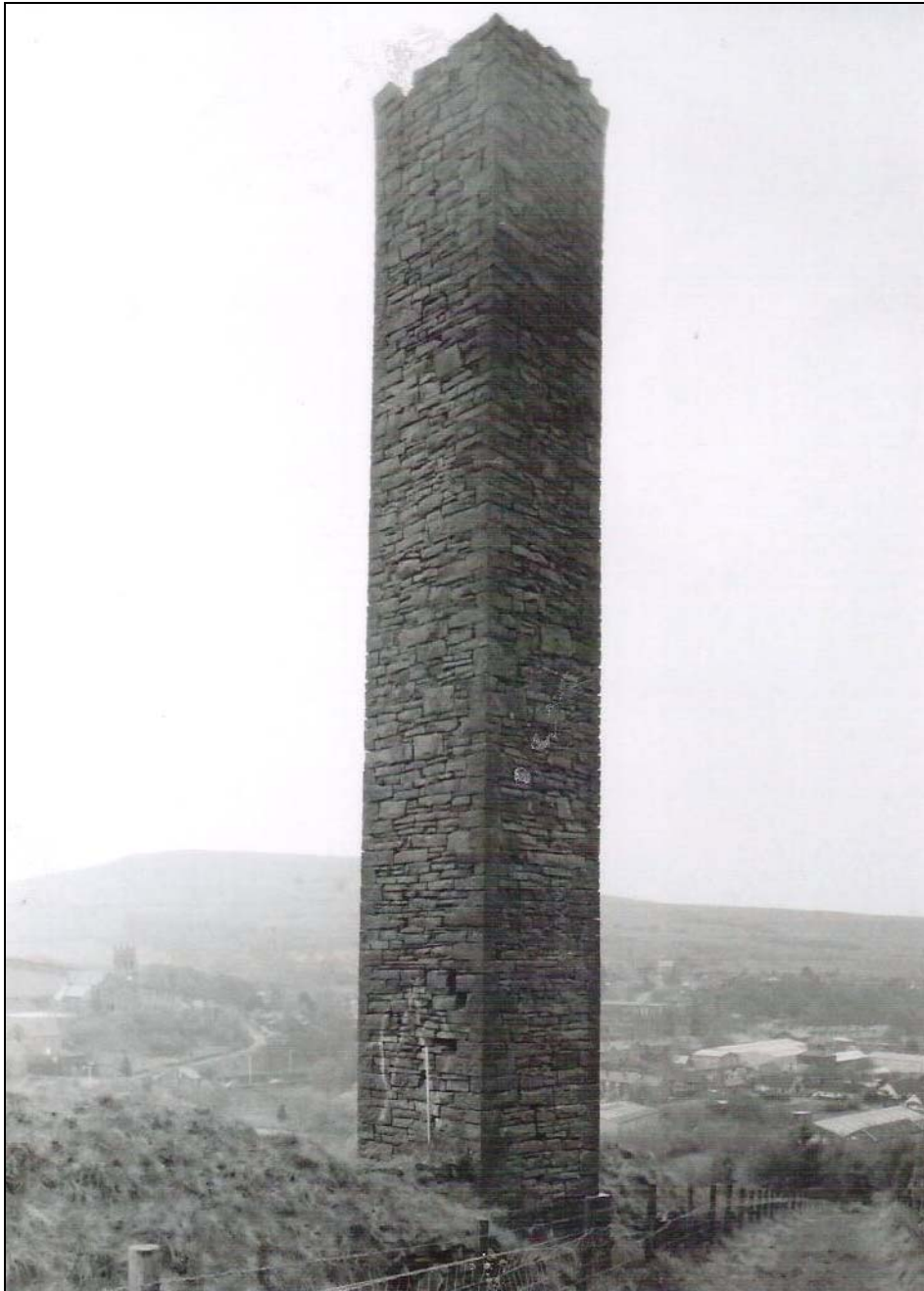


Facit Chimney, Facit Quarry, Whitworth

A Photographic Building Survey

By J.M. Trippier Archaeological and Surveying Consultancy



September 2008

Clients: Pennine Lancashire Groundwork

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EXECUTIVE SUMMARY

Facit Chimney was built in the mid to late 19th Century to remove fumes and/or steam from the finishing works serving Facit Stone Quarries. Along with other monuments in the vicinity and beyond it is an evocative reminder of the once important Rossendale stone quarrying industry. Although in comparatively good condition conservation work is required to prevent further deterioration. Pennine Lancashire Groundwork, acting on behalf of the Partnership involved in the *Valley of Stone* project, has commissioned such work, a requirement of which was an archaeological recording and monitoring programme. This report fulfils that requirement.

1. INTRODUCTION

- 1.1 The borough of Rossendale is located in Southeast Lancashire and covers an area of approximately 140 square kilometres. Whilst it is situated on the edge of industrialised towns such as Burnley and Rochdale, with the city of Manchester only 29 kilometres to the south, the landscape character is one of enclosed uplands, cut by steep valleys lined with linear development, with a large moorland plateau in the south east of the borough (*Supplementary Planning Guidance Landscape and Heritage Adopted SPG 2001 – 2016*). The moorland plateau contains an unusually complex cluster of quarry sites ranging from the 18th Century to the present day. The main landowners are Lancashire County Council, Rossendale Borough Council and United Utilities. The *Valley of Stone* project is intended to create a regionally significant resource focused on the stone quarrying industry but not exclusive to it. The overall importance of the conservation value of the *Valley of Stone* is reflected in its inclusion within the South Pennines Heritage Strategy.
- 1.2 The *Valley of Stone* Management Plan has been prepared on behalf of the Heritage Lottery Fund and a working party comprising representatives from the agencies who hold management responsibilities for sites within the *Valley of Stone*. The Plan is not prescriptive or binding on landowners and management agencies, but aims to be framework for co-ordinated management and the development of partnerships. The Plan comprises a statement of the objectives necessary for the long term preservation of the Valley of Stone and its landscape setting, aiming to balance the interests of conservation, public access, and the interests of those who live and work in the area. It provides a framework for the holistic and proactive management of the landscape, helping to ensure that the special qualities of the *Valley of Stone* are sustained and preserved for future generations.
- 1.3 The implementation of the Plan will be achieved by the various agencies adopting the *Valley of Stone* objectives and carrying out their management responsibilities within this strategy. Groundwork East Lancashire is monitoring and working with landowners to manage the sites for the duration of the project. Short and medium-term objectives include, inter alia, the enhancement and conservation of the landscape character of the *Valley of Stone* and the halting of ongoing degradation of sites and monuments that have been considered archaeologically significant. Facit Chimney is one such monument. It is structurally in good repair but remedial conservation work needs to be carried out, in order to preserve its significance within the quarry system and as a

local landmark. Groundwork East Lancashire prepared a brief to guide the conservation process. This specified that a suitably qualified archaeologist should photographically record, monitor and report on the findings during the conservation of the structure. J.M. Trippier Archaeological and Surveying Consultancy of Bolton were awarded the contract for this work. Mr. John Trippier BA (Hons.), MRICS, PIFA is a Chartered Surveyor and Practitioner of the Institute of Field Archaeologists with over 30 years experience of surveying and recording buildings of many types. This report details the findings of the archaeological survey.

2. SITUATION OF PROPERTY

- 2.1 Location: Facit Chimney lies within the township of Spotland and the ancient parish of Rochdale. It is located on the west side of the A671 road which runs north from Rochdale to Bacup. The site is situated at NGR 88508801 and at an elevation of approximately OD 280m. Its general location is indicated on the accompanying Plan 1 by a red arrow and it is shown more precisely edged red on Plan 2. The chimney can be accessed by public footpaths running from Millgate and Shawforth or from Cowm Top Farm at the end of High Barn Lane.
- 2.2 Geographical setting: The geology of the Rossendale district is dominated by the Millstone Grit series which is interspersed with deposits of shale and finer sandstones. These sandstone deposits have particular geological qualities which have been recognised and exploited in varying degrees since at least the Medieval period. Until the late-18th century this consisted of relatively small-scale, *ad hoc*, extraction in order to obtain building stone for local requirements. With improvements in transport between 1770 and 1840, coupled with the increased demand for local building stone, the scale of quarrying in the region increased, and saw the rise of a number of substantial workings. The mid to late-19th century was characterised by a significant expansion in quarrying brought about by increased urban growth, mechanisation and improved stone-working techniques. This period also saw the construction of railways into Rossendale, the construction of the mineral tramways and the establishment of a number of large stone processing sites (UMAU, 2003, 4 - 5). The subject chimney was associated with Facit Quarry which was situated on the eastern edge of the upland plateau bounded by the Rivers Irwell and Spodden where some of the most significant quarries were situated.

3. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

- 3.1 The 1st edn. OS 6" map of 1851 shows 'Tong End Quarry (Sandstone)', 'Cowm Shore Quarry(Sandstone)' and 'Mean Hey Quarry (Sandstone)' within the area which would later form Facit Quarry. However it is known that one James Schofield had a 'stone pitt' at Tong End in 1780. By 1839 10 firms were in business in these quarries including James Schofield, Henry Farrar, Abraham Hill and Sam Clegg. These quarry masters were often local farmers and it is recorded that in 1861 Charles Farrar of Tong End was employing a workforce of 10 in his quarries. However about 1869-70 Henry Heys of Stacksteads acquired a lease of the Facit quarries (Rothwell 2008, 52). This coincided with the completion of the Lancashire and Yorkshire Railway Co. Line from Rochdale to Facit. Just south of Facit Station (now demolished) sidings went off on the west side of the line to the goods shed beyond which were erected finishing sheds for the quarries above. These were linked to the quarries by a steep gravity incline which went off the line to the sidings and ran south-east to north-west along the edge of the escarpment which descended from the moorland plateau where the quarries were situated to the valley below. Facit chimney itself is perched on the very edge of this incline. It was clearly built to get fumes away

from the finishing sheds below to which it was linked by a flue which, although collapsed, is still clearly visible.

- 3.2 By the end of the 19th century the Facit quarries had reached their apogee and the layout of the features described above is clear on the OS 6" 2nd edn. map of 1894 where the former Tong End and Cowm Shore Quarries are now named as Facit Quarries. In 1914 Henry Heys and Co. Ltd had taken over virtually all the Facit quarries with the exception of Cowm Pasture which was worked by James Sanderson and Sons but in 1932-3 the firms amalgamated to become Heys Bros and Sanderson (Facit) Co. Ltd. Although the incline was abandoned in 1946, when a haulage cable snapped, the lower finishing works continued in use until the mid-1960s when major stone extraction at the Facit Quarries ended.
- 3.3 The extensive range of finishing buildings and the railway sidings, along which they formerly stood, was cleared and planted in a land reclamation scheme in the late 1980s (Rothwell 2008, 53). The well-defined tramway incline, partly enclosed by stone retaining walls, is still clearly visible although its rail lines have long since been removed and it now only survives as a grassed footpath. However it is still one of the most obvious tramway inclines in the district. The adjacent chimney has survived well and, together with the incline, provides a prominent and authentic reminder of the industrial past of the area as well as being a prominent local landmark.
- 3.4 Neither the incline, the chimney, nor the associated finishing works are specifically recorded on the Lancashire Sites and Monuments Record (now Historic Environment Record). However they were included in an archaeological assessment undertaken by the University of Manchester Archaeological Unit in 2003 (UMAU 2003) when they referenced these three features as BRIT 50, BRIT 51 AND BRIT 52 respectively. They assessed the Facit Quarry complex as a whole as having *moderate* levels of survival and potential for further archaeological investigation. The quarry is a prominent landscape feature and can be accessed from a number of public footpaths. As such it was assessed as having a *moderate* amenity value and, as it forms part of the largest cluster of quarries in the Whitworth area, a *high* group value.

4 METHODOLOGY

- 4.1 This "as built" record accords with the requirements of English Heritage's Level 2/3 record and comprises a written account, a drawn record comprising scaled elevations and a photographic record. The photographic record was made using a Nikon 35mm SLR Camera fitted with a Nikon 28mm lens with perspective control and Ilford HP5 film to enable the production of 5" x 7" monochrome prints. A two metre ranging rod was included in general shots and a smaller scale bar was used in the more detailed ones. A full photograph index and direction plan is included with this report. Photographs were taken before, during and after the conservation work took place. The scaled elevations were measured using electronic distance measuring (EDM) equipment and were drawn with an Autocad package.

5. PHYSICAL DESCRIPTION

- 5.1 The chimney stands slightly more than 11.3m high and has a maximum external floor plan of 2m square. It was not possible to arrive at an exact height because the stone plinth which forms the base of the chimney is now hidden somewhat by the surrounding earth and stone banking for the adjacent incline (see para. 3.1 above). The base of the chimney was most visible on the east side

where the open flue could be seen (see **Plate 5**) and the height given is from the base of this flue. The plan size of 2m square also relates to the plinth. It is apparent that the chimney itself is slightly smaller at 1.8m square where it joins the plinth. Furthermore whilst the east and west faces are perpendicular it is apparent that the south and north ones slope in slightly so that the width of the east and west faces narrow to 1.5m at the top of the chimney. The walls of the chimney are estimated to be 200mm thick at the top (see **Fig.5**).

- 5.2 The chimney is constructed of random roughly coursed millstone grit with undressed quoinstones at each corner (see **Plate 2**). It is bonded with lime mortar although in places on the surface 'black ash' mortar is also visible. This is especially prevalent about 1 ½ m above the plinth on the west face. But its concentration in one or two places suggests that it may have been a pointing operation rather than a means of finishing the original work. Generally the lime mortar is very badly degraded to the extent that the initial impression is of dry-stone construction. There are also quite large cavities in the stonework (see **Plates 3 & 6** for some of the more extreme examples). These suggest that there may have been some movement in the chimney since its construction. A diagonal jagged crack towards the base of the west face also suggests some settlement (see **Plate 12**). It is also obvious that the top metre or so of the chimney is now leaning out where the stonework has become loose and need resetting. This is especially noticeable on the north and west elevations (**Plates 7 & 11**). A substantial number of stones have become dislodged round the top of the chimney (**Plate 4**) but there is nothing to indicate that this was ever capped in any way which may explain its vulnerability.

6. CONSERVATION REQUIREMENTS

- 6.1 As mentioned in the preceding paragraph some existing areas require rebuilding to ensure stability. Loose and unstable stonework should be carefully dismantled, recording the location of stones. The contractor will be required to ensure reconstruction follows existing style and is well executed. Plants causing, or likely to cause, instability should be removed and vegetation generally cleared prior to repointing of the whole.
- 6.2 For reconstruction, some stones e.g. quoins will be clearly identifiable, but the remainder would need to follow the style of existing/photographic evidence. There may be insufficient stone in some areas to reconstruct; in this case consideration would have to be given to different facing to additional "new" stone (clearly identifiable to an experienced eye, but blending in with the existing). For mortared stonework, re-pointing would need to make assumptions about the final appearance of the joints. It is understood that the contractors have had the existing lime mortar sampled and analysed to establish its composition which should be replicated as closely as possible. Their specification for the mortar is included at Appendix of this report.
- 6.3 A structural engineer's report has determined that it will not be necessary to insert tie beams. However the same report recommended that to prevent further deterioration a layer of stainless steel 'Expamet' or similar light reinforcement be placed within the stone courses during reconstruction and/ or through stones be introduced to the walling to reinforce the inner and outer leaf bond. They also suggested that stainless steel anchor bars be placed between the coping stones on the chimney to both tie them together and strengthen the top of the chimney. A copy of this report is included at Appendix.

For safety the open flue at the base of the east elevation should have a steel of zinc coated grille fixed over it to prevent unauthorised ingress. It is understood that Groundwork's architect will produce a suitable design.

6.4 The conservation and continuing maintenance of the site will be undertaken to the relevant standards set by relevant bodies such as the Institute of Field Archaeologists.

7. RESULTS

8. ARCHIVING

8.1 An archive has been prepared in accordance with the recommendations of *The Management of Archaeological Projects* 2nd ed.1991. The archive will be deposited at the Lancashire County Record Office in Preston. Copies of this report will be sent to the in Lancashire County Historic Environment Record also in Preston.

9. BIBLIOGRAPHY

- English Heritage, 1991, *The Management of Archaeological Projects*, 2nd edition, London
English Heritage, 2006, *Understanding Historic Buildings: a guide to good recording Practice*, Swindon
Rothwell, M., 2008, *Industrial Heritage A Guide to the Industrial Archaeology of Whitworth*, Bridgestone Press
UMAU, 2003, *The Rossendale Quarrying Industry: Archaeological Assessment Report*, unpublished client report

Maps

- OS 1851, 1:10560 scale Lancashire Sheet 80, Southampton
OS 1893, 1: 2500 scale Lancashire Sheet 80:4, Southampton
OS 1961, 1: 2500 scale Lancashire Sheet SD 8819, Southampton (provided by client)

APPENDIX 1

Schedule of Work

for

Archaeologist

June 2007



1.1 Summary of brief

This brief has been produced to guide the conservation process at Lee Quarry Saw Shed, Facit Chimney and 4 Quarrymen's huts at Thurns Head. The site archaeologist will photographically record, monitor and report on the findings during the conservation of the structures *in situ*.

1.2 Site location and description

LEE QUARRY SAW SHED BACKGROUND INFORMATION

Introduction

Lee quarry extends between SD 863 208 and SD 870 210, approximately 1km south of Rockcliffe, with Lee Moss to the south and Holden Moor to the east. Historically, the quarry lay within the Brandwood Lower End subdivision of the Spotland Township (Rochdale parish).

Historical Summary

Working life: early nineteenth century to 1980's

Geology: Upper Haslingden Flags and shale with Rough Rock to south east.

Methods included hillside outcroppings, open pit working and mining. Extensive mechanisation from at least 1880's, including steam powered cranes, blasting, pneumatic drills.

Products: including flags, kerbs, manhole covers, later concrete flags and kerbs and road stone.

FACIT QUARRY CHIMNEY BACKGROUND INFORMATION

Introduction

One of the most obvious tramway inclines in the district ascends the hillside west of Facit, diagonally in a N.N.E. direction. Originally the route linked sidings which joined the main Facit line, South of former Facit Station at SD 886 188.

Historical summary

An extensive system, with an incline developed originally by the large firm Henry Heys in 1870/71 presumably as soon as the Lancashire and Yorkshire Railway Rochdale branch line came up the Spodden Valley to Facit in 1870.

1.3 Planning background

Lee quarry Saw shed and Facit chimney are owned by Lancashire County Council. Thurns Head is owned by United Utilities but leased to Rossendale Borough Council and Cragg Quarry is owned by Rossendale Borough Council.

The designations for the sites include:

Lee Quarry is the site of a geological SSSI,

Thurns Head SMR Entry and RIGS site

1.4 Archaeological and historical background

Historical background for the conservation sites can be found in Lancaster Universities Quarry survey

97 and Manchester Universities Archaeology Unit's survey 2003

1.5 Requirement for work

The archaeologist will photographically record the heritage structures before any intervention and the following conservation process and provide a report of the results. The results should be illustrated where necessary by the use of drawings and photographs, and by supporting data contained in the appendices.

The archaeologist will work to the By-laws of the Institute of Field Archaeology Code of approved practice for the regulation of contractual arrangements in field archaeology Sept 2002.

1.6 Stages of work and techniques

1. Pre intervention phase (recording *in situ* structures)
2. Watching Brief during conservation of structures Archaeologist to spend four days per week whilst conservation work is in progress.
3. Post-fieldwork analysis and report

1.7 Monitoring arrangements

Work will be monitored and approved by the county archaeologist.

1.8 Archive deposition

The final destination of the archive (records and finds) should be noted in the report.

1.9 Publication and dissemination

Technical terminology (including dating or period references) should be explained where necessary for the conclusions to be understood by a non-archaeological audience.

1.10 Other factors (including contingency)

The field archaeologist will have the power to suspend the conservation phase if unexpected finds call for further investigation. The county archaeology service will be informed of any significant finds and their approval will be necessary before work can resume.

*An Archaeological Recording and Monitoring Programme at
Facit Chimney, Whitworth, Lancashire*

GROUNDWORK Pennine Lancashire (Archaeologist) SCHEDULE OF WORKS

A. Recording, Watching Brief, Reporting

ITEM	DESCRIPTION	NO	UNIT	RATE	£	p
A.1	<p><u>Preliminaries</u> Basic level of measured survey, along with photographic record, before conservation works start. This would equate to a survey between levels 2 and 3, as set out in '<i>Understanding Historic Buildings</i>' a guide to good recording practice' (EH, 2006). Including all elements of a level 2 survey (p.140 with addition of a general site plan at 1:500 – 1:1250 (based on OS Mastermap) of each site; measured plans and elevations at an appropriate scale (1:20) sufficiently detailed as to allow full understanding of the remains when used in conjunction with the site photographs (i.e. a 'stone by stone' drawing is not required, but an appropriate outline should be drawn, with openings, building lines, etc. marked) If clear and unimpeded photograph(s) can be produced, however, that render a drawn elevation superfluous, then this may be done. Sites to be included: Lee Quarry Saw Shed, Facit Chimney, Quarry Men's Huts at Thurns Head x 3, Quarry mans hut at Cragg x 1, flag fence at Back Cowm.</p>	34	Days			
A.2	<p><u>Watching Brief</u> Archaeologist to be on site 24</p>	7	Days			
A.3	<p><u>Reporting</u> Archaeologist to produce a report of the conservation and any finds/ recommendations</p>	7	Days			

APPENDIX 2: FIGURES

Fig. 1: Site Location Map

Fig. 2: Site Plan

Fig. 3: OS 6" Lancashire Sheet 80, 1851

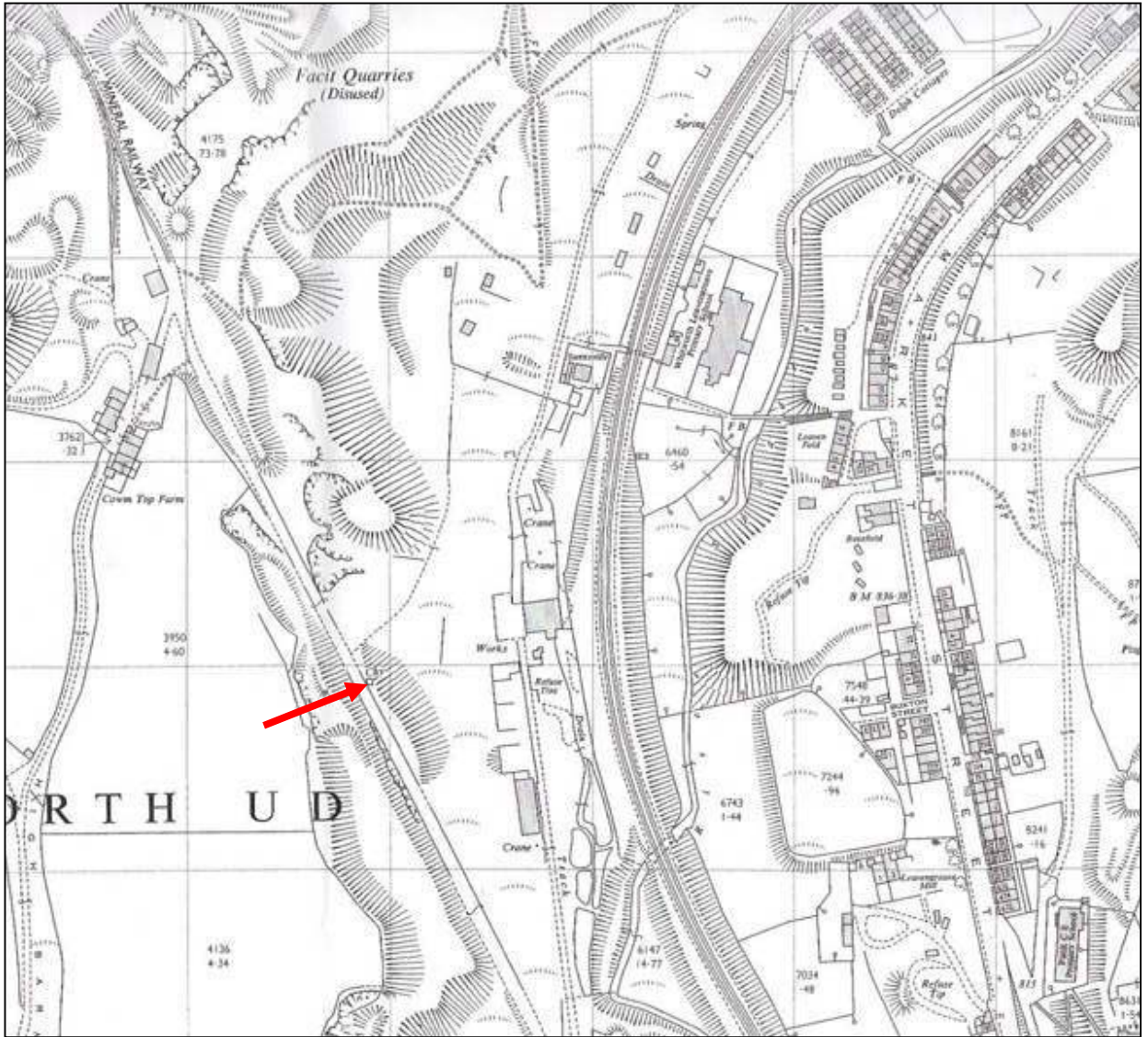
Fig. 4: OS 25" Lancashire Sheet 80:4, 1893

Fig. 5: Elevation Drawings

Fig. 6: Photographic Register

Fig. 7: Photograph Location Plan

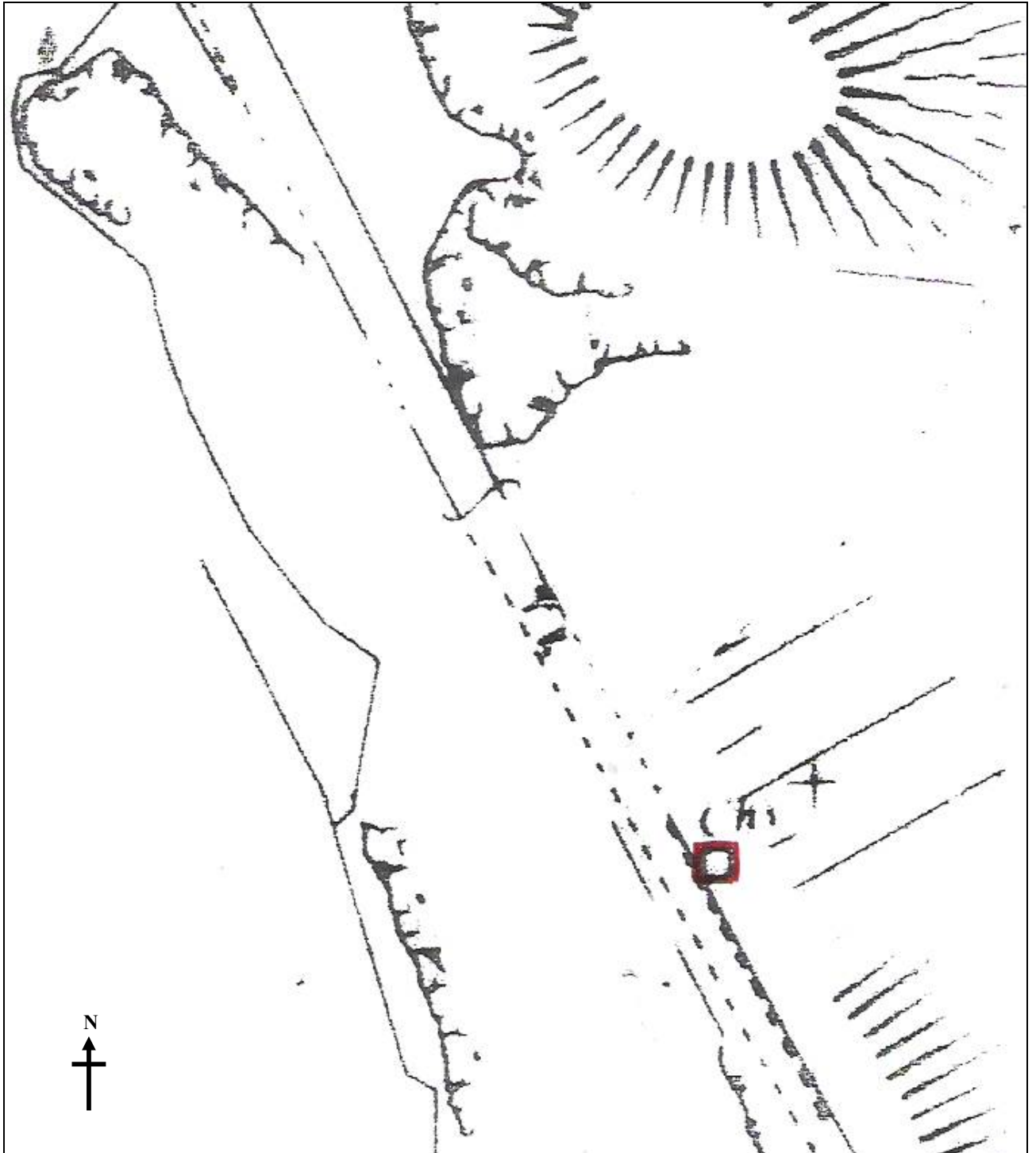
*An Archaeological Recording and Monitoring Programme at
Facit Chimney, Whitworth, Lancashire*



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FIG.1: LOCATION PLAN

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Facit Chimney, Whitworth, Lancashire*



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FIG.2: SITE PLAN

*An Archaeological Recording and Monitoring Programme at
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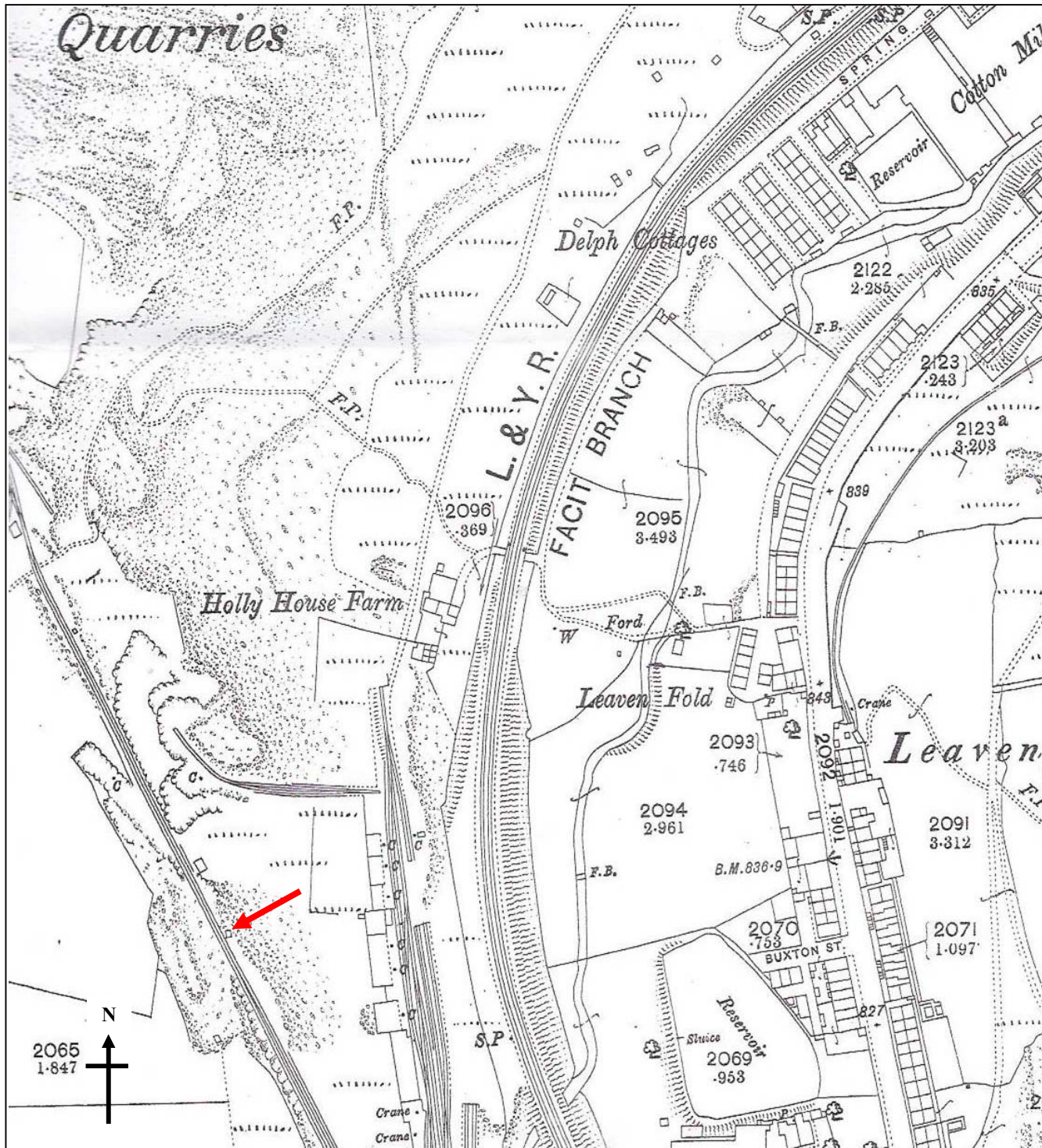
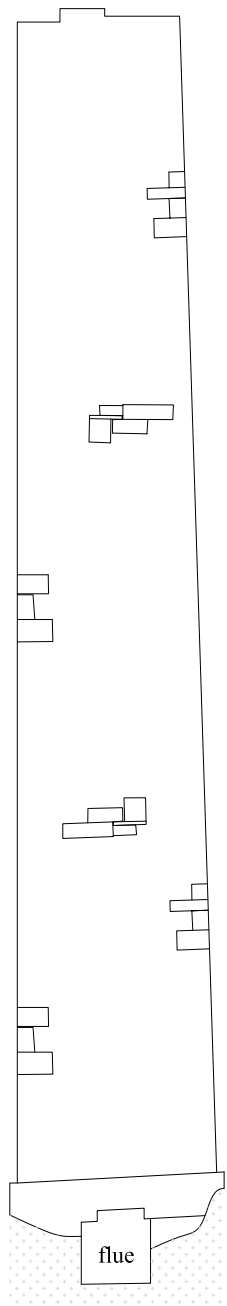
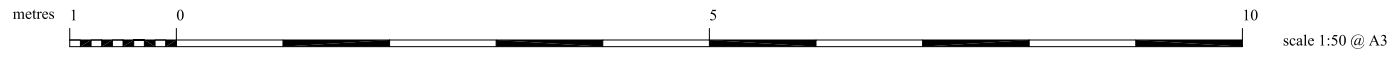
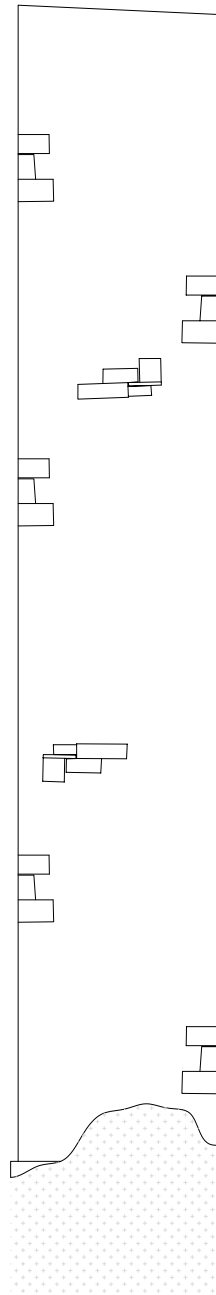


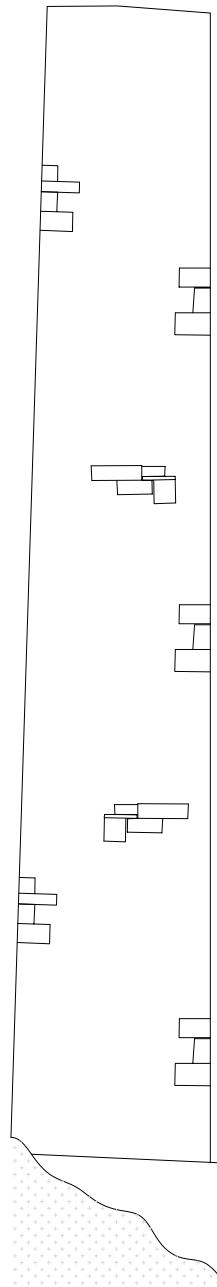
Fig.4: O.S. 25" Map 1893



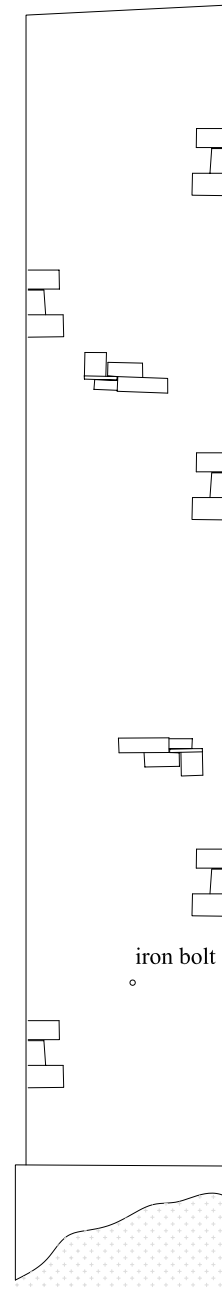
east face



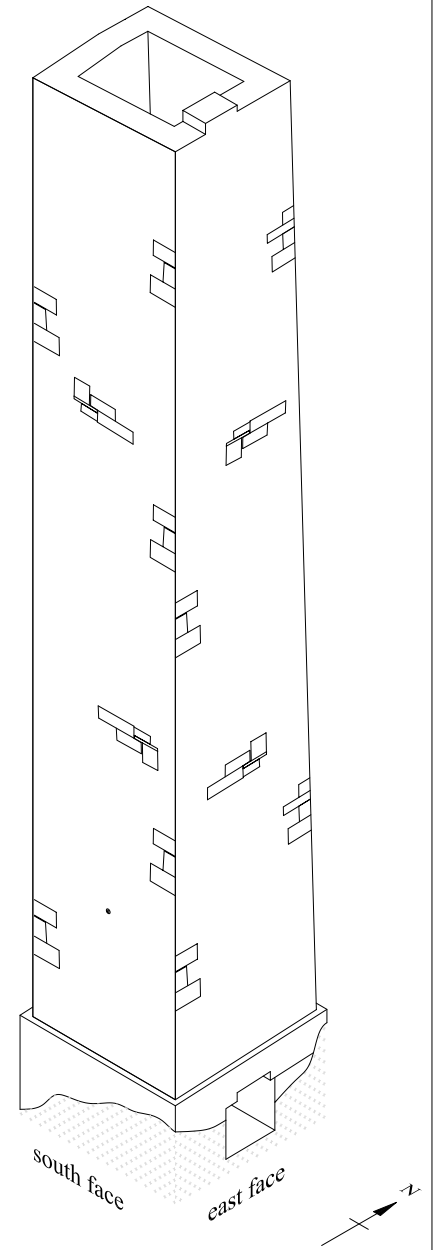
north face



west face



south face



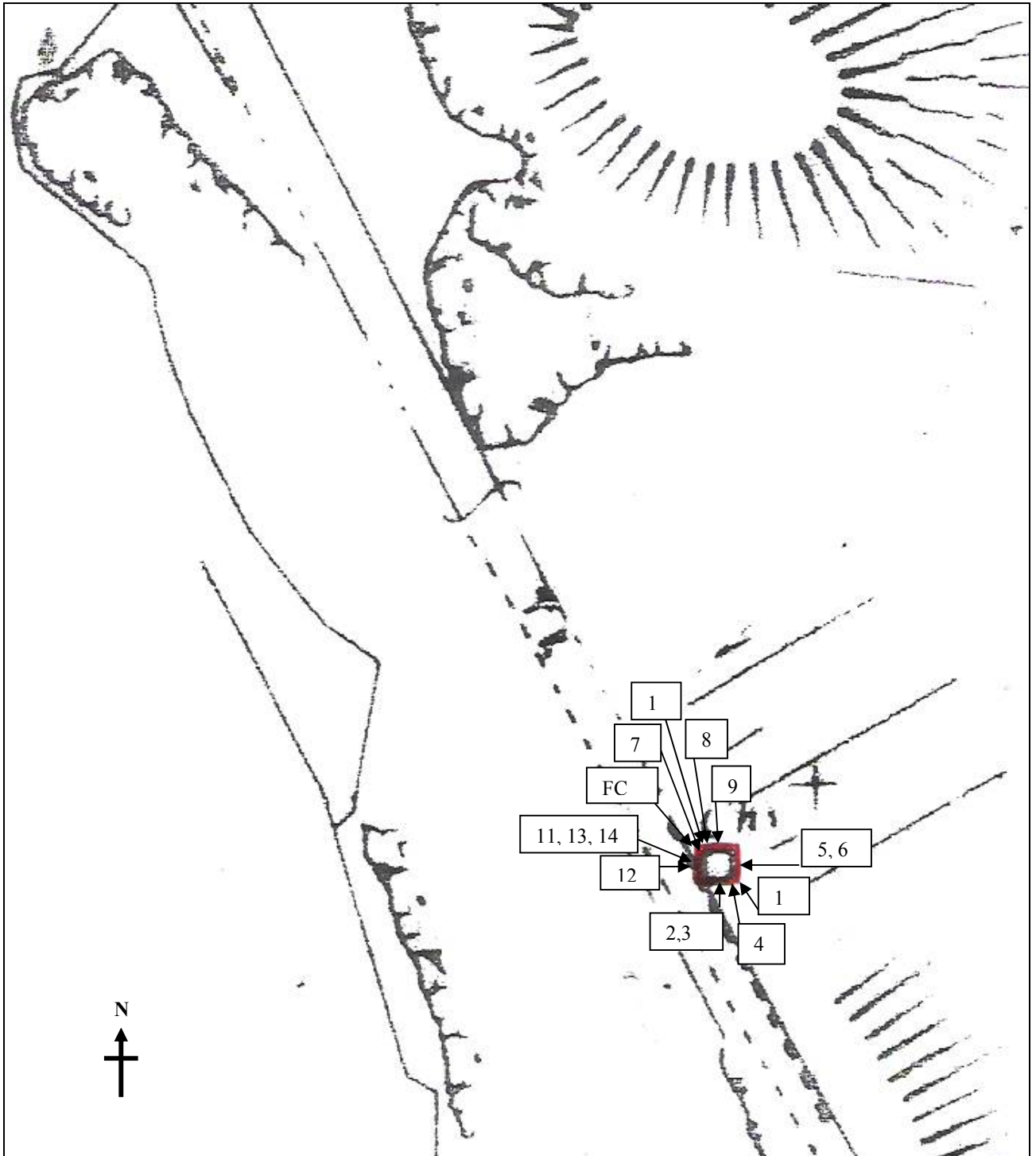
south face

east face



FIG. 6: PHOTOGRAPHIC REGISTER

Plates In Report	Monochrome Prints Film/exposure	Description	Direction Of Shot
	1/2		
1	1/3 (34)	South & east elevation	NW
	1/4 (33)	South elevation	NW
	1/5 (32)	Base of south elevation	NW
	1/6 (31)	Flue at base of east elevation	W
5	1/7 (30)	Flue at base of east elevation	W
6	1/8 (29)	East elevation above flue	W
2	1/9 (28)	Plinth at base of south elevation	N
3	1/10 (27)	Base of south elevation above plinth	N
4	1/11 (26)	Top of south elevation	NW
12	1/12 (25)	Base of west elevation	E
	1/13 (24)	Mid part of west elevation	E
	1/14 (23)	North and west elevations	SE
	1/15 (22)	North and west elevations	SE
Front Cover	1/16 (21)	North and west elevations	SE
11	1/17 (20)	West elevation	E
	1/18 (19)	West elevation	E
13	1/19 (18)	Lower half of west elevation	E
	1/20 (17)	Lower half of west elevation	E
	1/21 (16)	Mid part of west elevation	E
	1/22 (15)	Top of west elevation	E
14	1/23 (14)	Top of west elevation	E
	1/24 (13)	Base of north elevation	S
8	1/25 (12)	Base of north elevation	S
	1/26 (11)	Base of north elevation above plinth	S
	1/27 (10)	Base of north elevation above plinth	S
9	1/28 (9)	Base of north elevation above plinth	S
	1/29 (8)	Base of north elevation above plinth	S
	1/30 (7)	Top of north elevation	S
10	1/31 (6)	Top of north elevation	S
	1/32 (5)	Top of north elevation	S
	1/33 (4)	Top of north elevation	S
	1/34 (3)	North elevation	SE
7	1/35 (2)	North elevation	SE
	1/36 (1)	North elevation	SE



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**Fig. 7: Photograph Location Plan
(Nos. Refer to Plate Nos. in Report)**

APPENDIX 3: PLATES

Plate 1: South and East Elevations

Plate 2: Plinth at Base of South Elevation

Plate 3: Base of South Elevation above Plinth

Plate 4: Top of South Elevation

Plate 5: Flue at Base of East Elevation

Plate 6: East Elevation above Flue

Plate 7: North Elevation

Plate 8: Base of North Elevation

Plate 9: Base of North Elevation above Plinth

Plate 10: Top of North Elevation

Plate 11: West Elevation

Plate 12: Base of West Elevation

Plate 13: Lower Half of West Elevation

Plate 14: Top of West Elevation

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Facit Chimney, Whitworth, Lancashire*



Plate 1: South and East Elevations



Plate 2: Plinth at Base of South Elevation

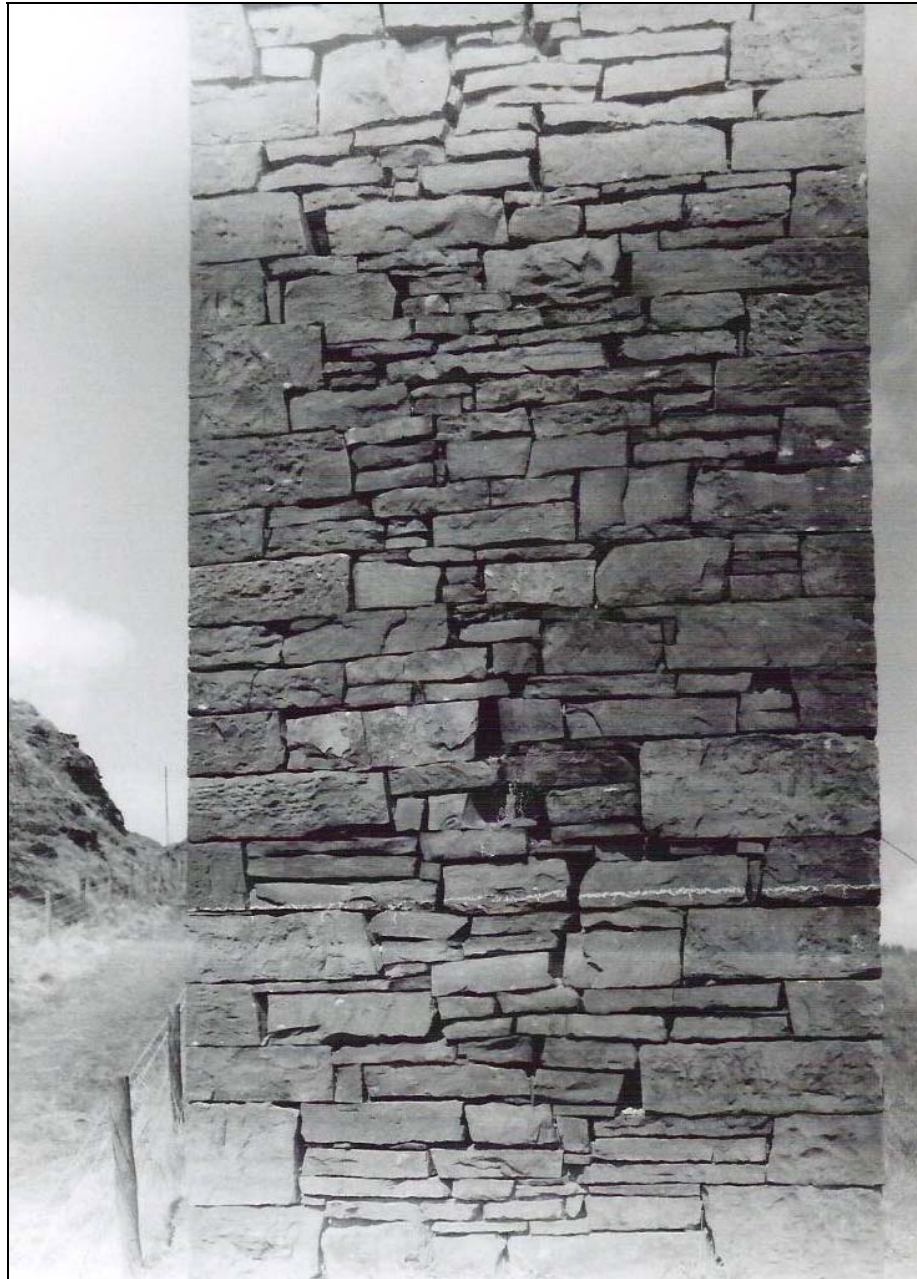


Plate 3: Base of South Elevation above Plinth

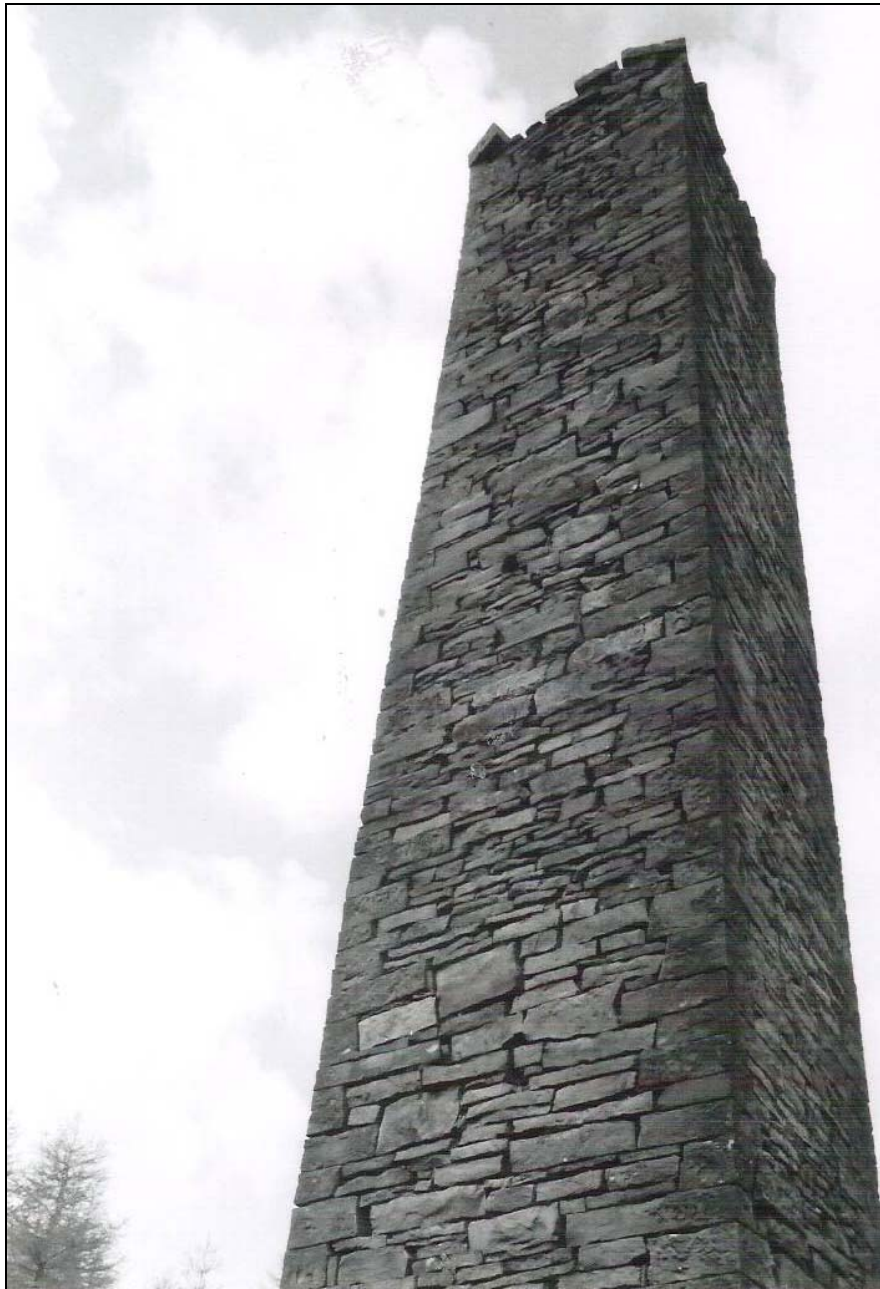


Plate 4: Top of South Elevation

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Plate 5: Flue at Base of East Elevation

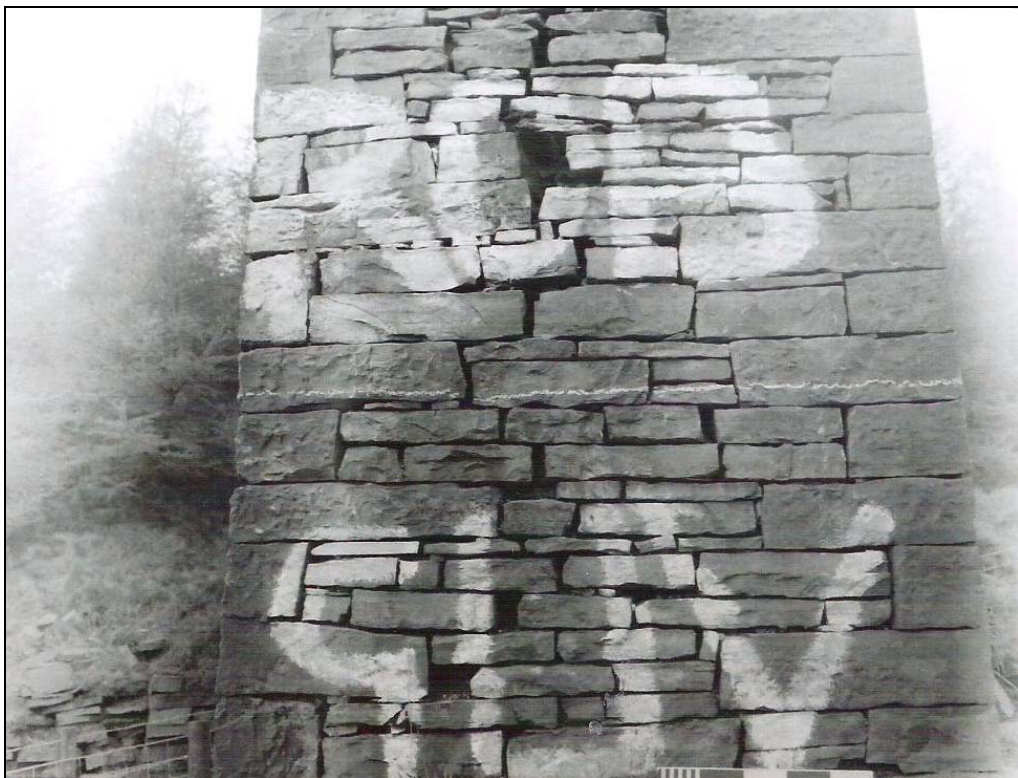


Plate 6: East Elevation above Flue

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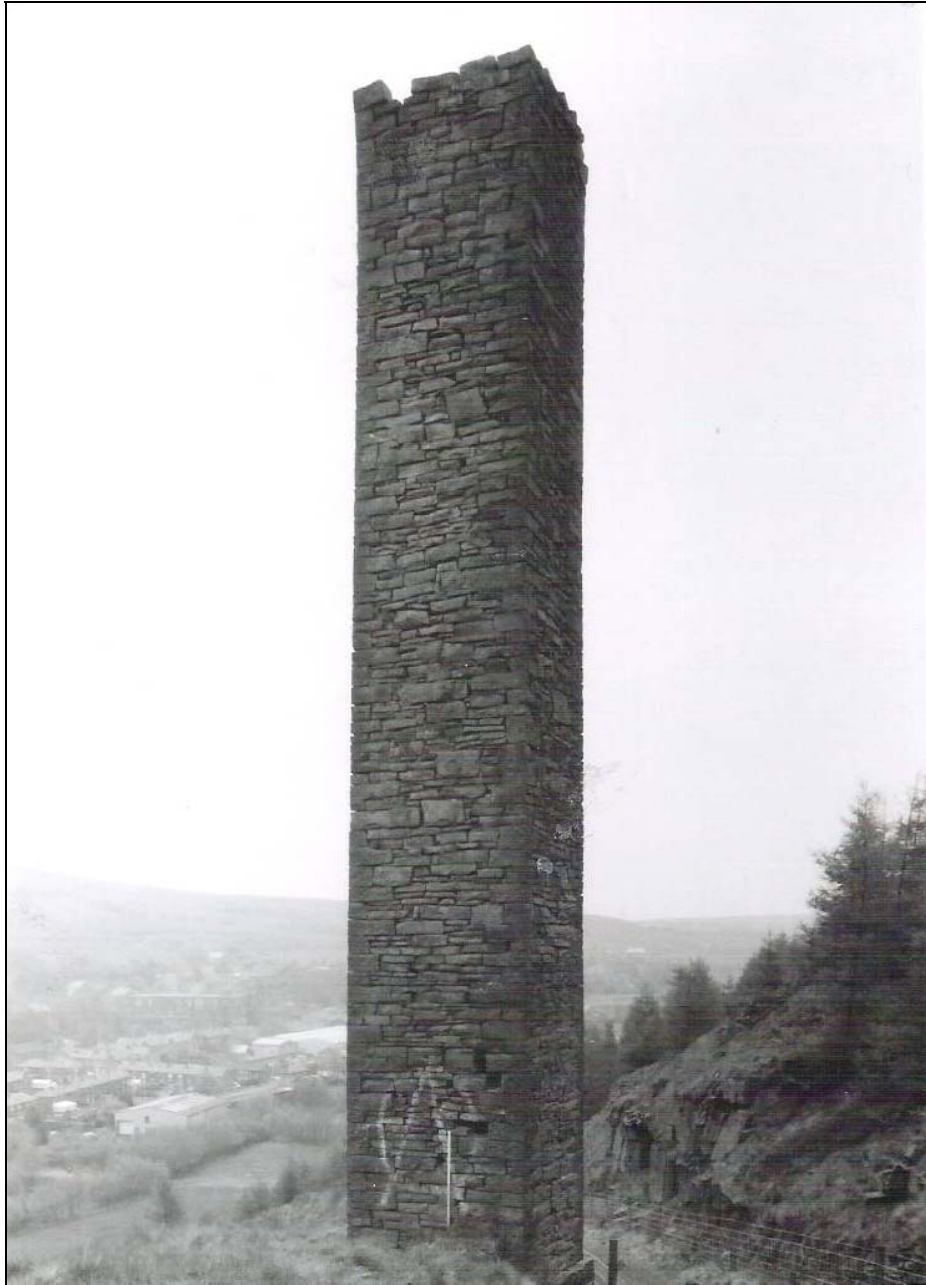


Plate 7: North Elevation

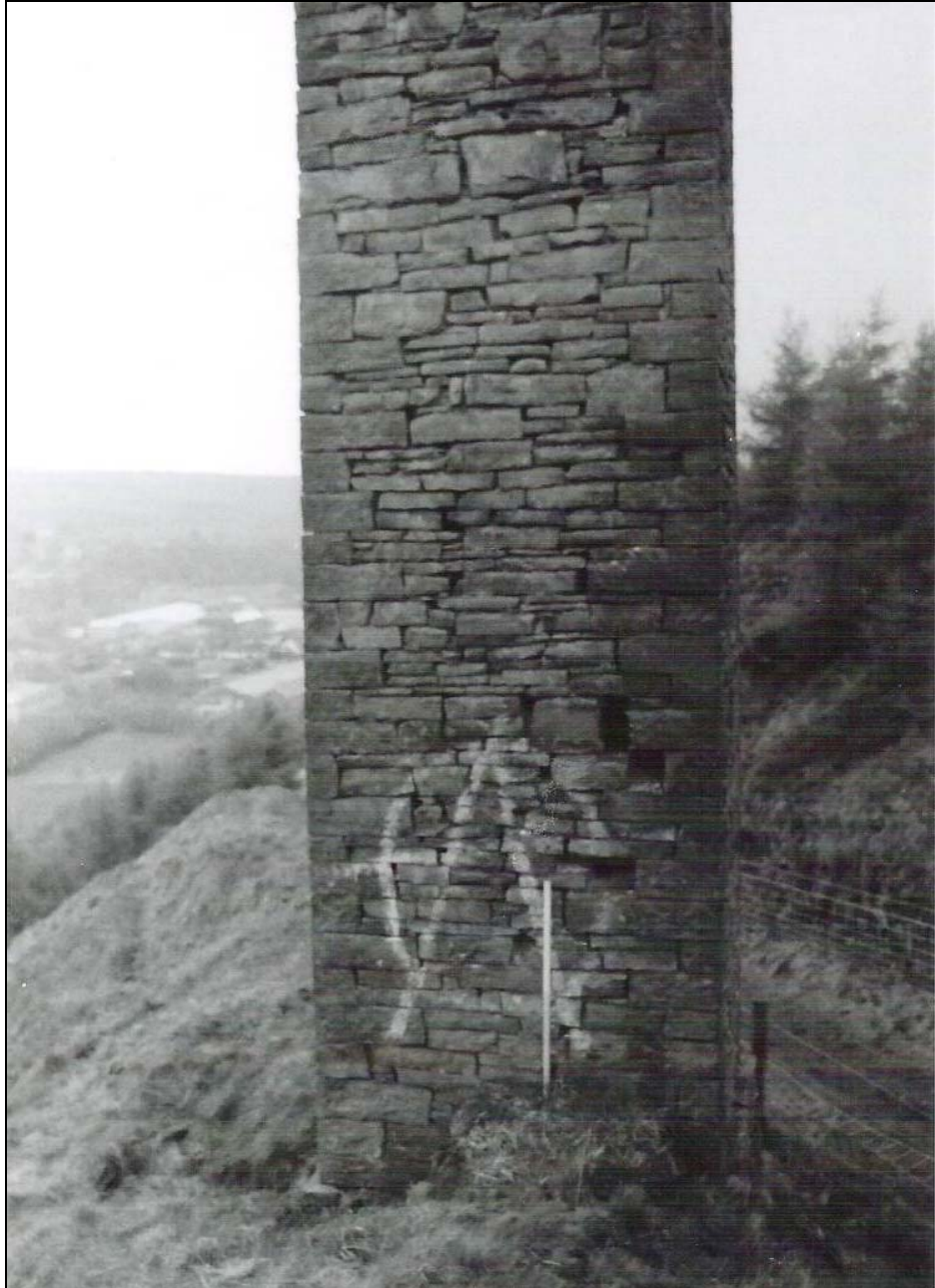


Plate 8: Base of North Elevation

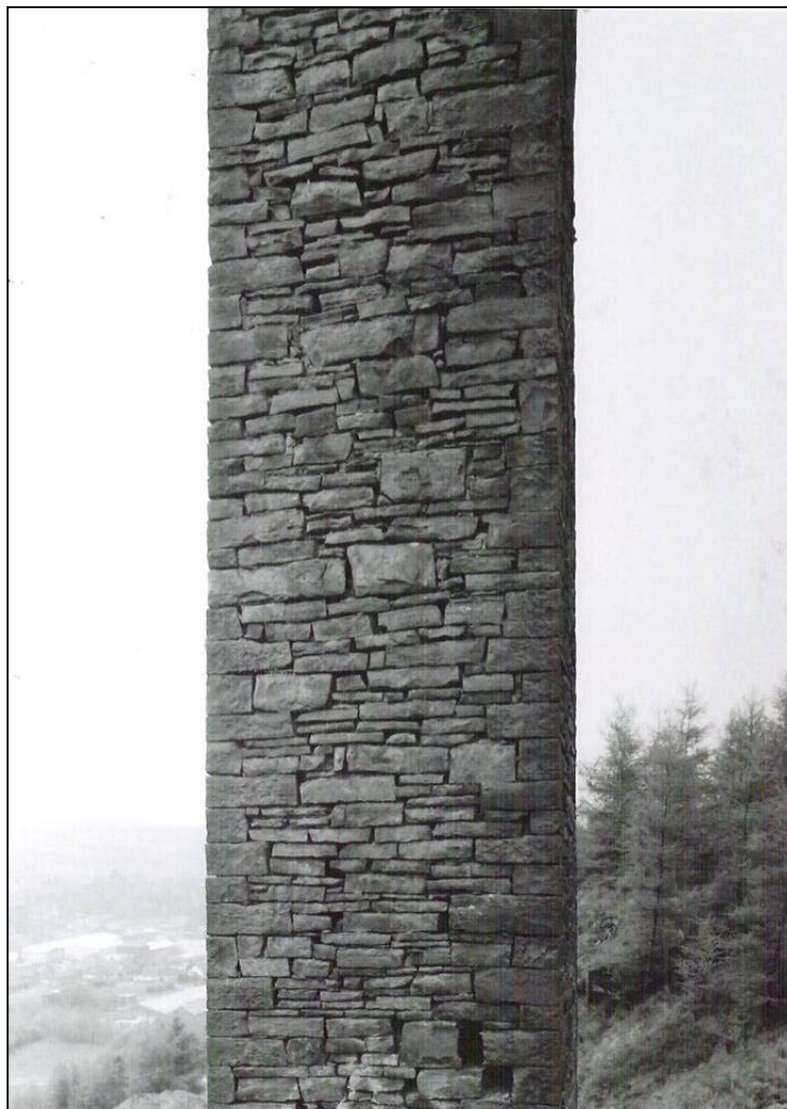


Plate 9: Base of North Elevation above Plinth



Plate 10: Top of North Elevation

*An Archaeological Recording and Monitoring Programme at
Facit Chimney, Whitworth, Lancashire*



Plate 11: West Elevation

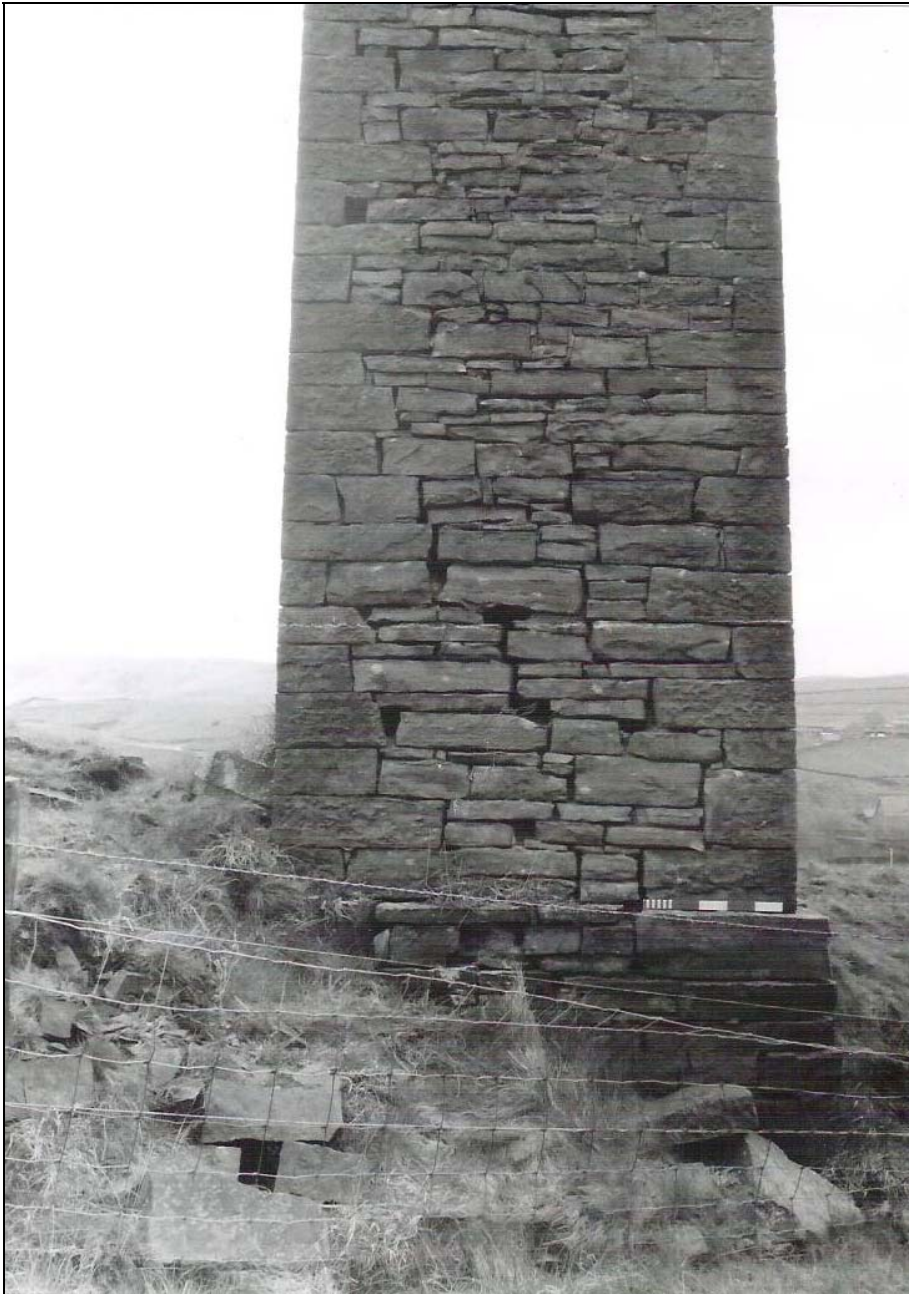


Plate 12: Base of West Elevation

*An Archaeological Recording and Monitoring Programme at
Facit Chimney, Whitworth, Lancashire*



Plate 13: Lower Half of West Elevation

*An Archaeological Recording and Monitoring Programme at
Facit Chimney, Whitworth, Lancashire*

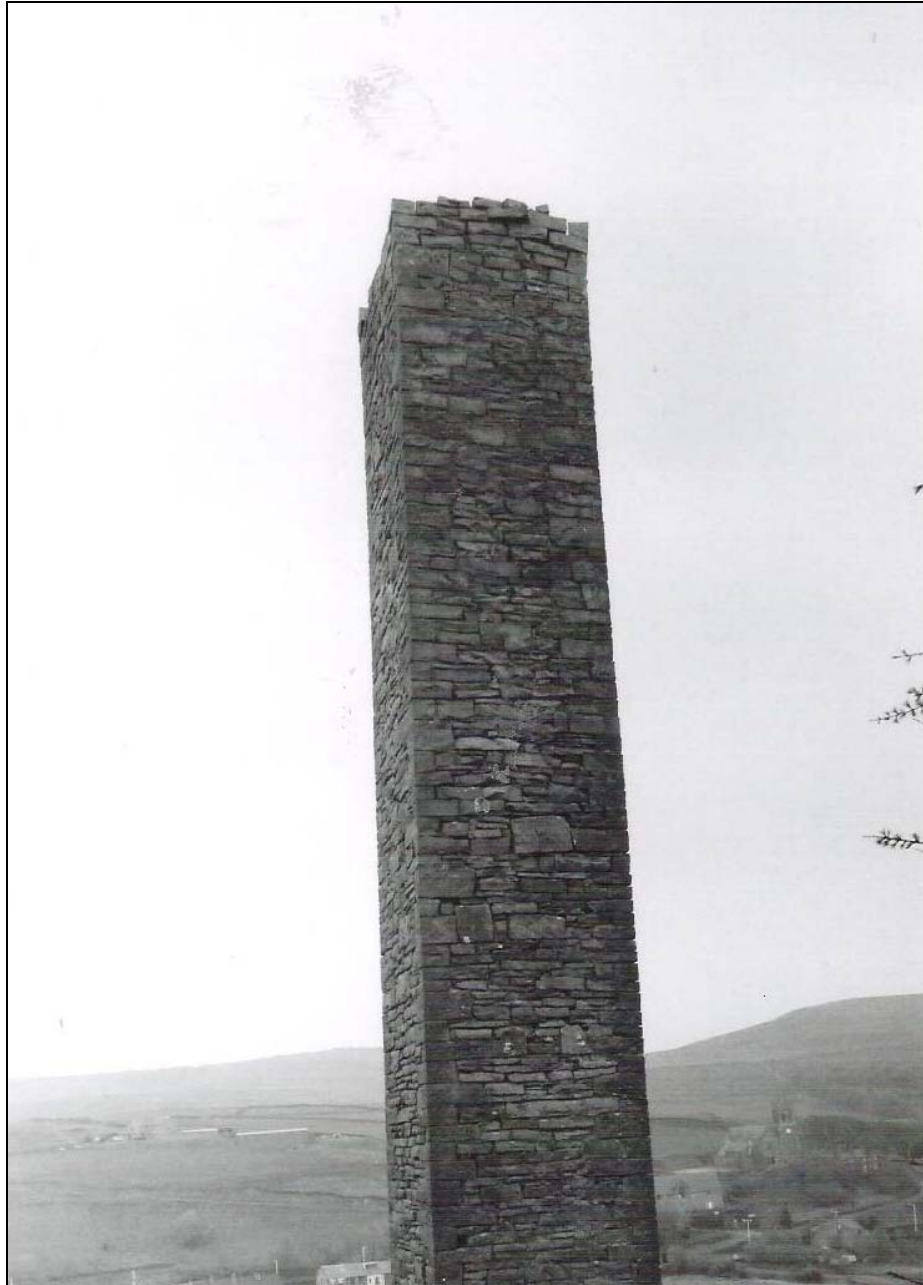


Plate 14: Top of West Elevation

Appendix 4: Lime Mortar Specification

Specification for hydraulic lime mortar mix at Facit Chimney

3 x Waddington grit sand
3 x Leighton Buzzard sand
2 x St Astier NHL 5

Data from St Astier web site below for information

Natural Lime NHL 5 (Chaux 100 naturelle Pure) Product Data
St Astier Natural Hydraulic Limes (NHL)

Conforms to European Norms EN 459 and BS 459
Strength factor: 5 (Eminently hydraulic)
Residue @ 0.09 mm: 7%
Density (volumetric weight) typical: 700 gr. / litre
Available (free) lime Ca(OH)₂ after slaking: 20-22%
Shelf life: 8-12 months kept sealed and dry

Contains no additives.
Whiteness index: 67
Surface cover (cm²per gram): 8000
Expansion : < 1mm
Residue of quick lime after slaking: < 1%

MORTARS MIX RATIO	Compressive strengthN/mm ²				Elasticity Moduli (Mpa)		
	EN459*	1 : 2	1 : 2.5	1 : 3	1 : 2	1:2.5	1 :3
7 DAYS		1.96	1.00	0.88	n/a	n/a	n/a
28 DAYS	5*	2.20	2.00	1.5	10800	1100	10000
6 MONTHS		7.31	5.91	5.31	18000	17050	16900
12 MONTHS		9.28	8.84	6.50	18510	17280	16150
24 MONTHS		10.81	8.81	7.8	21500	18020	17430
Consumption for 1m ³ of mortar Kg. +/- 10%		350	280	233			
EN 459/BS 459 (mortar ratio 1:1 by volume, with ISO 679 Sand)							

APPENDIX 5: Structural Engineers' Report

Ref: P&A/1370-08/RGT/SJ

25th September 2008

GCS Groundwork Pennine Lancashire
Bob Watts Building
Nova Scotia Wharf
193 Bolton Road
BLACKBURN
Lancashire
BB2 3GE

For the attention of Mr N Riley, Director for Contracts Division

Dear Sirs

Re: Inspection of Facit Chimney, Facit, Rossendale

We refer to our inspection of the above chimney on Wednesday 17 September 2008. Further to our inspection we report as follows.

1.0 Terms of Reference

This report has been prepared at the request of Mr N Riley on behalf of Groundwork Contract Services, the contractors renovating the above chimney.

2.0 Preamble

At the present time Facit Chimney which is located on the hillside above Facit is undergoing external renovation works.

The specification for the works include providing stainless steel reinforcing bars fixed into the stone joints at approximately 1m vertical centres.

Since starting the works and carrying out initial back pointing and filling-in of the major voids within the stonework the contractors have suggested that the steel reinforcing bars are no longer required.

3.0 Purpose of Report

Groundwork Pennine Lancashire have requested Partington Associates Ltd to carry out an inspection of the renovation works carried out to date and assess whether or not the reinforcement specified is now required.

4.0 Inspection of Chimney

The 11.8m high, 1850mm square chimney is built in random stone. The walls approximately 450mm thick consist of two leaves of Stonework. The small and large random stones are tied together at the corners with regular shaped stone quoins. The chimney has a slight taper over its full height.

At the time of our inspection a number of loose stones at the top of the chimney had been removed and the whole of the outer face of the stonework raked out and the voids back pointed and filled with lime mortar prior to the final repointing.

Except for minor undulations in the stonework particularly noticeable on the corners, the stonework to the chimney is in sound structural condition. We note vertical stress cracks in some of the larger stones particularly in the stone quoins. We would not consider these to be of any major structural significance.

The voids in the stonework have been filled in a satisfactory manner and we would now consider the outer leaf of the chimney to be in a stable condition

In respect of providing stainless steel reinforcement in the outer leaf, the random stone bed joints will make it very difficult to carry out this operation and could be more detrimental to the strength and appearance of the wall than if this work was not carried out.

5.0 Conclusions and Recommendations

Raking out the joints and filling the voids in the outer stone leaf has effectively re-bonded and strengthened the outer leaf. We are of the opinion that the chimney stack is now in sound structural condition. We would therefore recommend that the stainless steel reinforcing bars are omitted from the building specification

With respect to the repairs at the top of the chimney we recommend that a layer of stainless steel 'Expamet' or similar light reinforcement is placed within the stone courses during reconstruction and or through stones are introduced to the walling to reinforce the inner and outer leaf bond. We would also suggest that stainless steel anchor bars are placed between the coping stones on the chimney to both tie them together and strengthen the top of the chimney.

We trust that the above comments are satisfactory for your present needs, however should you have any queries or require any further information in respect of the remedial works already carried out please do not hesitate to contact us.

Yours faithfully

R G Taylor
PARTINGTON ASSOCIATES LTD

*An Archaeological Recording and Monitoring Programme at
Facit Chimney, Whitworth, Lancashire*