SALVIN'S FACTORY AND NEW ISLINGTON MILL, ANCOATS, MANCHESTER

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SUMMARY

Between January 2004 and March 2005, Oxford Archaeology North (OA North) undertook part of an on-going programme of archaeological investigation of several sites in the Ancoats area of Manchester (centred at SJ 8533 9852). The work is being conducted in advance of, and during, a major new development, which is being delivered by The New Islington Client Group.

Ancoats was formerly a key industrial district, and is now recognised to be of immense historical and archaeological significance on account of its pioneering role in the development of the steam-powered textile industry. In order to secure archaeological interests, a condition was attached to the planning application for the new development which, in the first instance, required a programme of archaeological evaluation. This revealed that two sites in particular, known as Salvin's Factory and New Islington Mill, had retained extensive buried remains. Following consultation with the Greater Manchester Assistant County Archaeologist, it was recommended that further archaeological excavation was required on these two sites in advance of development.

The excavation of New Islington Mill was completed by OA North between September and December 2004, and was coupled with an archaeological watching brief that monitored earth-moving works associated with the development of the site. The archaeological work was focused on the mill's former power systems, and yielded important evidence for a chronology of the systems employed. Similarly, the excavation of Salvin's Factory provided significant evidence for the early phases in the mill's power systems, which was yielded from the excavation of three targeted trenches, completed between March and June 2005.

There are few archive sources pertaining to the construction and operation of either Salvin's Factory or New Islington Mill, although those available have demonstrated their origins to be associated with the early period of factory-based textile manufacture in the area. Whilst it seems probable that both mills were originally water-powered, there is considerable evidence to demonstrate that steam-power was employed at an early date, including rare physical remains of a steam-pumping engine used in conjunction with a water-wheel, representing a key stage in the mechanisation of the textile industry.

This report provides an assessment of the dataset generated from the archaeological investigations of Salvin's Factory and New Islington Mill, and has been completed in advance of an assessment of the dataset from the entire programme of on-going works associated with the New Islington Development. It is recommended that the immensely significant results obtained from the investigations of these two pioneering textile mills are published in an appropriately academic manner, in advance of any future publication of the entire site.

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The archaeological excavations were carried out by Sean McPhillips, Chris Healey, Jason Clarke, Dave McNicol, Sophie Pullar, and Chris Ridings, and all survey requirements were fulfilled by Chris Wild. Ian Miller and Sean McPhillips compiled the report, Jo Dawson examined the finds, and Mark Tidmarsh and Christina Clarke prepared the drawings. Ian Miller edited the report, and was responsible for project management.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

1.1.1 Since January 2004, Oxford Archaeology North (OA North) has been engaged in an on-going programme of archaeological work at New Islington, Ancoats, Manchester (centred at SJ 8533 9852), on behalf of The New Islington Client Group. The work was required in advance of, and during, a major new development, which is being delivered by a partnership between Urban Splash Ltd, English Partnerships, New East Manchester and Manchester City Council. It concerns the redevelopment of land between the Rochdale and Ashton Canals, on the north-east side of the city centre, and aims to deliver New Islington: Manchester's Millennium Community.

1.1.2 Outline planning permission has been received for the Strategic Framework, which proposes the construction of 1400 new homes, a primary school, a health centre, and a new waterway. The development involves substantial earth-moving works, which may have a negative impact on the archaeological resource, including the buried remains of several historic cotton mills and ancillary works, a glass works, a network of former canal branches, and a putative section of a Roman road alignment from Manchester to Castleshaw.

1.1.3 In order to secure archaeological interests, Manchester City Council attached an archaeological condition to planning consent for redevelopment of the site, and a brief detailing the required programme of works was devised by the Assistant County Archaeologist for Greater Manchester. This allowed for the targeted archaeological evaluation of several sites, coupled with a watching brief during ground-remediation works, and a building survey of a former iron foundry in advance of demolition.

1.1.4 The programme of evaluation demonstrated the sites of two early textile mills, known as Salvin's Factory and New Islington Mill, to contain *in-situ* buried remains of considerable archaeological interest. In particular, extensive remains of the mills' power plant were encountered, which offered a potential to inform a wider understanding of the evolution of the steam-powered textile mill.

1.1.5 Following consultation with the Greater Manchester Assistant County Archaeologist, further archaeological investigation was required at these sites. In both cases, an updated project design was devised (*Appendices 1 and 2*), which allowed for the targeted excavation of the early power features. This was coupled with a watching brief that monitored ground-reduction works within archaeologically-sensitive areas.

1.2 SITE LOCATION, GEOLOGY, AND TOPOGRAPHY

1.2.1 The study area is situated within Ancoats (centred at SJ 8533 9852), on the north-east side of Manchester city centre (Fig 1). The entire site comprises some 146,450 square metres, and is bounded by the Rochdale Canal to the north-west, Woodward Place and Kirkby Street to the north-east, the Ashton Canal to the south-east, and the former Cardroom Road to the south-west (Fig 2).

1.2.2 Although Permo-Triassic red mudstones, siltstones and sandstones ('New Red Sandstone') constitute much of the geology of the Lancashire lowlands, the solid rock rarely emerges from beneath its thick covering of glacial and post-glacial deposits, which is dominated by clay soils (Countryside Commission 1998, 87). The overlying drift incorporates Pleistocene boulder clays of glacial origin, and sands, gravels, and clays of fluviatile/lacustrine origin (Hall *et al* 1995, 8).

1.2.3 Topographically, the Manchester Conurbation as a region is within an undulating lowland basin, which is bounded by the Pennine uplands to the east and to the north. The region comprises the Mersey river valley, which is dominated by its heavily meandering river within a broad flood plain (Countryside Commission 1998, 125). The topography of the study area, however, reflects the shallow valley of Shooter's Brook, a rivulet that flows westwards from Newton Heath, through Ancoats and into the river Medlock (Ashworth 1987, 22). Shooter's Brook was culverted during the early 19th century, and the topography of the valley has since been masked considerably by urban expansion. Today, the north-western boundary of the study area lies at a height of *c*50m above Ordnance Datum, from where it falls to *c*45m across the central part of the site, and then rises again to 50m or above along the south-eastern boundary.

1.2.4 The site of Salvin's Factory (centred on SJ 8526 9852) lies within the centre of the study area, across the course of Shooter's Brook. New Islington Mill (centred at SJ 8533 9866) is situated close to the eastern boundary of the study area, between New Islington, St Vincent Street, Woodward Place and Woodward Street (Fig 2).

2. METHODOLOGY

2.1 PROJECT DESIGN

2.1.1 Following on from the programme of archaeological evaluation associated with the New Islington development that has been completed to date, two sites were recommended for further investigation on account of significant buried remains being encountered: Salvin's Factory and New Islington Mill. Updated project designs for the excavation of each site were devised (*Appendices 1 and 2*), and following their formal acceptance by the Assistant County Archaeologist for Greater Manchester, OA North was commissioned to undertake the fieldwork. The excavation of New Islington Mill was undertaken during September and October 2004, and the phased work at Salvin's Factory commenced during March 2005. Following the completion of the excavations, earth-moving works on both sites were monitored by an archaeological watching brief.

2.2 AIMS AND OBJECTIVES

2.2.1 The main research aims of the investigations, given the commercial nature of the development, was to characterise the level of preservation and significance of the archaeological remains relating to early textile mills, and to provide mitigation records of all parts of the former mills that were to be destroyed during the proposed development.

2.2.2 The stated objectives of each archaeological excavation were:

- to expose and determine the presence, character, and level of survival of internal and external walls of the mill and establish any evidence for phasing;
- to expose and determine the presence, character, and level of survival of features pertaining to water-power;
- to elucidate the mechanisms of water-management features;
- to expose and determine the presence, character, and level of survival of steam-powered water-returning engines;
- to expose and determine the presence, character, and level of survival of power-source developments in both mills;
- to allow for the publication of the results of the excavations in a manner appropriate to their significance.

2.3 EXCAVATION

2.3.1 The excavation of New Islington Mill focused on a single area, and was undertaken in accordance with the project design (*Appendix 2*). Logistical

considerations dictated that the excavation of Salvin's Factory comprised three separate elements:

- *Area 1:* comprised the investigation of the south-western part of the mill, which incorporated elements of the original building and the early 19th century extension, as shown on Bancks and Co's map of 1831. The extension was thought to contain elements of the early steam-power plant. The excavation trench measured 20m by 10m, and extended 10m on either side of the proposed canal wall associated with the new waterway.

- *Area 2:* comprised the excavation of a linear trench, measuring 20m by 6m, that was placed at a right-angle to Area 1 and adjacent to a recently installed sewer. The trench was centred along the line of the proposed canal wall, and investigated the survival of the external walls of the mill's mid-19th century extension, and evidence of internal phasing.

- *Area 3:* comprised the excavation of a trench measuring some 12m by 12m that was placed across the north-eastern part of the original factory. The trench aimed to investigate the water-wheel pit and associated water-management features believed to have been situated across Shooter's Brook, and the early steam-power plant.

2.3.2 A watching brief was conducted during the mechanical excavation of a fourth area (Area 4) along the northern edge of Area 1, within the part of the site used currently as a car park by the main contractor. This excavation measured 20m by 12m, and was centred along the line of the proposed canal wall. The aim of the watching brief was to investigate and rapidly record external walls and physical evidence of the engine room, extension of the boiler house and chimney.

2.3.3 On the site of both mills the uppermost levels of overburden/demolition material were removed by a machine fitted with a toothless ditching bucket, to the top of the first significant archaeological level. Machine excavation was then used to define carefully the extent of any surviving foundations and other remains within each of the trenches. Thereafter, structural remains were cleaned manually to define their extent, nature, form and, where possible, date. All information identified in the course of the site works was recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology of English Heritage, with sufficient pictorial record (plans, sections and both black and white and colour photographs, the latter in 35mm and digital format) to identify and illustrate individual features.

2.3.4 All structures encountered during the course of the excavation were recorded three-dimensionally by EDM tacheometry using a total station linked to a pen computer data logger, the accuracy of detail generation being appropriate for a 1:250 output. The resultant digital plan was enhanced by manual survey on site using AutoCAD software within the pen computer, whilst selected components of the works were hand-drawn at a scale of 1:20. The positions of the trenches were located with respect to surrounding landscape features, and were also recorded using the total station.

2.4 WATCHING BRIEF

2.4.1 The watching brief was recorded by a full description and preliminary classification of the features and materials revealed, on OA North *pro-forma* sheets. A plan was produced showing the position of all structures and other features located during the course of the watching brief. A photographic record, using black and white, colour slide and digital formats, was also maintained.

2.5 FINDS

2.5.1 All finds recovered from the excavations were bagged and recorded by context number, processed and stored according to current standard practice based on guidelines set by the Institute of Field Archaeologists. The finds have been assessed by OA North in-house specialists, and are discussed in *Section 6*; a summary finds' catalogue is presented in *Appendix 4*.

2.6 ARCHIVE

2.6.1 A full professional archive has been compiled in accordance with current English Heritage guidelines (1991a), and the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (Walker 1990). The project archive represents the collation and indexing of all the data and material gathered during the course of the excavations, and has been combined with the data obtained from the wider programme of archaeological work associated with the New Islington development. 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. The paper, material and digital archive will be deposited in the Museum of Science and Industry in Manchester upon completion of the project.

3. HISTORICAL BACKGROUND

3.1 INTRODUCTION

3.1.1 The following section provides an account of Salvin's Factory and New Islington Mill based on available documentary and cartographic evidence. This is preceded by an overview of Manchester's immense contribution to Britain's textile industry during the 18th and 19th centuries, and the development of Ancoats, which emerged as the world's first true industrial suburb during this period. This is intended to place the excavated sites in a local and regional context, and to facilitate an assessment of their archaeological and historical significance.

3.2 SUMMARY HISTORY OF THE COTTON INDUSTRY

3.2.1 At the beginning of the 18th century, the English cotton industry was comparatively small. Most cotton materials were imported from India, but in 1701, and again in 1721, Acts of Parliament were passed which prohibited the wearing of Indian calicoes. These measures were aimed at assisting the English woollen industry, although it was actually cotton manufacturers that benefited. However, the benefits were slow to be realised due to the restricted supply of raw cotton, and the slowness of hand-spinning (Holland 1976, 39).

3.2.2 Improvements in the spinning process began with the introduction of James Hargreaves' spinning jenny in 1764, whereby a single worker could operate eight spindles simultaneously. Five years later, Richard Arkwright took out a patent for a water-driven spinning machine, called the water frame. The success of this machine enabled Arkwright to establish England's first cotton factory at Cromford, near Derby, in 1771 (Cossons 1975, 249). Arkwright's invention was improved upon by Samuel Crompton, who introduced the spinning mule in 1779. This machine combined the best features of the jenny, which made thin thread, with those of the water frame, which made strong thread. By using the mule, English spinners were able to make thin, strong thread from which fine cotton goods, such as muslin, could be manufactured.

3.2.3 During the second half of the 18th century, the technical revolution in the cotton-spinning industry transformed the economic and social structure of the region. At the beginning of this period, the manufacturing processes of spinning and weaving were still based upon the country cottage. By the end of the century, the industry had expanded to an incredible extent; between 1780 and 1800, imports of raw cotton into Lancashire increased from 5-6 million lb to 50 million lb *per annum* (Deane and Cole 1962, 52), and the number of spindles in operation increased from an estimated 1.7 million in the early 1780s to 4-5 million by 1812 (Baines 1835, 226).

3.2.4 During 1790, 1791 and most of 1792, the cotton trade was expanding in boom conditions (Edwards 1967, 11). However, the ever-increasing prospect of hostilities with France in 1792 caused a decline in the trade, and the declaration of war in 1793 accentuated difficulties and resulted in a contraction

in trade with Europe. However, the effects were offset quickly by the rapid growth of exports to America, and the cotton trade emerged from the crisis by the end of 1793 (*op cit*, 12). A rapid expansion of exports continued until autumn 1796, when problems occurred as the export markets were well-stocked and merchants became reluctant to give large orders until they knew the outcome of peace negotiations with France. Moreover, there was an increasing scarcity of money, and in February 1797 the Bank of England suspended cash payments (*ibid*).

3.2.5 The economic difficulties continued into the first half of 1798, but by June of that year the trade had made a remarkable recovery and cotton imports increased rapidly and exports soared, particularly to the North American and Caribbean markets (Edwards 1967, 12). Imports of cotton reached a new record peak in 1800 and, in October 1801, the signing of a peace treaty with France resulted in a period of very rapid expansion as the markets of Europe were opened to English cotton-spinners.

3.2.6 It was during this period that Manchester emerged as a leading cotton-spinning town; the number of cotton-spinning firms in the township of Manchester more than doubled from 51 in 1799 to 111 in 1802 (Bailey 1985). The high capital cost of mill construction in the town was spread over the maximum amount of productive capacity by building multi-storey mills of dimensions that surpassed those of any previous industrial buildings; the average size of Manchester's spinning mills increased six-fold between 1795 and 1820 (*ibid*).

3.2.7 Manchester retained its position as the leading national, and international, centre for cotton-spinning throughout the first half of the 19th century and, after the boom of 1848-53 detonated by the repeal of the Corn Laws, the number of cotton mills in Manchester reached a peak of 108 in 1853 (Williams and Farnie 1992, 21). Thereafter, the number of mills began to decline under the pressure of the continuing inflation of land values. This was exacerbated during the early 1860s by the American Civil War, which cut off the supply of raw cotton on which Lancashire's mills depended. This resulted in the Lancashire Cotton Famine of 1862-64, which resulted in mill closure, short-time working and mass unemployment; by November 1862, three-fifths of the labour force was idle (Holland 1976, 142).

3.2.8 Normal working resumed in April 1865, and Lancashire dominated the English cotton industry into the 20th century; during the early years of the century, it has been estimated that some 76 per cent of the cotton operatives of the United Kingdom were within Lancashire (Chapman 1905, 37). The cotton industry reached its peak in 1914, with India, the largest single customer, buying 3,000 million yards of cotton cloth (Holland 1976, 142).

3.2.9 The industry declined rapidly between the wars, largely through a fall in exports. Countries that had formerly provided lucrative markets, and particularly India, developed their own mills. A short boom period began in 1945 as a result of shortages caused by the war, but after 1952 British cotton textiles faced intense competition from manufacturers in the Far East, and declined rapidly (*ibid*).

3.3 THE DEVELOPMENT OF ANCOATS

3.3.1 By the beginning of the 13th century, Ancoats was known as *Elnecot*, derived from the Old English *ana cots* which means '*lonely cottage*' (Cooper 2002, 13). A 14th century document refers to Ancoats as one of eight hamlets within the township of Manchester, itself forming part of the Salford Hundred (Tait 1904). The area retained a semi-rural aspect until the late 18th century but, by 1800, Ancoats had been transformed into an effective industrial suburb.

3.3.2 This transformation began in the 1770s, when land owned by the Leigh family was sold to Thomas Bound, a builder, who then sold it on to others for development (Little 2002, 31). William Green's *Map of Manchester and Salford*, surveyed between 1787 and 1794, shows the focus for initial development to have been at the corner of Great Ancoats Street and Oldham Road, and depicts the main elements of the existing street plan laid out on former fields of the area. Building speculation then drove further expansion, with plots of land within a grid-iron pattern of streets being sold for development.

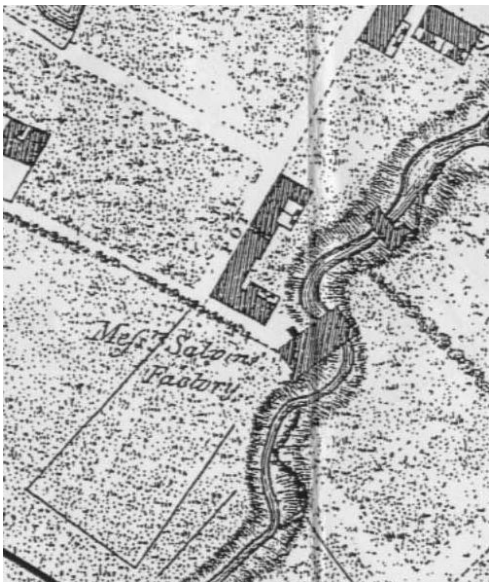
3.3.3 The earliest textile factories in the area included several water-powered mills erected along Shooter's Brook, to the south of Union (now Redhill) Street. There is some evidence to suggest, for instance, that New Islington Mill originated in the late 1780s as an Arkwright-patented water-frame mill (OA North 2004b). However, in seeking a solution to the inadequate power supplied to their water-wheels from Shooter's Brook, several firms experimented with steam-power. Notably, John Kennedy is reputed to have first applied steam-power to one of his spinning mules whilst renting space at Salvin's Factory in 1793 (Lee 1972, 9).

3.3.4 It was on the basis of a breakthrough in the application of steam power, and the national demand for textiles, particularly cotton, that created the explosion of factory building in Ancoats (Little 2002, 31). This was fuelled by the potential of cheap and reliable transport for goods and materials offered by the construction of the Rochdale and Ashton under Lyne canals, and led to the creation of a new breed of mill building in Ancoats. These were built on an unprecedented scale, many depending upon the developing network of short branch canals for transport and a source of water for the steam-power plants. The net result was the creation of an industrial suburb: an edge-of-town industrial estate with associated housing, community facilities (churches, pubs and charitable refuges) and related businesses (Williams 2002, 34).

3.3.5 From its origins as the first true industrial suburb to Manchester during the late 18th century, Ancoats expanded rapidly throughout the first half of the 19th century. Bancks and Co's detailed map of the area, published in 1831, shows an early stage in the development of land between Mill Street and the Ashton under Lyne Canal, on the eastern fringe of Ancoats. The land in this area was owned by Sir Oswald Mosley, who released plots for redevelopment in a piecemeal fashion. The subsequent detailed map of the area is that surveyed by the Ordnance Survey in 1848/9, which shows the extent of urban expansion in the area since 1831.

3.4 HISTORICAL BACKGROUND TO SALVIN'S FACTORY

3.4.1 Salvin's Factory is thought to have originated during the third quarter of the 18th century, and is shown on the earliest detailed maps of the area (Lewis 1788; Laurent 1793; Green 1794). William Green's *Map of Manchester and Salford*, published in 1794, clearly shows the factory to have been one of the first mills to have been erected in Ancoats, whilst its position relative to Shooter's Brook implies that it was originally water-powered. Green's map also annotates the name of the mill, which is believed to have derived from the original owner, who occupied a portion of the factory during the late 18th century (Lee 1972, 11).



Extract from William Green's map of 1794

3.4.2 The name 'Salvin' is not listed specifically in association with the factory in contemporary trades' directories; the earliest references occur in directories for 1788, which lists AG and H Salvin as fustian manufacturers based on Moseley Street (Lewis 1788, 26; Raffald 1788, 75). This was presumably the firm's main office, as it was a fashionable residential street during the 18th century, before becoming an important warehousing centre (Taylor *et al* 2002, 24). It is of note that the Salvins were a family of considerable status, who appear to have had a role in the development of the textile industry in the North East during this period; in 1791, it was reported that Messrs Salvin of Durham '*have an engine upon the Saverian plan (which has been finished about a month) which was to have been equal to the power of about 20 horses*' (quoted in Hills 1970, 141). By 1794, AG and H Salvin are referred to as 'merchants and cotton manufacturers' in Manchester (Scholes 1794, 115), but are not listed in directories published subsequently. However, the Salvins' connection with the factory can be traced through insurance documents until at least December 1798, when George Salvin insured the factory premises for £1200 (Royal ins pol 164597), with additional insurance for £800 to cover a steam engine and mill shafting.

3.4.3 It seems probable that Salvin's Factory was operated as a 'room and power' mill, where small firms could rent the space and machinery necessary to spin cotton (Williams and Farnie 1992, 51). In 1793, for instance, James McConnel and John Kennedy, in partnership with the Sandford brothers, are known to have rented space in the mill, where they worked as machine-makers and cotton-spinners (Lee 1972, 12); notably, John Kennedy is accredited with first applying steam power to a spinning mule for fine cotton-spinning whilst at Salvin's Factory (*op cit*, 9). It seems likely that Kennedy had perfected his experiments using an engine installed by the Manchester engineer Joshua Wrigley, which is documented to have been in operation by 1796 (Tann 1970, 75). This would have been a water-returning engine used to pump the water

that then drove the water-wheel, ensuring a steady supply of power to the mill. This technology had been utilised since the 1750s, when the Darbys of Coalbrookdale applied the system, based on Newcomen's pumping engine, to power the bellows in their blast furnace (Raistrick 1953, 132). It is unclear precisely when or where the system was adapted for use in a textile mill, although it appears that significant advances were made in Manchester. This system represented an important stage in the transition from water-powered mills to those powered by steam, not least for introducing the mill chimney to the urban landscape.

3.4.4 McConnel and Kennedy established their own business in 1795 and moved into rented premises on Canal Street (Lee 1972, 101), whilst their former partners, Benjamin and William Sandford, continued to occupy the factory. Pigot and Dean's directory for 1815, for instance, lists B & W Sandford as merchants and cotton-spinners based at Hodson's Square, with a factory on Pott Street (1815, 176). The firm appears to have achieved some success, and in *c*1809 their factory was valued at £2161 (Daniels 1915, 626). Similarly, in 1816, B & W Sandford was accredited with employing 178 people (PP (HC) III 1816), implying that it was a concern of above-average size; during 1815, the median size of labour force in cotton factories has been calculated at 54 employees (Lloyd-Jones and Le Roux 1980, 74). The Sandfords went into partnership with another cotton-spinner during the 1820s, and the firm of Sandford & Green is listed on Sandford Street in trades' directories by the middle of the decade (eg Pigot and Dean 1825, 142). Subsequent directories contain similar entries, but give the factory address as 59 Canal Street (Pigot and Son 1829, 252), suggesting some remodelling of the mill complex. By 1836, the partnership appears to have been dissolved, as Benjamin Sandford is listed individually as a cotton-spinner at 'Shooter's Brook Mill' (Pigot 1836, 291). However, he is not listed in Pigot and Slater's directory for 1841 nor subsequently, suggesting that the factory had closed by that date.

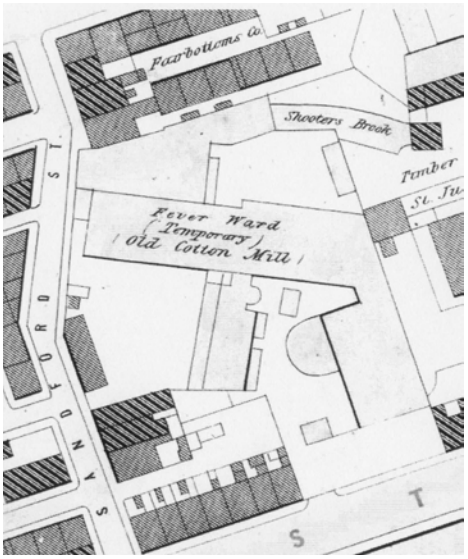
3.4.5 The first cartographic depiction of Salvin's Factory is upon Lewis' *Map of Manchester and Salford*, published in 1788, where it is shown to comprise a rectangular building with the north-eastern end straddling Shooter's Brook (Fig 3). The map also shows a square projection against the north-west elevation of the building, the function of which remains uncertain.

3.4.6 The detail shown on the *Plans of All the Spinning Factories Within the Township of Manchester*, which has been dated to *c*1822, identifies the original building as comprising six storeys with a loft. This plan also indicates that a second factory block of six and a half storeys had been added to the north-eastern side of the original building. This extension is shown to have incorporated an engine house at its northern end, with a detached boiler house adjacent. The chimney was located in the angle between the engine and boiler houses, and an external stair tower is depicted against the centre of the south-eastern elevation of the mill. A line of three ancillary buildings is also shown to have been added on the west of the mill complex, joining with the south-western corner of the original factory. The map also marks the position of two small structures against the north-west elevation of the original building, and

indicates these to have been taken down. One of these structures is named as a single-storey building. The second structure is labelled as a chimney, the position of which appears to coincide with a projection marked on Green's map of 1794.

3.4.7 Thornton's *Map of Manchester and its Environs*, published in 1824, confirms the configuration of the mill complex provided by the plan of *c*1822. Further additions to the mill appear on the *Map of Manchester and Salford*, produced by Bancks and Co in 1831, which annotates the complex as 'Sandford & Green Cotton Mill'. This map shows that a new range had been added at the south-east corner of the '*new factory*' named on the *c*1822 plan. It seems likely that this programme of expansion included the installation of an updated power system; in 1834 it was reported to a Parliamentary Commission that the mill was powered by a steam engine of 25hp, and that the factory was dedicated to fine spinning (PP (HC) XX 1834, Di, 243).

3.4.8 The Ordnance Survey 60": 1 mile map, surveyed in 1848, depicts the mill complex as unchanged, and again identifies the boiler house and chimney at the north end of the site. However, whilst a map published by Adshead in 1850 replicates the layout of the complex, it clearly labels the building as an 'old cotton mill', temporarily in use as a fever hospital. This provides further indication for the cessation of textile-manufacturing on the site by the mid-19th century. This map also shows a section of Shooter's Brook that does not appear to have been culverted crossing the northern part of the mill complex.



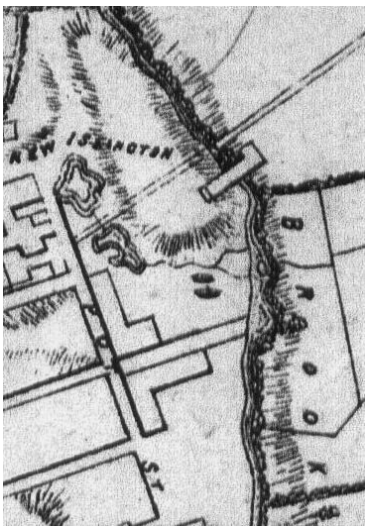
Extract from Adshead's map

3.4.9 The subsequent detailed map of the site was published by the Ordnance Survey in 1891 at a scale of 10': 1 mile. This shows the mill complex to have been modified considerably, with the erection of many new structures. Trades' directories for this period indicate the site to have been occupied jointly by the firms of Derbyshire & Housley, coach and carriage builders, and Bratby & Hinchliffe Ltd, soda-water machinery manufacturers (Slater 1895). These firms continued to occupy the premises into the 20th century, despite the factory being labelled as an engineering works on the Ordnance Survey map surveyed in 1915 and published in 1922. A photograph taken in 1962 (MCL/Lam10621) shows a three-storey factory, with a two-storey, four-bay office building at its west end. The buildings were demolished during the 1970s, and much of the site landscaped.

3.5 HISTORICAL BACKGROUND TO NEW ISLINGTON MILL

3.5.1 As with Salvin's Factory, New Islington Mill was also one of the pioneering steam-powered factories to have been established in Ancoats during the late 18th century, although it has been suggested that it originated as a water-powered concern that was in operation by the late 1780s (Nevell 2003, 43). This suggestion was based on a survey of Arkwright patented water-frame mills in Britain, undertaken by Patrick Colquhoun in 1788. An assessment of this survey (Chapman 1981) concluded that five of the mills were located in Manchester, and whilst New Islington Mill is not identified specifically, it has been proposed as a candidate on the basis of cartographic evidence. It is of note that no water-powered, or water- and steam-powered mills survive in Manchester (Williams and Farnie 1992, 53), and any evidence for these structures should be considered as highly significant.

3.5.2 The earliest map of the site is that produced by Lewis in 1788. This shows a narrow rectangular building with a short projection at its eastern end forming a L-shaped structure, with the main body of the building straddling Shooter's Brook. It is situated in the position of New Islington Mill, and whilst it is not labelled as to its function, its dimensions are consistent with those of a late 18th century textile mill, and particularly those of an Arkwright-type factory. These typically measured 60m by 9m, and represented the emergence of large, multi-storey purpose-built spinning mills, and the first diffusion of the factory system in the cotton industry (Chapman 1981).



Extract from Lewis' map

3.5.3 It would seem logical that the mill was sited with the specific intention of utilising Shooter's Brook for power. The configuration of the mill shown on Lewis' map implies that the putative water-wheel was located within the main building, parallel to the gable wall. It was common practice in such cases for the upper floors of the mill to be placed over the water-wheel chamber, such as at Aireworth Mills in Keighley (Giles and Goodall 1992, 128). However, the absence of any apparent water-management features, such as a weir, a headrace, dam or penstock taking water from the headrace to the wheel, is notable, although this may just reflect the detail of Lewis' survey.

3.5.4 Curiously, neither of the two subsequent detailed maps of the area, produced by Laurent in 1793 and William Green in 1794, depict a building in this position. Whilst the veracity of these maps may be questioned, the possibility that the structure shown on Lewis' map was abandoned, or even demolished, cannot be discounted. Some indication for considerable remodelling or rebuilding of the mill is suggested by documents within the Boulton and Watt Archive. This contains a portfolio of 12 engine drawings relating to an unspecified mill in Ancoats (3147/5/182). The portfolio was compiled in April 1799 at the request of J Lees, who is recorded in contemporary trades'

directories as a cotton manufacturer at New Islington (Scholes 1794, 81). Initially, Lees specified his requirement for a 16hp engine, although a subsequent enquiry in August 1799 specified a 20hp engine. The exact address of the mill is not given, and the absence of further correspondence implies that a Boulton and Watt engine was never purchased.

3.5.5 The next cartographic depiction of New Islington Mill is upon *A Plan of Manchester and Salford*, published by Bancks and Thornton in 1800 at a scale of 10": 1 mile. This map depicts a different configuration to that on Lewis' map, indicating the mill to comprise a rectangular range of buildings along the north side of New Islington, with a narrower range running parallel to the rear. The detail of Bancks and Thornton's map clearly indicates the mill to have been situated on the west bank of Shooter's Brook, and that the buildings do not straddle the watercourse, adding weight to the suggestion that the mill had been rebuilt between 1788 and 1800. The same configuration of buildings is presented on Ashton's *Plan of Manchester and Salford*, published in 1804, although Pigot's map of 1808 depicts the rear range to have been expanded to the east over Shooter's Brook.

3.5.6 The successive detailed maps of the study area include Johnson's *Map of Manchester* and Pigot's *New Plan of Manchester and Salford*, both of which were published in 1819. Johnson's map shows the eastern end of the front range to have been expanded to the north, forming an L-shape that joined with the rear range. A narrow rectangular projection on the eastern side of this extension is shown to straddle Shooter's Brook. The northern range is similarly shown to have expanded across Shooter's Brook. In broad terms, Pigot's map, produced at a scale of 8": 1 mile, replicates the detail of Johnson's map. A significant addition, however, is a reservoir situated immediately to the south of the mill.

Extract from Pigot's map of 1819

3.5.7 It seems that the mill was occupied during this period by the firm of Gallimore, Johnson and Brooks, who are identified as 'cotton-spinners' in contemporary trades' directories (Wardle and Bentham 1815). This firm is listed in directories of a slightly earlier date, although their business address is given as 'Garratt', which is located a short distance to the south-west (Dean and Dean 1811, 66). The Manchester Rate Book for the year 1815 lists Gallimore and Johnson as a cotton-spinning firm in Ancoats (M9/40/2). The rateable value of their premises was assessed as £85, which suggests their mill to have been of an above-average size.

3.5.8 A similar layout of the mill complex to that shown on the 1819 maps is replicated on the *Plans of All the Spinning Factories Within the Township of Manchester*, which has been dated to *c*1822. This annotated plan identifies the main block of the mill as comprising two factories, each of five storeys, with

an engine house at the east end, which was adjoined by a house and kitchen. This is also the first cartographic source to identify the occupants of the mill, who are named as '*Johnson and Brooks*', and to specify the factory to have been dedicated to cotton-spinning. Johnson and Brooks are listed as a partnership in a commercial trades' directory published in 1817, where they are described as '*spinners, manufacturers and printers*' (Pigot and Dean 1817). The inclusion of the terms '*manufacturers*' and '*printers*' are particularly interesting as these imply the firm to have been engaged in weaving in addition to cotton-spinning. Baines (1825, 309) confirms that Johnson and Brooks were both spinners and manufacturers of cotton goods at New Islington, and notes that they were concerned primarily with the production of dimity, a stout cotton fabric woven with raised stripes or fancy figures that was popular for quilts and other bedroom fabrics.

3.5.9 Thornton's *Map of Manchester and its Environs*, published in 1824, shows that extensions had been added to the western end of both the front and rear ranges of the mill. This map also shows the reservoir more clearly, and implies Shooter's Brook to have been culverted to the south of New Islington Mill. These additions appear more clearly on the *Map of Manchester and Salford*, produced by Bancks and Co in 1831. This map also indicates that the eastern corner of the front range of the mill had been extended, possibly in order to incorporate a new engine and boiler house. The main entrance to the mill at this time appears to have been from Pott Street, and situated at the opposite end of the complex from the new structural addition.

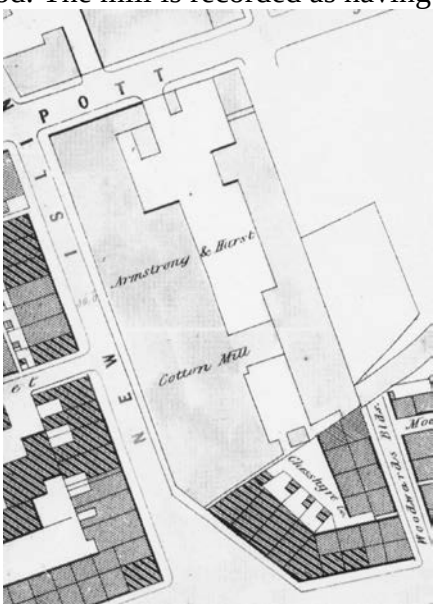
Extract from Thornton's map, 1824

3.5.10 In 1834, Thomas Brooks answered a questionnaire set by the Parliamentary Commission for child employment (PP(HC) 1834 (167) XX). Brooks stated that his firm had occupied the mill for some 18 years, and was engaged in cotton-spinning and power-loom weaving. Brooks mentioned that a temperature of 60^0 was maintained within much of the factory, suggesting that the firm was not engaged in the spinning of the finest counts of yarn. He also stated that power within the mill was provided by a 20hp steam engine, which was also used to drive an adjoining small mill, occupied by a tenant. This implies that the factory complex may have been a room-and-power mill, and whilst Johnson and Brooks are not listed in connection with the site in trades' directories after 1838, it appears to have had a series of occupants subsequently. In 1843, for instance, James Guest is accredited as a cotton-spinner based on the part of Pott Street that corresponds to the position of New Islington Mill (Slater 1843).

3.5.11 A small-scale map of Manchester produced to accompany Slater's trades' directory for 1843 shows the outline of New Islington Mill. Whilst the site is not shown in any great detail, the reservoir does appear to be marked.

However, this is the last cartographic source to depict the reservoir as it is shown to have been subsumed by an eastwards expansion of the main mill building on the Ordnance Survey first edition 60": 1 mile map of the area, surveyed in 1848-49. Other modifications to the mill complex at this time appear to have included the construction of walls that seemingly fronted a small courtyard in the north-west corner of the front range. This map also indicates considerable alteration to the rear range, the south-eastern part of which is shown to have been expanded to adjoin the putative engine house in the centre of the mill complex. It also shows an entrance to the site from Boon's Row, and a square structure to have been erected between the front and rear ranges at the south-eastern end of the mill complex, on the site of the reservoir. This structure is not labelled, but could indicate the position of a chimney, representing a remodelling of the steam-power plant.

3.5.12 In a directory for the year 1848, the firm of Dickinson & Co are listed as shirting manufacturers at New Islington, although the exact premises are not specified (Slater 1848, 84). The site is shown on Adshead's survey of the area, which was published in 1850. This map annotates the mill as having been occupied by the firm of Armstrong & Hirst. However, the firm of Scott and Holden is listed as '*spinners and manufacturers*' in a trades' directory published two years later (Slater 1852), although this firm was not associated with New Islington Mill for an extended period. The mill is recorded as having been occupied by William Sharp in 1858, who is described in a directory as a '*cotton-spinner, grocer and sugar refinr (New Islington Mill)*' (Kelly 1858, 1362). The Ordnance Survey Directory of 1861 similarly lists William Sharp as a cotton manufacturer, but in association with William Galloway. The latter is listed separately as a sugar refiner, based in Old Trafford. Slater (1872, 282) lists William L Galloway, of the firm of Sharp and Galloway, as a cotton-spinner and manufacturer and sugar refiner based at New Islington Mill, on Pott Street. The firm is also listed as having a subsidiary grocers' company, known as Sharp and Scott.



Extract from Adshead's map of 1850

3.5.13 By 1874, the site was occupied by the firm of J and G Walthew and Mayor, who are listed as cotton-doublers and manufacturers of sewing cotton at New Islington Mills (Slater 1874, 64). More details are provided by the entries in subsequent trades' directories; in 1890, the firm is listed as 'cotton-doublers of 2, 3, 4, 6 and 9 cord sewing and crochet cottons, gassed yarns etc', and their address is given as New Islington Mills, Pott Street, Ancoats (Slater 1890, 85). The firm left New Islington Mill and relocated to Stockport where, in 1893, they commissioned the firm of Stott and Sons, mill architects, to erect a doubling mill at Brinksway (Holden 1998, 235).

3.5.14 The Ordnance Survey 60": 1 mile map and Adshead's survey depict the mill complex in its most extensive form; the subsequent Ordnance Survey map, published in 1891, shows the site to have contracted slightly. Elements of the buildings forming the western end of both ranges appear to have been removed, and the eastern part of the rear range is depicted as comprising two equally-sized units. There also appear to have been some extensive changes to the putative engine house in the centre of the mill complex, which no longer adjoins the rear range. It is possible that this indicates the engine house had been demolished, and that the surviving element represents a stair tower.

Extract from the 1891 Ordnance Survey map

3.5.15 New Islington Mill is shown on the 1908 Ordnance Survey map to have been converted, at least in part, for use as an engineering works. This seemingly involved the replacement of the centre and western end of the two ranges by a single large structure. Trades' directories for that year indicate part of the mill was occupied by G Taylor & Son, iron merchants and engineers (Slater 1905, 398). The other portion of the site was occupied by William Knowles, a shirt manufacturer (*ibid*). By 1926, these businesses had been replaced by JB Wilson, a cotton-reeler, and Bradley Barber & Co, cabinet makers (Kelly 1926, 450), although only the former is marked upon the 1929 revision of Goad's insurance plan. Similarly, entries within trades' directories for 1932 indicate JB Wilson's cotton-reeling enterprise to have been the sole business operating from the site (Kelly 1932, 507).

3.5.16 A detailed plan of the site is provided by Goad's insurance maps. In particular, the revision of 1932 marks the north-western part of the site as '*vacant*', and the north-eastern part as being occupied by a stables and a cart shed. The south-western part of the site is shown to have been occupied by JB Wilson's cotton-reeling factory, which comprised two storeys plus a basement, with brick-arched ceilings supported by cast iron columns. It is impossible to ascertain whether this component of the building was part of the original structure, but the use of brick-arched ceilings nevertheless points to fireproof construction. Whilst this had become relatively common by the second half of the 19th century, it was considerably less common during the early period of factory building in Manchester (Williams and Farnie 1992, 54). Access to the factory, which is marked on Goad's map as '*New Islington Mill*', was evidently provided by an external stone staircase at the north-eastern corner of the building. The south-eastern part of the site incorporated a waste paper warehouse of three storeys. The first and second floors contained brick-arched ceilings, supported by cast iron columns. The area between these two buildings is marked as '*disused*', although a chimney 150' in height survived.

3.5.17 By 1939, JB Wilson had been superseded by Sutherland & Bowley Ltd, mattress manufacturers, whilst the other portion of the site appears to have reverted to engineering purposes with the establishment of the Electric Machinery Co (Kelly 1939, 512). The mattress manufacturing business appears to have failed at an early date, as trades' directories for 1942 indicate the site to have been occupied solely by the Electric Machinery Co. This firm appears to have dominated the site throughout the 1950s, although by 1961 Permanoid Ltd, electric cable manufacturers, occupied a portion (Kelly 1961, 549). This company appears to have encountered considerable success, and by 1965 it is the only business listed for the site (Kelly 1965, 535). This is confirmed by a photograph taken in 1967 (MCL/Lam56727), which shows the former cotton-reeling factory as a two-storey building with a basement occupied by '*Permanoid*' electric cable manufacturers.

4. RESULTS OF INVESTIGATIONS AT SALVIN'S FACTORY

4.1 INTRODUCTION

4.1.1 Following on from the initial programme of archaeological evaluation (OA North 2004a), three excavation trenches (Areas 1 to 3) were placed across the site, giving an overall investigated area equivalent to approximately 768m^2 (Fig 4). The results obtained from the excavation were enhanced by the findings of an archaeological watching brief, which monitored earth-moving works associated with the development (Area 4). The data generated from the watching brief, evaluation and excavation elements of work have been combined to form a single narrative, which is summarised below. Broad phasing has been ascribed to the deposits and structures encountered during the excavation, and the results are presented below in chronological order. This phasing is provisional, as is appropriate for an assessment of the dataset.

4.2 PHASE 1

4.2.1 The original mill is depicted on the earliest maps of the area, including those published by Lewis in 1788 and Green (1794), and is shown as a single rectangular block straddling Shooter's Brook, which passed through the north-eastern end of the building (Fig 3). It is thought that the factory operated as a water-powered 'room and power' mill during the late-18th century, as indicated by surviving insurance documents and entries within contemporary trades' directories (S*ection 3.4 above*).

4.2.2 The archaeological investigation yielded no evidence for the site having been occupied prior to the installation of the original factory building. Natural clay (***110***) was observed at a depth of 3.7m below the upper surviving structural remains of the mill.

4.2.3 The remains of two walls (***108*** and ***115***) were revealed, probably the north and west external walls of the original mill; the original east and south walls were not encountered (Fig 5). The vestiges of wall ***108*** were exposed within Area 1, running along a north-east/south-west alignment for a distance of 5m (Plate 1), the top of the surviving wall being partially exposed at a depth of 3.7m below the modern ground surface. The western edge of the wall was identified beneath a row of stone columns (***104***) that were associated with the later boiler house (Phase 3, *4.4.6 below*). Wall ***115*** was encountered over a distance of 8.5m, measuring 0.5m wide, and comprising a total of 13 courses of bricks laid in Stretcher bond (Plate 2) exposed to a depth of 1.23m along its east face. The components of both walls comprised hand-made, mould-thrown bricks bonded with speckled yellow lime mortar consistent with a late 18th-century construction. The position of walls ***108*** and ***115*** corresponded to the north and western external walls of the mill as shown on Green's map of 1794 (Fig 5).

4.2.4 Remains of a wall (***113***) cutting the natural clay, were located within the south-western part of the mill, bordered by wall ***115***. Wall ***113*** was placed along an

identical alignment to wall ***115***, at a distance of 1.12m. The wall was exposed for an overall distance of 1.70m and measured two-string bricks thick and three brick courses high. The wall was constructed from hand-made bricks bonded with yellow lime mortar. It possibly represented the original footprint of a small room, although no clear function for this room was determined.

4.2.5 Another feature that potentially belonged to the original phase of construction was a brick-lined culvert (***145***, Plate 3) that entered the mill at the north-eastern edge of the excavation. The external surface of the culvert was packed with clay (***144***), which had probably been deposited to form an impermeable interface against the culvert wall. The fabric of the culvert was composed of hand-made, mould-thrown bricks, and was aligned north-east/south-west. It incorporated a brick-arched roof (***151***), which had a width of 2.3m and was three brick courses thick. The culvert was approximately 1.8m deep, although the original floor was not exposed. The eastern wall (***146***) of the culvert was exposed at a depth of 4.9m below the modern ground surface. The southern edge of the wall returned sharply to the west for a distance of 1.5m, at which point the culvert widened to 3m, before re-aligning (***149***) to the south-west, and continuing beyond the edge of excavation. The roof of culvert ***145*** had undergone several phases of rebuilding, which perhaps reflected the development of internal rooms or an increased demand for water.

4.2.6 The clear modification to the original build of the culvert masked its intended character and function. Nevertheless, its position corresponded to the course of Shooter's Brook as depicted on Green's 1794 map, suggesting its proximity to the original water-wheel pit, although this could not be corroborated during the course of the investigation.

4.3 PHASE 2

4.3.1 This phase represents the modification of the mill's power system associated with the documented introduction of a steam-powered pumping engine during the 1790s (Tann 1970). This was presumably designed to assist the water-wheel, which would have remained the primary driving force. However, no physical remains of an engine or boiler associated with this pumping engine were encountered during the investigation. Cartographic evidence suggests that the footprint of the mill layout changed little, although it may be assumed that internal remodelling was required. Excavation revealed that elements of remodelling had been focussed upon culverts that flowed through the mill.

4.3.2 It would seem that at some stage the original arched roof (***151***) to culvert ***145*** was rebuilt and reduced in height (Fig 6). This was represented by placing 0.35m thick deposit of clay (***162***) within a gap below the old roof arch and the rebuilt roof (***152***). The rebuilt roof arch measured 0.30m thick and was formed by a single course of bricks laid side on, with a roof span exceeding 2.5m. Part of roof ***152*** remained intact across the widened section of the culvert along its western edge where it was bonded to a wide retaining wall (***155***). The depth of the culvert at this stage measured at 0.90m. Remnants of brickwork at the eastern base of the arch possibly represented an abandoned attempt at yet another roof arch (***153***). The brickwork survived to a height of 0.32m, and

comprised four courses bonded with lime mortar. The bricks were sealed by a large sandstone block that was installed within the east retaining wall (***149***) for roof arch ***151***.

4.3.3 The western retaining wall (***155***) was exposed over a distance of 2.5m, and had a maximum width of 0.56m. The southern edge of the wall was bonded to an enclosed channel (***163***) that was aligned east/west and measured 1m wide. The eastern edge of the channel floor curved into a small arc, seemingly forming part of the water-management system, perhaps an overflow or by-wash, drawing water from Shooter's Brook (Plate 4).

4.4 PHASE 3

4.4.1 This phase represents the documented extension of the mill to the north-east during the early 19th century (*3.4.6 above*). The period also incorporated the installation of an updated power system, which centred on a 25hp steam engine. The excavation exposed structural remains that seemingly represented this installation and other associated structures. These included an engine room, boiler house, chimney and flue. Other remains from this period comprised a pavement associated with Sandford Street. The mill's development is shown on the Bancks and Co map of 1831, which depicts a new range of structures within the south-eastern corner of the mill complex, with an open space bordering the north-eastern edge (Fig 7).

4.4.2 ***Engine Room:*** the remains of a structure were located along the north-western edge of Area 4, in a position that corresponded to the engine room shown on historic maps. Structural remains included the remnant of a north/south-aligned wall (***160***), that served as a partition between the engine room and the boiler house (*4.4.8 below*). Large amounts of fuel waste and a displaced stone ashlar block (***167***), that probably represented a machine base, were contained within the room, adding weight to its interpretation as an engine room.

4.4.3 Wall ***160*** was observed in the central part of Area 4 and survived for a distance of 1.5m. The wall was two-string bricks thick, and survived to a maximum height of 0.8m at an overall depth of 2.2m below a flagged floor (***102***; Phase 4, *4.5.7 below*). The western face of the wall (Plate 5) had been affected severely by exposure to heat, with many of the hand-made bricks blackened with soot and easily broken. The wall was butted by a thick layer of clay (***166***) that had seemingly been used to create a level foundation across the engine room floor.

4.4.4 Stone block ***167*** measured 1.3m by 1m by 1m, and lay on top of layer ***166***. Two metal rods were observed protruding from the upper surface of the stone block, indicating that it had been intended as a foundation for an item of machinery, presumably a steam engine. The block was sealed by a 0.5m thick deposit of fuel ash that was spread throughout the room.

4.4.5 ***Boiler House:*** detail shown on the *c*1822 *Plans of All the Spinning Factories Within the Township of Manchester* (Anon) indicates that a detached boiler house with floor plan measurements of some 20m by 15m was constructed adjacent to the engine house within the extended northern range. No external

walls of the boiler house were encountered during the excavation, although 10 stone columns (***104***) in two rows, that may be identified as structural elements within the basement of the boiler house, were exposed (Fig 7). The columns measured 1.5m square, and survived to a height of 3m above the natural clay (Plate 6). They were positioned between 2m and 3.4m apart, each comprising at least 30 courses of stone blocks and thin coping stones with no visible bonding material. The individual blocks each measured an average of 0.3m^2 and 0.10m thick. The columns were possibly used for a dual purpose such as supporting a floor and for accommodating haystack- or wagon-type boilers, although no structural evidence of the boilers survived.

4.4.6 A flagged surface (***102***, Fig 8), placed around the top of the columns, possibly indicated the original internal ground floor level. The floor comprised rectangular stone flags spread across the north-western edge of the boiler house that measured overall 12m by 8m. The flags were bordered in the north and east by walls that related to a later building (Phase 4, *4.5.9 below*). This suggests the flags were probably re-laid after the abandonment of the mill.

4.4.7 An east/west aligned culvert (***157***) was observed within Area 4 during the watching brief phase of work. It was placed across the north-western edge of stone columns ***104*** (Fig 7). The culvert was exposed over a distance of 6.5m, and was recorded at a depth of 3.5m below the modern ground surface, cut into natural clay. The eastern edge of the culvert seemed to continue beyond the edge of the excavation in the direction of Shooter's Brook, implying that a water passage was connected to the brook across the northern edge of the site, with the intention of carrying water to the engine and boiler rooms.

4.4.8 ***Boiler Room Extension (107):*** the stratigraphy suggested that a small extension was added to the south-western edge of the original boiler house, probably between *c*1822 and 1831. The room was positioned along the western edge of the site, bordered by the external mill wall (***115***). The northern wall (***112***) of the new building was built over one of the stone columns, thus incorporating the column into its fabric. The central part of the room had been disturbed by a modern plastic sewer pipe that partially obscured the room's internal features.

4.4.9 The boiler room extension had a rhomboidal shape (Plate 7), and was formed by three contiguous walls (***101***, ***112***, and ***116***), in addition to external wall ***115*** of the original build (*4.2.3 above*). The room measured 8.2m by 4.4m with an overall maximum depth of 1.2m from the upper surviving course of wall ***115*** to the internal brick floor (***111***). The floor comprised hand-made bricks that were laid throughout the room, except where they had been disturbed by the insertion of a large modern man-hole (***117***). The floor had been laid on a thin layer of fuel ash (***124***) that formed an interface with the underlying yellowish-red clay (***114***). Layer ***114*** is likely to have been of natural origin, although it had been discoloured by heat generated within the boiler room.

4.4.10 The eastern wall of the room (***101***) was particularly narrow (0.3m wide) and survived to a height of 1.2m. It was composed of loosely bonded hand-made bricks laid in an English bond (Brunskill 1997). The inner face of the wall was

heavily scorched through exposure to heat, which had rendered the fabric extremely fragile and easily broken. This suggested that the room had served as an additional boiler room, whilst internal dimensions were consistent with those required for a single haystack- or wagon-type boiler. In the central part of the wall was a 0.50m wide doorway (***109***) that provided access into the room from the basement of the boiler house. The doorway retained vestiges of vertical and horizontal charred timbers within the door frame, hinting that the room had sustained fire damage at some point.

4.4.11 Set into the floor in the central part of the room was a rectangular pit (***118***, Plate 8) that was probably used to receive fuel waste raked out from the boiler. The pit measured 3.2m by 1.5m, and was lined by three refractory brick walls (***119***, ***120*** and ***121***). The pit was partially sealed by a course of sandstone capping (***126***), its depth measuring 1.2m from beneath the capping to a refractory brick-lined floor (***122***).

4.4.12 It would seem that at some stage the north and south walls (***112*** and ***116***) of the room were also modified. Wall ***112*** seemed to have been built up around the top of one of the stone columns (***104***), and was possibly associated with the original boiler house prior to its expansion. Wall ***116*** was clearly later than the eastern wall of the room (***101***), as demonstrated by remnants of the floor (***111***) continuing beneath the wall.

4.4.13 Another feature possibly associated with the original boiler house was a single sandstone and brick column (***127***), situated within the southern part of the boiler house extension. The column measured 1.15m by 0.35m, and survived to a height of 0.75m. It was constructed of sandstone blocks that measured an average of $0.3m^2$ and 0.1m high, with random brick fragment inserts. The exact function of the column is unclear, although it is likely to have been associated with the row of stone columns (***104***) situated to its immediate east.

4.4.14 ***Chimney flue:*** remains of a small chimney (***136***) and associated flue (***130***) were encountered in Area 2 at a depth of 3.5m below the ground surface (Plate 9). Flue ***130*** was aligned north-east/south-west and extended over a distance of 9.1m across the external area to the south of the mill (Fig 7). The flue had a maximum width of 0.94m and an internal height of 0.85m. The structure comprised a single string brick-arched roof (***132***) that was supported on retaining walls in the north (***134***) and south (***133***). The floor (***135***) of the flue comprised a cambered brick surface, which sloped gradually to the south in the direction of the chimney. All structural components comprised hand-made bricks bonded with a hard white mortar.

4.4.15 The western end of the flue returned sharply to the north-west for a distance of 1.4m. This section was retained in the north (***139***) and south (***137***) by external walls of contemporary build to walls ***133*** and ***134***. The walls formed the edge of an open pit that incorporated an arched aperture (***138***), entering a small, square-shaped chimney (***136***). The aperture appeared to represent an access point to the chimney for maintenance purposes. The chimney had internal dimensions of 0.54m by 0.46m, and survived to a maximum height of 1m. It was lined with refractory brick, although the interior was filled entirely with

soot. A second entry point into the chimney (***141***) was identified within the eastern face of (***137***). This entrance measured 0.90m by 0.36m, and had been blocked with hand-made bricks.

4.4.16 During the evaluation a complex arrangement of flues (***21***, Plate 10), that bore resemblance to flue ***130***, were observed within the central area of Trench 2 (OA North 2004a). Two narrow flue channels, each 0.25m wide, were exposed within the central part of the trench. The channels were linked by a smaller channel composed of refractory bricks that formed a single channel 0.7m wide. All of the component bricks were heavily sooted, confirming the use of this structure as a flue. The structure was situated within the mill's north-eastern range, and in the vicinity of a boiler house as depicted on the Ordnance Survey Map of 1851 (Fig 4).

4.4.17 A narrow wall (***128***), encountered in Area 2, possibly represented the original internal wall that bordered flue ***130***. The wall lay parallel to the flue and was constructed from hand-made bricks bonded with lime mortar. It survived to a depth of two courses (0.22m high) with overall dimensions of 3.6m by 0.23m wide.

4.4.18 A linear feature (***142***) extended between the northern edge of the flue and wall ***128*** (Fig 7). The feature had an overall length of 9m and a width of 0.3m, and possibly represented a drainage channel.

4.4.19 ***Sandford Street:*** wall ***115*** was bordered in the south-west by remnants of a pavement (***125***) associated with Sandford Street. The pavement formed the western edge of excavation, and comprised a single course of Yorkstone flags that overlaid a thin coarse gravel bedding layer. In total, eight flags were exposed, each of which measured 0.9m by 0.6m.

4.5 PHASE 4

4.5.1 The Ordnance Survey maps published in 1891 shows a building on the site of Salvin's Factory (Fig 8), which may be identified from entries within contemporary trades' directories as an engineering and carriage-maker's works (Slater 1895). The excavated remains from this period include deposits of clay used for levelling, a cobbled yard, concrete floor foundations and external walls.

4.5.2 Culvert ***145*** (Phase 1, *4.2.5 above*) was sealed along its eastern edge by 1.6m thick layer of sandy-silt (***148***). The layer probably served as general levelling deposit.

4.5.3 Wall ***105*** lay along the eastern edge of Area 1, and is likely to have represented an external wall possibly associated with the engineering works. The wall measured 9m long by 0.5m wide, and incorporated a total of 18 brick courses bonded with mid-grey sandy mortar, with a stepped foundation that cut into the natural clay.

4.5.4 Cobbled surface ***106*** was observed over a distance of 4.5m by 0.9m, butting the eastern edge of wall ***105*** and extending to wall ***129***. The surface comprised rectangular-shaped granite setts with rounded corners that each measured between 0.3m by 0.2m and 0.15m by 0.1m. The surface was typical of late 19th century construction and may be associated with an inner courtyard relating to the engineering works.

4.5.5 Wall ***129*** was aligned north-east/south-west, parallel to wall ***105***, and was observed over a distance of 11m, having a width of 0.5m. The wall was exposed to a depth of 17 courses, and comprised machine-made bricks bonded by brown sandy mortar with residues of cement. The presence of cement clearly represented a re-pointing episode. The lower section of the wall truncated wall ***128*** (Phase 3, *4.4.17 above*). The wall's thickness indicated it to have been load-bearing, representing an exterior wall for the south range of the engineering works.

4.5.6 Wall ***100*** formed the north-eastern external wall of the engineering works' north range. The wall comprised machine-made bricks which were exposed to a depth of 3m, bonded with ash-rich mortar, indicative of a late 19th century date. It was bordered in the north-east by a basement (***168***) that truncated the roof of culvert ***145***. The basement had a sandstone-flagged floor (***169***), encountered at a depth of 1.5m below the upper surviving course of wall ***100***. The south-east wall (***170***) of the basement ran for a length of 2m and was seen to extend beyond the northern edge of the excavation. The north-eastern wall of the basement (***154***) partially overlaid the west retaining wall (***155***) of culvert ***145***, giving an overall dimension of the basement of 8m by 5m.

4.5.7 Wall ***156*** extended for a distance of 15m by 0.5m along the north-western edge of the former mill, following an north-east/south-west alignment. The south-east face of the wall was exposed to an overall depth of 3.5m, cutting natural clay.

4.5.8 Wall ***158*** was in an identical location and followed the same alignment to that of partition wall ***160*** (Phase 3, *4.4.3 above*). The wall survived to a maximum height of 0.44m and extended north-west/south-east for a distance of 5.1m by 0.25m before curving in a wide arc to the north-west for a further 2m, butting the south side of wall ***156***. The wall was constructed from re-used hand-made bricks bonded with grey ash-rich mortar.

4.5.9 A thick layer of fuel ash (***103***) extended to a depth of at least 2m across Areas 1 and 4. It was probably used in the north part of the mill to level flagged surface ***102***. The flags were bordered by walls ***100***, ***156***, and ***158***, and probably formed a courtyard within the north-east corner of the engineering works.

4.5.10 Wall ***143***, observed in Area 3, lay on a north-west/south-east alignment over a distance of 3.4m, and survived to a height of 0.38m. The fabric of the wall comprised hand-made bricks that had probably been re-used, since they were painted along the north face. The wall probably represented an internal wall relating to the engineering works.

4.5.11 Another wall (***161***) of comparable date was seen in the vicinity. This was aligned north-east/south-west, with a width of 0.46m, and was exposed for a distance of 2.5m. The wall comprised machine–made bricks bonded with dark grey ashy mortar. It survived to a height of 1m and was sealed by a concrete floor (***147***).

4.5.12 Concrete floor ***147*** extended across the width of Area 3 (12m by 8m). The concrete had a thickness of 0.15m, and sealed a sequence of levelling layers (***148***); it was probably installed to form a foundation level for the engineering works during the late 19th century.

4.5.13 The entire site was sealed by large amounts of demolition debris (***164***) measuring up to 2m thick. The debris had clearly been produced by the destruction of the engineering works and an adjacent school during the late 1970s.

5. RESULTS OF INVESTIGATIONS AT NEW ISLINGTON MILL

5.1 INTRODUCTION

5.1.1 Following on from a programme of archaeological evaluation (OA North 2004b), an area equivalent to approximately 400 square metres was exposed and recorded during the course of the archaeological investigation (Fig 9). In particular, the excavation allowed a detailed examination of two engine rooms, and provided physical evidence for a steam-powered pumping engine that had been used in conjunction with a water-wheel (Plate 11). This had been augmented by a complex arrangement of water-management features associated with power provision within the mill, and evidence for a flue and chimney.

5.1.2 The results obtained from the excavation were enhanced by the findings of an archaeological watching brief, which monitored earth-moving works associated with the development. The integrated results obtained from these elements of the archaeological investigation have been combined to form a single narrative. Broad phasing has been ascribed to the deposits and structures encountered during the investigation, and the results are presented below in chronological order. This phasing is provisional as is appropriate for an assessment of the dataset generated from the archaeological investigation.

5.2 PHASE 1

5.2.1 The earliest evidence on the site represents the initial period of textile manufacture at New Islington Mill during the 1780s, encompassing its origins as a putative water-powered spinning-factory. Detail of a building straddling Shooter's Brook is illustrated on a map produced by Lewis in 1788 (Fig 3), which indicates that water from the brook passed through the approximate centre of the mill.

5.2.2 Few archaeological remains from this period survived, although a culvert (***118***, Fig 11) passing beneath the floor of engine/power room ***100*** (*5.2.3 below*) may be a relict of water-powered operation from this time. It is possible that this part of the mill housed the water-wheel, although this area was remodelled subsequently to facilitate the installation of a steam engine.

5.2.3 ***'Power Room' (100):*** four walls were exposed (***101***, ***102***, ***211*** and ***125***/***212***) below varied depths of modern demolition debris. The room was rectangular in plan, aligned north-east/south-west, with exposed dimensions of 5.1m by 4.7m (Fig 10). The north (***102***) and west (***101***) walls survived to a maximum height of 1.70m. The south wall (***211***) was encountered during the watching brief, and was observed to survive to a depth of 2m. Survival of the eastern wall (***125***) was fragmentary, although a short section incorporated a maximum height of 13 courses. Each wall measured between 0.45m and 0.6m in width, and largely comprised hand-made, mould-thrown bricks set in a lime-based mortar. Several episodes of remodelling were evident within the fabric of the

surviving walls. In particular, a large worked stone block, built into the east-facing elevation of the room, retained clear evidence of a wheel scar (Plate 12). The projected circumference of this scar would not fit within the layout of room ***100*** as excavated, suggesting that the room had been remodelled, or the block had been re-used. However, the earliest phase was not fully exposed as a decision was made to preserve the foundations *in-situ*, and they were not therefore excavated.

5.2.4 ***Culvert 118:*** the culvert was partially exposed during the excavation, and was revealed to cross beneath the centre of room ***100*** on a north-west/south-east alignment. The component walls (***119***) were set 0.50m apart, and comprised hand-made bricks bonded with grey speckled lime mortar. During the watching brief the culvert was observed to 'dog-leg' to the east for a distance of 3m beyond the south-western edge of room ***100***, then returned sharply to the south in the direction of Shooter's Brook. Although no wheel pit was firmly identified in the room, the position of the culvert hints at it representing the remnant of a millrace.

5.3 PHASE 2

5.3.1 The mill appears to have been rebuilt at some stage between 1788 and 1800, as indicated by the sequence of historic maps (*3.5 above*). A map published by Bancks and Thornton in 1800 shows the mill complex to have comprised a range of buildings along the north side of New Islington, with a narrower range running parallel to the rear. This suggests that the original mill building was either remodelled or demolished, and that there was a significant change to the mill's power source, namely the introduction of a steam engine.

5.3.2 The early steam engine was almost certainly housed within 'engine/power room' ***100***. The physical evidence for the engine was provided by several features (Fig 11), including machine scars (***115***), a small condenser pit (***108***), a large iron plate (***117***), and foundation beds (***109*** and ***126***).

5.3.3 The culvert (***118***) beneath the floor of the engine room was sealed with an iron plate (***117***), seemingly prior to the installation of a steam engine (Plate 13). The plate measured 2m by 1.25m, with a maximum thickness of 0.03m, and resembled a large tray, with two raised lips up to 0.27m high along its northern and eastern edges. A circular hole measuring 0.10m in diameter had been punched into its surface in the north-eastern corner.

5.3.4 The engine room floor (***116***) was made up of randomly-patterned bricks, thin stone flags and stone ashlars. The ashlar component was located along the eastern edge of the surface in the vicinity of culvert ***118***. The floor appeared to have been split level, with a sunken pit (***114***) in the north-eastern corner, bordered by the iron plate. The pit was rectangular in plan and aligned north/south, with dimensions of 1.20m by 0.90m, and a depth of 0.60m below the floor (Plate 14). It appeared to be connected to a channel, blocked with fuel ash, which surrounded a small metal pipe that ran through west wall ***101***.

5.3.5 Overlying floor ***116*** was a heavily-corroded cast iron collared pipe (***127***) that entered the southern part of the room (Fig 11) through a brick foundation (***121***). The pipe was recumbent along a north/south alignment for 0.35m, and returned vertical next to pit ***114***. The pipe had a maximum diameter of 0.29m and an internal diameter of 0.16m, secured to the north by a 0.33m-wide high-pressure flange joint.

5.3.6 A circular pit (***108***), formed within two large sandstone blocks, was exposed within the south-eastern corner of room ***100*** (Plate 15), measuring 0.60m in diameter, with a maximum depth of 0.74m. The stone block on the western side of the pit was cut into a hollowed shape along its eastern edge. The stone block along the eastern edge of the pit was similarly cut into a semi-circular shape, but from a slightly higher level. The eastern block displayed surface detail in the form of precise multi-faceted indentations in the shape of a cylinder, seemingly to allow for the insertion of a piston connection.

5.3.7 A stepped brick platform (***126***) was exposed in the south-western corner of room ***100***. The platform comprised a single course of bricks overlying floor ***116***, with surviving measurements of 0.54m^2, and a centrally-aligned square-shaped void that measured 0.20m^2 and 0.40m in depth. The void probably accommodated elements of a wooden frame for the engine. A large brick and stone block (***109***), laid east/west across the width of the room, sealed the platform.

5.3.8 Stone block ***109***, which had dimensions of 1.6m by 1m by 0.6m, probably functioned as a machine base. The block overlaid a seven-brick course foundation perforated by a square hole that housed a square-sectioned iron-restraining rod. The rod was observed lying recumbent across the west edge of pit ***108***.

5.3.9 Worn recesses (***115***), located within the inner face of wall ***101***, probably indicated friction caused by engine apparatus. Other features in the wall comprised small, evenly-spaced square sockets within the upper course, which possibly represented slots for a timber gantry level.

5.4 PHASE 3

5.4.1 Between 1804 and 1808 the mill was expanded to the east, seemingly across Shooter's Brook, as depicted on Pigot's map of 1808. A reservoir had been built immediately to the south of the mill by 1819 (*3.5.6 above*). Further developments to the mill were depicted on Bancks and Co's map of 1831, where a series of structures had been added to the eastern corner of the south range (*3.5.9 above*). These additions possibly incorporated a new engine room (***141***) and boiler room (***128***).

5.4.2 The excavation revealed structures pertaining to this period of expansion, which included innovations to the mill's power system centred within the new engine room (***141***). This appeared to have housed a water-wheel supplemented by a small steam-pumping engine, such as those known to have been developed by the Manchester-based engineer Joshua Wrigley (Tann 1970).

The engine was used to pump water, which then aided the driving of the water-wheel, providing a constant source of power into the mill. It is probable that this engine was intended as a supplementary source of power, and had been used in conjunction with the steam engine within room ***100***.

5.4.3 Other structures originating from this period included several culverts installed across the eastern edge of the mill. These appear to have represented elements of a water-management system that was designed to provide the new steam-power plant with the required water.

5.4.4 ***Engine Room 141:*** the room was located along the eastern edge of the excavation, with three contiguous walls (***102***, ***159*** and ***176***) exposed below varied depths of modern demolition debris (Plate 16). The walls comprised mould-thrown bricks set in lime-based mortar. The south wall (***159***) survived to a maximum height of 2.03m and comprised 24 courses laid in an English Garden bond (Brunskill 1997). The east wall (***176***) was observed for a distance of 7.5m. The room was rectangular in plan, with dimensions of 6.90m by 5.5m. Several internal features suggested that it had been used originally to house a small water-wheel that had been assisted by a steam-powered pumping engine. Large circular-sectioned restraining rods on the floor demonstrated the position of machinery within the room.

5.4.5 The focal point of the room was dominated by a water-wheel pit (***165***, Plate 17), centred at the confluence of two culverts (***178*** and ***179***). The wheel pit (Fig 11) was bordered by rows of large stone ashlar blocks in the north-east (***166*** and ***187***) and north-west (***162*** and ***163***). The southern part of the room was defined by a split-level platform (***173***) formed along the edge of a sloping brick floor (***172***). On either side of the platform were two square waterlogged pits (***174*** and ***175***), that appeared to draw water in and out of the room, supplying the engine with water.

5.4.6 Wheel pit ***165*** was aligned north/south and had an overall length of 3.50m, a width of 0.68m, and was excavated to a maximum depth of 2.30m from the upper surface of ashlar blocks ***162*** and ***166***. The southern edge of the pit had been systematically stepped down at an angle of *c*45° to the edge of the culvert roof arch. The overall dimensions of the brick slope (***182***) measured 2.09m at a height of 1.34m below the ashlar blocks. The east (***181***) and west (***199***) walls of the pit were exposed to a depth of 0.66m above a two-string arched roof of culvert ***178***. The arch had an approximate width of 1m and depth of 0.58m from beneath the apex of the arch to the culvert floor. The culvert was sealed along the north edge by stone lintel ***183***, which in turn was overlaid by a brick wall (***202***). The lintel had a chamfered edge along the southern face that marked the point where the stone had been worked to allow the wheel's motion. The bottom edge of the wall had a semi-circular hollow measuring 0.38m in diameter, cut into its south face, which possibly housed part of the wheel apparatus. The position of the wheel axle was represented by two concave grooves (measuring 0.26m in approximate diameter) that were hollowed within the east and west edges of blocks ***162*** and ***166*** (Plate 18). Two large vertical lumps of iron, adhering to the surface of the groove within

162, may have represented a residue of a mount that held a fixing bar. The overall depth from the water level to the axle was recorded at 1.8m, which suggested the diameter of the wheel measured 3.6m.

5.4.7 Culvert ***178*** was aligned east/west through the wheel pit, and provided a constant source of water into it. The eastern wall of the culvert had a vertical pipe positioned (Plate 19) inside the entrance of the west-facing roof arch that extended from the water level and continued through the inner skin of the wheel pit wall, terminating above ashlar block ***166***. Culvert ***179*** was observed running north from ***178*** in the centre of the wheel pit, seemingly acting as a tail-race. The roof of the culvert was capped with stone lintel ***183***, which was exposed at a depth of 1.41m below the top of the wheel pit walls.

5.4.8 The floor of the room (***172***) comprised a sloping brick surface measuring 3.07m by 1.70m that descended at an approximate 40º angle from a 0.79m wide level surface of flagstones (***171***) within the floor of the room at the southern edge of the wheel pit. The floor levelled onto a platform (***173***) located at the southern end of the room, and retained several features that suggested that it had formed a foundation for a large engine bed. These included square and round metal rod mounts and worn linear scars created by continual friction. Two parallel scars that each measured 20mm wide lay adjacent to a brick foundation support (***186***) along the floor's western edge. Two threaded machine rods with circular sections (0.05m diameter) extended vertically from the brick floor at a distance of 2m apart.

5.4.9 Sealing the east edge of floor ***172*** was a five-course pedestal brick foundation (***189***) that functioned as support for an ashlar block (***168***). The brick base measured 1.30m in length and survived to a maximum height of 0.30m. The bricks in the wall resembled a hastily-applied blocking episode as none were faced and all were unevenly laid.

5.4.10 A further two stone blocks were encountered bordering the eastern (***168*** and ***188***) side of the room, and three blocks along the western (***160***) end. Blocks ***160*** and ***168*** were supported by brick bases (***186*** and ***189***) that overlaid floor ***172***. Block ***188*** overlaid a single course of stone flags (***171***), which formed an interface with the floor.

5.4.11 Platform ***173*** was aligned east/west along the southern edge of the room (Plate 20), and probably provided access to machinery overlying floor ***172***. The platform was exposed at a depth of 2.03m below the upper course of the east external wall (***176***), and extended over a distance of 1.77m and width of 0.65m. Along the western and eastern edges were two rectangular-shaped pits containing water (***174*** and ***175***).

5.4.12 Pit ***174*** measured 0.79m by 0.60m and was characterised by an open two-string brick roof arch within the south face of the pit. The arch suggested that the pit had been associated with a culvert running from the west below floor ***172***, returning to the south below wall ***159***. Pit ***175*** resembled an overflow structure and measured 1.11m by 0.67m. At some stage a narrow channel (***190***) measuring 0.36m was placed within the pit, passing through the southern

edge of floor ***172***. An area of repair within the channel wall to the east of the pit revealed the blocking of a stone flag-roofed brick drain (***191***). Drain ***191*** measured 0.55m by 0.39m and was positioned 0.20m above the water level within the pit. This suggests that the pit possibly represented a junction for a drain or channel that entered the room via the eastern wall (***176***).

5.4.13 The northern edge of brick base ***186*** was bonded to a small brick platform (***164***) positioned between the north block of ***160*** and block ***163*** at a depth of 0.77m below the upper surface of the blocks. The platform measured 1m by 0.5m and comprised three courses of hand-made bricks that appeared to run underneath bed ***163***. The platform also appeared to be at the same level as the top of the western wall (***199***) of the wheel pit. This implied that the platform and wheel pit might have been installed at the same time. The function of the platform remains unclear, although it may have been used as a southern access into the wheel pit.

5.4.14 The three dressed ashlar machine blocks (***160***) along the western edge of the room had identical dimensions, with lengths of 1.7m, widths of 0.60m, and depths of 0.77m. The north block butted the southern edge of block ***162***, and the southern block was butted by fuel ash waste (***161***) that formed an interface between the blocks and south wall ***159***. The upper surface of each bed contained *in-situ* threaded round machine restraining rods set at a distance of 1.8m apart. Along the eastern edge of the blocks was an indentation that formed a 1.20m by 0.25m shelf. Inside the shelf along the northern block were two closely-spaced square niches filled with iron residue that may be associated with machinery fittings.

5.4.15 Running below the shelf of each bed were two vertically-positioned concave recesses (***177***) that also cut through supporting brick wall ***186***. The recesses measured 0.90m in height and 0.20m in width, and were positioned 0.24m apart. The recesses possibly represented the position of engine components.

5.4.16 The northern edge of the engine room was bordered by a brick platform (***167***). The surviving dimensions of the platform measured 1.30m by 1.20m, bordered on each edge by three contiguous walls. Two of the walls were aligned north/south (***202*** and ***203***) and butted the northern face of block ***166***. Both walls butted an east/west-aligned wall (***201***), which formed the northern edge of the platform. The western wall (***202***) was exposed to a depth of 0.84m, and survived to a width of two strings, bonded by a hard red mortar. A small hole had been bored into the bottom of the wall that was possibly associated with wheel pit ***165***. The stone lintel (***183***) bordering the northern edge of the wheel pit lay directly below the hole.

5.4.17 Running between the room's western wall (***102***), and the western edge of blocks ***160*** and ***162***, was a north/south-aligned slot (***184***). This was filled with fuel waste (***161***) and pipe ***140***. The pipe filled the slot for a distance of 2.35m, before returning 1.80m to the south-east, overlying the machine beds toward the southern edge of the wheel pit. The pipe measured 0.14m in diameter (0.10m internal). The fuel waste deposit had a thickness of 1m and a width of 0.60m, which was observed in the east-facing section of the engine room.

5.4.18 ***Boiler Room 128:*** a partially exposed room was located at the north-western edge of the excavation, adjoining engine rooms ***100*** and ***141***. The exposed area measured 7.10m by 6.60m and was excavated to a maximum depth of 1.2m. The room was rectangular in plan, aligned east/west, with remnants of external walls that survived to a height of 0.80m. Little evidence survived of the original boiler house further west, although during the evaluation (OA North 2004b) a floor was exposed in the central part of the room.

5.4.19 The southern wall of the room was partially formed by the northern external wall (***101***) of engine/power room ***100***. This was re-inforced by the installation of a wide load-bearing wall (***142***) along the eastern edge of wall ***101***. The wall was aligned north/south for a distance of 1.40m before returning sharply to the east for a distance of 2.80m, butting the eastern wall of the room (***131***, Plate 21). This wall also formed the north-eastern corner of engine room ***141***. The northern face of wall ***142*** had been breached by a cast iron pipe (***140***) that passed through the wall from engine room ***141***.

5.4.20 The eastern wall (***131***) of the room was badly truncated and was visible as a return in the north-east corner for a surviving distance of 3.35m. The southern edge of wall ***131*** overlaid an east/west stone lintel (***183***) that related to the northern edge of the wheel pit (***165***) within engine room ***141***. Wall ***134*** (Plate 22) represented the original external wall of the building and survived for a distance of 1.40m to the north before returning to the west (***132/135***) for a distance of 4.60m, before disappearing into the western edge of the excavation. The wall was exposed to an overall depth of 0.90m and comprised hand-made bricks bonded by a reddish-yellow sandy-lime mortar. At some stage the wall had been re-pointed with grey speckled mortar and was identical to the bonding material of the culvert wall (***119***) in room ***100***. An extra brick skin had been attached to the western face of wall ***134*** that allowed for an ashlar bed ***136*** to be placed along the inside face of the wall.

5.4.21 Ashlar block ***136*** measured 1.80m by 1.20m and 0.60m in depth. The upper surface of the block was perforated at either end by two small holes that were intended to support machinery. The block was supported by a two-pier brick pedestal base (***137***) that extended 0.18m on either side. Within the gap between the piers was evidence of an *in-situ* cast iron fixing rod positioned vertically below the block (Plate 23).

5.4.22 The interior of the room was defined by a series of four brick piers (***129***) situated along the western edge of the room, and two piers in the northern area (***138***). Each of the piers forming row ***129*** had dimensions of 1.86m by 0.90m, set 0.45m apart over a distance of 4.10m, with a single brick course exposed. An additional four platforms were exposed along the same row to the west during the evaluation (Trench 2). Two of the platforms had an unfaced brick pile (***130***) overhanging them. The pile measured 1.40m by 0.88m, with a height of 0.50m. Although the pile did not appear to be *in-situ*, it sealed a trough between the platforms. Platforms ***138*** mirrored the position of ***129***, with a distance of 2.10m between the rows. The brick platforms were situated parallel to ashlar block ***136***. The platform to the immediate east of block ***136***

had an unfaced brick pile (***139***) positioned along its eastern edge at a height of 0.40m above the surface. The platforms and piles possibly represented the remains of columns that may have supported an overlying floor, or marked the position of boilers.

5.4.23 ***Water Power:*** a complex arrangement of sub-surface features was encountered during the excavation and watching brief that provided evidence for water-management. These include the culverts servicing both engine rooms (***118***, ***178*** and ***179***), and a further three culverts (***193***, ***194***, and ***195***) that were located across the southern part of the mill and beyond the engine rooms.

5.4.24 The culverts east of the engine rooms were aligned broadly north-east/south-west, and were exposed at a distance of 11m from the south-east corner of the main excavation (Fig 10). The structures were closely positioned with an overall width of 4.9m and were exposed at a depth of 2m below a concrete floor that partially sealed the mill foundations. Two of the culverts were redundant (***193*** and ***194***), the one active drain (***195***) being that furthest to the east.

5.4.25 The active drain ran parallel to the culverts for an approximate distance of 8m, below a chimney flue (***143***, Phase 4, *5.5.17 below*). At some point beyond the flue, the drain diverged from the culverts and followed a semi-circular arc in a north-east direction for an approximate distance of 20m. The drain was then realigned with the culverts, at a distance of 3m east of New Islington Road. At this point drain ***195*** widened and joined with culvert ***194***. The drain and culverts passed through the west external wall (***196***) of the mill, and headed north below New Islington Road (Plate 24). At the time of the watching brief the flow of water in ***195*** was fairly rapid, suggesting that the redundant culverts may at some point have acted as storm overflow drains. Unfortunately, no direct evidence of water carriage servicing the engine rooms from these culverts was uncovered.

5.4.26 Drain ***195*** measured 1.3m wide in the east, widening out to 2.5m at the junction with culvert ***194***. Both structures comprised at least seven courses of hand-made bricks bonded by yellow lime mortar bearing no inclusions. The internal depth measured 0.90m from beneath a two string barrel-shaped arched roof, above the water.

5.4.27 Culvert ***193*** had similar dimensions and components to ***194*** and ***195***. However, archaeological evidence suggested that culvert ***193*** may have functioned as a drain outlet from the two engine rooms. The floor at the north-east end, near to pumping engine room ***141***, sharply dropped, providing an increased depth to that recorded in drain ***195***. The depth of the culvert in this area measured 1.33m from below the roof arch to the floor. A narrow slot (***206***) located at the western end of the culvert, within the north wall, may have functioned as a drain. The slot was aligned north/south, positioned directly east of culvert ***118***, in the direction of engine/power room ***100***. No relationship between the culverts was determined, although it is possible that culvert ***118*** was connected to ***193***.

5.4.28 ***Mill walls:*** along the north and south edges of the site were remnants of walls that possibly related to the third phase of mill construction. The area was excavated extremely rapidly which hindered accurate recording, but the locations were recorded with the aid of digital photography and line drawings.

5.4.29 Along the eastern edge of New Islington Road was an extensive north/south-wall (***196***) that formed the southern external wall of the mill. The wall survived to an overall height of 2.70m, the upper course being exposed at a depth of 0.15m below the pavement, and was sealed by kerb stones. The northern face was split into equidistant bays and piers 1.2m apart, that were decorated with blue paint.

5.4.30 The south-east corner of the mill (***209***) was located 2.5m to the immediate south of engine room ***141***, overlying culvert ***193***, and survived for a distance of 3m. The wall survived to a height of 1.1m and width of 0.45m, and comprised moulded bricks bonded by yellow lime mortar. The position of the wall is indicated on the 1831 map by Bancks and Co, and may represent a remnant of the mill's external wall.

5.5 PHASE 4

5.5.1 Substantial extensions to the mill are illustrated on the Ordnance Survey map surveyed in 1848-49, which indicates the removal of the reservoir (*see 5.4.1*) by the expansion east of the main building. This removal coincided with structural modifications undertaken to the culverts, and the erection of a chimney (***205***) in the area where the reservoir had been. Further structural evidence from this period coincided with developments to engine room ***100***, identified by the probable installation of a larger engine. These installations probably indicated the upturn in production at the mill, although it is unclear whether the pumping engine house (***141***) was still operating at this time.

5.5.2 Archaeological evidence suggests that the east section of a flue which extended on a north/south alignment from the chimney (***205***, *5.5.16 below*) towards the boiler room, had been adapted and converted from its original use as a culvert. This was demonstrated within the structure's eastern and western walls by the lower courses of hand-made bricks which were clearly water-worn. The roof arch was composed entirely of refractory bricks and was evidently a later addition. The culvert sealed the roofs of culverts ***193*** and ***195***, suggesting it was used for a short time prior to its conversion.

5.5.3 ***Engine/Power room 100:*** evidence of the room's development (Fig 10) included the addition of an extensive brick platform along the eastern edge of the room, bordered by wall ***102***, and the incorporation of rows of stone bases laid along the western edge of the room that probably provided foundation supports for a larger engine.

5.5.4 Further evidence for the installation of a new engine was provided by brick platform ***103***, located along the eastern edge of the room. The structure had overall dimensions of 5.10m by 2.20m, overlying a row of ashlar blocks (***105*** and ***111***). The blocks were observed at a depth of 1.2m below the highest

surviving brick course. Each block contained square and round threaded iron restraining rods protruding vertically to a height of 0.35m through the upper brick courses, positioned 0.5m apart (Plate 25). At the south-eastern corner of structure ***103*** was a repaired section (***107***, Plate 26), which measured 1.10m by 0.43m and comprised a single course of brick headers that overlaid the north block in row ***105***, with further brick infilled along its southern edge. The repair was probably created to allow for the insertion of a larger stone block (***109***) that sealed the earlier brick foundation base across the width of the room.

5.5.5 Block ***109*** was further modified by the insertion of a metal pipe (***110***) that passed though its upper surface, diagonally, with an upright collared section at its north end. The pipe measured 0.80m in length, with a diameter of 0.13m and internal diameter of 0.10m. A similar pipe (***120***) with identical dimensions was seen protruding through foundation ***121*** at the south-western corner of the room, running along the same alignment for 0.50m. It is probable that both pipes were associated.

5.5.6 During the watching brief, it was observed that culvert ***118*** was at some stage blocked along the eastern edge of the engine room to form a $1m^2$ waterlogged pit (***180***). The dimensions of the pit perhaps suggest it may have provided a water source for a condenser relating to a larger steam engine.

5.5.7 Located along the western edge of the room above floor ***116*** (Phase 2, *5.3.4*) was a row of five stone blocks that resemble machine bases (***122***), supported by a brick foundation (***121***). The blocks were observed above the west wall (***119***) of culvert ***118*** and extended to a maximum depth of 0.80m. Each machine base measured an average of 1.36m by 1m and extended to an overall length of over 5.5m. The largest block in the centre of the row measured 1.54m in length, and had a semi-circular scar with a diameter of 1.10m running down the eastern face. The scar probably resulted from friction from an engine fly wheel. The dimensions of the foundation blocks suggest that the room probably housed a larger beam engine than previously.

5.5.8 Sealing ***122*** along the western edge of the room was an extensive multi-level brick platform (***123***) that probably acted as a foundation support for machinery. The platform (Plate 27) measured 1m in width up to the western limit of the excavation, and had a maximum thickness of 0.5m. Rows of three evenly-spaced, square-sectioned iron restraining rods, housed in square sockets set 1m apart, were observed protruding through the upper surface of the platform into the ashlar blocks below.

5.5.9 Bonded to the eastern edge of ***101***, was an east/west wall (***197***) that ran for 2m to wall ***102***. The wall formed an interface between wall ***101*** and platform ***103***, and was bonded with dark grey mortar. The wall was presumably related to this phase of the engine room, although a clear function was not established.

5.5.10 The platform was overlaid by a row of four stone ashlar and brick machine bases (***124***). The bases were partially exposed at 0.1m below the topsoil along the western edge of excavation. They comprised a large stone block at the southern end of the row measuring 1.60m by 0.60m, bordered along its

northern edge by a 0.5m wide refractory brick pier capped with limestone. This was bonded to another stone block of identical dimensions, which had a round-sectioned rod protruding through it. A much larger stone block with a circular rod was observed above ***123*** in the north-west corner with a length of 1.10m and width of 0.35m; this was partially exposed running beyond the edge of excavation.

5.5.11 A socket in the western corner of wall ***101*** contained the remains of a small metal pipe measuring 0.10m in diameter protruding into the room. A similar brick-shaped socket was observed within the western face of structure ***103*** at the same level, along the northern edge. The socket (***113***) was filled with a metal pipe of identical dimensions which may have been a return of the same pipe.

5.5.12 ***Pumping Engine Room 141:*** evidence of this room's apparent disuse as an engine house included the incorporation of a brick-lined pipe channel (***185***) running across the width of the room in the direction of engine/power room ***100***, and a foundation block (***198***) overlying the western wall.

5.5.13 Channel ***185*** was located within the southern part of the room positioned below the southern block within row ***160***. The structure was filled largely with fuel ash that encased a 0.20m wide metal water pipe, placed north/south above the floor. An area of brick infill (***192***), observed below the western edge of the channel, represented reconstruction of the south-western corner of the room. The infill comprised 11 machine-made brick courses laid in an English Bond pattern, to a depth of 1m, lining the western edge of pit ***174***, with a maximum width of 0.97m.

5.5.14 A small stone ashlar block (***198***) was observed overlying the western edge of wall ***102***. The southern edge of the block was in line with the rear edge of block ***162***, at a distance of 0.32m. The block measured 0.90m by 0.59m and 0.40m in depth. The south-western edge was butted by wall ***197*** within room ***100***. The block sealed a layer of slate, which acted as rendering between the block and the surface of wall ***102.*** The block had two incised grooves along the upper surface and its western edge that implied it may have been used to support machinery.

5.5.15 The space in between blocks ***187*** and ***188*** was filled by a make-up layer (***169***), comprising mixed debris such as crushed brick, mortar, wood, fuel ash, and a series of three small layers of flat stones, sealed by a rectangular flagstone (***170***). The flagstone had a circular hole punched into the southern edge, that may have housed a rod or bolt. It was very unstable at the time of excavation, but it nestled flush within the blocks and presumably had provided a level surface that may have functioned as an equipment base or as the rear access to the engine mounted on ***166***. The make-up layer sealed a course of flagstones (***171***) within the floor of the room.

5.5.16 ***Chimney:*** remnants of the mill chimney (***205***) were encountered during the watching brief at a distance of 18m from the south-east edge of pumping engine room ***141***. The chimney was of a circular plan, and survived to a height

of 1.50m, with an internal diameter of 2.50m. A similarly shaped structure is shown on the Ordnance Survey map of 1851. It marked the terminal edge of the flue (***143***) that was traced across the northern part of the mill. The chimney comprised hand-made bricks that were heavily sooted along the inner face and a refractory brick-lined floor, and incorporated a square brick plinth at its base.

5.5.17 Flue ***143*** (Plate 28) was constructed almost entirely from refractory brick and was aligned north/south for a distance of 9.7m, being exposed to a maximum depth of 0.60m. The components of the structure comprised two walls along its eastern and western sides (***145*** and ***144***), an inner flue wall (***156***) attached to the eastern face of ***144***, and a partially-intact brick-arched roof (***146***). A possible extension of wall ***145*** was observed at a distance of 3.5m north beyond the evaluation trench. The wall was observed over a distance of 3.4m and was butted by two 0.50m long walls seen running beyond the eastern excavation edge. The space between the exposed short wall sections was filled by large amounts of roof slate. Both walls comprised hand-made bricks bonded by a creamy yellow speckled mortar. The southern wall (***154***) of the flue was observed for a distance of 2.80m, aligned east/west. The wall's north face was lined with refractory bricks and had a very slight curvature for 1.48m that straightened out for a distance of 1.40m. The wall had a width of 0.24m, but widened to 0.36m at the point where it was butted along the south face by a north/south wall (***157***). Wall ***154*** may have functioned as a temporary partition that blocked the flue. Large amounts of soot and fuel ash (***200***) were observed butting the southern edge of the wall, indicating the area behind the chimney had been used to dump waste material. A possible north wall of the flue (***155***) crossed the north-eastern part of the site along an east/west alignment. The wall was observed for a distance of 1.10m butting the extended section of wall ***145*** along its western face. Roof ***146*** survived for a distance of 6.20m and was composed almost entirely of refractory bricks measuring two-strings thick, bonded with red sandy mortar.

5.5.18 An east/west-aligned wall (***148***) was observed butting wall ***145*** at the southern edge of the flue for a distance of 1.56m. The wall had a maximum width of 0.62m and comprised moulded bricks bonded by pale red sandy mortar; it may have formed the south border of a rake-out area.

5.5.19 Two channels (***149*** and ***150***) were placed within wall ***145***. Channel ***149*** was located below the flue roof and was observed running east for a distance of 0.60m. The channel comprised a one course thick refractory brick platform which had a two-string brick width measuring 0.68m, laid on top of wall ***145***. The platform sealed a piece of flattened iron with a serrated edge serving as a roof lintel. The lintel bridged two single-string refractory brick piers set 0.45m apart. Channel ***150*** had similar dimensions to ***149*** and was observed at the edge of flue roof ***146***. The north edge of the channel entered a circular chamber (***151***). Chamber ***151*** comprised an east/west-aligned wall (***152***) that had a concave inner face lined with refractory bricks. The concave face ran for a distance of 0.70m, and survived to a height of 0.40m. Wall ***153*** was observed at a distance of 1.10m from the western edge of ***152***. The wall was aligned east/west with a straight edge along its southern face for a distance of 1.77m,

which then curved to the west for 1.30m. It is uncertain what function the channels served, other than that they were associated with high temperatures. It is possible that they represented elements of the textile-finishing processes, such as foundations of bleaching vats.

5.5.20 Flue ***217*** was positioned 0.50m east of ***143*** and was exposed at a depth of 0.80m below a concrete floor. The flue was blocked along the southern face with nine courses of moulded brick (***218***), bonded with dark grey ashy mortar. Traces of an original floor were exposed, comprising a mixture of refractory and hand-made bricks. All the channels and flues were backfilled with large amounts clinker and fuel ash (***147***).

5.6 PHASE 5

5.6.1 This period encompasses the final phase of activity on the site. Physical remains from the 20th century were largely represented by rebuilds of the mill's external and internal walls.

5.6.2 Butting the west wall of flue ***217***, and overlying flue ***143***, was a mixed deposit of fuel waste and demolition debris (***216***), measuring 0.60m thick, and sealed by a stone sett yard surface (***220***). The surface possibly related to an inner courtyard associated with a later development.

5.6.3 A section of wall (***157***) was partially exposed beneath a concrete basement floor (***221***) running across the top of flue ***143***. The wall was aligned north/south, surviving for a distance of 3.40m, and formed the south-eastern edge of the excavation. It was built of machine-made bricks bonded with ash-rich mortar.

5.6.4 Butting the south edge of the wall were large amounts of fuel ash and clinker, that may have been associated with the rake-out or dump of material from the boilers and the chimney. This waste deposit (***200***) was sealed by two large water pipes (***158***) that ran across the southern edge of the excavation.

5.6.5 Butting the northern face of wall ***196*** was a large, 2m wide, load-bearing east/west wall (***213***), exposed to an overall depth of 2m, and sealing a flagged floor (***215***). The wall comprised machine-made bricks bonded with dark grey-black mortar. A similar wall (***214***) with identical fabric and dimensions was located running along an identical alignment at a distance of 2m.

5.6.6 A culvert (***219***) aligned north/south was observed at the west edge of the site for a distance of 4m, overlying culvert ***193***. The culvert passed below an east/west aligned wall (***207***) that formed the northern side of a probable cellar that possibly related to the engineering works. The entire culvert had been backfilled with hand-made bricks that had been stacked in a deliberate space-saving fashion. The bricks may have originally derived from an earlier phase of the wall which had been disposed of in the culvert when the cellar wall was constructed. Wall ***207*** was observed for a distance of 12.5m and exposed to a maximum depth of 2m, comprising machine-made bricks bonded with ash-rich mortar.

5.6.7 A wall (***133***) was observed in the north-western part of the site, butting the north wall (***134***) of the former boiler house. The wall was aligned north/south, and was exposed for a distance of 4m. The wall was built of machine-made bricks bonded with a dark grey ash-rich mortar.

5.6.8 The entire site was sealed by large amounts of demolition material (***204***), which had been used as levelling in preparation for the recreation area during the late 20th century.

6. RESULTS OF THE ASSESSMENT

6.1 ASSESSMENT AIMS AND OBJECTIVES

6.1.1 The aim of this assessment was to evaluate all classes of data from both of the archaeological investigations undertaken, in order to determine the potential of the dataset for further analysis and publication. A statement of the significance of the results from each element of the archive is given below. These statements are based on the assessment work undertaken, related to the original academic themes expressed in the project design.

6.1.2 The objectives of this assessment correspond to, and are prescribed by, *Appendix 4* of *Management of Archaeological Projects 2nd edition* (English Heritage 1991a). They are to:

- assess the quantity, provenance and condition of all classes of material: stratigraphical, documentary, artefactual and environmental;
- comment on the range and variety of that material;
- assess the potential of the material to address questions raised in the course of this project design;
- formulate any further questions arising from the assessment of this material.

6.1.3 This assessment will present:

- a factual summary, characterising the quantity and perceived quality of the data contained within the site archives;
- a statement of the academic potential of the data;
- recommendations on the storage and curation of the data.

6.2 MATERIAL ASSESSED

6.2.1 The entire paper, digital and material archive was examined for the purposes of this assessment. In addition, artefacts collected from the two sites were examined together. Quantifications are incorporated within the individual assessments.

6.3 PROCEDURES FOR ASSESSMENT

6.3.1 The method of assessment used varied with the class of information examined, although in each case it was undertaken in accordance with guidance provided by English Heritage in *Management of Archaeological Projects* (English Heritage 1991a). All classes of finds were examined in full, with observations supplemented by the finds records generated during the course of the fieldwork; full details of all the recovered finds reside within the project archive.

6.4 STRUCTURAL AND STRATIGRAPHIC DATA

6.4.1 Provisional broad phasing has been ascribed to all contexts, and the results are described in *Section 4* and *5* above, and summarised in *Appendix 3*.

6.4.2 ***Salvin's factory, quantification;*** there is a total of 100 context records, which may be broadly divided between phases as follows:

Natural origin	1
Phase 1 (1780s)	4
Phase 2 (1790s)	25
Phase 3 (early- to mid-19th century)	48
Phase 4 (late-19th to late-20th century)	22

6.4.3 Records pertaining to the structural remains of the site dominate the project archive. The archive comprises the following:

Plans	12
Sections	6
Digital survey file (AutoCAD)	5
Colour slides	5 films, totalling 180 slides
Monochrome prints	4 films, totalling 144 photographs

6.4.4 ***New Islington Mill, quantification:*** there is a total of 178 context records, which may be broadly divided between phases as follows:

Natural origin	1
Phase 1 (1780s)	8
Phase 2 (1800)	13
Phase 3 (1800-1831)	73
Phase 4 (1831-1851)	63
Phase 5 (Late-19th to 20th century)	20

6.4.5 Records pertaining to the structural remains of the site dominate the project archive. The archive comprises the following:

Plans	12
Sections	6
Digital survey file (AutoCAD)	5
Colour slides	8 films, totalling 288 slides
Monochrome prints	8 films, totalling 288 photographs
Digital photographs	200 images

6.4.6 ***Potential:*** the stratigraphic and structural data will provide the framework within which all other analyses will take place. The archaeological investigation of both sites has allowed as full as possible a stratigraphic record to be made of the development of each mill. The key to understanding the chronology of the different types of activity, and the development of the sites, resides within the layout and organisation of each, which can be interpreted through an integrated study of the artefactual and stratigraphic records. Individual contexts, moreover, offer a potential for understanding significant transitions of power sources active on the site.

6.5 INTRODUCTION TO THE ARTEFACTS

6.5.1 The artefactual assemblage recovered during the course of the investigation comprised finds from various material categories, including pottery, glass, clay tobacco pipes, metalwork (iron and copper alloy), leather and industrial residues. In broad terms, the finds were in good condition, although both assemblages were recovered from demolition rubble within the various evaluation trenches and excavation areas. Therefore the material may be considered as effectively unstratified.

6.6 POTTERY

6.6.1 ***Quantification:*** a combined total of 140 sherds (weighing 13.73kg) of pottery was recovered from the archaeological investigations, of which 25 fragments (2.15kg) and 115 fragments (11.58kg) were collected from Salvin's Factory and New Islington Mill respectively. The entire assemblage was of a post-medieval date.

6.6.2 ***Methodology:*** the assessment of the post-medieval pottery was undertaken in accordance with guidance provided by English Heritage in *Management of Archaeological Projects* (English Heritage 1991a). All the material was examined and recorded by sherd count and weight, and placed within broad groupings of vessel form and type. The data have been input into an Access database, and included comments on the condition of the pottery in order to help determine residuality and intrusion, and inform any consideration of the nature and development of the site.

6.6.3 ***Evaluation:*** in general terms, the pottery was in good condition and unabraded, and included several fragments from single vessels, indicative of contemporary dumping. The assemblage was predominantly mid- to late-19th century in date, although a small amount of 20th-century material was also produced. The assemblage comprised kitchen and tableware forms typical of the period; there was no indication of any vessels that may have had a specialist or industrial function.

6.6.4 The pottery assemblage from Salvin's Factory included several stoneware vessel fragments (11), of which two complete bottles were recovered. The complete vessels had the manufacturers' name printed or stamped on the vessel body. Manufacturers identified were '*Paton*' and '*Stephens*'. The bottle bearing the trademark of Paton was collected from demolition rubble ***164***

(Phase 4). This bottle derived from a firm based in Bristol, although no further information regarding the period of production was established. The bottle bearing the trademark of Stephens was collected from the backfill (***144***, Phase 1) of culvert ***145***, and may be identified with a firm based in Aldersgate Street, London. No further information about the firm has been identified during the assessment. However, the bottle had a pouring spout, which suggests that the vessel was not intended to be sealed with the type of cap fitted on ginger beer bottles. The other vessel fragments probably derived from bottles that may have had a local origin, but were too small for identification.

6.6.5 The rest of the assemblage comprised 19th and 20th century tea wares, including 'Willow' and 'Broseley' patterned plates and a sugar bowl, glazed white earthenwares, and blue striped industrial slipware tea-pots and cups. A single sherd of trailed slipware plate was recovered from a layer of clay (***165***, Phase 2) between the chimney ***136*** and wall ***129*** at the south end of the site, that may be ascribed a late 18th to mid-19th century date. In addition, two fragments of red glazed earthenware were recovered from the boiler room backfill (***103***, Phase 4). The fragments derived from a large storage jar form typical of the late 19th and 20th centuries.

6.6.6 The pottery assemblage from New Islington Mill was dominated by stoneware bottles, of which 33 vessels were represented. Several of these were complete, and many had the manufacturers' name printed or stamped on the vessel body. Other stoneware forms represented included a bowl and a small jar. Manufacturers represented included *'Townsend'* , '*J Pratt and Son*', '*R Bowes & Son'* , '*W Dales Junr*', '*R Nuttall*', '*Richard Nichols*', and '*J Bourne & Son'*. The trademark of '*Townsend*' is associated with a ginger beer firm based at Salford that was producing bottles of this type by 1876 (Slater 1876). Other ginger beer makers include the trade mark of '*J Pratt & Son*', who are listed at 58 Leigh Street, Manchester in a trades' directory of 1879 (Slater 1879, 308). J Pratt & Son do not appear in directories for 1909, implying that the firm had ceased trading by this date. In a trades' directory for 1884, Richard Bowes is listed as '*botanic beer manufacturer*', based on Pearson Street, Manchester (Slater 1884). However, by 1891, the firm is referred to as '*Richard Bowes & Son*', and is listed as a mineral water manufacturer, based on Mangall Street (Slater 1891, 577. The trademark of '*W Dales Junr*' is listed in a trades' directory for 1892 as a '*botanic beer manufacturer*' based at 54 Mitchell Street and Pollard Street (Slater 1892). Other firms in the area included '*Robert Nuttall*' mineral water manufacturers of Ancoats (Slater 1895). Robert Nuttall is not listed in trades' directories from 1905 onwards, implying that the firm had ceased trading by this date. The trademark of '*R Nichols*' does not appear in contemporary trades' directories until 1901, where they are listed as '*botanic beer brewers*', based at Irlam Street in Newton Heath (Slater 1901, 1479). The firm of Joseph Bourne and Son were based at the Denby Potteries near Derby. Information supplied by trade directories confirmed the firm was producing stoneware bottles of this type from 1871 to 1880. (Slater 1880).

6.6.7 The remainder of the pottery assemblage comprised tea wares that include glazed white earthenware and porcelain (31 fragments), industrial slipwares

(ten fragments), transfer-printed wares (three fragments), and single sherds from an Agate Ware bowl and a red-bodied earthenware that probably derived from a flower pot.

6.6.8 ***Potential:*** the excavations have produced a moderate assemblage of virtually unstratified material. Much of the assemblage would appear to be associated with domestic activity, and as such may have originated from adjacent tenements.

6.6.9 None of the pottery assemblage appears to have had a specialist function, and it would therefore seem unlikely that further detailed study could add significantly to the interpretation of the site. An exception to this may be represented by the groups of stoneware bottles, probably deposited by mill-workers. It is of interest that nearly all of the firms represented by the trademarks on the bottles were based in Ancoats or adjacent districts, providing a valuable example of localised production and consumption. A note should be made of these bottles, which should highlight their local origin.

6.7 CLAY TOBACCO PIPE

6.7.1 ***Quantification:*** in total, seven fragments of clay tobacco pipe were recovered, of which two derived from Salvin's Factory and five from New Islington Mill. The group included six stem fragments and a single bowl fragment.

6.7.2 ***Methodology:*** the assessment was undertaken in accordance with the guidelines set out in English Heritage's *Management of Archaeological Projects* (1991a). All artefacts were examined and recorded by fragment count and weight using the terminology supplied by Oswald (1975). Outline details of the objects were entered into an Access database in order to prepare a preliminary catalogue.

6.7.3 ***Evaluation:*** a preliminary examination of the clay tobacco pipes from Salvin's Factory included a bowl fragment without a spur or heel that had moulded rose decoration. A similar example is illustrated in the Oswald report of clay pipes (Oswald 1975, 7) and was of a style popular in the early 19th century. The stem fragment was undecorated and thus difficult to date with precision. None of the fragments from New Islington Mill bore any surface detail or stamps. The date range for the collection is likely to be in the 19th century.

6.7.4 ***Potential:*** the small assemblage of clay tobacco pipes recovered from the excavations does not contain enough examples to be statistically viable. In summary, it would seem unlikely that further detailed study of the clay tobacco pipes could add significantly to the interpretation of the site.

6.8 GLASS

6.8.1 ***Quantification:*** a combined total of 92 fragments (weighing 10.30kg) of glass was collected from the evaluations and excavations, of which Salvin's Factory yielded 11 fragments (1.15kg) and 81 fragments (9.15kg) were recovered from New Islington Mill. All the fragments generally date from the mid-19th to early-20th centuries. The fragments may be divided into three main categories: vessels (30), objects such as rods (21), stoppers (four), and tile, and manufacturing waste (26). All the fragments generally date from the mid-19th to early-20th century.

6.8.2 ***Methodology:*** all artefacts were examined for the purposes of this assessment. Outline details of the objects were entered into an Access database in order to prepare a preliminary catalogue.

6.8.3 ***Evaluation:*** in general terms, the glass was in good condition and included several fragments from single vessels. The group of glass vessels from Salvin's Factory included six bottles comprising beer (two), mineral water, ink, milk and fruit drink. Many were complete, with the manufacturer's name printed or stamped on the vessel body. It was possible to identify the manufacturer of two beer bottles, with the remainder unattributed. The trademark on two bottles identified was '*JC Swales & Co. Ltd*', which was a firm of brewers based in Manchester and Wigan (Slater 1895, 36). The milk bottle bore the trademark of Lancashire Hygienic Dairies Ltd, Manchester, made by Forster's Glass Company Limited. The mineral bottle had a barely legible trademark except for the word '*Manchester*' embossed on its base. The fruit drink bottle was moulded from clear glass and bore the trademark of '*Wilds Whole Fruit Drinks*', which was a firm based in Heywood, Manchester. The other vessels included a burnt mineral water bottle recovered from the boiler room (***103***, Phase 4) with remnants of a trademark bearing '*Blackburn*' embossed across the base, a small clear glass bottle containing residues of ink, and a blue octagonal medicine flask.

6.8.4 The other glass fragments derived from a square-shaped ornament in clear glass with a green tinge. The ornament had an internal indentation that may have been intended to house a table or piano leg, similar to those known to have been manufactured in Ancoats' glass works during the second half of the 19th century (OA North 2004c).

6.8.5 The group of glass vessels from New Islington Mill for the most part comprised 20 mineral water and beer bottles, many being complete, with the manufacturer's name printed or stamped on the vessel body. It was possible to identify the manufacturers of seven glass bottles, with the remainder unattributed. Manufacturers represented included '*Goodall Backhouse and Co.*', '*Ard and Co.*', '*Fletcher & Holt*', '*Rob Nuttall*', '*J Pratt & Sons*', '*Pomfre*', '*P Dowd*', '*R White*', '*Southport*', '*N Berry*', '*Standring Son & Co*', and '*W Hancock & Sons*'. The trademark '*J Pratt & Sons*' is clearly the same firm that was producing ginger beer in 1879 (s*ee section 6.6.6*), but it is unclear if they were producing beer in glass bottles at this time. The trademark '*P Dowd*' refers to Patrick Dowd, a mineral and aerated water manufacturer

based in Manchester (Slater 1895, 174). The trademark '*R White*' refers to Robert White & Sons Limited, a ginger beer manufacturer based in Stepney in East London. The firm is listed in trade directories with their main factories in Camberwell in 1896 (Kelly 1896, 843) and in 1899, when the company advertised themselves as the '*largest brewers of ginger beer in the world, ginger ale, lemonade & mineral water manufacturers*' (Kelly 1899, 2069).

6.8.6 The sources of the following trademarks were not identified. The trademark '*N Berry*' was that of a firm based at Walkden near Bolton whose bottles were manufactured by Cannington Shaw and Co in St. Helens between 1875 and 1913. The trademark *Standring Son & Co*' was seemingly that of a firm based in Manchester producing aerated water. The trademark '*W Hancock & Sons*' refers to William Hancock, a brewery firm based at Wiveliscombe, Somerset (www.archon.nationalarchives.gov.uk 2005). The trademark of '*Ard and Co.*' is associated with a firm based in Salford. The trademark of '*Fletcher & Holt*' refers to a firm producing mineral water bottles based in Collyhurst, Manchester, whilst that of '*Pomfre*' is associated with a mineral water manufacturer based at the Albion Works in Bury. Other vessels represented include an ink bottle and condiment jar.

6.8.7 The remainder of the glass assemblage from New Islington Mill included fragments of rods and stoppers, which may have represented the waste products of glass manufacture. Other manufacturing waste included fragments of amorphous lumps of molten glass cullet in a variety of colours, a distorted base and stem of a blue wine glass, presumably a production waster, and a crucible handle.

6.8.8 The relative abundance of glass manufacturing debris is likely to reflect the position of the site close to the former Molineaux and Webb Manchester Flint Glass Works, which was situated on Kirkby Street, Ancoats. It would seem most likely that the glass fragments recovered from the evaluation and excavation originated from the works, and indicate that the general area has been subjected to considerable disturbance. This was perhaps a result of the redevelopment associated with the construction of the Cardroom Estate in the 1960s.

6.8.9 ***Potential:*** the assemblage offers little potential for further study, although some additional research of the manufacturers' trademarks of the unattributed bottles would generate a comparison with the ceramic manufacturers during the same period. It would seem that the glass bottles were produced locally with few traded over larger distances, which again provides evidence for localised production and consumption.

6.9 METALWORK

6.9.1 ***Quantification:*** a total of four fragments (0.192kg) of metalwork was recovered from the excavation. The assemblage comprised two objects of iron and four objects of copper alloy.

6.9.2 ***Methodology*:** all artefacts were examined for the purposes of this assessment. Outline details of the objects were entered into an Access database in order to prepare a preliminary catalogue.

6.9.3 ***Evaluation:*** the copper alloy objects recovered from Salvin's Factory comprised two valves with screw threads of a type that was introduced from the mid-19th century. The copper alloy material from New Islington Mill included a strip and a small block resembling a nut.

6.9.4 A preliminary examination of the metalwork revealed objects with an industrial function that probably date to the late 19th or 20th century. The objects were in a fairly poor condition as a result of their burial environments, which had caused severe surface corrosion, hindering accurate identification of the assemblage.

6.9.5 ***Potential:*** in summary, it would seem unlikely that further detailed study of the metalwork could add significantly to the interpretation of the site.

6.10 INDUSTRIAL RESIDUES

6.10.1 ***Quantification:*** a single lump of slag (0.402kg) was recovered from demolition layer ***204*** (Phase 5), at New Islington Mill during the evaluation.

6.10.2 ***Methodology:*** the artefact was examined for the purposes of the assessment. Outline details of the objects were entered into an Access database in order to prepare a preliminary catalogue.

6.10.3 ***Evaluation:*** the lump has a slight ferrous content and also showed signs of glass vitrification across much of the surface. This would indicate that the fragment may have been detritus from perhaps the process of glass making.

6.10.4 ***Potential:*** the position of the site close to the former Molineaux and Webb Manchester Flint Glass Works suggests that the lump was likely to have originated from the works, and indicates that the general area has been subjected to considerable disturbance. However, it would seem unlikely that further detailed study of the slag could add significantly to the interpretation of the site.

6.11 LEATHER

6.11.1 ***Quantification:*** in total, five leather shoe fragments in reasonable condition were produced from the evaluation.

6.11.2 ***Methodology:*** all artefacts were examined for the purposes of the assessment. Outline details of the objects were entered into an Access database in order to prepare a preliminary catalogue.

6.11.3 ***Evaluation:*** the assemblage included four almost complete adult shoes and a hob-nailed boot heel. The shoes were of a similar size with several retaining soles and two with low heels. In addition, two almost complete shoes of

different styles both had surviving eyelets. One shoe had fringed eyelets that had very small lace holes. Both shoes were of a style popular during the 19th century. An almost complete 'slip-on' shoe, with no heel, displayed evidence of the sole having been repaired with small copper rivets. This shoe may also be of 19th century design. The hob-nailed boot is of possible 19th or 20th century design.

6.11.4 ***Potential:*** the leather has no potential for further study.

7. STATEMENT OF POTENTIAL

7.1 INTRODUCTION

7.1.1 Ancoats has been called 'the world's first industrial suburb', built on the east side of the medieval town of Manchester, which at the end of the 18th century was rapidly expanding, with the growth of the textile industry (Williams 2002, 34). Ancoats developed as a result of the increased demand for housing for the expanding population, and the creation of new textile mills powered by steam. It was in essence an industrial estate, although it also contained not only housing, but community facilities and related service businesses. The impact of the Industrial Revolution is seen more clearly here than almost anywhere else in the world, and this has been recognised by the placement of the Ancoats, Castlefield, and Worsley Delph areas of the city on the list of proposed World Heritage Sites prepared by the Government for submission to UNESCO. Whilst the sites of New Islington Mill and Salvin's Factory lie outside the present boundary of the proposed World Heritage Site, the comprehensive mitigation record of the works generated during the course of the archaeological investigation can offer a significant contribution to a broader understanding of this key industrial area.

7.1.2 These two mill sites are of especial significance as they incorporate rare physical remains for the major stages in the evolution of Manchester's steam-powered textile mill. In particular, evidence for elements of water-power and steam-assisted water-power systems has been recovered, representing the physical manifestation of the first wave of steam-powered mills in the world.

7.2 PRINCIPAL POTENTIAL

7.2.1 The greatest potential for analysis lies in the confirmation of the phasing of the sequence of structures and archaeological deposits revealed by the investigation. The stratigraphic data will also provide the framework within which other analysis will take place.

7.2.2 ***Stratigraphic data:*** further analytical study of the stratigraphic record may elucidate a detailed, chronological sequence of events pertaining to the development of the mills and the sites in general. In particular, this may inform an understanding of the implementation and development of technical innovations represented by the excavated structures.

7.2.3 ***Documentary study:*** the significance of the excavation results is increased by the supporting primary documentary evidence available within the various county record offices and archives. An appraisal of these sources has been undertaken as part of this assessment (*Section 3 above*), although this has by no means been exhaustive. Further detailed examination of the primary documentary evidence could provide significant additional information, and facilitate the dating of the excavated structural remains.

7.2.4 ***Finds data:*** the finds data is unlikely to contribute greatly to an understanding of the industrial process operating on the excavated sites. However, the preponderance of locally-produced consumables should be noted.

7.3 NATIONAL PRIORITIES ADDRESSED BY THE SITE'S POTENTIAL

7.3.1 In 1991 English Heritage produced a document, *Exploring Our Past*, which included a strategy for dealing with the problems and opportunities which would be encountered during the following decade (English Heritage 1991b). Many of the ideas first raised in *Exploring our Past* were developed further in a draft document, *Research Agenda*, circulated to the archaeological profession in 1997. Section 7 of *Exploring our Past*, *The Way Forward*, and Section 3 of *Research Agenda*, *Archaeological Research Priorities*, outlined a series of broad academic objectives. Those of relevance to the present site are as follows:

Processes of Change

- to enable archaeology to contribute to important debates and controversies which hitherto have been largely the preserve of economic historians (PC7);
- to examine the relationship between traditional and new industries during the period of industrialisation (PC8).

Themes

- to improve our understanding of single monument forms via site-specific study (T6);
- to contribute to an exposition of the remains of industrial archaeological sites (T6);
- to inform the development of new research frameworks for the management of the industrial archaeological resource (T6);
- to investigate a documented industrial site to compare the application of new technologies with the historical records of innovation and contemporary technical literature (T7);
- to assist analysis of the contrast between urban and rural industrial sites (T7).

7.3.2 Whilst it is debatable whether the complete dataset from the investigated elements of the sites could fully address all of these, they should nevertheless be borne in mind when addressing more local issues.

7.4 LOCAL AND REGIONAL PRIORITIES

7.4.1 A draft Regional Research Agenda for the North West has recently been published on the internet (Newman and McNeil 2005), and presents priorities and objectives for archaeological research in the region. This document has highlighted the urgent need for the publication of results obtained from detailed analysis of pioneering industrial complexes. Whilst the publication of '*Cotton*

Mills in Greater Manchester' by Williams and Farnie in 1992 provided an important contribution to the study of one of the nation's most important industries, it was necessarily restricted to a general overview. The publication of the archaeological investigations into two early mill complexes that encapsulate all of the major technological advances in steam-powered cotton spinning would represent a significant contribution to the existing body of academic material.

7.4.2 A further priority for archaeological research is to inform a greater understanding of the origins of factory-based industrial settlements and the early development of industrialised urban areas. Ancoats is perhaps one of the best examples of this phenomena in the country, yet few academic works have been dedicated to its development. The inception and development of the excavated sites, together with the surviving mills of the Murray brothers and McConnel & Kennedy, are key to the early expansion and success of Ancoats.

8. UPDATED PROJECT DESIGN

8.1 AIMS AND OBJECTIVES OF PROGRAMME OF ANALYSIS

8.1.1 ***Overall objectives:*** the overall objectives are:

- to secure the publication of the archaeological investigations of two late 18th century textile mills in an appropriate academic manner;
- to contribute to an understanding of steam-assisted manufacture in the early part of the 19th century to act as a benchmark against which future work on similar sites in the region may be measured;
- to deposit a completed project archive into the public domain.

8.1.2 ***Specific objectives:*** the specific objectives which the data can address are:

1. to characterise and date the sequence of the excavated structures and deposits revealed to elucidate an understanding of the power transmissions inherent in the exposed structures;
2. to place the mill complexes and the introduction of the steam-powered textile factory into the context of the evolution of mill power systems in Ancoats, using examples of other mills in the vicinity;
3. to integrate the site-based evidence with the documentary material to provide a coherent account of the development of the mills' complex, including the actual buildings, and the companies that occupied them;
4. to highlight the pioneering contribution that the mills made to the development of Manchester's cotton-spinning industry, and the phenomenal growth of Ancoats during the first half of the 19th century;
5. to disseminate the significance of the mill complexes, particularly to the local and regional population, and contribute to a greater appreciation of the area's rich industrial heritage.

8.2 PRESENTATION OF RESULTS

8.2.1 In accordance with the guideline outlined in the English Heritage document *Management of Archaeological Projects 2* (English Heritage 1991a), it is proposed that the results of the project should be presented in the following stages:

1 **Publication texts:** the dataset generated from the on-going programme of archaeological investigation associated with the New Islington development is clearly of high local significance. Once the entire programme of fieldwork has been completed, an updated project design for the dissemination of the results to the public in an appropriate manner may be devised. However, the excavations of Salvin's Factory and New Islington Mill have produced findings of regional, and potentially national, significance that merit further analysis and

preparation of an academic text suitable for publication in their own right.

It is important to ensure that any such academic publication is presented in a manner that is accessible to anyone with an interest in the industrial development of Ancoats. In this respect, the results should be integrated with a wider discussion of the textile industries in the area.

2 **Project archive:** the completion of the project will result in an integrated archive, which will be deposited with The Museum of Science and Industry in Manchester.

9. METHOD STATEMENT

9.1 INTRODUCTION

9.1.1 This statement relates the tasks to the aims and objectives specified in *Section 8.1* above. The programme of works is tailored to address the specific objectives, which, when achieved, will secure the general objectives outlined in *Section 8.1* above.

9.2 START-UP

9.2.1 ***Task 1:*** to facilitate all objectives.

9.2.2 All members of the project team will be fully briefed by means of a project meeting, and a timetable will be established.

9.3 STRATIGRAPHIC ANALYSIS

9.3.1 ***Tasks 2-8:*** to address Objective 1, and contribute to all other objectives.

9.3.2 The stratigraphic sequence for each site will form the contextual framework for an integrated report which, following the incorporation of documentary and artefactual data, will form the framework for the interpretation of the sites. The interpretative framework will be based on the refinement of broad chronological phases into sub-phases reflecting changes in the organisation of the textile mills.

9.3.3 Detailed structural analysis will be undertaken on those features identified as being of major interpretative importance to the sites.

9.4 DOCUMENTARY RESEARCH

9.4.1 ***Task 9:*** to address Objectives 2 - 4.

9.4.2 Further documentary research will be undertaken to enhance the fieldwork results, as a firm link between stratigraphic analysis and primary documentary data will prove invaluable in interpreting the remains of both textile mills. Further documentary study will be focused upon eliciting information pertaining to the development of the individual mills and the textile industry in Manchester. Research will also be undertaken to identify comparable structures elsewhere, from either historical or archaeological sources.

9.5 FINDS ANALYSIS

9.5.1 ***Task 10:*** to address Objective 3.

9.5.2 A full catalogue will be compiled for each material category, accompanied with illustrations where necessary. This will lead to the production of a brief text for each material category, with comparators where possible. This data will form the basis of a link between documentary and physical remains, forming a

framework for a discussion of the technical processes and everyday life within the textile mills. In this, most weight will be placed on the pottery and glass assemblages.

9.6 PRODUCTION OF TEXT

9.6.1 ***Task 11:*** a draft text and illustrative material will be produced and edited.

9.6.2 During each part of the analytical programme, a selection will be made of appropriate material for illustration. This will cover general plans, phase plans, and artefacts. Experienced illustrators, using standard conventions, will compile these illustrations, either digitally for the plans, or manually as appropriate. A number of artefacts will be photocopied for the publication.

9.6.3 Following the completion of the full analysis of all the stratigraphic and artefactual evidence, a text suitable for publication will be drawn up. This could be in the format described in *Section 10*, and will incorporate as necessary any information from comparable excavations. This text will be submitted to internal revision, and will be submitted to all specialists after editing, for their comments. The edited text will be submitted to an external referee for formal academic review, after which it will be copy edited, ready for publication.

9.7 ARCHIVE

9.7.1 ***Task 12:*** on completion of the publication text, the research archive will be finalised, and the finds archive deposited with the Museum of Science and Industry in Manchester.

10. PUBLICATION SYNOPSIS

10.1 INTRODUCTION

10.1.1 An academic text presenting the important results obtained from the archaeological investigations of Salvin's Factory and New Islington Mill requires preparation suitable for publication in an appropriate manner. The text should not exceed 15,000 words in length, and will be accompanied by suitable illustrations.

10.1.2 The text will require placing within the context of the development of Ancoats as the world's first true industrial suburb, and the evolution of the steam-powered textile mill in Manchester. This will necessarily require comparison and reference to other textile mills in the area to provide an overview of an industry that was to dominate the region's economy throughout the 19th century.

10.1.3 In order to achieve the objectives outlined in *Section 8*, it is recommended that a text is prepared as a special chapter for inclusion in the academic monograph on Murrays' Mills, which is currently in preparation. This will allow the results obtained from Salvin's Factory and New Islington Mill to be placed in their historic context, in addition to the project's modern context of regeneration schemes within Ancoats, in a cost-effective fashion. Elements will also be included within a wider discussion of the contribution that the early textile mills made to the development of Ancoats and Manchester.

10.2 THE STRUCTURE OF THE REPORT

10.2.1 The following section represents a likely breakdown of the proposed publication. It should be noted, however, that this synopsis can only be regarded as a draft, based on the current understanding of the article/chapter.

10.2.2 The text will be supported by a number of graphics, comprising drawings and photographs, to illustrate the evidence, tables to summarise data and, where appropriate, interpretative phase drawings. The finished text will aim to present a high degree of integration between the structural/stratigraphical history of the site, the documentary evidence, and the contextual background.

10.3 OUTLINE SYNOPSIS

1. INTRODUCTION

1.1 Site location

2. DOCUMENTARY BACKROUND

2.1 Technological background

2.2 Documentary evidence for Salvin's Factory and New Islington Mill

3. THE ARCHAEOLOGICAL INVESTIGATIONS

3.1 Phased description of the structures encountered during the archaeological investigations

4. DISCUSSION

4.1 Chronological and technological discussion

4.2 Thematic context

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Acknowledgements

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APPENDIX 1: PROJECT DESIGN FOR SALVIN'S FACTORY

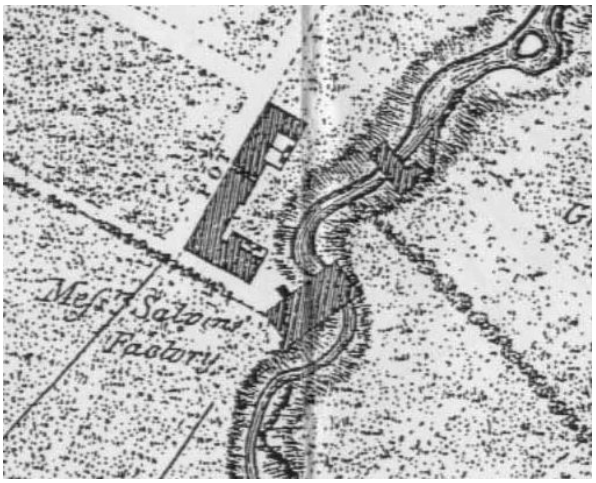
March 2005

Oxford Archaeology North

SALVIN'S FACTORY,

NEW ISLINGTON,

MANCHESTER



Extract from Adshead's Map of the Townships of Manchester, 1850

ARCHAEOLOGICAL EXCAVATION

REVISED PROJECT DESIGN

Proposals

The following revised project design is offered in response to a request from Mr Richard Hattan, of Urban Splash Ltd, acting on behalf of the New Islington Client Group, for an archaeological excavation of Salvin's Factory in advance of the proposed development of land at New Islington, Ancoats, Manchester.

1. BACKGROUND

1.1 CIRCUMSTANCES OF PROJECT

1.1.1 This project design is for one element of a programme of archaeological work that is required as part of the New Islington development within the Ancoats area of Manchester, and has been formulated to meet the requirements of a specification produced by Norman Redhead, the Assistant County Archaeologist for Greater Manchester. The development is being delivered by a partnership between Urban Splash Ltd, English Partnerships, New East Manchester and Manchester City Council, and concerns the redevelopment of land between the Rochdale and Ashton Canals.

1.1.2 Outline planning permission has been received for the Strategic Framework, which proposes the construction of 1400 new homes, a primary school, a health centre, and a new waterway. The development involves substantial earth-moving works, which may have a negative impact on the sub-surface archaeological resource, namely the remains of several historic cotton mills, ancillary textile works, a glass works, and the canals that served them.

2.1 HISTORICAL BACKGROUND

2.1.1 Salvin's Factory (centred at NGR SJ 8526 9852) is thought to date to the third quarter of the 18th century, and the site appears on the earliest detailed maps of the area, including William Green's *Map of Manchester and Salford*, published in 1794. The factory is known to have operated as a 'room and power' mill, where small firms could rent the space and machinery necessary to spin cotton. In 1793, the firm of McConnel and Kennedy, which became the largest cotton-spinning firm in Manchester during the 19th century (Lee 1972), occupied Salvin's Factory. Map regression analysis has indicated that the original core of the mill was within the part of the site that is to be destroyed during the proposed construction of the canal wall.

2.1.2 The mill was originally water-powered, but had been modified by 1796 when a steam engine installed by the Manchester engineer Joshua Wrigley is known to have been in operation (Williams and Farnie 1992). This engine would have been used to pump the water that then drove the water-wheel, ensuring a steady supply of power to the mill. This system represented an important stage in the transition from water-powered mills to those powered by steam, not least for leading to the introduction of the mill chimney. The mill doubled in size during the first decades of the 19th century with the addition of a new building to the north. These buildings appear from cartographic evidence to have been replaced during the late 19th century when the site was remodelled.

2.1.3 A recent programme of archaeological evaluation has demonstrated that significant structural remains of the mill survive across the site, from depths of 1m below the modern ground surface. These remains were revealed to be well-preserved, and represented several phases in the development of the mill complex.

1.3 OXFORD ARCHAEOLOGY

1.3.1 Oxford Archaeology has over 30 years of experience in professional archaeology, and can provide a professional and cost effective service. We are the largest employer of archaeologists in the country (we currently have more than 200 members of staff) and can thus deploy considerable resources with extensive experience to deal with any archaeological obligations you or your clients may have. We have offices in Lancaster and Oxford, trading as Oxford Archaeology North (OA North), and Oxford Archaeology (OA) respectively, enabling us to provide a truly nationwide service. Watching briefs, evaluations and excavations have taken place within the planning process, to fulfil the requirements of clients and planning authorities, to very rigorous timetables. OA is an Institute of Field Archaeologists Registered Organisation (No 17), and is thus bound by the IFA's Code of Conduct and required to apply the IFA's quality standards.

1.3.2 Given the geographical location of Manchester, it is intended to co-ordinate the project from our northern office in Lancaster, though the project team will use the most appropriate resources from both offices. Between our two offices our company has unrivalled experience of working on post-medieval sites, and is recognised as one of the leading archaeological units in the country with regard to dealing with Industrial Period projects.

1.3.3 OA North has considerable experience of the assessment, evaluation and excavation of sites of all periods, and has particular experience of industrial archaeology in the North West having undertaken in recent years excavation, survey, building recording and post-excavation projects in both urban and rural environments; *inter alia* (locally to Manchester) the survey, excavation, recording, analysis, consolidation, publication and consultancy relating to the 'Hotties' continuous glass tank furnace at St Helens (Krupa and Heawood 2002); the excavation of the former Calprina textile works in Stalybridge (OA North 2002a); the excavation and survey of the Macintosh Mill in Manchester (OA North 2002b); the evaluation and excavation of the Jersey Street Flint Glass Works in Ancoats, Manchester (OA North 2004c); and a programme of archaeological investigation at the Torrs complex of textile factories in New Mills in Derbyshire. OA North are also currently undertaking a comprehensive programme of survey and excavation of the Murrays' Mills in Ancoats, which are the oldest surviving steam-powered cotton spinning mills in Manchester.

2. AIMS AND OBJECTIVES

2.1 ACADEMIC AIMS

2.1.1 The main research aim of the investigation, given the commercial nature of the development, will be to characterise the level of preservation and significance of the archaeological remains relating to this early textile mill, and to provide a mitigation record of all parts of the former mill that will be destroyed during the proposed development.

2.2 OBJECTIVES

2.2.1 The objectives of the project may be summarised as follows:

- to expose and determine the presence, character, and level of survival of and external walls of the mill and establish any evidence for phasing;
- to expose and determine the presence, character, and level of survival of the water-wheel pit;
- to elucidate the mechanisms of water-management features;
- to expose and determine the presence, character, and level of survival of the steam-powered water-returning engine and associated boiler house;
- to expose and determine the presence, character, and level of survival of the mill chimney;
- to allow for the publication of the results of the excavation in a manner appropriate to their significance.

3. METHOD STATEMENT

3.1 The following work programme is submitted in line with the aims and objectives summarised above, and in accordance with the project brief supplied by the Greater Manchester Assistant County Archaeologist.

3.2 **FIELDWORK**

3.2.1 In order to manage the large volume of spoil that will be generated from the excavation, and other logistical considerations, it is proposed that the fieldwork will comprise three phases.

- *Phase 1:* this will investigate the south-western part of the mill, which incorporates elements of the original building and the early 19th century extension, as shown on Bancks and Co's map of 1831. The extension is thought to contain elements of the early steam-power plant. The excavation trench will measure some 20m by 10m, and will extend 10m either side of the proposed canal wall.

- *Phase 2:* will comprise the excavation of a linear trench, measuring some 20m by 6m, which will be placed at a right angle to the Phase 1 trench and adjacent to the recently installed sewer. The trench will be centred along the line of proposed canal wall, and will investigate the survival of the external walls of the mill's mid-19th century extension, and any evidence of internal phasing.

- *Phase 3:* will comprise the excavation of a trench measuring some 12m by 12m, which will be placed across the north-eastern part of the original factory, outside of the main contractor's hoarding line. This trench will aim to investigate the water-wheel pit and associated water-management features, believed to have been situated across Shooter's Brook, and the early steam-power plant. The proposed positions of the trenches, superimposed on historic mapping, are shown in Figures 1 and 2.

3.2.2 Excavation of the uppermost levels of modern overburden/demolition material will be undertaken by a machine fitted with a toothless ditching bucket to the top of the first significant archaeological level. The work will be supervised by a suitably experienced archaeologist. Spoil from the excavations will stored temporarily adjacent to the trench and then removed by the main contractor, except for the Phase 3 trench, which will backfilled upon completion of the archaeological works.

3.2.3 Machine excavation will then be used to define carefully the extent of any surviving walls, foundations, and other remains. Thereafter, structural remains will be cleaned manually to define their extent, nature, form and, where possible, date. It should be noted that no archaeological deposits will be entirely removed from the site. If the excavation is to proceed below a depth of 1.2m, which is to be anticipated, then the trenches will be widened sufficiently to allow the sides to be stepped in.

3.2.4 All information identified in the course of the site works will be recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results of the evaluation will be recorded on *pro-forma* context sheets, and will be accompanied with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.

3.2.5 A full and detailed photographic record of individual contexts will be maintained and similarly general views from standard view points of the overall site at all stages of the evaluation will be generated. Photography will be undertaken using 35mm cameras on archivable black and white print film as well as colour transparency, and all frames will include a visible, graduated metric scale. Extensive use of digital photography will also be undertaken throughout the course of the fieldwork for presentation purposes. Photographs records will be maintained on special photographic *pro-forma* sheets.

3.2.6 The precise location of the trenches, and the position of all archaeological structures encountered, will be surveyed by EDM tacheometry using a total station linked to a pen computer data logger. This process will generate scaled plans within AutoCAD, which will then be subject to manual survey enhancement. The drawings will be generated at an accuracy appropriate for 1:20 scale, but can be output at any scale required. Sections will be manually drafted as appropriate at a scale of 1:10. All information will be tied in to Ordnance Datum.

3.2.7 Human remains are not expected to be present, but if they are found they will, if possible, be left *in situ* covered and protected. If removal is necessary, then the relevant Home Office permission will be sought, and the removal of such remains will be carried out with due care and sensitivity as required by the *Burials Act 1857*.

3.2.8 Any gold and silver artefacts recovered during the course of the excavation will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act, 1996.

3.2.9 ***Finds policy:*** finds recovery and sampling programmes will be in accordance with best practice (following current Institute of Field Archaeologists guidelines) and subject to expert advice in order to minimise deterioration. OA has close contact with Ancient Monuments Laboratory staff at the University of Durham and, in addition, employs in-house artefact and palaeoecology specialists, with considerable expertise in the investigation, excavation, and finds management of sites of all periods and types, who are readily available for consultation.

3.2.10 Finds storage during fieldwork and any site archive preparation will follow professional guidelines (UKIC). Emergency access to conservation facilities is maintained by OA North with the Department of Archaeology, the University of Durham. Samples will also be collected for technological, pedological and chronological analysis as appropriate.

3.3 HEALTH AND SAFETY

3.3.1 OA North provides a Health and Safety Statement for all projects and maintains a Safety Policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (3rd Edition, 1997). OA North will liase with the Client/main contractor to ensure all current and relevant health and safety regulations are met.

3.3.2 OA North has professional indemnity to a value of £2,000,000, employer's liability cover to a value of £10,000,000 and public liability to a value of £15,000,000. Written details of insurance cover can be provided if required.

3.3.3 Normal OA North working hours are between 9.00 am and 5.00 pm, Monday to Friday, though adjustments to hours may be made to maximise daylight working time in winter and to meet travel requirements. It is not normal practice for OA North staff to be asked to work weekends or bank holidays and should the Client require such time to be worked during the course of a project a contract variation to cover additional costs will be necessary.

3.4 OTHER MATTERS

3.4.1 Access to the site will be arranged via the Client/main contractor.

3.4.2 The Client/main contractor will be responsible for the provision of a secure enclosed area for the archaeological work to take place within.

3.4.3 The Client/main contractor is asked to provide OA North with information relating to the position of live services on the site. OA North will use a cable detecting tool in advance of any machine excavation.

3.4.4 It is anticipated that OA North will be granted the use of the existing welfare facilities in the Volker Stevin compound.

3.5 POST-EXCAVATION AND REPORT PRODUCTION

3.5.1 ***Archive:*** the results of the fieldwork 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*) and the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. 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.

3.5.2 The paper and finds archive for the archaeological work undertaken at the site will be deposited with the Museum of Science and Industry in Manchester, as this is the nearest museum which meets Museums' and Galleries' Commission criteria for the long term storage of archaeological material

(MGC 1992). This archive can be provided in the English Heritage Centre for Archaeology format, both as a printed document and on computer disks as ASCii files (as appropriate). The archive will be deposited with the Museum of Science and Industry in Manchester within six months of the completion of the fieldwork.

3.5.3 Except for items subject to the Treasure Act, all artefacts found during the course of the project will be donated to the receiving museum.

3.5.4 A synthesis (in the form of the index to the archive and a copy of the publication report) will be deposited with the Greater Manchester Sites and Monuments Record. A copy of the index to the archive will also be available for deposition in the National Archaeological Record in London.

3.5.5 ***Report:*** the site records, finds and any samples from the excavation programme outlined below will form a checked and ordered site archive as outlined in the English Heritage guideline document *Management of Archaeological Projects* (2nd edition, 1991b) (hereafter MAP 2). Following compilation of the project archive, a report will be produced assessing the potential of the archive (including the paper archive, the finds archive and any palaeoenvironmental samples that are taken) for further analysis as defined in MAP 2 Appendix 4. This post-excavation assessment report will make recommendations for further analysis and publication of the results, as appropriate.

3.5.6 Four copies of a bound and collated assessment report will be submitted to the Client within six weeks of the completion of the fieldwork. Further copies will be sent to the Manchester Planning Department, the Assistant County Archaeologist, the Greater Manchester Sites and Monuments Record, and the Museum of Science and Industry in Manchester. The report will include a copy of this project design, and indications of any agreed departure from that design. It will include an historical and archaeological background to the study area, an outline methodology of the investigation, and present, summarise, assess, and interpret the results of the programme of archaeological works detailed above. It will also include an assessment of any finds recovered from the evaluation trenching. In addition, recommendations for any further mitigation works and details of the final deposition of the project archive will also be made.

3.5.7 A summary of the results produced from the archaeological investigation will be published in the CBA North West magazine.

3.5.8 ***Confidentiality:*** the final report is designed as a document for the specific use of the Client, 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.

APPENDIX 2: PROJECT DESIGN FOR NEW ISLINGTON MILL

August 2004

Oxford Archaeology North

NEW ISLINGTON MILL,

NEW ISLINGTON,

MANCHESTER

ARCHAEOLOGICAL RECORDING METHOD STATEMENT

Proposals

The following method statement is offered in response to a request from Mr Richard Hattan, of Urban Splash Ltd, acting on behalf of the New Islington Client Group, for a programme of archaeological recording at New Islington Mill in advance of the proposed development of land at New Islington, Ancoats, Manchester.

1. BACKGROUND

1.1 This method statement is for a programme of archaeological recording that is to be undertaken during the redevelopment of the site of New Islington Mill, Ancoats, Manchester (centred on SJ 8533 9866). The site has been subjected recently to an archaeological evaluation (OA North 2004b), which revealed considerable remains of this early textile mill to survive *in situ*. In particular, significant elements of a sequence of engine and boiler houses were exposed within the south-eastern part of the proposed development area.

1.2 Following on from the results of the evaluation, the Greater Manchester Assistant County Archaeologist has recommended that further archaeological work is required before the planning condition attached to the redevelopment of this site can be released.

2. OBJECTIVES

2.1 The objectives of the project may be summarised as follows:

- to furnish a greater understanding of the mill's power systems;
- to establish the presence or absence of water-power features within the eastern part of the site;
- to record the line of the flue encountered during the evaluation trenching;
- to establish the nature, extent and precise position of other structural remains across the site;
- to recover discrete structural components, such as stone ashlars used as engine mounting blocks, for possible future display purposes.

3. METHOD STATEMENT

3.2 The following work programme is submitted in line with the objectives summarised above, and in accordance with a verbal project brief specified by the Greater Manchester Assistant County Archaeologist.

3.2 **FIELDWORK**

3.2.11 The archaeological recording will be undertaken in conjunction with the development programme. It is envisaged that this will proceed in two phases:

- *Phase 1 - Initial preparatory works*: the area considered to be of high archaeological significance, which is focused upon the mill's engine and boiler houses (Fig 1), will be subject to a programme of rapid archaeological excavation. The area will be stripped to a depth of *c*1m, and the position and extent of all structures encountered will then be recorded archaeologically.

- *Phase 2 - Further earth-moving works:* an intensive archaeological watching brief will be undertaken throughout the process of ground reduction across the site, and during the excavation of foundation and service trenches.

3.2.12 ***Excavation***: the area identified during the archaeological evaluation as being of high significance will be stripped to a depth of *c*1m below the modern ground surface; this area is shown in Figure 1, and will be surveyed and marked on the ground in advance of any redevelopment work.

3.2.13 Excavation of the uppermost levels of modern overburden/demolition material will be undertaken by a machine fitted with a toothless ditching bucket to the top of the first significant archaeological level. The work will be supervised by a suitably experienced archaeologist. Spoil from the excavation will stored adjacent to the trench, and will be backfilled upon completion of the archaeological works.

3.2.14 Machine excavation will then be used to define carefully the extent of any surviving walls, foundations, and other remains. Thereafter, structural remains will be cleaned manually to define their extent, nature, form and, where possible, date. It should be noted that no archaeological deposits will be entirely removed from the site.

3.2.15 All information identified in the course of the site works will be recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results of the excavation will be recorded on *pro-forma* context sheets, and will be accompanied with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.

3.2.16 A full and detailed photographic record of individual contexts will be maintained and similarly general views from standard view points of the overall site at all stages of the evaluation will be generated. Photography will be undertaken using 35mm cameras on archivable black and white print film as well as colour transparency, and all frames will include a visible, graduated metric scale. Extensive use of digital photography will also be undertaken throughout the course of the fieldwork for presentation purposes. Photographs records will be maintained on special photographic *pro-forma* sheets.

3.2.17 The position of all archaeological structures encountered will be surveyed by EDM tacheometry using a total station linked to a pen computer data logger. This process will generate scaled plans within AutoCAD 14, which will then be subject to manual survey enhancement. The drawings will be generated at an accuracy appropriate for 1:20 scale, but can be output at any scale required. Sections will be manually drafted as appropriate at a scale of 1:10. All information will be tied in to Ordnance Datum.

3.2.18 ***Watching Brief:*** a programme of field observation will accurately record the location, extent, and character of any surviving archaeological features within the specified areas. This work will comprise the observation of the process of excavation for these works, the systematic examination of any subsoil horizons exposed during the course of works, and the accurate recording of all archaeological features and structures, and any artefacts, identified during observation.

3.2.19 During this phase of work, recording will comprise a full description and preliminary classification of features or materials revealed, and their accurate location (either on plan and/or section, and as grid co-ordinates where appropriate). All archaeological information collected in the course of fieldwork will be recorded in standardised form, and will include accurate national grid references. A photographic record will be undertaken simultaneously. The recording techniques and procedures employed by OA North for such detailed recording represent current best practice.

3.2.20 It is assumed that OA North will have the authority to stop works to enable the recording of important features, and to call in additional archaeological support if a find of particular importance is identified. This would only be called into effect in agreement with the Client and the archaeological curator, or his representative, and will require a contingency sum. In normal circumstances, field recording will also include a continual process of analysis, evaluation, and interpretation of the data, in order to establish the necessity for any further more detailed recording that may prove essential.

3.2.21 ***Finds policy:*** finds recovery and sampling programmes will be in accordance with best practice (following current Institute of Field Archaeologists guidelines) and subject to expert advice in order to minimise deterioration. OA has close contact with Ancient Monuments Laboratory staff at the University of Durham and, in addition, employs in-house artefact and palaeoecology specialists, with considerable expertise in the investigation,

excavation, and finds management of sites of all periods and types, who are readily available for consultation.

3.2.22 Any gold and silver artefacts recovered during the course of the excavation will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act, 1996.

3.2.23 Human remains are not expected to be present, but if they are found they will, if possible, be left *in situ* covered and protected. If removal is necessary, then the relevant Home Office permission will be sought, and the removal of such remains will be carried out with due care and sensitivity as required by the *Burials Act 1857*.

3.2.24 Finds storage during fieldwork and any site archive preparation will follow professional guidelines (UKIC). Emergency access to conservation facilities is maintained by OA North with the Department of Archaeology, the University of Durham. Samples will also be collected for technological, pedological and chronological analysis as appropriate.

3.3 HEALTH AND SAFETY

3.3.1 OA North provides a Health and Safety Statement for all projects and maintains a Safety Policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (3rd Edition, 1997). OA North will liase with the Client/main contractor to ensure all current and relevant health and safety regulations are met.

3.3.2 OA North has professional indemnity to a value of £2,000,000, employer's liability cover to a value of £10,000,000 and public liability to a value of £15,000,000. Written details of insurance cover can be provided if required.

3.3.3 Normal OA North working hours are between 9.00 am and 5.00 pm, Monday to Friday, though adjustments to hours may be made to maximise daylight working time in winter and to meet travel requirements. It is not normal practice for OA North staff to be asked to work weekends or bank holidays and should the Client require such time to be worked during the course of a project a contract variation to cover additional costs will be necessary.

3.4 OTHER MATTERS

3.4.1 Access to the site will be arranged via the Client/main contractor.

3.4.2 The Client/main contractor will be responsible for the provision of a secure enclosed area for the archaeological work to take place within.

3.5 POST-EXCAVATION AND REPORT PRODUCTION

3.5.1 ***Archive:*** the results of the fieldwork 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*) and the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. 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.

3.5.9 The paper and finds archive for the archaeological work undertaken at the site will be deposited with the Manchester Museum, as this is the nearest museum which meets Museums' and Galleries' Commission criteria for the long term storage of archaeological material (MGC 1992). This archive can be provided in the English Heritage Centre for Archaeology format, both as a printed document and on computer disks as ASCii files (as appropriate). The archive will be deposited with the Manchester Museum within six months of the completion of the fieldwork.

3.5.10 A synthesis (in the form of the index to the archive and a copy of the publication report) will be deposited with the Greater Manchester Sites and Monuments Record. A copy of the index to the archive will also be available for deposition in the National Archaeological Record in London.

3.5.11 ***Report:*** four copies of a bound and collated final report will be submitted to the Client within six weeks of the completion of the fieldwork. Further copies will be sent to the Manchester Planning Department, the Assistant County Archaeologist, the Greater Manchester Sites and Monuments Record, and Manchester Museum. The final report will include an historical and archaeological background to the study area, an outline methodology of the investigation, and present, summarise, assess, and interpret the results of the programme of archaeological works detailed above. It will also include an assessment of any finds recovered from the evaluation trenching. In addition, details of the final deposition of the project archive will also be made.

3.5.12 A summary of the results produced from the archaeological investigation will be published in the CBA North West magazine.

3.5.7 ***Confidentiality:*** the final report is designed as a document for the specific use of the Client, 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.

APPENDIX 3: SUMMARY CONTEXT LISTS

SALVIN'S FACTORY

Context	Description	Phase
21	Flue channels encountered during evaluation in Trench 2	3
100	North external wall of structure post-dating mill	4
101	East wall of boiler room ***107***	3
102	Flagstone yard surface	4
103	Fuel ash waste make-up layer	4
104	Stone columns relating to boiler house	3
105	East/west-aligned wall of structure post-dating mill	4
106	Cobble surface or alley east of the former mill	4
107	Boiler room group number	3
108	Original north external wall of the mill	1
109	Doorway through wall ***101***	3
110	Natural clay in Areas 1, 3 and 4	-
111	Brick floor of boiler room ***107***	3
112	North wall of boiler room ***107***	3
113	Short north/south-aligned wall below boiler room ***107***	1
114	Yellow clay in boiler room ***107***	-
115	Original west external wall of mill	1
116	East wall of boiler room ***107***	3
117	Man-hole truncating floor ***111***	4
118	Rake-out pit group number boiler room ***107***	3
119	Retaining wall along west edge of pit ***118***	3
120	North wall of pit ***118***	3
121	South wall of pit ***118***	3
122	Brick floor of pit ***118***	3

Context	Description	Phase
123	North-west/south-east-aligned wall butting ***115*** below room ***107***	1
124	Fuel ash interface between floor ***111*** and layer ***114***	3
125	Flagstone pavement butting the outside edge of wall ***115***	3
126	Stone capping sealing pit ***118***	3
127	Stone-and brick-built stack within boiler room ***107***	3
128	North-east/south-west-aligned interior wall	3
129	East/west-aligned exterior wall	4
130	Flue group number	3
131	Natural clay in Area 2	-
132	Brick roof of flue ***130***	3
133	South wall of flue ***130***	3
134	North wall of flue ***130***	3
135	Brick floor of flue ***130***	3
136	Vertical flue (chimney) group number	3
137	South wall of chimney ***136***	3
138	South wall of chimney ***136***	3
139	North return of wall of ***133***	3
140	Access pit at the west end of flue ***130***	3
141	Blocked air vent within east face of wall ***137***	3
142	Linear feature between wall ***138*** and pit ***140***	3
143	North/south-aligned internal wall possibly associated with Engineering works	4
144	Redeposited clay packed around culvert ***145***	1
145	Culvert possibly associated with direct carriage of water from Shooter's Brook	1
146	East wall of culvert ***145***	1
147	Concrete floor foundation of engineering works	4
148	Sandy-silt levelling layer above ***144***	4

Context	Description	Phase
149	East retaining wall remnant for roof arch ***151***	2
150	Curved brick extension along the east and west edge of culvert ***153***	2
151	Culvert roof arch (earliest phase)	1
152	Culvert roof arch (latest phase)	2
153	Possible remains of a culvert roof arch	2
154	East wall of basement ***100***	4
155	Original west wall of culvert ***145***	2
156	North external wall of structure post-dating mill	4
157	Culvert placed across the edge of stone columns ***104***	3
158	Partition wall running along the same alignment as wall ***160***	3
159	Stone piers in Area 4 (same as ***104***)	3
160	Partition wall	3
161	Partition wall possibly associated with engineering works	4
162	Clay/silt levelling above culvert roofs ***145*** and ***153***	2
163	Channel/drain running into culvert ***145***	2
164	Demolition layer across the site	4
165	Redeposited natural clay between wall ***129*** and flue ***130***	2
166	Redeposited clay below wall ***158***	3
167	Stone block/machine base?	3
168	Basement	4
169	Floor of basement ***168***	4
170	South wall of basement ***168***	4

NEW ISLINGTON MILL

Context	Description	Phase
100	Engine/Power room, group number	1
101	West wall of room ***100***	1
102	North wall of room ***100***	1
103	Brick platform along east edge of room ***100***	4
104	Not used	-
105	Ashlar blocks below platform ***103***	4
106	Not used	-
107	Area of repair within the west face of platform ***103***, possibly associated with modifications to machine base ***109***	4
108	Condenser pit	2
109	Brick and stone machine base within the floor of room ***100***	2
110	Metal pipe running through machine base ***109***	4
111	Millstone Grit ashlar engine blocks below the inner west face of platform ***103***	4
112	Not used	-
113	Socket within the west face of platform ***103***	4
114	Sunken brick-lined pit in the north-east corner of room ***100***	2
115	Sockets and recesses within the south face of wall ***101***	2
116	Brick floor running along the inside west edge of room ***100***	2
117	Large rectangular plate laid across the floor of room ***100***, sealing culvert ***118***	2
118	Brick-lined culvert running underneath room ***100***	1
119	Brick wall support for culvert ***118***	1
120	Metal pipe running into blocks ***122***, possibly same as pipe ***110***	4
121	Brick foundation within room ***100***	4
122	Row of five ashlar blocks overlying foundation ***121***	4
123	Brick platform partially overlying blocks ***122***	4

Context	Description	Phase
124	Stone and brick machine bases overlying the west edge of platform ***123***	4
125	East wall of room ***100***	1
126	Rectangular platform with a square central void below machine base ***109***	2
127	Large iron steam pipe overlying floor ***116***	2
128	Boiler room group number	3
129	Row of four brick platforms along the south edge of boiler room ***128***	3
130	Brick pile overhanging platforms ***129***	3
131	East wall of boiler room ***128***	3
132	North wall of boiler room ***128***	3
133	North/south-aligned wall, butting wall ***132***	5
134	North-east corner of wall of boiler room ***128***	3
135	West extension of wall ***134***	3
136	Large Millstone Grit machine block, butting wall ***134***	3
137	Brick pedestal base below machine block ***136***	3
138	Row of two brick platforms along the north edge of boiler room ***128***	3
139	Brick pile overhanging platforms ***138***	3
140	Cast iron pipe running from room ***141*** into boiler room ***128***	3
141	Pumping engine room group number	3
142	Reinforced south wall of boiler room, butting wall ***101***	3
143	Flue group number	4
144	West retaining wall for flue ***143***	4
145	East retaining wall for flue ***143***	4
146	Brick arched flue roof	4
147	Clinker backfill of flue	4
148	East/west-aligned wall, butting wall ***145***	4
149	Channel through wall ***145***, sealed by iron lintel	4

Context	Description	Phase
150	Channel through flue roof ***146***, sealed by iron lintel	4
151	Circular chamber along the east edge of flue ***143***, serving an unknown function	4
152	North wall of chamber ***151***	4
153	South wall of chamber ***151***	4
154	South wall of flue ***143***	4
155	North wall of flue ***143***	4
156	West inner flue wall	4
157	North/south-aligned wall butting wall ***154***	5
158	Cast iron pipe contained within walls ***157*** and ***154***	5
159	East external wall of pumping engine room ***141***	3
160	Row of two stone ashlar blocks along the west edge of pumping engine room ***141***	3
161	Fuel ash waste between wall ***159*** and blocks ***160*** (same as ***216***)	3
162	Ashlar machine base (with sump) at the north-west edge of pumping engine room ***141***	3
163	Ashlar machine base butting the south-east edge of machine base ***162***	3
164	Brick platform between blocks ***160*** and machine base ***163***	3
165	Wheel pit	3
166	Ashlar machine base along the north-east edge of wheel pit ***165***	3
167	Brick platform north of machine base ***166***	3
168	Ashlar machine base butting block ***188*** in the south-east corner of pumping engine room ***141***	3
169	Make-up layer south of machine base ***166***	4
170	Flagstone sealing layer ***169***	4
171	Flagged floor below layer ***169***	3
172	Brick sloping floor of engine room serving as an engine bed	3
173	Split level brick platform running along the south edge of engine bed ***172***	3
174	Pit in south-west corner of pumping engine room ***141***	3

Context	Description	Phase
175	Pit in south-east corner of pumping engine room ***141***	3
176	North/south wall (same as ***144***) running along the east edge of machine base ***168***	3
177	Concave recesses within the east face of blocks ***160***	3
178	East/west-aligned culvert running below wheel pit ***165***	3
179	North return of culvert ***178***	3
180	Square waterlogged pit at east end of culvert ***118*** dog-leg	4
181	East brick wall of wheel pit ***165***	3
182	Sloping brick edge along the south limit of the wheel pit ***165***	3
183	Stone lintel sealing roof of culvert roof ***179***	3
184	Slot between wall ***102*** and blocks ***160***	3
185	Pipe channel running east/west below blocks ***160*** and machine base ***168***	4
186	Brick base below blocks ***160***	3
187	Ashlar machine base butting the south-western edge of machine base ***166***, along the wheel pit	3
188	Ashlar block butting the south east edge of machine base ***166***	3
189	Brick foundation below machine base ***168***	3
190	Channel north of pit ***175***	3
191	East/west-aligned blocked drain below wall ***190*** feeding pit ***175***	3
192	Brick infill along the west edge of pumping engine room ***141*** below channel ***185***, and butting floor ***172***	3
193	Culvert running east/west across the site	3
194	Disused culvert running east/west across the site	3
195	Active drain running east/west across the site	3
196	External west perimeter wall	3
197	East/west-aligned wall butting the inner face of wall ***101***	4
198	Ashlar machine block on top of wall ***102***	4
199	West wall of wheel pit ***165***	3

Context	Description	Phase
200	Fuel ash waste backfill butting the south edge of wall ***154***	4
201	East-west wall bordering the north edge of platform ***167***	3
202	North/south-aligned wall butting the west edge of platform ***167***	3
203	North/south-aligned wall butting the east edge of platform ***167***	3
204	Demolition debris across the site	5
205	Chimney	4
206	Slot within wall ***193***	3
207	Cellar wall associated with engineering works	5
208	West flue wall (same as ***144***)	4
209	North/south-aligned wall relating to original mill range	3
210	Not used	-
211	South wall of room ***100***	1
212	South wall of room ***100*** (same as ***125***)	1
213	East/west-aligned wall (south) exposed during watching brief	5
214	East/west-aligned wall (north) exposed during watching brief	5
215	Flagstone floor between walls ***213*** and ***214***	5
216	Fuel waste and demolition material between flues ***143*** and ***217***	5
217	Blocked north/south-aligned flue parallel to south end of flue ***143***	4
218	North/south-aligned wall bordering flue ***217***	4
219	Brick-blocked culvert at the south end of flue ***217***	4
220	Stone sett yard surface	5
221	Concrete floor associated with engineering works	5

APPENDIX 4: SUMMARY FINDS CATALOGUE

SALVIN'S FACTORY

Context	Material	Category	Quantity	Description	Date
103	Glass	Ornament	1	Table leg fitting	Late 19th/20th century
103	Ceramic	Vessels	12	Stoneware fragments (three), blue striped industrial slipware (five), sponge-printed bowl, glazed white earthenware, red glazed earthenware storage jar	19th/20th century
103	Copper alloy	Objects	2	Screw-threaded valves	?Late 19th/20th century
103	Glass	Vessels	4	Milk bottle with trademark '*Lancashire Hygienic Dairies Ltd'*, mineral water bottle base with partial trademark '*Blackburn'* embossed on base, ink bottle, and octagonal flask	19th/20th century
144	Ceramic	Vessel	1	Stoneware bottle with trademark '*Stephens, Aldersgate St London''*	19th century
164	Ceramic	Clay Pipe	2	Decorated bowl and stem from separate pipes	19th century
164	Ceramic	Vessels	2	Stoneware bottles, one with trademark '*Paton'*	19th century
165	Ceramic	Vessels	11	Stoneware bottle fragments (five), 'Willow' and Broseley' patterned earthenware (three), glazed white earthenware (two), slipware	18th to 20th centurys
165	Glass	Vessels	5	Bottles (three) with trademarks '*Wilds Whole Fruit Drinks', JC Swales & Co Ltd* (beer), unidentified bottle with '*Manchester'*on base. Wine glass base	Late 19th/20th century

New Islington Mill

Context	Material	Category	Quantity	Description	Date
54 (Tr 1)	Ceramic	Vessels	6	Two complete stoneware bottles (no stamps) and small fragment of a third, fragment of late industrial slipware bowl, one small stoneware jar, one crucible	Late 19th/20th century
54 (Tr 1)	Glass	Vessels	3	Mineral water bottles, one stamped '*N Berry*' and manufactured by Cannington Shaw and Co, St Helens, one '*P Dowd*', and one '*W Hancock*'	Late 19th/20th century
54 (Tr 1)	Glass	Pontil rod	1	Pontil rod used in glass manufacture	Late 19th/20th century
54 (Tr 1)	Glass	Production waste	1	Stem and distorted base of blue wine glass 'waster'	Late 19th/20th century
54 (Tr 1)	Leather	Object	1	Fragment of ?leather shoe	19th/20th century
54 (Tr 2)	Ceramic	Vessel	4	One fragment of industrial slipware, one fragment of tea ware, two fragments of stoneware bottles	Late 19th/20th century
54 (Tr 2)	Ceramic	Object	1	One ceramic object, possibly electrical insulator	20th century
54 (Tr 2)	Glass	Vessels	6	Three cod mineral water bottles, one marble-stopper water bottle, one green lemonade bottle, two milk bottles and small jar	Late 19th/20th century
54 (Tr 2)	Leather	Shoe	3	Fragments of leather shoes	Late 19th/20th century
54 (Tr 3)	Ceramic	Vessels	3	Two stoneware bottles with trade marks ('*Richard Nicols*' and '*J Pratt and Son*') and fragment of transfer-printed ware bowl	Late 19th/20th century
54 (Tr 3)	Glass	?Vessel	1	Small fragment of glass	19th/20th century
54 (Tr 3)	Leather	Shoe	1	Ladies leather shoe	20th century

54 (Tr 4)	Ceramic	Vessels	5	Four stoneware bottles with trade marks ('*Townsends*', '*W Dales Junr*', and two '*R Nuttall*', and fragment of flower pot	Late 19th/20th century
54 (Tr 4)	Glass	Vessels	2	Water bottles with trade marks ('*P Dowd*' and '*Fletcher and Holt*')	Late 19th/20th century
54 (Tr 4)	Glass	Industrial debris	20	Fragments of glass manufacturing debris	19th/20th century
203	Leather	Shoes	4	Shoes in varied degrees of completeness	19th/20th century
203	Leather	Boot	1	Heel attached with hobnails	19th century
203	Industrial Residue	Slag	1	Ferrous lump with glass vitrification	19th century
203	Glass	Vessels	3	Water bottles with trademarks ('*Goodall Backhouse and Co*', '*Ard and Co*')	19th century
203	Glass	Vessels	2	Ink bottle, medicine bottle	19th/20th century
203	Glass	Objects	9	Rods (seven), stoppers (two)	19th century
203	Glass	Industrial debris	2	Fragments of glass manufacturing debris	19th century
203	Glass	Industrial debris	4	Fragments of glass manufacturing debris	19th century
203	Glass	Objects	8	Rods (five), stoppers (two), tile	19th/20th century
203	Glass	Vessels	5	Mineral water bottles (two), fragments	19th/20th century
203	Glass	Objects	9	Rods	19th century
203	Glass	Vessel	1	Mineral water bottle with trademark '*Fletcher & Holt*'	19th century
203	Glass	Bottles	4	Mineral water and beer bottles with trademarks; '*Rob Nuttall*', '*J Pratt & Sons*', '*Pomfre*'and '*P Dowd*'	19th century
203	Glass	Vessel	1	Blue wine glass	19th century

203	Ceramic	Vessel	26	Blue striped industrial slipware (eight), Agate ware (one), brown trail slipware (one), glazed white earthenwares (17)	18th to 20th centurys
203	Ceramic	Vessel	14	Glazed white earthenwares (eight), industrial slipware (two), porcelain (two)	19th/20th century
203	Ceramic	Vessel	3	Industrial slipware cup with mid brown and white dots on a light brown background, porcelain, glazed white earthenware	19th/20th century
203	Ceramic	Vessel	17	Stoneware ginger beer bottle with trademark '*Nuttall*'(one), numerous unmarked stoneware bottle fragments (16)	19th century
203	Ceramic	Vessel	2	Stoneware ginger beer bottle with trademark '*J Bourne and Son*'	1871-1880
203	Ceramic	Vessel	5	Unmarked stoneware bottle and bowl fragments	19th century
203	Ceramic	Vessel	6	Stoneware bottles with trademark '*R Bowes & Son*'	19th century
203	Ceramic	Vessel	20	Unidentified stoneware fragments	19th/20th century
203	Ceramic	Clay Pipe	5	Undecorated stems	19th century

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Plate 28 Flue ***143*** along the east edge of engine room ***141***

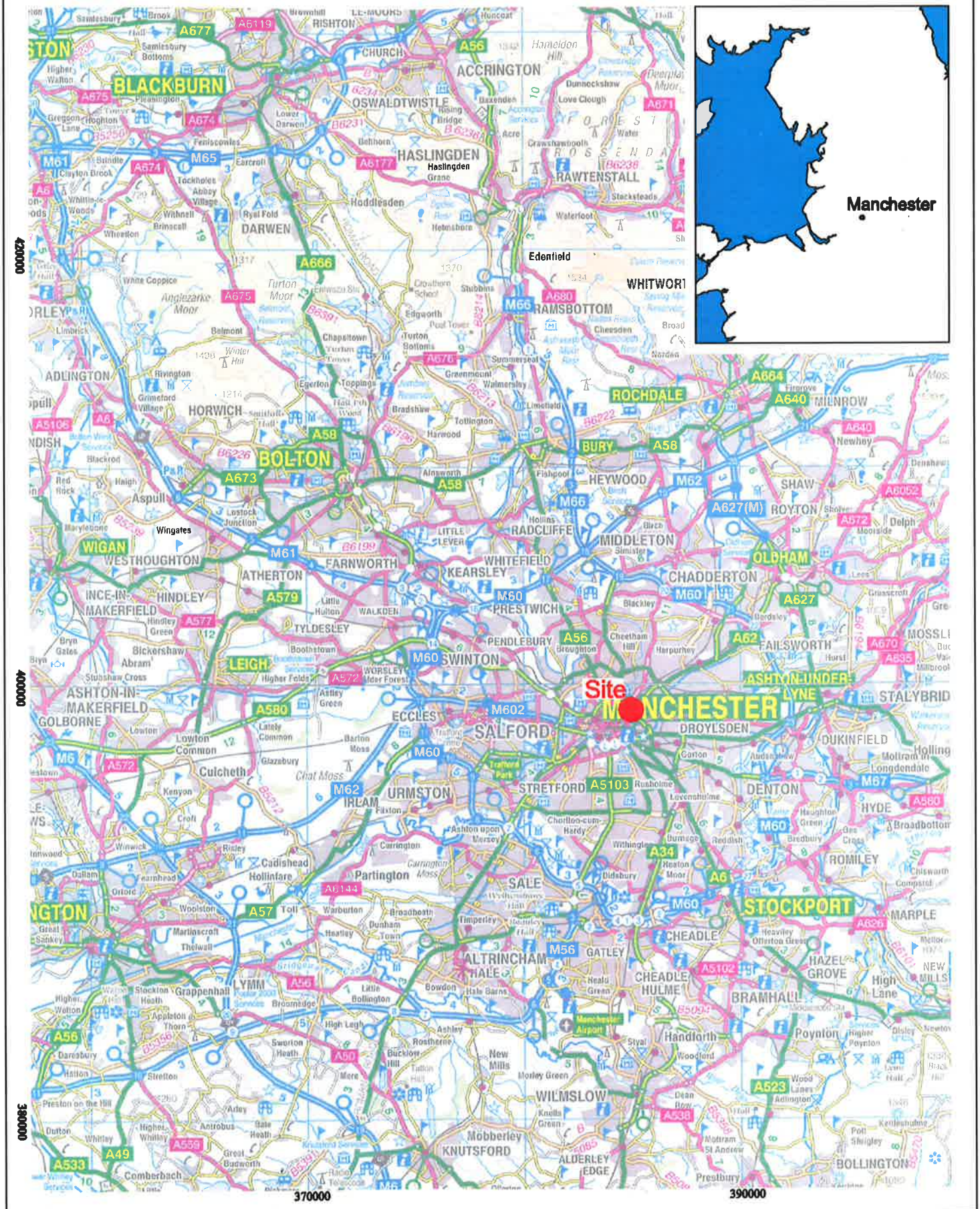

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Figure 1: New Islington location map

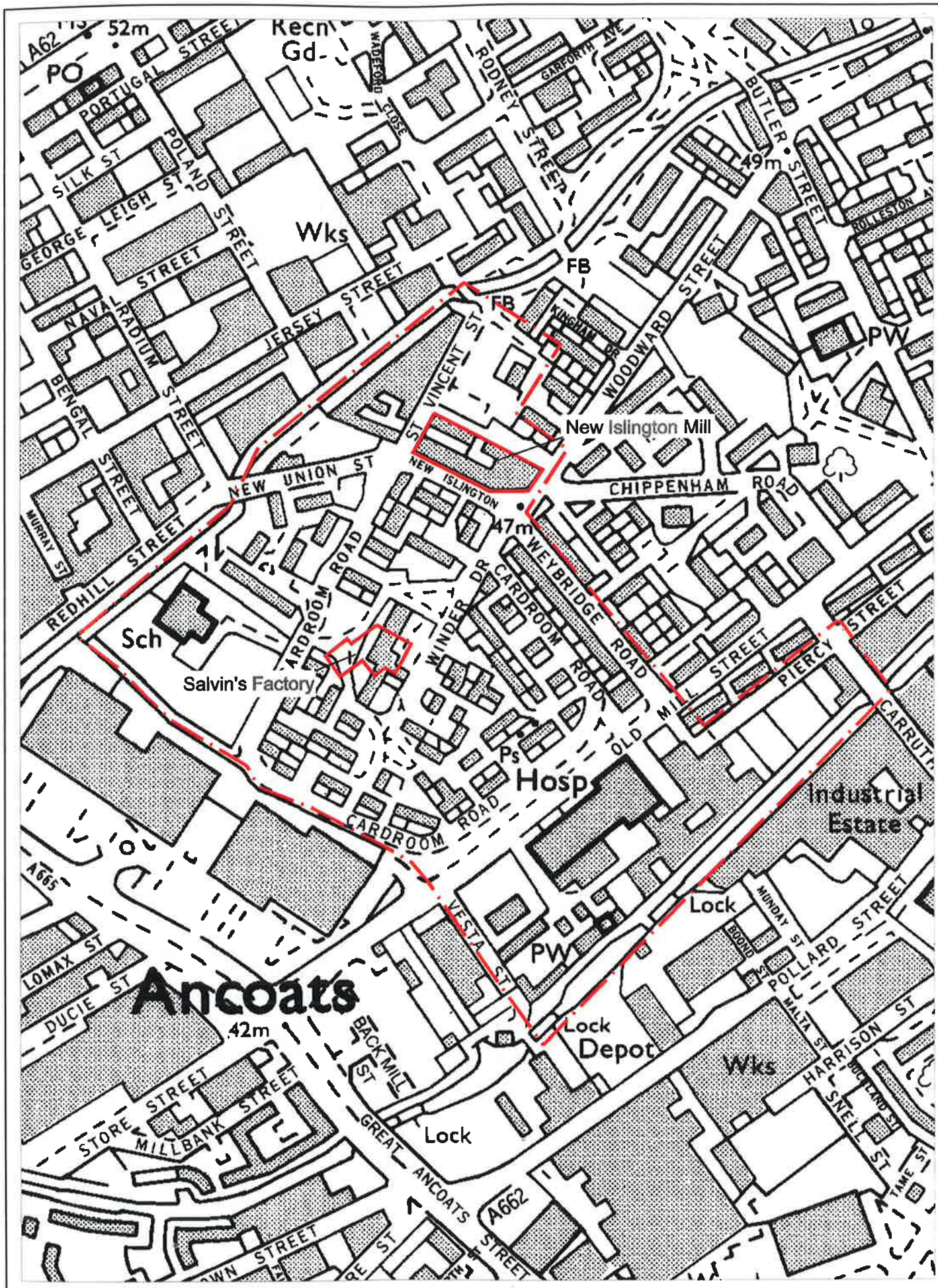

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Figure 2: Location of Salvin's Factory and New Islington Mill within the development area

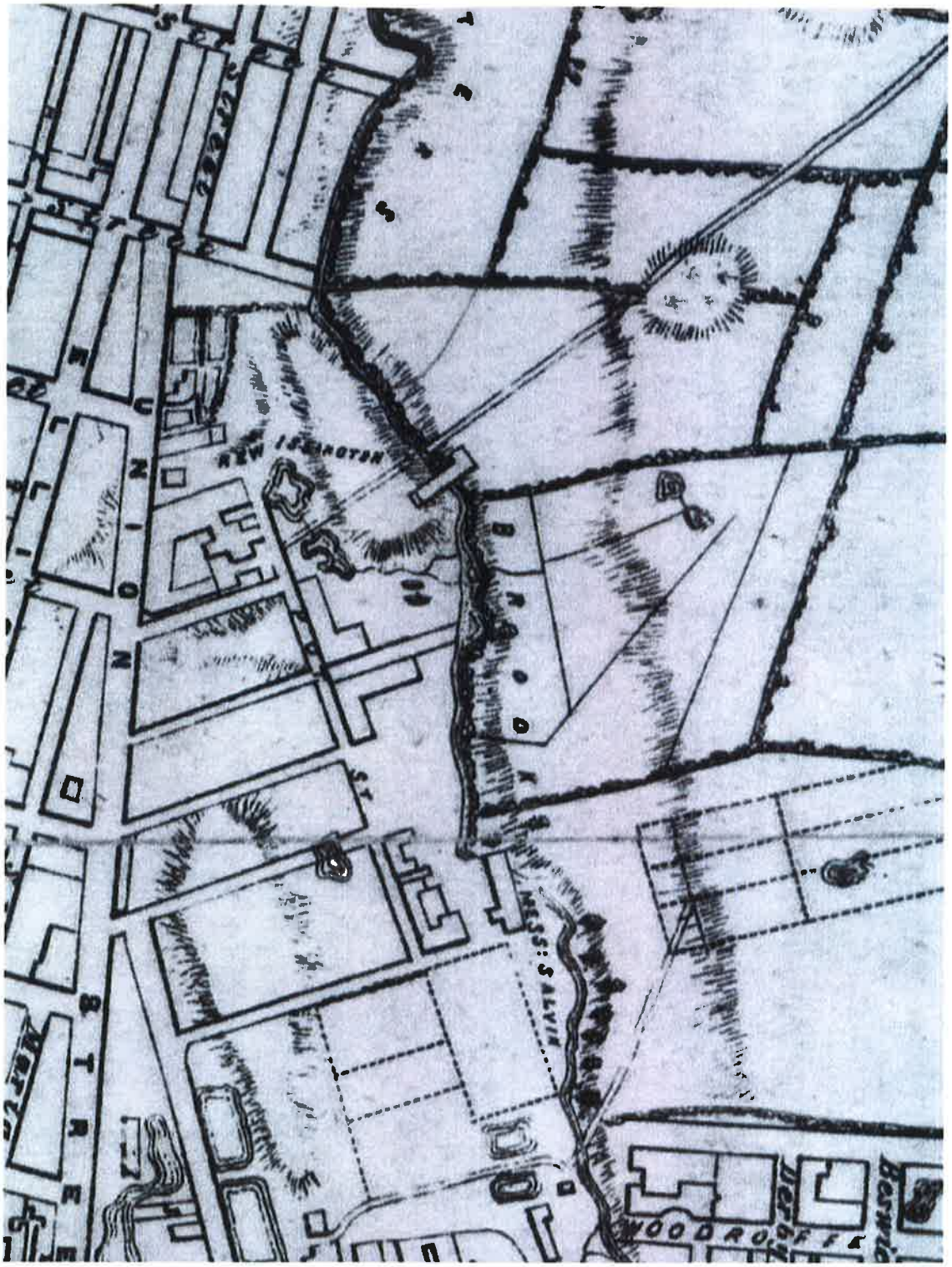


Figure 3: Extract from Lewis' *Map of Manchester*, published in 1788. A building in the position of New Islington Mill is shown straddling Shooter's Brook, with Salvin's Factory shown a short distance downstream, similarly straddling the brook.

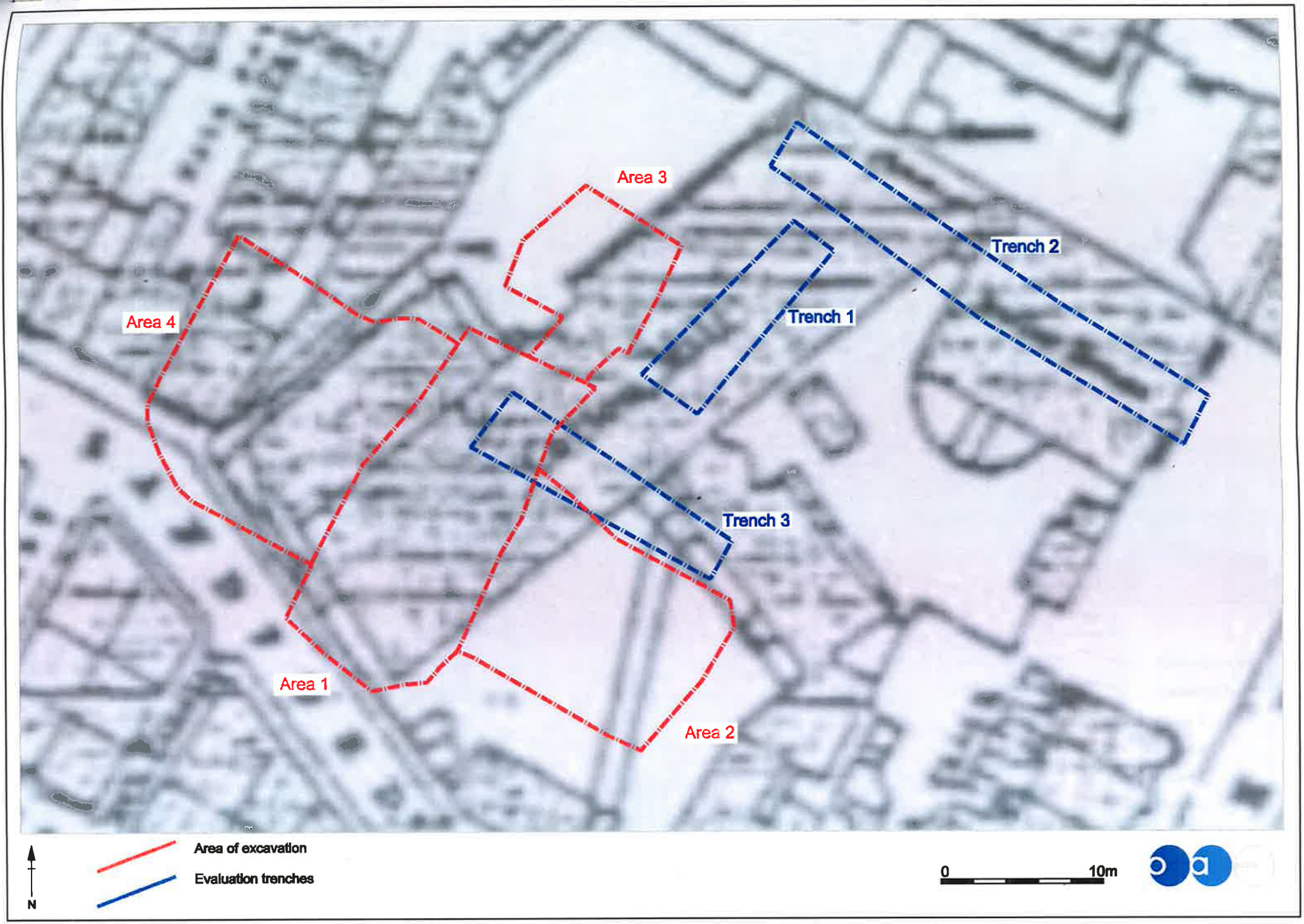


Figure 4: Location of the archaeological investigations superimposed on the Ordnance Survey 60": 1 mile map, published in 1851

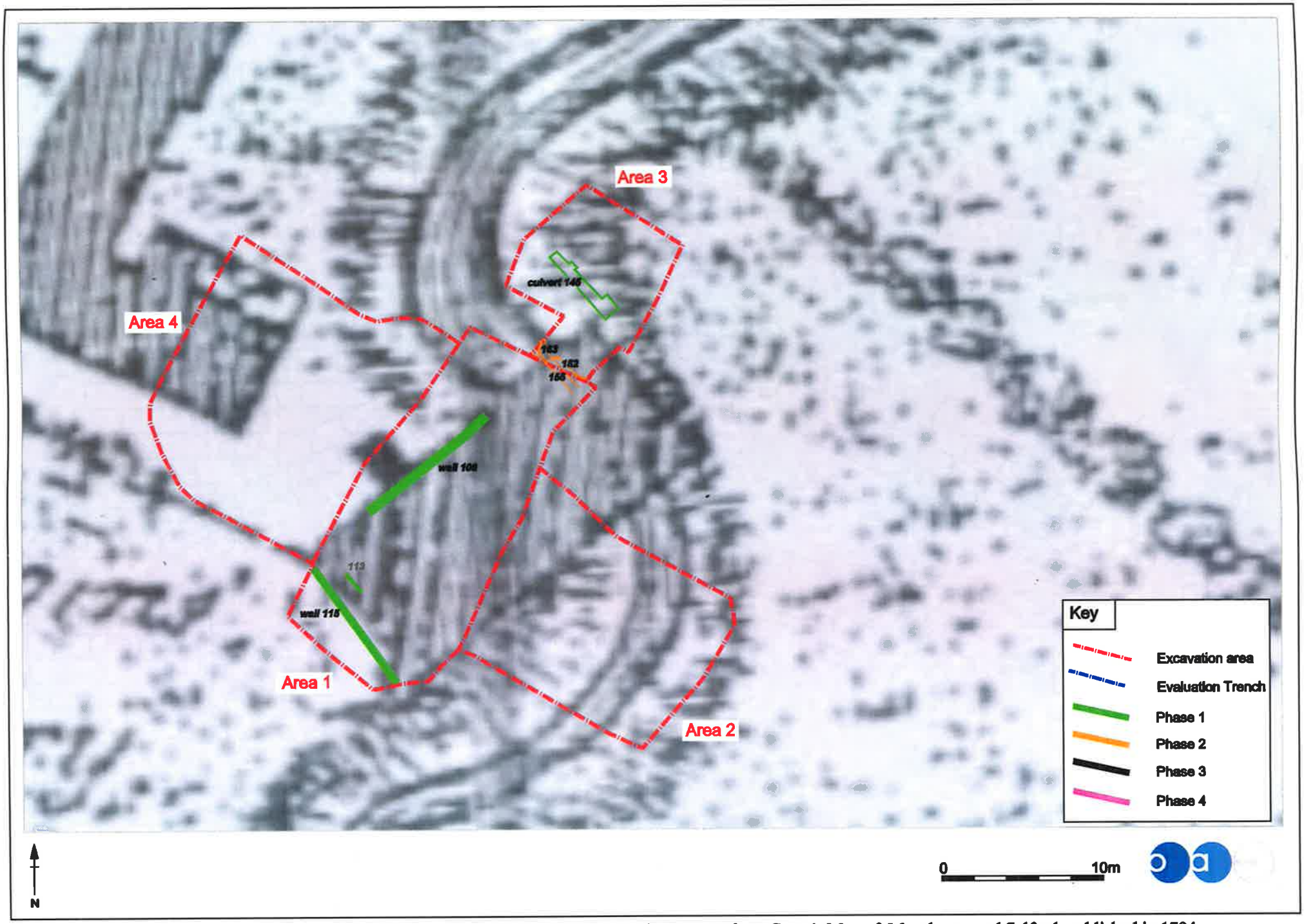


Figure 5: Salvin's Factory: Plan showing Phase 1 & 2 structures, superimposed on extract from Green's Map of Manchester and Salford, published in 1794

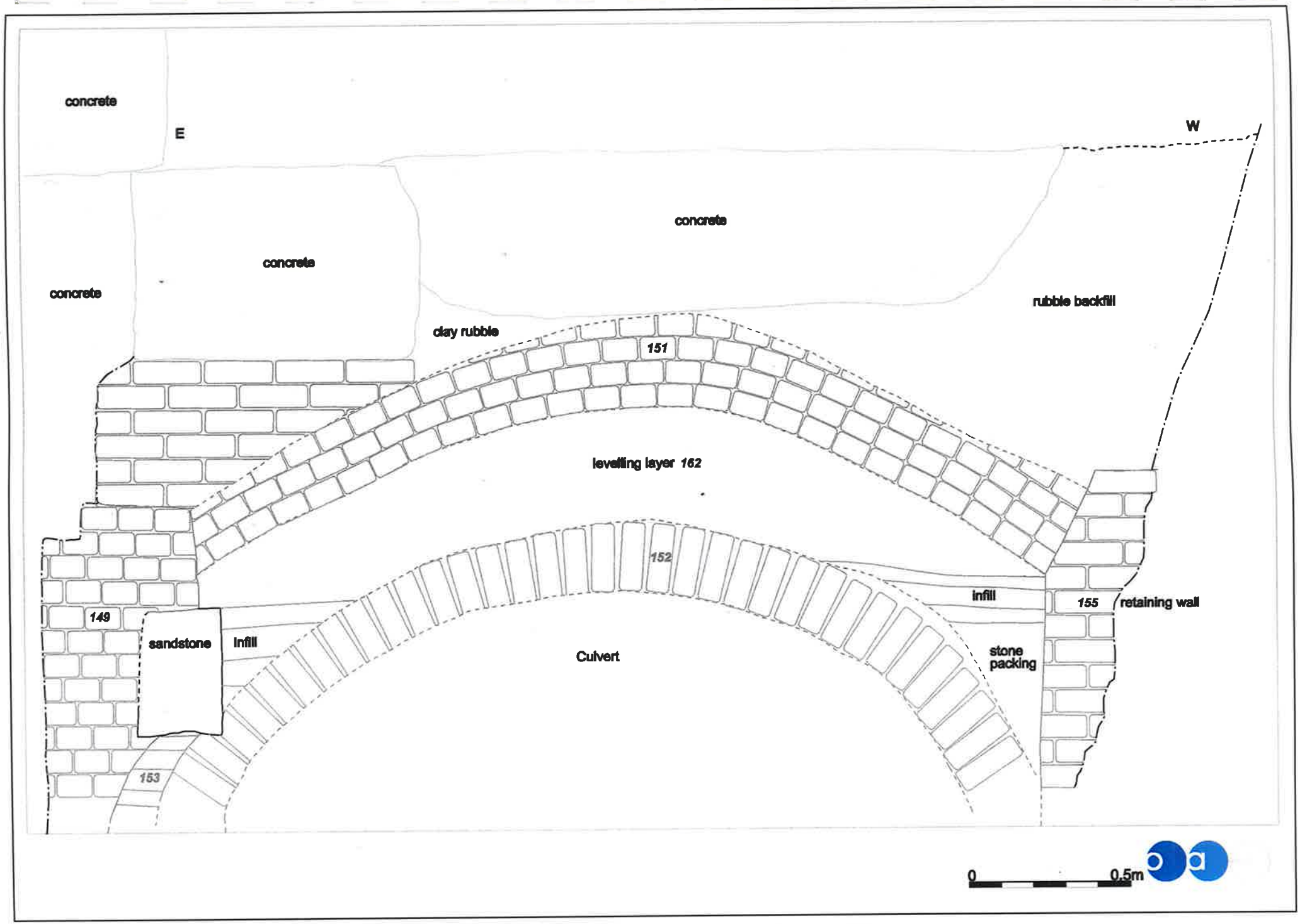


Figure 6: Salvin's Factory: North-facing section through culvert *145*

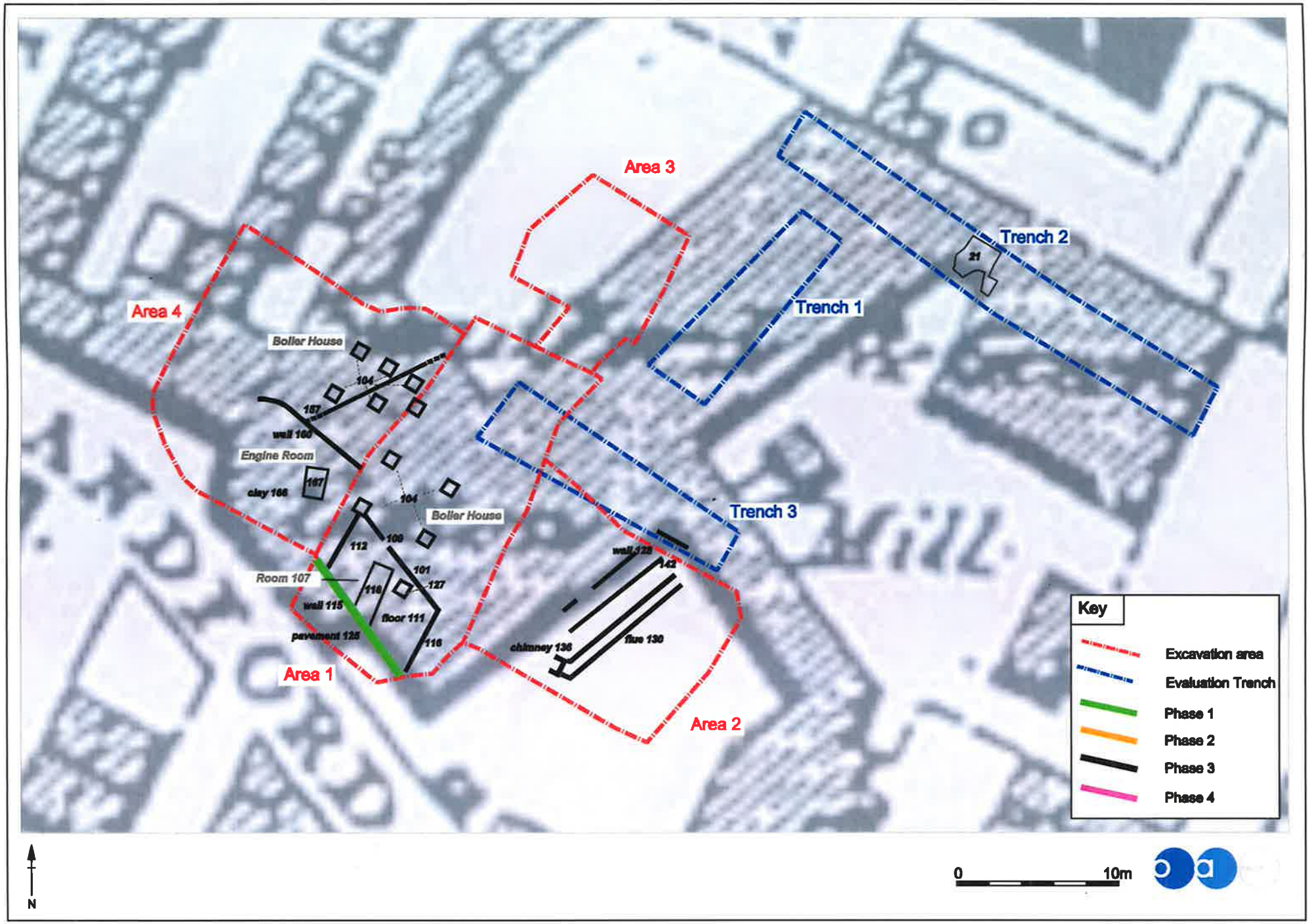


Figure 7: Salvin's Factory: Plan showing Phase 3 structures, superimposed on extract from Bancks & Co Map of Manchester and Salford, published in 1831

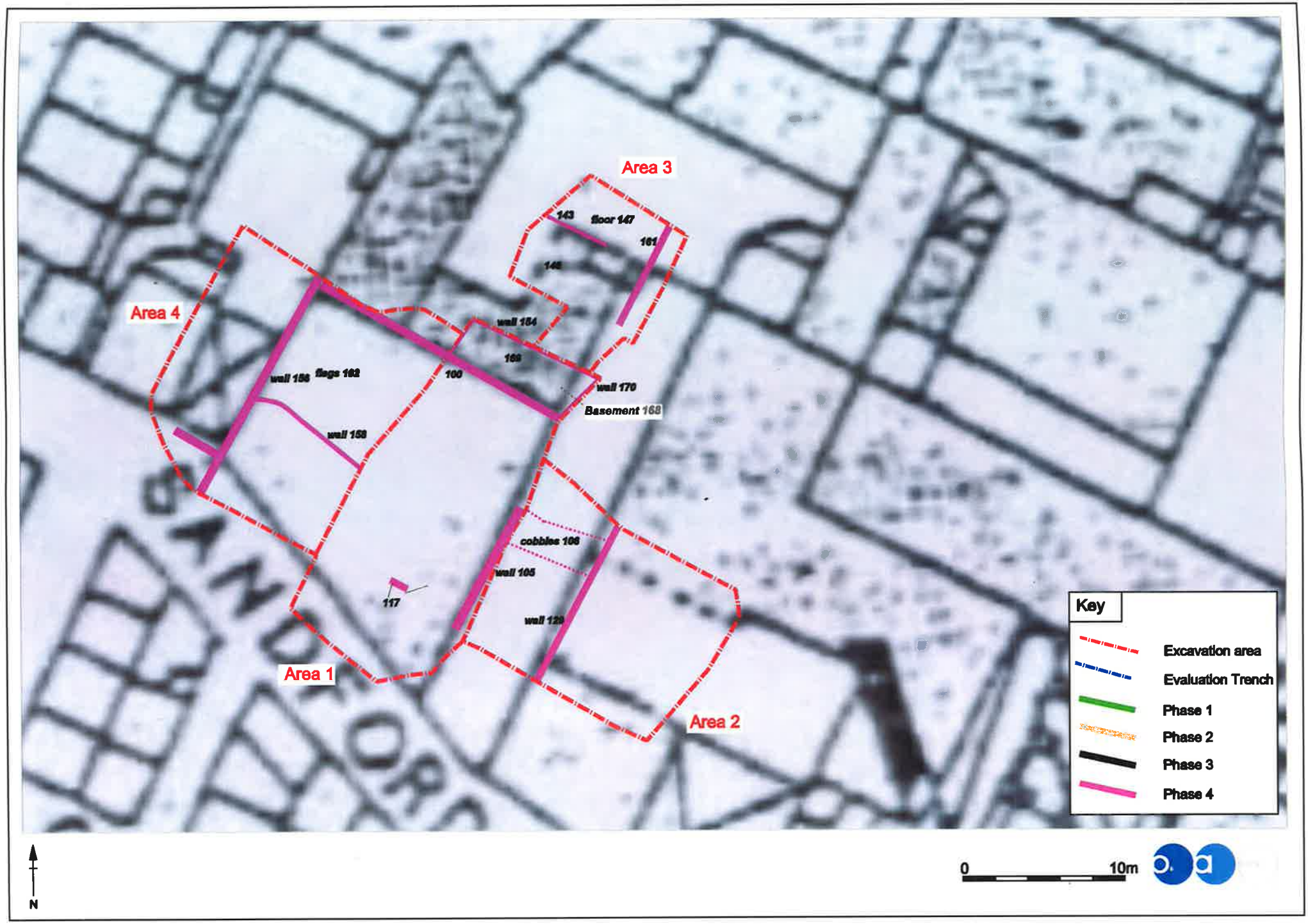


Figure 8: Salvin's Factory: Plan showing Phase 4 structures, superimposed on extract from Ordnance Survey Map, 1891

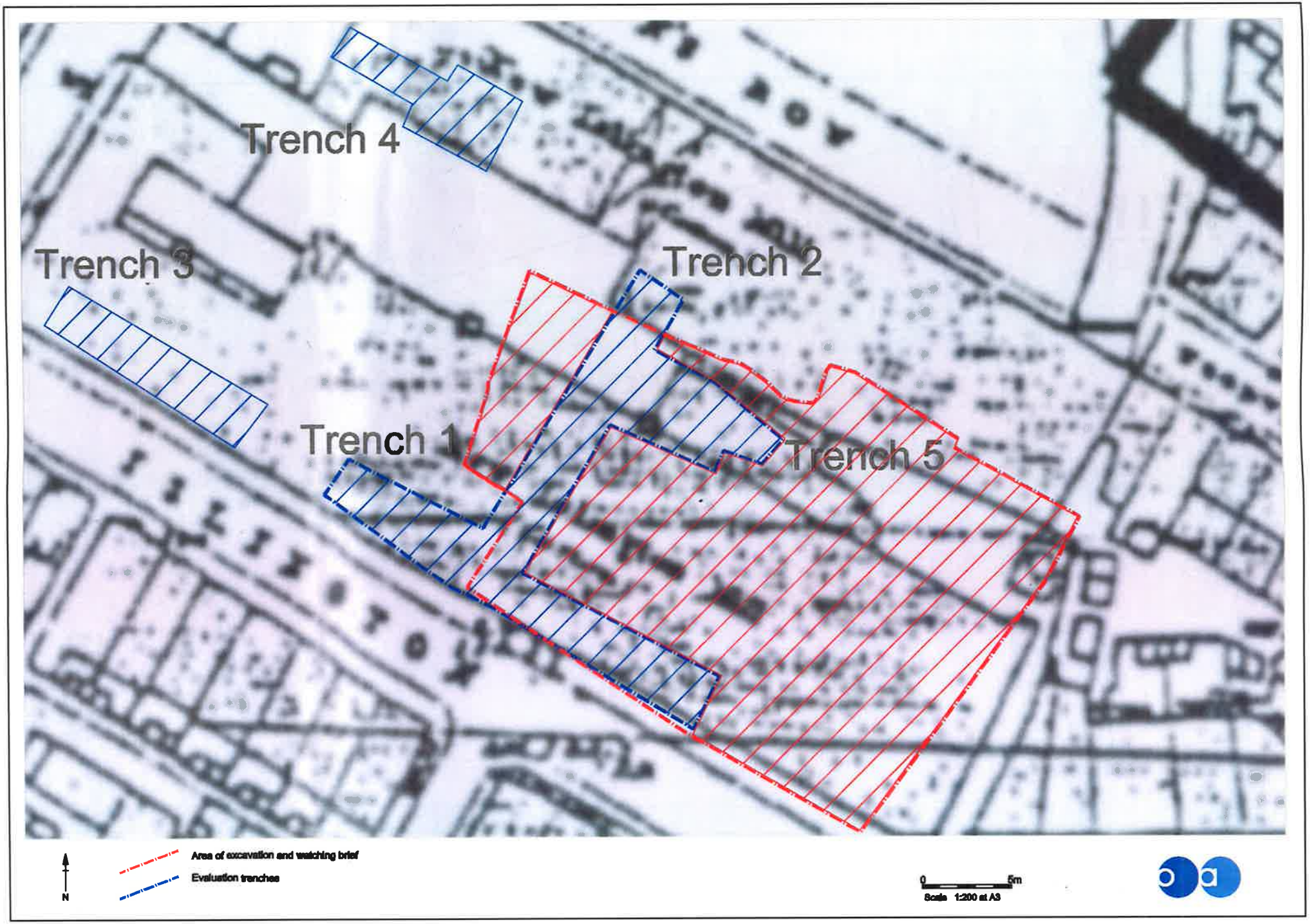


Figure 9: Position of evaluation and excavation trenches at New Islington Mill superimposed on the Ordnance Survey Map published in 1851

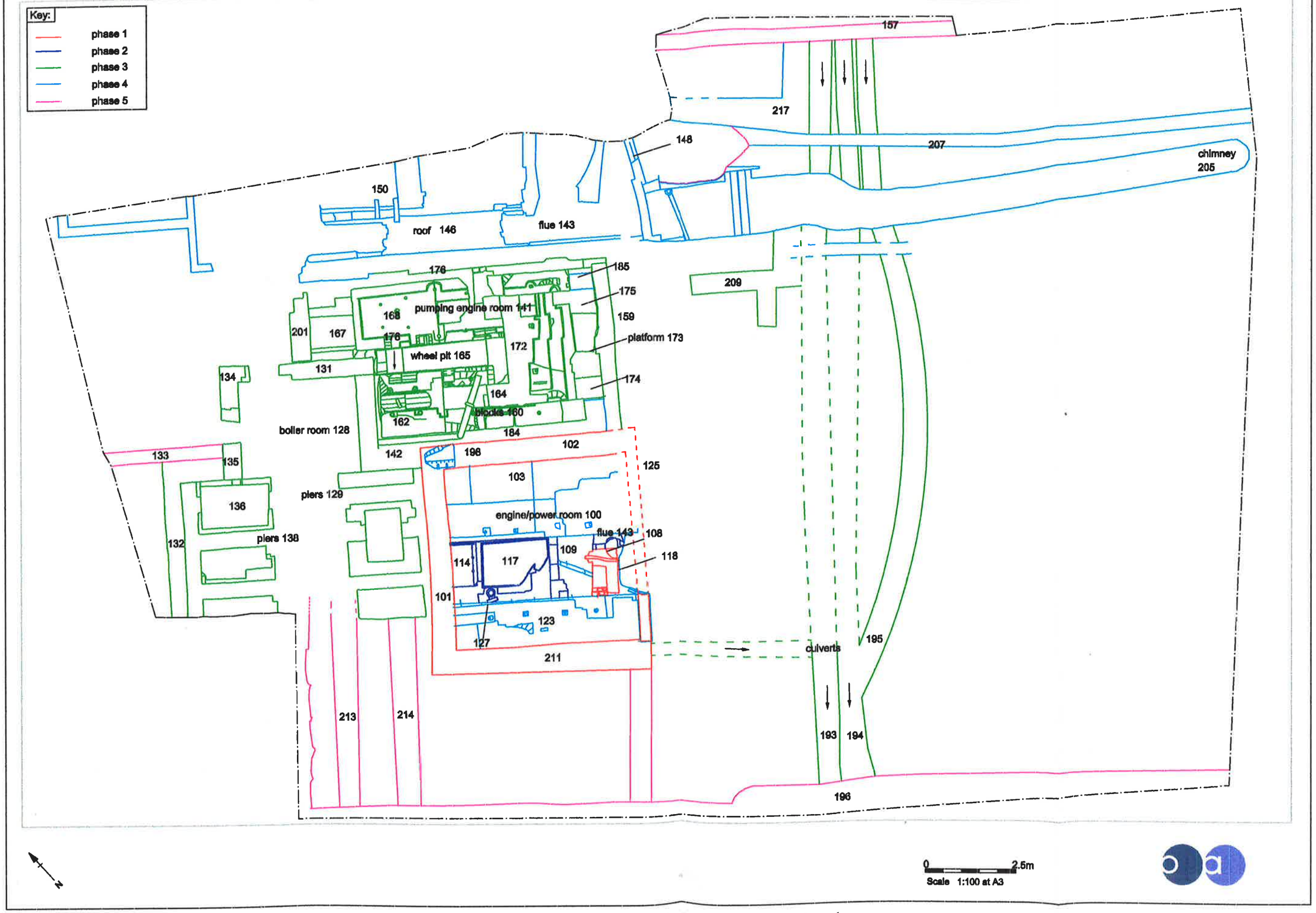
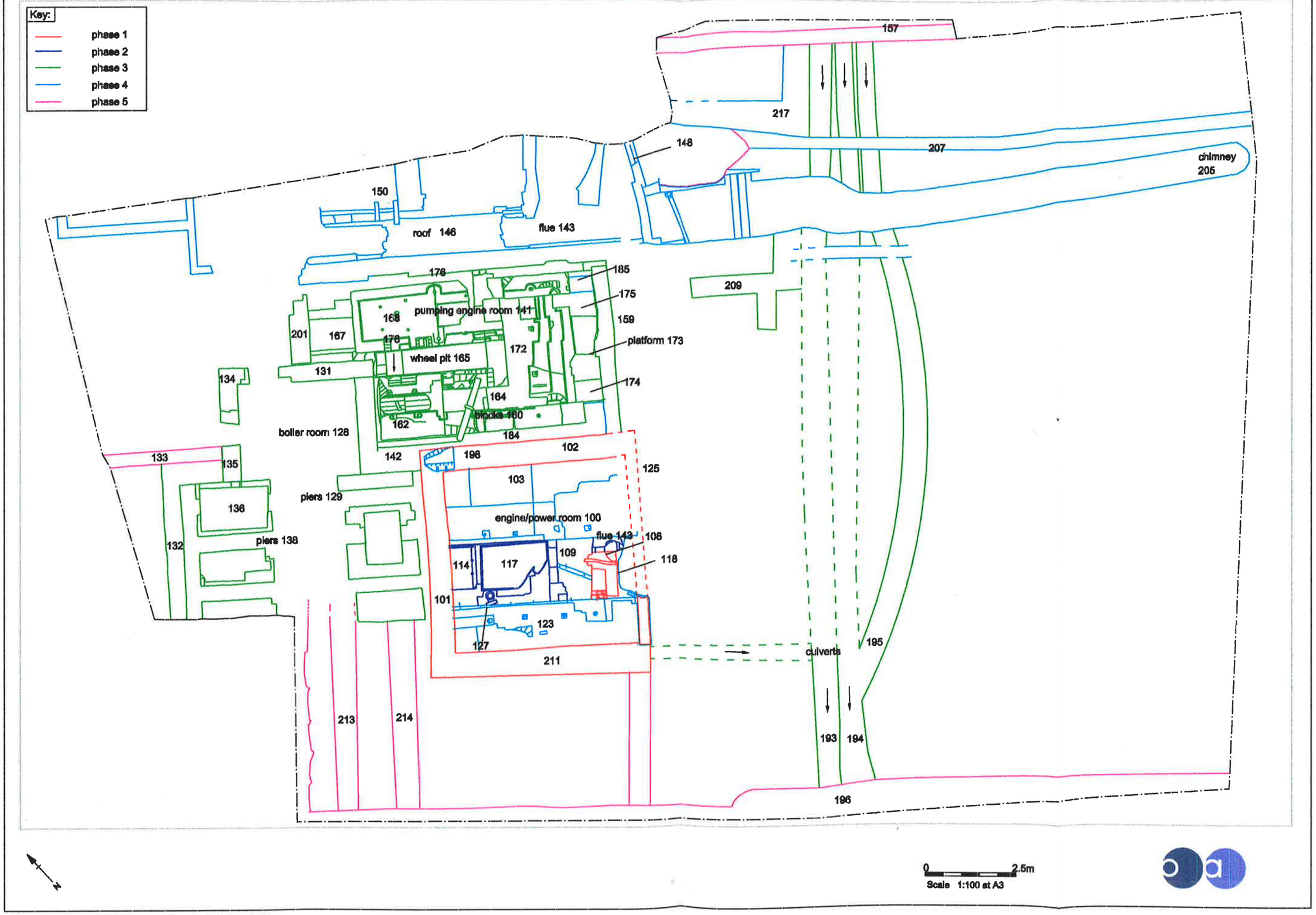


Figure 10: New Islington Mill: Phased excavation site plan



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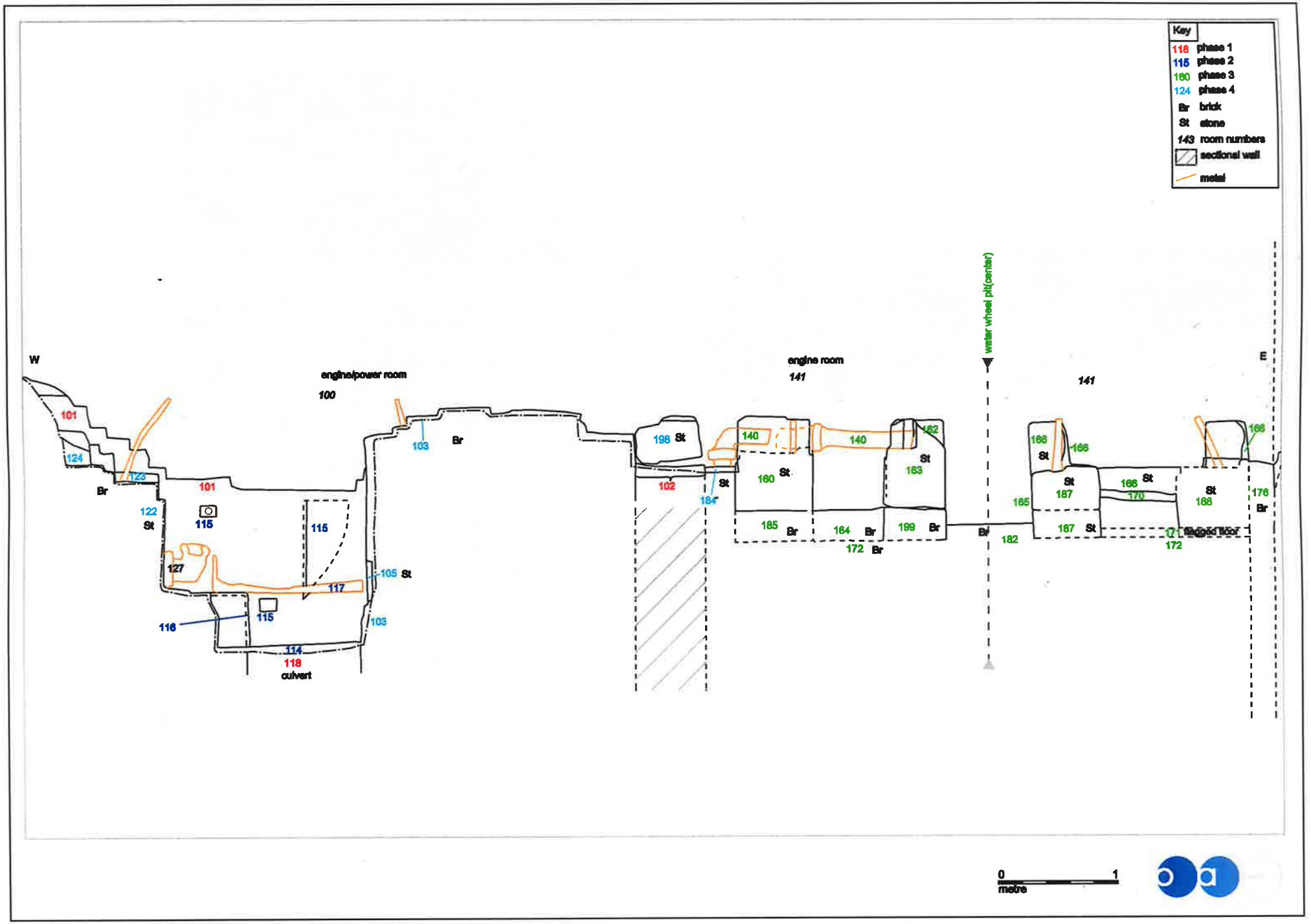

Figure 11: New Islington Mill: South-facing section through Engine Rooms 100 and 141

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Plate 14: North-eastern end of engine room ***100***, showing sunken-level area

Plate 15: Pit ***108*** and culvert ***118*** within engine room ***100***

Plate 16: General view across engine room ***141***, looking south-west, with flue in the foreground

Plate 17: Water wheel pit ***165***

Plate 18: Housings for the water wheel axle bearings

Plate 19: Pipe within culvert ***178***

Plate 20: Platform ***173*** across the south edge of the pumping engine room (***141***)

Plate 21: Walls ***131*** and ***142*** within the south-east corner of the boiler house

Plate 22: Wall ***134*** along the north edge of the boiler house

Plate 23: Ashlar foundation bed ***136*** within boiler house

Plate 24: Culverts running beneath New Islington Road via the mill's west external wall (***196***).

Plate 25: View of machine restraining rods within brick platform ***103***

Plate 26: Section of repair (***107***) within the west face of platform ***103***

Plate 27: Brick platform ***123*** along the west edge of engine room ***100***

Plate 28: Flue ***143*** along the east edge of engine room ***141***

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