right area of the map. The label 'Harras Moor' is oriented vertically on the right side. The map also shows some building outlines at the bottom and top edges.

The map displays Harras Moor with a grid overlay. Key features include:

- TP1, TP2, TP3, TP4, TP5:** Points of interest marked in red circles.
- Shelf (downhill):** A red line with a cross symbol indicating a specific path or feature.
- Harras Moor:** The main area of the map, labeled in the bottom right corner.
- Buildings and Roads:** Various structures and paths are shown in the background.
- Grid:** A coordinate grid is overlaid on the map.

The map displays Harras Moor with several distinct paths and marked points. A green line outlines the perimeter of the moor. Inside, there are three main paths: a blue line, a red line, and a brown line. A dashed line, possibly a boundary or a specific path, runs diagonally from the bottom left towards the top right. Five points of interest are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. TP1, TP2, and TP3 are located along the dashed line in the lower-left quadrant. TP4 and TP5 are located along the dashed line in the upper-right quadrant. A north arrow is positioned in the upper right corner of the map area. The text 'Harras Moor' is written vertically on the right side of the map.

The map displays Harras Moor with several paths and points of interest. A green line outlines the perimeter of the moor. Inside, there are four main paths: a blue path, a red path, a brown path, and a yellow path. A dashed black line runs diagonally from the bottom left towards the top right. Five points are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. A north arrow is located in the upper right corner. The text 'Harras Moor' is written vertically on the right side.

The map displays Harras Moor with a grid overlay. A red line with cross-ticks runs diagonally from the bottom left towards the top right. Other paths are shown in blue, green, and brown. A dashed black line and a dotted yellow line are also present. A red circle with a crosshair is labeled 'Shed (damaged)'. The area is bounded by a green line, and the text 'Harras Moor' is written vertically on the right side.

TP1

TP2

TP3

TP4

TP5

Shed (damaged)

Harras Moor

The map displays Harras Moor with a grid overlay. A red line with cross-ticks runs diagonally from the bottom left towards the top right. Other paths are shown in blue, green, and brown. A dashed black line and a dotted yellow line are also present. A red circle with a crosshair is labeled 'Shed (damaged)'. The area is bounded by a green line, and the text 'Harras Moor' is written vertically on the right side.

TP1

TP2

TP3

TP4

TP5

Shed (damaged)

Harras Moor

The map displays Harras Moor with several paths and points of interest. A green boundary line encloses the main area. A blue path runs along the top and left sides. A red path runs along the bottom and right sides. A brown path runs along the top and right sides. A dashed black line runs diagonally across the lower right. Five points are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. A north arrow is located in the upper right corner. The text 'Harras Moor' is written vertically on the right side.

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The map displays Harras Moor with several paths and points of interest. A green boundary line encloses the main area. A blue path runs along the top and left sides. A red path runs along the bottom and right sides. A brown path runs along the top and right sides. A dashed black line runs diagonally across the lower right. Five points are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. A north arrow is located in the upper right corner. The text 'Harras Moor' is written vertically on the right side.

The map displays Harras Moor with several distinct paths and marked points. A green line outlines the perimeter of the moor. Inside, there are four main paths: a blue path, a red path, a brown path, and a yellow path. A dashed line, likely a boundary or a specific route, runs diagonally from the bottom left towards the top right. Five points of interest are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. TP1, TP2, and TP3 are located along the dashed line in the lower-left quadrant. TP4 and TP5 are located along the dashed line in the upper-right quadrant. A north arrow is positioned in the upper right corner of the map area. The text 'Harras Moor' is written vertically on the right side of the map.

The map displays Harras Moor with several survey lines and points. A north arrow is located in the upper right quadrant, pointing towards the top right and labeled 'Shed (down)'. The area is bounded by a green line. Various colored lines (green, blue, red, brown, yellow) represent different survey paths. Five points are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. A dashed line runs diagonally across the center, and a solid line runs along the top edge. Buildings and roads are visible at the bottom and right edges.

The map displays Harras Moor with several survey lines and points. A north arrow is located in the upper right quadrant, pointing towards the top right and labeled 'Shed (down)'. The area is bounded by a green line. Various colored lines (green, blue, red, brown, yellow) represent different survey paths. Five points are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. A dashed line runs diagonally across the center, and a solid line runs along the top edge. Buildings and roads are visible at the bottom and right edges.

The map displays Harras Moor with several paths and points of interest. A green line outlines the perimeter of the moor. Inside, there are four main paths: a blue path, a red path, a brown path, and a yellow path. A dashed black line runs diagonally from the bottom left towards the top right. Five points are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. A north arrow is located in the upper left corner. The text 'Harras Moor' is written vertically on the right side.

The map displays Harras Moor with several survey lines and points. A north arrow is located in the upper right quadrant, pointing towards the top right and labeled 'Shaft (down)'. The survey lines are color-coded: green, blue, red, brown, and yellow. Five points are marked with red circles and labeled TP1, TP2, TP3, TP4, and TP5. TP1, TP2, and TP3 are located along a dashed line that runs diagonally from the bottom left towards the center. TP4 and TP5 are located along a solid line that runs horizontally across the middle of the map. The map also shows buildings and roads at the bottom and right edges, and a green line boundary on the left and top.

The map displays a proposed development area on Harras Moor, outlined in green. A grid is overlaid on the map. A north arrow is located in the upper right corner, and a scale bar is in the upper left corner. Five trial pits are marked with red circles and labels: TP1, TP2, TP3, TP4, and TP5. A dashed line runs horizontally across the middle of the map. The map also shows existing buildings and roads.

The map shows a proposed development area outlined in green. The area is divided into several sections by a dashed line running horizontally across the middle and a solid line running vertically on the right. The sections are labeled 'TP1' through 'TP5' in red circles. A north arrow is located in the top right corner. The area is labeled 'Harras Moor' in the bottom right corner.

The map shows a proposed development area outlined in green. The area is divided into several sections by a dashed line running horizontally across the middle and a solid line running vertically on the right. The sections are labeled 'TP1' through 'TP5' in red circles. A north arrow is located in the top right corner. The area is labeled 'Harras Moor' in the bottom right corner.

The map displays Harras Moor with a grid overlay. A red line with cross-ticks runs diagonally from the bottom left towards the top right. Other paths are shown in blue, green, and brown. A dashed black line and a dotted yellow line are also present. A red circle with a crosshair is labeled 'Shed (damaged)'. The area is bounded by a green line, and the text 'Harras Moor' is written vertically on the right side.

TP1

TP2

TP3

TP4

TP5

Shed (damaged)

Harras Moor

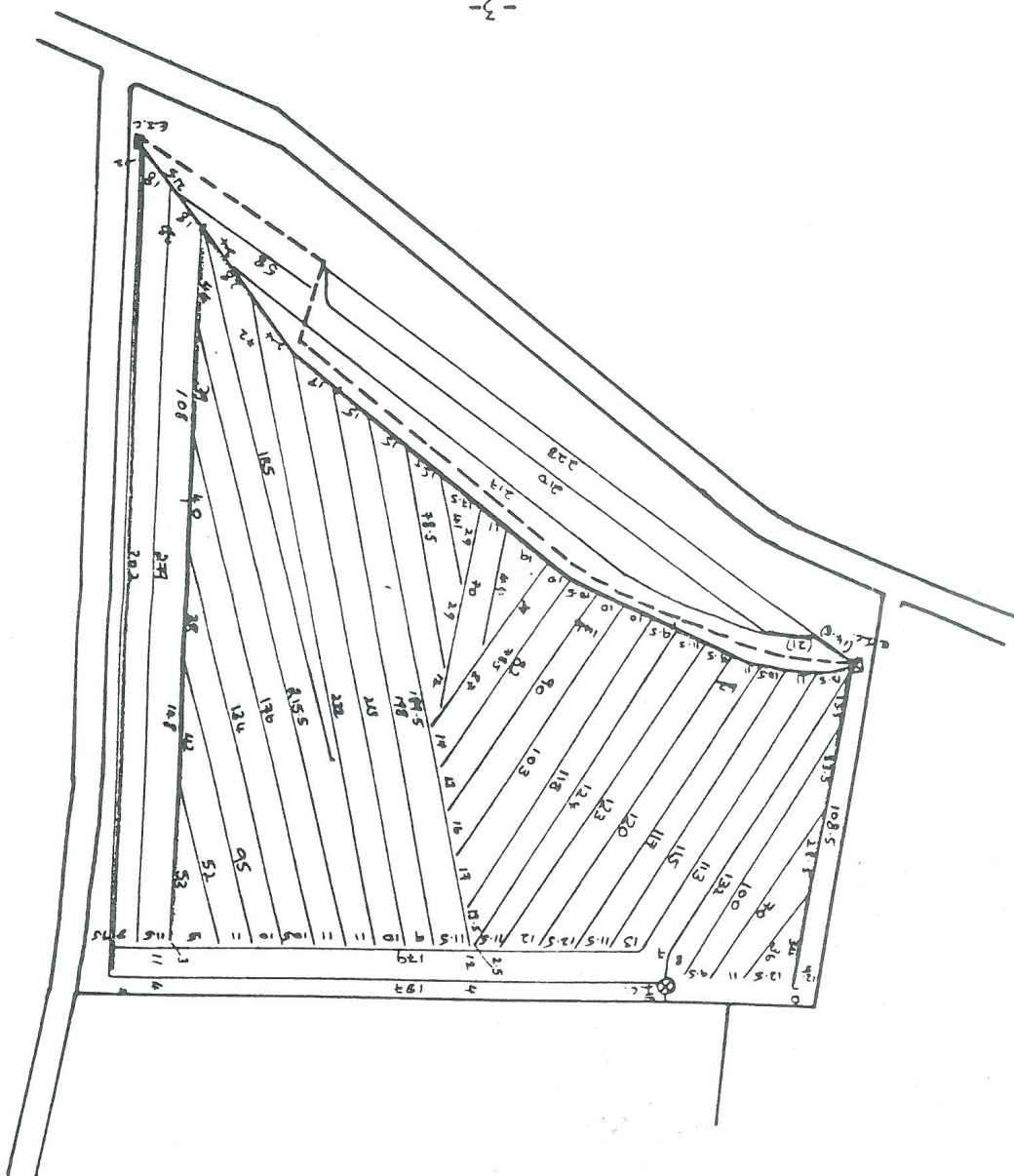
The map displays Harras Moor with a grid overlay. Key features include:

- TP1, TP2, TP3, TP4, TP5:** Points of interest marked in red circles along a dashed horizontal line.
- Shelf (down):** A red line with a cross symbol indicating a specific feature.
- Harras Moor:** The name of the area, written vertically on the right side.
- Paths:** Various colored lines (green, blue, red, brown, yellow) representing different routes or boundaries.
- Grid:** A light grey grid overlaying the map.

APPENDIX 8 UNDERDRAINAGE PLAN AFTER OPENCAST RESTORATION

8000

-3-



APPENDIX 9 SITE INVESTIGATION PHOTOGRAPHS



Photo 4: TP1 located in the north west of the site.



Photo 5: TP1, compact disturbed subsoil over very compact grey shale overburden.



Photo 6: TP1 exposed gravel indicating a field drain location below.



Photo 7: TP1 boundary visible between the compact grey shale backfill on the left with the red / brown natural clay on the right.



Photo 8: TP2 located in the western section of the site.



Photo 9: TP2 exposed boundary between the grey shale opencast backfill on the left with the red / brown natural clay on the right.



Photo 10: TP3 located on the south west of the site. The trial pit trenches were dug on both sides of the fence.



Photo 11: TP4 located in the south of the site.



Photo 12: TP5 located in the south east of the site.



Photo 1: View northwards across Development Area and wider site beyond.



Photo 2: Confirmed SW corner of previous opencast excavated area looking north-west.



Photo 3: View south-eastwards towards the SE corner of the site.