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Salford
MANCHESTER

Historic Building Investigation and Watching Brief

New Little Mill,
Jersey Street,
Ancoats,
Manchester

Client:

Manchester Life
Development Company
2 Ltd

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Technical Report:

Lewis Stitt and Ian
Miller

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Contents

Summary	1
1. Introduction	2
1.1 Planning Background	2
2. The Setting	4
2.1 Location.....	4
2.2 Geology.....	4
3. Historical Background	5
3.1 Development of Ancoats.....	5
3.2 Overview of the Development of the Cotton Industry.....	6
3.3 A & G Murray and Murrays' Mills.....	7
4. Methodology	16
4.1 Survey Methodology.....	16
4.2 Watching Brief Methodology.....	16
5. Historic Building Investigation	17
5.1 Introduction.....	17
5.2 External Description.....	17
5.3 Internal Description.....	32
6. Watching Brief.....	79
6.1 Watching Brief.....	73
7. Discussion	79
7.1 Introduction.....	79
7.2 The development of New Little Mill.....	79
7.3 Significance.....	83
8. Archive	84
8.1 Archive.....	84
Sources.....	85
Cartographic.....	85
Secondary Sources.....	85
Online Sources.....	86
Acknowledgements.....	87
Acknowledgements.....	87
Appendix 1: Context List	89
Appendix 2: Illustrations.....	89

Summary

Manchester Life Development Company 2 Ltd (MLDC) has obtained planning (116300/FO/2017) and listed building consent (116301/LO/2017) to deliver the proposed redevelopment of New Little Mill, a derelict cotton-spinning mill in the Ancoats area of Manchester that is afforded statutory protection as a Grade II listed building (centred on NGR 385095 398670). The consented scheme allows for the repair, refurbishment and change of use of New Little Mill, including the removal of internal structure and construction of a new two-storey roof extension that will cause localised impacts on any surviving archaeology within the pile footprint, and will impact on any buried archaeological remains that survive *in-situ*.

In order to secure archaeological interests and mitigate the loss of the historic building, Manchester City Council attached a condition to planning consent that required an appropriate scheme of archaeological investigation to be undertaken as part of the development. Following consultation with the Greater Manchester Archaeological Advisory Service (GMAAS), in their capacity of archaeological advisors to Manchester City Council, it was agreed that the scheme of archaeological works would include an historic building survey of the building, coupled with a watching brief during development groundworks.

The importance of New Little Mill as a monument to the development of the textile industry in Manchester has been highlighted by the documentary study, showing it to be the earliest extant structure in the city that was purposely built to utilise electricity from the Manchester Corporation main supply. Although all the motors were removed when the building was repurposed in the mid-20th century, evidence for the position of associated line shafting was revealed. Furthermore, within the basement, a ducting shaft that predates New Little Mill almost certainly represented the housing for an earlier driveshaft that powered the original Little Mill, initially from the New Mill engine house, and subsequently from the Bengal Street engine house from the late 19th century until Little Mill was destroyed by fire in 1908. This duct and two further tunnels beneath Bengal Street provide the only physical remains associated with Little Mill, and therefore form important elements of the Murrays' Mills complex.

The survey allowed for the detailed examination of the construction of New Little Mill, which in many respects was typical of a cotton-spinning mill of the early 20th century. Although the use of concrete and rolled steel were well-established by this time, the construction of New Little Mill provides excellent physical evidence for the early 20th-century evolution from the use of multi-span arches to a flat ceiling carried by steel joists. Cast-iron columns were still commonplace at this time, and their use lingered within multi-storeyed mills far longer than in single-storey weaving sheds, mainly due to the ease with which they could be interlocked vertically to provide structural stability. The mill did, however, borrow technology from weaving shed construction, with the unusual inclusion of a north-light glazing band to the upper floor. New Little Mill also retained good evidence for fire-fighting apparatus, as well as a secondary humidification system, which was added shortly after the completion of the initial construction in 1909.

An archaeological watching brief was also maintained during ground-breaking works in the yard to the rear of the mill. This demonstrated, however, that any remains of archaeological interest had been removed.

1. Introduction

1.1 Planning Background

Manchester Life Development Company 2 Ltd (MLDC) has obtained planning (116300/FO/2017) and listed building consent (116301/LO/2017) to deliver the proposed redevelopment of New Little Mill, a derelict cotton-spinning mill in the Ancoats area of Manchester that is afforded statutory protection as a Grade II listed building. The consented scheme allows for the repair, refurbishment and change of use of New Little Mill, including the removal of internal structure and construction of a new two-storey roof extension, to provide 68 residential apartments, car parking, hard landscaping, external lighting, access and other associated works. The delivery of the scheme will require piling of the new foundations and below-ground services that will cause localised impacts on any surviving archaeology within the pile footprint, and will impact on any buried archaeological remains that survive *in-situ*.

The historic interest in the development site is highlighted in an archaeological assessment that was prepared to support the planning application for redevelopment (Arup 2017). In the light of the conclusions drawn from this assessment, coupled with consultation with the Greater Manchester Archaeological Advisory Service (GMAAS) in their capacity as Archaeological Advisors to Manchester City Council, it was recommended that further archaeological investigation was merited in advance of and during the proposed development works. It was recommended that this could best be achieved via an historic building investigation of the former cotton mill in advance of any development, coupled with a watching brief during ground-breaking works associated with the construction programme.

In accordance with the advice provided by GMAAS, Manchester City Council attached a condition (116300/FO/2017 Condition No 4) to planning consent that required an appropriate scheme of investigation to be carried out in advance of development. The wording of this condition states:

‘No development shall take place until the applicant or their agents or their successors in title has secured the implementation of a programme of archaeological works to be undertaken in accordance with a Written Scheme of Investigation (WSI), prepared by the appointed archaeological contractor. The WSI should be submitted to and approved in writing by the local planning authority. The development shall not be occupied until the site investigation has been completed in accordance with the approved WSI. The WSI shall cover the following:

1. A phased programme and methodology of investigation and recording to include:
 - a historic building survey to enhance previous survey work, including further documentary research;
 - a targeted archaeological watching brief.
2. A programme for post-investigation assessment to include:
 - analysis of the site investigation records and finds
 - production of a final report on the significance of the archaeological interest represented.

3. Provision for publication and dissemination of the analysis and report on the site investigation.
4. Provision for archive deposition of the report and records of the site investigation.
5. Nomination of a competent person or persons/organisation to undertake the works set out within the approved WSI.

Reason - To investigate the archaeological interest of the site and record and preserve any remains of archaeological interest, pursuant to saved policy DC20.1 of the Unitary Development Plan for the City of Manchester and guidance in the National Planning Policy Framework.'

In addition, a similar condition was attached to Listed Building Consent (116301/LO/2017 Condition No 3) that states:

'Prior to the commencement of the development, a programme of recording features, fixtures, fittings and any other items of interest, in situ, at the development shall be submitted for approval in writing by the City Council, as Local Planning Authority. The works to the Listed Building hereby approved shall not be undertaken until the recording works have been completed in accordance with this programme of works. For the avoidance of doubt the programme of works shall cover the following:

1. A programme and methodology for the recording of any internal and external features/fixtures/fittings/structures, *in situ*.
a historic building survey to enhance previous survey work, including further documentary research.
2. A programme for post investigation assessment to include:
 - time scale for the submission and approval of the details prior to the commencement of the works;
 - analysis of the site investigation records and a scheme/strategy for the features to be incorporated into the development;
 - production of a final report on the significance of the historical interest represented.
3. Provision for publication and dissemination of the analysis and report on the site investigation.
4. Provision for archive deposition of the report, finds and records of the site investigation.

Reason - To investigate the historical interest of the site and record and preserve any remains of historical interest, pursuant to policy EN3 of the Manchester Core Strategy and saved policy DC19 of the Unitary Development Plan for the City of Manchester and guidance in the National Planning Policy Framework.

In September 2017, Salford Archaeology was commissioned by MLDC to undertake the required scheme of historic building investigation, and subsequently by Eric Wright to maintain the watching brief during the development groundworks.

2. The Setting

2.1 Location

New Little Mill is situated in Ancoats, which lies on the north-east side of Manchester city centre (Fig 1). The mill is bounded by Jersey Street to the north, Bengal Street to the west, Radium Street to the east and the refurbished Fireproof Mill to the south (centred on NGR 385095 398670). The Rochdale Canal lies parallel to the south of the mill, immediately adjacent to Redhill Street. The mill forms a Grade II listed block of the historic Murrays' Mills cotton spinning complex (List Entry No 1282961).



Plate 1: Recent aerial view across New Little Mill

2.2 Geology

Geologically, the area is underlain a series of glaciofluvial sheet deposits of sand and gravel with till at the south-east. Underlying this is strata of the Chester Pebble Beds Formation of the Sherwood Sandstone Group and the Manchester Marls Formation of the Cumbrian Coast Group. The West Manchester Fault runs north-west/south-east across the centre of the study area (www.bgs.ac.uk/geologyviewer).

3. Historical Background

3.1 Development of Ancoats

New Little Mill formed an integral component of the cotton-spinning mill complex of A & G Murray, one of the most famous names in Manchester's textile industry. The construction of Murrays' Mills was integral to the development of Ancoats, which had emerged as the world's first planned industrial suburb by the early years of the 19th century. In order to place the mill complex in context, a summary history of its setting is presented below.

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). As this name suggests, Ancoats was a rural area on the eastern periphery of Manchester. It retained a semi-rural aspect until the late 18th century, when the population of Manchester expanded at an unprecedented rate, and resulted in the transformation of Ancoats into a key industrial suburb.

This process of industrialisation 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. The focus for initial development was at the corner of Great Ancoats Street and Oldham Road, and contemporary maps depict 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 pattern of streets being sold for development.

The earliest factories in the area were several water-powered mills erected along Shooters 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 (Miller and Wild 2007), although most of the firms operating in this area were essentially 'poor competition to the profitable Arkwright factory colony' (Little 2004, 31). However, in seeking a solution to the inadequate power supplied to their waterwheels from Shooters Brook, several firms experimented with steam power. A notable example was at Salvin's Factory, when John Kennedy is reputed to have first applied steam power to one of his spinning mules in 1793 (Lee 1972, 9). It was on the basis of a breakthrough in the application of steam power that created the explosion of factory building in Ancoats (Miller and Wild 2007).

The proposed line of the Rochdale Canal ran between Shooters Brook and the new focus of development, offering the potential of cheap and reliable transport for goods and materials. The completion of this canal in 1804 coincided broadly with the efficient application of steam power to cotton-spinning machinery, and a growth in the national demand for textiles. A small number of enterprising firms seized the opportunity presented by this combination of factors, resulting in the creation of a new breed of mill building in Ancoats. The net result was the creation of 'the World's first industrial suburb', an edge-of-town industrial estate with associated housing, community facilities (churches, pubs and charitable refuges) and related businesses.

3.2 Overview of the Development of the Cotton Industry

The technical revolution in the cotton-spinning industry during the second half of the 18th century 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).

By 1815, 90% of Britain's cotton industry was located in Lancashire (Holland 1976, 43). There were numerous reasons for this phenomena: local workers were experienced in textile manufacture, there were few restrictive guild regulations as cotton was a relatively new industry, the favourable climate, the availability of pure water for the finishing processes, abundant coal for steam power, plenty of female and child labour, existing trading links and a good and easily accessible port in Liverpool. The growth of the export trade, especially to Europe, continued to grow during the second decade of the 19th century. The export of twist and yarn, for instance, rose from £794,465 in 1812 to £1,119,850 in 1814, and then to £2,022,153 by 1820 (Lee 1972, 57).

The onset of the American Civil War caused severe problems for the English cotton industry as the blockade of America's southern ports by the Federal navy cut off the supply of raw cotton on which Lancashire's mills depended. This resulted in the Lancashire Cotton Famine of 1862-64. During this period, raw cotton increased in price from 9d per lb in 1861 to over 2s in 1863 (Holland 1976, 142). From the peak of the famine in 1862/3, unemployment fell, but not until the end of the war, in April 1865, was normal working resumed.

Lancashire dominated the English cotton industry into the 20th century; during the early years of the 20th 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). However, Manchester's share of the industry declined; a total of 2,666,000 spindles were operative in Manchester and Salford at the beginning of the 20th century, compared to 11,603,000 in Oldham and 5,035,000 in Bolton (Chapman 1905, 41). Nevertheless, Manchester remained pre-eminent as a centre for the production of fine yarn, whilst Oldham was associated with coarse and Bolton with medium yarn (Walmsley 1893, 79).

Despite cotton remaining to be Britain's leading export until 1938, 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. Japan captured many former British markets in China and the Far East. 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. More seriously, however, was the widespread manufacture of man-made fibres; by 1962, 40% of British cloth production was in man-made fibres (Holland 1976, 278). The textile industry declined rapidly thereafter, and many of the mills fell into dilapidation or dereliction.

3.3 *A & G Murray and Murrays' Mills*

The origins of the Murrays' involvement in Manchester's cotton-spinning trade may be traced to 1780. In this year, Adam Murray migrated from the village of Knockmalling, Kirkcudbrightshire in Scotland, to Chowbent (now Atherton) near Leigh in Lancashire, where he was apprenticed to a machine-maker called William Cannon (Lee 1972). Adam was joined there subsequently by his brother George, and his former neighbours James McConnel and John Kennedy, who were all similarly apprenticed to Cannon. It was at Chowbent that the Murrays developed their expertise with spinning machinery.

Adam Murray completed his apprenticeship in 1787, and wasted little time in establishing a business. By 1790, he had accumulated sufficient capital to relocate to Manchester, where he established himself as a manufacturer of textile machinery; a trade directory published in 1794, for instance, lists Adam Murray as a 'machine-maker' based at 12 Little Newton Street, Manchester (Scholes 1794, 95). He was clearly successful in this business and, by 1797, had expanded to occupy three factories in Ancoats - on Newton Street, Henry Street and Union Street - where he had machinery and stock insured to the total value of £2,000 (Guildhall MS 7253/32A). The trade directories also provide evidence for him being engaged in cotton-spinning within a few years, presumably in the first instance as a side-line occupation to machine-making (Scholes 1797, 90).

Cotton-spinning appears to have become Adam Murray's primary occupation rapidly, and George Murray soon joined him in partnership. A directory published in 1800 lists both Adam and George Murray as cotton spinners, again based at 12 Newton Street (Bancks 1800, 33). The same entry appears in a directory published two years later (Dean and Co 1802), although by that date the Murrays had completed their first two spinning mills.

The first part of the mill complex, originally called Union Mill, was erected in 1798. In its original form, the mill was eight storeys of 11 bays, with plan dimensions of approximately 31m x 12m. This building is thought to have been the first cotton-spinning mill ever built to a height of eight storeys, and set the trend for subsequent mills in the area. The mill was powered by a steam engine supplied by the firm of Boulton and Watt, the leading builders of steam engines at that time.

Within three years the Murrays' had effectively doubled the size of their mill with an extension to the east, referred to as Decker Mill. The economic boom that followed the signing of a peace treaty with France in 1801 was probably a major factor in the expansion of the site at this time. Decker Mill was also built to a height of eight storeys, although, at ten bays long, was slightly shorter than Old Mill. The original 12hp engine that had powered Old Mill was replaced with a 40hp model to drive both mills.

Between c 1804 and 1806 the Murray Street Block, Bengal Street Block, New Mill and its associated engine and boiler houses were all constructed, completing the core of the Murrays' Mills complex that largely survives today. These additions formed a quadrangle arrangement enclosing a central yard and canal basin that was linked to the Rochdale Canal, with an entrance off Murray Street. The result was, by contemporary standards, an enormous cotton-spinning complex with an unprecedented 84,000 mule spindles and 1,300 operatives (Williams with Farnie 1992, 160).

Adam Murray died as a bachelor at the age of 52 on 26 June 1818 (*Manchester Mercury*, 7 July 1818). Thereafter, the business was managed by George Murray, but continued to trade as A & G Murray. It seems that one of his earliest decisions as sole partner was to develop the plot of land to the east of Bengal Street with the erection of what was called the Little Mill, a gas works and a terrace of 15 cottages (M9/40/2/100), separated by Gas Street. These new buildings are shown on Pigot's *New Plan of Manchester and Salford*, which was published in 1819, but at a scale too small to yield any detail of individual structures.

The earliest detailed survey of Little Mill is provided by an annotated plan of c 1822 (Plate 2), which identifies the building as a factory of six storeys with a loft; the mill was increased in height subsequently to nine storeys, but the date at which this was completed is unknown (Miller and Wild 2007). The footprint of the factory is shown to have occupied 704 square yards (644 square metres), although slightly more than half of this area comprised the large gasometer house. This will almost certainly have contained several retorts that supplied the entire mill complex with gas for lighting purposes, and will also have provided the impetus for the naming of the adjacent Gas Street. The plan also shows the main mill complex to the west of Bengal Street with the canal basin in the enclosed central yard.

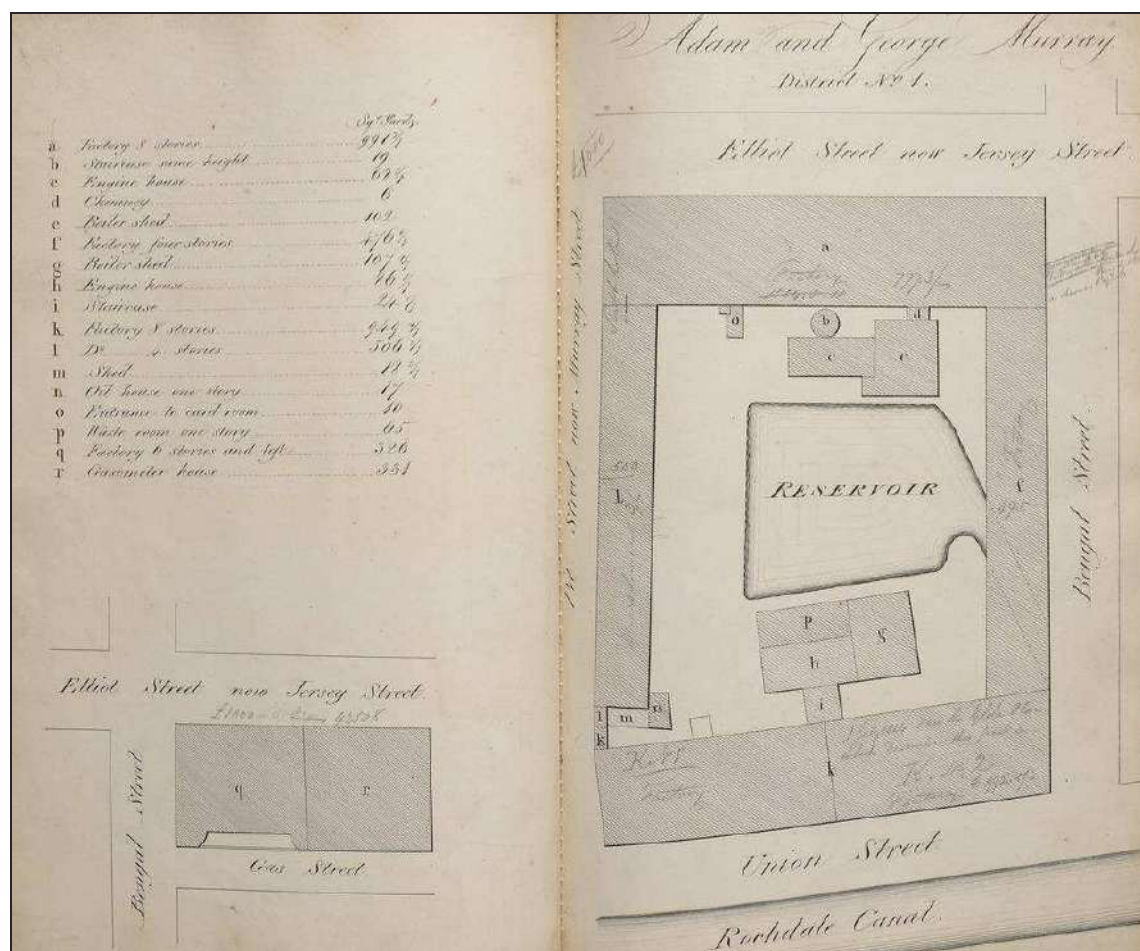


Plate 2: Plan of Murrays' Mills produced in c 1822

Little Mill is shown on the plan of c 1822 to have been linked to New Mill via a tunnel beneath Bengal Street, which may have provided a conduit for a pipe from the gasometer to the main complex (Plate 2). The possibility that power was transmitted from the main site via the tunnel cannot be discounted, as the documentary material provides no evidence that Little Mill contained its own engine. The cottages on Gas Street are omitted from the plan of c 1822, although these are shown on a map published by Bancks & Co in 1831. This map also shows an iron foundry to the rear of Little Mill and the gasometer house that also appears to have been owned by George Murray before 1855.

In his response to the Parliamentary Commissioners in 1834, George Murray stated that his workers did not live in company-owned properties, 'with, perhaps, five or six exceptions' (PP (HC) 1834 (167) XX, A1), hinting that his houses on Gas Street were reserved for key workers, such as overseers and engineers. Whilst the Census returns for this period list several 'cotton mill employees' on Gas Street, precise occupations are not divulged, although three 'machinists' are specified in the returns for 1851 (107/2225 Folio 390-402).

During the early 1840s, A & G Murray expanded their complex further with the addition of two new factories, referred to as Doubling Mill and Fireproof Mill, situated to the south of Little Mill on the eastern side of Bengal Street. It is tempting to accredit the growth of the mill complex at this time to the increased demand for doubled fine yarn resulting from an expansion of the Nottingham lace and hosiery markets, coupled with the introduction of the mechanical sewing machine, which greatly increased the demand for thread. Fireproof Mill was the first building within the Murrys' complex to have been of 'fireproof' construction, incorporating Hodgkinson-type cast-iron beams supported by a single row of centrally-placed cast-iron columns, and brick-vaulted ceilings (Miller and Wild 2007). These new mills are shown on the Ordnance Survey 1:1056 Town Plan that was published in 1851 (Plate 3).

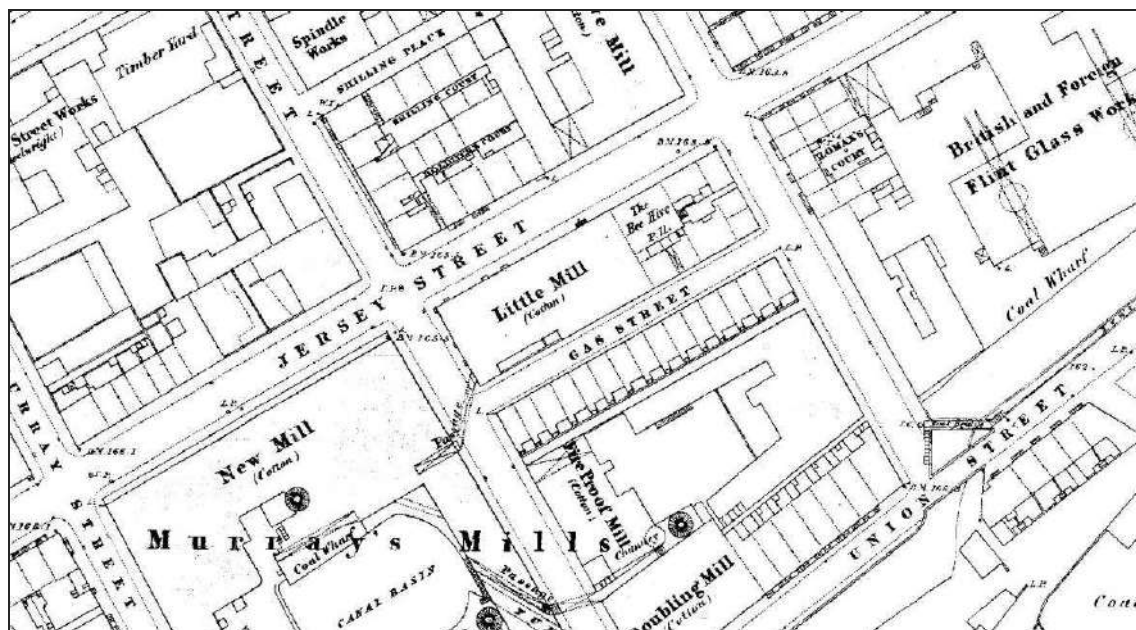


Plate 3: Extract from the Ordnance Survey 1:1056 Town Plan of 1851

Following the death of George Murray in c 1855, his sons Benjamin and James managed the company. In 1898, however, the Fine Cotton Spinners' and Doublers' Association Limited was formed, comprising a total of 31 concerns with a share capital of £4,000,000 and an issue of debenture stock of £2,000,000. A & G Murray, together with the firm of McConnel and Kennedy, were amongst the original firms to amalgamate. By 1909 the Association had expanded to include 50 businesses, controlling 4,000,000 spindles (Fine Cotton Spinners' and Doublers' Association Limited 1909). In that year, the Association published an engraving of that featured the north-facing elevation of New Mill, but also shows Little Mill, the Murray Street Block and part of Old Mill (Plate 4). By the time of publication, however, Little Mill was no longer extant, having been subject to a catastrophic fire on 28 January 1908, attributed to 'friction in some part of the machinery on the second floor', resulted in its demolition. The damage caused by the fire was estimated at £20,000, and some 200 operatives were put out of work (*Cotton Factory Times*, 31 January 1908).

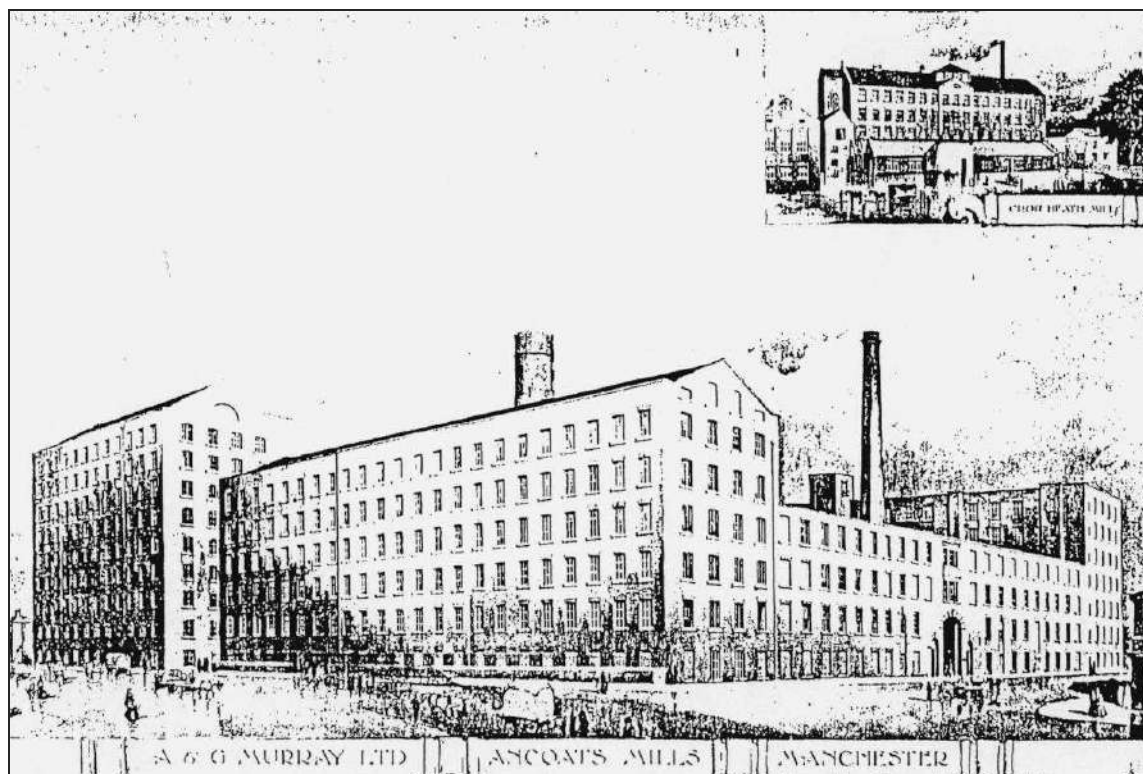


Plate 4: A view of Murrays Mills from the north-west in 1909 (from Fine Cotton Spinner and Doublers Association Limited 1909)

Proposals for a replacement mill were devised rapidly, and architect's plans for New Little Mill were deposited with Manchester City Council on 25 June 1908 (Building Control Plans 19038). These show the new building as five storeys high, ten bays long, and five bays wide, occupying a larger footprint than its predecessor, and necessitating the demolition of the company-owned houses along Gas Street (Plates 5-8). The architecture and structural engineering inherent within New Little Mill was typical for its date, utilising reinforced concrete for the construction of the floors and roof. It was of especial significance, however, as it was one of the earliest, if not the first, purpose-built electrically-powered textile mill in Manchester.

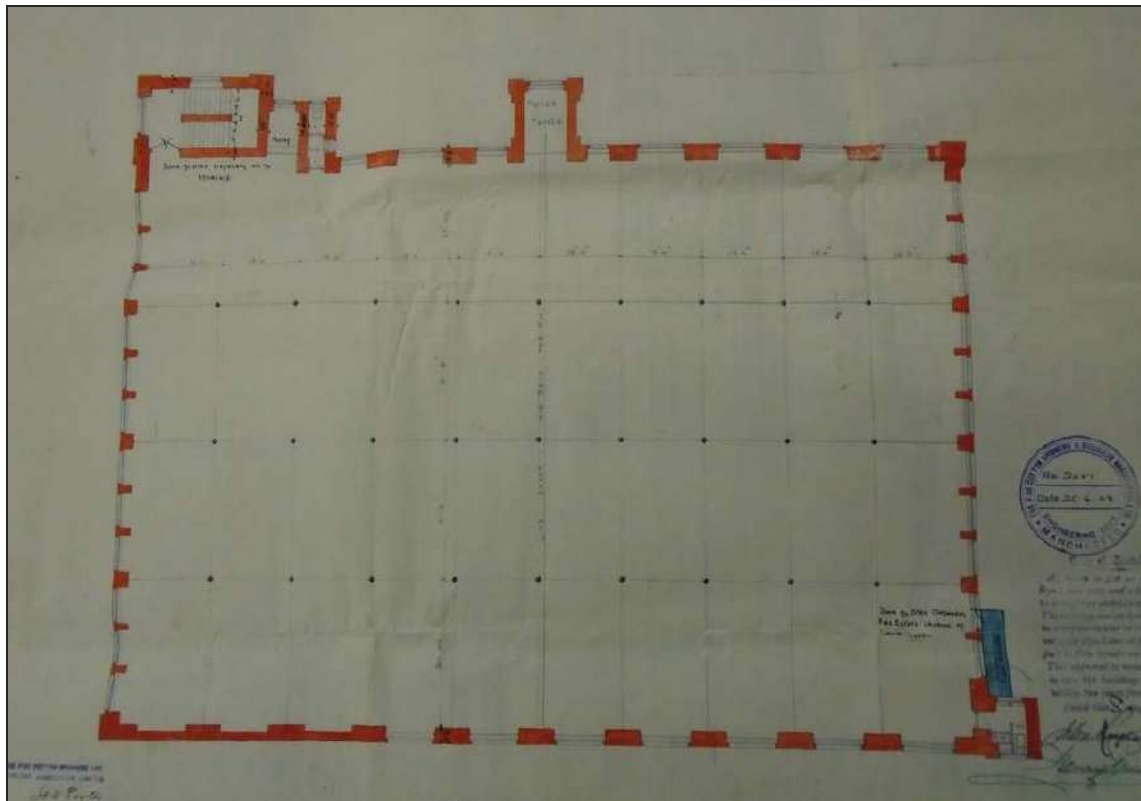


Plate 5: Architect's drawing of New Little Mill of June 1908

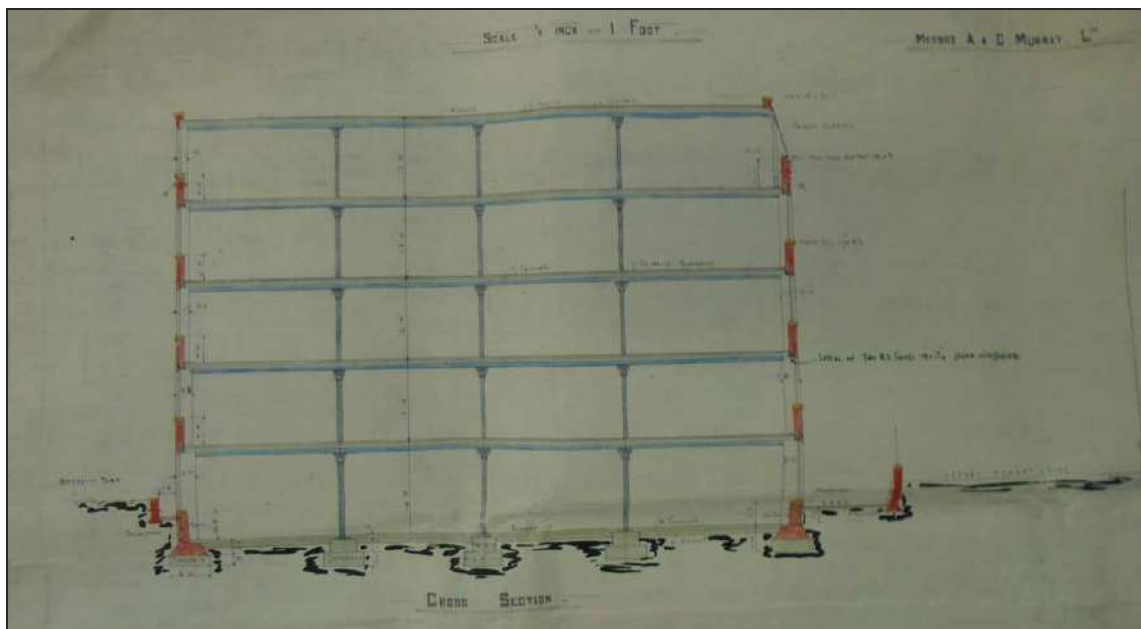


Plate 6: Architect's drawing of New Little Mill of June 1908

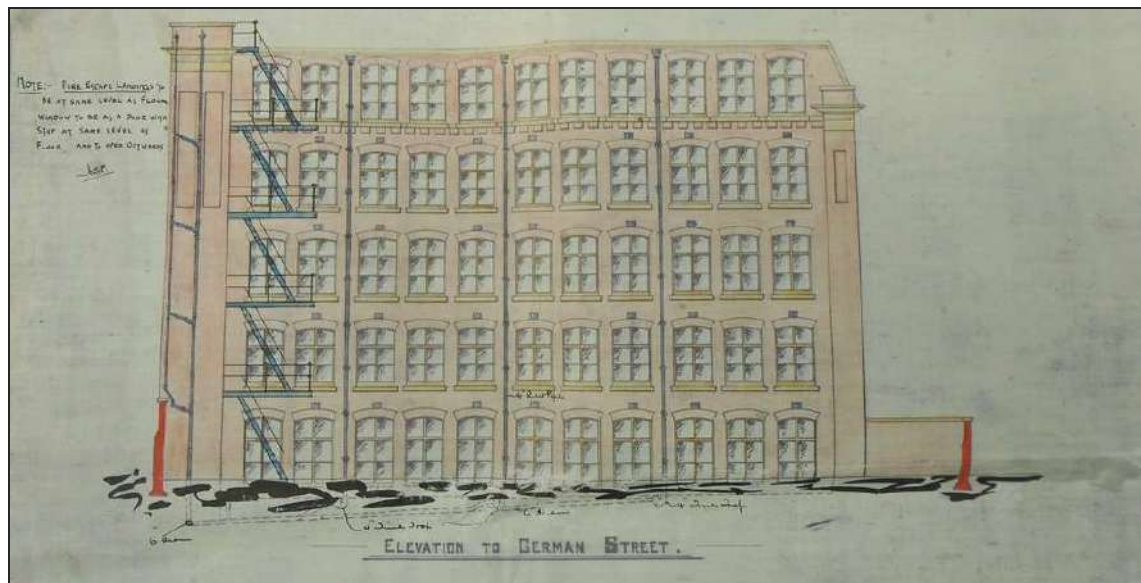


Plate 7: Architect's drawing of New Little Mill of June 1908

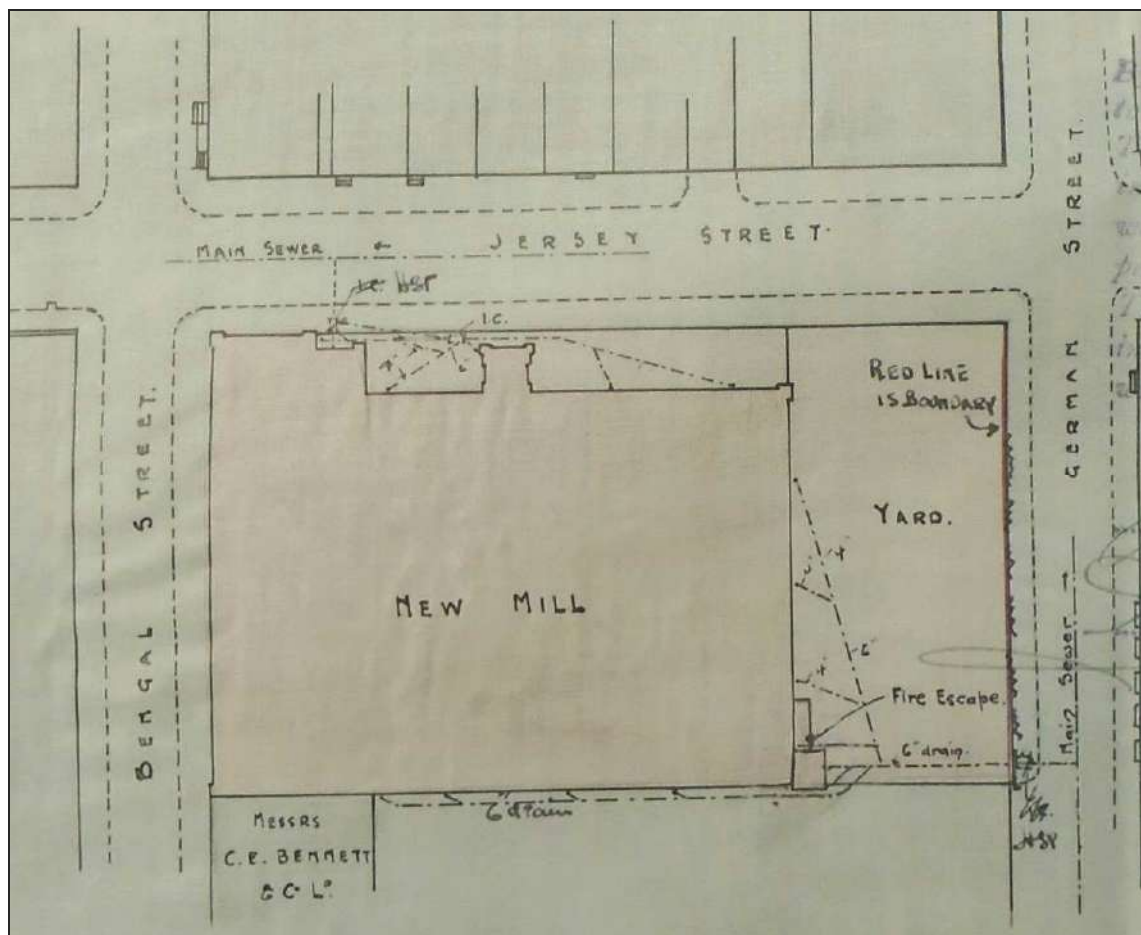


Plate 8: Architect's drawing of New Little Mill of June 1908

Brunswick Mill, on Bradford Road in Ancoats, was converted to electric drive in 1908, but obtained its power supply directly from the Manchester Corporation main at 6500 volts, and was transformed down to 400-440 volts for machinery and 220 volts for lighting purposes in a transformer house (*Illustrated London News* 1909). It is likely that A & G Murray Ltd used a system similar to that installed at Brunswick Mill. Electricity was supplied by Manchester Corporation, via a single-storey transformer house situated in the courtyard adjacent to the Bengal Street block. Group-drive motors were sited on each floor of New Little Mill to power the spinning machinery. These motors were housed in a full-height external tower, attached to the Jersey Street elevation, as a precaution against the fire risk.

A & G Murray's use of electric drives was not restricted to their newest factory, and its adoption within the main complex was a significant modification to the mills. The archive sources have not furnished a precise date for the adoption of the electric drive system, although it is likely to have been broadly concurrent with the completion of New Little Mill in 1909. Electricity not only powered the textile machinery, but facilitated the installation of new infrastructure, such as lighting and a small cage hoist that was added to the north-east corner of New Mill. The successful application of electricity to power New Little Mill was adopted subsequently by McConnel & Kennedy, when they erected Royal Mill and Paragon Mill in 1912.

Possibly before work was even finished on the construction of New Little Mill, a modification was proposed for the addition of a ventilating and humidifying tower. Plans were drawn up in January of 1909 (Plates 9 and 10), with the tower being added to the southern elevation of the mill (Plate 9).

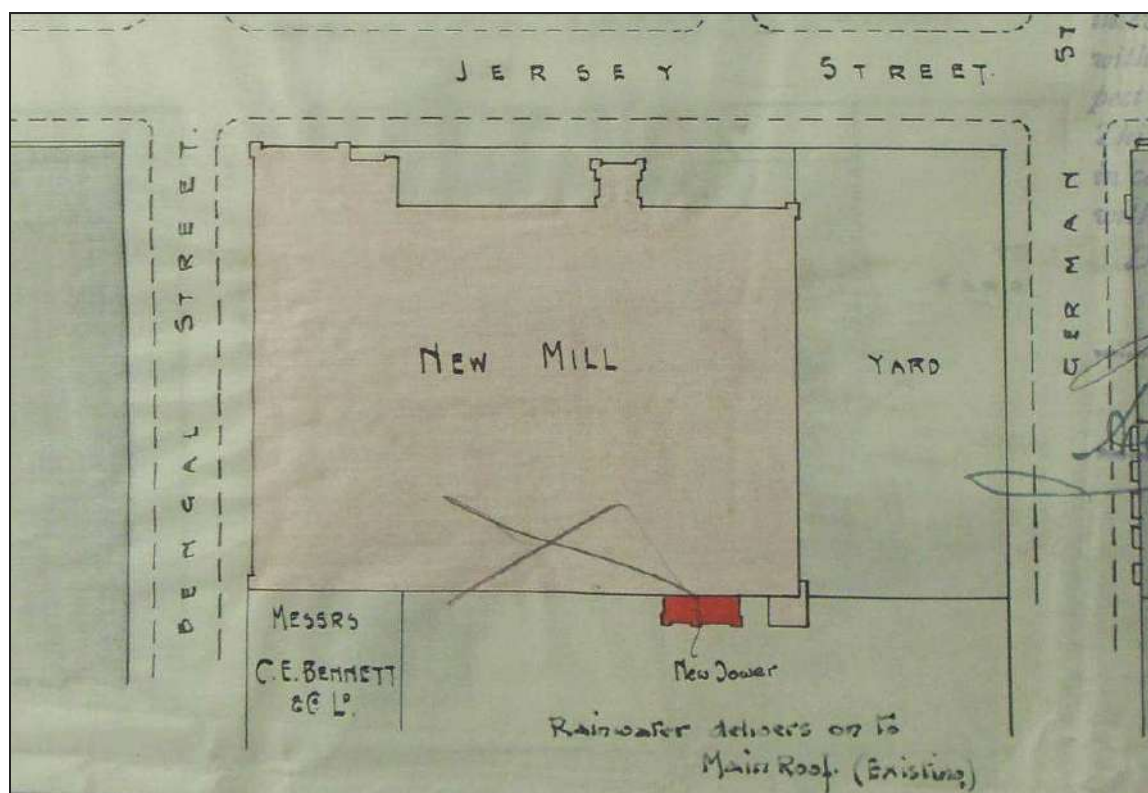


Plate 9: Architect's drawing of addition to New Little Mill, January 1909

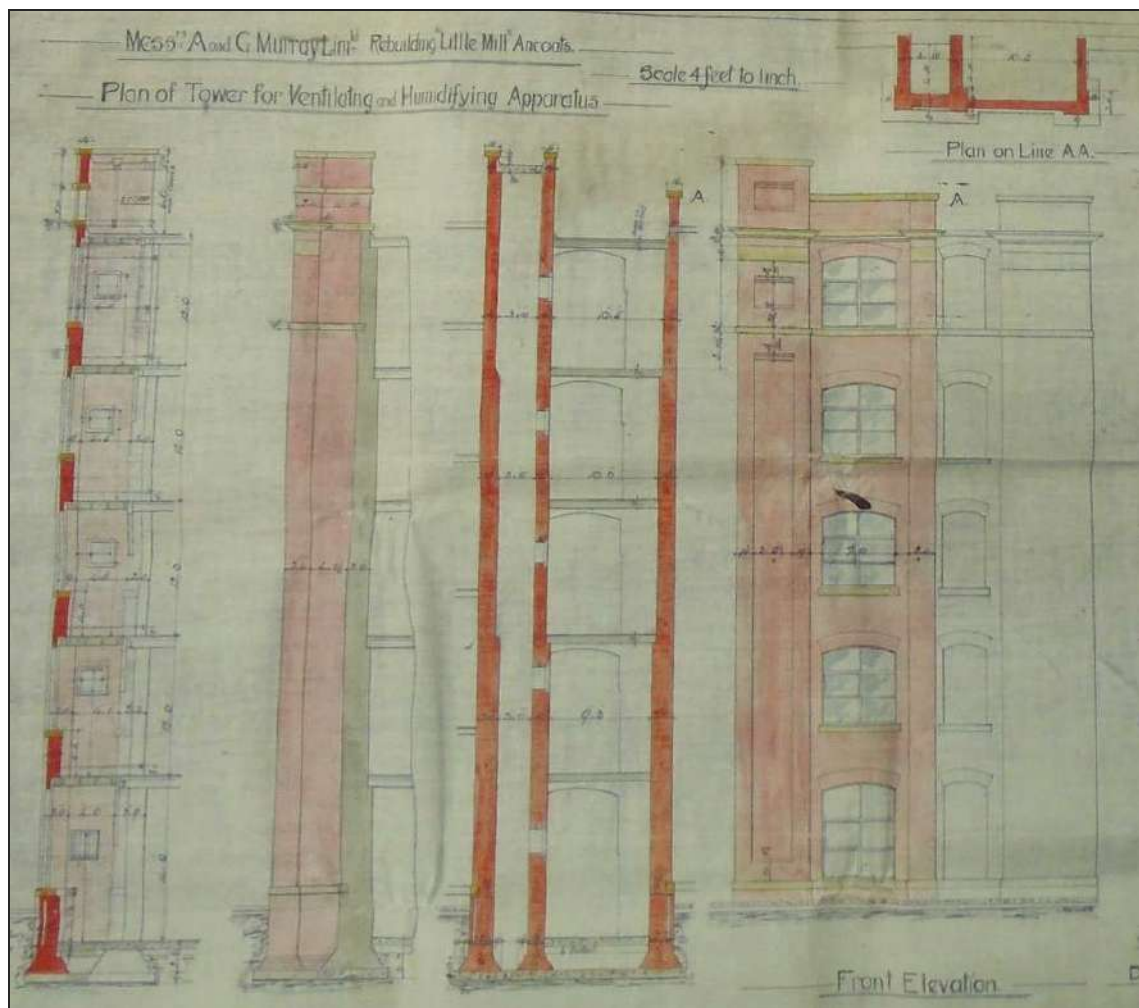


Plate 10: Architect's drawing of addition to New Little Mill, January 1909

A useful source of information for the development of the site during the second decade of the 20th century is provided by a deposited building plan of 1926 (Plate 11). This shows the electric sub-station adjacent to the Bengal Street Block, and the three tunnels beneath Bengal Street that connected New Little Mill with the main complex on the western side of the street.

Cotton production seems to have ended between 1948 and 1960, when the Fine Spinners' and Doublers' Limited conveyed the mill complex to two or more separate companies. Old and Decker mills appear to have been the first elements of the complex to have been sold. The deed of conveyance, dated 6th February 1948, was between the Fine Spinners' and Doublers' Limited and Messrs F and SS Hurst, who purchased the two mills for £5,800.

The site was used for a variety of functions thereafter. The 1966 revision of Goad's Insurance Plan labels Old and Decker mills as various clothing factories and warehouse, with the basement being used as a carpet warehouse. New Little Mill underwent several name changes. At one time it was known as 'Dixon's Mill' after A&G Murrays' modernising turn-of-the-century Managing Director. In the 1960s it became known as 'Chorlton Street Warehouse', as shown on a 1967 plan for construction of a fire escape to the Jersey Street elevation.

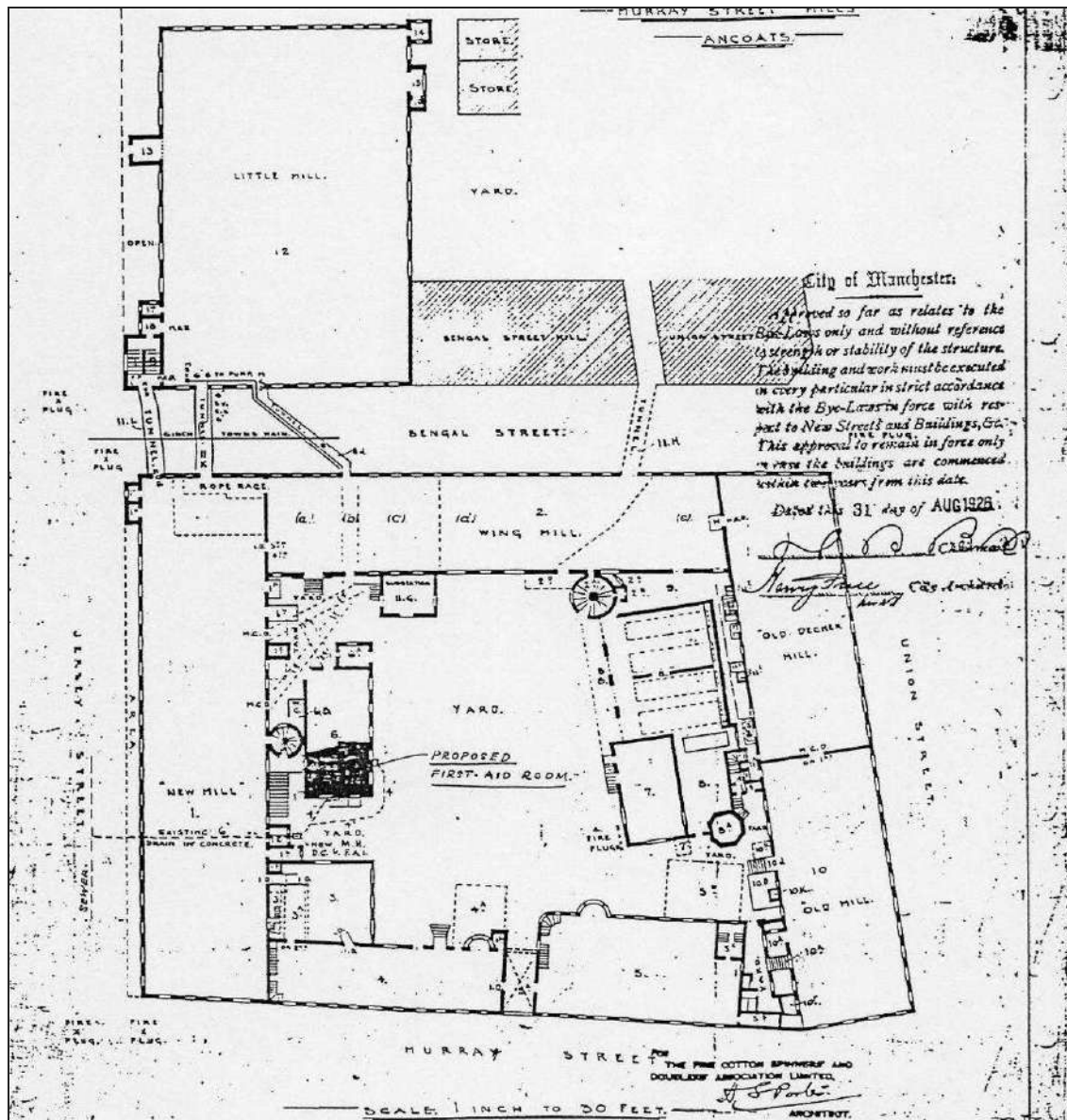


Plate 11: A deposited building plan of the Murrays' Mills dated 1926

The north-eastern corner of the Jersey Street elevation can be seen to have a later insertion, in 1967, of a fire escape block. Building control plans (E/2352/9, Manchester City Local Archive) describe the construction to be of brick walls, reinforced concrete floors and roof of asphalt over felt laid on concrete. As part of the build a section of railings and part of the existing plinth boundary wall were removed at ground floor level, on Jersey Street. Existing Mill windows were removed in order to facilitate the entrance to each of the building's floors.

4. Methodology

4.1 Survey Methodology

The Historic Building Investigation was undertaken to Historic England Level 3 standard, as outlined in *Understanding Historic Buildings: A Guide to Good Recording Practice* (Historic England 2016). This comprised a detailed descriptive, photographic and analytical survey of New Little Mill. The drawn record was based on survey drawings supplied by the client, which were manually enhanced, with the resulting phased archaeological drawings produced in industry-standard AutoCAD format.

4.2 Watching Brief Methodology

Prior to the commencement of the evaluation trenching, the Client provided Salford Archaeology with service plans for the area, and the areas of trenching were scanned with a Cable Avoidance Tool. Two evaluation trenches were excavated using a mechanical excavator fitted with a 0.5m wide toothless bucket. Spoil was placed next to the excavated trenches, and was then backfilled on completion of the evaluation.

Separate contexts were recorded individually on Salford Archaeology *pro-forma* trench sheets. The trench was located and planned by GPNS.

Photography of all relevant phases and features were undertaken in digital format using a digital SLR camera. General working photographs were taken during the archaeological works, to provide illustrative material covering the wider aspects of the archaeological work undertaken.

All fieldwork and recording of archaeological features, deposits and artefacts were carried out to acceptable archaeological standards. All archaeological works carried out by the CfAA are carried out to the standards set out in the Code of Conduct of the Chartered Institute for Archaeologists.

5. Historic Building Investigation

5.1 Introduction

A programme of historic building investigation was undertaken of the redundant, three-storey industrial building known as New Little Mill, which had formed a part of the late 18th-century cotton spinning complex of Murrays' Mills. The investigation was carried out to Historic England Level 3 standard, and was undertaken in December 2017.

The building comprised a three-storey structure of 10 by 4 bays, built on the eastern side of Bengal Street, which separated it from the main part of the Murrays' Mills complex (Fig 1). It had four floors, the lower of which was placed partly below ground level, forming a lower-ground floor, rather than a full basement, with access to the ground floor up a short flight of steps (Plate 12). The current structure is a rebuild of the early 20th century, following a fire, and represents a typical mill of the period, built in machine-made red brick below a flat roof. The building was constructed in two phases, with the principal entrance on the Jersey Street frontage, aligned on an approximately west-south-west / east-north-east alignment (Fig 1). For clarity of description, site north is taken as being perpendicular to Jersey Street (Figs 2-6).



Plate 12: General view of the north-western façade of New Little Mill

5.2 External Description

Northern façade: this principal façade, fronting Jersey Street was constructed of machine-made brick, in three stretcher English Garden Wall bond (Fig 7; Plate 12). The elevation retained its original stair tower at the western end (Plates 12 and 13), which also incorporated a hoist and privy (Figs 2-6; Plates 5, 12 and 14), with a further tower in the centre of the façade, originally housing the electric motors that powered the mill (Plate 5). These projected from the façade, with protruding pilasters, recessed at sill level of the third floor (Plates 12 and 13). A later brown-brick stair tower had been erected at the eastern end of the façade (Plate 12).



Plate 13: Detail of upper stair tower



Plate 14: Detail of upper hoist/privy tower

Each of the exposed bays between the towers, had 7' (2.13m) wide windows, with gauged segmentally-arched lintels and projecting concrete sills (Plate 14). At lower ground-floor level, the sill of the window was formed by a three-course sandstone plinth that had a plain squared head. This did not extend across the central motor tower, and was not observed to the east, where it was obscure by later structures

Above lower ground-floor level, each window was boarded with plywood sheeting housing a Perspex two-light opening (Plate 15). The narrower windows in the stair tower were fully boarded, as were those of the hoist tower and the central motor tower, all having similar arched lintels to the main façade, and with similar concrete sills, apart from at third-floor level, where it formed part of a continuous string band across the panel, carried on bull-nosed brick corbels (Plates 12, 13 and 14). Similar corbels form the head of the main façade (Plate 15), below a sandstone string band to the steeply-pitched northern bay of what was otherwise a flat roof (Plate 15). Although this was latterly covered with felt, it would have originally formed a fully-glazed band of steeply-pitched lights, affording high-quality light without shadows into the upper floor of the mill, utilising a similar roofing technique to that of the weaving sheds that became commonplace during the second half of the 19th century.



Plate 15: Detail of the windows on the upper-floors and roof structure

The pilasters of the towers also had sandstone bands, placed level with the springing point of the upper windows (Plates 12, 13, and 14), three courses below a moulded sandstone capping to each pilaster, with those of the stair tower forming the outer edges of a continuous projecting string (Plate 13). The recessed panels of the motor tower and hoist/privy tower were capped with a three-tiered segmental arch, in brick, below a plain parapet with oversailing sandstone capping (Plate 14).

The pilasters of the wider stair tower had narrow recess at second- and third-floor levels, each capped with tiered brickwork (Plate 13), and projected above the façade, where they had further panels (Plate 13). The parapet wall had a rounded scoop, again with oversailing sandstone capping, and representing a moderate architectural embellishment (Plate 13).

The privy and hoist had separate windows within the tower adjacent to the stair tower, suggesting that the original hoist was an open cage, allowing light into the interior, and with the windows of the privies retaining what were probably original louvred timber vents in their upper part (Plate 14). Although the string band was continuous between the hoist and privy window sills, it had a rebate moulded into the concrete, to distinguish between the two windows (Plate 14). The privy tower also had narrow windows or similar style to each floor within its return, eastern elevation, with these also retaining the timber louvres (Plate 15).

All window apertures at lower ground-floor level, and at ground-floor level within the towers, were blocked with brick (Plates 12 and 16). The apertures of the two bays to the east of the hoist/privy tower were remodelled at lower ground-floor level, with a narrower window against the tower, and a wider window to the east, spanning the bay division. Both had flat lintels between rebuilt brick piers and a narrow timber canopy, (Plate 17), demonstrating that they represented remodelling of the original apertures.



Plate 16: Detail of the blocked windows of the lower ground floor

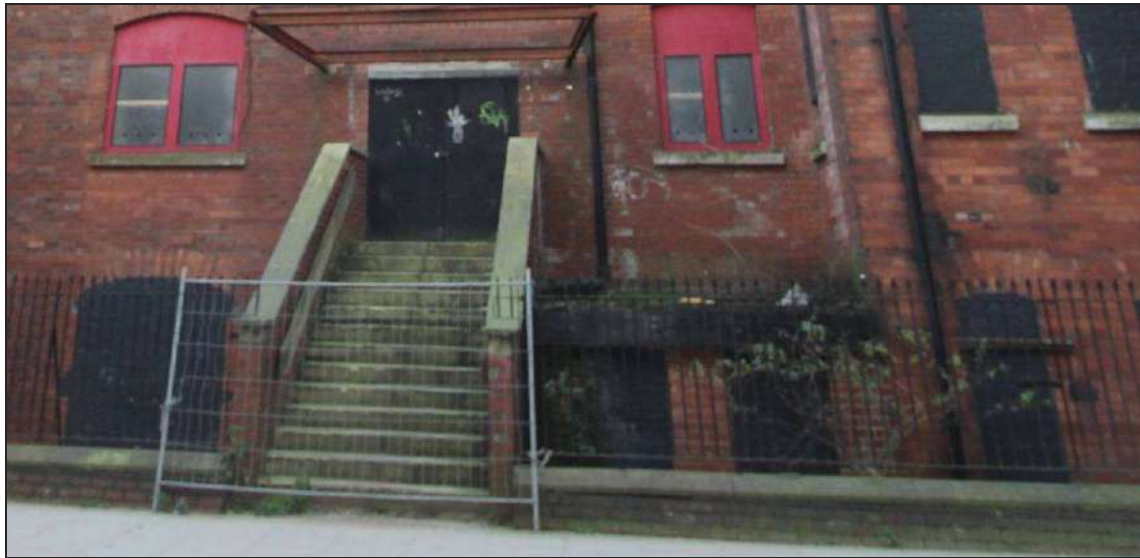


Plate 17: Offset lower ground-floor level windows, boundary wall and entrance

The principal entry into the building was placed on the eastern side of the stair tower, through a wide doorway accessed by a straight flight of closed-string stairs (Plates 17 and 18). These comprised 13 concrete-cast steps, with machine-made brick side walls with oversailing flat stone copings. Each side housed a timber-plank handrail, with a round moulded edge, and bolted to the walls.

The present door had been inserted into an earlier aperture with the original gauged brick segmental arched head having been retained, matching those of the adjacent windows. The doorway had an inserted concrete lintel with square return end reveals. The door had been replaced with a timber-framed casing and a set of double flush timber doors (Plate 18). The framing for a late, I-section steel canopy survived above the doorway, extending to cover most of the stair (Plates 17 and 18). Low retaining walls ran east and west from the front of the stairs, comprising four courses of brickwork below a chamfered sandstone capping, into which wrought-iron railing were set (Plates 12, 16, 17, and 18). This was gated at its eastern end, adjacent to the motor tower, and butted the stair tower at its western end, forming a barrier to a lowered external floor level to the lower ground-floor level beyond.

Several further additions had been made to the northern façade, most noticeably being a large, almost two-bay wide stair tower placed at the eastern end of the wall (Figs 2-7; Plates 12 and 19). This was of a darker, brown brick construction, in stretcher bond with small horizontal windows, with projecting concrete sills corresponding to internal landing levels (Plate 19). As elsewhere, these were brick-blocked at the lower levels, and boarded above (Plate 19). A contemporary wall, of similar construction butted the motor tower, infilling the space to the new stair tower, which projected slightly further from the façade (Figs 2-7; Plate 19). This was of 8' (2.44m) height, and housed a double-doorway, latterly shuttered with steel plating, but which afforded access to a doorway in the west wall of the new tower at ground-floor level (Fig 2).

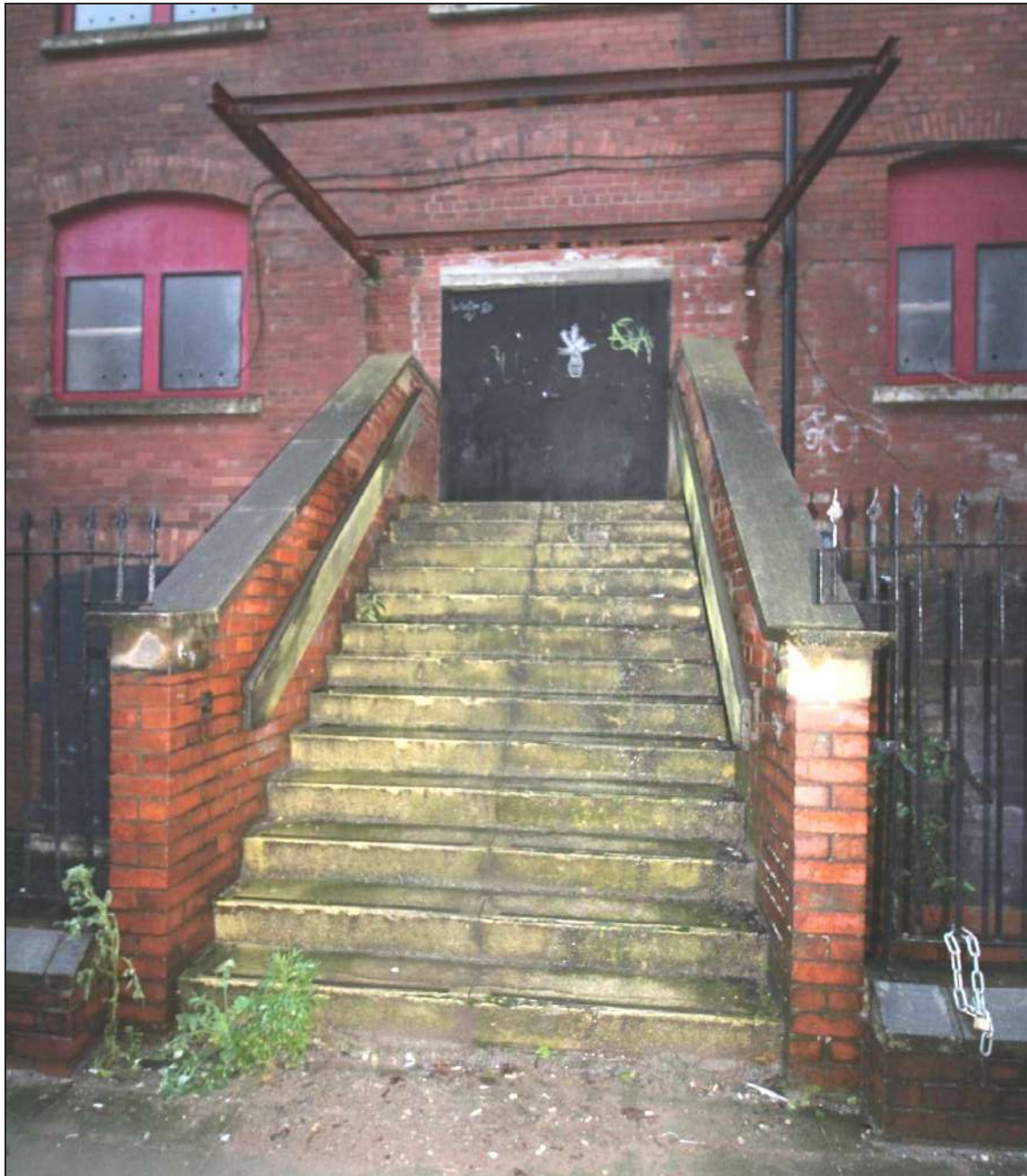


Plate 18: Stairs to the main entrance in the northern façade



Plate 19: Late stair tower and entrance at the eastern end of the northern façade

Western façade: the western façade fronted Bengal Street, and was of similar architectural decoration to the northern façade, constructed in a continuation of the three-stretcher English Garden Wall bond (Fig 8; Plate 20). The stair tower projected beyond the northern bay, and is narrower than on its northern face, but houses similar windows, although that at upper ground-floor level was a taller aperture, with the sill being placed lower than that within the northern façade. (Fig 8; Plate 20).



Plate 20: General view of the south-western façade

To the south, each of the four bays housed three windows to each floor, separated by piers of only two-brick width (0.39m) within each bay, and of 2½ brick width (0.74m) at each bay division. Those at upper ground-floor level were of similar height to that in the stair tower, although the decoration of the façade was otherwise the same as that of the principal façade, with the close-set windows having individual sills apart from the decorated sill band at upper-floor level (Plate 20). The lower ground-floor level windows were blocked, as were the upper ground-floor level windows, unlike the principal northern elevation (Plate 20). The façade terminated at its southern end with a protruding pilaster, recessed at sill level of the second floor. The brick string course and oversailing chamfered sandstone string course continued around from the north-western façade. A low parapet with oversailing sandstone blocks had shallow single-tiered corbels above the narrow brick piers within each bay, double corbels at each bay division, and three corbels to the south of the stair tower, which had similar decoration to the parapet as on its northern side (Plates 20 and 21).

The stair tower housed a doorway at street level, which appears to have represented an original secondary entrance (Plates 5 and 22). It had square return-end reveals below a recessed sandstone lintel, with tiered sandstone brackets to a projecting moulded sandstone hood. The doorway latterly housed a replaced set of flush steel doors with modern door furniture (Plate 22).



Plate 21: Detail of the parapet wall of the stair tower, and corbels to the parapet to the south



Plate 22: Detail of the doorway at basement level of the stair tower

Southern façade: the southern façade was also constructed with machine-made brick in a three-stretcher English Garden Wall bond. The three western bays were concealed behind the earlier Fireproof Mill to the south, and a privy tower projected slightly beyond the eastern bay (Fig 9; Plate 23), even though the original architects plans of 1908 had the privy tower placed on the east wall, rather than the south (Plate 5). A ventilation and humidifying tower was placed against the adjacent bay, almost immediately following the completion of the mill (Plates 9, 10, and 23), projecting to a similar extent to the privy tower (Figs 2-6, 9).



Plate 23: General view of the southern façade

The window apertures in the intervening bays were as the northern façade, with blocking at lower and upper ground-floor level, and two-light Perspex pane within the upper floor timber boarding of the windows of the upper floors (Plates 23-25). The decoration of the upper floor sill and parapet were as on the western facade (Plate 25).



Plate 24: Detail of blocked windows to the ground floor



Plate 25: Detail of the upper-floor window apertures and parapet

The privy tower at the eastern end of the façade had similar decoration to those of the northern elevation, but had windows in its eastern and western faces, rather than the southern, outward-facing side (Plates 23, 26, and 27). The third-floor level string band continued around the privy tower, but was not carried by brick corbels as with the other towers (Plates 23, 26, and 27). The narrow space in the eastern bay to the west of the privy tower housed narrow windows to each floor (Figs 2-6; Plates 23 and 27). These were of similar style to those elsewhere, but were of only 4' (1.22m) width.

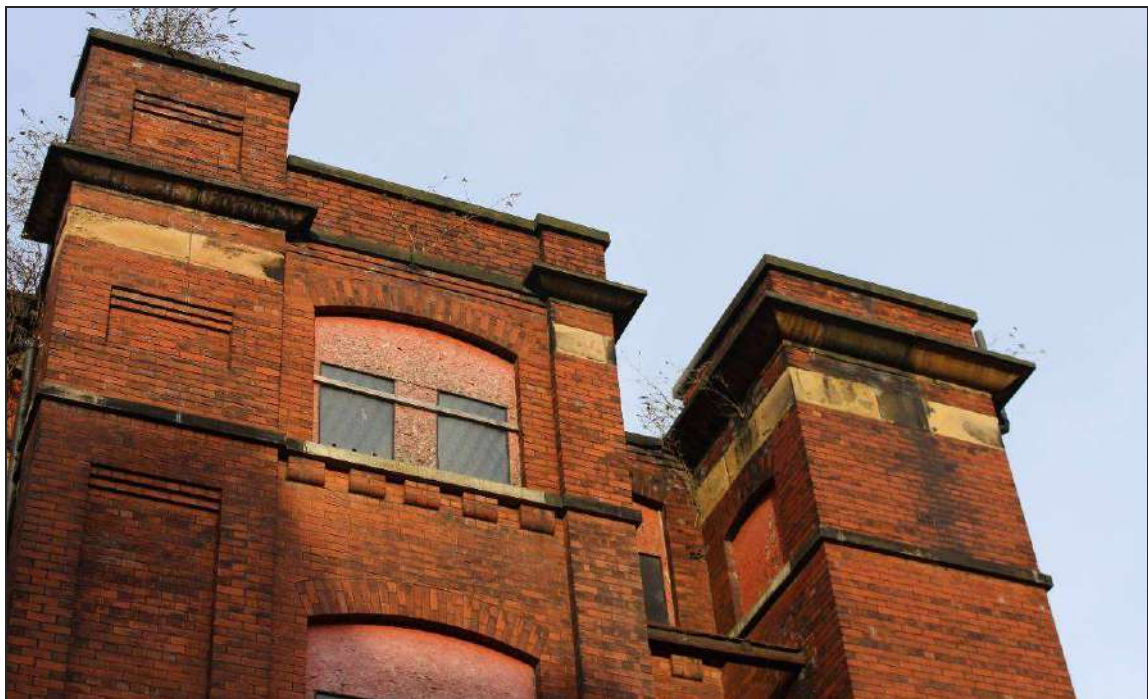


Plate 26: The third-floor of the privy tower (right) and later ventilation and humidification tower



Plate 27: General view of privy tower and later ventilation and humidification tower

A further tower was added to the southern façade almost immediately following the completion of the original construction. This was of the full width of the penultimate bay from the eastern end of the elevation (Figs 2-6; Plates 23 and 27), and externally comprised a bay with a window to each floor, matching those of the original façade (Plate 27), with a narrow flue on the western side. This had a recessed panel, matching the pilasters of the northern and western facades, with continuation of the decoration of the elevation and tower at third floor and parapet level (Plates 26 and 27). I-section steel beams tied this tower to the original privy tower to the east at first-, second- and third-floor level (Plate 27).

Eastern façade: the eastern façade was of four wide bays, with a privy tower projecting beyond its southern extent (Fig 10; Plate 28), and was similarly constructed in three-stretcher English Garden Wall bond (Plate 28). A late stair tower also butted the northern end of the façade, built with brown brick in stretcher bond.



Plate 28: General view of the north-east façade

As with the other elevations of the mill, the window apertures to each of the floors comprised gauged segmentally-arched brick lintels, and projecting concrete sills (Fig 5; Plate 28). The lower and upper ground-floor apertures were similarly bricked-up whilst the upper floors have replaced two-light timber-framed windows. Decoration to the third floor was as the other elevations, with the pilaster at the northern end of the wall being lower than full elevation height, to accommodate the slope of the northern-light roof bay (Plate 28). As with the western façade, each bay housed three windows, with the wider bay divisions carrying downpipes from the roof against the eastern façade (Plate 28). Although the original architects' plans suggest that the northern face of the privy tower would house doorways onto a fire escape, placed in the southern bay (Plate 7), the tower was actually placed on the southern façade, with no space for doorways in the shallow projection beyond the west elevation (Figs 2-6). With the repositioning of the privy tower, the doorways onto the fire escape were placed in the southern part of the southern bay, and were of similar width and lintel style to the adjacent windows (Plate 28). Each was blocked latterly with galvanised steel-panel shuttering (Plates 28-30), but original ornate cast-iron brackets for each landing survived either side of each doorway, and at the bay division to the north at all but third-floor level (Plate 28). These incorporated some decoration (Plate 30), although they were not personalised to the mill or its owners, as is often seen, but their position demonstrates that the wide landings suggested by the architect were installed (Plate 5).



Plate 29: Detail of the fire escape doorway on the second floor



Plate 30: Detail of the cast-iron brackets of the fire escape

A further doorway had been remodelled from the fourth window aperture from the north end of the upper-ground floor (Plates 28 and 31). This retained the gauged segmentally-arched head of the window with the sill having been fully removed. The side jambs and the two upper-lights of the original timber window frame had been retained, suggesting that all original windows were probably of six large lights in three rows of two (Plate 31). The aperture latterly housed a roller shutter door, elements of which had been retained although the doorway had recently been boarded. The doorway appears to have afforded access to a narrow lean-to structure in the northern two bays, at lower and upper ground-floor levels, and of which four machined-timber half trusses survive, bolted to the wall at upper ground-floor lintel height (Plate 28). Vertical rails for further trusses survive either side of the inserted doorway (Plate 31).

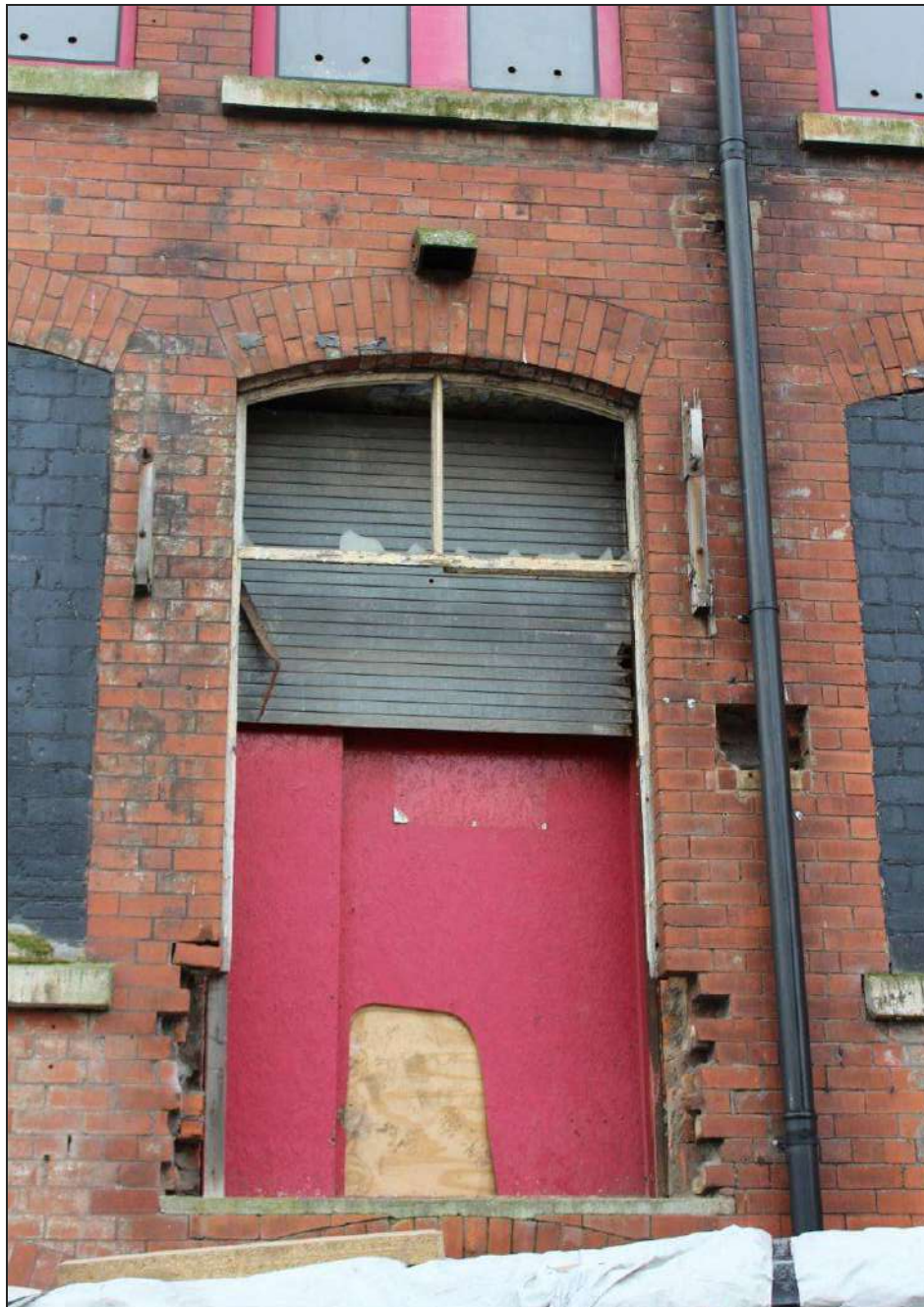


Plate 31: Remodelled doorway at upper ground-floor level

5.3 *Internal Description*

Internally, the mill comprised 10 x 4 bays, each divided by 9" (0.23m) diameter hollow cylindrical cast-iron columns, placed at 13' (3.96m) centres on the long axis of the mill, and carrying transverse I-section beams that supported the flat concrete ceilings (Figs 2-6; Plate 32). Each column had a double astragal to round head plate that incorporated a socket for the column above (Plate 33). The beams spanned between columns, carried on narrow brackets within the column casting supported by narrow flanges within the capital (Plate 33).



Plate 32: General view of the ground floor, detailing the cast-iron column arrangement



Plate 33: Detail of the astragal capital of the columns on the ground floor

Upper ground-floor level: the principal entrance in the northern elevation, fronting Jersey Street, afforded access to the upper ground-floor level of the interior (Fig 2; Plate 34). Access would have been through large double doors, housed within a recessed opening with bull-nosed brick reveals (Plate 34). The original internal lintel was obscured by a modern timber panelled false ceiling, that has been inserted to create an entrance vestibule (Plate 34).



Plate 34: Principal doorway into the mill in the northern wall, with ceiling of vestibule

The upper ground floor had been divided into 15 separate modern compartments with modern plasterboard and timber-framed partition walls, possibly obscuring some detail, although many of the partitions had been removed prior to the survey, revealing brickwork and ceiling detail (Plates 32-34).

Each bay on the long elevation have full-height recessed window bays of 7'6" (2.28m) width, with bull-nosed brick piers of 5'5" (1.65m) width carrying the ends of the I-section steel ceiling beams between (Fig 2). In the end walls of the mill, the window bays were again recessed, but with narrower piers within each bay, between wider examples at each bay division (Fig; Plate 35). Most windows retained six-light timber frames of three rows of two large lights, with a tilt opening to one side of the central row (Plate 35). The majority of the glazing had been removed, but some windows did retain obscured glass panes (Plate 35).



Plate 35: Recessed windows in end wall of upper ground floor, with original timber window frames, late partition wall (left) and fire alarm valve (right)

The motor tower within the north elevation was set within a blind recess, with bull-nosed brick reveals, and with an I-section steel lintel and concertina sliding door affording access into an inserted hoist/lift (Plate 36). The tower was constructed to house electric motors that powered line shafting to each floor, but its remodelling into a hoist shaft following the removal of the motors removed any evidence for the motor housings, or the placement of the belt drives for line shafting. The hoist was locally manufactured in Ancoats by Etchells, Congdon, & Muir Ltd, with the cage being rated at 20 cwt.



Plate 36: The doorway of the former motor tower at upper ground floor level



Plate 37: Internal view of the hoist tower

Lower ground-floor level: access to the lower floor was originally afforded by a stair tower at the western end of the north wall, but this was augmented latterly by the addition of a further stair tower at the opposite end of the same wall (Fig 3). This had been blocked with timber panelling at the time of the survey.

The stair in the north-west corner of the basement comprised a half-turn concrete stair around a brick stair wall (Figs 2-6). A small store room was formed with timber partitions below the rear of the stairs (Fig 3; Plate 38), with a relatively large vestibule at basement level having a large fireproof door into the main mill, hung on two large pintels, rather than being a sliding door as seen on the floors above (Plate 38). The lowest flight of stairs also led directly to a tunnel beneath Bengal Street, affording access to the basement of New Mill, within the main Murrays' Mills complex (Fig 3; Plate 39). This passage also appears to have had a substantial fireproof door at its entrance, although only a single strap hinge survived *in-situ* (Plate 40). The 5'2" (1.57m) wide tunnel was contemporary with the construction of the original Little Mill in 1818, and had an arched ceiling, with its crown 7' (2.13m) above the extant concrete floor (Plate 39). The western 5'6" (1.68m) had been rebuilt in machine made brick below a flat iron-sheet ceiling (Plate 41), and butted the outer edge of the external wall face of New Little Mill, suggesting that the tunnels had to be rebuilt at its eastern end following the fire that destroyed the original Little Mill. The tunnel was blocked latterly at its western end, into the basement of New Mill (Plate 42), with the passage having been somewhat compromised by the insertion of a water pipe across it (Plates 41 and 42), although this is not the water main shown on the plan of 1926 (Plate 11).



Plate 38: Vestibule at base of north-west stair tower with door into basement and room



Plate 39: Original tunnel from Little Mill to New Mill within basement



Plate 40: Detail of the remains of the hinge for the door of the north-west tunnel



Plate 41: Detail of the phasing within the northern tunnel



Plate 42: Blocked doorway into the basement of New Mill and inserted water main pipe

The basement was similar in layout to the floors above, but was taller to accommodate preparatory working, as opposed to the spinning that was undertaken on the floors above (Plates 6 and 43).

Despite the taller height of the ceiling, the columns were of similar 9" (0.23m) diameter, even though wider columns in basements of broadly contemporary mills were common. The space was less divided than on the upper ground floor, revealing more of the concrete rendered floor, and painted brick walls and ceiling (Plate 43). As with the floor level above, many of the window apertures retained six-light frames of similar style



Plate 43: General view of the lower ground floor

A second tunnel below Bengal Street, connecting the basement of Little Mill to the basement of New Mill within the Murrays' Mills main complex, was constructed as a ducting tunnel, rather than for pedestrian access, and was used latterly for pipework between the two mills. It is not shown on mapping until 1851, but its placement on the approximate centre-line of New Mill (Plate 3) suggests that it may have been used to house a drive shaft between New Mill and Little Mill, and is thus more likely to have formed part of the original construction.

The entrance into the tunnel was placed within the recess of the window aperture of the fourth-bay within the western wall (Fig 11; Plate 44), utilising the bull-nosed brick piers as jambs, and an I-section steel beam lintel inserted at a height of 4'6¼" (1.38m) above floor level. Internally, the tunnel comprised a brick-arched ceiling for the majority of its length, as to the north, with exposed brick walls and a concrete floor with a central channel of 8" (0.20mm) depth (Plate 45). As with the tunnel to the north, two phases of construction were clearly visible within the brick side-walls, with the latter brickwork crudely keyed into the earlier phase, and representing the rebuilding of the present structure. The tunnel housed mid- to late 20th-century water pipes, carried on what appeared to be earlier cast-iron brackets (Plate 46). These pipes turned northward along the face of the internal west wall of the basement into a timber-partitioned room that contained the main control valve or 'Christmas Tree' for the fire sprinkler system.

The small room, of approximately 5'6" square (1.67m²), had timber panelled walls with a doorway in the north wall (Fig 3). The door has been removed but the simple moulded timber rectangular architraves had been retained. An adjoining room to the east appears to have represented a small office or workshop and was of similar, contemporary construction. This had a doorway in the eastern end wall, and a continuous glazing band set within the timber panelling of the north wall (Fig 3; Plate 48).

The 'Christmas tree' valve linked into the sprinkler system, with water being piped between floors by a vertical cast-iron pipe placed in the fourth bay from the western end of the mill (Figs 2-6; Plate 49). An associated fire alarm valve was placed at ground-floor level, immediately adjacent to the stair tower (Fig 3), and appeared to bear the name 'Dowson Taylor & Co, Engineers, Manchester & ?London', although this was heavily obscured by many layers of paint (Plate 50).

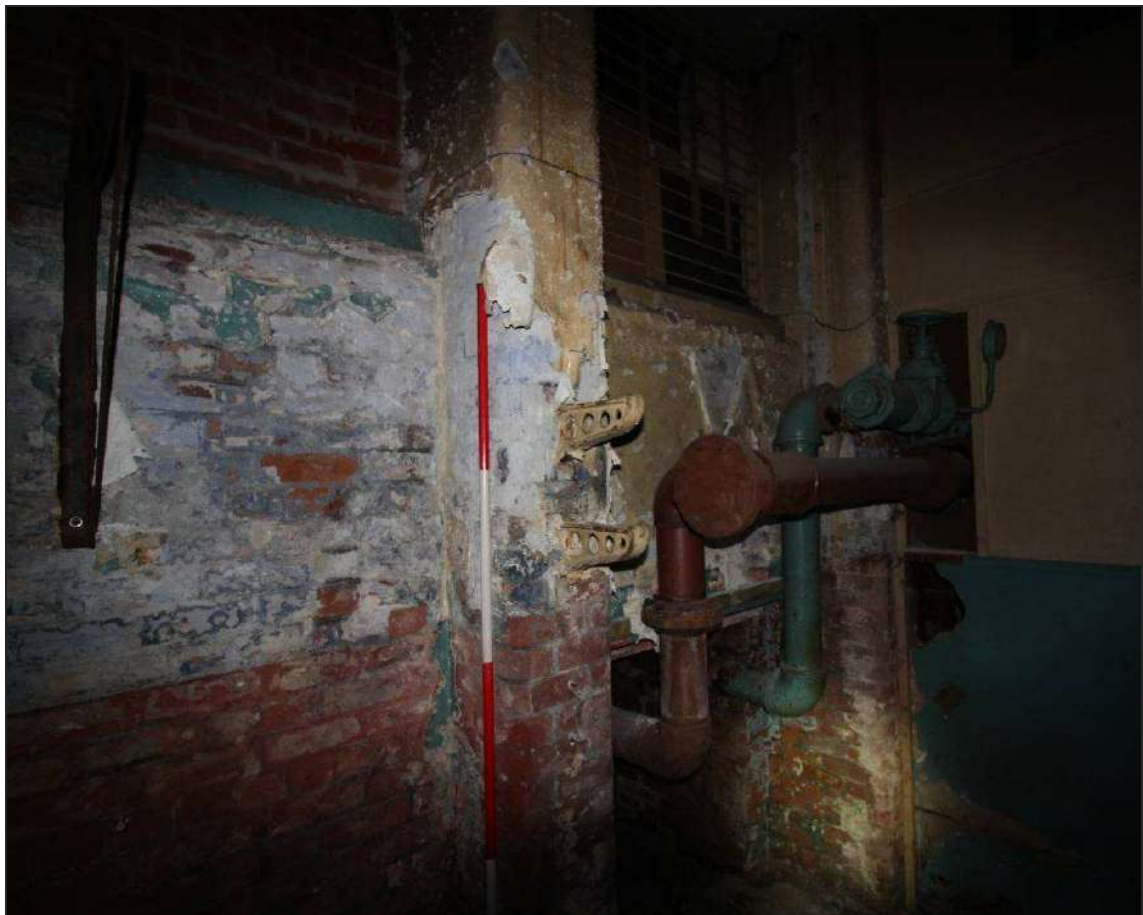


Plate 44: Entry into the service tunnel within the south-west wall



Plate 45: General view of the service tunnel, detailing the channel within the floor



Plate 46: Detail of the brackets supporting the pipework within the tunnel

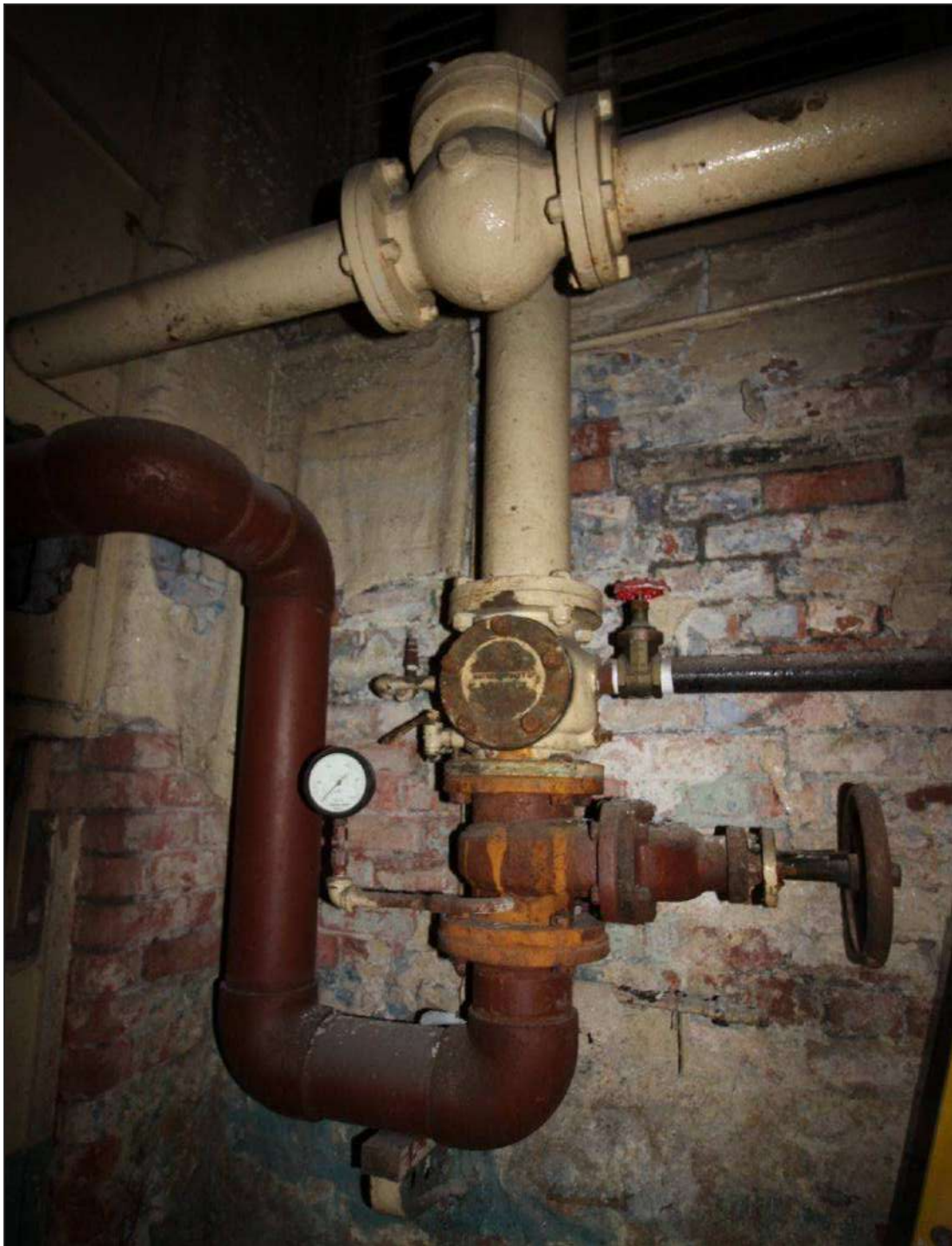


Plate 47: The 'Christmas Tree' valve for the fire-sprinkler system



Plate 48: Timber-partitioned office with sprinkler system valve room to the rear



Plate 49: Vertical pipe at ground-floor level transferring water between floors for the sprinklers



Plate 50: Sprinkler system fire alarm valve, Ground floor

A third tunnel, situated three-bays to the south of the small shafting tunnel, had been blocked, flush with the face of the internal west wall. This originally afforded access into the northern end of the Bengal Street Block, or Wing Mill of the Murrays' complex predating an engine house attached to the southern side of the end of New Mill, which powered a rope race (Miller and Wild 2007). Entry into the tunnel had been through a 5'6" (1.67m) high doorway with a concrete lintel, and was of full-bay width, utilising the brick piers of the bay as its jambs (Plate 51). The blocking of the entrance comprised grey machine-made brick, suggesting a date in the latter part of the 20th century.

An original privy tower of 7' x 5'6" (2.13 x 1.67m) internal dimensions was placed at the eastern end of the south wall. It retained a single stall, formed of tongue-and-grooved timber partitions, which appear original, separating the flushing toilet (replaced latterly with a modern ceramic bowl) from a washbasin that was placed beneath the window to the immediate north (Fig 3). The partition had a continuous glazing band of two rows above door lintel height, including a vent opening window (Plate 52).

To the west of the original privy tower, a narrow window formed an original aperture within the end bay of the mill (Fig 3). The adjacent bay was remodelled shortly after the completion of the present structure, with the addition of an 18'6" (5.64m) wide tower, that span marginally wider than the adjacent bay. Not only does this project beyond the southern façade of the structure, but also included a room of 15'4" (4.67m) width that projected 8'9" (2.67m) into the open-plan basement (Plate 53). This was of full-brick thickness construction, in stretcher bond, and had a doorway towards the eastern end of its north wall. This had a concrete lintel and a concrete threshold step up into the room. The door has been removed but the timber door frame survived. Both the east and west walls of this room also had high-level windows into the basement, with concrete lintels and sills, but these were blocked with machine-made brick.



Plate 51: Blocked entrance into the southern tunnel below Bengal Street



Plate 52: Timber partition within basement privy



Plate 53: The small vestibule leading into the boiler room within the basement



Plate 54: Detail of the blocked window within the south-west wall of the inserted room

The eastern part of the projecting tower was open into the internal room at basement level, whilst the western part was enclosed to form a flue relating to the humidification and ventilation system that was housed within the tower (Fig 3). The segmentally-arched head of the original window in this bay of the mill had been retained within the ceiling of the new tower, with the window itself having been removed to form the open-plan access into the extension (Plate 55). The window aperture within the south wall of the later tower had bull-nosed brick reveals below a segmentally-arched lintel and a chamfered sandstone sill (Plate 56). This was blocked subsequently in two phases, the first comprising machine-made brick to a height of 2'2" (0.66m), and finally being completely blocked with modern grey brick in stretcher bond (Plate 56).

A blocked flue leading into the base of a chimney was situated within the west wall of the tower, below an I-section steel lintel of 7½" (0.19m) thickness, and placed 5' (1.52m) above floor level (Plate 57). This was blocked subsequently, with machine-made brick laid in stretcher bond (Plate 57). A second, narrow aperture into the flue was placed directly above the lintel of the lower aperture, and was similarly blocked below a lintel of edge-set brick above an iron bar (Plate 57). The eastern face of the chimney within the secondary tower also housed the western end of a flat steel beam, placed across the entire room at approximately 3m above floor height (Plates 55-57). This was supported at its mid-point by a strap into the concrete ceiling, which appears to have lifted the centre of the beam slightly (Plate 56). The beam appears to have formed protection for a series of reducing water pipes that form part of the humidification system, and that would likely have been connected to a boiler placed within the vestibule within, or immediately to the north of the base of the tower. Further pipes linked into this system passed through the east wall of the vestibule within the basement, and formed a network of heating pipes, which survived extant throughout the basement, running in pairs down either side of each column row (Plates 43 and 56).



Plate 55: Remains of the segmental arch head of the earlier window within the basement



Plate 56: Blocked window in the south wall of the secondary tower

To the east of the ventilation tower, the entrance into the original privy tower was partly blocked by a concrete stair, inserted to give access to a fire door in the southern bay of the east wall (Fig 3; Plate 58). The door had been inserted into an earlier window aperture and consists of recessed reveals with a concrete lintel, and formed part of modifications to the fire escape. The seven concrete steps had a handrail on the southern side, formed of tubular steel, probably representing a mid-20th-century replacement of original timber or steel steps up to the doorway.



Plate 57: Two blocked flues leading into the chimney

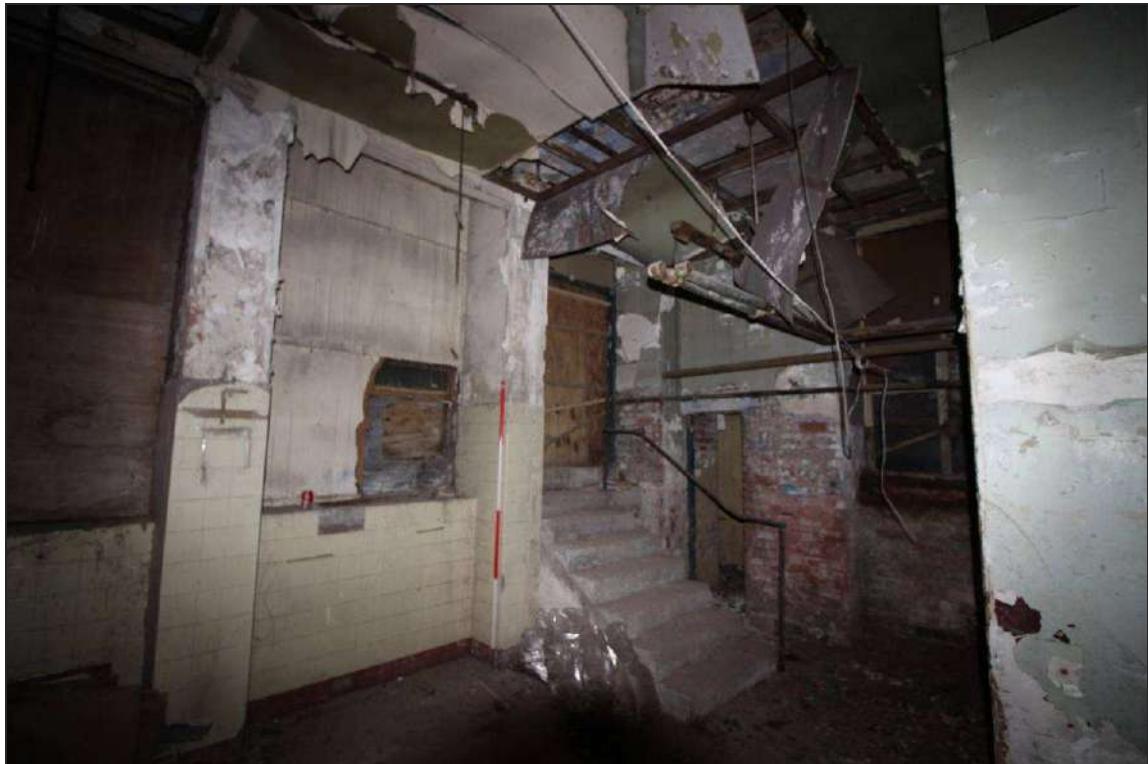


Plate 58: Concrete stairs leading out to the fire escape

No access was possible into the base of the motor tower, which was later remodelled to house a lift. The original hoist tower to the west was blocked at all floor levels. To the east of this original hoist tower and the main entrance, the base of what formed a privy tower on the floors above formed a narrow passage (Fig 3). This appears to have retained a privy at its northern end, the door frame and white-glazed tiling surviving *in-situ* (Plate 59), but with a short flight of four concrete steps on the eastern side of the passage affording access into a small room that infilled the external area to the main entrance steps (Fig 3). This latterly housed two modern toilet cubicles (Plate 60), and had a modern grey brick blocked window in the north wall (Fig 3), suggesting that it was added to the building to provide additional toilets, presumably for female employees.

At the eastern end of the northern façade an additional tower placed against the original structure represented a late 20th-century stair tower (Figs 2-6). The stairs within the tower were of a closed stringer type with concrete rendered risers and treads with a modern steel round handrail bolted to the external wall. The handrail on the open side was supported by slender painted steel balusters, bolted to each step. At each landing a small, horizontal rectangular window with a flush concrete lintel and a flat internal sill afforded some natural light, and comprised a three-light timber-framed window with steel security bars (Plate 61).



Plate 59: Base of original privy tower



Plate 60: Stalls within extension between privy tower and entrance steps



Plate 61: First-floor landing of the later stair tower

Original access to the upper floors was afforded by the tower at the western end of the northern façade, housing a half-turn concrete stair (Figs 2-6; Plate 62). Scars on the adjacent brick wall suggest that these represent replacements of an earlier stair, presumably of brick and sandstone construction. Each landing was well-lit with windows in the east wall, and larger windows in the north wall lighting both the landing and the outer flight of steps between floors (Figs 2-6). Each floor also retained a sliding external door with fireproof cladding (Plates 62 and 63), each having relatively ornate brackets to the rail rollers (Plate 63), but none retaining maker's plates. The doors themselves were timber with iron sheets riveted over the surface to afford the fireproof protection (Plates 62 and 63).

The first floor was completely open plan (Fig 4) and had painted brick walls, a concrete rendered timber floor, and a concrete ceiling of flat-arched vaulting between rendered I-section steel beams (Plate 64). Each beam span comprised three beams of 24' (7.32m), jointed above a 9" (0.23m) diameter hollow cylindrical cast-iron columns with astragals below flanged capitals with round head plates with projecting rectangular lugs (Plate 65). These carried the flat section of the base of each I-beam, the end of which was bifurcated to form a rounded clasp around the foot of the column above, which was socketed into the head of that below, forming a continuous interlocking column through the full building (Plate 65). No evidence was visible for how the bifurcated ends of adjacent beams were jointed together, suggesting that they were bolted with a plate level with the top of the I-section beam, above visible ceiling level (Plate 65).

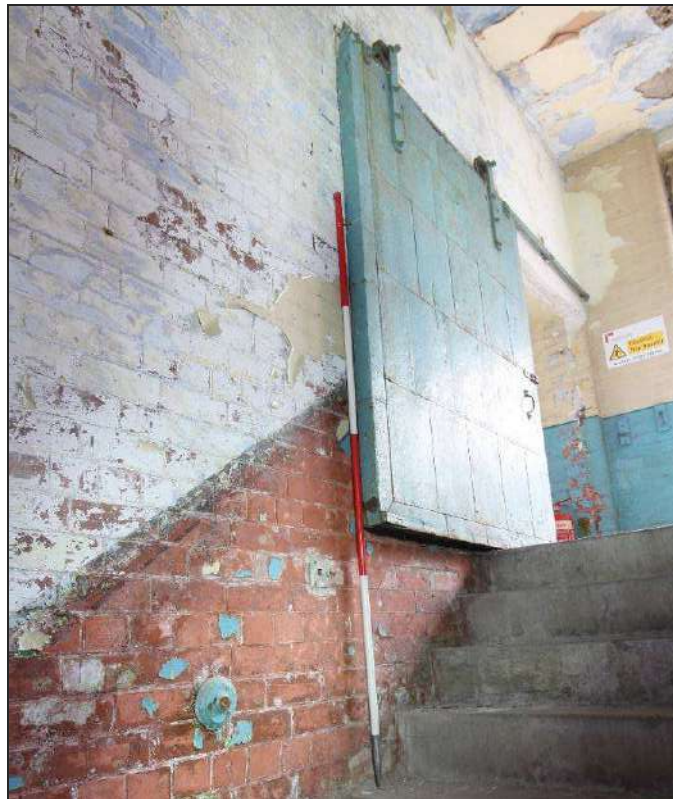


Plate 62: Detail of stairs and entrance doorway within the later stair tower



Plate 63: Detail of fireproof sliding door



Plate 64: General view of the first floor, looking east



Plate 65: Detail of column capital

Each bay housed a floor to ceiling recessed window aperture within each wall, measuring 7'6" (2.23m) wide, between 5'5" (1.66m) wide brick piers. Each housed a six-light timber-framed window, divided in three rows of two lights (Plate 66). The central row comprised centre-hung hopper-style tilt openings (Plate 66), and although the majority of the glazing had been removed, some windows retained obscured glass panes.



Plate 66: Detail of window

Two-rows of cast-iron eye-brackets were bolted into the ceiling within the sixth and seventh bays from the western end of this floor. Each row ran in the same direction, with those in the seventh bay aligned immediately to the south of the centre-line of the motor tower (Plate 67), strongly suggesting that they related to line shaft hangers associated with power transfer to the floor. Pipes relating to the humidification system were also placed longitudinally down the length of the floor (Fig 4), but were attached at a higher level than those on the floors below (Plate 64).

The hoist tower adjacent to the stairs at the north-west corner of the mill was blocked, and the adjacent privy had been removed, although the room remained open (Plate 68). As at basement level the walls were of glazed brick, with channel-section metal beams spanning the six-light timber-framed window to house the toilet cistern (Plate 69). The entrance into the privy was rebated into the wall thickness on its eastern side (Fig 4), where it had a narrow two-light window, the upper of which had a tilt vent opening. A basin would have been placed below the window within the reveal, with a sign for 'drinking water' being attached to the base of the window frame, demonstrating that the water was piped from the main.



Plate 67: Detail of a cast-iron eye-bracket bolted into the ceiling of the first-floor



Plate 68: Doorway into original privy tower with blocked hoist to left



Plate 69: The blocked window and cistern rails within the northern privy tower on the first floor

The original second privy tower in the south-eastern corner represented a wider room, with extant, but replaced toilet and hand-wash facilities (removed subsequently) within a single room unlike the northern privy tower (Fig 4). The room was extremely well lit, having windows similar to those of the main elevations in both the east and west walls, both having latterly been boarded externally (Plate 70).

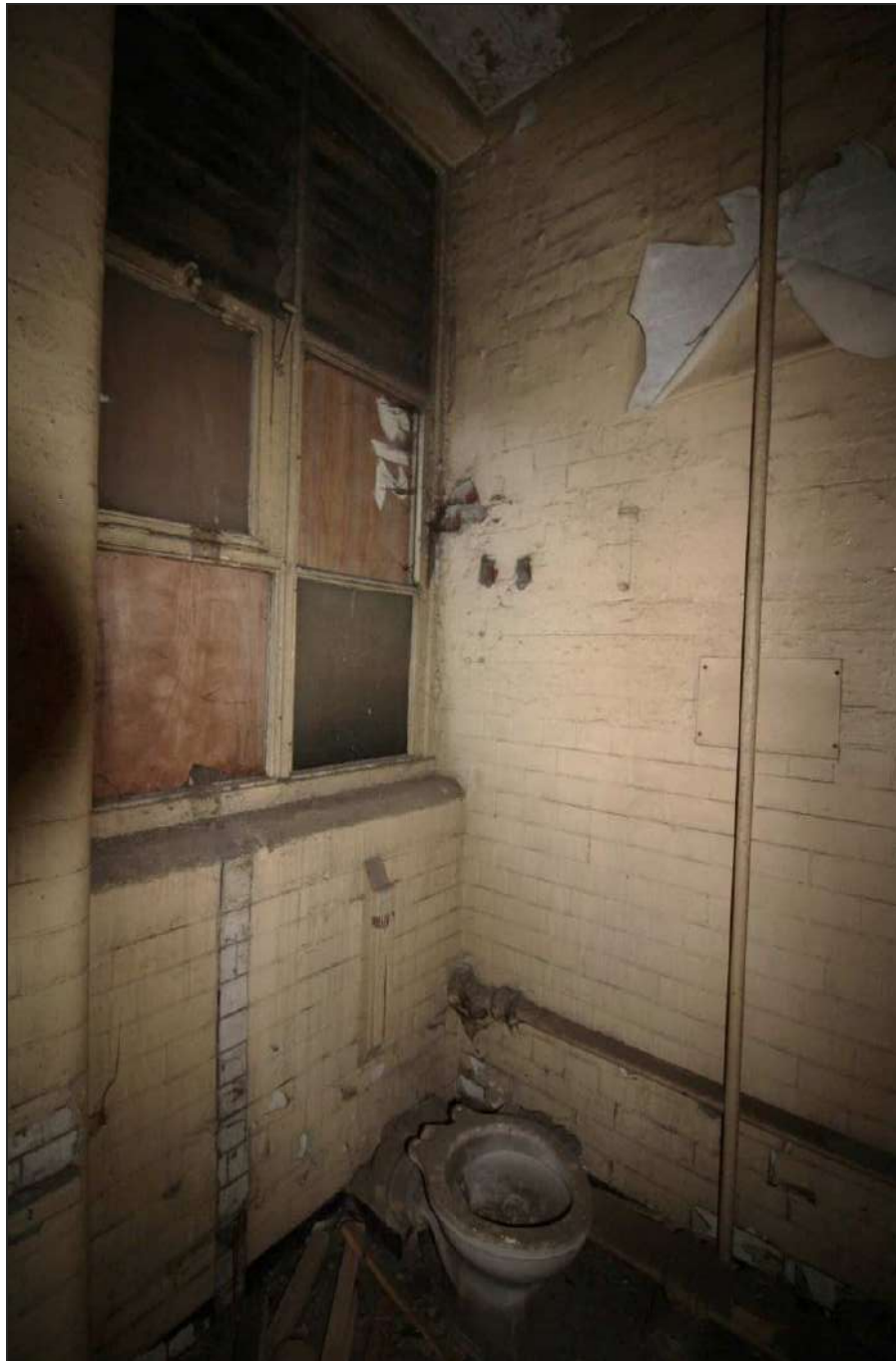


Plate 70: South-east privy tower with extant replaced sanitary ware

The later adjacent humidification and ventilation tower had also been remodelled into a privy tower at this level, and was also entered through a narrow doorway with bull-nosed brick reveals and a chamfered, flush rectangular lintel. Part of the eastern jamb of the original window aperture was cut away to ease access into a vestibule that housed a low washbasin and box-shuttered pipework (Plate 71), with two brick-built cubicles placed transversely across the tower, backing onto the enclosed chimney of the former ventilation system (Fig 4; Plate 72). The brick partition of the cubicles was erected around the external, single-skin arched lintel of the original window aperture (Plate 73).



Plate 71: Cutaway east jamb of original window with cubicle wall respecting original lintel arch

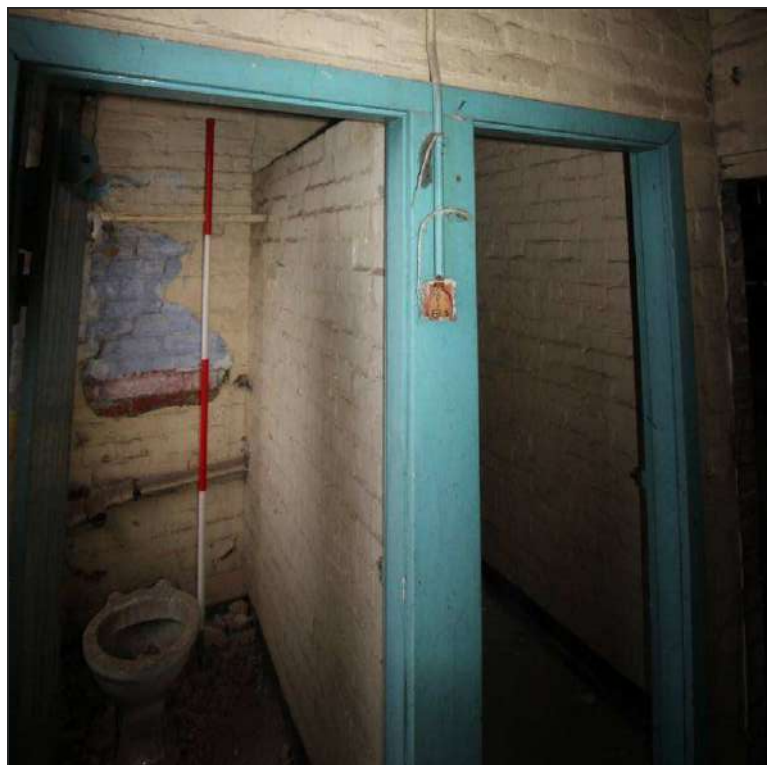


Plate 72: Brick wall toilet cubicles inserted into the humidification and ventilation tower



Plate 73: Detail of retained arched head of original window, with inserted cubicle wall on right

The motor tower was boarded at this level, but access was maintained to the late stair tower at the northern end of the elevation (Plate 74). Immediately adjacent to the tower, at the northern end of the east wall, a pair of fuse boxes appeared to represent a relatively late replacement of earlier boxes placed within the wide pier of the bay division to the south (Fig 4). These retained original ducting, but the fuse arrays within had been removed upon replacement.



Plate 74: Doorway into the late stair tower at first-floor level

As with the first floor, the second floor was accessible from both stair towers (Fig 5). The original doorway leading in from the north-western stairwell is through a larger sliding riveted door with a steel door track bolted to the stairwell wall (Plate 62). The doorway had bull-nosed brick reveals below a flush concrete lintel. Entry from the later stair tower was through an inserted doorway with square return end reveals with a flush rectangular concrete lintel. The doors have been removed although the timber doorframe has been retained within the opening.

The layout of this floor was similar to that of the first floor, comprising a rendered timber floor, painted brick walls and a vaulted ceiling (Plate 75), carried on columns as below (Plate 76). The pipes of the humidification system survived almost entirely intact (Plates 75-78). An area of damaged ceiling revealed that the concrete floor was attached to a diamond-shaped steel mesh, itself attached to the underside of slender I-section steel ceiling joists. These were placed on approximately 2' (0.61m) centres and were carried on L-section brackets riveted into the rib of the I-section ceiling beams (Plate 77).



Plate 75: General view of the second floor



Plate 76: Detail of the columns on the second-floor



Plate 77: Detail of concrete and I-beam ceiling construction

Two columns at the north-western end have later brackets attached at a height of 1.87m above floor level. These comprised small timber battens, moulded to the diameter of the column and strapped in place by a 1" (25mm) wide steel band (Plate 78). A 2" (0.05m) L-section steel angle bracket was subsequently bolted to the outer face of each timber. A stop had been welded to one edge of the bracket, with a steel pin welded into the centre. Several early electrical fuse boxes and switches are situated around the main compartment of this level.



Plate 78: Detail of an attached bracket to the north-west column

The original privy towers were as the floor below. A ledged and braced timber door was placed against the wall adjacent to the entrance of the north privy tower, and presumably represented the door for the privy tower. It had a tongue and groove timber board panel below the middle rail, and two rows of three glazed panels above (Plate 79). The glazing was of obscured glass separated by simple chamfered timber mullions and transoms. The later ventilation and humidification tower was similarly remodelled to the floor below, having brick cubicles for privies. The entrance into the tower had a more pronounced rebuilt eastern jamb (Plate 80), with the timber framing of what was presumably an air vent also visible within the blocking of the original window aperture (Plate 80). The vestibule of the tower was also better preserved than that below, retaining two cast-iron pedestals for washbasins along with planked shuttering for a cupboard shuttering pipework along the south wall (Plate 81).



Plate 79: Northern privy and blocked hoist tower, with original doorway lying nearby



Plate 80: Detail of the remodelled entrance into ventilation and humidification tower



Plate 81: Washbasin stands and shuttered pipework, second floor

Entry into the third floor of the mill was similarly afforded by the two stairs towers against the north wall (Fig 6). The top landing of the original stairwell had a concrete rendered floor, painted brick walls and a suspended rendered ceiling. The landing was lit by two window apertures within the north and west walls (Fig 6; Plate 82). Each aperture had bull-nosed brick reveals, replaced concrete lintels and an internal sill of bull-nosed brick. Each retained a six-light timber-framed window, the glazing having been removed and boarded externally (Plate 82).



Plate 82: The third-floor landing of the original stair tower

The third floor represented the upper floor of the building, and had a similar layout to those of the lower levels, comprising a rendered timber floor, painted brick walls and a flat concrete ceiling (Fig 6; Plate 83). Despite representing the upper members of the vertical columns from basement level, the column and ceiling arrangement was similar to that on the floors below, with the top of the capital presumably infilled with concrete, rather than housing the foot of an additional column above.

One of the columns retains a 'Bill Radette' 500V switchfuse, above a 500V 'Startet' on/off switch (Plate 84). Radette switch fuses were manufactured by Bill Switchgear of Aston, Birmingham, between 1950 and 1970 (collection.sciencemuseumgroup.org.uk), whilst the Startet switch may have related to an industrial sewing machine, probably relating to use of the mill following the cessation of spinning in the early post-WWII period. Humidification pipes were again well preserved (Plate 83), as were the smaller pipes of the sprinkler system, the vertical pipe of which had a curved 90° joint just below ceiling level (Plate 85)



Plate 81: General view of the third-floor



Plate 84: Detail of the electrical switch boxes mounted on a third-floor column



Plate 85: Top of vertical pipe of sprinkler system jointed into diminishing pipes of the upper floor

Whilst the south, east, and west walls were of similar construction to the floors below, and housed similar windows (Plate 86), a significant difference to the floors below was the construction of the north wall at this upper level. It comprised a brick wall to a height of 4'6" (1.37m), capped with an angled concrete sill to a sloping continuous glazing band, interrupted only by the motor tower (Plate 87). Whilst the window frames had been removed, and replaced with plywood shuttering (Plate 87), the unusual window construction could still be identified, with the upper part of each frame having been attached to a longitudinal I-section steel rail that formed the window lintel. Columns were placed at each bay division, not only carrying the end of the ceiling beams as below, but supporting the joint between the longitudinal beams of the window lintel (Plate 88). All members were bolted onto the headplate of the column, which differed to those elsewhere, having a flange only on the inner, southern face (Plate 88), and demonstrating an attention to detail within the construction of the building that was undertaken with high aesthetic regard.



Plate 86: Windows on the third-floor, and remodelled entrance into later privies



Plate 87: Glazing band within the north wall of the third-floor, with columns at each bay division



Plate 88: Detail of column capital and beam jointing by north wall of upper floor

As with the floors below, the ventilation and humidification tower had been remodelled into privies with brick partitions. The layout differed slightly at this floor level, with a thick concrete floor within the tower having a step up from the main mill (Plate 86). It is probable that this floor related to machinery relating to the upper level of the humidification and ventilation system, rather than the privies. As on the floors below, some sanitary ware survived, and is of mid-20th-century date, as does timber planking to carry a raised cistern, the scar for which could be seen within the peeling paintwork to the rear (Plate 89). Door frames and a planked batten door also survived (Plate 89), with the extant six-light window in the south elevation being divided into two by the brick partition wall forming the front of the privies, again as on the floors below (Figs 2-6).

Another slight difference to the floors below is that the segmentally-arched head of the original external window lintel had been removed (Plate 90), unlike on the lower floors, probably because there was no need to retain strength in the wall above, which terminated immediately above, with the original parapet having also been removed.



Plate 89: Toilet cubicle with wall scar for cistern within the later privy on the third floor



Plate 90: Detail of the removed external lintel arch of the original window aperture

The original motor tower continued to this level, although its entrance was blocked, affording no access to the later hoist headgear (Plate 91). The opening was less obscured than below, showing the bull-nosed brick reveals to the original aperture, which had been reduced in height with an inserted I-section steel lintel (Plate 91). Within the adjacent bay of the main mill, scars on the ceiling and in the bay to the south were similar to those on the first floor (Plate 67), suggesting a similar arrangement for power transfer from the motor tower into the mill.



Plate 91: Blocked doorway of the motor tower, with scars for possible power transfer brackets in the ceiling

6. Watching Brief

6.1 Introduction

In order to deliver the design proposals for the refurbishment of New Little Mill, some ground-breaking works were required in the yard to the rear of the building. In particular, the installation of an attenuation tank to run-off rainwater required the excavation of a trench measuring approximately 10 x 7m to a depth of 2.5m. The position of this trench coincided with the footprint of former workers' houses on Gas Street, which were built by George Murray in c. 1818 to house key employees. These houses comprised a single terrace of 15 cottages, each with a privy and a small yard to the rear, as shown on historic mapping of the area, suggesting that the company-owned houses provided a higher standard of accommodation to many of the workers' housing in Ancoats (Plate 92).

In view of the archaeological interest in the houses on Gas Street, a watching brief was maintained during the excavation works required for the attenuation tank. This was implemented to ensure that any surviving foundations of the houses were recorded archaeologically.

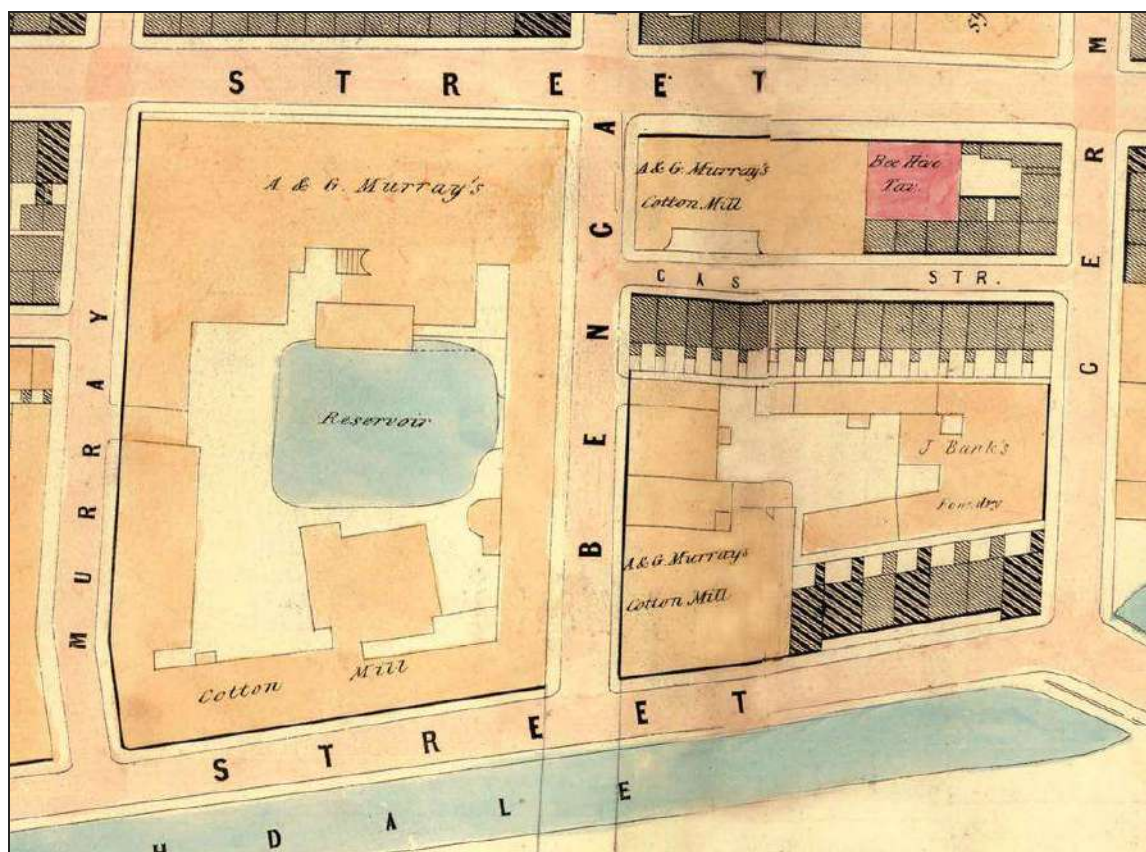


Plate 92: Extract from Adshead's map of 1851, showing the houses on Gas Street

6.2 Watching Brief Results

The earliest structural remains revealed during the watching brief comprised the fragmentary remains of several brick walls (**003**, **004**, **006**, **009**, **010**, **011**, **013**, **017**, **018**, **019**, **020** and **021**). Walls **003** and **006**, together with the remnants of a brick floor (**004**) were exposed at the northern end of the trench, and are likely to have represented the vestiges of the foundations for early 19th-century buildings situated to the rear of the Bee Hive pub on Jersey Street.

Wall **006** was identified in the vertical section of the excavated trench and aligned broadly east/west, although may have represented the corner of a building as part of a return could be discerned. It comprised hand-made bricks bonded with lime-based mortar, indicative of an early 19th-century construction date (Plate 93). It survived to a maximum height of three courses, and had been partially removed during the construction of a later wall (**005**). Wall **003** similarly comprised hand-made bricks bonded with lime-based mortar. It was two-courses wide, aligned broadly north/south, and survived for a length of just 0.5m. It overlay another brick-built structure (**020**), which almost certainly represented an early 19th-century drain. A further short section of this north/south-aligned drain was revealed a short distance to the south (**009**), where it was found to comprised two parallel walls of hand-made bricks supporting a flagstone capping (Plate 94).

Brick floor **004** abutted wall **006**, and was revealed at a depth of 1.5m below the modern ground surface, although only a few of the component bricks remained *in-situ*. These comprised hand-made bricks bonded with lime-based mortar, and appeared to have been laid directly on top of the natural clay geology.



Plate 93: The excavated remains of wall **004**, with later wall **005** above



Plate 94: The vestiges of drain 009

The fragmentary remains of several walls revealed in the southern part of the trench are likely to have represented further remains of the buildings to the rear of the Bee Hive pub on Jersey Street. Walls **018**, **019**, and **021** all comprised hand-made bricks bonded with lime-based mortar, consistent with an early 19th-century construction date. Wall **018** was two courses wide and was aligned north/south (Plate 95), whilst walls **019** and **021** were three-courses wide, aligned east/west, and probably formed the rear wall of a building. A short section of another two-course wide wall (**017**), again constructed of hand-made bricks, abutted wall **018** and almost certainly represented an internal partition. The absence of any intact surfaces suggests that the buildings had been demolished to below floor level, and that the surviving walls represented the foundation courses.

Other short sections of probable early 19th-century walls (**010**, **011**, and **013**) were exposed in the central part of the trench. Walls **010** and **011** formed a short L-shaped structure (Plate 96), which possibly represented the vestiges of a fireplace, although this could not be determined with confidence. Wall **013** comprised a pillar of hand-made bricks that measured 0.5 x 0.5m, but was isolated from any other structural remains.



*Plate 95: The excavated remains of wall **018***



*Plate 96: The remains of walls **010** and **011**, with later wall **012** above*

A second phase of development on the site was represented by the remains of four walls (**007**, **008**, **014** and **015**). Wall **007** comprised a two-course wall of hand-made brick bonded with lime-based mortar that was aligned east/west in the northern part of the trench. Walls **014** and **015** similarly comprised hand-made bricks, and formed an L-shaped structure (Plate 97).



*Plate 97: The remains of walls **014** and **015***

The latest phase of development on the site was represented by walls **001**, **002**, **005**, **012** and **016**. Wall **001** formed a boundary to the site along Jersey Street and Radium Street, and comprised machine-made bricks bonded with cement-based mortar, indicative of a 20th-century construction date. The fabric of wall **002**, revealed in the north section of the excavated trench, similarly comprised machine-made bricks and was almost certainly of the same date as wall **001** (Plate 98). This appeared to have cut through wall **003**.

Wall **005** was aligned north/south across the centre of the site, and similarly comprised machine-made bricks bonded with cement, indicative of a 20th-century construction date (Plate 93). This wall, together with walls **012** and **016**, were three-courses wide and of little archaeological interest (Plate 96).



*Plate 98: Wall **002** exposed in the north section of the excavated trench*

7. Discussion

7.1 Introduction

The importance of New Little Mill, as potentially the first cotton-spinning mill purpose-built in Manchester to be powered by electricity, rather than steam power, makes it an iconic landmark within the extant industrial suburb of Ancoats. The building is broadly typical of mills of the late Victorian period, comprising large open floors carried on steel beams with concrete ceilings, below a flat roof. However, the details of construction of such mills vary widely, and the slightly damaged state of the building afforded a valuable opportunity to examine the construction methodology applied to New Little Mill in greater detail than has typically been carried out during rapid surveys of many of the mills of this period in the region.

7.2 The Development of New Little Mill

Phase 1: the earliest remains observed during the historic building survey predate the present New Little Mill, and relate to the former Little Mill, that occupied the site from c. 1818 to 1908. This fabric survives within tunnels beneath Bengal Street, linking Little Mill to the main Murrays' Mills complex through New Mill and the Wing Mill (known latterly as the Bengal Street Block). As such, they represent important structural remains of the Murrays' Mills complex as a whole. The northern and southern of the three passages were personnel tunnels, allowing the workforce to move between Little Mill, New Mill, and Wing Mill. The lower central tunnel is not depicted until 1851, suggesting that it was a later addition, although it is more likely that it too formed part of the original construction but was not drawn as it represented a ducting tunnel rather than a passage. No evidence is recorded for a power plant associated with Little Mill, and it is therefore probable that the tunnel carried a drive shaft from New Mill, driven directly from the primary motion shaft within the basement of New Mill. It has also been suggested that the tunnel also carried gas pipes below Bengal Street from a gasometer to the east of Little Mill into the main complex (Miller and Wild 2007, 79). The tunnel latterly housed pipes associated with the sprinkler system within New Little Mill, and this may potentially mask features relating to bearings carrying a driveshaft through the tunnel, or brackets for a gas pipe.

Phase 2: following a catastrophic fire in January 1908, Little Mill was demolished, and plans were quickly draughted to build a larger replacement structure, extending across Gas Street and the site of a row of cottages on its southern side. The new structure, known as New Little Mill, appears to have been completed by the end of the year, as further drawings for modifications were submitted as early as January 1909. This provides a good example of the timescale for the erection of the generation of early 20th-century mills, which utilised the latest materials of machine-made bricks, rolled steel, and concrete, which when combined with developments in engineering and construction technology, allowed for a much quicker rate of construction than had been possible in the mid-19th century. From the late 19th century wider rectangular mills had larger windows, projecting stair towers, and flat concrete roofs, all of which can be identified within the design of New Little Mill.

The speed of construction required at New Little Mill may explain the lack of architectural embellishment in the form of terracotta tiling often appearing from around 1880 (Williams with Farnie 1992, 99), but simple yellow sandstone detailing was incorporated, again a typical feature of the period. As with most early 20th-century mills, the privy tower on the northern façade was combined into a hoist tower, the latter having become a regular feature in the last decade of the previous century. The projecting privy tower at the south-eastern corner of the mill not only represents a relatively unusual inclusion of two privy towers, but also a relatively uncommon example of a small projecting privy tower within a 20th-century mill.

The off-centre motor tower of the northern façade provides physical evidence for the importance of New Little Mill within the development of the textile mill in Manchester, it being possibly the first mill in the city built to be powered entirely by electricity supplied by Manchester Corporation. Acme Mills in Pendlebury were built to use mains electricity as early as 1904, but the first documented conversion of a mill to electric power in Manchester was at Brunswick Mill in 1908 (*op cit*, 134f), by which time New Little Mill was already under construction. Following the success of electric motor power at New Little Mill, two larger spinning blocks were constructed for the same method of power supply at the adjacent McConnel and Kennedy complex on Jersey Street in 1912 (*op cit*, 135). Electricity for New Little Mill was supplied by Manchester Corporation, via a transformer house situated in the courtyard of the Main Murrays' Mills complex. Group-drive motors were sited on each floor of New Little Mill within the external tower, as a precaution against the fire risk. Vents to cool the motors can be seen in the external wall of the tower, but later internal refurbishment to a hoist has removed evidence for the motors internally. Alignments of brackets at first-floor level, and scars on the upper floor suggest the position of line-shaft brackets, possibly placed in pairs carrying five longitudinal shafts down the length of the mill, all driven by belts from a primary shaft placed close to the north wall.

Whilst the use of steel and concrete had become standard practice by the end of the 19th century, methods of its employment in the construction of mills varied widely through the early 20th century. Whereas many mills associated the early use of concrete for ceilings employed vaulting, as a continuation of earlier brick jack arches, by the end of the first decade of the 20th century many mills, such as New Little Mill had flat concrete ceilings, carried on I-section steel beams. Rather than vault between relatively large longitudinal beams, the flat ceiling was attached to the underside of smaller I-section steel joists via a reinforcing steel mesh. The space between floors was infilled with coke breeze, a very lightweight concrete formed largely of waste coke from blast furnaces. Timber battens were then laid on top of the breeze, their surface level with the top of the main ceiling beams carrying the timber plank spinning floor, which was itself coated with a further skim of concrete. The steel ceiling joists were attached to the face of the large I-section ceiling beams by an L-section rail bolted into the rib of the beam. The beams themselves were jointed around the column, but the detail of this joint, and how they were fixed to the column capital was obscured by concrete render. The use of concrete render to cover exposed metalwork within the ceilings of mills was introduced in the last decade of the 19th century, once it was realised that exposed metalwork may suffer structural failure following a serious fire (Freeman 1891, 230).

The use of cast iron persisted for columns into the early 20th century, and their employment at New Little Mill was still typical of mills erected prior to WWI in the region. Columns within multi-storeyed mills had been linked together vertically through the floor from the late 18th century. Where timber ceiling beams were employed, as was typically the case in the early mills, cast-iron crush boxes joined the head of the lower column to the foot of that above, protecting the timber which passed through it. Once cast-iron and steel beams began to be employed from the mid-19th century, these were almost always jointed vertically with the use of a socket. Beams typically had a rounded coupling at the end, wrapping around the column head, as at New Little Mill, and joined with either a bolt through lugs on each beam end, or with a shrink ring placed around projecting lugs, generally at the base of the beam end (Giles and Goodall 1992, 69f). Neither of these methods of jointing were employed for the steel beams at New Little Mill, the exact arrangement being obscured by the concrete ceiling. The actual column castings show their complexity by the early 20th century; each column had a double flange to a head plate, typical of columns employed in single-storey weaving sheds from the late 19th century, but with the cylindrical core continuing through the head plate to form a socket for that above. The base of the columns above was narrower, to slot inside the socket, and then had a wide pedestal or foot, often concealed below, or flush with the upper floor level. An additional casting mould was made for the extra row of columns on the upper floor, placed adjacent to the north wall, and having only a single flange on its inner face. This also differs from those elsewhere, requiring modification to the casting mould to include a pair of bolt holes for the attachment of the flange of a standard I-section beam end above. The headplate also formed the top of the column, unlike elsewhere, where it continued above to form the socket for the column above. The longitudinal beams forming the window lintels appear to have been jointed by bolts through a long iron plate placed on top of the headplate of the column.

The glazing band on the upper floor of the mill is an unusual feature for a spinning mill, and derives from the tradition of northern light asymmetrical roofs found in single-storey weaving sheds from the mid-19th century. Whilst most early 20th-century large spinning mills were much taller than the surrounding structures, typically being of four to six storeys in height, New Little Mill was relatively short, and the glazing band may have been introduced to maximise the best quality light from the north, which would not cast shadows, but which would have been reduced by the buildings opposite into normal vertical windows.

Although fire escapes were not covered by national legislation until the Factories Act of 1937, their use was becoming commonplace by the end of the 19th century, with them having been installed within the main Murrays' Mills complex by this date (Miller and Wild 2007, 125). External fire escapes were included within the original plans of New Little Mill, and included large landings, rather than those just big enough to form the half turn stair. Fire-fighting apparatus had been an important early feature of the Murrays' Mills complex, with a rudimentary system having been installed within the Old and Decker Mill stair tower by Boulton and Watt in 1802 (*op cit*, 70). However, little of the complex had any significant modifications for fireproofing, apart from the Blowing room of the 1820s and the 1840s Fireproof Mill, built to the south of Little Mill (*op cit*, 157).

A full sprinkler system was installed throughout the main complex in 1902 by local engineering company Mather & Platt (*op cit*, 134). New Mill was built with an integrated sprinkler system, that current pipes within the ducting tunnel would suggest formed a branch from the main system of 1902. It too was of Mather and Platt production, although the alarm valve at ground-floor level appears to bear a stamp of Dowson, Taylor & Co, another local company formed in Bolton in 1883, and subsumed into the Mather & Platt family in 1898 (Boschi and Taylor 2001), although the name appears to have been continued in usage on equipment during the early 20th century.

Phase 3: the importance of humidity in the efficient spinning of cotton was well-established by the early 19th century. The original Old and Decker Mills of 1798 and 1802 within the main Murrays' Mills complex provide rare early examples of heating towers being included in the original construction of the mills in order to increase humidity on the spinning floors (Miller and Wild 2007). By the turn of the 20th century, the need for humidity, in order to reduce the tension in thread and reduce breakages, meant that the inclusion of a humidification system was regularly advocated in the design of a cotton spinning mill, as for example in Morris and Wilkinson's *The Elements of Cotton Spinning*, published in 1897. The original design of New Little Mill, as with most contemporary structures in the region, did not include a humidification system, probably due to the naturally damp environment of Manchester, which made the breakage of thread less of an issue than elsewhere. However, it appears to have been decided very shortly after the completion of New Little Mill that additional humidity was required, along with a means of ventilation, associated not only with dust extraction, but also with reducing particulate pollution in the air within the spinning floors, where staining of the product could lead to depreciation of value of the yarn (Lander 1914, 5).

Plans for a ventilating and humidifying tower were according drawn up in January 1909, with the new structure being placed at the eastern end of the south elevation (Plates 9 and 10). There is no extant evidence for the ventilation system, which presumably comprised motor-driven fans, placed within the main body of the new tower on each floor, and drawing the dust from the main room through ducting and out through a vent in the window aperture within the tower. The replacement of the system with privies unfortunately removed any evidence for such a system. The humidification system would have required steam, with a boiler having been apparently placed in the basement, and a chimney placed on the western side of the new tower for its exhaust. Pairs of pipes survive on each floor, placed above head height, and carried the steam around the mill, heating the air throughout each floor. Many complex systems of spraying and condensing water to produce a higher level of control of both temperature and humidity within the building were introduced in the early 20th century, including the 'Vortex' humidifier by Mather & Platt (*op cit*, 81-88), who installed the original sprinkler system within New Mill, but it appears that the simple steam pipe system was sufficient to produce the desired humidity within New Little Mill.

Phase 4: the exact date of the cessation of spinning in New Little Mill is unclear, but it appears to have ended between 1948 and 1960, when the Fine Spinners' and Doublers' Limited conveyed the entire Murrays' Mills complex to two or more separate companies. New Little Mill underwent several name changes, being known as 'Dixon's Mill', and in the 1960s it became known as 'Chorlton Street Warehouse'.

Three modifications observed during the historic building recording appear to relate to this period, most notably the removal of the motors that had powered the spinning machinery. The tower was refurbished to provide a larger hoist/lift to all floors of the building, which may well have been rented to separate companies. The hoist cage was manufactured by Etchells, Congdon, & Muir Ltd, who were established on Mill Street in Ancoats in 1900 and manufactured lifts until 1966 (www.beno.co.uk/lift/ecm.html). It is likely that the lift was installed as part of remodelling for reuse prior to 1966. Power to new machinery within the building would have been provided directly from the mains supply by this date, and the extant electrical apparatus demonstrates this to have comprised an industrial 500V supply. The 'Radette' switch fuse attached to a column of the upper floor was a model manufactured by Bill Switchgear of Aston, Birmingham, between 1950 and 1970 (collection.sciencemuseumgroup.org.uk), confirming both the date of the reuse of the mill, and the 500V supply. On/off switches, such as the Startet one associated with the fuse, were typical of industrial sewing machines of this period, suggesting that part, if not all, of the mill was initially re-used for clothing manufacture. Improvements in working conditions in the post-WW2 period were also observed within the mill, with the addition of extra toilet facilities, presumably unisex, in the basement, and within the ventilation tower, which also became redundant following the cessation of spinning.

Phase 5: the final phase of construction relates to the addition of a further stair tower on the north-eastern corner of the Jersey Street elevation in 1967. It is marked on building control plans (E/2352/9, Manchester City Local Archive) as a fire escape block, rather than an alternative entrance. As part of the build a section of railings and part of the existing plinth boundary wall were removed at ground floor level, on Jersey Street. This again demonstrates improvements in the workplace environment and greater regard for health and safety in the second half of the 20th century.

7.3 *Watching Brief*

The watching brief revealed the fragmentary remains of early 19th-century buildings that had fronted Jersey Street, but not the former workers' houses on Gas Street; the footprint of these houses appears to have been beyond the southern end of the trench excavated for the attenuation tank. However, based on the results obtained from the watching brief, it is unlikely that the foundations of the former houses on Gas Street will survive intact.

8. Archive

8.1 Archive

The results of the archaeological investigation form the basis of a full archive that has been prepared to professional standards, in accordance with current Historic England guidelines, the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990), and current ClfA standards and guidance for the creation, compilation, transportation and deposition of archaeological archive. 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 ClfA in that organisation's code of conduct.

The documentary and digital archive generated from the historic building investigation is currently in the possession of Salford Archaeology. A copy of this report will be submitted to the Greater Manchester Historic Environment Record in digital and hard copy formats. A digital copy of the report will be publicly available on the Archaeological Data Service (ADS) website.

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Acknowledgements

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Appendix 1: Context Index

Context Number	Trench Number	Feature Type	Description
0101	1	Layer	Demolition rubble
0102	1	Layer	Clay with CBM
0103	1	Layer	Natural clay
0104	1	Structural	Brick stanchion
0105	1	Structural	Stone column base
0106	1	Structural	Stone column base
0107	1	Structural	Flagged floor
0108	1	Cut	Gully/furrow
0109	1	Fill	Fill of [0108]
0110	1	Cut	Furrow
0111	1	Fill	Fill of [0110]
0112	1	Cut	Furrow
0113	1	Fill	Fill of [0112]
0114	1	Layer	Ash
0201	2	Layer	Demolition
0202	2	Layer	Clay with CBM
0203	2	Layer	Natural clay
0204	2	Layer	Disturbed natural
0205	2	Structural	Brick stanchion
0206	2	Structural	Brick stanchion
0207	2	Structural	Flagged surface

Appendix 2: Illustrations

- Figure 1: Site location
- Figure 2: Ground-floor plan
- Figure 3: Basement plan
- Figure 4: First-floor plan
- Figure 5: Second-floor plan
- Figure 6: Third-floor plan
- Figure 7: North elevation
- Figure 8: West elevation
- Figure 9: South elevation
- Figure 10: East elevation
- Figure 11: Internal elevation of the west wall of the basement
- Figure 12: Plan of the remains recorded during the watching brief
- Figure 13: Phase plan of the remains excavated during the watching brief



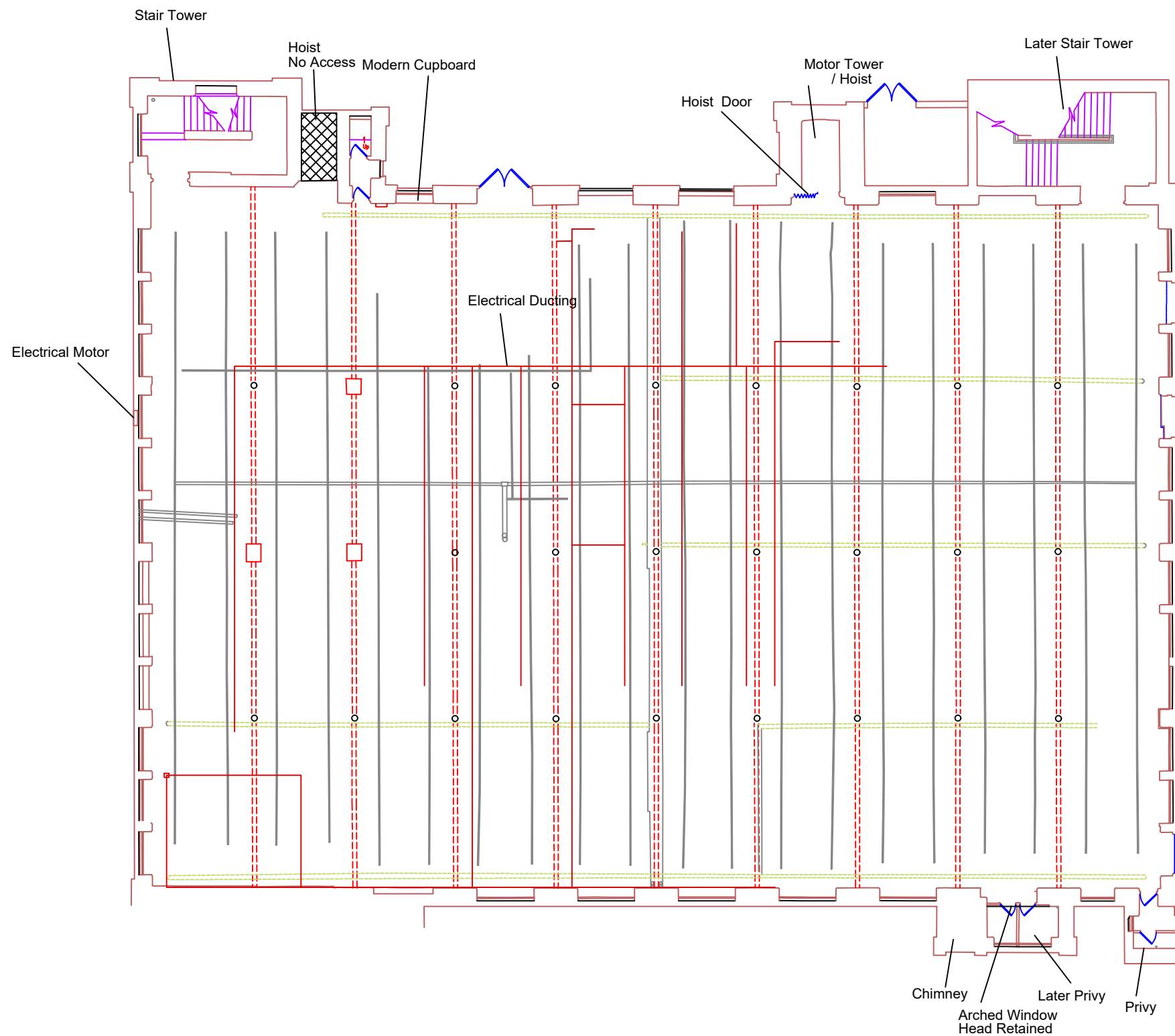
New Little Mill, Ancoats, Manchester
Figure 1: Site Location Plan

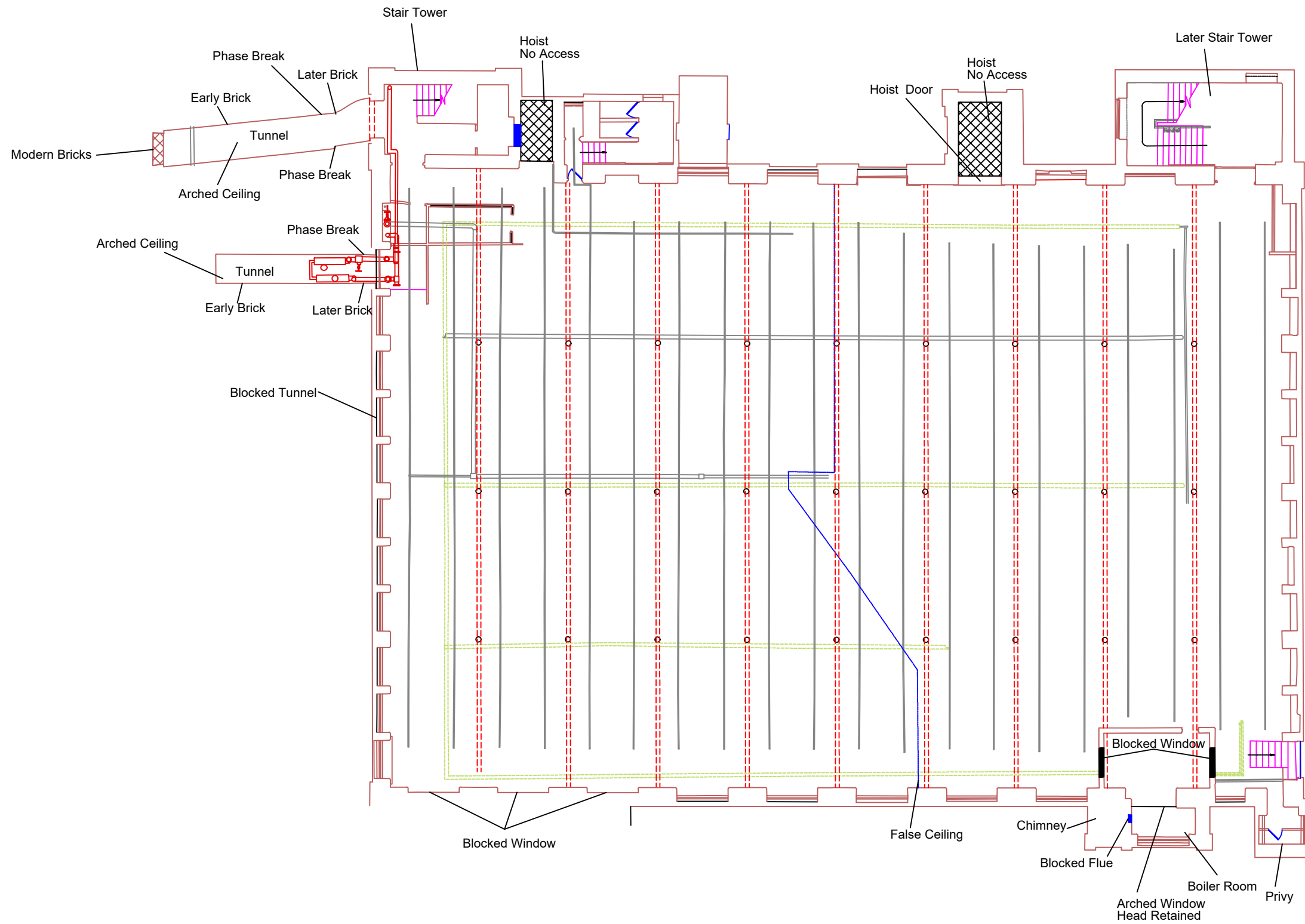


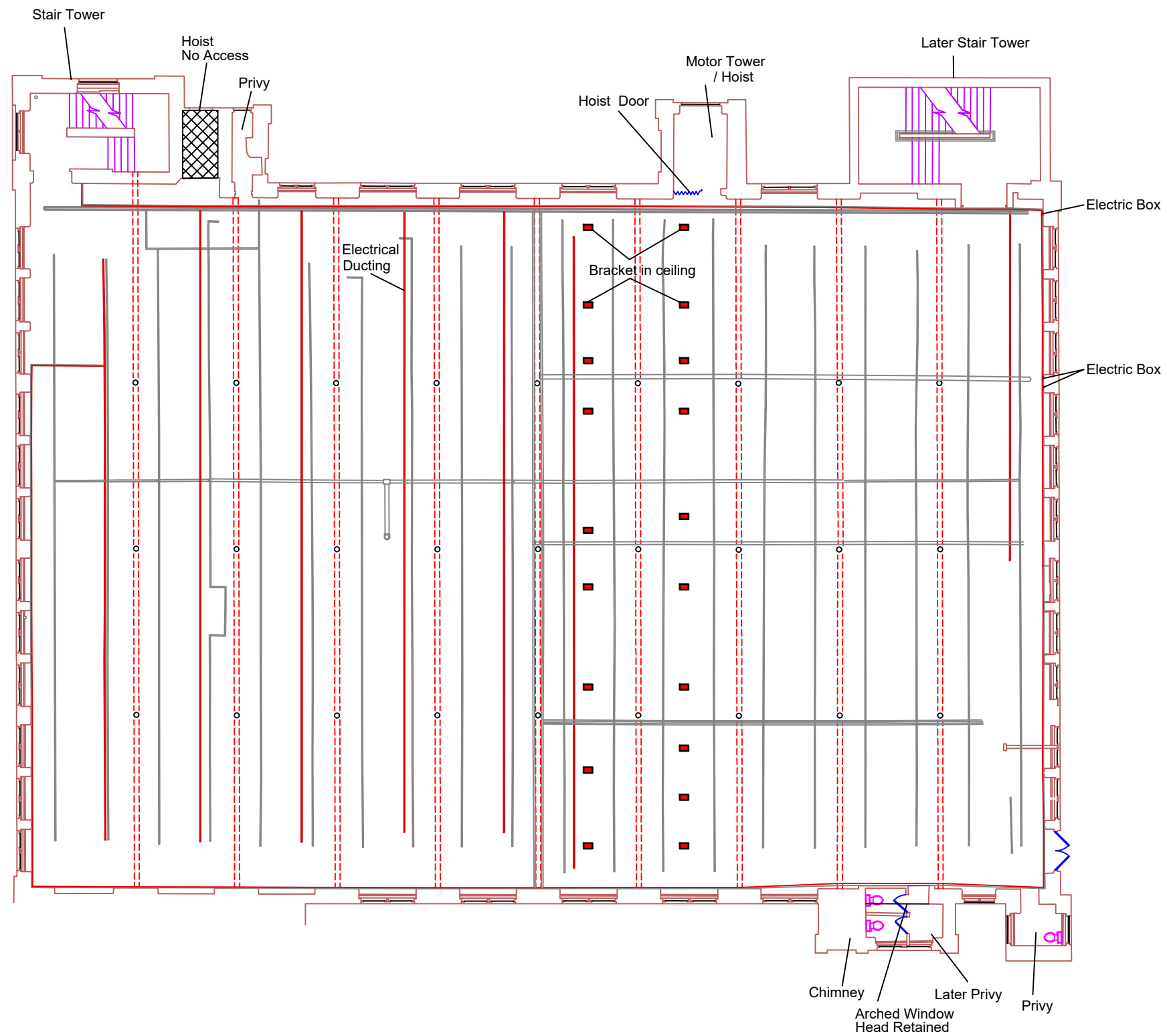
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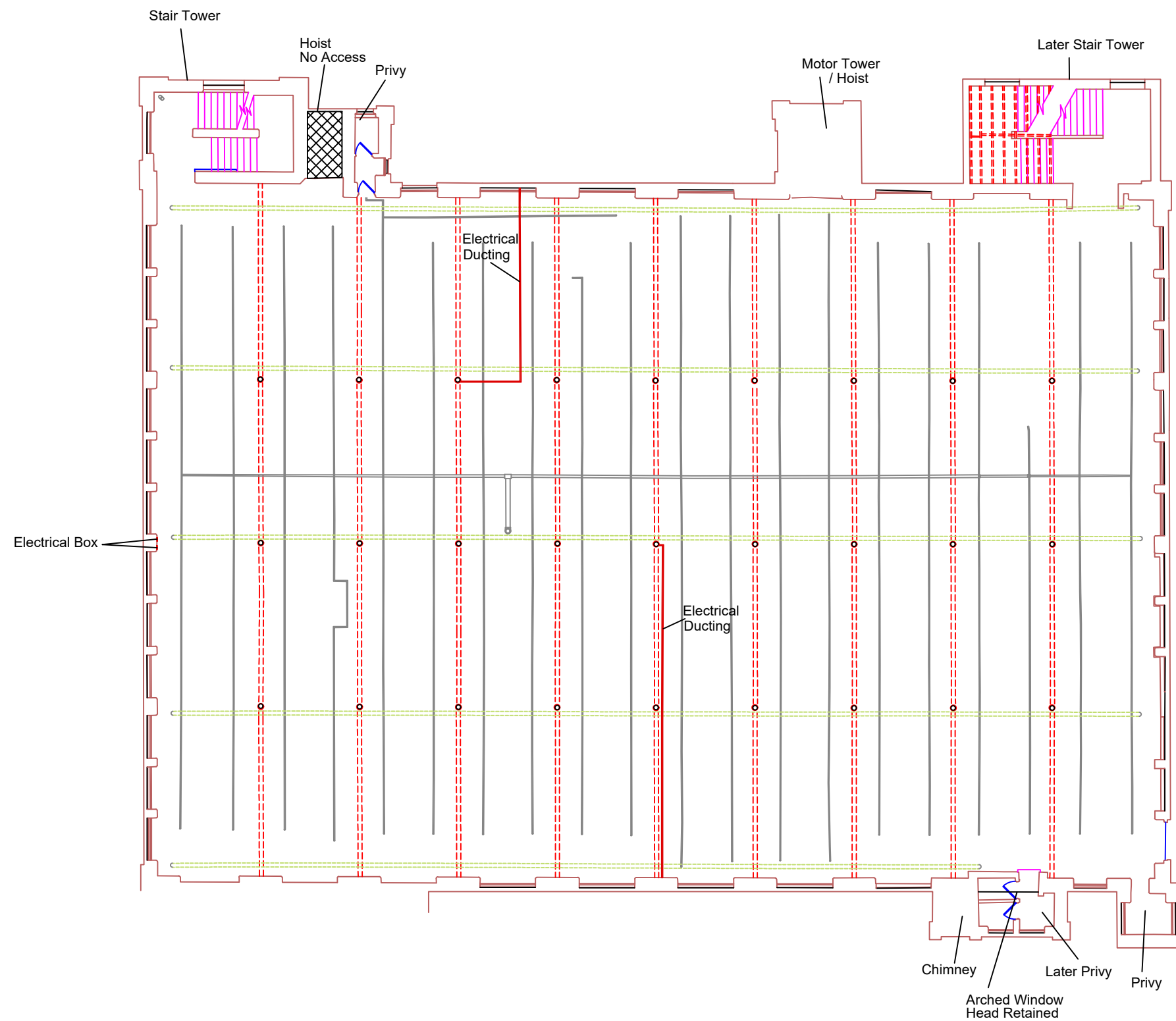


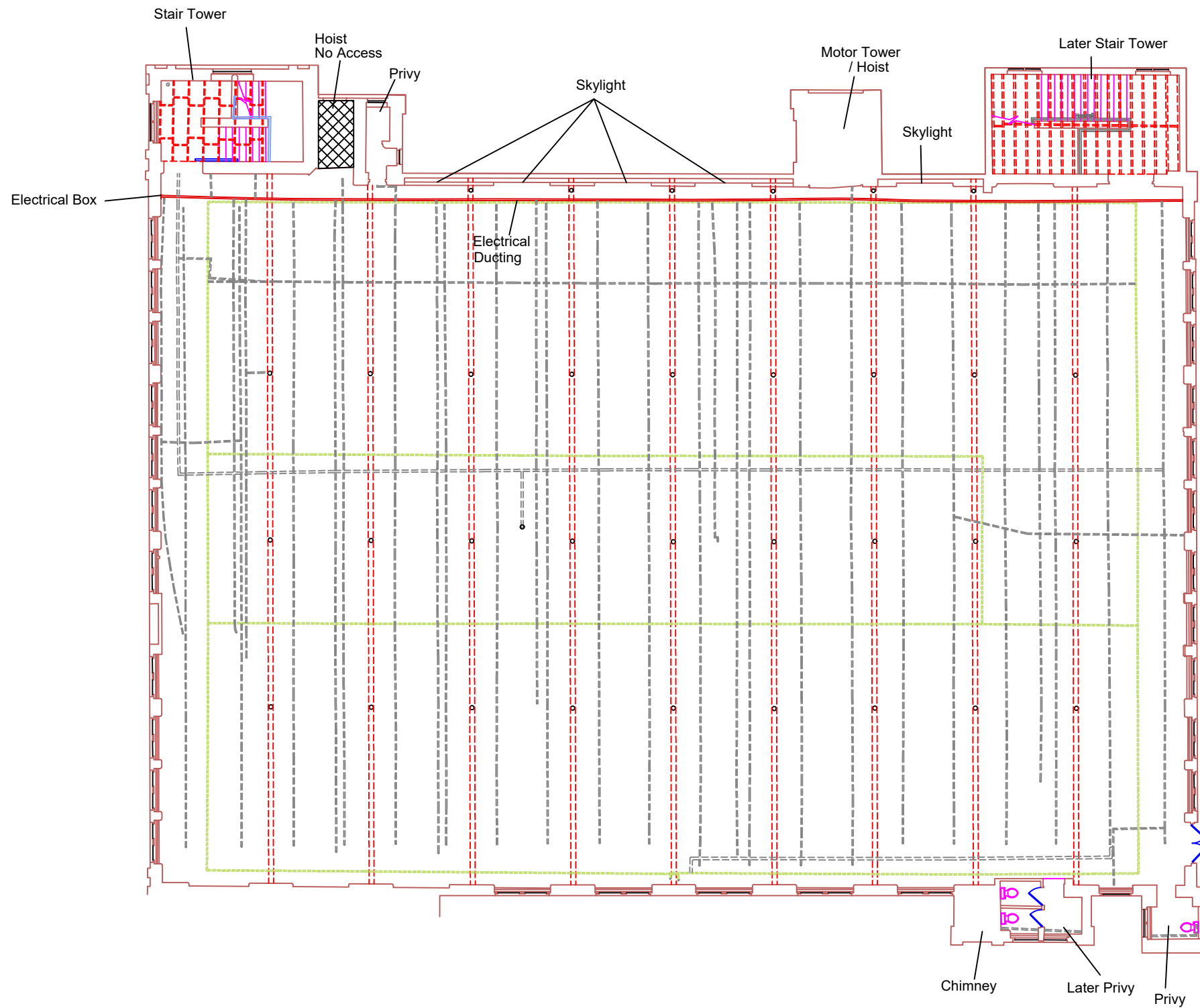
Site location











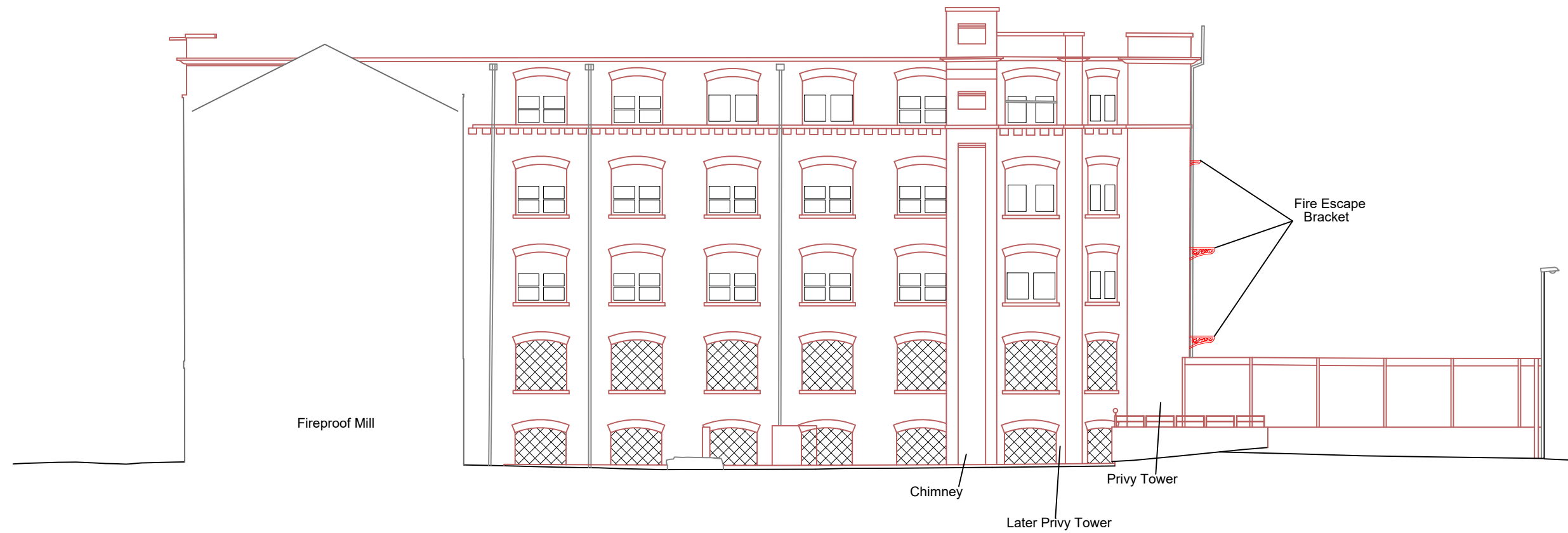




Stair Tower

New Little Mill

Fireproof Mill



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0 10 m
Scale at A3 1:200

New Little Mill, Ancoats, Manchester
South-east Elevation

Key:

Building
Window
Door

Blocked



**SALFORD
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0 10 m
Scale at A3 1:200

New Little Mill, Ancoats, Manchester
North-east Elevation

Key:

Building
Window
Door

Blocked



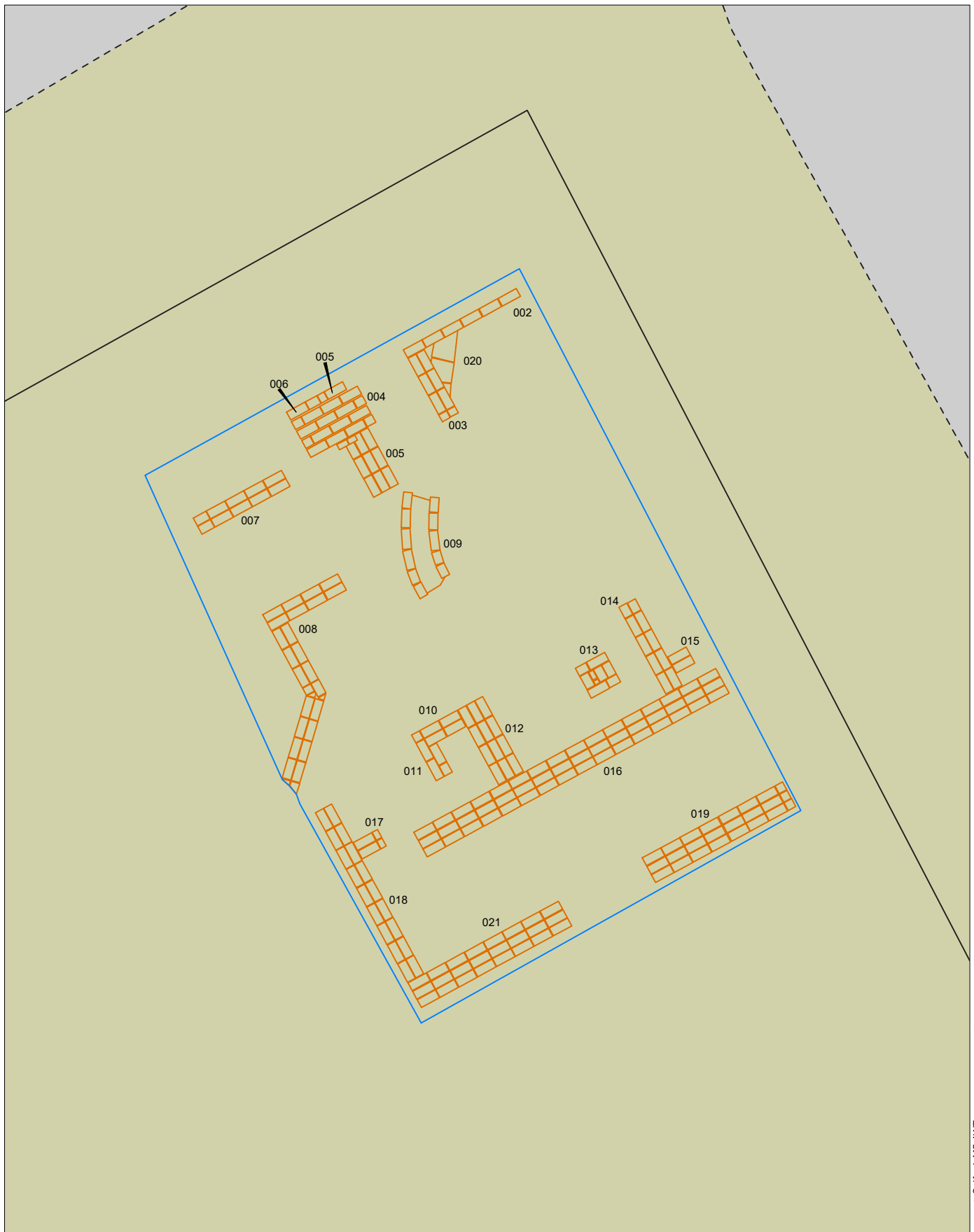


Figure 2:

Watching brief area plan with contexts annotated



Key:

- Trench
- Brick



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0 2 m
Scale at A4 1:40



Figure 3:

Watching brief area phased plan with contexts annotated



Key:

- Trench
- Brick
- Phase 1
- Phase 2
- Phase 3



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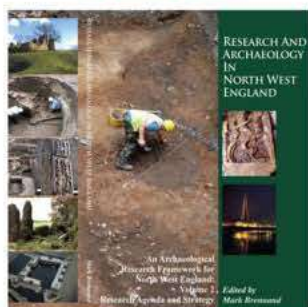
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2 m



Scale at A4 1:40

CONSULTANCY



DESK BASED ASSESMENTS



WATCHING BRIEF & EVALUATION



EXCAVATION



BUILDING SURVEY



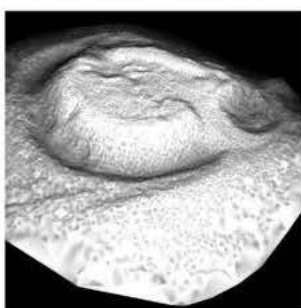
3D LASER SCANNING



COMMUNITY INVOLVEMENT



LANDSCAPE SURVEYS



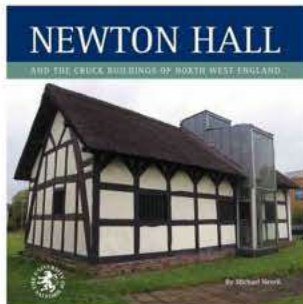
GEOPHYSICAL SURVEYS



WORKSHOPS & VOCATIONAL TRAINING



RESEARCH PUBLICATIONS



SEMINARS, DAYSCHOOLS CPD EVENTS

