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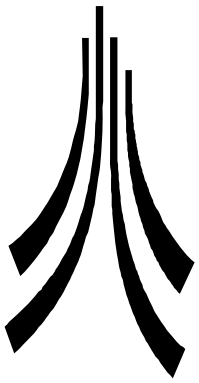

April 1999

LAMBTON COKEWORKS

near Fencehouses

Sunderland

Archaeological Assessment Report

Commissioned by: City of Sunderland Council

Lambton Cokeworks
Sunderland

Archaeological Assessment Report

Report no 1998-99/ 056/AUA7879

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CONTENTS

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The documentary research was undertaken by Iain Hedley, who also compiled this report. The report was edited by Jamie Quartermaine and Richard Newman. The project was managed by Jamie Quartermaine.

SUMMARY

LUAU were commissioned in March 1999 by the City of Sunderland Environment Department to undertake an archaeological assessment of the site of the former Lambton Cokeworks, Fencehouses, in advance of the reclamation of the site.

The area includes the site of the Bournmoor D Pit whose excavation and recording in 1995-6 revealed the remarkable survival of early pithead structures and the earliest and most extensive timber waggonway remains so far discovered in Britain.

The pre-industrial landscape is likely to have been fully enclosed by the time the D Pit was sunk and no evidence of any significant earlier archaeological remains in the study area have been found. The site of the B Pit, which probably dates to around 1784, lies within the study area and may retain significant archaeological features at the pit head, though this is not conclusive. From the mid-nineteenth century the colliery and ancillary coalfield industries such as brick and tile, coke, and firebrick, continued to develop, whilst the rail network linking these sites to the Lambton Railway continued to be modified. Up until the 1890's the colliery belonged to the Earl's of Durham (Lambton) but was then converted to a limited company before being sold to James Joicey. In 1947 the Joicey collieries were nationalised and the D Pit continued to operate under the National Coal Board until closure in 1965. The coke works continued until 1983 and were demolished soon after.

The assessment of the archaeological and historical significance of the surviving remains within the proposed development area concludes that the most significant archaeological remains relating to the early development of the D Pit and the timber waggonway have been fully addressed by the previous excavation and recording programme. However, a watching brief is recommended should these remains be significantly disturbed or removed by future ground works, and the recommendation applies equally to contemporary horizons in areas immediately peripheral to the excavation area. An additional watching brief is also deemed appropriate at the site of the B Pit should similar ground works be envisaged in this area.

1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Lancaster University Archaeological unit (LUAU) were commissioned in March 1999 by the City of Sunderland Council (CSC) to undertake an archaeological assessment as part of a proposed reclamation scheme at the site of the former Lambton Cokeworks (NZ 318514), near Fencehouses, Sunderland. It is proposed that the site be subject to a mixed use redevelopment scheme which will include housing, a small industrial area, road construction, extensive landscaping and the creation of a vast area of parkland, including wetland and woodland areas and a large lake.

1.1.2 ***History of Investigation:*** the importance of the site was brought to light in August 1995 by Chris Goldsmith and Jim Rees (Keeper of Industry at the North of England Open Air Museum, Beamish) following the exposure of remains of a wooden waggonway during ground investigation works by CSC at the site of the former Bournmoor D Pit (NZ 319511). These remains were inspected by Ian Ayris (County Industrial Archaeologist) and deemed to be of high archaeological importance. A machine investigation, supervised by Ian Ayris, followed and a report was compiled for CSC which recommended further archaeological excavation and recording. This work was undertaken by the City of Newcastle upon Tyne Archaeology Unit (CNAU) in March 1996 (Phase I) and September-November 1996 (Phase II) (CNAU 1996; 1997). The results of this work were published in 1998 (Ayris *et al* 1998).

1.1.3 Following the completion of this work Allied Exploration and Geotechnics Ltd (AEG) were commissioned by CSC to undertake geotechnical investigation of the site. This comprised 376 cable percussive boreholes, 5 rotary openholes, 514 trial pits, and 6 geophysical surveys using ground penetrating radar (AEG 1997, 1). The results of this work have been assessed as part of the current assessment.

2. METHODOLOGY

2.1 PROJECT DESIGN

2.1.1 The archaeological assessment was carried out broadly in accordance with the project brief prepared by Ian Ayris (County Industrial Archaeologist) and supplied by Mr M Lowe of CSC (Environment Department). During the course of the assessment it became clear that the vast extent of documentary source material, particularly relating to the archive of the North of England Institute of Mining and Mechanical Engineers deposited at Northumberland Records Office (Melton Park), precluded a detailed study of all these sources within the defined scope of the present assessment. All identified sources deemed to be of potential importance are listed in the bibliography sources. Similarly the vast extent and nature of the geotechnical data precluded the compilation of a meaningful model of archaeologically significant deposits. A number of potentially significant or busy areas were sampled but these proved to be of limited application.

2.1.2 An important though unquantified source of research material is held by the Lambton Estate. Several unsuccessful attempts have been made to access the material in the archive in recent years, including an attempt during the excavation and recording of Bournmoor D Pit (J Nolan pers comm) phase. Contact was made during the present assessment with Mr Kirton-Darling (Agent) of the Lambton Estate Office. He has confirmed that the Lambton archive remains unindexed and he did not feel that access to the material would be appropriate at present. He did, however, express a willingness to arrange access when the material is in a suitable condition and would be happy to allow immediate access to a framed map of the Lambton Estate dated to 1800 which shows the Bournmoor D Pit and waggonway.

2.2 DOCUMENTARY SOURCES

2.2.1 Many of the primary documentary sources for the early development of Bournmoor D Pit site were assessed during the excavation and recording phase, principally by Chris Goldsmith and conveyed to John Nolan (CNAU). The archive of the project was made available to this assessment by John Nolan. In many cases the primary sources noted within these documents were consulted further. A search of the National Coal Authority Archives at Bretby was also requested but the results had not been received at the time of writing.

2.2.2 The Sites and Monuments Record (SMR) for Tyne and Wear was consulted and no buildings or sites of special architectural or historic interest (ie listed buildings) were found to exist within the redevelopment area. The only sites recorded within the area consisted of industrial features depicted on early edition Ordnance Survey maps, including the course of an early electric telegraph line (SMR 3144). In addition, no earlier archaeological sites were not within 1km of the site boundary.

2.2.3 All relevant cartographic sources available at the Durham Record Office have been consulted, with the exception of the Morton Grange tithe map which was not available and may depict some features immediately on the south side of the Moor Burn. Potentially relevant cartographic and pictorial sources are believed to be held in the archive of the NEOAM Beamish. However, given the timescale, it was not possible to consult this archive during the course of the assessment. Similarly, a copy of the tithe

map of 1847 for Bournmoor is held in the Archives and Special Collections Section of Durham University but could not be consulted during the assessment. This map is significant in that it will show the arrangement of the D Pit prior to the radical alterations to the site in the early 1850s.

2.2.4 During the course of the desk-based assessment the following archive repositories were consulted, the Durham Record Office, Northumberland Record Office, Tyne and Wear Archives, and Tyne and Wear Sites and Monuments Record. In addition Ian Ayris (County Industrial Archaeologist), Dave Heslop (County Archaeologist) and John Nolan (excavator of the D Pit) were also consulted.

2.2.5 An assessment of the aerial photographic coverage for the proposed development area, held by the National Aerial Photographic Library in Swindon, was not possible due to a severe backlog of requests. The results of the search will post-date this report but will be included in the project archive. Two sorties dating from March 1968 were identified at Durham Record Office towards the end of the project. Additional photographic archive is believed to be held by NEOAM, Beamish.

3. TOPOGRAPHICAL AND GEOGRAPHICAL BACKGROUND

3.1 SITE LOCATION

3.1.1 The proposed site for redevelopment occupies an area of former coal industry land, measuring approximately 65 hectares. It extends from the north side of Fencehouses in the south, northwards to Shiney Row, and is bounded by a disused railway embankment to the east, the A183 and a dismantled railway to the north, and Blind Lane and part of the redirected course of the Herrington Burn to the east. The southern boundary of the site is an arbitrary line separating Bournmoor D Pit from the site of the former Lady Ann Pit.

3.2 GEOLOGY AND TOPOGRAPHY

3.2.1 The site is underlain mainly by laminated clays and alluvium of geologically recent age. This in turn is underlain by Middle Coal Measures of Carboniferous age, consisting mainly of interbedded sandstones and mudstones with a number of coal horizons which were worked extensively beneath the whole of the site (AEG 1997).

3.2.2 The topography varies greatly within the site, in part a reflection of the varying industrial uses of the different parts of the site. The site of the former cokeworks includes the fragmentary remains of brick and concrete foundations and remains of storage facilities and railway sidings. Due to contamination in this area the vegetation cover is poorly formed. The northern part of the site is mainly flat, with rough pasture and some farm buildings, but with an area of undulating ground of mounds and shallow valleys to the south east. The eastern part of the site is built up with colliery spoil up to 15m high (AEG 1997).

4. ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL

4.1 PRE-INDUSTRIAL DEVELOPMENT

4.1.1 No Prehistoric, Roman or Medieval finds are known to have been recovered from within at least 1km of the site boundary.

4.1.2 The site lies largely within the former township of Bournmoor, the centre of which lay beyond the north-east boundary of the site, with the area east of the Herrington Burn falling within Newbottle. The earliest reference to the site was *c*1680 when Bournmoor, formerly Biddick Fence, was sold by William Bowes to Henry Lambton (Whellan 1856). By this time the Lambton's were established as amongst the leading coal owners of the Wear valley but made no attempt to develop Bournmoor as a coal mining interest.

4.1.3 No records have been found of the organisation of the estate at Bournmoor at this time though it seems likely that the land was leased to a small number of tenant farmers. An estate map of 1812 (DRO D/Bo/G10/xvi) reveals that by this time the land had been enclosed with organised field boundaries. No records relating to the enclosure have been located which may be explained by the fact that the Lambton's were sole owners of the land and could, therefore, undertake enclosure without an Act of Parliament. The accompanying survey (DRO D/Bo/G53/151) reveals that the land was mainly occupied by Ralph Wylam's Farm, which included Elba (possibly Wylam's farm), with a further two fields bordering the west side of the Herrington Burn occupied by Ralph Collins of Bourn Moor Farm. The name Elba appears on the 1855 Ordnance Survey map and it is likely that the name post-dates the imprisonment of Napoleon on the Isle of Elba in 1814-15. An identical building plan is clearly depicted on the 1812 estate map and it is likely that it was renamed sometime between 1814-15 and 1855. The building plan, which comprises buildings arranged around a central yard, is likely to have been a residence rather than an active farm. In 1834 it was described as a hamlet (Mackenzie and Ross 1834, 364) suggesting several connected dwellings. The map also depicts a mill dam at the confluence of the Herrington and Moor Burns linked via a mill race to the New Lambton corn mill, situated to the west and beyond the study area.

4.1.4 Whilst the detailed survey terminates at the Herrington Burn it records the possession on the east side of John George Lambton Esq (Newbottle Ground) and General Maxwell. The tithe map for Newbottle (D/X 755/7/1-2), although dating to 1838, shows a similar picture of land division on the east side of the burn. All of the fields falling within the study area were in the possession of the Earl of Durham (Lambton Estate) and occupied by Ralph Wylam. Wylam's land also included West House situated in the north east corner of the study area.

4.2 INDUSTRIAL DEVELOPMENT

4.2.1 ***Pre1789***: before 1625 the Lambton family collieries, though well-established, were of modest size but afterwards continued to grow rapidly up to the outbreak of the Civil War. At this time their Lumley, Harraton, and Lambton Collieries were yielding £800 a year in rent, and at least the latter was managed in partnership with George Grey of Southwick, George Lilburne of Sunderland, and Sir William Bellasis (Hatcher 1993,

82, 86, 255). Although the Lambton's were members of the royalist cause during the Civil War, they were able to retain their coal interests when Henry Lambton renounced the royalism of his father who was killed at Marston Moor (Clavering 1995, 224).

4.2.2 The development of the Lambton Waggonways, which linked the inland collieries of the Lambton Estate with staithes on the River Wear, awaits detailed research. The earliest Wear waggonways are reputed to have been Allen's on the north side of the river in 1690, though earlier examples may have existed on the south side (Clavering 1996, 2). The larger the colliery and the greater the distances from staithes on the river the greater the commercial advantages afforded by railed transport. By 1750 at least five waggonways were in existence (Clavering 1996, 8). This system continued to expand and grow ever more complex in the later eighteenth century as production rose and new branches were constructed to facilitate the transport of coal from the increasing number of collieries. The development of the Lambton waggonways has been summarised by Ayris *et al* (1998, 5-6).

4.2.3 The reason for the delay in developing coal mining at Bournmoor may lie in problems of mine drainage presented by the location of the site and the depth of the coal seams: The High Main Seam, uppermost in the succession, lay at a depth of 67 fathoms (approximately 122.5m) (NRO 3410 Wat/2/8, 255). Technical considerations aside, the degree of capitalisation necessary to develop the coal would have been prohibitive. The development of the Bournmoor seams could not occur until the availability of efficient and cost-effective, and deeper, drainage technology in the latter part of the eighteenth century.

4.2.4 The earliest dated reference to the Bournmoor Colliery is in February 1784 when the 'scale of charges for wagon maintenance at General Lambton's Collieries at Harraton, Lambton and Bourn Moor' were recorded (NRO 3410 Wat/2/2, 6). Proposals regarding the working of the colliery and the cost of production were also recorded in the same year (NRO 3410 Wat/2/2, 76; Wat/2/8, 233). If these accounts relate to the A and B Pits, which would be the earliest to be sunk in the succession, then the February date for wagon maintenance suggests the initial sinkings for the colliery may have begun in 1783 or earlier. In August 1784 calculations regarding the dimensions and accounts of an engine house at Bourn Moor were made by George Green (NRO 3410 Wat/2/11, 24). The engine house, which cost £288 14s 4½d, had provision for three 13 feet diameter haystack boilers, and an undated plan showing the same dimensions and the title 'Bourn Moor Engine House' has survived (NRO 3410 Plans/60). The A pit lay to the north side of Bournmoor Farm and beyond the bounds of the study area. The site of the B Pit, which continued to be depicted by the Ordnance Survey as late as 1940, lay within the study area at approximately NZ 3207 5154. It is not clear at which of the early pits the engine house was designed for.

4.2.5 ***1789-1797***: expansion of the Bournmoor Colliery occurred soon after with the sinking of C Pit, which lay to the north of the A183 and outside the study area, probably in either 1789 or 1790 (NRO 3410 Wat/2/8, 255). Whilst in June of the following year the D Pit, which lay in the southern part of the study area, was working the high Main Seam suggesting that the sinking may have begun as early as 1789 (NRO 3410 Bud/3, 13).

4.2.6 Although General Lambton would have been involved in the establishment of the Bournmoor Colliery, it is likely that from the beginning the operation would have been leased out in keeping with the policy of the other Lambton collieries. An abstract

for an agreement has survived dated 1st of January 1785 by Mr Featherstonehaugh and Co for working General Lambton's Collieries at Harraton, Lambton, Bournmoor and Lumley for five years (NRO 3410 John/2, 45; Wat/2/2, 77). It is stated that this is in keeping with Mr Featherstonehaugh's late agreement with Mr Lambton. A lease and deed of covenant for seven years from General Lambton to Marmaduke Featherstonehaugh, George Fenwick and Thomas Croudace regarding the same collieries dated 1st June 1793 was engrossed but not executed (NRO 3410 Bud/95, 1).

4.2.7 The accounts of the various Lambton Collieries for 1792 indicated that D Pit coal was both the cheapest to produce and the cheapest to transport (NRO 3410 Bud/13, 13-18). The Main Seam, however, would appear to have been almost wrought out by 1795 and the D Pit possibly laid in early in 1797. Between March 1795 and late November 1796 reports were made regarding the working methods at Bournmoor (NRO 3410 Wat/3/59, 2-4, 10) and in December 1796 the viewer John Buddle and other experts queried the current workings and considered the possibility of making an outstroke from Morton and whether the engines should be maintained (NRO 3410 For/1/7/179). It is likely that a decision was made to maintain the D Pit engine for pumping.

4.2.8 ***1797-1808***: in December 1799 accounts were made of the coal resting at the surface and the size of the pit heap (NRO 3410 Wat/3/59, 12). In 1800 John Buddle was appointed inspector of the Lambton Collieries and reports soon followed regarding Bournmoor Colliery. The upcast was then being aired from Lady Ann Pit (NRO 3410 Bud/13, 5). Buddle descended the D Pit shaft to the Maudlin Seam (77½ fathoms or 142m) and noted the poor state of the roof which required two rows of props (NRO 3410 Bud/3, 7). In 1800 a new set of pumps were installed in the D Pit engine house and a new beam installed in the following year (DRO NCB I/JB 2096). The improvements to the engine may have been in anticipation of the re-opening of the Pit. In December 1801 the D Pit was included in the estimate of charges for working several of the collieries and was again working in 1802 (Ayris *et al* 1998, 6). Buddle notes in December 1802 that the D Pit engine with its three 13" boilers was capable of a 67 fathom lift with a 14" bore (Bud/13, 19). In 1808 John Buddle inspected Bournmoor D Pit and concluded in September that the pit would be finished by the next binding of the pitmen (NRO 3410 Bud/13, 179). The pit is not recorded in the accounts for the following year and is likely to have been laid in once more.

4.2.9 ***1808-1817***: the earliest cartographic source which shows appreciable detail is the estate map of 1812 surveyed by John Bell (DRO D/Bo/G10, xvi). The map shows a number of features which the accompanying survey (D/Bo/G53/151) describes as raff (timber) yard, brick garth, cottages (D Pit Row), engine, small gardens and ground between the mill race and down to the public house. The shaft is also shown and the engine house is depicted linked to the Lambton Waggonway by a branch line. Records are illusive at this time which suggests that the mine was used for pumping rather than drawing coals. The importance of the pumping role is underlined by concern at the state of the engine, with the option of its abandonment in favour of the Morton engine being actively considered in 1814 (Ayris *et al* 1998, 6).

4.2.10 A significant change had occurred in the organisation of the Lambton collieries in 1813 when John Lambton came of age. He immediately took back control of his collieries from the contractors. In their place he appointed a 'colliery board' consisting of the two resident viewers, the eminent mining engineer John Buddle as visiting head viewer, and occasionally himself (Flinn 1984, 53). Lambton then set about expanding his coal interests with the acquisition of land at Newbottle, Witton Gilbert, and

Nesham by 1822, and leased three collieries from other land owners in 1828 borrowing heavily from London financiers in the process (Flinn 1984, 38-9, 208).

4.2.11 In 1815, whilst maintenance work was underway on one of the boilers at the D Pit, deposits of salt were discovered coating the inner surface. Similar discoveries at Lambton led to the discovery of a saline spring and the subsequent establishment of a salt works at nearby New Lambton (Parsons and White 1828, 273).

4.2.12 ***1817- 1821/2***: plans may have been underway in 1816 to reopen the D Pit as a scheme was devised to drive a drift from Morton in order to pump out the workings (NRO 3410 For/1/7,179). This also suggests that the D Pit engine was either out of commission or was not in a sufficient state of repair to undertake the task in isolation. In 1817 the engine house was demolished and a replacement erected (Ayris *et al* 1998, 6). A 28 horse power winding engine was purchased later in the year from a sale at Urpeth Colliery which may suggest that the Morton scheme had been enacted (Ayris *et al* 1998, 6). In 1818 the D Pit was once again drawing coals, this time from the deeper Hutton Seam. The D Pit waggonway may have been abandoned at this stage in favour of a new arrangement linking it to the Lambton Railway (Lumley Branch) and the main Lambton Railway opened in 1819 (Timoney 1983, 45). The production estimates for the seam reveal that the venture was expected to last only a few years and the D Pit may have been laid once more in 1821/2.

4.2.13 ***1821/2-1854***: the pit was certainly closed by 1823 and the engine is likely to have been used exclusively for pumping. It is recorded as drawing water from a dormant colliery in 1835 (NRO 3410 Bud/28, 19). The centre of coal production on the Lambton Estate at this time appears to have shifted from this area to collieries at Cocken, Sherburn and Littletown (Ayris *et al* 1998, 6).

4.2.14 ***1854-1856/7***: around 1854 a new pit was superimposed on the D Pit and coal production was resumed (Ayris *et al* 1998). The colliery was surveyed by the ordnance survey soon after (1856/7) and the resulting map reveals a considerable investment had been made in developing the mine. The old arrangement of the D Pit was replaced by new buildings, including a new engine house erected on the south side of the shaft. A group of at least 19 buildings, perhaps including two extent on the 1812 map, had been built to the north of the D Pit, arranged in a rectangle so enclosing a central yard. These are likely to be houses with a series of gardens on the south and east sides. The Grey Horse public house, which was established by 1812 (DRO D/Bo/G10, xvi), is also depicted close to the northern bank of the Moor Burn, south east of D Pit.

4.2.15 Ancillary industries were also established at this time with a tile works and clay pit to the north and a coke works consisting of a two ranges of bee-hive coke ovens to the north-west. A washing dolly for cleaning the coal was also added to the south-west of the coke ovens. A waggonway connected the washing dolly to a three fingered spoil tip on the east side of the tile works.

4.2.16 Whellan's Directory for 1856 states that extensive coke ovens at Bournmoor belonged to James Morrison of Roker, Sunderland, who obtained two prize medals at the London Exhibition, and were managed by Thomas Leconste. Robert Robson is also listed as tile manufacturer, D Pit (1856, 637). The precise relationship between the Lambton's as coal owners and the ancillary industries which grew up adjacent to the D Pit can not be determined on the basis of available evidence. It is likely, however, that some form of fixed term lease was in operation.

4.2.17 By 1856 the Lambton Railway (opened in 1819 (Timoney 1983, 45)) had been extended with the addition of the Lambton Railway D Pit Branch linking the D Pit and Lady Ann Pit to the Lumley Branch. In addition, a further branch linked the Lumley branch to the main Leamside Ferryhill branch, which defines the west side of the study area, with ancillary branches to facilitate the input and output of the coke works. By the time of the OS 1st edition map (1856/7) the Bournmoor Engine was in place, located at the junction of the D Pit and Lumley branch lines. This may have been a stationary steam engine and a long narrow building to the west, recorded on the OS 1st edition map (1856/7) as 'Duney's Bay', may have been an engine shed.

4.2.18 Other developments saw the infilling of the mill pond for the New Lambton Mill, possibly with colliery spoil and the construction of an early electric telegraph line (SMR 3144) along the course of a further branch line connecting the Lumley and Wapping branch lines, the latter following an existing road which partly defines the northern limit of the study area (now the A183). By the time of the OS 1st edition survey, Elba had acquired a number of gardens on the east and south sides. The B Pit, omitted from the 1812 survey, is shown as an 'Old Shaft' within an enclosure containing trees, possibly a small plantation, and was by this date clearly long abandoned.

4.2.19 ***1856/7-1895***: the development of the colliery and of the ancillary industries during the second half of the nineteenth century is poorly understood, though it is likely that the collieries were leased out for much of this period (DRO NCB 27/27). In 1861 an agreement was made between the Marchioness of Londonderry and the Earl of Durham for the joint construction of the Union Railway linking Burnmoor coke ovens with Penshaw Station (DRO D/Lo/E 340 and 383). In 1872 coals were being led from Burnmoor Colliery to the Penshaw Staith (DRO D/X/43/1).

4.2.20 A photographic album of the Lambton estate compiled by F Depeaux in 1891 includes views of the D Pit and a coke oven (TWCMS C12348). The D Pit photograph, which looks south-east from the north end of D Pit Row, shows the engine house and headstock obscured behind a cloud of steam/smoke, two further buildings, one with external boilers, a brick-built chimney and railway tracks, one of which has fully laden waggons on it and appears to be embanked above the general ground level.

4.2.21 In 1895 the Ordnance Survey revised the map of the Bournmoor area. The main developments at the D Pit in this intervening period was the erection of a new engine house and ancillary buildings which appear in the 1891 photograph. The coke works had expanded considerably with the addition of a new battery of coke ovens and the extension of the existing two. A gasometer established at the north end of the works may suggest that at this time the gas produced as a by-product was being collected as town gas for lighting. A firebrick works had also been established on the west side of the coke works. The tile works had expanded to become a brick and tile works and a further kiln had been added. The spoil heap had also grown considerably to cover the earlier clay pit and warranting the diversion of the Herrington Burn a short distance to the east. In keeping with this expansion a new terrace of workers housing was erected to the west of D Pit Row. The New Lambton Mill had been demolished and the mill race infilled. West House and the Bourn Moor Engine had been demolished by this time.

4.2.22 By 1895 the transport system had again been re-organised with the abandonment of the D Pit Branch. A new branch had been built which ran from the main Lambton Railway on the west side of the Firebrick works northwards. The Lumley Branch had

also been diverted northwards to join the new line. Once more the various industrial components within the site were interconnected with a complex system of railway lines.

4.2.23 ***1895-1915***: in the 1890s the private coal producing proprietorships were converted into limited companies and the Earl of Durham's collieries operated as the Lambton Collieries Ltd (Church 1986, 123). At this time the largest colliery company in County Durham was created by James Joicey. In 1896 Joicey took over Lambton Collieries Ltd from the Earl of Durham and in 1901 he acquired the Hetton Coal Company. This firm operated as the Hetton Lyons, Eppleton and Elmore Pits. In 1920 he added Silksworth Colliery and in 1924 these different interests were transformed into a new company - the Lambton, Hetton and Joicey Collieries Ltd (Emery, 1992, 13). Correspondence from Lord Durham from the period 1880 to 1930 (NRO 725/C4) indicates, however, his continuing interest in the Hetton and Lambton Collieries. This may have been in the form of the mineral royalty but also concerning the wayleaves for the Lambton Railway.

4.2.24 The maps for the area were again revised by the Ordnance Survey in 1915, by which time and further significant changes had occurred. The most significant of these was the demolition of the bee-hive coke ovens and the erection of a new by-product recovery coking plant whose centre shifted northward. The firebrick works and the brick and tile works remained largely unaltered, although the spoil heap continued to expand eastwards causing the Herrington Burn to be further diverted, in part forming a small lake. The eastern part of the study area by 1915 had become a golf course

4.2.25 ***1915-1940***: By 1940 a new engine house and several buildings had been erected at the D Pit. Some modification to the coking plant and the brick and tile works had occurred, although the firebrick works had remained largely unaltered. The spoil heap had continued to expand and the Herrington Burn had been once more diverted to the east. A large lake had developed on the north side of the spoil heap which was drained into the burn.

4.2.26 ***1947-1983***: in 1947 the coal industry was nationalised and the running of the colliery and the coking plant passed to the National Coal Board (NCB). In the 1950s the NCB were selling gas produced at the coking plant to the Northern Gas Board (DRO NCB 31 Box 86/17).

4.2.27 In 1965 the D Pit closed for the final time. The coking plant continued to operate until 1983 and was demolished soon after.

4.3 GEOTECHNICAL DATA

4.3.1 The locations of the boreholes and test pits were not determined by archaeological considerations and their value for archaeological purposes is consequently limited. Certainly they were not suitable for the development of an archaeological deposit model. The sheer size of the record generated by the ground investigation exercise prohibited the systematic assessment of each individual record. However, certain areas such as the D Pit area, the main centre of the coke works including the line of the early waggonway, and the site of the B Pit were examined. In practice much of this information, where geotechnical descriptions can be assessed in archaeological terms, suggests that over much of the site the immediate strata consists of colliery spoil of varying consistency and depth, and in the case of the known spoil tipping areas natural horizons were not encountered. Not surprisingly the coke works site produced the greatest concentration of concrete and brick deposits relating to construction and demolition, with odorous oily tar frequently encountered.

4.4 EXCAVATION

4.4.1 The results of the excavation and recording have been fully covered in two reports and a synthesis has been published (CNAU 1996, 1997; Ayris *et al* 1998). The most important features uncovered during the excavation were the waggonway remains which consisted of 150m of timber-laid track in four substantially intact lengths with fragmentary remains of a further six tracks. In addition, the excavation recorded a brick-built rail head structure associated with a least part of the waggonway system and the remains of an engine house.

4.4.2 The earliest waggonway remains were believed to date to the sinking of the D Pit and the initial period of working of the colliery around 1790. The surviving timbers dated to sometime between 1812 and 1817 and were contemporary with the rail head structure which may have been associated with unloading coal for the engine house in the period when it was pumping the mine. The final elements of the waggonway may have continued to operated at least until 1835 when pumping is known to have continued, and possibly up to 1840 when standard gauge was introduced. The adjacent engine house remains, which consisted of a rectangular building with the fragmentary remains of haystack boiler settings and ash pits, is thought to be the original D Pit engine house built around 1789 and depicted on the 1812 estate map. Its plan is substantially that described in the 1784 Bournmoor engine house calculations and depicted on a surviving plan (NRO 3410 Wat/2/11, 24; Plans/60), which are thought to relate to the A or B Pit. A brick-built extension on the east side and two further ash pits suggest two further boilers were added to the engine (Ayris *et al* 1998, 9-21). Although the date of this event is unclear it must post-date 1802 when Buddle referred to the three boilers at the D Pit (Bud/13, 19) and may conceivably relate to the installation of a new 28 horse power winding engine in 1817 (Ayris *et al* 1998, 6).

5. CONCLUSIONS

5.1 EARLY COLLIERY AND TRANSPORT REMAINS

5.1.1 The colliery remains relating to the early phase of the D Pit and the associated transport remains are of considerable archaeological significance. Their importance has already been recognised by the wider archaeological community and by City of Sunderland Council, leading to the initiation of the current programme of archaeological investigations. The timber waggonway is the most complete and well-preserved timber waggonway in the country and its discovery has led to much interest both within the region and nationally. Furthermore, the discovery of the remains of the original engine house, together with the recent excavation of a near contemporary engine house at the site of the Wallsend B Pit, has led to the wider recognition of the archaeological potential of early pithead sites. This should be a material consideration if significant ground disturbance is proposed at the site of the B Pit.

5.2 LATER REMAINS

5.2.1 The remains of the later nineteenth and twentieth century colliery and transport arrangements, whilst of interest for the development of the study area are considered to be fragmentary and of low archaeological value. Similarly, although the ancillary industries (firebrick, brick and tile, and coke works) are of interest as part of the wide development of the site from the mid-nineteenth century onwards it is considered that any surviving remains will be fragmentary and of low archaeological value.

6. RECOMMENDATIONS

6.1 D PIT AND WAGGONWAY

6.1.1 The colliery and transport remains relating to the early development of the D Pit have been extensively investigated and it is considered that a further programme of archaeological investigation is not necessary. However, should these remains be subject to significant disturbance or removal at some future date then a watching brief during the course of such works would be appropriate. Similarly, should significant disturbance be envisioned to contemporary horizons in areas peripheral to the excavated area, then a watching brief of these works would also be appropriate.

6.2 B PIT

6.2.1 Whilst the geotechnical data at the site of the B Pit proved inconclusive and its historical development is presently uncertain, it is considered that there is significant potential for the survival of pit head features. The site is not depicted on the 1812 map and was presumably abandoned by that time, but was consistently depicted by the Ordnance Survey into the 1940s. It is considered that a watching brief in this area would be appropriate should significant future ground disturbance be envisaged in this area.

6.3 DOCUMENTARY RESEARCH

6.3.1 Mr Kirton-Darling (Agent) has expressed a willingness to allow consultation of the Lambton Estate archive at some future date. However, the archive is not indexed and he does not feel that it will be practical to undertake research into so specific a subject area until the indexing has been completed. A map of the Lambton Estate, dated *c*1800 and showing the D Pit, is held at the Lambton Estate Office and Mr Kirton-Darling is happy to allow access to it. The map is framed and will require photographic copying. It is recommended that the map be assessed for its relevance to the development of the colliery and, if appropriate, copied into the project archive. Favourable personal contact with the Estate Office may allow wider access to the archive as and when it is in a suitable condition to be usefully consulted.

6.3.2 The scale of the deposited archive at the NRO and DRO was such that only limited study could be made of this material. It is considered that significant information can be gained from a more intensive study of this material should this be deemed necessary.

7. BIBLIOGRAPHY

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NRO Northumberland Records Office (Melton Park)

TWA Tyne and Wear Archives

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7.3 UNPUBLISHED PHOTOGRAPHIC SOURCES

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DRO EP/Bu 14/3 Photograph of Lambton coke ovens, c.1920

DRO NCB 20/3 Lambton, new ovens site from D Pit gantry, 7/5/1952

DRO NCB 20/4 Lambton, view from D Pit Head, 23/4/1952

DRO NCB 20/30 Lambton, coke screening plant, 7/9/1954

DRO NCB 20/32 Lambton, weighbridge pit, coke sales yard and secondary screening, 14/5/1955

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TWA C12348.15 Lambton Collieries D Pit

7.4 UNPUBLISHED CARTOGRAPHIC SOURCES

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7.5 DOCUMENTARY SOURCES

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D/DMA Box 31/6 Colliery Consultative Committee: schedules of targets/actual production etc for Harraton, Seaham, South Hetton and Lambton "D" pits, 1956, 1957

D/DMA 328/4 Scrap book of press cuttings and photographs re closure of Lambton D Pit. Included are miscellaneous papers and letters re same, *c* Jan 1965

D/Lo/E 383 Union Railway from Burn Moor Coke Ovens to Penshaw Station, Agreement re joint construction between the Marchioness of Londonderry and the Earl of Durham, 1861

D/Lo/E 340 Agreement (draft) between the Marchioness of Londonderry and the Earl of Durham for the construction of a double line of railway from Penshaw Station to Burn Moor coke ovens, 1861

D/X/43/1 An account of the coals led....from Houghton Burnmoor Colliery to Painsher Staith 4/7-1/8/1772

D/X/369/13 Newbottle Colliery, Lady Ann and D Pit, Smith and Wright work pay bill, 1868

D/X/531/39 Plan of the NCB (Durham Division) showing mines, pumping station, coke ovens, brickworks, and, nd.

D/X/1050/15 Plan of workings in the Hutton Seam Bourn Moor royalty, 19th C.

D/X/369/3 Pay bills including Houghton Pit, Margaret Pit, Dorothy Pit, Norton Pit, Deit Bourn Moor and Lady Ann Pit, Bunker Hill, Bowes House, Newbottle Colliery, 1868

D/X/26/4 Newbottle Bourn Moor Colliery paybill, 22/4-20/5 1801

NCB 3/136 Burnmoor Colliery accounts of coals wrought out of royalties, 1912-1937

NCB 27/27 Epitome of leases: Lambton Colliery, Newbottle Group of Collieries 3/3/1865-30/7/1896

NCB 27/28 The Rt Hon Earl of Durham to Lambton Collieries Ltd: copy of lease, wayleave over Lambton Railway, and, 29/6/1896

NCB 30 Box 179/6 Coal supplies to and from coke ovens, Lambton Coking Plant, Jan. 1975 - Jan 1984

NCB 31 Box 86/17 Agreement between NCB and Northern Gas Board re sale of gas produced at the Lambton coking plant, Jan 1956

NCB I/CO/86 Coke Owners papers. 1328 documents with various entries for coke production in Durham in the 19th century, including coke yard plans

NCB I/CO 252 Lambton D Pit (or Burnmoor) awards and agreements, 1873-1909

NCB I/CO 253 Lambton D Pit (or Burnmoor) awards and agreements, 1910-1946

NCB I/JB 2072 Lambton Colliery. Comparison of prices of sundry articles with 3 or 4 years ago includes Bourn Moor, 1800

NCB I/JB 2096 D Pit, cost of replacing pumps, 1801

NCB I/X/76 Newbottle Burnmoor Colliery paybill, 1787

NCB North East Bye-products Association Minute Books (2 Vols) 1910-1937; Annual Reports 1915-1934

UD/CS 232 Undated map showing Bourn Moor, Chester-le-Street parish

UC/CS 144+163 Valuation List, Bourn Moor, 1882, 1901-1906

X50/1 Catalogue of Lambton Estate records. Lambton Papers

NRO 3410 NEIMME Collection:

7.5.1 ***Watson Collection:***

Watson/2/2 Proposal Book 1762-1810

6 Scale of charges for wagon maintenance at General Lambton's Collieries at Harraton, Lambton and Bourn Moor, Feb 1784

76 Proposal re the working of Harraton, Lambton and Bourmoor Collieries belonging to General Lambton, by George Johnson, 1784

77 Abstract of an agreement by Mr Featherstonehaugh and Co re working General Lambton's Collieries at Harraton, Lambton, Bournmoor and Lumley for 5 years from 1/1/1785

Watson/2/8 View Book 1741-1807

233 Statement of costs for producing coal at Harraton, Lambton and Bournmoor Colliery, 1784

255 Estimated cost of sinking a Pit at Burnmoor Colliery Seven feet and a half Diamr to the Thill of the high Main Coal say 67 fathoms, nd. [falls between entries for 1789 and 1790 and probably relates to C or D Pits]

Watson/2/11 Colliery View Book 1762-1790

24 Calculations re the dimensions and accounts for Bourn Moor Engine House, by George Greene 19/8/1784

Watson/3/59

1 Account of coal produced at Lumley by Sober Watson and at Lambton, Harraton and Bourne Moor, by Thomas Smith 22/4 - 6/5/1789

2-4, 10 Reports re working methods at Lambton, Bourne Moor and Lumley Collieries, 12/3/1795-23/11/1796

5-8, 11-12 Accounts of the amounts of coal on the surface and measurements of the pit heaps at Lambton, Harraton, Bourne Moor and Lumley, 31/12/1795-31/12/1799

9 Note of a bet between John Watson and John Stoker re the sinking of C Pit, nd.

Watson/3/31 Parishes of Chester-le-Street, Houghton-le-Spring, Lanchester and Easington

9 Plan of railways running through the Earl of Durham's estate, the Earl of Scarborough's estate, the township of Lambton and the township of Bour-Moor, showing the line of the Earl of Durham's railway, projected line of railway "No. 2" and the projected line of the railway independent of the Earl of Scarborough. Scale 20chains: 1 inch 27cm x 45cm, nd.

7.5.2 ***Buddle Collection:***

Bud/3 Colliery Memoranda 1809-1811

192 Report re the Lambton Collieries for Thomas Williamson Esq. including reasons for the reduction in profits and detailed statements of working costs, Aug. 1810

Bud/13 Colliery Memoranda 1797-1810

Volume containing reports and accounts of John Buddle Snr and Jnr, re the Lambton Collieries, 1797-1810

1 Notes re appointment of John Buddle Snr as inspector of the Lambton Collieries, fixing wages for waggonways and the supply of rye for miners, 18/8/1800

5 Report re Bourn Moor Colliery, including section of seam and current workings, 3/9/1800

7 Report re D Pit, including poor state of the roof, 10/12/1800

13 Statement of working costs for D Pit, Bourn Moor Colliery, Hutton Seam, Lambton Colliery and Harraton Colliery, 18/6/1792

38 Accounts of wages paid at Lambton Collieries including charges paid for keeping the Morton Engine, 1803

76 Estimate of working costs for the Lambton Collieries, 31/12,1801

98 Statement of numbers of employees and wage rates for the Lambton Collieries, 1804-1805

103 Statement of additional working costs for Lambton Collieries, 1805

106 Statement of binding costs for Lambton Collieries 18/10/1803

123 Estimate of coal remaining in the various Lambton Collieries, Aug. 1806

125 Account of the workings and working costs at the Lambton Collieries, 31/12/1805-31/12/1806

139 Account of coal lead from Lambton Collieries, 31/12/1805-31/12/1806

153 Account of the workings and working costs at the Lambton Collieries,31/12/1806-31/12/1807

167 Estimate of working costs for Lambton Collieries, Sept 1807

179 Account of the workings and working costs at the Lambton Collieries, 31/12/1807-31/12/1808

193 Revised estimate of working costs for the Lambton Collieries 15/3/1809

199 Account of the workings and working costs at the Lambton Collieries,31/12/1808-31/12/1809

219 Estimate of working costs for the Lambton Collieries, 1809

235 Account of the workings and working costs at the Lambton Collieries,31/12/1809-31/12/1810

243 Estimate of working costs for the Lambton Collieries, 1810

Bud/17 Colliery Memoranda 1810-1812

1 Account of the workings and working costs at the Lambton Collieries,31/12/1810-31/12/1811

20 Estimate of production and waggonway costs for Lambton, Harraton, Bourn Moor, Lumley and Penshaw Collieries, 31/12/1811

26 Account of costs for Lambton Collieries continued from Vol 13, 1811

28 Account of the workings and working costs at the Lambton Collieries,31/12/1811-31/12/1812

Bud/28 Colliery Memoranda 1835

54 Account of transport costs from Philadelphia to Sunderland, Houghton-le-Spring to Philadelphia, Lumley and Cocken to Bourn Moor, Penshaw to Low Lambton, Littleton to Pittington and Pittington to Jane Pit, Jan-June 1835

69 Table showing coal transported from the Lambton Collieries, 31/12/1834-30/6/1835

89 Valuation of the Lambton Collieries, June 1835

91 List of rents payable for dormant collieries, June 1835

Bud/29 Colliery Memoranda 1800-1805

Volume containing fortnightly accounts of coal produced and working and leading charges for the Lambton Collieries, i.e. Lambton, Harraton, Bourn Moor, Lumley and Penshaw, 13/8/1800-31/12/1805

Bud/43/1-2 Lambton Colliery Journals 1806-1814

Journal of work at the Lambton Collieries, entries arranged chronologically, inc current workings, estimates of reserves, working costs, coal produced and sections of seams. 2 Volumes 12/11/1806-22/12/1809 and 1/2/1809-19/1/1814

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Volume of reports, correspondence and minutes for meetings of the Colliery Board, mainly re Lambton Collieries 1704-1836

6 Memo re Lambton Waggonway and Ousten Colliery lease, nd.

8 Account of coal produced at Lambton, Harraton, Bourn Moor, Lumley and Penshaw Collieries, 31/12/1809-24/1/1810

22 Details of the lengths of the Lambton Waggonway, 14/9/1814

31 Minutes re drainage in the D Pit and West Pit, Lumley....(Colliery Board Meeting No.59), nd.

Bud/95 Lambton Collieries 1793-1799

1 Lease and Deed of Covenant from General Lambton to Marmaduke Featherstonehaugh, George Fenwick and Thomas Croudace to work Harraton, Lambton, Bourn Moor and Lumley Collieries for 7 years from 1 June 1793. Note that the above lease was engrossed but not executed.

7.5.3 ***Forster Collection (part 1):***

Collection of reports relating to various 18th and 19th century viewers, collected by Thomas Emerson Forster

For/1/7 Colliery Report Book 1768-1799

155 Report re measurement of pillars at Lambton, Harraton, Bourn Moor and Lumley Collieries, by John Watson 28/5/1795

179 Queries re current workings at Lumley and Bourn Moor including the possibility of making an outstroke from Morton and whether the engines should be maintained with recommendations by John Buddle Snr, John Ramsay, John Donnison, William Smith, Robert Donkin, Richard Donkin, John Smith, John Watson, Thomas Brough and John Buddle Jnr with additional recommendations by John Smith and Thomas Barnes, 21/12/1796, 6/1/1797

7.5.4 ***Bell Collection:***

Bell/18 History of Coal Mining Volume 18

1 Lambton Collieries, including note from Surtees re coal working 1616 and extracts re working and accidents, 1757-1772, cuttings 1820-1848

7.5.5 ***Johnson Collection:***

Collection of bound volumes of reports, leases and correspondence relating to George and John Johnson and others, Agents to Willington Colliery

John/2 View Book 1738-1795

45 Abstract of an agreement by Mr Featherstonehaugh and Co for working General Lambton's collieries at Harraton, Lambton, Burnmoor and Lumley for 5 years from 1/1/1785

7.5.6 ***Plans:***

60 Plan of the Bournmoor Engine House, nd. (probably 1784; see Wat/2/11, 24)

7.5.7 ***Colliery leases:***

Les/1 Colliery leases and Miscellaneous Papers, 1761-1889

2 Account of expenses of working in Newbottle-Bournmoor Colliery, 31/12/1798-31/1/1799, in connection with the estate of the late John Nesham, 31/1/1799

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31 List of Mason's apprentices, their ages and wages at Newbottle and Bourn Moor Collieries, 21/5/1861

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APPENDIX 1
PROJECT BRIEF

APPENDIX 2
PROJECT DESIGN

Lancaster University Archaeological Unit

February 1998

LAMBTON COKEWORKS

SUNDERLAND

ARCHAEOLOGICAL ASSESSMENT

Proposals

The following project design is offered in response to a request from the City of Sunderland Environment Department for an archaeological assessment at the Lambton Cokeworks.

1. INTRODUCTION

1.1 Lancaster University Archaeological Unit (LUAU) has been invited by the City of Sunderland Environment Department to submit a project design and costs for an archaeological assessment in advance of phase Two of a land reclamation scheme on the site of the Lambton Cokeworks, Sunderland. An archaeological excavation has revealed a late eighteenth century waggonway which served the Lambton D pit at Fencehouses and is the most complete timber waggonway found to date in the UK (Ayris *et al* 1998). D pit was a part of the group of collieries owned by the Lambton family of Co Durham, which was sunk in 1789 and opened in 1791; it is presumed that the waggonway dates from the opening of the pit, although this could not be confirmed during the excavation.

1.2 Because of the evident archaeological importance of the site an archaeological assessment is required to inform the development programme and make recommendations for further archaeological work on the site. The project design has been prepared in accordance with a project brief by the Design and Conservation Section of Sunderland City Council.

1.3 The Lancaster University Archaeological Unit has considerable experience of the evaluation and excavation of sites of all periods, having undertaken a great number of small and large scale projects during the past 18 years. Evaluations and assessments have taken place within the planning process, to fulfil the requirements of clients and planning authorities, to very rigorous timetables. LUAU has the professional expertise and resource to undertake the project detailed below to a high level of quality and efficiency. LUAU and all its members of staff operate subject to the Institute of Field Archaeologists (IFA) Code of Conduct and LUAU is an IFA registered organisation.

2. OBJECTIVES

2.1 The following programme has been designed in accordance with a brief provided by Mr M Lowe of the Design and Conservation Section of Sunderland City Council to provide an accurate archaeological assessment of the designated site, within its broader context. The principal purpose of the assessment is to collate existing information about the archaeology of the site, to determine the significance of the identified archaeological resource and to provide recommendations for any further archaeological investigation. The required stages to achieve these ends are as follows:

2.2 ***Desk Top Survey***

A documentary study to accrue an organised body of data which would examine the history of the site and would identify areas of particular archaeological significance.

2.3 ***Assessment Report***

A written assessment report will assess the significance of the data generated by this programme within a local and regional context. It will advise on the requirements for further evaluation or recording measures as necessary.

3. METHODS STATEMENT

3.1 The following work programme is submitted in line with the stages and objectives of the archaeological work summarised above.

3.2 DESK TOP SURVEY

3.2.1 The following will be undertaken as appropriate, depending on the availability of source material. The level of such work will be dictated by the timescale of the project.

3.2.2 ***Documentary and cartographic material:*** this work will rapidly address the full range of potential sources of information. It will consult the Tyne and Wear Sites and Monuments Record, The Northumberland, Durham and Tyne and Wear Record Offices, and the North Eastern Institute of Mining and Mechanical Engineers (NEIMME) Collection. The study will also examine data held by the City Contracting services of the City of Sunderland, particularly relating to boreholes and subsurface interventions. It is also recommended that Beamish Museum be consulted, as they hold a large archive of early photographs of industrial sites and particularly for this site. The documentary study will augment the information already available on the waggonway remains and will seek to enhance the documentary chronology for this important site.

3.2.3 The study will examine all possible cartographic sources, which would include early maps, and such primary documentation (tithe and estate plans etc.) as may be reasonably available. In particular the study will examine the 1812 estate map (Durham Record Office) (Ayris *et al* 1998). It is understood that the Ordnance survey maps have been copies and will be made available to the successful tenderer. Any photographic material lodged in either the County Sites and Monuments Record or the various County Record Offices will also be studied. Published documentary sources will also be examined and assessed.

3.2.4 The archivist of the Lambton Estate will be approached in order to consult the family records, but as it is understood that access will not be made available within the anticipated assessment programme, the consultation is not costed within the fixed price costs, instead a day-rate is incorporated to allow for a further stage of work.

3.2.5 ***Aerial photography:*** a survey of the extant air photographic cover will be undertaken. This may indicate the range and survival of archaeological and structural features in the designated area, and if appropriate coverage is available, allow an assessment of the rate and progress of erosion of archaeological features. It will also facilitate the rapid recognition and plotting of archaeological features including those no longer visible at ground level. Aerial photographic work will entail liaison with the Royal Commission on the Historical Monuments (England), although, within the timescale available, it is unlikely that prints will be forthcoming from this body for inclusion in this report within the defined timescale.

3.2.4 ***Physical environment:*** a rapid desk-based compilation of geological (both solid and drift), pedological, topographical and palaeoenvironmental information will be undertaken. This will not only set the archaeological features in context but also serves to provide predictive data, that will increase the efficiency of the field inspection.

3.3 ASSESSMENT REPORT

3.3.1 ***Archive:*** The results of Stage 3.2 will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*The Management of Archaeological Projects, 2nd edition, 1991*). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. It will include summary processing and analysis of any features and finds recovered during fieldwork. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IFA in that organisation's code of conduct.

3.4.2 This archive can be provided in the English Heritage Central Archaeology Service format, both as a printed document and on computer disks as ASCii files (as appropriate), and a synthesis (in the form of the index to the archive and the report) will be deposited with the Tyne and Wear Sites and Monuments Record. A copy of the archive will also be available for deposition in the National Archaeological Record in London. LUAU practice is to deposit the original record archive of projects (paper, magnetic, and plastic media) with the appropriate County Record Office, and a full copy of the

record archive, should any material be recovered, with the material archive (artefacts, ecofacts, and samples, at this stage from surface collections) with an appropriate museum.

3.4.3 ***Collation of data:*** The data generated by 3.2 (above) will be collated and analysed in order to provide an assessment of the nature and significance of the known surface and subsurface remains within the designated area. It will also serve as a guide to the archaeological potential of the area to be investigated, and the basis for the formulation of any detailed field programme and associated sampling strategy, should these be required in the future.

3.4.4 ***Assessment Report:*** One bound and one unbound copy of a written synthetic report will be submitted to Sunderland City Council, and a further copy submitted to the Tyne and Wear County Archaeologist. The report will include a copy of the project brief, this project design, and indications of any agreed departure from that design. It will present, summarise, and interpret the results of the programme detailed above and will include a full index of archaeological features identified in the course of the project, together with appropriate illustrations, including a map and gazetteer of known or suspected sites identified within or immediately adjacent to the study area. It will also include a complete bibliography of sources from which the data has been derived, and a list of further sources identified during the programme of work, but not examined in detail. The report will also include a complete bibliography of sources from which data has been derived, and a list of further sources identified during the programme of work, but not examined in detail.

3.4.5 This report will identify areas of defined archaeology, an assessment and statement of the actual and potential archaeological significance of any features within the broader context of regional and national archaeological priorities will be made. Illustrative material will include a location map, which can be tailored to the specific requests of the client (eg particular scales etc), subject to discussion. The report will be in the same basic format as this project design; a copy of the report can be provided on 3.5" disk (IBM compatible format).

3.4.6 ***Proposals:*** The report will make a clear statement of the likely archaeological implications of the intended development. It will also make recommendations for any further archaeological recording deemed necessary or desirable for individual sites. It will seek to achieve, as a first option, the preservation *in situ* of all significant archaeological features, and possible strategies for the mitigation of the development, including design modifications, will be considered. Where conservation is neither possible, nor practical, it may be appropriate to recommend a further stage of more intensive archaeological work in order to mitigate the effects of development.

3.4.7 ***Confidentiality:*** The assessment report is designed as a document for the specific use of the client, for the particular purpose as defined in the project brief and this project design, and should be treated as such; it is not suitable for publication as an academic report, or otherwise, without amendment or revision. Any requirement to revise or reorder the material for submission or presentation to third parties beyond the project brief and project design, or for any other explicit purpose, can be fulfilled, but will require separate discussion and funding.

4. OUTLINE RESOURCES

The following resource base will be necessary to achieve the proposals detailed above.

4.1 ***Desk Top Study***

4 man-days Project Supervisor

4.2 ***Assessment Report***

2 man-days Project Supervisor

1 man-days Illustrator

4.3 ***Timetabling:*** LUAU can undertake the work at short notice if required, although a week lead in is preferred.

4.4 The project will be under the management of **Jamie Quartermaine, BA, Surv Dip, MIFA** (Unit Project Manager) to whom all correspondence should be addressed. All Unit staff are experienced, qualified archaeologists, each with several years professional expertise.

ILLUSTRATIONS

The boundary of the development area is shown on all the OS historic maps by a broad blue line.

based upon the Ordnance Survey 1:50000
with the permission of the controller of HMSO

Fig 1 : Lambton Cokeworks, Sunderland Location Map

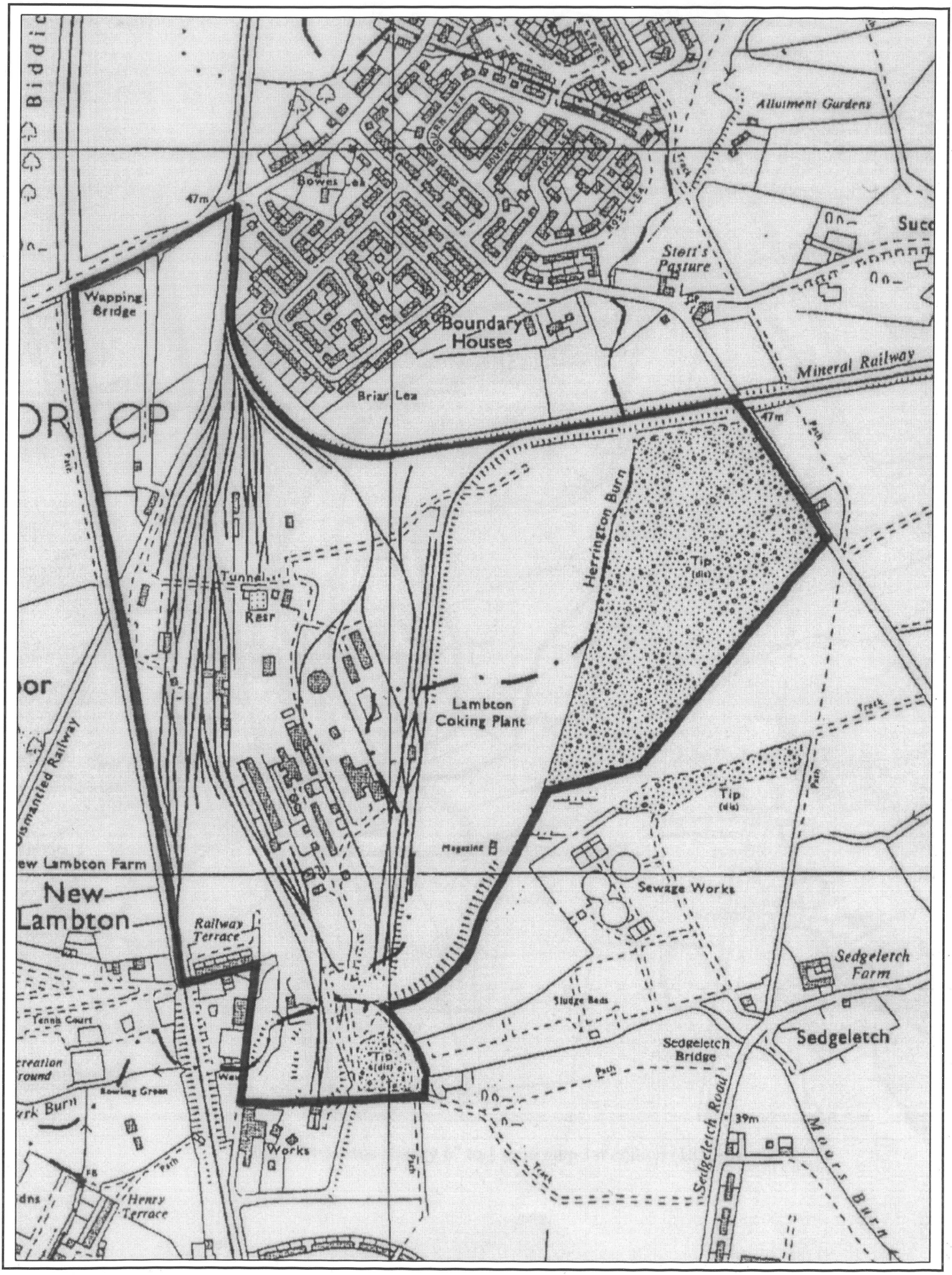

Fig 2 Current 1:10,000 map

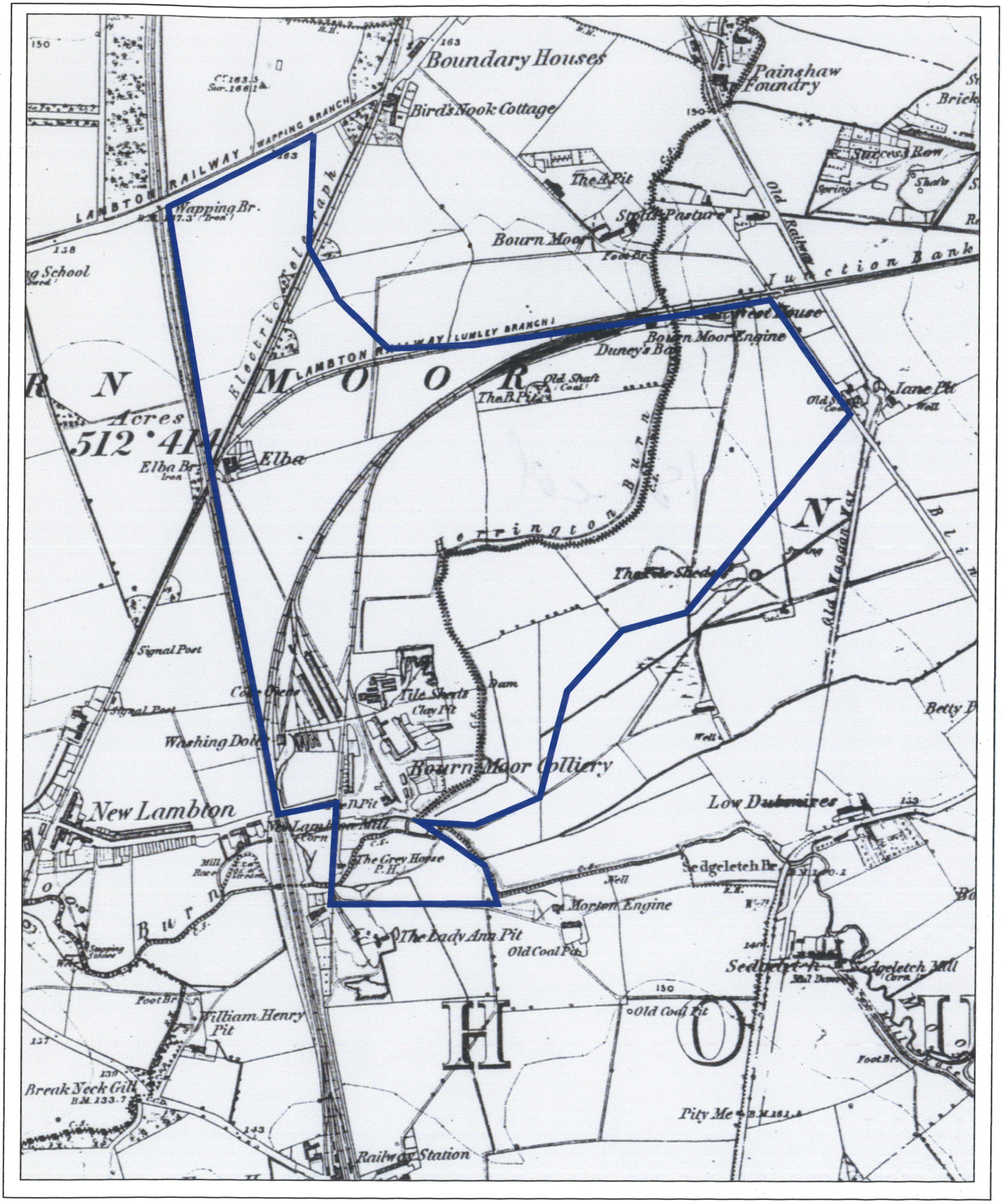

Fig 3 Ordnance Survey 6" to 1 mile map 1st edition (1855-6)

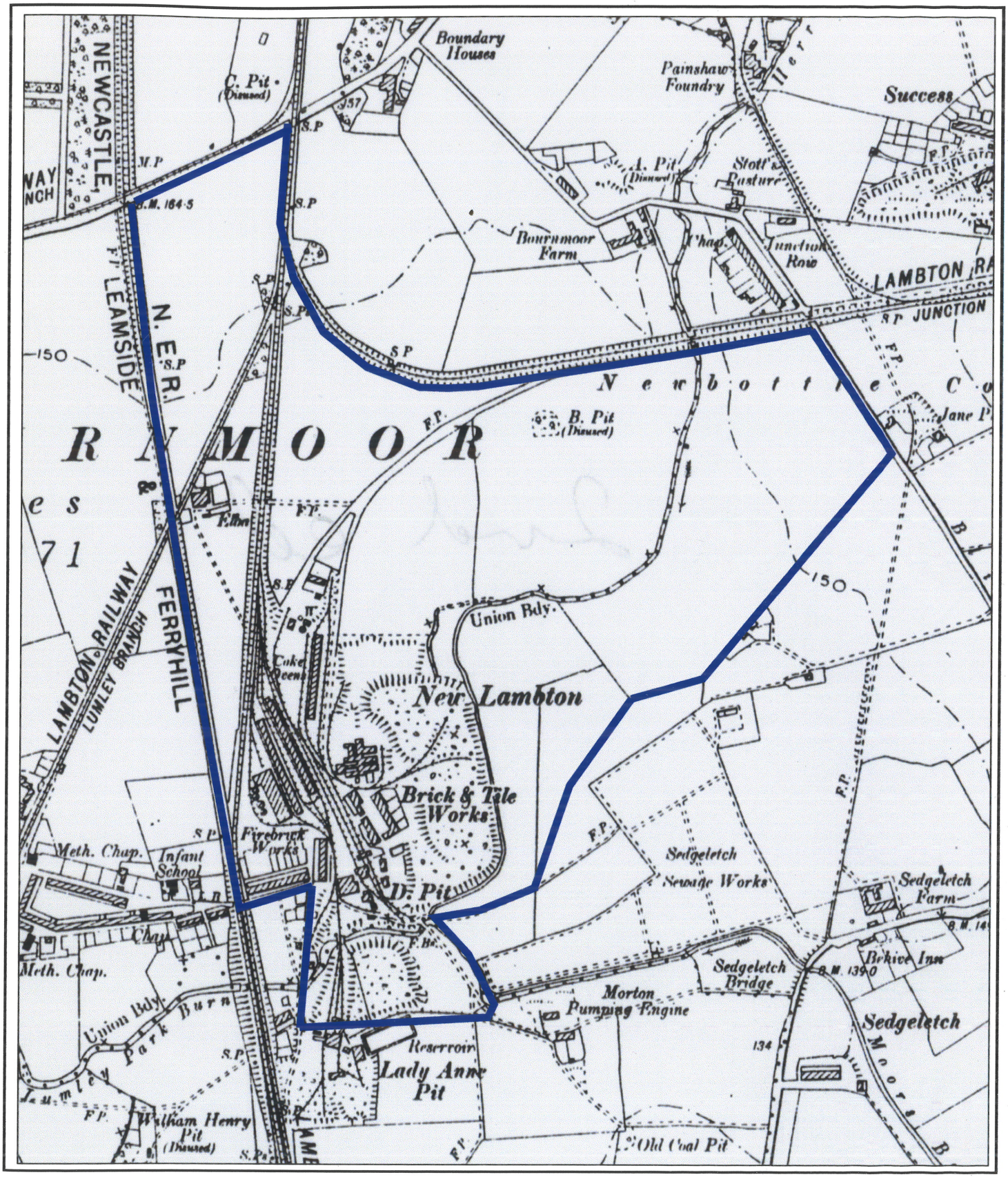

Fig 4 Ordnance Survey 6" to 1 mile map 2nd edition (1898)

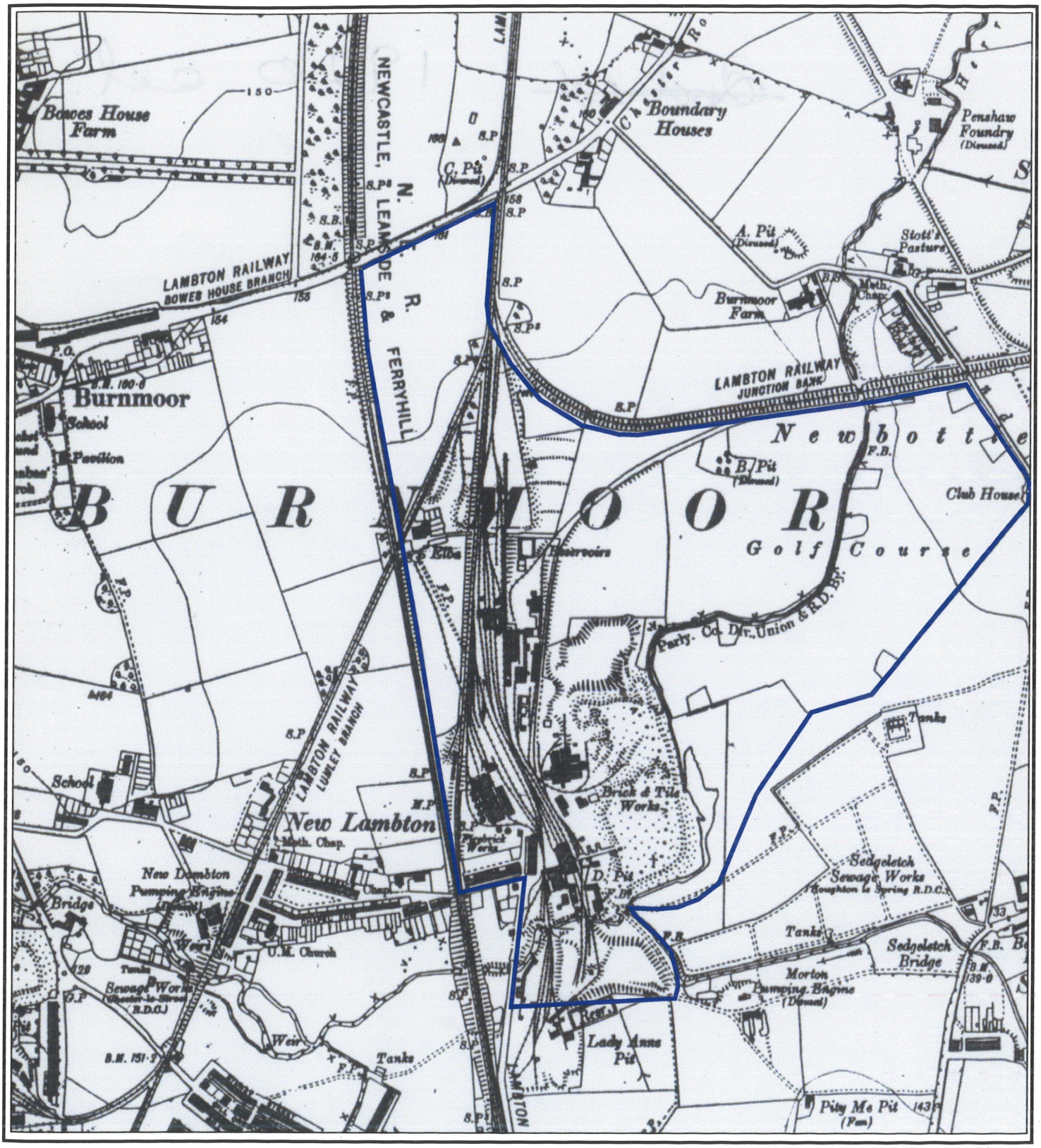

Fig 5 Ordnance Survey 6" to 1 mile map (1921)

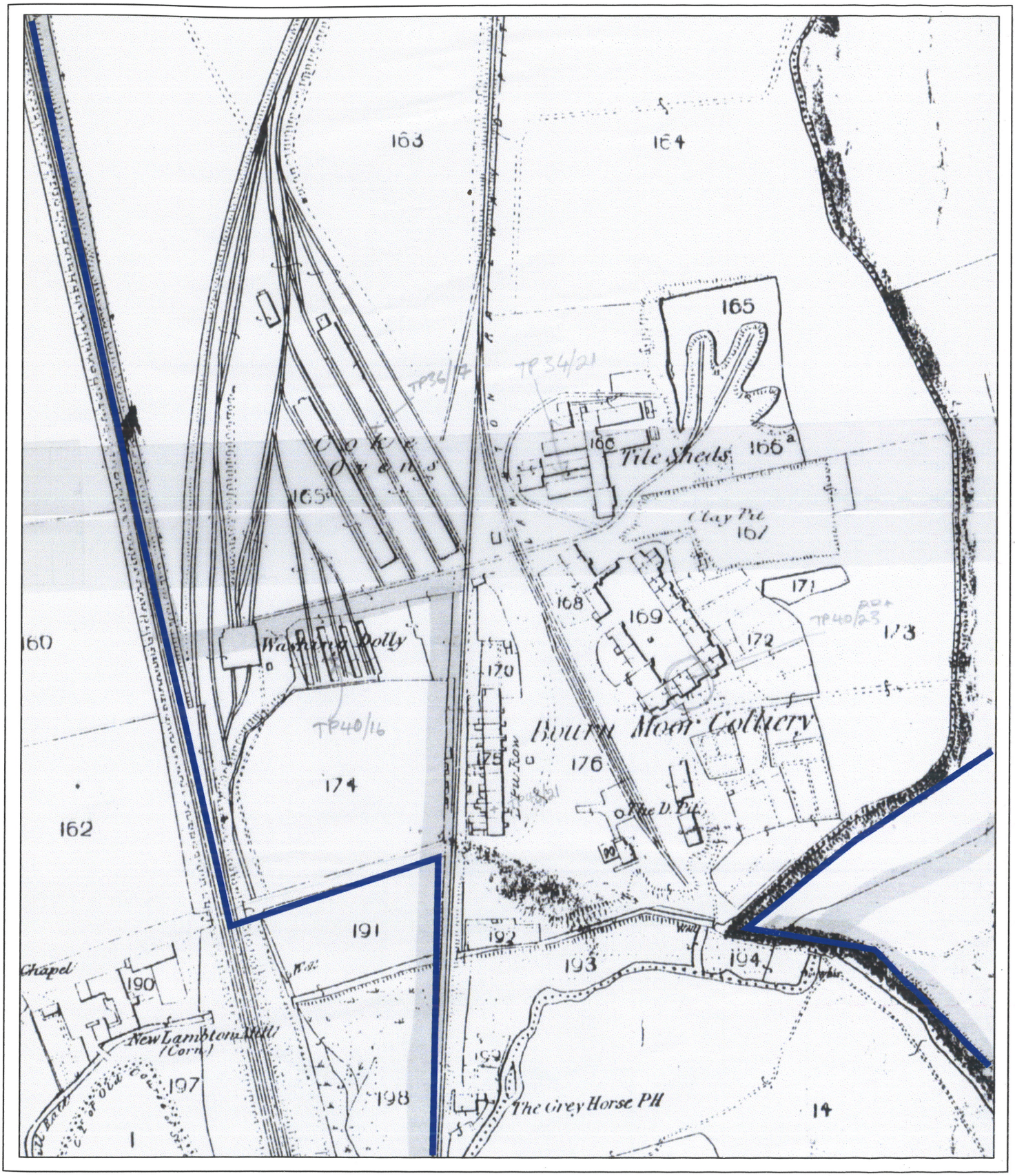

Fig 6 D Pit: Ordnance Survey 25" to 1 mile map 1st edition (1855-6)

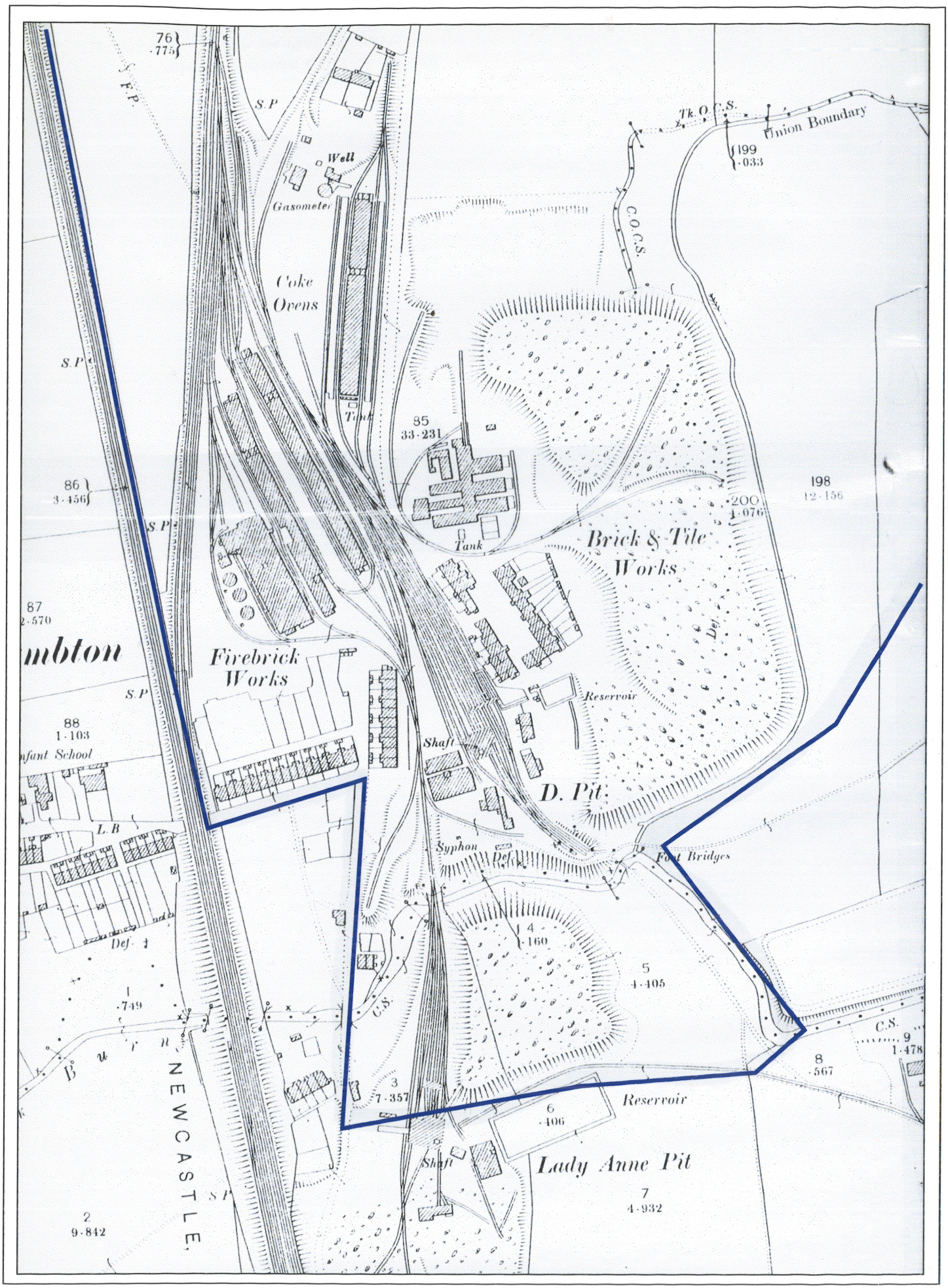

Fig 7 D Pit: Ordnance Survey 25" to 1 mile map 2nd edition (1898)

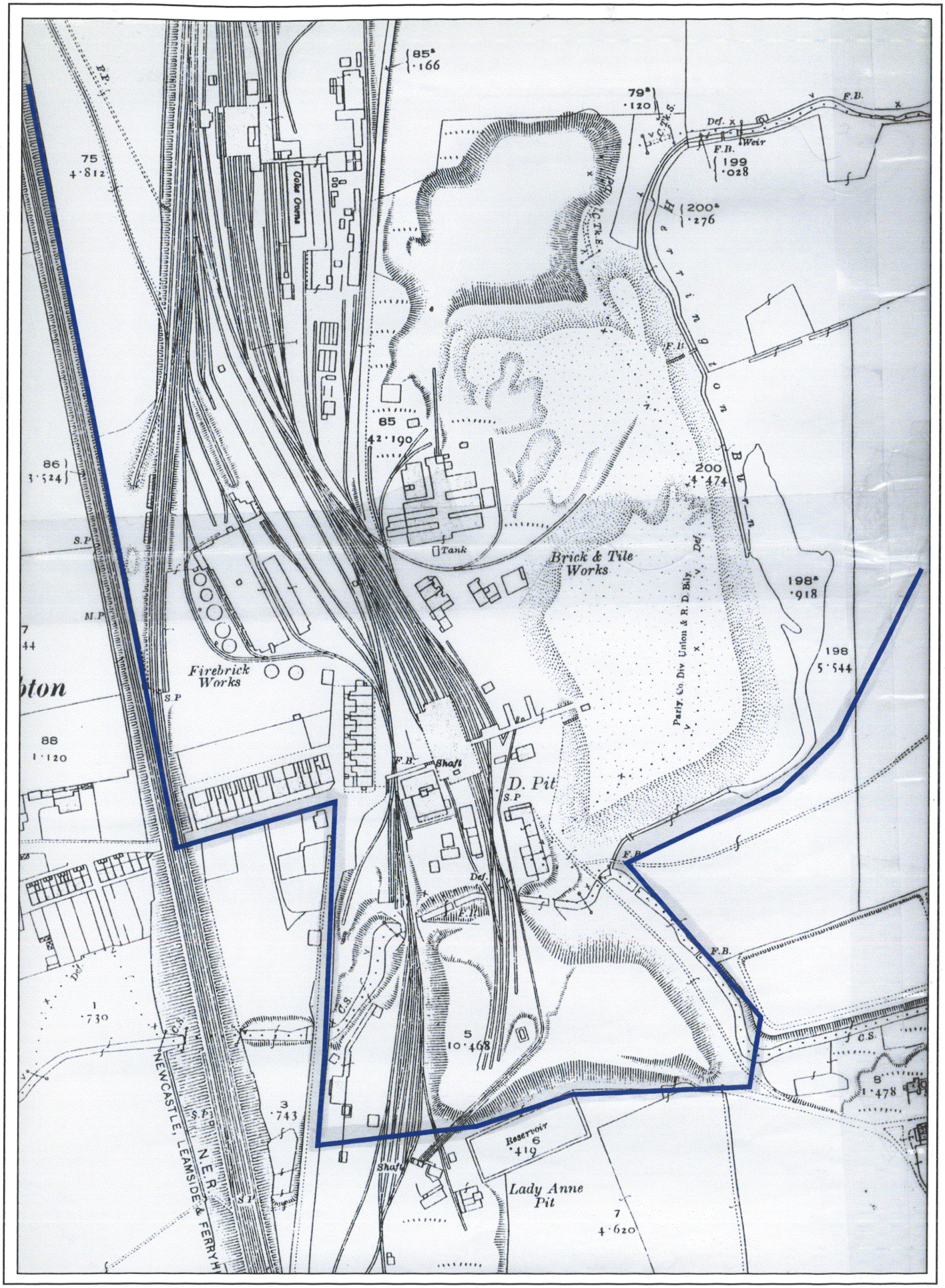

Fig 8 D Pit: Ordnance Survey 25" to 1 mile map (1921)

Fig 9 D Pit: Ordnance Survey 25" to 1 mile map (1940)

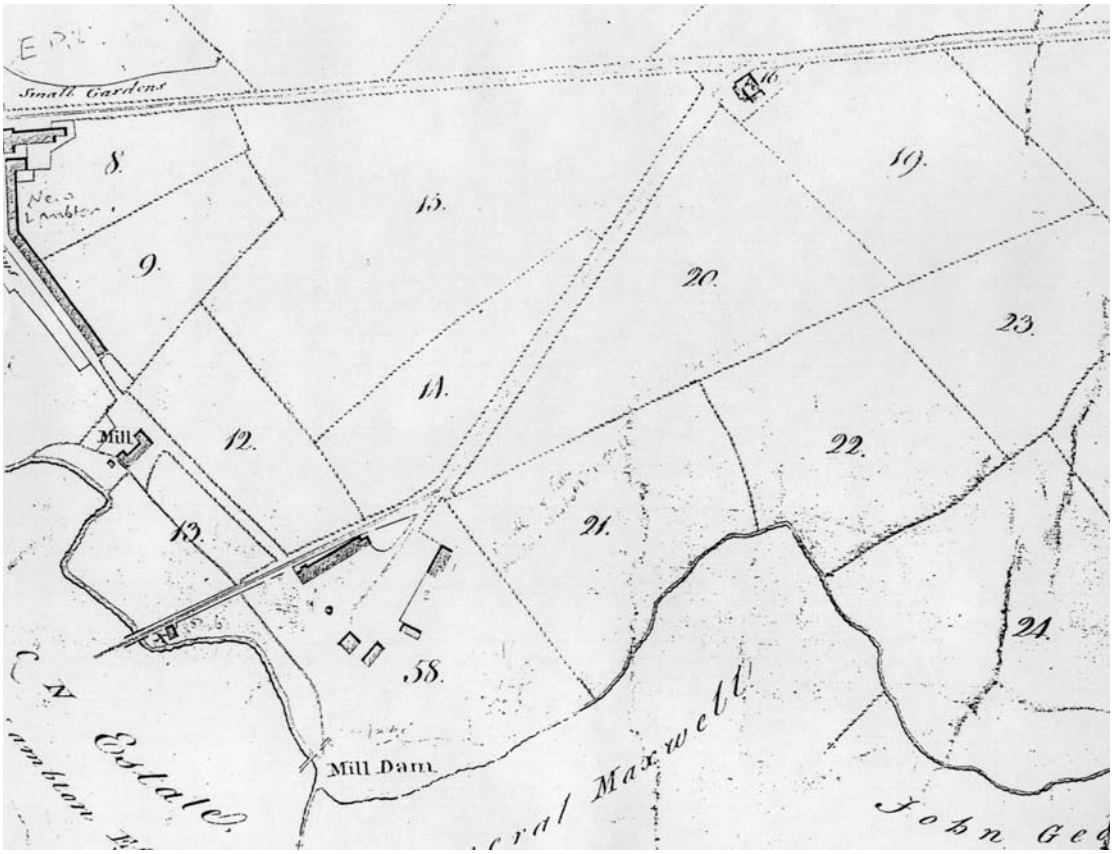

Fig 10 Survey of the Lambton Estate (1812) (D/Bo/G53/151)

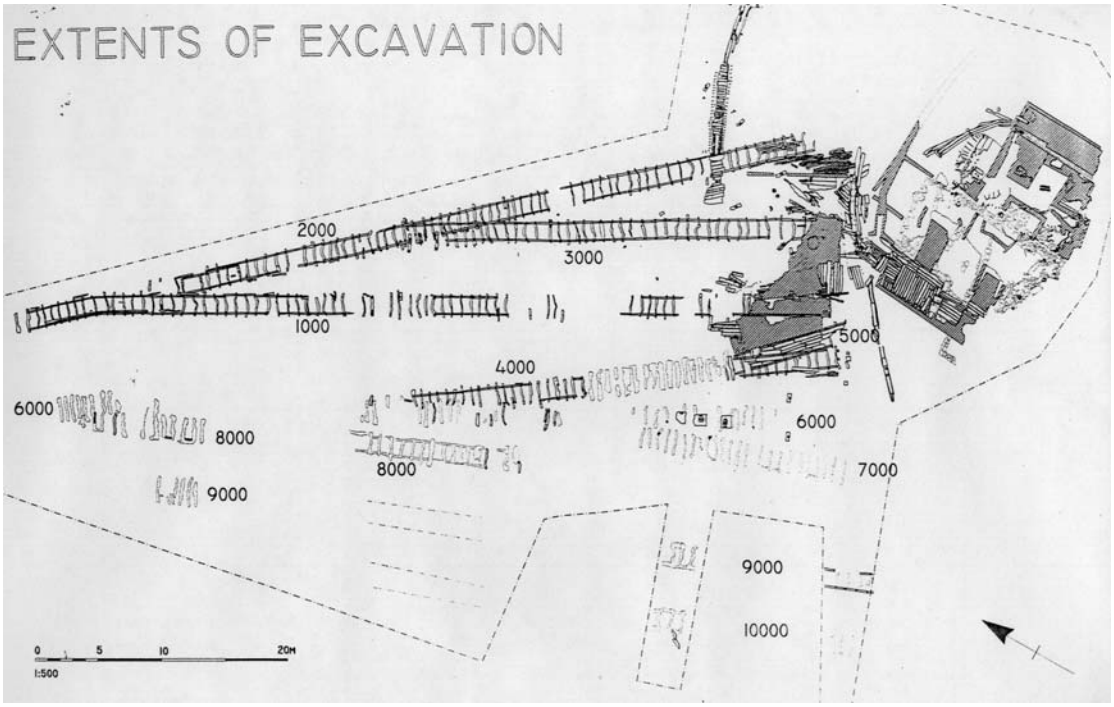

Fig 11 Excavation Plan of the Cokeworks Waggonway (CNAU1996)

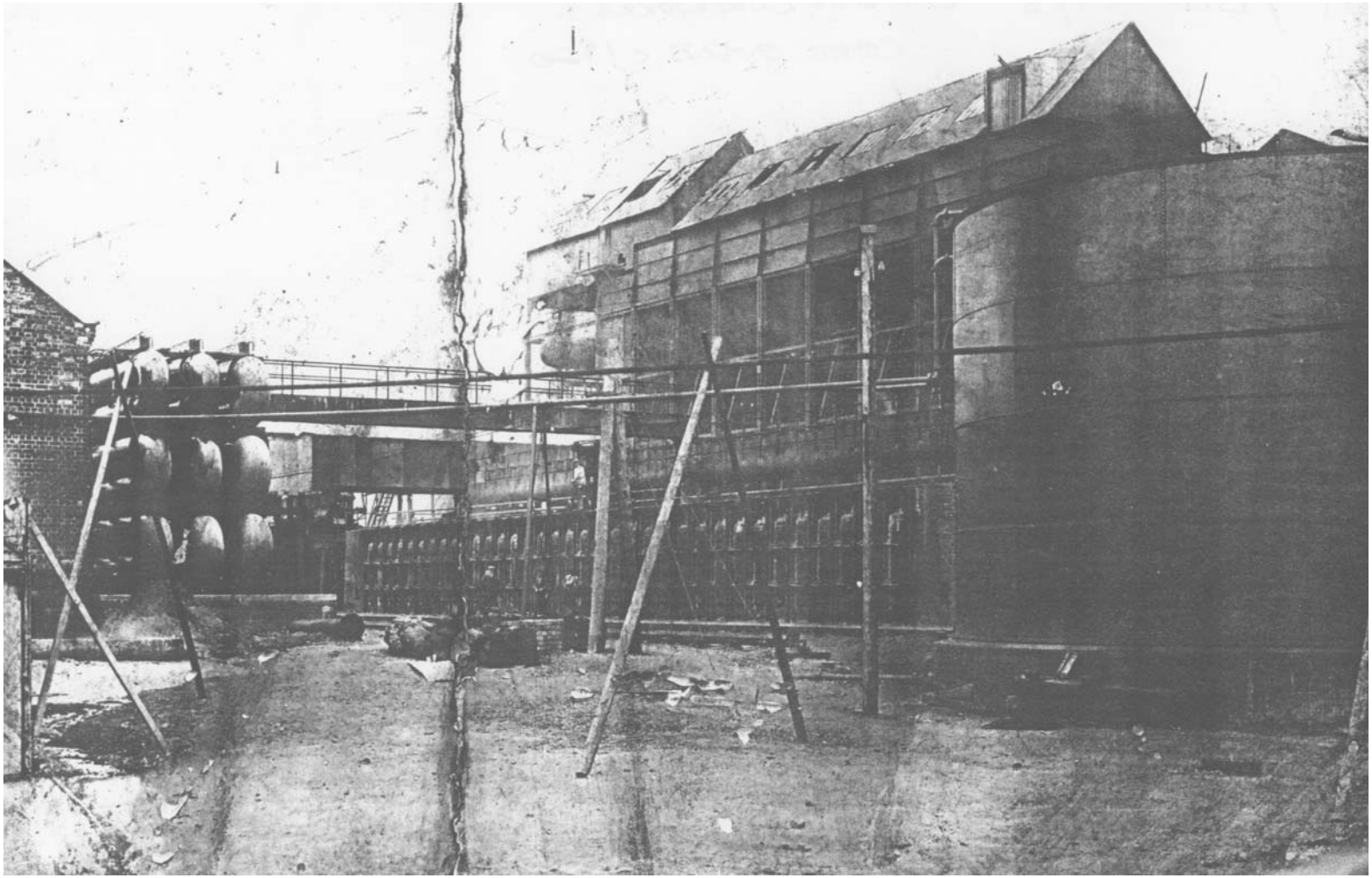

Fig 12 Photograph of the Lambton coke ovens, *c*1920 (DRO EP/Bu 14/3)