

THE COAL AUTHORITY

HARD LEVEL ADIT, BARNEY BECK, OLD GANG, REETH HIGH MOOR, RICHMONDSHIRE, NORTH YORKSHIRE

**WATCHING BRIEF REPORT** 

**DECEMBER 2020** 





DATE ISSUED: December 2020

JOB NUMBER: CL12400

REPORT NUMBER: 0001

GRID REFERENCE: NGR NY 97137 00658

OASIS REFERENCE: wardella2-409298

VERSION: V0.1

STATUS: DRAFT

## THE COAL AUTHORITY

HARD LEVEL ADIT, BARNEY BACK, OLD GANG, REETH HIGH MOOR, RICHMONDSHIRE, NORTH YORKSHIRE

## **WATCHING BRIEF REPORT**

**PREPARED BY:** 

Cat Peters Principal Archaeologist

**REVIEWED BY:** 

Dave Jackson Associate Director

**APPROVED BY:** 

Chloe Brownlee-Chapman Regional Director

This report has been prepared by Wardell Armstrong LLP with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The report is confidential to the Client and Wardell Armstrong LLP accepts no responsibility of whatever nature to third parties to whom this report may be made known.

No part of this document may be reproduced without the prior written approval of Wardell Armstrong LLP.





WASTE RESOURCE MANAGEMENT

Bluggmand.



# **CONTENTS**

EXECUTIVE SUMMARY	1
1 INTRODUCTION	2
1.1 Project Circumstances and Planning Background	2
1.2 Project Documentation	2
2 METHODOLOGY	4
2.1 Standards and Guidance	4
2.2 The Watching Brief	4
2.3 Site Archive	4
3 BACKGROUND DATA	6
3.1 Location and Geology	6
3.2 Archaeological and Historical Background	6
4 ARCHAEOLOGICAL WATCHING BRIEF RESULTS	8
4.1 Introduction	8
4.2 Results	8
5 CONCLUSIONS	10
5.1 Summary and Impacts	10
6 BIBLIOGRAPHY	11
APPENDIX 1: PLATES	12
APPENDIX 2: FIGURES	16
ILLUSTRATIONS	
FIGURES	
Figure 1: Site location	
Figure 2: Historic Ordnance Survey mapping	
Figure 3: Results of watching brief (after R.H. Harrison Construction Limited)	
PLATES	
Plate 1: Completed structures, channel and monitoring structure facing south	12
Plate 2: Completed structures, channel and monitoring structure facing north	12
Plate 3: View of Hard Level Adit and beyond from north-west	13
Plate 4: View of Hard Level Adit and beyond from north-west	13
Plate 5: View of Hard Level Adit from south-south-east	14
Plate 6: View of Hard Level Adit from south-south-east	14
Plate 7: View of Hard Level Adit from south	15
Plate 8: View of Hard Level Adit from south	15



## **EXECUTIVE SUMMARY**

Wardell Armstrong LLP (WA) was commissioned by The Coal Authority to undertake an archaeological recording and monitoring of groundworks occurring in the vicinity of the Hard Level Adit, north of Barney Beck, part of the Old Gang Lead Mine, on Reeth High Moor in the Yorkshire Dales National Park (NGR NY 97137 00658). The groundworks occurred in association with the installation of a new flow monitoring structure. This structure will monitor the volume of water flowing from the Hard Level Adit and allow for the future monitoring of pollutants leaching from the former lead mine. Future management plans can then target the reduction of these pollutants into Barney Beck and beyond.

The Hard Level Adit and the area to the south, including Barney Beck, and to the north-west, north and east, forms part of the scheduled area of 'lead mines, ore works and smeltmills at Old Gang on Reeth High Moor' (NHLE 1015860), a nationally significant heritage asset. The Old Gang smeltmill complex is one of the best preserved lead smelt mills and the most structurally complex in the North Pennines, comprising upstanding structural remains and associated sub-surface archaeological deposits. As such, Scheduled Monument consent was applied for, and granted, subject to a number of archaeological conditions, including an archaeological monitoring and recording programme, in-line with an approved Written Scheme of Investigation (WSI; Scheduled Monument Consent ref: S1015860-15042020).

The watching brief was undertaken across three days in November 2020 and comprised the archaeological supervision of all groundworks associated with the installation of the new flow monitoring structure to the south of the Hard Level Adit and north of Barney Beck. A photographic recording survey was undertaken prior to, and following the works, and, along with this report, will address a number of conditions of Scheduled Monument Consent.

No archaeological remains or features of archaeological interest were disturbed by the groundworks. The installed flow monitoring structure, with associated low walls constructed to channel the flow of water from the Hard Level Adit through a single channel to flow directly into Barney Beck, were completed in compliance with the approved method statement. This will result in less flooding when rainfall is high, and thus protect the scheduled monument from future water-related erosion and damage, and future monitoring of the outfall of water from the former lead mines will contribute to a management plan which will reduce the concentration of pollutants into the watercourse.



## 1 INTRODUCTION

# 1.1 Project Circumstances and Planning Background

- 1.1.1 Wardell Armstrong LLP (WA) was commissioned by The Coal Authority to undertake archaeological recording and monitoring of groundworks occurring in the vicinity of the Hard Level Adit, part of the Old Gang Lead Mine, on Reeth High Moor in the Yorkshire Dales National Park (NGR NY 97137 00658). The groundworks occurred in association with the installation of a new flow monitoring structure. This structure will monitor the volume of water flowing from the Hard Level Adit into Barney Beck and allow for the future reduction of pollutants leaching from the former lead mine. This work formed part of the wider Water and Abandoned Metal Mines Programme, a joint venture between the Environment Agency, Defra and The Coal Authority, aimed at reducing the pollutants discharged from abandoned metal mines.
- 1.1.2 The Upper Swaledale rivers had been identified as heavily polluted by lead, cadmium and zinc, particularly Barney Beck, Gunnersdale Gill and Arkle Beck, and this pollution extends for tens of kilometres, considerably downstream of Richmond. The most polluting discharge was found to be from the Hard Level Adit into Barney Beck, hence the requirement for the installation of the new monitoring structure.
- 1.1.3 The Hard Level Adit lies within the scheduled area of 'lead mines, ore works and smeltmills at Old Gang on Reeth High Moor' (NHLE 1015860), a nationally significant heritage asset. The Old Gang smeltmill complex is one of the best preserved lead smelt mills and the most structurally complex in the North Pennines, comprising upstanding structural remains and associated sub-surface archaeological deposits. As such, Scheduled Monument consent was applied for, and granted, subject to a number of archaeological conditions, including an archaeological monitoring and recording programme, in-line with an approved Written Scheme of Investigation (WSI; Scheduled Monument Consent ref: S1015860-15042020).

# 1.2 **Project Documentation**

1.2.1 The archaeological recording and monitoring of the installation of the new monitoring structure, conformed to methodologies defined in the Written Scheme of Investigation (WSI) which was prepared in April 2020 (Wardell Armstrong 2020) and submitted with the application for Scheduled Monument Consent, and thus approved by the granting of consent. The archaeological work comprised a pre-works photographic survey of the area of works, the archaeological monitoring of all work



undertaken in association with the installation (under the remit of an archaeological watching brief), and a final photographic survey of the area of works once the project was complete. This is in line with government advice as set out in Section 16 of the National Planning Policy Framework (NPPF; MHCLG 2019).

1.2.2 This report summarises the results of this scheme of archaeological work, and, along with an online OASIS report, and submission of the pre and post-works photographs, adheres to the conditions imposed on the work (Ref: S1015860-15042020).



## 2 METHODOLOGY

## 2.1 Standards and Guidance

- 2.1.1 A watching brief is defined as a programme of 'monitoring and investigation carried out during a non-archaeological activity within a specified area of land or development where construction operations may disturb or destroy archaeological remains' (CIfA 2020).
- 2.1.2 The archaeological watching brief was undertaken following the Chartered Institute for Archaeologists Standard and Guidance for an archaeological watching brief (2020), and in accordance with the WA fieldwork manual (2020). It adhered to methodologies outlined in the approved WSI (Wardell Armstrong 2020), and in compliance with the conditions attached to the Scheduled Monument Consent for the works (Ref: S1015860-15042020).

# 2.2 The Watching Brief

- 2.2.1 The watching brief comprised the archaeological monitoring of all works associated with the installation of the monitoring structure at the Hard Level Adit. It also incorporated a photographic survey of the works area, before any works commenced, and after the completion of the installation of the monitoring structure.
- 2.2.2 The key aims of the archaeological work were to:
  - Provide a permanent photographic record of the area to be affected both before and after the works;
  - Monitor all groundworks occurring within the scheduled area, however minimal, to reduce unnecessary impacts on the monument;
  - Provide the opportunity for an appropriate resource allocation to deal with any archaeological remains encountered during the work;
  - Disseminate the results of the fieldwork through an appropriate level of reporting following the on-site work.
- 2.2.3 All work undertaken within the scheduled area were monitored under close supervision by a suitably trained archaeologist. No archaeological remains were encountered and no artefacts were recovered or environmental samples taken.

## 2.3 **Site Archive**

2.3.1 A full professional archive has been compiled in accordance with the project specification, and the Archaeological Archives Forum recommendations (Brown



- 2011). The archive will be deposited within an appropriate repository, with copies of this report sent to the Yorkshire Dales National Park Authority (YDNPA) within three months of the completion of the groundworks, and copies of the photographic record sent to both the YDNPA and Historic England, within the same timescale. The archive will be accessible under the unique project identifier (OGR-A; CL12400).
- 2.3.2 Wardell Armstrong LLP supports the **O**nline **A**cces**S** to the Index of Archaeological Investigation**S** (**OASIS**) project. This project aims to provide an on-line index and access to the extensive and expanding body of grey literature, created as a result of developer-funded archaeological work. As a result, and in accordance with Scheduled Monument Consent for the works, details of the results of this project will be made available by WA as a part of this national project. The OASIS reference for the project is: **wardella2-409298**.



## 3 BACKGROUND DATA

# 3.1 Location and Geology

- 3.1.1 The location of the new monitoring structure is just to the south of Hard Level Adit, located on Reeth High Moor, a little north of Barney Beck, a tributary of the River Swale, and approximately 6.5km west of Reeth in the Yorkshire Dales National Park (NGR NY 97137 00658; Figure 1). A track, presently used for farm vehicles and as a public right of way for walkers to access the area, lies to the immediate north-east, and continues parallel to Barney Beck. The track continues through the disused remains of the main Old Gang Smelting Mills Complex to the south-east of Hard Level Adit, to meet a public highway to the east. To the north-east, a second adit is visible on the north side of the track; and, a little to the east, is a single, detached building, also part of the former lead-mining complex, with a second detached building further to the south-east, on the south side of the track. This area was part of the former Grinding Mill.
- 3.1.2 The location of the new monitoring structure and associated groundworks was a little to the south of Hard Level Adit, and north of Barney Beck (Figure 3).
- 3.1.3 The sedimentary bedrock in the vicinity consists of limestone of the Four Fathom Limestone Member, a sedimentary bedrock formed approximately 329 to 331 million years ago in the Carboniferous Period (BGS 2020). No superficial deposits are mapped for the area (BGS 2020).

# 3.2 Archaeological and Historical Background

- 3.2.1 This historical and archaeological background is predominantly based on Historic England's description of the former mine. It is intended only as a summary of historical developments around the site to provide context and inform on sub-surface potential.
- 3.2.2 The area has been used for lead extracting and smelt milling for centuries, the earliest surviving structural elements dating to the late 18<sup>th</sup> century, with 'New Mill' on the hillside to the north. The lower mill, the complex to the east, known as Old Gang Mill, was constructed in 1846 and utilised the earlier flue system. This used fuel in the form of peat, cut each June from the surrounding moorland, and the 36 stone pillars and two gable ends 120m apart visible on the hillside overlooking Hard Level Adit are the surviving remains of the former peat store.
- 3.2.3 The majority of the lead extracted during later phases of lead mining was accessed from levels driven as crosscuts or directly onto the vein, with at least four levels known



to survive. The Spence Level Adit is that to the south east of Hard Level Adit and has a narrow arch; the Hard Level Adit itself, measuring 1.3m wide and 1.7m tall, has a rectangular portal and slab roof. The spoil from the Hard Level Adit was transported across a single span bridge, still surviving to the south, across Barney Beck, to an extensive spoil tip. The remains of the former ore dressing works, established to dress the ore extracted from Hard Level Adit, are located to the south-east, south of the access track and north of Barney Beck.

- 3.2.4 Historic Ordnance Survey mapping of the late 19<sup>th</sup> and early 20<sup>th</sup> century demonstrate the impact of mining on the wider landscape, and illustrate a range of features in the vicinity, including dressing floors, buildings, tramways, mills, shafts, spoil heaps, trackways and aqueducts (Figure 2). The Third Edition 1914 Ordnance Survey map identifies these as 'disused', the result of a steady decline during the later 19<sup>th</sup> century. Government mineral statistics indicated that ore from the Old Gang mines yielded 74% lead up until 1888, but in the 1890s this reduced to 55% (Gill 1992, 123). Mining eventually ceased in 1907, although the dressing floors continued to be used beyond this date for reprocessing the waste tips. The site was scheduled in 1979 with amendments made in 1997.
- 3.2.5 The extent of the scheduled area, protecting structural remains and sub-surface features, is shown in Figure 1, with the area monitored during the archaeological watching brief shown in Figure 3.



## 4 ARCHAEOLOGICAL WATCHING BRIEF RESULTS

## 4.1 Introduction

- 4.1.1 The watching brief was undertaken over three days in November 2020. On 2<sup>nd</sup> November 2020, the first day scheduled for the works, heavy rain had occurred over the preceding weekend, and although a pre-works photographic survey was produced on this day, the water levels and continuing bad weather necessitated a postponement of the installation works. A second pre-works photographic survey was undertaken on Wednesday 18<sup>th</sup> November, showing less water, and this was immediately followed by the installation works, which continued into Thursday 19<sup>th</sup> November.
- 4.1.2 All elements of the installation of the monitoring structure on Wednesday 18<sup>th</sup> and Thursday 19<sup>th</sup> November were undertaken under the archaeological watching brief remit. Once the structure had been installed and the area had been tidied and cleared of equipment, the post-works photographic survey was completed. A selection of photographs taken during the photographic survey are included in Appendix 1, showing the appearance of the area before and after the installation of the new monitoring structure. A description of the groundworks undertaken under the watching brief is included below and an illustration to support the text, included as Figure 3.

## 4.2 Results

- 4.2.1 The opportunity afforded by the scheme, to observe the site after heavy rainfall, and again two weeks later, showed that the scheduled area to the south of the Hard Level Adit was periodically flooded, and that the high volume of water resulted in an additional channel being formed to the south-east, as well as the direct route straight from the Hard Level Adit into Barney Beck. This was posing a present and future risk of damage from erosion within the scheduled area.
- 4.2.2 The groundworks undertaken to facilitate the installation of the new monitoring structure initially required the relocation of large stones and boulders from the outflow from the Hard Level Adit, and from the east and west banks. Several large boulders were retained either side of an existing drop in level, to support the new retaining wall structures, and to create a narrower channel for the water to be directed through, whilst also passing the location of the new monitoring structure.



- 4.2.3 Two new retaining wall structures were created, comprising custom-built gabion baskets, the western measuring 2.1m by 0.35m and inserted on an approximate east to west orientation, and the eastern measuring 1.4m by 0.35m and placed on an approximate north-west to south-east orientation. This created a channel 0.37m wide through which water would pass. These gabion baskets were filled with the large stones and boulders earlier relocated, with additional stones utilised from the bed of Barney Beck, in a neat, compact arrangement. A water resistant membrane was then secured over these gabion baskets, to prevent water from seeping through these new retaining wall structures, and narrow wire baskets, 0.15m in width, were affixed to the visible sides of this (the north side of the western structure and the west face of the eastern structure) to reduce the visual impact of the new structures on the scheduled monument. These narrow gabion baskets were neatly filled with stone from the immediate vicinity, and stones were placed on top and around, and covered in earth (removed from a raised heap on the north side of Barney Beck) and mosses, to blend the new structures into the landscape. An area of dry-stone wall revetment, 1m in length, was also built adjacent to the north-western extent of the newly inserted eastern wall structure to secure it into place.
- 4.2.4 Once the water outfall had been controlled by the establishing of these two new wall structures, a metal monitoring post with rectangular structure attached was affixed to the eastern wall structure. The monitoring structure extends above the height of the new wall structures, and as a silver metal unit, is the most visually different element in the area (Plates 1-2). Weathering and moss growth is anticipated, which will further help these new features to blend into the landscape.
- 4.2.5 No sub-surface archaeological features were disturbed during the works, and no archaeological finds were encountered.



## 5 CONCLUSIONS

# 5.1 **Summary and Impacts**

- 5.1.1 The photographic recording and archaeological watching brief were undertaken across three days in November 2020. A pre-works photographic survey was undertaken ahead of the works, followed by the installation works. All elements of the installation of the monitoring structure were undertaken under the archaeological watching brief remit. Once the structure had been installed and the area had been tidied and cleared of equipment, the post-works photographic survey was completed.
- 5.1.2 The pre-works photographic survey showed that periodically, high volumes of water passed through the Hard Level Adit, resulting in the pooling of water, and the cutting of an additional channel to the south-east, as well as the direct route straight from the Hard Level Adit into Barney Beck. This was posing a present and future risk of damage from erosion within the scheduled area. The new retaining wall structures have created a narrower channel for the water to be directed through, with no opportunity for it to seep into the wider areas. This will reduce the risk of future erosion. In addition, this water will now pass the new monitoring structure and thus will provide data on concentrations of pollutants, allowing assessments to be made on how to reduce these and minimise future leaching into the wider area.
- 5.1.3 No adverse direct impacts on sub-surface archaeological remains occurred as a result of the installation of the new monitoring structure.
- 5.1.4 Although the pre and post-work photographic surveys show the impact of the new monitoring structure and its associated retaining wall structures visually on the wider area, these have been minimised by the use of materials from the immediate vicinity, with only metal from the gabion baskets visible at certain angles, and the metal monitoring structure itself (Appendix 1, Plates 3-8). It is anticipated that weathering and future moss growth will further help these new features blend into the landscape, diminishing their impact on the scheduled area.



## 6 BIBLIOGRAPHY

British Geological Survey, (2020) *Geology of Britain Viewer*, <a href="http://mapapps.bgs.ac.uk/geologyofbritain/home.html">http://mapapps.bgs.ac.uk/geologyofbritain/home.html</a>, British Geological Survey, accessed 27<sup>th</sup> November 2020

Brown, DH (2011) *Archaeological Archives: A Guide to Best Practice in Creation, Compilation, Transfer and Curation.* Archaeological Archives Forum.

CIfA, (2020) Standard and Guidance for an Archaeological Watching Brief. Chartered Institute of Field Archaeologists: Reading

Gill, M.C., (1992) *Yorkshire Smelting Mills Part 1: The Northern Dales*. In, British Mining No. 45, NMRS, PP111-150

Historic England (2020) *Lead Mines, Ore Works and Smeltmills NHLE 1015860: Scheduled Monument Consent, Ref: S1015860-15042020*, Dr Andy Hammon, Historic England

MHCLG 2019, National Planning Policy Framework, Ministry of Housing, Communities and Local Government: London

National Heritage List England (NHLE 2020) <a href="https://historicengland.org.uk/listing/the-list/">https://historicengland.org.uk/listing/the-list/</a> 'NHLE 1015860: Lead mines, ore works and smeltmills at Old Gang on Reeth High Moor', Historic England, accessed 27th November 2020

Ordnance Survey Historic Map Series, First Edition, six-inch scale, 1857, Yorkshire Sheet 36

Ordnance Survey Historic Map Series, First Edition, six-inch scale, 1895, Yorkshire Sheet 36.SE

Ordnance Survey Historic Map Series, First Edition, six-inch scale, 1914, Yorkshire Sheet 36.SE

Wardell Armstrong (2020) Wardell Armstrong LLP: Excavation Manual, Wardell Armstrong

LLP, unpublished internal document, Edition 1.5

Wardell Armstrong (2020) Written Scheme of Investigation for an Archaeological Watching Brief, Barney Beck, Reeth High Moor, unpublished grey literature report by Wardell Armstrong LLP



# **APPENDIX 1: PLATES**



Plate 1: Completed structures, channel and monitoring structure facing south



Plate 2: Completed structures, channel and monitoring structure facing north



# **Pre-works**



Plate 3: View of Hard Level Adit and beyond from north-west

# **Post-works**



Plate 4: View of Hard Level Adit and beyond from north-west



# **Pre-works**



Plate 5: View of Hard Level Adit from south-south-east

# **Post-works**



Plate 6: View of Hard Level Adit from south-south-east



# **Pre-works**



Plate 7: View of Hard Level Adit from south

# **Post-works**

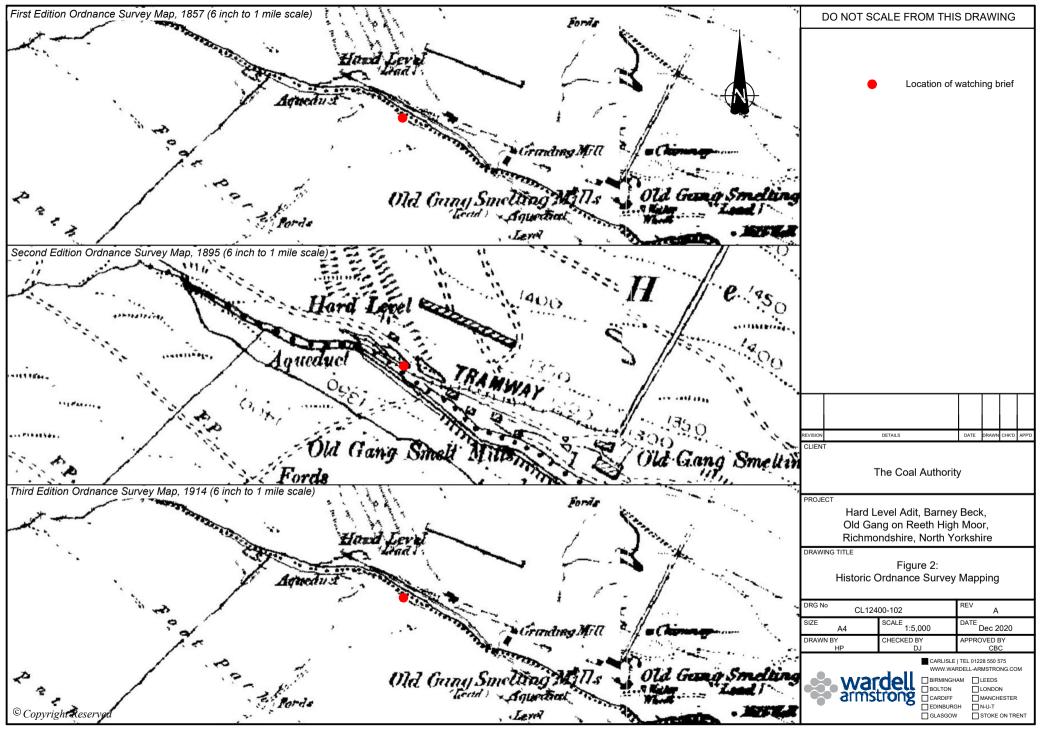


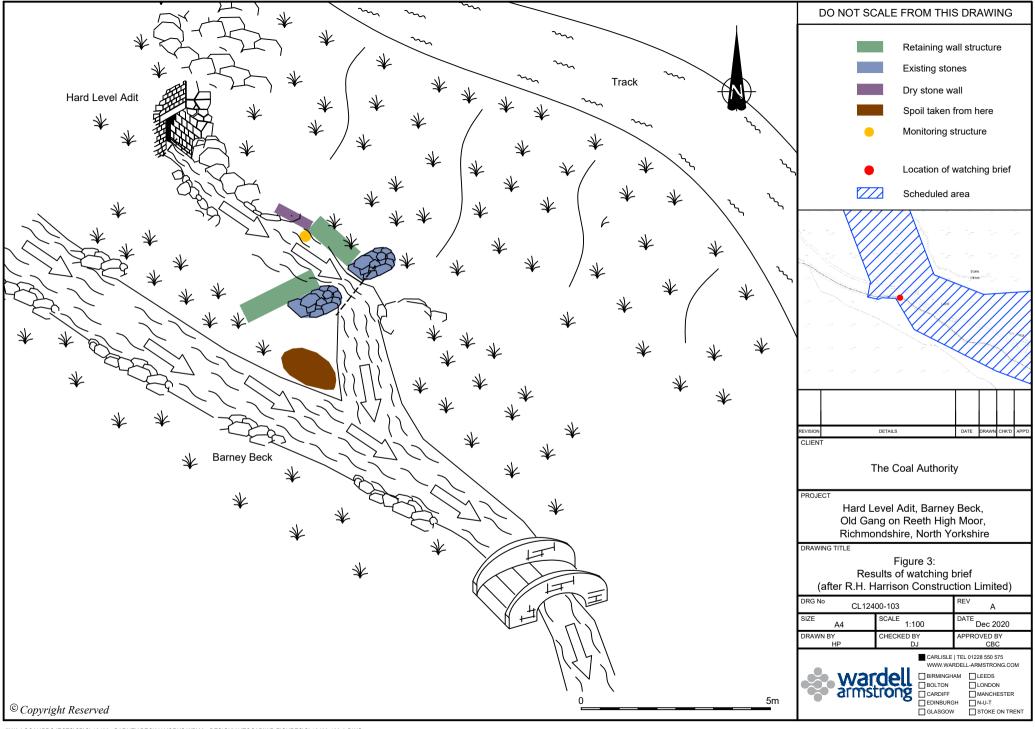
Plate 8: View of Hard Level Adit from south



# **APPENDIX 2: FIGURES**







# wardell-armstrong.com

### STOKE-ON-TRENT

Sir Henry Doulton House Forge Lane Etruria Stoke-on-Trent ST1 5BD Tel: +44 (0)1782 276 700

### **BIRMINGHAM**

Two Devon Way Longbridge Technology Park Longbridge Birmingham B31 2TS Tel: +44 (0)121 580 0909

### **BOLTON**

41-50 Futura Park Aspinall Way Middlebrook **Bolton** BL6 6SU Tel: +44 (0)1204 227 227

**BURY ST EDMUNDS** 6 Brunel Business Court Eastern Way Bury St Edmunds Suffolk IP32 7AJ Tel: +44 (0)1284 765 210

### **CARDIFF**

**Tudor House** 16 Cathedral Road Cardiff CF11 9LJ Tel: +44 (0)292 072 9191

### **CARLISLE**

Marconi Road **Burgh Road Industrial** Estate Carlisle Cumbria CA2 7NA Tel: +44 (0)1228 550 575

## **EDINBURGH**

Great Michael House 14 Links Place Edinburgh EH6 7EZ Tel: +44 (0)131 555 3311

**GLASGOW** 2 West Regent Street Glasgow **G2 1RW** 

## Tel: +44 (0)141 433 7210

#### **LEEDS**

36 Park Row Leeds LS15JL

## Tel: +44 (0)113 831 5533

### LONDON

Third Floor 46 Chancery Lane London WC2A 1JE Tel: +44 (0)207 242 3243

## **NEWCASTLE UPON TYNE**

City Quadrant 11 Waterloo Square Newcastle upon Tyne NE1 4DP Tel: +44 (0)191 232 0943

#### **SHEFFORD**

PI House R/O 23 Clifton Road Shefford Bedfordshire SG17 5AF Tel: +44 (0)1462 850 483

#### **TRURO**

Baldhu House Wheal Jane Earth Science Park Baldhu Truro TR3 6EH Tel: +44 (0)187 256 0738

# International offices:

## **ALMATY**

29/6 Satpaev Avenue Regency Hotel Office Tower Almaty Kazakhstan 050040 Tel: +7(727) 334 1310

### **MOSCOW**

21/5 Kuznetskiy Most St. Moscow Russia Tel: +7(495) 626 07 67

