



Tootill Bleachworks, Seven Acres Park, Bolton

Greater Manchester

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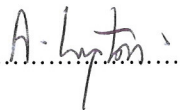
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CONTENTS

SUMMARY	2
ACKNOWLEDGEMENTS.....	3
1. INTRODUCTION	4
1.1 Circumstances of Project.....	4
1.2 Location and Geology	4
2. METHODOLOGY	6
2.1 Excavation.....	6
2.2 Archive.....	6
3. HISTORICAL BACKGROUND.....	7
3.1 Introduction	7
3.2 Background to the Calico-Printing Industry	7
3.3 Background to the Bleaching Industry.....	10
3.4 Development of the Study Area.....	12
4. RESULTS	18
4.1 Introduction	18
4.2 Phase 1: Mid-Nineteenth Century	20
4.3 Phase 2: Late Nineteenth Century.....	298
4.4 Phase 3: Early Twentieth Century.....	29
4.5 Phase 4: Late Twentieth Century	30
4.6 Finds.....	30
5. DISCUSSION	32
5.1 Introduction	32
5.2 Phase 1: Mid-Nineteenth Century	34
5.3 Phase 2: Late Nineteenth Century.....	36
5.4 Phase 3: Early Twentieth Century.....	36
5.5 Phase 4: Late Twentieth Century	36
6. RECOMMENDATIONS	37
6.1 Introduction	37
6.2 Recommendations	37
BIBLIOGRAPHY	39
APPENDIX 1: PROJECT DESIGN.....	42
APPENDIX 2: CONTEXT LIST	52
APPENDIX 3: FINDS CATALOGUE.....	53
ILLUSTRATIONS	55
Figures.....	55

SUMMARY

Seven Acres Park is a local nature reserve that follows the course of the Bradshaw Brook in the Breightmet area of Bolton, Greater Manchester. The nature reserve contains several sites of known archaeological interest, including a former industrial site that was known from the mid-nineteenth century as Tootill Bleachworks (centred on NGR SD 7375 0951). The site of this bleachworks has recently been the subject of informal intrusive investigation carried out by local enthusiasts, which demonstrated that important archaeological remains survived *in-situ*. However, Bolton Council, in consultation with the Greater Manchester Archaeology Unit, expressed concern that an appropriate record of the exposed remains had not been compiled in accordance with professional guidelines. In order to redress this shortcoming, a programme of community-based archaeological excavation was proposed by the Heritage Landscape Officer for Bolton Council in consultation with the County Archaeologist for Greater Manchester.

In October 2009, Oxford Archaeology North (OA North) was commissioned by Bolton Council to facilitate a community-based archaeological investigation of the site. The work was carried out over a two-week period, and involved local heritage and wildlife voluntary groups, working alongside local residents. The excavation was intended to engage members of the local community with an interest in the site, produce a detailed record of the exposed archaeological remains, and to establish the potential of the site for further investigation and ultimate presentation as a monument to the industrial heritage of the area.

The excavation was successful in both its involvement of the local community, and in the well-preserved archaeological remains that were revealed. Three broad phases of activity were identified, with the earliest of these appearing to date from the conversion of the bleachworks from a small, water-powered concern, into a much larger, steam-powered complex prior to 1837. The engine house was partially excavated, and comprised the stone foundation bed for a beam engine. The remains of at least five stone-built tanks associated with the bleaching process were also revealed to the south of the engine house. A subsequent phase, which probably represented the expansion of the complex in the late nineteenth century, comprised the remodelling of the stone-built tanks, presumably reflecting improvements in technology and a change of apparatus.

The results obtained from the excavation suggest that there is considerable potential for further archaeological investigation at the site of Tootill Bleachworks, whilst the preservation and character of the buried remains present a valuable opportunity for the consolidation, interpretation and display as a monument to the industrial heritage of the area. The project has also demonstrated an appetite amongst local residents for community-based archaeological excavation, which has built on important historical research of the area carried out by members of The Friends of Seven Acres and Bolton Archaeological Society.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank Bill Farrell, Heritage Landscapes Officer for Bolton Council, for commissioning and supporting the project on behalf of Bolton Council, and to Norman Redhead, the County Archaeologist for Greater Manchester, for his advice and guidance. Thank are also expressed to The Wildlife Trust for allowing the use of the facilities in their Environmental Resource Centre. Particular thanks are expressed to members of The Friends of Seven Acres and Bolton Archaeological Society and local volunteers who participated in the excavation; Tisha Malone, Janet Suggett, Christine Hatton, Thomas Dallimore, Mike Marsh, Stacey Arrowsmith, John Leedham, Brian Davies, Kate Statham, Harriet Winstanley, Rachael Foster, Lydia Bennington, Aaron Dyer, Andy Coutts, and Frank Murphy. Especial thanks are expressed to Sara Vernon of Bolton Archaeological Society for co-ordinating the volunteers and for sharing her considerable knowledge of the area, and to Ian Johnson who carried out a preliminary measured survey of the archaeological remains and participated in the excavation.

The local volunteers were directed by Chris Wild, Elizabeth Murray and Graham Mottershead of OA North. The report was compiled by Chris Wild and Elizabeth Murray, the finds were examined by Sean McPhillips, and the drawings were produced by Chris Wild and Marie Rowland. The report was edited by Ian Miller, who also responsible for project management.

The project was funded entirely by a grant secured by Bolton Council.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

- 1.1.1 Seven Acres Park is a local nature reserve that follows the course of the Bradshaw Brook in the Breightmet area of Bolton. The area is teeming with wildlife, and also has considerable heritage attributes, as has been highlighted in important research carried out by The Friends of Seven Acres and members of the Bolton Archaeological Society. Another local group of enthusiasts recently carried out some informal intrusive investigation at the site of the Tootill Bridge Bleachworks, a former industrial complex that lies within Seven Acres Park. This demonstrated that important archaeological remains survived *in-situ*, although Bolton Council, in consultation with the Greater Manchester Archaeology Unit, expressed concern that an appropriate record of the exposed remains had not been compiled in accordance with professional guidelines. In order to redress this shortcoming, a programme of community-based archaeological excavation was proposed by the County Archaeologist for Greater Manchester and the Heritage Landscape Officer for Bolton Council.
- 1.1.2 The scope for of the archaeological excavation was devised by Norman Redhead, County Archaeologist for Greater Manchester, and following discussions between Bill Farrell, the Heritage Landscape Office for Bolton Council, the County Archaeologist for Greater Manchester, and Oxford Archaeology North (OA North), a programme of work was produced to carry out the programme of archaeological investigations as part of a community-based excavation (*Appendix 1*). The work was undertaken by OA North, in conjunction with volunteers from The Friends of Seven Acres, Bolton Archaeological Society, the Wildlife Trust, and by other interested locals in October and November 2009.

1.2 LOCATION AND GEOLOGY

- 1.2.1 The site of Tootill Bleachworks (centred on NGR SD 7375 0951) lies within the Seven Acres Country Park, which is situated in the Breightmet area of Bolton, some 3km to the east of town centre. The site lies to the north of Bury Road (A58), on the east side of the Bradshaw Brook, in the southern part of Seven Acres Park (Fig 1; Plate 1).
- 1.2.2 Whilst it may have been the location of Breightmet's manorial corn mill, which is referred to as early as 1257, the site is known to have been occupied by a water-powered mill by the 1760s. Historical research has revealed that the site has a complex history, with paper making being established in the 1770s, followed by bleaching and dyeing, and cotton spinning in the 1780s, and finally returning to use as a bleachworks in the nineteenth century. However, all buildings have since been demolished, although some of their foundations can still be seen.

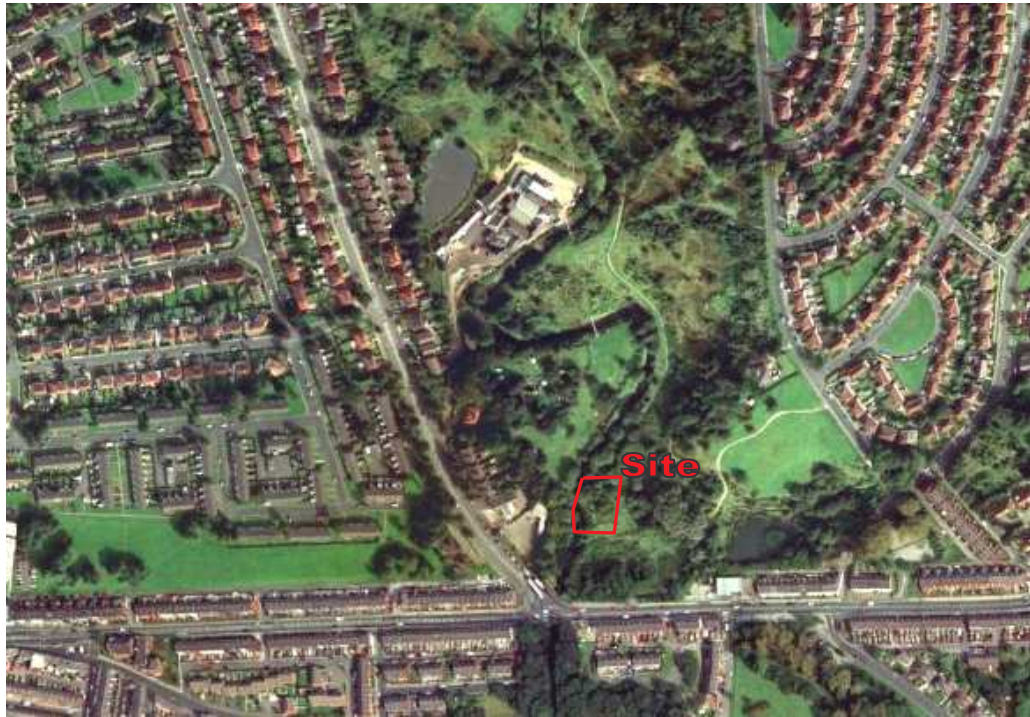


Plate 1: Recent aerial view of the site

2. METHODOLOGY

2.1 EXCAVATION

- 2.1.1 The principal aim of the archaeological excavation was to record and assess the presence, extent, state of preservation, and significance of any archaeological remains within the study area. The fieldwork undertaken followed the method statement detailed in the approved Project Design (*Appendix 1*), and was consistent with the relevant standards and procedures provided by the Institute for Archaeologists (IfA), and their code of conduct.
- 2.1.2 Whilst it was envisaged initially that the excavation would consist of several hand-excavated test pits, located within the study area outlined within the Project Design, the provision of a mechanical excavator by Bolton Council allowed for a strip-and-record type excavation of a much larger area within the study area.
- 2.1.3 A large area, measuring approximately 125m² was excavated by a machine fitted with a toothless ditching bucket. This was then used to carefully define the extent of several surviving walls, foundations and other remains, after which all excavations were undertaken manually. All deposits were levelled and related to the Ordnance Datum and Ordnance Survey co-ordinates.
- 2.1.4 Following discussion with both the County Archaeologist and Bolton Council, several tree stumps were removed subsequently by machine, and a small evaluation trench was excavated to the west of the main excavation area, in order to assess the potential for *in-situ* archaeological fabric. Upon the completion of the excavation, a further days stripping and test trenching was carried out in order to assess the potential for further work.
- 2.1.5 All information was recorded stratigraphically with accompanying documentation (plans, sections and both colour slide and black and white print photographs, both of individual contexts and overall site shots from standard view points). Photography was undertaken with 35mm cameras on archivable black-and-white print film, as well as colour transparency, all frames including a visible, graduated metric scale. Digital photography was used extensively throughout the course of the fieldwork for presentation purposes. Photographic records were also maintained on special photographic *pro-forma* sheets.

2.2 ARCHIVE

- 2.2.1 The results of all archaeological work carried out will form the basis for a full archive to professional standards, in accordance with current English Heritage guidelines (*Management of Archaeological Projects*, 2nd edition, 1991).
- 2.2.2 The Arts and Humanities Data Service (AHDS) online database *Online Access to index of Archaeological Investigations* (OASIS) will be completed as part of the archiving phase of the project.

3. HISTORICAL BACKGROUND

3.1 INTRODUCTION

3.1.1 The manufacture of woollen cloth had been an important industry in Bolton throughout the medieval period. Consequently, it had grown at the centre of a dense web of manufacturing towns and villages. The domestic textile industry benefited greatly from the ready supplies of waterpower for small-scale workings and also the humid atmosphere, which meant thread was less likely to break (Aspin 1995). However, in the latter part of the eighteenth century a number of the old textile firms in the area, which had previously carried out woollen manufacture, began to convert on a wholesale basis to the production of cotton goods. The textile-finishing trades developed as an important branch of the cotton industry, and the Bolton/Bury area became a leading centre for these trades.

3.2 BACKGROUND TO THE CALICO-PRINTING INDUSTRY

3.2.1 'The highest place in the trio of beautiful arts now before us is held, undeniably, by calico printing, since it not only paints the woven fabric with delight, but in its power to multiply and vary the cheerful pictures is practically inexhaustible' (Grindon 1882). Calico printing is a term applied generically to the printing of any textiles, although the term originated to describe specifically the printing of cotton cloth (Murphy 1911, 2). The first printed cotton cloth, known as chintz, was introduced into England from India during the seventeenth century. At that time, clothes in Britain were made from wool, linen, or silk, and plain dyed with natural colours. Indian chintz was very fine cotton, brightly coloured with exotic patterns (O'Brien 1792). It quickly became fashionable and English printers, based primarily in London, began to manufacture copies, whilst wealthy wool and silk manufacturers tried to stop chintz from being imported (Turnbull 1951). In the 1720s chintz was made illegal with those wearing it risking being arrested. In Lancashire, weavers produced an alternative cloth, with a linen warp and cotton weft known as fustian (Aspin 1995). This was exempt from the law, and dyers and printers found ways of copying the Indian chintz using fustian. When public demand led to the regulations against cotton cloth being removed, British printers and dyers were able to produce their own chintz. This quickly became more popular than the imported material.

3.2.2 The block printing method was the oldest method of printing, using engraved wooden blocks in a similar manner to reproducing book illustrations by woodcuts. It was invented in China in 2500 BC, but not used in Europe until the seventeenth century. The block was made of layers of wood sandwiched together, one side of which had a raised printing surface that varied depending on the type of cloth and the pattern to be printed. Three types of block were commonly used to print on cotton cloth: line blocks for printing outlines and small details; blotch blocks with felted surfaces for large areas of colour; and

ground blocks, also felted, for small areas of colour. Each colour was applied with a different block; there could be over a 100 blocks in a set.

- 3.2.3 To help the printer match up each part of the pattern there were pitch pins on the corners of the block. In the nineteenth century the block printer worked with a tierer, usually a child, who pushed a trolley of printing colour along the printing table. Frequently, such printing formed part of a bleaching and dyeing concern, providing a cloth finishing service to the textile trade. A large works would employ a few hundred hand-block printers, each man with his own printing table or bench. Many firms also had their own block-making department. Although it began to be replaced around the 1770s-80s by machine printing, hand-block printing lasted well past the mid-1800s (Turnbull 1951).
- 3.2.4 Machine printing of cloth by roller or cylinder was invented in the 1770s. A patent (no 1007) was granted to Charles Taylor, Thomas Walker, and Joseph Adkin, all of Manchester, in 1772 for printing by engraved wooden rollers (Turnbull 1951). The printing machine with the pattern engraved on copper rollers was introduced in the 1780s, and gradually superseded hand-block methods during the first half of the nineteenth century (Ashmore 1969). There were many attempts to mechanise block printing, but they could not compete with the speed of roller printing machines. Thomas Bell, of Walton-le-Dale in Lancashire, took out a patent in 1783 (no 1378) for a copper-covered roller engraved on its curved surface, which worked in the reverse manner to hand blocks, *ie* the engraved lines were the printing area, and smooth areas were kept clear of colour (Plate 2). Instead of the pattern being on a flat surface, it was engraved around a copper roller.

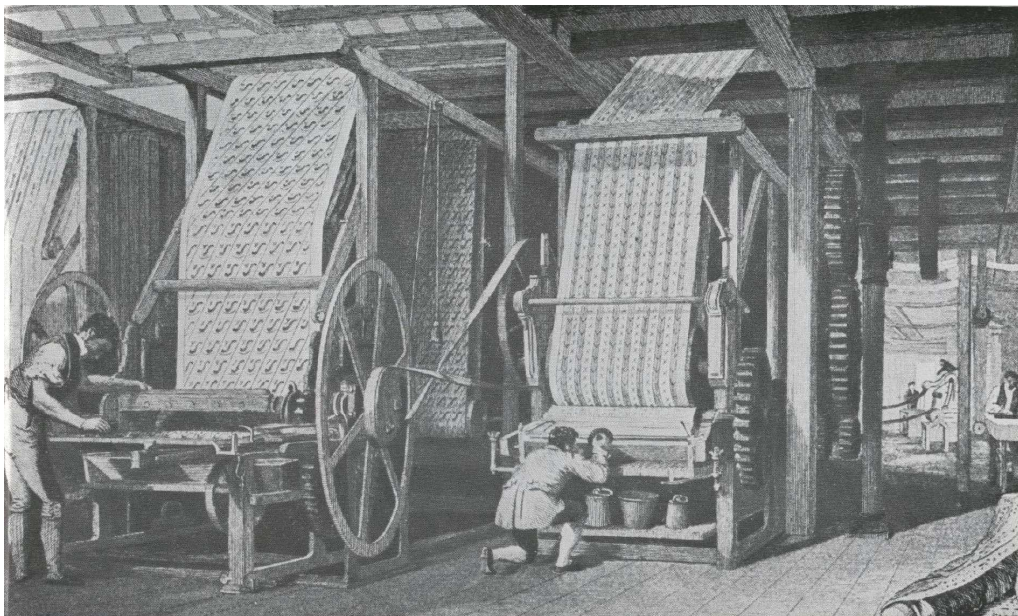


Plate 2: The mechanised calico-printing process in a cotton mill during the 1830s, showing on the left a machine with engraved copper rollers transferring the pattern onto the cloth, and on the right is a block printer using a hand-carved wooden block. (drawn by T Allom and engraved by J Carter, and taken from Chaloner and Musson 1965)

- 3.2.5 Cloth was passed continuously from an overhead roller through the nip between the engraved roller and a plain roller called a pressure bowl. The lower part of the engraved roller dipped into a colour trough, and as it revolved its surface was wiped clean by a doctor knife before the cloth reached it. Colour was thus left only in the engraved lines, which transferred the pattern onto the cloth. The pattern was printed full width, and repeated itself in the distance equal to the circumference of the copper roller. At first, single colours only were printed, but soon multi-colour machines were invented with several rollers, each carrying part of the pattern and fitted with its own colour trough and doctor knife. The cloth passed each roller in sequence, building up the final multi-coloured design (Baines 1835). The cloth moved continuously through the machine and, unlike block printing, was much quicker. There were many ways of making the pattern on the copper roller: hand engraving; mill engraving where the pattern is pressed into the copper; or etching, where the pattern is cut into the copper surface by acid.
- 3.2.6 Once printed, the inks had to be fixed to the cloth, and any excess mordant or other chemicals needed to be removed. The first process, known as ageing, aimed to remove the mordants and acetic acid used to fix the dyes to the cloth during the printing process. This process was only really understood after c 1800, when it was realised that moisture was also required during the drying of the cloth (Turnbull 1951, 62), in order to ‘age’ (fix) the colour. In the humid atmosphere of England, particularly in north-west England, where the industry had become specialised by this time, it had been sufficient for ageing rooms to be placed near rivers or ponds (*ibid*). These rooms were originally heated by flues from fires, and later by steam pipes, but as it became necessary to reduce the ageing time, which had previously been about four days (*ibid*), whilst increasing the quantities of cloth, the amount of steam required in the ageing rooms soon became too great for men to work within (*op cit*, 64).
- 3.2.7 The first enclosed steaming machine was invented by John Thom in 1849, and was further developed by Walter Crum in 1856 (*ibid*). Uptake by the major printworks ensued, culminating in the highly successful ‘Rapid Ager’, patented by Mather & Platt in 1879, which comprised an enclosed metal steaming chamber with rollers for continuous running. This revolutionised the processing of prints and long outlived the types of colour (mordents and vegetable colourings) for which it was first devised (Mather & Platt 1958).
- 3.2.8 The dyes used in all branches of the textile industry until the mid-nineteenth century were natural, and came mainly from animals (*eg* cochineal), plants (*eg* woad, logwood), shell-fish (*eg* murex and purpura, which formed the ‘imperial purple’ of Roman times), and minerals. Indigo and madder were the two most important dyes, both used extensively in Europe in the eighteenth century (O’Neill 1862). The simplest way of dyeing was mixing a colouring agent with water in a vat and placing a textile within the dye bath. The textile fibres would then absorb the colour, although many natural colours do not fix well, or cannot be made into dyes easily; at this time there was no natural green dye, and textiles had to be dyed yellow then blue. After dyeing the cloths were fixed in a steam room; later in the nineteenth century, steam was directed at the cloth as it was drawn over heated rollers (Aspin 2000).

3.3 BACKGROUND TO THE BLEACHING INDUSTRY

- 3.3.1 Bleaching of woven cloth was an old-established industry in Lancashire (Ashmore 1969, 60). The traditional method was to boil the cloth in an alkaline ley made from plant ashes and to sour it in buttermilk. The equipment was very simple comprising boiling 'kiers' and troughs or becks of stone or wood. Bleaching was achieved by exposing the cloth to the sun for long periods in bleach crofts. The growth of the linen trade in the late seventeenth and eighteenth centuries increased the amount of land given over to bleaching and the amounts of cloth lying in the bleach-fields for the weeks that were necessary for the processes. Parliament, faced with the problem of securing this valuable property, introduced the death penalty in 1745, for croft breaking or the receiving of cloth worth one shilling or more. Physical remains of this period are inevitably almost non-existent. However, the terminology survived into the factory period (*ibid*). Towards the end of the eighteenth century, the long bleaching process was under examination and bleachers began to use sulphuric acid instead of buttermilk in souring.
- 3.3.2 In 1798, Charles Tennant invented a combination of chlorine and lime that completely met the requirements of the bleaching trade. This resulted in the introduction of bleaching powder, patented by Tennant in 1799, which was made by impregnating dry-slaked lime with chlorine gas (Murphy 1911, 133). Another major development in the bleaching industry was the introduction of mechanisation during the late eighteenth century: water and steam power began to be used to drive the machines, including dash wheels, washing machines, squeezers, mangles and calendars (Ashmore 1969, 61). By the middle of the nineteenth century, textile engineering had become a recognised branch of the engineering industry, resulting in the general improvements of bleaching plant (Sykes 1926, 15). These innovations, together with the increasing demand for cotton goods, led to the adoption of the factory system, although some bleach crofts did remain in use in rural areas for longer.
- 3.3.3 The bleaching industry was transformed between 1780 and 1860 as bleaching moved indoors and the large open bleach crofts were no longer required. The key changes were the use of chlorine, the introduction of soda ash in the bucking stage, and the application of steam power to washing and moving the cloth. Bleachers had always established their operations in proximity to plentiful water but with the introduction of steam power to drive the machines they also required coal. These changes speeded the process and made it possible to work all year round.
- 3.3.4 By the mid-nineteenth century bleaching had become a continuous process that was carried out in specialised factories. The first stage in the process was to sew all the pieces of cloth together, end to end, forming a continuous rope of cloth that could be several miles long (Ashmore 1969, 61). The cloth could then be moved between the various processing rooms by winches, which drew the rope of cloth through overhead porcelain eyes.
- 3.3.5 Prior to being subject to the actual bleaching process, any fibre remaining on the surface of the cloth, such as frayed filaments from weaving, needed to be removed in order to obtain a perfectly smooth surface. This was achieved by

singeing the cloth over red-hot copper plates in a Singe House, which would contain a singeing machine heated by a stove underneath. Once it had passed over the hot copper plate, it was fed immediately through a trough of water to extinguish any sparks. The cloth was then subject to the 'grey wash' process. The bleach croft was one of the largest areas within the bleach works and contained many items of machinery, including steam engines, washing machines, a liming machine, a high-pressure kier, open kiers and cisterns.

- 3.3.6 Initially, cloth was fed in the form of twisted rope into the liming and washing machine, where it was alternately impregnated with scouring liquor and squeezed dry through rollers. The impurities were broken down by chemical action in the liming machine. The cloth was then boiled in a kier. Boiling in lime, or 'bowking', circulated the lime solution continuously through the cloth at a high temperature. The cloth was then subject to the 'grey sour', which involved treating the cloth with a weak solution of hydrochloric acid to dissolve any vestiges of lime, and it was then washed thoroughly. Cloth was frequently boiled twice in kiers with soda and washed again.
- 3.3.7 The next process was the bleaching, or chemicing, process that was intended to destroy what remained of the natural colouring matters in the fibre. This was achieved by passing the cloth through a clear solution of chloride of lime, or bleaching powder. It was then allowed to lie for several hours whilst the necessary chemical reactions took place. The cloth was passed through a dilute solution of sulphuric acid, a process known as the 'white sour', followed immediately by a final washing in clean water, which rendered the cloth perfectly pure. The cloth was then passed through padded squeezing rollers and drying cylinders. The drying process was completed in the 'Hanging Stove'. Stretching machines rectified any shrinking in the cloth. The finishing process also required the cloth to be evenly and finely damped, fulfilled by the damping machine.



Plate 3: Early twentieth-century view of the interior of a bleachworks

3.4 DEVELOPMENT OF THE STUDY AREA

- 3.4.1 The historical background for the development of the study area is derived largely from previous studies of the site (UMAU 2009), and is summarised below.
- 3.4.2 A manorial corn mill existed in Brightmet in 1257 when it was owned by Avina de Samlesbury, after whose death its ownership was divided between her daughters (Farrer and Brownbill 1911, 266). It is possible that this may have been the water-powered mill which was among the lands in Brightmet and Harwood known to have been held by Thomas Ainsworth in the late sixteenth century (*op cit*, 267).
- 3.4.3 The site is depicted on a plan of the area, which has been dated to *c* 1764. This plan shows the mill as a relatively small structure (Plate 4), which appears to have been served by two millraces that were connected with a millpond on the east side of the mill. One commenced just above Thicketford Bridge, *c* 1km upstream on the Bradshaw Brook. The other leat was formed by a tributary stream which flowed into that brook from the east. It is possible that this mill was the location of Brightmet's medieval corn mill, although there is no firm evidence to confirm this.



Plate 4: Tootill Bridge Mill, depicted on an estate plan of *c* 1764

- 3.4.4 This early mill was situated next to a minor meandering road and adjacent to the original Tootill Bridge site over the brook. This bridge, which was rebuilt in 1773, seems to have replaced an earlier ford (Barton (ed) 1881-3, 243). At the time of the c 1764 estate survey, the Tootill Bridge Mill formed part of the tenancy of Josiah Phethean, originally a Cheshire man who had come to Brightmet in the service of John Parker (*op cit*, 177). In 1770, Josiah Phethean and James Hardman began a paper-making business at the mill. Their partnership was dissolved in the following year, but Phethean continued this business until at least 1779 (*op cit*, 26).
- 3.4.5 William Yates' *Map of the County Palatine of Lancaster*, which was published in 1784 but surveyed during the 1770s, shows a water-powered mill on Bradshaw Brook to the south-west of Brightmet Hall (Plate 5). Although it is not named on Yates' map, it is almost certainly that within the present study area.



Plate 5: Extract from Yates' *Map of Lancashire* of 1786, depicting a water-powered mill

- 3.4.6 By 1784 the mill was being used as a calico-printing works by Messrs Cooper, Whitehead and Chadwick, following the purchase of the site by John Whitehead due to the death of William Wilson, a dyer and calico printer, in 1783 (Aspin 2003, 285). This is corroborated by a notice posted in the *Manchester Chronicle* in November 1784:

‘Stolen, out of the bleaching grounds of Messrs. Copper, Whitehead and Chadwick, at Tootle Bridge, near Bolton, on Thursday, the 21st, or Friday the 22nd of October, four pieces of calico, chocolate ground, not finished.

Also three pieces of ell wide calico, light-coloured chintz, two of them yellowed, marked 'CW & C' Whoever will give information of the person or persons concerned in the above felony, so that he, she, or they may be convicted, shall, on such conviction, receive a reward of five guineas, by applying to the Committee for the prosecution of such felonies, at Mrs. Cooper's, the Three Crowns, in Bolton; or at Mrs. Beever's, the Golden Lion, in Deansgate, Manchester.'

- 3.4.7 In addition to his involvement in the textile-finishing trades, it seems that John Whitehead was also engaged in spinning cotton at Tootill Bridge. The evidence for this is drawn from an advertisement posted in the *Manchester Chronicle* in December 1786:

'To be Sold, at the Factory at Tootle Bridge, near Bolton in Lancashire, either together or in part, 704 spindles, with carding, slubbing, roving, reeling frames, and bobbins, and everything thereunto belonging, ready for spinning cotton twist. The above are all new, and upon the best construction, and will be sold on reasonable terms, on account of being short of water to work them. Apply to John Whitehead, at Ainsworth Hall, near Bolton, or at his Print Warehouse, in the Market Place, Manchester'.

- 3.4.8 The firm Cooper, Whitehead and Chadwick later became John Whitehead & Sons, and continued to trade under that name until the 1830s (Barton (ed) 1881-3, 319-20). It has been suggested that the Tootill Bridge works were used initially for bleaching and dyeing, with calico printing being carried out at Ainsworth Hall where water was in shorter supply. When the lease on Ainsworth Hall expired, the Whiteheads transferred the calico-printing side of the business to Tootill Bridge (*ibid*). By the mid-1840s, however, calico printing had ceased there and it was reported that the site 'is at present a bleach works and the larger buildings are cotton works' (Graham 1846, 341, 435).

- 3.4.9 The site is depicted on the Ordnance Survey first edition 6": 1 mile map, surveyed between 1844 and 1847, and published in 1850 (Plate 6). The works is annotated clearly on this map as 'Tootill Bridge Bleach Works', although there are few, if any, references to the bleachworks in trade directories for the 1840s. The Ordnance Survey map shows the bleachworks to expanded considerably relative to eighteenth-century plans (*eg* Plate 4). The map also shows a new road, the modern Bury Road, to have been built a short distance to the south of the mill.

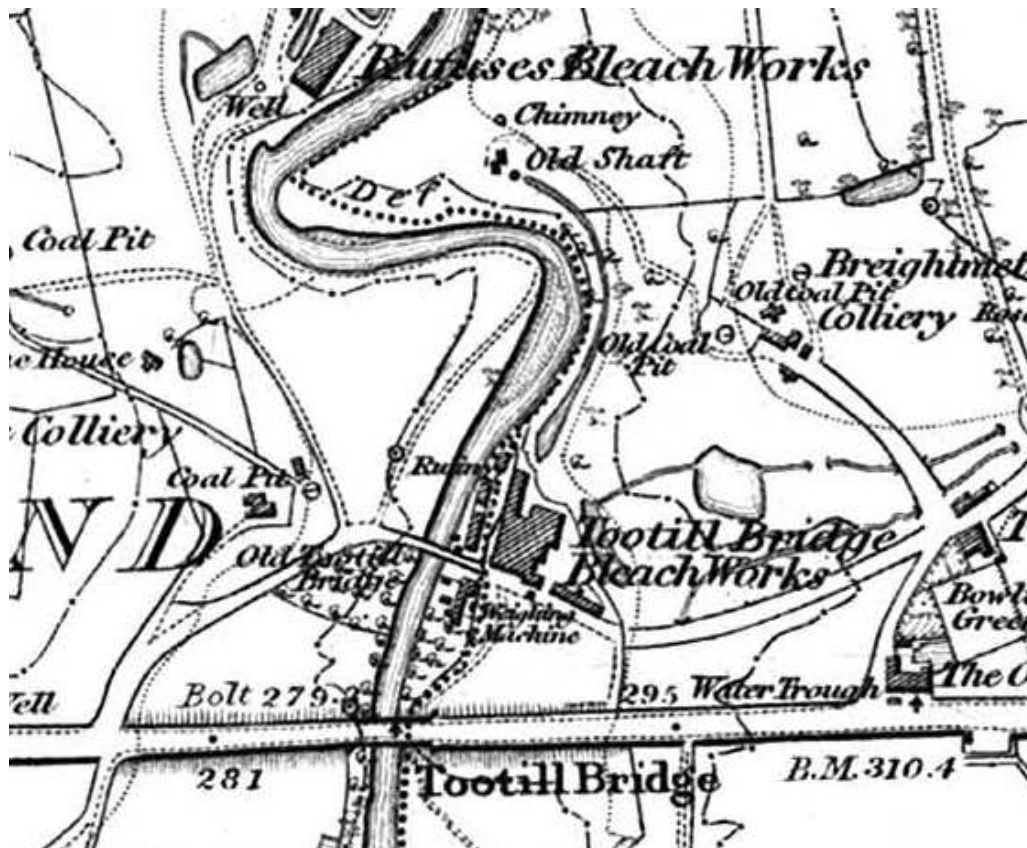


Plate 6: Extract from the Ordnance Survey first edition 6'': 1 mile map of 1850

- 3.4.10 The bleachworks was occupied during the 1850s and early 1860s by the firm of Edwin Hollins & Co. However, the partnership between E Hollins, RI Woody and JB Champion, bleachers at Tootel Bridge near Bolton, was dissolved in 1863 (*Daily News* 30 May 1863; *Morning Post* 30 May 1863). The works appears to have been occupied subsequently by William Hampson & Co and, by the end of the 1860s, by Waterhouse & McCarty (Slater 1851; 1858; 1861; 1865; 1869). In 1868, the partnership between Waterhouse and McCarty was dissolved (*The Standard* 7 October 1868), and the business was continued by John Waterhouse & Co, listed in trade directories for the 1890s as bleachers and finishers at Tootel Bridge Bleach Works, with an office in Manchester (Worrall 1891; Worrall 1898).
- 3.4.11 In 1885, there was a fatal accident at the bleachworks. Amos Yates, an engine tender, was at work loosening the crank between the beam and the flywheel of the steam engine, when he slipped into the wheelpit and was carried around by the flywheel several times before the engine could be stopped (*Preston Chronicle* 3 October 1885). The incident clearly indicates that the beam engine was still in use during the mid-1880s.
- 3.4.12 The bleachworks was evidently remodelled during the second half of the nineteenth century, and is shown to have been enlarged slightly on the Ordnance Survey first edition 25'': 1 mile map of 1893 (Plate 7). The remodelling comprised infilling of open areas between outlying structures and the main bleachworks building.

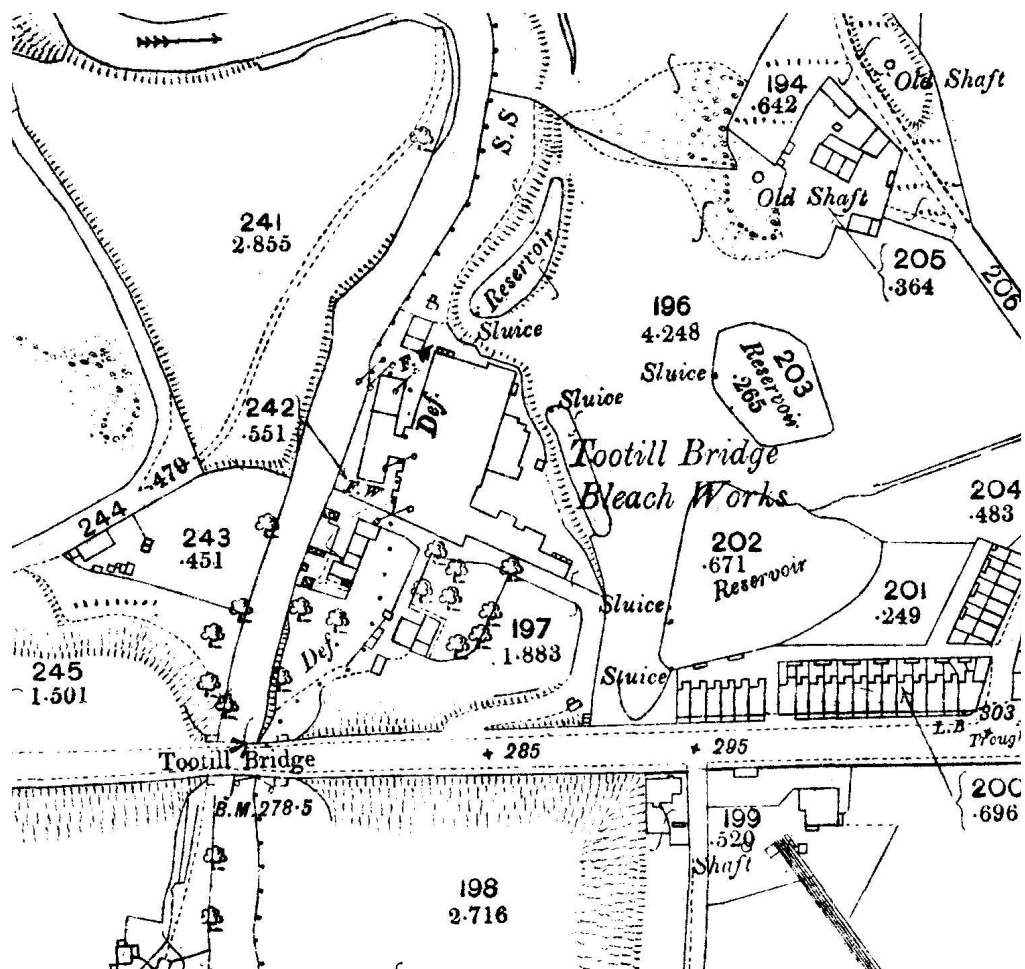


Plate 7: Extract from the Ordnance Survey first edition 25": 1 mile map of 1893

3.4.13 In 1900, numerous bleaching concerns throughout England were amalgamated into a limited company under the designation of the Bleachers' Association Ltd. The company was formed with the 'object of acquiring and amalgamating numerous firms and companies engaged in the bleaching trade, and strengthening and extending various associations which previously existed for various purposes in connection with that trade' (Sykes 1926). In July 1900, John Waterhouse & Co, of Tootill Bridge Bleachworks, entered into a contract for the sale of their works to the newly formed company. The announcement stated that the works had been first established in c 1850 (*The Standard* 23 July 1900; *The Courier* 23 July 1900).

3.4.14 In 1910, the Ordnance Survey published the second edition 25": 1 mile map of the area, which was surveyed in 1908. The site is still named Tootill Bridge Bleach Works, although the layout of the complex is shown to have been remodelled and expanded slightly. A narrow, rectangular building has been added to the northern part of the complex, adjacent to the eastern bank of Bradshaw Brook. The small, detached, square structure in the eastern part of the site is marked as a chimney. The reservoir immediately to the north of the works appears to have been infilled, and the area of trees to the south of the site has been cleared.

- 3.4.15 Further changes to the layout of the site can be discerned from the detail provided by the Ordnance Survey 25”: 1 mile map of 1930, which identifies the complex as the Tootill Bridge Paint Works. The buildings abutting the western side of the main block have evidently been remodelled for the change of use. The engine house abutting the eastern side of the main block has also been reduced in size, perhaps suggesting that the steam engine had been decommissioned.
- 3.4.16 The Ordnance Survey map of 1970 shows the site to have been largely cleared. The only building shown as extant is the small east/west-aligned block in the south-eastern part of the former complex. The reservoirs are all marked ‘disused’.

4. RESULTS

4.1 INTRODUCTION

- 4.1.1 The main aims of the archaeological investigation were to determine the level of preservation of the surviving fabric relating to historical structures on the site, engage the interest of the local community in the rich industrial heritage of the area, and assess the feasibility of further community-based excavation of the monument.
- 4.1.2 It had been envisaged originally that all excavation would be exclusively manual, although the opportunity to utilise a mechanical excavator for a short period proved invaluable in achieving the principal aims of the investigation. In particular, the mechanical excavator was used to remove a significant accumulation of colluvial silts that had been deposited over the entire site by flooding of the Bradshaw Brook and run-off from Bury Road.



Plate 8: Volunteers involved in the excavation of the bleachworks

- 4.1.3 Following the removal of the majority of the silts, extensive and well-preserved remains were exposed and cleaned manually by volunteers from the local community, and particularly members of the Bolton Archaeological Society (Plate 8). The investigation was focused on the stone foundation beds for a nineteenth-century steam engine that had been exposed by initial, but unauthorised, excavation. The initial investigation also generated a measured survey of above-ground remains of the bleachworks across the site, allowing a reconstruction drawing of the works to be compiled (Plates 27 and 28).

- 4.1.4 An area measuring approximately 22m by 15m was cleared of modern overburden, and the surface of historical structural remains were cleaned and recorded. In addition, a narrow trench placed some 7m to the west of the main area was excavated by machine (Figs 2 and 3), and was intended purely to establish the presence or absence of buried remains, and their depth below the modern ground surface. This trench measured 18.5 x 1.3m, was excavated to a maximum depth of 1.5m. The excavated material comprised a thick deposit of demolition material, which overlay the well-preserved remains of a flagstone floor. However, having established the presence of this floor, no further investigation was carried out, and the trench was backfilled for safety considerations.
- 4.1.5 Three principal structural elements were revealed during the archaeological investigation of the main area. These comprised: the stone foundation beds for a steam engine, which had been exposed by the initial excavation work (Plate 9), and the remains of the associated engine house; a room containing several bleaching tanks; and a large yard to the east of the former building. The exposed remains appeared to comprise three main constructional phases, all relating to the nineteenth/twentieth-century bleachworks, and which appear to correspond broadly to the detail shown on Ordnance Survey mapping of the site. A final phase of post-demolition activity was also identified.



Plate 9: Exposed remains of the engine bed, prior to the excavation

4.2 PHASE 1: MID-NINETEENTH CENTURY

- 4.2.1 The earliest remains exposed almost certainly dated from the mid-nineteenth century, and probably represented a change in power supply from water power to steam. This is likely to have been associated with the documented expansion of the bleachworks complex in the late 1840s.
- 4.2.2 Excavation revealed that the stone foundation beds for a steam engine (**003**) comprised large, well-coursed, dressed blocks of local sandstone, bonded in a pale lime mortar. The bed comprised a large, L-shaped base, measuring 7m long and 1.2m wide, with a 3m southern return of a similar width at its western end (Fig 4). The individual blocks varied in size (Plate 10), with the larger blocks having been used where heavier anchor points were required, and had maximum dimensions of 1.2 x 0.7 x 0.4m. A further T-shaped base (**020**), situated 1.85m to the west (Fig 4), was of similar construction, and almost certainly formed part of the same foundation bed at a lower level. A gap on the upper level probably housed the condenser, several fixing points for which had been drilled into the western face of the L-shaped engine bed (Plate 11).



Plate 10: Dressed stone blocks of the engine bed, with cut-away for the crank



Plate 11: Fixing bolts in the engine bed, for column (top) and condenser

4.2.3 Both bases also incorporated housings for fixtures, or rebates for various parts of the engine, with their upper surfaces retaining both lead-lined sockets, and protruding ironwork suggesting that this part of the structure survives to its original height. The T-shaped section of stonework at the west of the engine bed (020) had four large, cast-iron bolts projecting from the surface, each 40mm in diameter, and almost certainly representing the anchor fixings for a cylinder associated with the engine. A semi-circular rebate, on the south face of the L-shaped stonework, represents a cut-away for the crank, at the base of the main connecting rod to the beam, or where a crank and crank shaft was placed. A series of adjacent bolt-holes on the upper surface of the engine bed would have anchored the end bearing of the crank shaft. A cast-iron lined rebate and two bolts projecting from the surface of the western end of the bed (Plate 12), would have fixed a column supporting the entablature beam, to which the main beam was fixed.



Plate 12: Housing and fixing bolts for the column supporting the entablature beam

4.2.4 To the north of the engine bed (003), a narrow void, 0.61m wide, would have housed the engine flywheel (Plate 13). The wall to the north (024), which formed the north wall of the engine house (Fig 4), had its central section constructed in dressed sandstone block, similar to the engine bed, and with a large single capping stone, measuring 4.6 long. This would have supported the bearing for the axle of the flywheel, and had two large bolt-holes in its upper face (Plate 14). Two rectangular voids in the southern face of the wall, immediately below this large block, corresponded to the position of these bolt-holes, and would have allowed the securing nuts to have been tightened or released, as necessary.

4.2.5 This north wall of the engine house (024) continued in both directions, for a total observed length of 8.75m, continuing beyond the western limit of excavation (Fig 4). It was 0.8m wide and was constructed of smaller, roughly-dressed local sandstone blocks, faced on either side and with a rubble core, bonded with a pale lime mortar. At its eastern end, the wall returned to both north and south, as a slightly narrower wall (typically 0.6m wide) of similar

construction (024). At its northern end, this wall continued beyond the limit of excavation, whilst to the south, it returned westwards, again as a contemporary build of similar construction. At the western limit of excavation, this southern wall of the engine house returned northwards, although it was not possible to establish whether the wall also continued further to the west, beyond the limit of excavation (Fig 4).



Plate 13: The engine flywheel pit



Plate 14: Detail of bolt-holes for axle bearing, and flywheel scar

- 4.2.6 These walls (**024**) formed a small, rectangular engine house, measuring 11.16 x 3.66m, which appeared to have been intended to house a small vertical steam engine. The area between the large masonry beds within the engine house was infilled with a deposit of boiler ash, **002**. This was excavated to a maximum depth of 1.2m, but continued beyond this depth of excavation (Plate 15); it was not possible to establish the full depth of the deposit, nor establish whether a floor surface survived below the engine bed.



Plate 15: Engine bed **003**, walls of engine house **024**, and ash backfill **002**

- 4.2.7 Immediately to the south of the engine house, and butting its southern wall, was a series of stone-built tanks, which had almost certainly been intended to contain bleaching solution used as part of the bleaching process (Fig 4). The stone-built tank at the eastern end (**004**) was the best preserved, and measured approximately 2.05m² with side-walls constructed of large edge-set sandstone flags (Plate 16), which were typically 0.12m wide and 2.1m in length. These projected approximately 0.1m above a later concrete floor, and appear to have been heavily truncated. Similar, less well-preserved remains of two further tanks **008** and **009**, were also revealed to the west (Plate 17), with a probable fourth tank having originally been placed in the gap between tanks **004** and **008** (Fig 4).
- 4.2.8 A further bleaching tank, **012**, was placed 3.66m to the south of **004**, on a slightly different alignment, parallel to a wall immediately to the south, **017**. This tank also contained the remnants of a later concrete base. It was of similar construction to the tanks to the north, although the flagstone that formed its southern edge, survived, in part, to a much greater height (Plate 18). A further edge-set flagstone, partially exposed immediately to the west (Plate 18), suggests that a further row of four tanks, mirroring those to the north, were provided within the original layout of this area of the bleachworks complex.



Plate 16: Bleaching tank **004**, with edge-set flagstone sides, and Phase 2 base and pipe



Plate 17: General view from the west showing engine house (left), bleaching tanks (centre), Phase 1 and 2 floors and culvert (right), Phase 3 platform (top right), and yard (top)



Plate 18: Bleaching tank **012**, with further edge-set flagstone continuing beyond excavation



Plate 19: Culvert **010**, with flagstone capping and floor **014**, and Phase 2 pipe

4.2.9 Immediately to the north of tank **012**, and butting the edge-set flagstone forming its northernmost face, was stone culvert **010** (Fig 4; Plate 19). This measured 0.75m wide and 1.2m deep, and was capped in part with large flagstones, the easternmost of which had collapsed into the culvert. It was constructed of local, roughly dressed sandstone rubble, on a parallel alignment to the dye tank to the south (Fig 4), bonded in a pale grey lime mortar. Its base retained infrequent flagstones, possibly relating to its apparent later remodelling to house a large cast-iron pipe, 0.22m in diameter. Below the level of this later pipe, at a depth of 0.8m below the floor, a smaller pipe entered the southern side of the culvert from tank **012**. This presumably represented the drain from the original base of the tank, which became obsolete following the Phase 2 remodelling of the tanks.

4.2.10 The culvert continued beyond the limit of excavation to the west, but at its eastern end butted a north/south-aligned wall, which formed the return of wall **017**. This was built on a slightly different orientation to both the southern element of wall **017** and the engine house to the north (Fig 4). It was of similar construction to the south wall of the engine house (**024**), which it appeared to butt it at its northern end (Fig 4), although it is possible that the two walls may have been keyed at a lower, unexcavated level. The room formed by walls **017** and the southern part of **024**, and apparently comprising at least eight dying tanks, originally had a flagstone floor (**014**). This had variable survival, and was quite badly damaged at its eastern end, where it butted wall **017**, and was

heavily collapsed. A small section of collapsed flags to the south-west of tank **008** revealed that a further culvert, constructed of hand-made brick and aligned north/south, survived below the floor surface. This was not fully exposed as the floor was left *in-situ*.

- 4.2.11 To the east of both the engine house and the room containing the bleaching tanks, an extensive sandstone sett surface (**016**) formed a large yard (Fig 4). The surface continued up the slope from the bleachworks buildings, beyond the limit of excavation, but presumably narrowing to an access trackway. An area measuring 3.6m x 13.1m, adjacent to the building was exposed, revealing regular rows of dressed rectangular sandstone setts, although it had been recently remodelled in parts. At the northern edge of the yard, adjacent to the engine house, a row of flagstones defined the extent of the cobbled sets (Fig 4), with what appeared to be a void to the north. This probably represented the open face of the boiler house, allowing coal to be delivered from the yard to the charging platform.
- 4.2.12 Evidence for what appeared to be tramway tracks were incorporated into a later Phase 3 loading ramp, built against the east wall of the building, at the southern edge of the excavation area (Fig 4). The cast-iron tracks, were placed on an approximately east/west alignment, and appear to have provided access directly to the bleaching tanks, although the rails had been bent during the insertion of the later ramp (Plate 20).
- 4.2.13 A further stone wall **025** was observed beyond the limit of excavation, at the south-eastern corner of the site, and heavily overgrown with vegetation (Plate 16). It survived for a length of at least 2.75m, to a maximum height of 0.3m above present ground level, and had a slight eastwards return at its southern end (Fig 4). It appears to represent the further survival of the eastern external wall of the bleachworks complex at this date, and had well-dressed sandstone blocks forming its external, eastern, face (Plate 21).



Plate 20: East wall of bleachworks, with possible tramway rails, overlain by platform **015**



Plate 21: East wall of bleachworks, 022, with dressed and coursed external stone facing

4.2.14 Only limited excavation was possible to the north of the engine house (024), although this revealed a well-preserved sandstone flag floor, which incorporated the footing for a cast-iron column (Plate 22). Given its position, adjacent to the wall, this is extremely unlikely to have been a column supporting ceiling beams, and is far more likely to have been associated with a bearing relating to the power transfer from the engine house, immediately to the south (Fig 4). Further remnants of this flagstone floor survive to the north, below the reservoir, which was recently extended as part of drainage management works (Bill Farrell *pers comm*).



Plate 22: Floor 018, to north of wall 024, incorporating column/bearing base

4.3 PHASE 2: LATE NINETEENTH CENTURY

- 4.3.1 The second phase of activity appears to relate to the late nineteenth-century expansion of the complex, prior to the production of the Ordnance Survey edition of 1893 (Fig 3). Whilst the majority of this expansion lay outside the excavation area, the physical remains of several internal alterations, which probably date from this time, were exposed. The major alteration within the excavation area was the reduction of the depth of the bleaching tanks, effectively reducing them to floor level, by the insertion of concrete floors.
- 4.3.2 Within tank **004**, a 50mm diameter, iron pipe was set within this concrete base, and continued south, across the flagged floor of the room (**014**) to the culvert (**010**) to the south. It appears to have originally been placed immediately below the new concrete base of the tank, but the settling and collapse of the floor subsequently revealed the length of the pipe within the concrete. With new drainage pipes apparently running across floor **014** to the culvert, the floor level within the room was also raised. The new concrete floor surface (**013**) was 25mm thick, and was laid on a bed of sand and clinker to a depth of 0.25m, which in turn overlay a 0.1m thick layer of ash. This floor layer was truncated, presumably by recent drainage works, but did survive intact in the south-west corner of the site (Plate 17). A small section also survived immediately to the south of tank **004**, suggesting that it extended originally across the whole room. The floor seemed to be of a similar composition to the bases present within tanks **004** and **012**.
- 4.3.3 A large, 0.22m diameter, cast-iron pipe was also most probably inserted into culvert **010** (Plate 19) during this phase. At its eastern end, adjacent to wall **017**, the pipe had a 90° upright bend, suggesting that this pipe served a machine within the room, presumably taking waste water into the culvert, to be discharged into the river, only a few metres to the west (Fig 4).
- 4.3.4 What appears to have been a manhole access into sub-surface drainage channels, was probably inserted into the north-west corner of yard **016** at this time (Fig 4). It butted the engine house (**024**) and was rectangular in plan, measuring 1 x 0.75m internally. It was of hand-made brick construction, bonded in with a pale lime mortar, and had been previously excavated and revealed to have contained the junction of several ceramic drains (Ian Johnson, *pers comm*).

4.4 PHASE 3: EARLY TWENTIETH CENTURY

- 4.4.1 This phase represents the final phase of alteration to the complex, in the early twentieth century. Although there are few stratigraphic relationships to differentiate it from the Phase 2 remodelling of the site, its major feature, a vehicle ramp, would almost certainly suggest a date post-1910 for its construction, and other features identified within this phase were built using similar materials.



Plate 23: Loading platform, **015**, remodelled yard, **016**, and Phase 3 man-hole, **006** (left)

- 4.4.2 The platform, **015** (Plate 23), was placed at the south-eastern corner of the site (Fig 4), at the southern exposed edge of the cobbled yard (**016**), and was constructed using frogged brick and concrete. It was 3.5m in length, and 2.5m wide, and was constructed to form a counter-slope from the yard, to the east external wall of the bleachworks (**017**), and overlay, and badly damaged, what appear to be earlier tramway tracks below (Plate 20). The platform was presumably used in a loading/unloading capacity, and incorporated ridged tiles and a raised lip at its western end, presumably serving as a guide for reversing vehicles.
- 4.4.3 Several repairs were observed within yard surface **016**, to the north (Plate 23). In its south-western corner, a patch of rounded, water-worn cobbles within the more regular, rectangular sandstone setts, presumably represented an area of repair. A row of east/west-aligned setts, situated within the central part of the surface, was raised slightly (Plate 23), suggesting they had been relaid above a drain. The surface also incorporated a row of refractory tiles, presumably originating from the boiler house and re-used during Phase 4. These were aligned north-west/south-east, an extended from the north-east corner of platform **015** (Plate 23). An approximately square manhole (**006**), situated to the north-east of platform **015**, also appeared to date to Phase 3. It was

constructed using a mixture of a hand-made brick, frogged brick and refractory brick (Plate 23), and retained a ceramic drain within its base, that appeared to flow to the north-west. Some rebuilding of the southern side of the large culvert (**010**), undertaken using frogged, machine-made brick (Plate 19), may also date to this phase, and it was bonded in a black sooty mortar, typical of the period.

- 4.4.4 At the western end of the engine bed (**003**), a 0.6m length of the north wall of the engine house (**024**) had been rebuilt using frogged bricks, bonded with a hard, black sooty mortar. The exact purpose remains unclear, but was presumably undertaken due to alterations to the engine.

4.5 PHASE 4: LATE TWENTIETH CENTURY

- 4.5.1 This final phase relates to recent activity undertaken by Bolton Council, in order to improve the drainage of both the site, and the surrounding area. Unfortunately, this appears to have slightly compromised tanks **009** and **008**, where a deep soakaway, covered with a metal grill was inserted (Plate 17), to allow flood water to clear swiftly into culvert (**010**). Much of this area of the site was covered with a modern deposit of refuse and rubble hardcore, subsequently, which probably destroyed a large part of concrete floor surface **013**, but equally would have protected the more significant features below.

4.6 FINDS

- 4.6.1 In total, 74 objects were recovered from the excavation, with an additional 79 fragments deriving from a single iron vessel. The bulk of the assemblage (60 fragments) derived from stratified deposits with the remainder recovered from backfill deposits close to the stone wheel pit. The material was dominated by iron objects (38), domestic and non domestic ceramic items (32) including bungs, glazed wall and floor tiles, a complete stoneware bottle, window and vessel glass (7), copper alloy (8), textiles (2), and single pieces of slate and lead. The fragments were generally in fair condition, except for the textiles, which were not recovered from waterlogged condition and as such were desiccated. It is likely that the entire assemblage dates no earlier than the mid-nineteenth century. A catalogue of the finds is presented as *Appendix 3*.
- 4.6.2 **Iron:** the objects were mostly identifiable with only three out of the 38 fragments unrecognisable due to dense corrosion products. However, as these derived from unstratified deposits further investigation was not required. The objects were entirely of industrial function and included a variety of square-sectioned bars, a crow bar, bolts, part of a spade blade, an axe blade, tool handles, a cord fixing plate, two machine cogs and nails. An additional 79 fragments from a single vessel probably derived from a bucket.
- 4.6.3 **Ceramic:** amongst the 32 fragments, there were 24 unglazed hard fired earthenware bungs which resembled a type of furniture commonly used in kilns, however, it is likely that the bungs recovered from the fill of a culvert and drain fill **11** were pertinent to the bleaching process. Of interest amongst the remainder of the fragments is a complete stoneware ginger beer bottle bearing

the name of J Haslam & Sons, manufacturers who were seemingly based near Bolton during the latter half of the nineteenth century.

- 4.6.4 The remaining fragments included several undecorated white earthenware glazed wall and floor tiles, and part of toilet bowl.
- 4.6.5 **Copper Alloy:** in total, an 1884-penny and a token (Plate 24) were recovered from context **2** and **1**. The token was perforated and retained visible ligature of 'TOOTILL BRIDGE 55 BLEACH WORKS'.



Plate 24: 'Tootill Bridge Bleach Works' perforated copper token

- 4.6.6 **Textiles:** this category included a fragment of cotton cord and a fragment of desiccated leather upper deriving from an adult shoe.
- 4.6.7 **Glass:** the glass derived context **002** and included five small pieces of clear window or lantern fragments, part of a clear bottle and a spectacle lens. These could be dated to the latter half of the nineteenth century
- 4.6.8 **Miscellaneous material:** this category included a single piece of lead flashing, and part of a decayed roof slate

5. DISCUSSION

5.1 INTRODUCTION

- 5.1.1 The archaeological investigation at the site of Tootill Bleachworks achieved a successful community-based excavation in what were frequently adverse weather conditions, and also demonstrated that well-preserved archaeological remains survive *in-situ* across a large part of the site. All of the exposed remains comprised structural elements of the bleachworks, representing several distinct phases of the site's development from the mid-nineteenth century onwards. In accordance with the Project Design, however, excavation did not continue below the uppermost archaeological structures, and therefore the extent to which any earlier remains survive on the site was not fully established. The area targeted for excavation, moreover, was focused on the steam-power plant for the nineteenth-century bleachworks, which had already been exposed partially by the earlier informal excavations. This lies a short distance to the east of Bradshaw Brook, where the documented medieval corn mill and eighteenth-century cotton mill are likely to have been sited. Similarly, any buried remains of the medieval bridge across Bradshaw Brook will lie to the east of the excavated area. Whilst the presence of buried remains pertaining to these early structures awaits confirmation via intrusive investigation, the results obtained from the present work has demonstrated a considerable potential for surviving archaeological remains on the site.
- 5.1.2 Notwithstanding the considerable importance of the factory-based textile-finishing industries to the economic development of north-west England from the late eighteenth century (Nevell *et al* 2003), only a handful of these sites have been investigated archaeologically, and even fewer consolidated and presented to the public as monuments to the region's rich industrial heritage. An example of where this has been achieved successfully can be drawn from the Hodge Printworks at Broadbottom in Tameside (McNeil and Nevell 2000, 56), where stone-built dye vats were excavated and recorded by the Greater Manchester Archaeology Unit in 1986, and the remains consolidated for public display (*Section 6.2.6 below*). All of these tanks are approximately 1.8m deep, and comprise huge stone slabs joined together by iron stays. The tanks are thought to have been constructed during the early nineteenth century (Nevell *et al* 2003, 96-7), and are thus likely to be of a slightly earlier date than those at Tootill Bleachworks.
- 5.1.3 Stone-built tanks at textile-finishing works have also been recorded during recent archaeological excavations at Cheadle Bleachworks near Stockport (OA North 2008a), and at the Adelphi Dyeworks in Salford (Plate 25; OA North 2008b). However, in both of these cases the remains were destroyed during redevelopment.



Plate 25: Excavated mid-nineteenth-century dye tank at Adelphi Street Dyeworks

- 5.1.4 Perhaps the most extensive programme of archaeological investigation of a former bleachworks, however, was that carried out by the University of Manchester Archaeological Unit at Wallsuches Bleachworks near Horwich during the redevelopment of the site for housing. Established as a bleachworks in *c* 1777, Wallsuches was one of the first to utilise the new chemical bleaching processes, and was also one of the earliest textile-finishing works in the area to use steam power to drive the machinery (Neve *et al* 2003, 97). The works were expanded to include the textile-printing processes in the mid-nineteenth century, and developed into an extensive complex of stone- and brick-built buildings. Amongst the physical remains recorded at Wallsuches were a large stone-built bleaching tank, the footings for the bleaching kiers, and rectangular, U-section troughs that represented the bases of washing machines (*op cit*, 99).
- 5.1.5 Whilst the Wallsuches bleachworks complex was considerably larger than that at Tootill, the industrial processes carried out, and the machinery used, will have been very similar. The excavated bleachworks at Cheadle, which was established in 1874 on the site of a water-powered corn mill, also provides a useful comparison for Tootill Bleachworks; whilst waterwheels provided the principal source of motive power initially at Cheadle, the processes and machinery used are likely to have been very similar to those at Tootill. As at all of these excavated sites, the archaeological work at Tootill Bleachworks has identified several distinct phases in the development of the site, which are likely to represent developments in the bleaching industry as a whole.

5.2 PHASE 1: MID-NINETEENTH CENTURY

- 5.2.1 The earliest surviving remains appeared to relate to the conversion of the eighteenth-century calico-printing works from a water-powered concern to one driven by a steam engine. This appears from the cartographic sources to have probably been contemporary with an expansion of the complex, and was in place prior to 1837 (UMAU 2009). The main block of the engine bed had been the subject of the initial informal excavations, and the current project has built on the results obtained from that work.
- 5.2.2 The engine house probably contained a single-cylinder beam engine (Plate 26), the primary driveshaft from which ran to the north into a large range of buildings, shown on the Ordnance Survey maps of 1850 and 1893 (Figs 2 and 3). It is almost certain that the associated steam-raising plant lay to the north-east of the excavation area, and remnants of historic fabric pertaining to these structures were captured by a measured survey carried out by local enthusiasts during the initial investigation of the site, allowing a reconstruction of the power arrangements in the bleachworks to be formulated (Plate 27). These remains comprised a small section of extant brickwork, which contained refractory brick and a portion of a large metal plate, which probably represents a damper, utilised as part of a flue system between a boiler and a chimney. This suggests that the chimney, and possibly an economiser, lay to the north of the boiler, which appears to have had its charging platform positioned in the north-west corner of the yard. This area is shown on historic mapping as an extension attached to the eastern wall of the bleachworks, and on the 1893 Ordnance Survey map a chimney appears to be located further to the east.
- 5.2.3 The discovery of well-preserved bases of at least eight bleaching tanks to the south of the engine house gives an indication of the internal arrangement of the complex, and has significant potential for future work and presentation of the monument to the wider public. The associated culvert would have served these tanks, providing a conduit for waste water discharging into the Bradshaw Brook.
- 5.2.4 The building that housed the bleaching tanks was served by a large yard on its eastern side, which presumably also afforded access to both the engine house and the boiler house. The presence of what appeared to be tramway tracks into the room containing the bleaching tanks from the yard, also demonstrates that access was provided to the main processing areas from the yard. It seems likely that materials were almost certainly stored in the range of buildings along the southern side of this yard, depicted on both the 1850 and 1893 Ordnance Survey maps (Figs 2 and 3).
- 5.2.5 The additional, machine-excavated trench to the west of the excavation area revealed what appeared to be the well-preserved floor of a large room. Whilst further investigation to elucidate the exact nature of these remains was not carried out, it nevertheless demonstrated that other parts of the site retain similar levels of preservation relating to the nineteenth-century bleachworks complex.

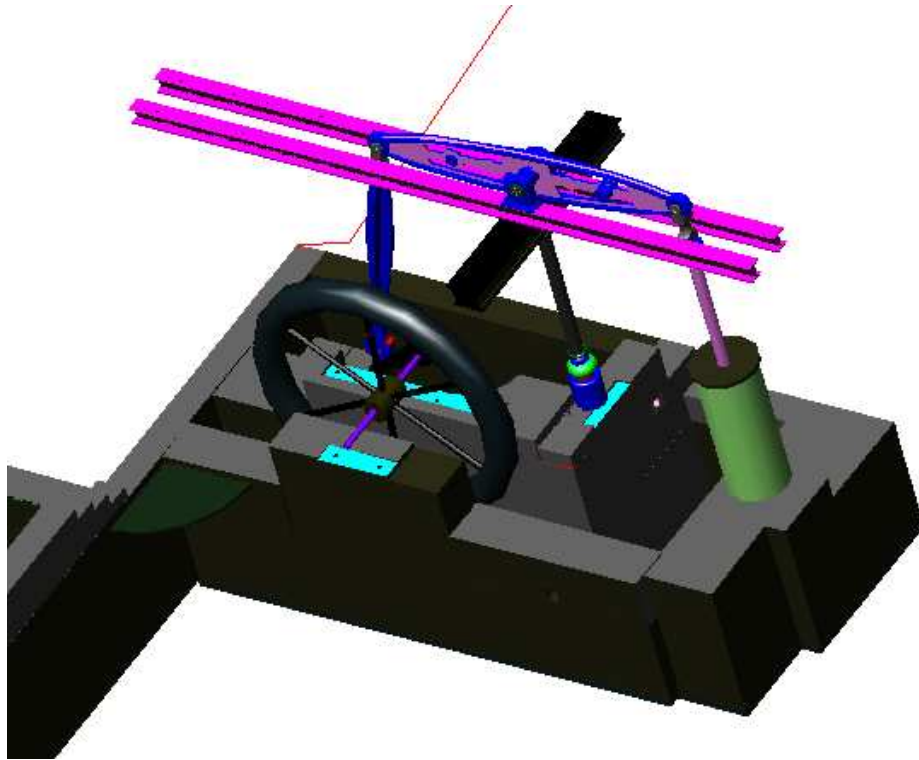


Plate 26: Extract of a measured survey and reconstruction of the beam engine by Ian Johnson

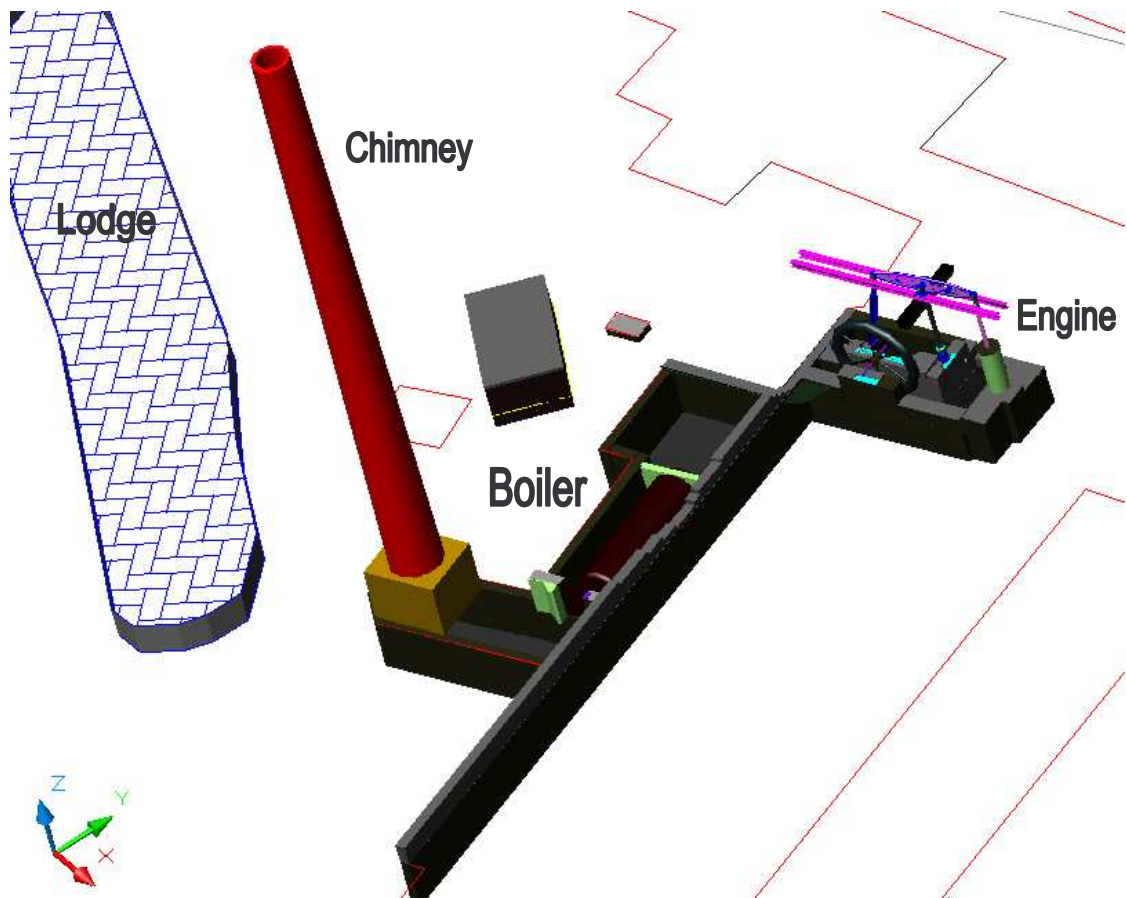


Plate 27: Extract of a measured survey and reconstruction of the bleachworks by Ian Johnson

5.3 PHASE 2: LATE NINETEENTH CENTURY

5.3.1 A second major phase of construction was undertaken prior to 1890, and most probably relates to one of the changes in ownership of the complex in the latter part of the nineteenth century. Whilst the Ordnance Survey map of 1893 clearly shows an expansion of the works (Fig 3), this was almost undertaken exclusively outside the present excavation area. However, a significant remodelling of the bleaching tanks appears to have been undertaken at this time, with the level of the tanks being raised significantly, and a new water-management system having been introduced. This is likely to have coincided with the rapidly developing mechanisation of all processes associated with the bleaching industry in the late nineteenth century, many of which were developed in the region (Mather and Platt 1958).

5.4 PHASE 3: EARLY TWENTIETH CENTURY

5.4.1 Only small-scale alterations appear to have been undertaken within the excavated part of the site during the early twentieth century, and these appeared typically to relate to drainage. The phase appeared to be defined by the introduction of frogged, machine-made brick as a building material, as it became widely available in the region at this time.

5.4.2 The major structural development observed within this phase was the remodelling of the platform to the south-east of the building. This appeared to represent good physical evidence for one of the major changes of the twentieth-century manufacturing industry; the introduction of road transport and distribution. This revolutionised access, warehousing, and available markets for most industries, with the small-scale and small distance movement of both raw-materials and finished products, becoming economically viable, although it is rarely recorded in sub-surface archaeological contexts.

5.5 PHASE 4: LATE TWENTIETH CENTURY

5.5.1 The site had been converted for use as a paint works by 1930, but most of the buildings had been demolished by 1970. Landscaping works carried out subsequently in response to issues of groundwater run-off and localised flooding is likely to have removed some buried structural remains immediately to the north of the excavated area, and the present reservoir has subsumed the northern end of the former bleachworks. However, the present investigation would not have been feasible without these works.

5.5.2 The monument now lies within a public park, and forms part of a wider landscape, which until recently has been considered largely as a 'wildlife-based' amenity. The inclusion of archaeological interests within the future management of the area should ensure that no further compromise to the monument is undertaken.

6. RECOMMENDATIONS

6.1 INTRODUCTION

- 6.1.1 The excavation has demonstrated clearly that well-preserved remains of the Tootill Bridge Bleachworks survive within the Seven Acres Park, despite extensive demolition during the twentieth century and the probable impact of subsequent landscaping works. The exposed remains, moreover, were of considerable archaeological interest, and demonstrated several of the processes undertaken within the bleachworks.
- 6.1.2 The project has also demonstrated that there is an appetite for community-based archaeological investigations within the local area, and that these can be undertaken successfully; whilst the site yielded very few artefacts, the structures revealed during the excavation elicited considerable interest. However, although the deposits are relatively shallow, they are sealed with a substantial deposit of colluvium and topsoil, which is generally waterlogged and laborious to excavate manually. The use of a mechanical excavator increased the success of the project markedly, and it is recommended that a similar approach is adopted with any future excavation.

6.2 RECOMMENDATIONS

- 6.2.1 There is clearly scope for further archaeological investigation, both at the site of the former Tootill Bleachworks and within the wider environs of Seven Acres Park, which has been shown from documentary research to have a rich history (UMAU 2009). The scope for future work can be seen to fall into three broad categories: non-intrusive investigation; excavation; and presentation.
- 6.2.2 *Non-intrusive investigation:* as an initial phase of any future fieldwork, some clearance of vegetation of the site of the bleachworks and its immediate environs would allow a more detailed topographic survey of all the upstanding structural remains on the site, or geophysical survey where there are no above-ground remains visible. Clearance could be carried out usefully along the bank of the Bradshaw Brook, for instance, which may help to locate the site of the medieval corn mill and the eighteenth-century cotton mill. Other known sites of archaeological interest in Seven Acres Park could also provide foci for future surveys, such as the site of Breightmet Hall.
- 6.2.3 Whilst the considerable body of historical data for other sites in the area collated already by The Friends of Seven Acres and members of Bolton Archaeological Society provides a firm basis for any future archaeological studies, topographic and geophysical surveys may assist in the identification of areas that have potential for buried remains.

- 6.2.4 **Excavation:** there is considerable potential for further archaeological excavation on the site of Tootill Bleachworks, which could be carried out as a community-based project, and usefully enhance the present understanding of the site. Research objectives, for instance, could focus on the character, extent and date of the stone-built bleaching tanks, or the watercourses associated with these tanks. Further investigation within targeted areas of the present excavation area may also channel the interests of locals wishing to undertake further unsupervised excavation to answer outstanding issues.
- 6.2.4 **Presentation:** the excavated remains of the Tootill Bleachworks provide opportunities for the interpretation and presentation of the site to the wider public. Most easily, this could be achieved by the production of a pamphlet, which could be displayed within the existing notice boards in the vicinity, and made available within the Wildlife Trust visitor centre; the centre could perhaps also house a small exhibition that explains the archaeological heritage of the nature reserve. In addition, purpose-built information boards could be placed within or adjacent to the exposed remains, allowing the visitor to see both the results of the excavation, and an explanation of the visible fabric.
- 6.2.6 A larger-scale presentation of the monument could include the re-excavation and consolidation of salient features, most notably the engine house and bleaching tanks, as has been achieved at Hodge Printworks (Plate 28). With appropriate associated signage, this would prove an invaluable educational resource for the area, presenting rare yet tangible physical remains of this important local industry.



Plate 28: Consolidated dye tanks at Hodge Printworks in Tameside

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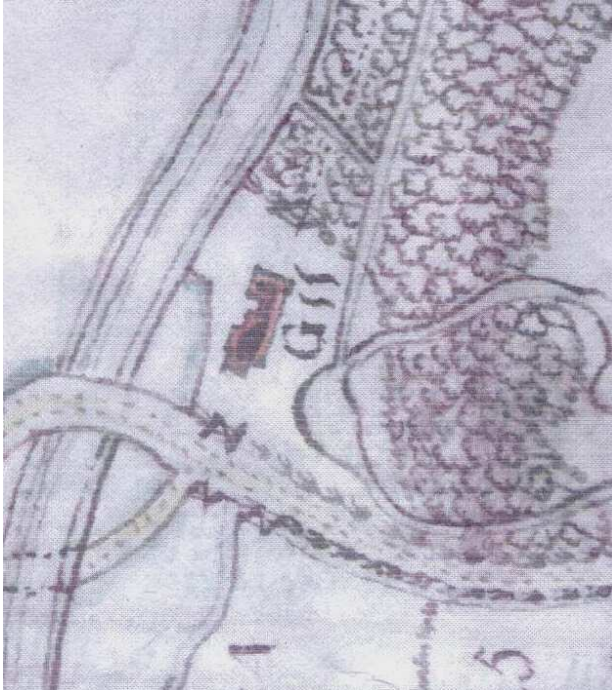
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APPENDIX 1: PROJECT DESIGN



Tootill Bleachworks,
7 Acres Park,
Bolton

**Archaeological Survey
Project Design
(Version 1.3)**

Tootill Bridge Mill shown on an estate plan of c 1764



**Oxford Archaeology
North**

September 2009

Proposals

The following updated Project Design is offered in response to a request from Mr B Farrell, Heritage Landscape Officer for Bolton Council, for an archaeological survey at the site of Tootill Bleachworks, in 7 Acres Park, Bolton.

1. BACKGROUND

1.1 LOCATION AND CIRCUMSTANCES OF PROJECT

- 1.1.1 The site of Tootill Bleachworks is situated in the Breightmet area of Bolton, Greater Manchester (centred on NGR SD 7375 0951). The site lies to the north of Bury Road (A58), on the east side of the Bradshaw Brook, in the southern part of 7 Acres Park (Plate 1). Whilst it may have been the location of Breighmet's manorial corn mill, which is referred to as early as 1257, the site is known to have been occupied by a water-powered mill by the 1760s. Historical research has revealed that the site has a complex history, with paper making being established in the 1770s, followed by bleaching and dyeing, and cotton spinning in the 1780s, and finally returning to use as a bleachworks in the nineteenth century. However, all buildings have since been demolished, although some of their foundations can still be seen.

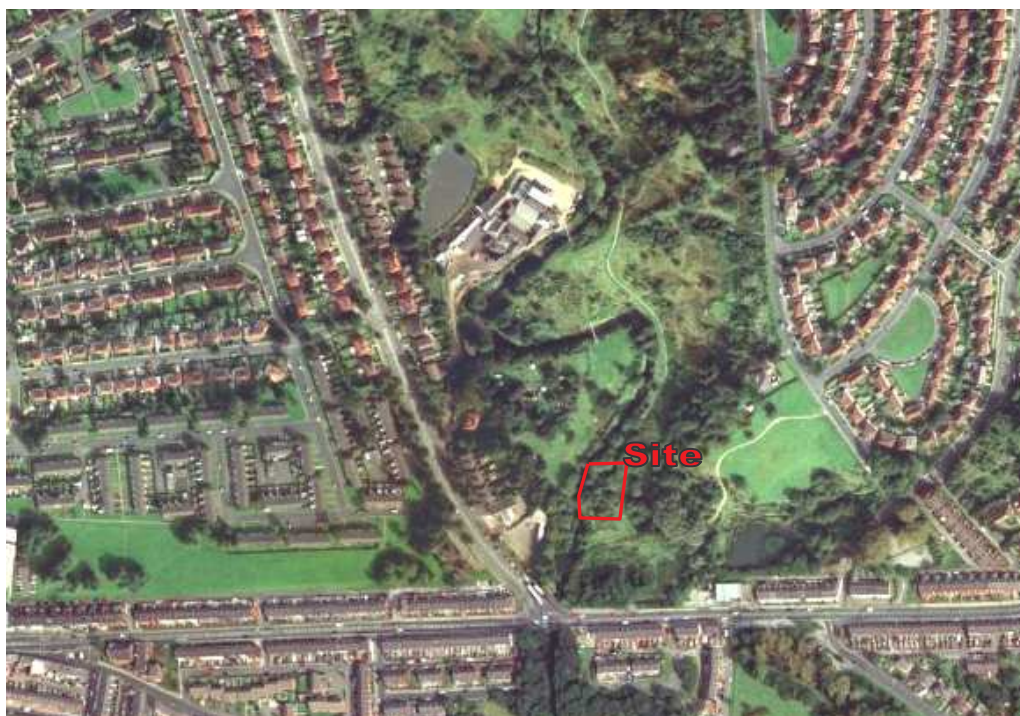


Plate 1: Recent aerial view of the site

- 1.1.2 A local group of enthusiasts has recently carried out some intrusive investigation of the site, exposing some structural remains of the former works. These indicate several phases of activity which, together with the other associated remains visible nearby, merit a detailed archaeological record to elucidate fully their character, extent and significance.
- 1.1.3 The scope for an appropriate scheme of archaeological survey of the site has been devised by Norman Redhead, County Archaeologist for Greater Manchester, and presented in a Project Brief (GMAU 19/1/09). Following discussions between the County Archaeologist for Greater Manchester, the Heritage Landscape Office for Bolton Council, and OA North, a provisional programme of work is proposed to address the specific requirements of the Project Brief.

1.2 OXFORD ARCHAEOLOGY

- 1.2.1 Oxford Archaeology is an educational charity (Registered Charity No 285627), and is Institute for Archaeologists Registered Organisation (No 17). OA has over 30 years of experience in professional archaeology, and can provide a professional and cost effective service. We are the largest employer of archaeologists in the country (we currently have more than 200 members of staff) and can thus deploy considerable resources with extensive experience to deal with any archaeological obligations you or your clients may have. We have offices in Lancaster, Oxford and Cambridge, trading as Oxford Archaeology North (OA North), Oxford Archaeology South (OA South), and Oxford Archaeology East (OA East) respectively, enabling us to provide a truly nationwide service.
- 1.2.2 OA North has considerable experience of the assessment, evaluation and excavation of sites of all periods, and has particular experience of industrial archaeology in the North West. Amongst the numerous projects that OA North have completed within Greater Manchester in recent years, those of particular relevance to the Tootill Project, include the survey, evaluation and excavation of the Cheadle Bleachworks, the evaluation of the Water Street Dyeworks, the excavation of the Adelphi Street Dyeworks, and the excavation of the Calprina Printworks near Stalybridge.
- 1.2.3 OA North has considerable experience of working with local communities and amateur groups. In particular, OA North has been involved in a number of Local Heritage Initiative (LHI) projects, which are projects sponsored by the Countryside Commission, and funded by Heritage Lottery, that have been based on considerable community involvement. This can range from surveys which incorporate training for the local groups, to major training excavation projects for volunteer groups. The following are some examples of community projects undertaken by OA North.
- **Skipwith Common:** OA North is presently working with the Friends of Skipwith Common, to undertake a survey of Skipwith Common, a lowland, wetland common to the south of York. The work is funded by Natural England.
 - **Muncaster Fell:** a survey of Muncaster Fell, West Cumbria, which comprised training members of the Eskdale Local History Society in survey and culminated with a publication of the results. This entailed a range of techniques from GPS based identification surveys, to detailed total station surveys of a deserted medieval settlement and also a probing survey of a Bronze Age funerary cairn.
 - **Ingleton:** an excavation and survey of a complex enclosed settlement at Ingleton, North Yorkshire, undertaken with the Ingleborough Archaeology Group, which comprised training and supervision to complete an intensive investigation of a rural Roman settlement site. This culminated with a high profile excavation which provided training for upward of a core of 10 people and more general training for 30 people from the local area.

1.2.4 OA North is also committed to Outreach and Public Relations. As an educational charity, OA seeks to promote an active public relations policy in relation to archaeology, while always considering the potential contractual or political sensitivity of the material released. It is widely recognised that well-organised and successful archaeological work can generate significant positive publicity and OA encourages clients to consider archaeology as a public relations asset. OA has a publications department that is experienced and fully equipped to provide general interest text and graphics for release to the press and general public in a wide variety of forms including display boards, leaflets and popular books. In certain circumstances it is possible to hold open days or install public viewing galleries on major sites. OA has considerable experience in the establishment of community based projects, and includes numerous training surveys and excavations. At Lathom, Lancashire, for instance, a programme of survey and excavation is being undertaken currently with a local volunteer trust, with training provided by OA, to discover the lost remains of the major fourteenth-century palace.

2. AIMS AND OBJECTIVES

2.1 ACADEMIC AIMS

2.1.1 The principle aim of the archaeological survey will be to record and assess the presence, extent, state of preservation, and significance of any archaeological remains within the study area, in accordance with the scope of works defined in the Project Brief, whilst engaging members of the local community in the project. The work will also assess the potential of the site for a further phase of community archaeological investigation.

2.2 OBJECTIVES

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

- to establish the character, extent and significance of the archaeological remains present on the site through survey and targeted trial excavation;
- to further elucidate the nature of the archaeological remains, enabling an understanding of the phasing and interpretation of the site;
- to introduce and train members of the local community in the principles and practicalities of archaeological investigation;
- to establish the potential of the area as a community resource worthy of a further stage of archaeological investigation;
- provide data that will demonstrate the educational potential of the site and an appraisal of the potential for future presentation.

3. METHOD STATEMENT

3.1 SUMMARY OF THE ARCHAEOLOGICAL SURVEY

- 3.1.1 It is proposed that the archaeological survey will be carried out as a single piece of fieldwork over a period of two weeks. The work will comprise the manual cleaning and survey of exposed archaeological remains, centred on the large stone machine beds that lie in the centre of the former bleachworks (Plate 2), followed by the targeted excavation of several trial pits. All work will be carried out using exclusively manual techniques; at no stage during the course of the project will mechanical excavators be employed.
- 3.1.2 The work will be carried out by a maximum of ten volunteers from the local community, who will receive tuition in the basics of archaeological survey, excavation, recording and interpretation. It is anticipated that the volunteers will have no previous experience of archaeological excavation, and will thus receive training from OA North staff in all of the tasks in which they will be participating. Training will include the correct and safe use of the hand tools that will be used during the course of the fieldwork. The volunteers will be supervised at all times by two competent members of OA North staff.



Plate 2: The exposed remains of stone machine beds

- 3.1.3 The programme of fieldwork outlined below has been designed to meet the overall aims and objectives of the project, and will also form the basis of a task-orientated risk assessment. This will be compiled by OA North Project Director, and will be site specific. A copy of the risk assessment will be forwarded to Bolton Council for their comment and approval prior to the commencement of the fieldwork.

3.2 FIELDWORK

- 3.2.1 **Preparation and Vegetation Clearance:** prior to the commencement of any work, a risk assessment will be compiled by the OA North Project Director. The initial element of the fieldwork will comprise the establishment of survey control, and an outline measured survey of the site. This data will then be overlain onto historic mapping to allow the key areas of archaeological interest on the site to be identified. In the light of this information, elements of the site will be cleared of scrub vegetation; it is not anticipated that any trees will be cleared during this process. Bolton Council, in consultation with the OA North project team will carry out the vegetation clearance. Bolton Council will also offer local advice on the land, and risk assess the fencing of the working area for the fieldwork.
- 3.2.2 Once the site has been prepared, but prior to commencement of the fieldwork, a meeting will be arranged to finalise the work programme with Heritage Landscape Office for Bolton Council and local community volunteers representatives, and the on-site arrangements for the provision of welfare facilities. A start date for the fieldwork will also be agreed, and the County Archaeologist will be notified.
- 3.2.3 **Cleaning and Survey:** exposed areas of the site will be cleaned manually using a range of hand tools, including mattocks, shovels, spades and trowels; at no stage during the course of the works will a mechanical excavator be employed. Where possible, all *in-situ* features or deposits, wherever possible, will be left intact to allow an measured to be completed.
- 3.2.4 The precise location of all archaeological structures encountered will be surveyed by EDM tacheometry using a total station linked to a pen computer data logger. This process will generate scaled plans within an AutoCAD system, which will then be subject to manual survey enhancement by local community volunteers. The drawings will be generated at an accuracy appropriate for 1:20 scale, but can be output at any scale required. Sections will be manually drafted as appropriate at a scale of 1:10. All information will be tied in to Ordnance Datum.
- 3.2.5 **Evaluation Pits/Trenches:** once the data from the survey of the above-ground remains has been collated and overlain onto historic mapping, informed decisions can be reached as to the number, size and location of the evaluation test pits or trenches. These will, however, be placed within the central section of the former bleachworks, where the presently exposed remains lie (Fig 1).
- 3.2.6 All excavation will be carried out using exclusively manual techniques. Spoil from the excavation will stored adjacent to the trench, and will be backfilled upon completion of the archaeological works.
- 3.2.7 Structural remains will be cleaned to define their extent, nature, form and, where possible, date. It should be noted that no archaeological deposits will be entirely removed from the site. It is not anticipated that excavation in any of the trenches or test pits will proceed below a depth of 1.2m, although should this be considered necessary, then the trench will be widened

sufficiently to allow the sides to be stepped in or battered back to a safe angle of repose.

- 3.2.8 All information identified in the course of the site works will be recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results of the evaluation will be recorded on *pro-forma* context sheets, and will be accompanied with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.
- 3.2.9 A full and detailed photographic record of individual contexts will be maintained and similarly general views from standard view points of the overall site at all stages of the evaluation will be generated. Photography will be undertaken using 35mm cameras on archivable black and white print film as well as colour transparency, and all frames will include a visible, graduated metric scale. Extensive use of digital photography will also be undertaken throughout the course of the fieldwork for presentation purposes. Photograph records will be maintained on special photographic *pro-forma* sheets.
- 3.2.10 On completion of the archaeological record, and following notification to the County Archaeologist, the site will be closed. The test pits or trenches excavated during the current programme of work will be backfilled manually, unless otherwise agreed with Bolton Council.
- 3.2.11 ***Finds policy:*** finds recovery and sampling programmes will be in accordance with best practice (following current Institute of Field Archaeologists guidelines) and subject to expert advice in order to minimise deterioration. OA has close contact with Ancient Monuments Laboratory staff at the University of Durham and, in addition, employs in-house artefact and palaeoecology specialists, with considerable expertise in the investigation, excavation, and finds management of sites of all periods and types, who are readily available for consultation.
- 3.2.12 Finds storage during fieldwork and any site archive preparation will follow professional guidelines (UKIC). Emergency access to conservation facilities is maintained by OA North with the Department of Archaeology, the University of Durham. Samples will also be collected for technological, pedological and chronological analysis as appropriate.
- 3.2.13 Human remains are not expected to be present, but if they are found they will, if possible, be left *in situ* covered and protected. If removal is necessary, then the relevant Home Office permission will be sought, and the removal of such remains will be carried out with due care and sensitivity as required by the *Burials Act 1857*.
- 3.2.14 Any gold and silver artefacts recovered during the course of the excavation will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act, 1996.

3.3 HEALTH AND SAFETY

- 3.3.1 OA North provides a Health and Safety Statement for all projects and maintains a Safety Policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (3rd Edition, 1997).
- 3.3.2 At the commencement of the work, all project team members will undergo a site induction, whereby they will receive instructions on relevant issues, such as how to enter excavation trenches and a 'toolbox talk'. The induction will also include an introduction to site health and safety procedures, and all participants be asked to read the relevant OA North documentation covering the risk assessment for the site. All participants will be required to sign an induction form, acknowledging that they have read and understood the health and safety documentation.
- 3.3.3 A maximum of ten volunteers will be allowed on the site at any one time, and all attendance will be strictly by prior arrangement. It is anticipated that all participants will be over the age of 16; volunteers between the ages of 8 and 16 may participate, but must be supervised at all times by a parent or guardian. No visitors will be allowed onto the archaeological site without the permission of the senior OA North member of staff. All visitors will be required to adhere to site safety rules, will be escorted by an OA North team member at all times.
- 3.3.4 All OA North staff will wear PPE at all times while on site; volunteers will be required to wear clothing appropriate to the task undertaken, including sturdy shoes or boots. The project team will be provided with information on the clothing requirements in advance of the fieldwork. Any volunteers wearing inappropriate clothing may be excluded from participating in certain tasks on site. All work will be supervised by two OA North staff members.
- 3.3.5 A signing in and out book will be maintained daily by OA North during the duration of the works.
- 3.3.6 Areas to be excavated will be scanned using a cable avoidance tool, as required. Service plans, if available, will be inspected prior to the start of any intrusive ground works.
- 3.3.7 OA North has professional indemnity to a value of £2,000,000, employer's liability cover to a value of £10,000,000 and public liability to a value of £15,000,000. Written details of insurance cover will be provided in advance of commencement.
- 3.3.8 Normal OA North working hours are between 8.30 am and 4.30 pm, Monday to Friday, though adjustments to hours may be made to maximise daylight working time in winter and to meet travel requirements. It is not normal practice for OA North staff to be asked to work weekends or bank holidays and should the Client require such time to be worked during the course of a project a contract variation to cover additional costs will be necessary.

3.4 OTHER MATTERS

- 3.4.1 Access to the site will be arranged via the Heritage Landscape Office for Bolton Council, or his representative.
- 3.4.2 Welfare and storage facilities will be provided on site for the duration of the fieldwork for the use of the OA North project team and community volunteers.
- 3.4.3 It is understood that Bolton Council will be responsible for the provision of a secure enclosed area for the archaeological work to take place within, and will also provide welfare facilities for the project team.

3.5 POST-EXCAVATION AND REPORT PRODUCTION

- 3.5.1 **Archive:** the results of the fieldwork will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*The Management of Archaeological Projects, 2nd edition, 1991*) and the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IFA in that organisation's code of conduct.
- 3.5.2 The paper and finds archive for the archaeological work undertaken at the site will be deposited with the nearest museum which meets Museums' and Galleries' Commission criteria for the long term storage of archaeological material (MGC 1992). This archive can be provided in the English Heritage Centre for Archaeology format, both as a printed document and on computer disks as ASCII files (as appropriate). The archive will be deposited within six months of the completion of the fieldwork.
- 3.5.3 Except for items subject to the Treasure Act, all artefacts found during the course of the project will be donated to the receiving museum.
- 3.5.4 A synthesis (in the form of the index to the archive and a copy of the publication report) will be deposited with the Greater Manchester Historic Environment Record, maintained by the Greater Manchester Archaeological Unit. A copy of the index to the archive will also be available for deposition in the National Archaeological Record in London. In addition, the Online Access to Index of Archaeological Investigations (OASIS) form will be completed, and a summary of the project will ultimately be published on their web site (<http://ads.ahds.ac.uk/project/oasis/>).
- 3.5.5 **Report:** four copies of a bound and collated final report will be submitted to the Client within six weeks of the completion of the fieldwork. Further copies will be sent to the Bolton Metropolitan Borough Council, Bolton Museum, and the Greater Manchester County Archaeologist, for inclusion in the Greater Manchester Historic Environment Record. The final report will include a copy of this project design, and indications of any agreed departure

from that design. It will include an historical background to the study area, an outline methodology of the investigation, and present, summarise, assess, and interpret the results of the programme of archaeological works detailed above. It will also include an assessment of any finds recovered from the evaluation trenching. In addition, recommendations for any further works and details of the final deposition of the project archive will also be made.

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

4. WORK TIMETABLE

- 4.1 The programme of fieldwork will be carried out over a two-week period. It is envisaged that the first week will be given over to the cleaning and survey of the exposed remains, together with the necessary tuition in archaeological principles. The excavation, recording and backfilling of the evaluation pit/trenches will be carried out during the second week.
- 4.2 A report will be submitted within six weeks of the completion of the fieldwork.

5. STAFFING PROPOSALS

- 5.1 The project will be under the overall charge of **Ian Miller BA FSA** (OA North Senior Project Manager), to whom all correspondence should be addressed. Ian has considerable experience and particular research interests in Industrial Archaeology.
- 5.2 The survey is likely to be directed by **Chris Wild Bsc** (OA North Project Officer). Chris is an highly experienced field archaeologist, who has a particular interest in Industrial Archaeology, and especially that of Greater Manchester.
- 5.3 Assessment of any finds from the excavation will be undertaken by OA North's in-house finds specialist **Christine Howard-Davis BA** (OA North Finds Manager). Christine has extensive knowledge of all finds of all periods from archaeological sites in northern England, and is a recognised expert in the study of post-medieval artefacts.

6. MONITORING

- 6.1 Monitoring meetings will be established with the Heritage Landscape Office for Bolton Council and the archaeological curator at the outset of the project. Monitoring of the project will be undertaken by the Greater Manchester County Archaeologist, who will be afforded access to the site at all times.

APPENDIX 2: CONTEXT LIST

Context	Description	Phase
001	Alluvial Silt	4
002	Boiler ash within 003	3/4
003	Engine bed, stone-built	1
004	Bleaching tank	1
005	Fill of 004	2
006	Brick built man-hole	3
007	Fill of 006	4
008	Bleaching tank, west of 004	1
009	Bleaching tank west of and adjacent to 008	1
010	Brick and stone built culvert	1
011	Primary fill of drain	1/2
012	Bleaching tank at south-east corner of building	1
013	Concrete floor	2
014	Stone and concrete floor below 013	1
015	Concrete and brick platform	3
016	Sett surface	1
017	Stone wall forming room around bleaching tanks	1
018	Stone flag floor surface north of 024	1
019	Hand-made brick manhole access	2
020	T-shaped stone structure, (part of 003)	1
021	Stone wall at west, same as 024	1
022	Stone wall at site entrance, only partially observed, heavily overgrown	1
023	Floor butting wall 022	2/3
024	Stone wall, main construction	1

APPENDIX 3: FINDS CATALOGUE

Context	Object no	Quantity	Material	Description	Period
2	1010	7	Glass	Window (5), clear vessel fragment, spectacle lens	19th-20th century
5	1018	3	Ceramic	Wall tile fragment	19th-20th century
7	1016	5	Ceramic	Floor tile; x3 white glaze and unglazed wall tile, white glazed stoneware (possible toilet bowl fragment)	19th-20th century
2	1009	1	Copper Alloy	Coin; 1884 Victorian penny	19th century
1	1006	1	Copper Alloy	Token; perforated bearing ligature TOOTHILL BRIDGE 55 BLEACH WORKS	
11	1008	1	Ceramic	Complete stoneware bottle; J HASLAM & SONS IVY SPRING TONGE NEAR BOLTON	19th-20th century
Backfill close to the north of stone wheel pit	1020	10	Iron	Spike with flattened tip, heavy square sectioned rectangular bars x2 (3cm/2cm) thick), fixing bolt with square nut and plate, crow bar, nuts (2), grid, thin plate with cut away for fixing	19th-20th century
Backfill close to the north of stone wheel pit	1021	6	Copper Alloy	Spools, bobbin shaped perforated	19th-20th century
2	1003	86	Iron	Thin walled vessel x 79 (bucket?), bolt, nails (2), machine cog, nuts, strip	19th-20th century
2		1	Lead	Strip	19th-20th century
Fill of culvert	1001	10	Ceramic	Bungs	19th-20th century
u/s	1000	3	Iron	Heavily corroded objects (unidentifiable, likely to be nails)	19th-20th century

2	1004	1	Lead coated iron	Axe blade?	19th-20th century
2	1002	14	Iron	Spade fragment, strips (7), thin sectioned concave bar, nails (3), thin walled tool handle, small cord pulley fixing plate	19th-20th century
11	1007	14	Ceramic	Bungs	19th-20th century
5	1019	3	Iron	Large spike, nails (2)	19th-20th century
2	1012	1	Textile	Cord	19th-20th century
2	1014	1	Slate	Decayed roof	19th-20th century
2	1011	1	Iron	Nail	19th-20th century
2	1013	1	Textile	Desiccated leather	19th-20th century

ILLUSTRATIONS

FIGURES

Figure 1: Location map

Figure 2: Extract from the Ordnance Survey 6" to 1 mile map of 1850, showing location of excavated areas

Figure 3: Extract from the Ordnance Survey 25" to 1 mile map of 1893, showing location of excavated areas

Figure 4: Detailed plan of the excavated area



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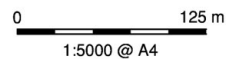


Figure 1: Site location



Figure 2: Extract from the Ordnance Survey 6": 1 mile map of 1850, showing location of excavated areas

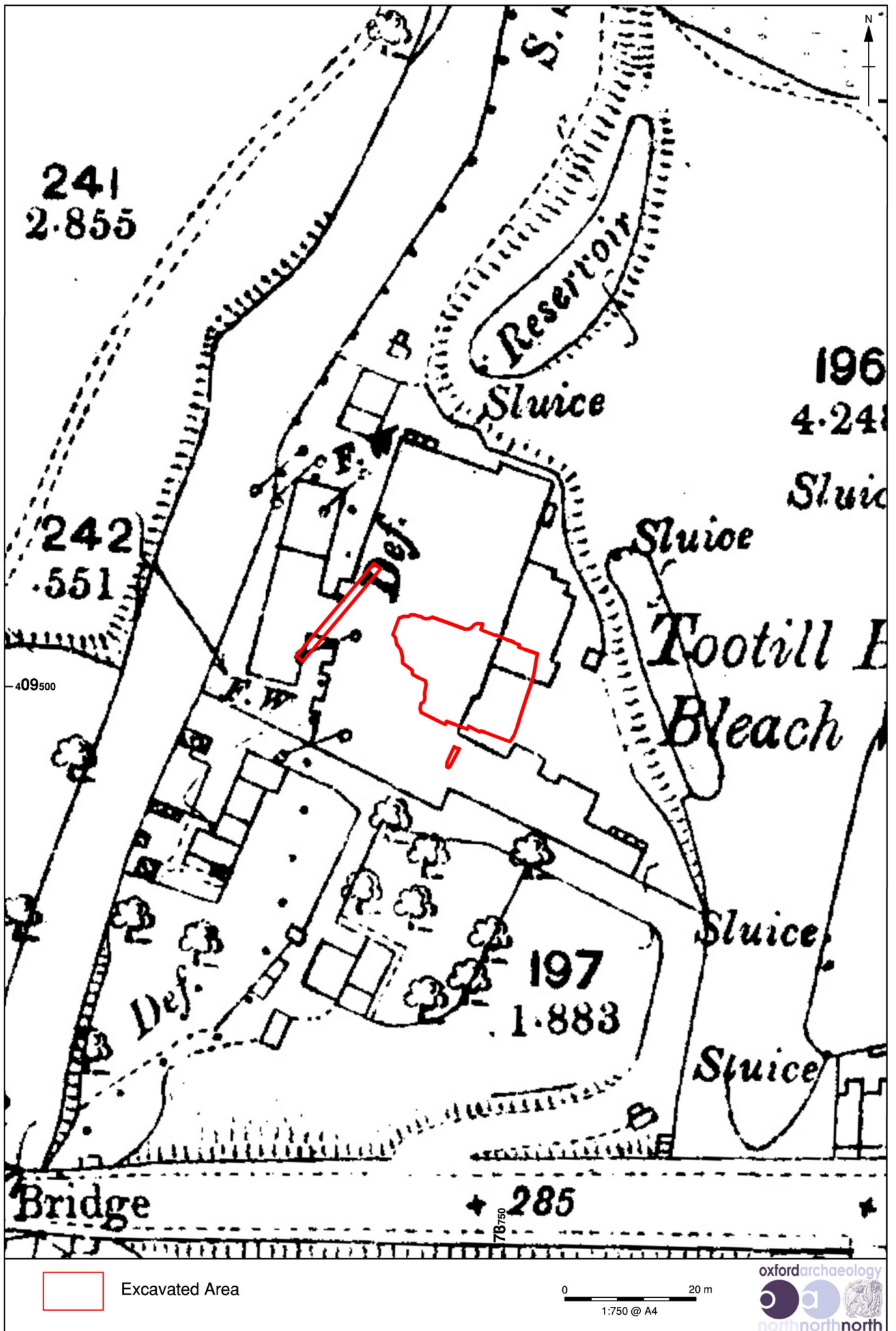
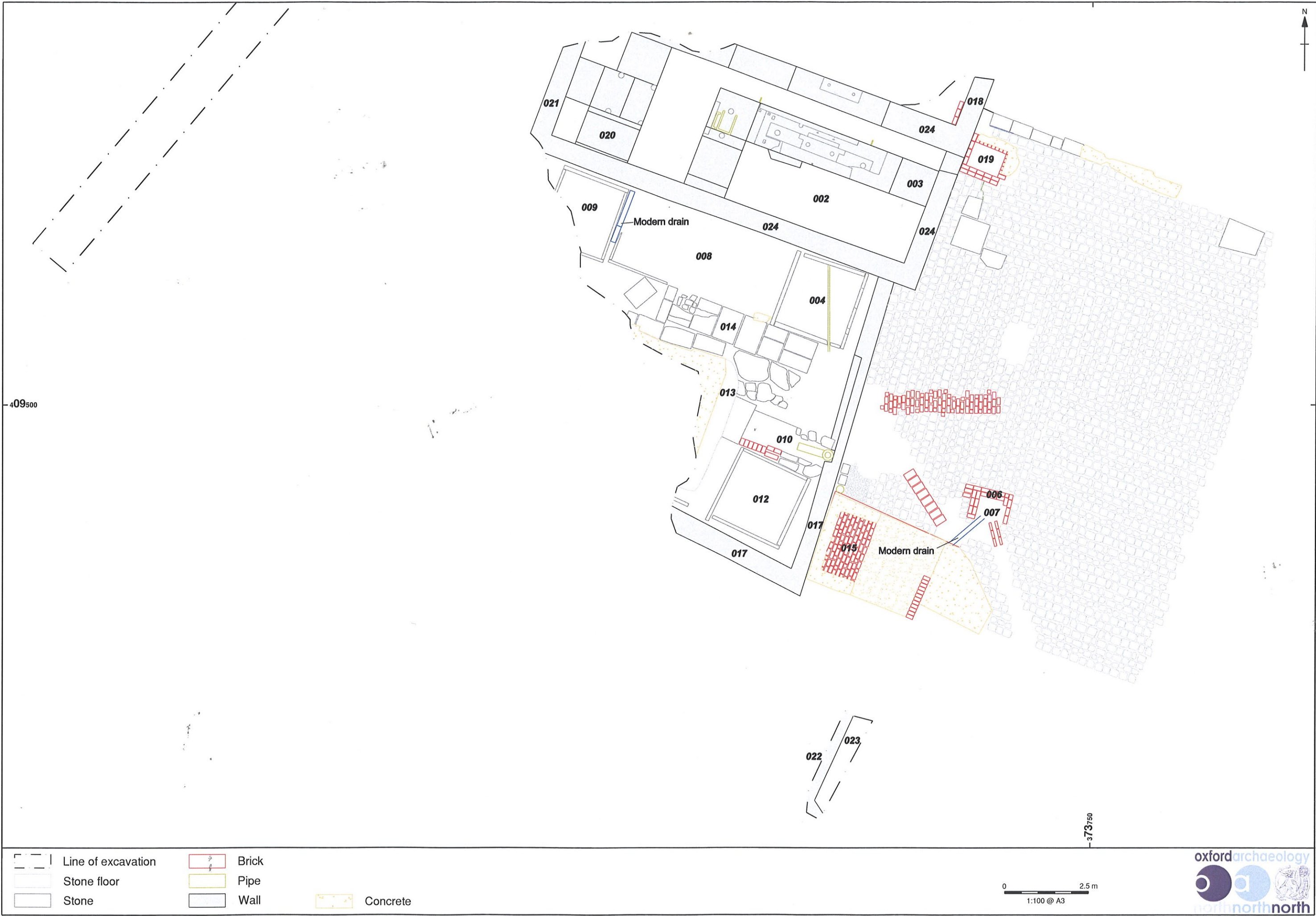









Figure 3: Extract from the Ordnance Survey 25": 1 mile map of 1893, showing location of excavated areas



- | | | | |
|---|--------------------|---|----------|
|  | Line of excavation |  | Brick |
|  | Stone floor |  | Pipe |
|  | Stone |  | Concrete |
| | |  | Wall |

0 2.5 m
1:100 @ A3

Figure 4: Detailed plan of the excavated area