Heritage Asset Recording

Paddle and Rymer Weirs on the Thames



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Paddle and Rymer Weirs on the Thames

Heritage Asset Recording

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Table of Contents

Summary 1

1 Introduction 2

1.1 Background 2

1.2 Aims and objectives 2

1.3 Methodology 2

2 Historical Background 3

2.1 Improvements to navigation on The Thames and the creation of a system of locks 3

3 Technology and Significance of Paddle and Rymers 4

3.1 Paddle and rymer weirs: a technological summary 4

3.2 Significance of paddle and rymer weirs 4

4 Description and Outline History of Individual Sites in Current Study 5

4.1 Radcot Weir 5

4.2 Northmoor Weir 6

4.3 Mapledurham Weir 7

4.4 Blakes Weir 9

4.5 Molesey Weir 9

5 Conclusion 11

Appendix A. Bibliography 12

Appendix B. Paddle and Rymer Weir Operations 13

Appendix C. Extract from Thames Valley Villages Vol 1 by CG Harper (1910) 14

List of Figures

Fig. 1 Site location and 1899 2nd Edition OS Map; Radcot Weir

Fig. 2 Plan of Radcot Weir

Fig. 3 Site location and 1899 2nd Edition OS Map; Northmoor Weir

Fig. 4 Elevation and section of Northmoor Weir

Fig. 5 Site location and 1879 1st Edition OS Map; Mapledurham Weir

Fig. 6 Plan of Mapledurham Weir

Fig. 7 Site location; Blakes Weir

Fig. 8 Section through Blakes Weir

Fig. 9 Site location and 1865 1st Edition OS Map; Molesey Weir

Fig. 10 Partial elevation and section through Molesey Weir

List of Plates

Plate 1 Racdot Weir, facing north west

Plate 2 Radcot Weir, facing north

Plate 3 Radcot Weir, scarfed beam for rymers

Plate 4 Radcot Weir, paddles

Plate 5 Northmoor Weir, facing south

Plate 6 Northmoor Lock, facing north west

Plate 7 Northmoor Weir, facing north east

Plate 8 Northmoor Weir, facing west

Plate 9 Northmoor Weir, paddles

Plate 10 Mapledurham Weir, facing east

Plate 11 Mapledurham Weir, paddles and rymers

Plate 12 Mapledurham Weir, paddles and rymers

Plate 13 Mapledurham Weir, walkway facing east

Plate 14 Mapledurham Lock, facing north

Plate 15 Blakes Weir, facing south east

Plate 16 Blakes Weir, facing south east

Plate 17 Blakes Weir, paddles

Plate 18 Blakes Lock, facing east

Plate 19 Molesey Weir, facing north west

Plate 20 Molesey Weir, radial gate weir facing south

Plate 21 Molesey Weir, paddle and rymer weir facing north

Paddle and Rymer Weirs on the Thames

Summary

Oxford Archaeology (OA) was asked by Atkins Ltd, acting on behalf of The Environment Agency, to carry out a programme of heritage asset recording on five paddle and rymer weirs on the River Thames (and Kennet), which are to be replaced. The weirs recorded are those at Radcot, Northmoor, Mapledurham, Blakes and Molesey. OA previously undertook a similar piece of recording on Shepperton 'B' Weir on the River Thames in Surrey.

The structure of each of the weirs is substantially, and in some cases entirely, modern but the general mode of operation of the weirs forms part of long tradition which stretches back to the medieval period and they therefore contribute to the historic environment. The aim of the project was to investigate and record the structures prior to their replacement or alteration. The work concentrated on the structures' construction, history, use, phasing and how they fitted into the overall operations of the River Thames.

Each of the structures forms an element in the historic character of the surrounding area and they help to demonstrate the technology and evolution of the navigation improvements on the River Thames.

1 INTRODUCTION

1.1 Background

1.1.1 Oxford Archaeology (OA) were commissioned by Atkins Ltd, acting on behalf of The Environment Agency, to carry out a programme of heritage asset recording on five paddle and rymer weirs, on the River Thames (and Kennet), which are to be replaced. The weirs which have been recorded are those at Radcot, Northmoor, Mapledurham, Blakes and Molesey. The work will form part of a wider programme of archaeological investigation, including trial trenching at Radcot but the current report only covers the above-ground recording.

1.1.2 This report follows an *Archaeological Assessment of the Thames Paddle and Rymer Weirs* in 2002, an *Audit of the Heritage Assets of the Non-Tidal River Thames* in 2004 and a *Paddle and Rymer Weir Heritage Review* prepared by Michael Trueman for the Environment Agency in 2008.

1.2 Aims and objectives

1.2.1 The main aim of the project was to investigate and record for posterity the weir structures in advance of their replacement or alteration. The work has concentrated on the structures' construction, history, use, phasing and how they fit into the overall operations of the River Thames. The other main aim was to create an ordered archive of the work which will be deposited with the Environment Agency Archives.

1.3 Methodology

1.3.1 The archaeological recording of the five weirs was undertaken at a combination of Levels 1 and 2 as defined by English Heritage in *Understanding Historic Buildings: A Guide to Good Recording Practice (2006).* At each of the weirs the modern elements were recorded broadly at Level 1 while any older elements which appear to survive from a previous structure were recorded at Level 2.

1.3.2 Level I and Level II are both relatively low levels of recording. Level I is *'essentially a basic visual record, supplemented by the minimum of information needed to identify the building's location age and type. This is the simplest record'* (EH, 2006).

1.3.3 The guidelines state that Level II is *'a descriptive record made in circumstances similar to those of Level 1 but when more information is needed. It may be made of a building which is judged not to require any fuller record.... A plan and sometimes other drawings may be made but the drawn record will normally not be comprehensive.'*

1.3.4 The ***photographic record*** was undertaken using 35 mm film (black and white prints) and digital photography. It included both general views of structures and specific details. Digital images were used to provide illustrations to the final report.

1.3.5 The ***drawn record*** comprised of existing elevations and plans provided by Atkins Consultants Ltd. Descriptive annotation was added to indicate construction, evidence relating to the structure's use and any features of historical interest. The recording followed IFA standards and guidelines using conventions outlined in *Understanding Historic Buildings: A Guide to Good Recording Practice* (English Heritage 2006).

1.3.6 The ***written record*** (the final report) complements the photographic record and includes a description of the fabric and features and an analysis of their construction, function and development and relationship to other features on the river. The written record also

includes a history of the use of paddle and rymer weirs on the Thames as well as a limited map regression and individual histories of each weir.

2 Historical Background

2.1 Improvements to navigation on The Thames and the creation of a system of locks

2.1.1 Early history and flash locks

2.1.2 The River Thames has been used for navigation and informal exploitation through mills and fish traps for centuries. Mill owners would create a weir across the river to form a large head of water which would power their mill. This of course created an obstruction for boats navigating along the river and the solution were 'flash locks' which incorporated a number of removable paddles within the weir retaining the water. When a boat needed to go downstream a number of these paddles could be removed and the boat would pass over the weir in a 'flash' of water. Boats going upstream would have to be winched up and due to the vast quantity of water which would have been lost through removing the paddles, it is likely that at some weirs the mill owner would also have used the winch for boats going downstream. A description from 1910 of the operations of a flash weir is included at Appendix C.

2.1.3 Flashlocks of this type are known to have been used in the medieval period and they are documented on the Thames from at least 1295. In this period there were a number of statutes and Acts designed to rid the Thames of anything perceived as obstructions to navigation such as mills and weirs. These appear to have had limited success and it is ironic that some of these weirs would have improved navigation in the more shallow parts of the river through raising the water level.

2.1.4 Flashlocks are of direct relevance to the current study because the technology they employed evolved into and is shared by the paddle and rymer weirs which have been recorded here.

2.1.5 Summary of the creation of a system of Thames locks

2.1.6 The formally sanctioned system of locks and weirs that were constructed to make it easier to navigate evolved gradually from the 17th century. This system was largely based on the use of pound locks, the earlier ones of which were timber lined below the water level with sloping turf banks on the upper parts, which were safer and used far less water than the earlier flashlocks which they gradually replaced. This was not a quick or easy process however as although the flashlocks were hugely inefficient and created many difficulties they provided an income, through tolls, to their owners and it was not until the early 20th century that the last ones were finally removed.

2.1.7 The earliest official locks were constructed in the 1630s to the south of Oxford by the Oxford to Burcot Commission, a body created earlier in the century to improve conditions for navigation on the river. In the mid 18th century a further body was created, The Thames Navigation Commissioners to improve other stretches. Its powers were initially limited but in 1770 they were increased significantly and in the following decades the River's navigability was enhanced with much larger groups of locks, intended to benefit from the canal-building boom and the industrial revolution which relied on the greatly expanding navigable waterways network.

2.1.8 New groups of locks were constructed in several phases in the last decades of the 18th century and the first half of the 19th century. The usual pattern in this period was for a

weir across the main channel and a pound lock located in a new cut. These were sometimes located at existing mill weirs and sometimes at entirely new sites.

2.1.9 These improvements divided into several distinct phases: between 1772-3 locks were built between Sonning and Maidenhead; between 1778 and 1789 a series was constructed between Dorchester and Reading and between 1790 and 1791 locks were added between Lechlade and Oxford. Further improvements were undertaken between 1798 and 1810 at Culham and Romney and between 1811 and 1815 there were a wave of works undertaken by the City of London Corporation to enhance the navigation below Staines.

2.1.10 In 1866 responsibility for the whole length of the Thames passed to a new, single body, The Thames Conservancy Board, which took control of the large majority of the weirs and locks. In 1878 its financial position was greatly strengthened by a Act of Parliament which forced the six London water companies to pay revenue to the Board in return for taking water from the river. Large scale improvements followed this and these included the creation of a new series of locks in the last decade of the 19th century, between Lechlade and Oxford.

3 Technology and Significance of Paddle and Rymers

3.1 Paddle and rymer weirs: a technological summary

3.1.1 A weir is a barrier across a waterway, intended to divert a flow into a particular channel, possibly to catch fish or power a mill, or to maintain a certain water level along a given stretch (Trinder 1992). Weirs generally differ from dams due to them allowing a flow of water over their top. The Thames weirs reduce the risk of widespread flooding to properties along the river by regulating the flow of water.

3.1.2 The two principal weir types are fixed crest weirs and moveable weirs where the sill height can be varied between different times of year and to reflect different conditions. There are several types of moveable weir, including the vertical gate, moveable frame, radial and roller gate but the structures which form the focus of the current study are paddle and rymer weirs.

3.1.3 As referred to above the technology employed in the paddle and rymer weir is shared by (and evolved from) the flashlock which is known to have been used on the Thames since the medieval period. The key difference between the structures in the current study and the paddle and rymer flashlock, of which no functioning or intact examples survive[1], is that the surviving weirs are associated with pound locks to lower and raise boats.

3.1.4 A paddle and rymer weir consists of the rymers, removable upright bars, which are slotted into a horizontal base plate fixed to the river bed. The rymers are fixed in place by a horizontal upper beam and the removable wooden paddles are slotted between them. The paddles are stacked vertically depending on the level of the water. These are held in place by the simple flow of the water and, for the most part, are removed one by one to control the flow and level.

3.2 Significance of paddle and rymer weirs

3.2.1 The structures in the current study are very largely of 20th century date but the technology employed within them follows a much older tradition and they are therefore part of the historic environment, particularly due to many examples of this weir type having been lost. In the 19th and 20th century many paddle and rymer weirs were altered or replaced by

1 Fragmentary remains do survive at Eynsham and Hurley

buck gates (particularly in the 1920s and 30s), radial gates (in the 1960s and later) and flap gates from the 1980s.

3.2.2 Partly due to a greater recognition of these types of weirs as heritage assets the existing paddle and rymers are now frequently replicated, rather than replaced with a new type of weir, when the structures are upgraded.

3.2.3 An assessment of the significance of the paddle and rymer technology, both in general terms and of individual sites was undertaken by Michael Trueman in 2002 for the Environment Agency and English Heritage. Michael Trueman's assessment showed that in 2002 thirteen paddle and rymer weirs remained in operation at eleven sites and fragmentary remains of two paddle and rymer flashlocks also survived.

3.2.4 The 2002 assessment considered that *'possibly the best preserved of the original constructions are those at Streatley Mill (of 1929) and Goring Mill (of 1937)'*. These are small weirs however and the report adds that *'Rushey is perhaps the best example of a P&R weir that fully spans the river channel'.* These three weirs have all been listed Grade II since the 2002 report.

3.2.5 Trueman considers ***Radcot*** to be of local/regional significance. Its interest is lessened by the fact that much of the structure was replaced in 1993 and that its group value is also reduced by the replacement of the lock-house in 1986. ***Northmoor*** is assessed to be of regional interest and to have a higher group value because it retains its original 1894 lock and lock-house. In addition although the weir was rebuilt in 1995 the original sill, gangway and railings were reused. ***Blakes*** is considered to be of local interest; is limited by the fact that it was entirely rebuilt and similarly ***Mapledurham*** is also of local interest due to it being small and altered. **Molesey** is considered to be of regional interest partly due to its long span.

4 Description and Outline History of Individual Sites in Current Study

4.1 Radcot Weir

Grid Reference SP29580028

4.1.1 ***Introduction:*** Radcot Lock is located approximately 1.5km north west of the small village of Radcot in rural Oxfordshire (Fig. 1). The river flows in an easterly direction around a small island. The lock is situated to the south in the smaller cut channel and the lock-house is immediately to the north. The weir is situated in the main channel on the north side of the island and spans its full width (Plate 1).

4.1.2 ***Historical Background:*** The earliest documentary reference to a weir at Radcot is from 1429 when there was a watermill and fishery in this area. It is not known how the location of this early weir relates to the modern structure surviving today. In 1746 the weir and flashlock at Radcot (at that time called Beck's although also known as Clarke's and Buck's) was noted as being free of tolls (Thacker 1920). A Mr Chymist is recorded as owning Radcot Weir in 1789 and then in both 1791 and 1793 tolls of 5 s were being imposed on 60-ton barges (Thacker 1920).The lock is described in a folio of 1794 as: 'a rude railing stretches across the stream from a group of willows on one side, to a bank with two thatched habitations on the other: of singular form and peculiar neatness. The inhabitants emply their industry in two elements: to till the earth, and to fish the water' (Thacker).

4.1.3 In 1868 Radcot Weir was removed to allow the widening of the waterway and then a new lock and weir at Radcot was opened in 1892 as part of the Thames Conservancy Board's

improvements. John Williams was appointed as the first lock keeper in February 1893 and when he retired in 1910 he was replaced by a man called Almond.

4.1.4 In 1993 the rymer weir was renewed and much of the older structure, including the gangway, railings, paddle racks and rymer beam, were replaced. The lock-house at the site had previously been replaced in 1986 after the old one suffered damage from subsidence.

4.1.5 The 1876 1st edition Ordnance Survey map shows no weir on the site of the existing paddle and rymer weir but an early weir can be seen to the west adjacent to Old Man's Bridge, known as Harper's Weir. The 1899 2nd edition OS map shows the lock and weir as they exist today with the lock island and north and south channels (Fig. 1).

4.1.6 ***Description:*** Radcot Weir is approximately 34.59m in length, 4.57m wide and has a fall of 1.48m although depth varies across the channel. Some sections are as deep as 1.54m, where three paddles are used, and some are as shallow as 1.1m deep, using two. The structure rests on concrete winged revetments with "Kee Klamp" and welded wire mesh barriers above on either bank and timber piling with large rubble and concrete bags in the bed of the river to support the concrete sill and base plate. The weir is made up of three steel riveted A-frames and has a narrow walkway, constructed with wood and surfaced with a steel grid and railed on the west side (Fig. 2). The paddle and rymer structure is located on the east side of this (Plate 2). A large scarfed wooden rymer beam, approximately 20cm by 20cm, is bolted to the A-frame on the east side of the walkway and the rymers are slotted into this (Plate 3).

4.1.7 The weir can accommodate 33 paddles. The paddles are simply made with a post nailed to a boarded paddle measuring approximately 60cm by 52cm (Plate 4). The rymers taper towards the top with stopped chamfers and are painted alternately in green and grey. The posts of the paddles are also painted in green and pale blue. The two paddles racks at either side of the weir are constructed from "Kee Klamp" tubular metal.

4.1.8 The weir is not visible from the lock but can be seen on the approach to the lock from the west side and forms part of the lock island setting.

4.2 Northmoor Weir

Grid Reference SP43150211

4.2.1 ***Introduction:*** Northmoor Lock lies close to the Lambourn Downs, a part of the North Wessex Downs Area of Outstanding Natural Beauty. The weir is located adjacent to the lock approximately 1.2km south east of Northmoor village and 10km south west of Oxford (Fig. 3). The lock island is located within the River Thames, which flows in a northerly direction towards Oxford. The weir structure lies between the southern side of the lock island and the east bank of the Thames (Plate 5). The lock and lock-house (Plate 6) are accessed by a track that runs from the village of Appleton approximately 1km to the south. Northmoor is one of the most remote lock and weirs on the River Thames and is connected to Northmoor village by a footpath. The weir is a means of crossing the river but is not a right of way.

4.2.2 ***Historical Background:*** Northmoor was described as a 'wholly modern station' by FS Thacker in 1920, without any documentary evidence of early weirs or locks on the site. The lock and weir was opened in January 1896 and formed part of the improvements undertaken in the last decade of the 19th century by the Thames Conservancy Board to improve the stretch of the river between Oxford and Lechlade.

4.2.3 The structure replaced Hart's Weir, or Ridge's Weir, about a mile upstream. In 1994 -95 the weir was rebuilt by the National Rivers Authority with new frames and the addition of a pedestrian footbridge and fishweir. The sillbeam, gangway and railings were carefully reused from the previous structure (Trueman 2002). The old wooden paddles and rymers were replaced in glass fibre (the only weir with these) and, although a recent lock, it follows the early pattern of manually operated wood beam pound locks.

4.2.4 The site retains its original 1894 lock and lock-house.

4.2.5 The 1899 2nd edition OS map shows the weir and the lock island as they exist today with east and west channels and the lock-house on the west bank (Fig. 3).

4.2.6 ***Description:*** The weir structure spans the river and rests on concrete winged revetments (Plate 7). It is 34.61m in length by 4.56m wide and has a fall of 1.24m. It is made up of three trapezium shaped steel frames, which sits on two metal sills over timber bearers and thick metal piles in the river bed. Under the frame is a stepped concrete sill to which the metal base plate is attached. Part of the original 19th century structure still survives at Northmoor in the form of re-used metal sill and gangway.

4.2.7 The cross beams of the frame hold a boarded walkway flanked by well built, stained wooden barriers on the north side. On the south side, a gangway sits on supports cantilevered from the top of the frame (Plate 8). This is accessed through a gate and has a well built, stained wooden barrier on the south side. Both the walkway and the gangway have an asphalt surface.

4.2.8 In between the walkway and the gangway is the paddle and rymer structure, which has 36 bays for paddles between its rymers (Fig. 4). The centre of the channel is deeper and bays hold up to three paddles. The rymers are fixed to the rymer beam, which is bolted to the cross beams of the frame structure. The rymers taper towards the top with stopped chamfers and are painted alternately dark green and grey. The paddles are simply made with a post nailed to a boarded paddle, measuring approximately 58cm by 53cm (Plate 9), and are painted dark green and grey. There are two timber paddle racks which are likely to date to the last refurbishment in 1998.

4.2.9 In recent years, the lock and weir setting has undergone enhancements to help improve the appearance and match it more closely to its 19th century appearance. A piece of the original sill with part of a rymer are on display next to the foot bridge. The weir forms a part of the historic lock island setting and is an element in its overall character as well as providing access to the island.

4.3 Mapledurham Weir

Grid Reference SU66857680

4.3.1 ***Introduction*** Mapledurham Weir is located in rural Berkshire near the village of Mapledurham and approximately 5km north west of Reading town centre. The Thames flows in a south easterly direction from the lock and weir complex. The paddle and rymer weir, or Weir 'E', is one of six weirs in this complex which spans the river from the lock island on the south side to the disused mill island on the north side. The other weirs are Weir 'A' and 'B', which are radial gate weirs, Weir 'C', a fixed crest weir with a line of lasher boards, Weir 'D', which has two bottom hinged tilting gates and Weir 'F', an overfall (Plate 10).

4.3.2 ***Historical Background:*** Mapledurham Mill dates back as far as the Domesday Book of 1086, one of the earliest recorded on the Thames, and it is likely that the weir was connected to it then. The earliest reference to the weir is from the time of Edward I

(1239-1307) as the mill was attached to the property of Mapledurham House (Thacker 1920).

4.3.3 There are further references to Mapledurham Weir from the 16th century but it was only in the late 18th century that the site was significantly improved with the addition of a pound lock. Mapledurham formed part of the works undertaken between 1778 and 1789 by the Thames Navigation Commissioners between Dorchester and Reading (Kemplay, 2000). The lock was added in 1778, adjacent to the old flash weir that served Mapledurham mill.

4.3.4 The lock, which was initially called Purley Lock due to the parish in which it is located, was constructed of fir rather than masonry and although a watch box was added in 1798 there was no lock-house until 1816 (Kemplay, 2000). In 1832 the lock was reported to be in dangerous condition (Thacker 2000) and it was then rebuilt in both 1868 and 1888 (Trueman, 2002).

4.3.5 A new and much larger pound lock was constructed in 1908 alongside the original 18th century lock and in 1923 the weir was renewed. The existing weir structure is understood to essentially date from the 1923 works although its appearance has been altered by the addition of the modern upper beam, access walkway and railings. The lock-house dates from 1931 and in 1955/6 Mapledurham became the first lock on the river to benefit from the replacement of the traditional balance beam from the lock gates with a new system of electrically controlled gates and sluices. In 1973 Mapledurham was further modified to the use of hydraulically controlled gates rather than electrical. In 1990 it was renewed and modified once again.

4.3.6 The 1879 1st edition OS map for the area shows a weir with two large sluice gates spanning the channel between the lock island and Mapledurham Mill (Fig. 5). By the time the 1899 2nd edition OS map was drawn, it appears that large walkways had been added to the weir on the east and west sides between the islands and the sluice gates. The lock island appears the same.

4.3.7 ***Description:*** Mapledurham Weir is a partial width weir in a complex of six weirs. It is located between Weir 'D' and Weir 'F' (see above) and is separated from these structures by concrete bullnose piers, on which the structure sits (Fig. 6). It measures 7.62m in width, accommodating twelve paddle and rymer bays, each 1.81m (three paddles) deep (Plates 11 & 12). The structure includes a steel grid walkway with “Kee Klamp” handrails above, which spans the complex from the lock island and by which all the weirs are accessed. The walkway on the west side, which runs east to west, has a surface of asphalt and appears older than that steel walkway which runs north west to south east from the west sluice gate to Weir 'E'. The walkway provides access to the paddles and rymers for operation by means of six steel steps (Plate 13). The paddles and rymers are located in a gap in the centre of the walkway. The rymer beam is a large timber member bolted to the concrete piers at either side and the rymers are slotted into this.

4.3.8 The weir rests over a stepped concrete sill to which the metal base plate is attached. Rymers taper towards the top with stopped chamfers and are painted dark green and grey. The paddles, which comprise of posts nailed to boards of approximately 60cm x 56cm, are painted dark green and grey. The east side of the walkway features a timber paddle rack.

4.3.9 The paddle and rymer weir is a relatively small part of Mapledurham Weir as a whole. It makes up part of a large weir complex that incorporates varied technologies showing how water is managed on the River Thames and it therefore contributes to the overall understanding of the evolution of this weir. The paddle and rymer weir however, is in

poor condition and its appearance has been greatly altered in recent years, reducing its value as a heritage asset. It is inaccessible to the public.

4.4 Blakes Weir

Grid Reference SU72557347

4.4.1 ***Introduction:*** Unlike the other weirs, Blakes Weir is located on the River Kennet in Reading, Berkshire (Plate 15). The River Kennet is administered as if it were part of the River Thames and is owned and managed by the Environment Agency. It is approximately 3km east of the town centre close to Blakes Lock, which is located on the Kennet and Avon Canal (Fig. 7). Blakes forms the overfall between the Kennet and Avon Canal and the River Kennet.

4.4.2 ***History*** The River Kennet was made navigable in 1723 and the Kennet and Avon Canal was built between 1794 and 1810. Blakes Lock, on the Kennet and Avon, was originally a flashlock and was converted to a timber built pound lock in 1802 to improve navigation between the River Kennet and the River Thames. The lock still retains its manual beams (Plate 18). The canal fell into disuse in the late 19th and early 20th centuries due to competition from the railways but was restored between 1970 and 1990, largely by volunteers.

4.4.3 The original paddle and rymer weir was built on the River Kennet, west of the lock, in 1928 but the modern weir is a 2001 rebuild.

4.4.4 ***Description*** Blakes Weir is a partial width weir which runs east to west and is located west of nearby Blakes Lock. It is approximately 33m in width and can accommodate 48 paddles in 8 bays. The weir is one paddle deep and each paddle is 4.60m in length (Plate 16). The steel frame which supports the structure (Fig. 8) features a railed steel walkway with a surface of asphalt on the north side and a railed steel gangway with a surface of asphalt for operation of the weir on the south side. The rails are of iron, painted black and they extend between the brick built, winged revetments on either bank. The area is bound by rails for storage of paddles. The weir is built over a stepped concrete sill onto which the metal base plate is attached.

4.4.5 The paddle bays and rymer beam are located in between the walkway and gangway. The wooden rymer beam is attached to a substantial steel beam which spans the length of the weir. The rymers taper towards the top with stopped chamfers and are painted dark green and grey. The handles of the paddles, which comprise of a post nailed to boards of approximately 69cm x 46cm, are painted green (Plate 17).

4.5 Molesey Weir

Grid Reference TQ15036874

4.5.1 ***Introduction:*** Molesey Lock was built in 1815 by the corporation of London and is situated approximately 2km south-east of the town of Hampton in the Elmbridge District of Surrey, to the south of the River Thames (Fig. 9). The Molesey Weir is located near Hampton Court Palace on the River Thames, upstream of the lock, and is part of an extensive and well established weir complex consisting of the paddle and rymer weir, sluice weirs and radial gates (Plate 19).

4.5.2 ***Historical Background:*** Before Moseley Lock was built, the area was known as Moulsey Hurst. At this time the Thames, during times of drought, was liable to become too shallow for river craft to pass through and in 1802 there was a proposal for a station here

to raise the water above a series of shoals at Kenton Hedge and Sundbury Flatts (Thacker, 2000). These plans were not developed but in 1809 John Rennie, the eminent engineer prepared a new scheme for a new lock and weir and in 1812 the Act for the construction of Molesey Lock was passed by parliament. Construction began in 1814 and the newly built lock, along with an Italianate , was opened in 1815. This formed part of a wave of improvements undertaken by the City of London Corporation between 1811 and 1815 to enhance the navigation to the south of Staines. A water colour depicting the weir dating from 1827, now held in the British Library, shows that it was crude structure built of wooden piles with large removable paddles.

4.5.3 In 1853, the lock and weir structure underwent some changes in anticipation of lower water levels caused by water extraction upstream. The level of the lock was lowered and the weir, which had fallen into a state of dilapidation, was rebuilt in 1859. In 1864, fish ladders were added to the weir and a boat slide was built in 1871. The lock and weir structure suffered considerable damage in the great flood of 1877 and was again rebuilt in 1882. The tail end of Ash Island was cut away at this time to allow the weir to be lengthened. In 1905, the lock and weir structures were rebuilt to accommodate a 200ft long naval craft built at Platt's Eyot, an island just upstream of the lock. A new lock-house was built on a plot of land adjacent to the lock on the south bank in 1925. The weir was again renewed in 1925 as a paddle and rymer structure and the existing structure is understood to essentially survive from this date. It retains 1920s gangways with modern railings. The lock and weir were the subject of adaptations during the period of World War II and in 1959 the lock was completely restored and modernised, with electric controls for the gates.

4.5.4 The 1865 1st edition OS map for the area shows a weir which runs north to south from tag island and then turns in a south easterly direction and runs to meet the lock island. By the time the 1897 2nd edition OS map was drawn (Fig. 9), the structure had changed, incorporating a dog-leg to resemble the existing weir (Plate. 19). This is most likely to be the 1882 rebuild.

4.5.5 Molesey was the most popular lock on the Thames in the 19th century and early 20th century with thousands of pleasure boats passing through. This was also the heyday of the annual Molesey Regatta, which still takes place today. It is a feature of the historic landscape of Molesey.

4.5.6 ***Description:*** The modern weir with radial gates runs north east to south west from Ash Island across the Thames (Plate 20). The older partial width paddle and rymer weir runs south from the south west side of the modern structure towards the lock (Plate 21). The paddle and rymer weir is a structure of fourteen steel frames, which sits on a base of concrete, to which the steel base plate is fixed, and has a fixed crest overfall and later buck weir (Fig. 10). It has a “Kee Klamp” railed walkway with an asphalt surface above.

4.5.7 The paddle and rymer structure can accommodate 37 paddles. The wooden rymer beam is located at the west side of the frame and consists of five lengths of timber, fixed to the gangway with rymer slots cut into it. A series of still locking bars have been welded into position on it.

4.5.8 Rymers taper towards the top with stopped chamfers and are painted grey. Paddles measure 99cm by 38cm and are the widest paddles of those surviving on the River Thames. The handles are painted grey.

5 CONCLUSION

5.1.1 The Thames has been an important navigation route since the medieval period and it played a crucial role in the industrialisation of the country by carrying fuel and raw materials to manufacturers and finished goods to markets as well as providing power to run machines. The range of improvements undertaken to the river demonstrate not only technical ingenuity but also the importance of the route.

5.1.2 Weirs comprise one important element of these improvements and they are often part of a larger historic river landscape including locks and auxiliary buildings. They have not only formed a functional purpose in controlling rivers but are able to give an insight into the wider historic development of an area. Weirs, for example, are often found at the site of mills (as in the case of Mapledurham) and as such provide an indication of the locality's industrial heritage. Paddle and rymer weirs date from the medieval period and there are now thought to be only thirteen remaining examples (at eleven sites) on the River Thames (Rickard et al).

5.1.3 Although the advent of alternative modes of transport and the reduced reliance of water as a source of power has gradually decreased the importance of waterways in Britain the Thames remains an important functioning navigable highway and it forms part a network of navigable rivers across the country. The weirs remain a crucial element of the infrastructure which makes the Thames navigable. The rarity of paddle and rymer weirs means that they are of considerable interest in the context of River Thames navigation. The weir provides flow and level control, both for navigation and flood defence purposes. As such, while the weir is of archaeological interest, its modernisation is fundamental to the continued operation of a navigable river system.

5.1.4 The structures in the current study are all largely, and in some cases entirely, modern, but, they all retain the paddle and rymer technology which continues a tradition which stretches back to the medieval period. Original components are not immediately visible in any weir, however, Northmoor Weir is thought to retain a part of its 19th century structure. This may exist as the base plate or timber piling and sheeting fixed into to the river bed, and part of the gangway over the frames.

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Trueman M, *River Thames Paddle & Rymer Weir Replacement; Heritage Review* (2008)

Maps

1876 1st Edition OS Map, Oxfordshire

1899 2nd Edition OS Map, Oxfordshire

1879 1st Edition OS map, Parish of Mapledurham

1865 1st Edition OS Map, Parish of Hampton

1897 2nd Edition OS Map, Parish of Hampton

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http://www.visitthames.co.uk (May 2010)

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Appendix B. Paddle and Rymer Weir Operations

The method of operation of the upstream full-span rymers was described to the author by the Radcot keeper

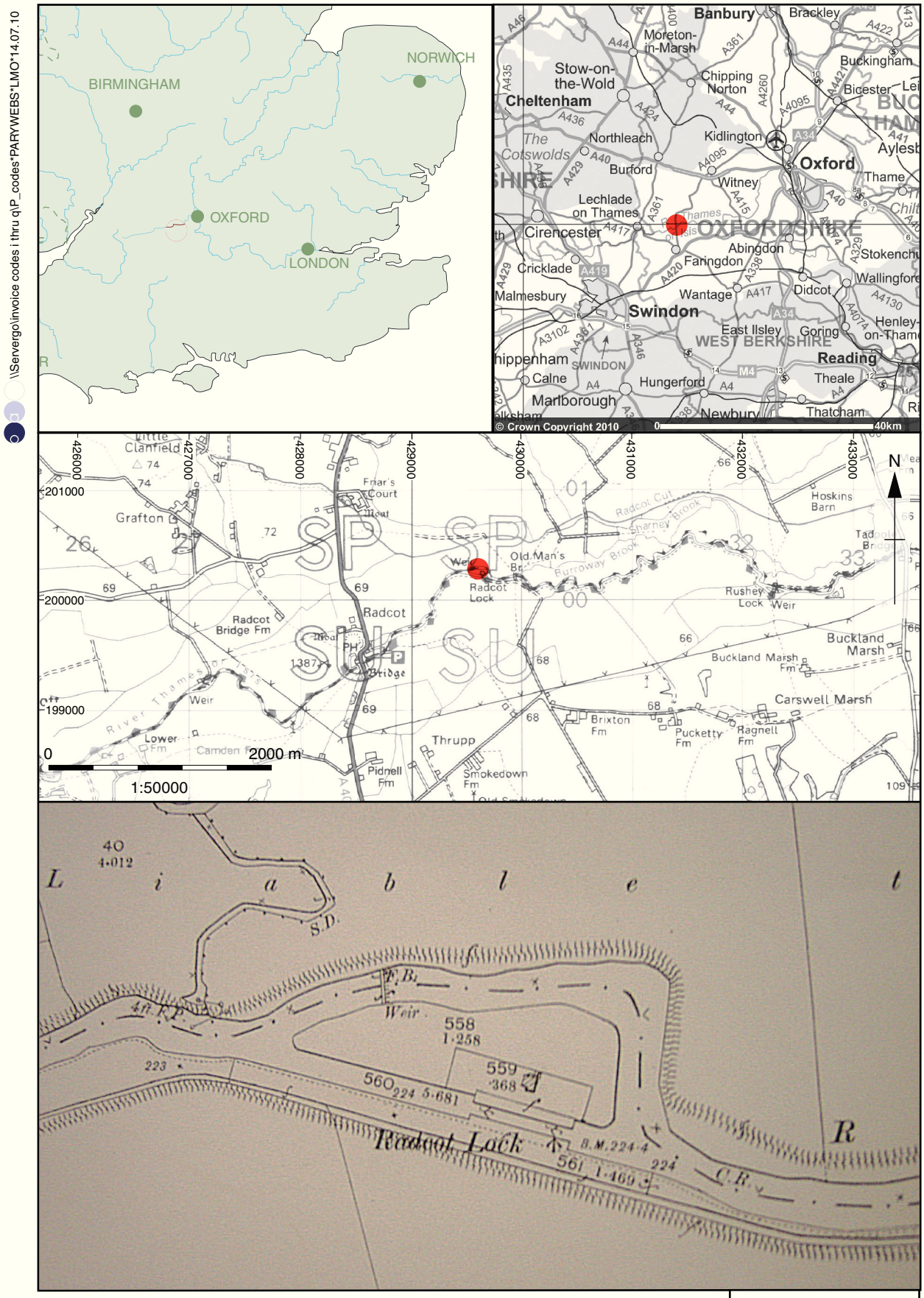
1. If the weir needs to be fully opened, the tendency is to leave the last two rymers (at the riverside edges of the weir) in place so that they provide a starting point for putting the weir back together.
2. When reinstating paddles and rymers, the operator works from the side of the weir towards the middle. The basic process is - put two rymers in, then the 'paddle set' between them, then place the next rymer, followed by a paddle set and so on.
3. In the event that all the rymers have previously been removed, then for the first 1 or 2 sets, the operator drags the rymer to its approximate intended location whilst a second operator attaches a rope to the base of the rymer and guides it to the base sill. Each subsequent rymer is levered into position using the previous rymer as a fulcrum.
4. The force of headwater pushing against the weir causes gradual bowing of the rymers. When a rymer is put back into the weir, care is taken to ensure that the curve is pointed upstream, so that the headwater bends the rymer back the other way.
5. Each rymer is dragged rather than lifted from the store to the weir. This causes gradual wear on the base of each rymer that eventually creates difficulty in getting that rymer into the sill slot. The bottom inch is then cut off and the process starts again. Eventually the rymer becomes too short to continue in use.
6. The life span of a rymer might be 8 years (although those of a recent batch have broken very easily - within 3 months). [Other keepers thought that some rymers might be 20 years old].
7. Paddles are 'walked' from the store onto the weir.

From ***River Thames Paddle & Rymer Weir Replacement; Heritage Review*** by Michael Trueman on behalf of the Environment Agency (2008)

APPENDIX C. EXTRACT FROM *THAMES VALLEY VILLAGES* VOL 1 BY CG HARPER (1910)

The extract below is taken from *Thames Valley Villages* by CG Harper and is an account of a flash weir still in operation in 1910. Eaton Weir was located close to Lechlade and was the last remaining Flash Weir on the Thames finally being removed in 1937. This account is relevant to the current project because flash weirs and paddle and rymer weirs share the same technology.

'Eaton Weir, and others of its kind, are, in fact, complete barriers across the river, affording a check to all craft until four or five of the paddles are pulled up. The construction is simple, consisting of a sill, generally a heavy beam of wood, laid across the bed of the river with a similar beam crossing immediately over it, from bank to bank. These form the framework of the weir which is completed by a number of stout supports going perpendicularly down at intervals from upper beam to lower and by a continuous row of 'paddles' set between them. The 'paddles' are roughly speaking in the shape of shovels, but much longer in the handle and bigger in the blade. It is obvious that when all the paddles are down in their places the head of water must be considerably raised above the weir, although a volume of water pours through all the while. To admit the passage of a boat the weir-keeper draws up four paddles or more, and then, if the craft be going down stream it is guided by the steersman carefully to the weir and deftly allowed to be shot through by the force of the waterfall thus created in the opening. A little mild excitement generally accompanies this 'shooting the rapids' even though the fall be only about eighteen inches to two feet when the paddles are first drawn, and reduced to almost nothing if you wait a few minutes while the head of accumulated water runs itself away. The Thames Conservancy will have its dues and whether it be a lock or a weir you pass you render threepence for a small boat and receive a pink ticket in return'.



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Figure 1: Site location and 1899 2nd Edition OS Map; Radcot Weir

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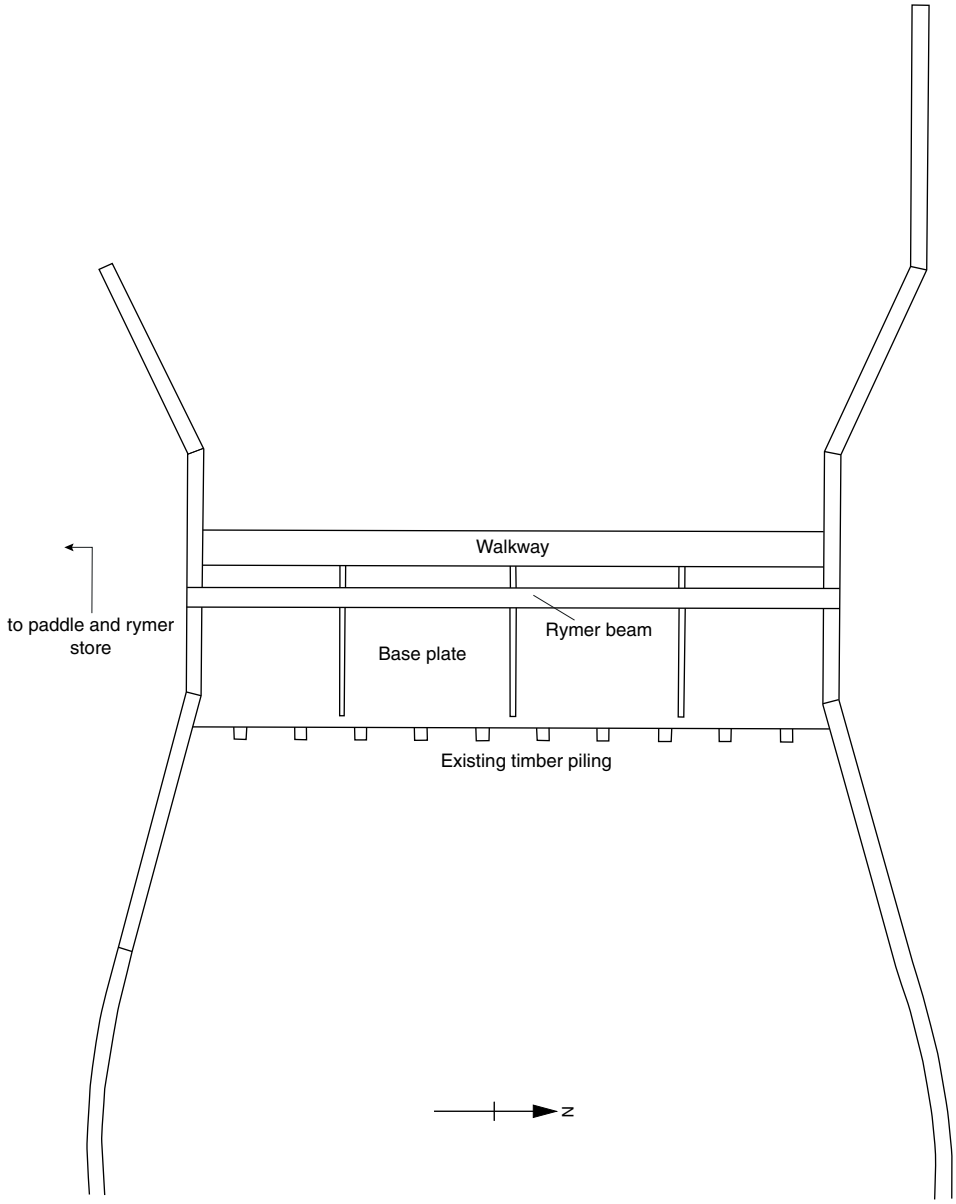


Figure 2: Plan of Radcot Weir

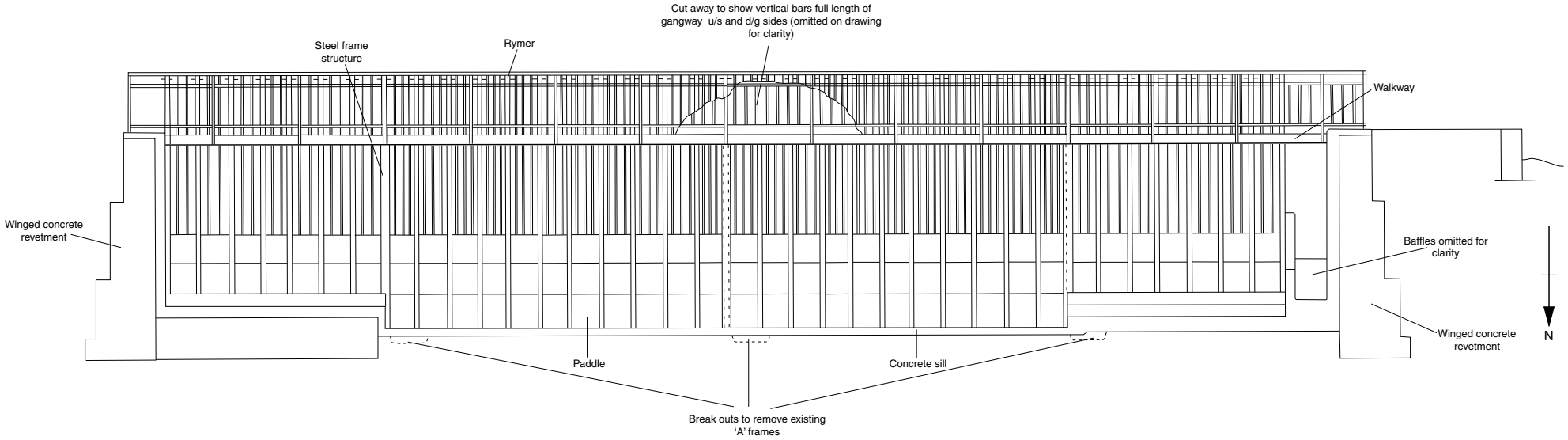
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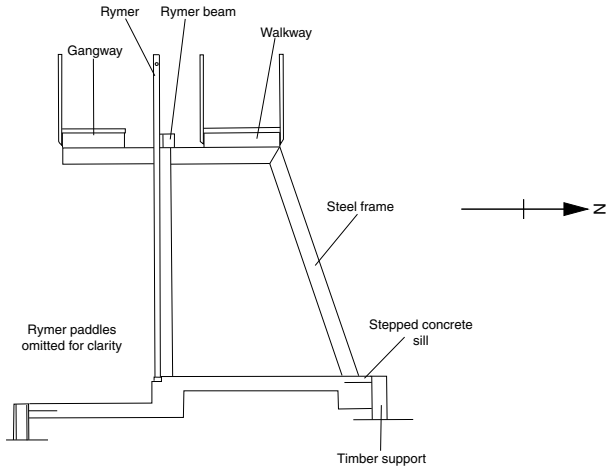
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Figure 3: Site location and 1899 2nd Edition OS Map; Northmoor Weir

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Elevation through Northmoor Weir



Section through Northmoor Weir

Figure 4: Elevation and section of Northmoor Weir

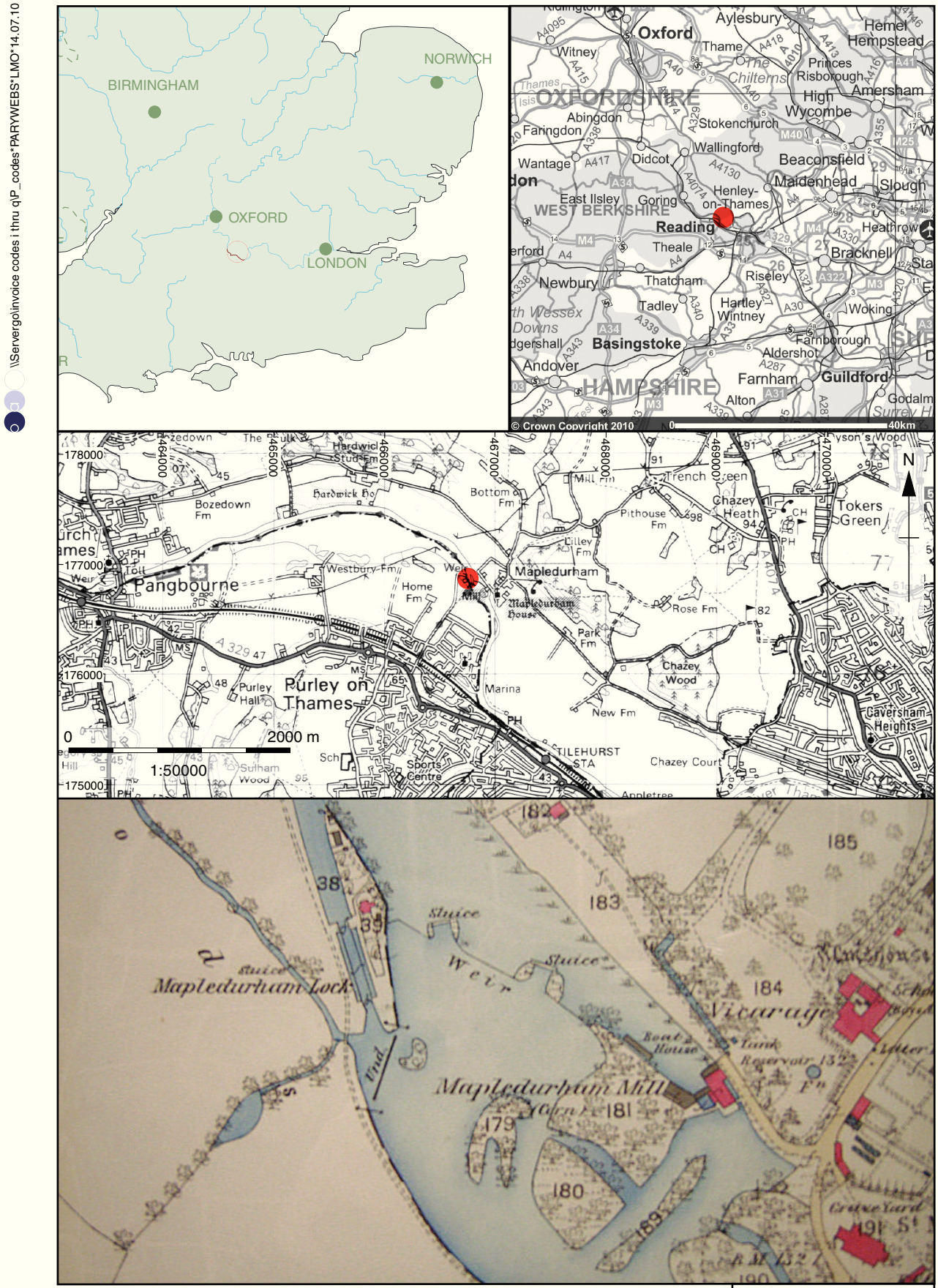
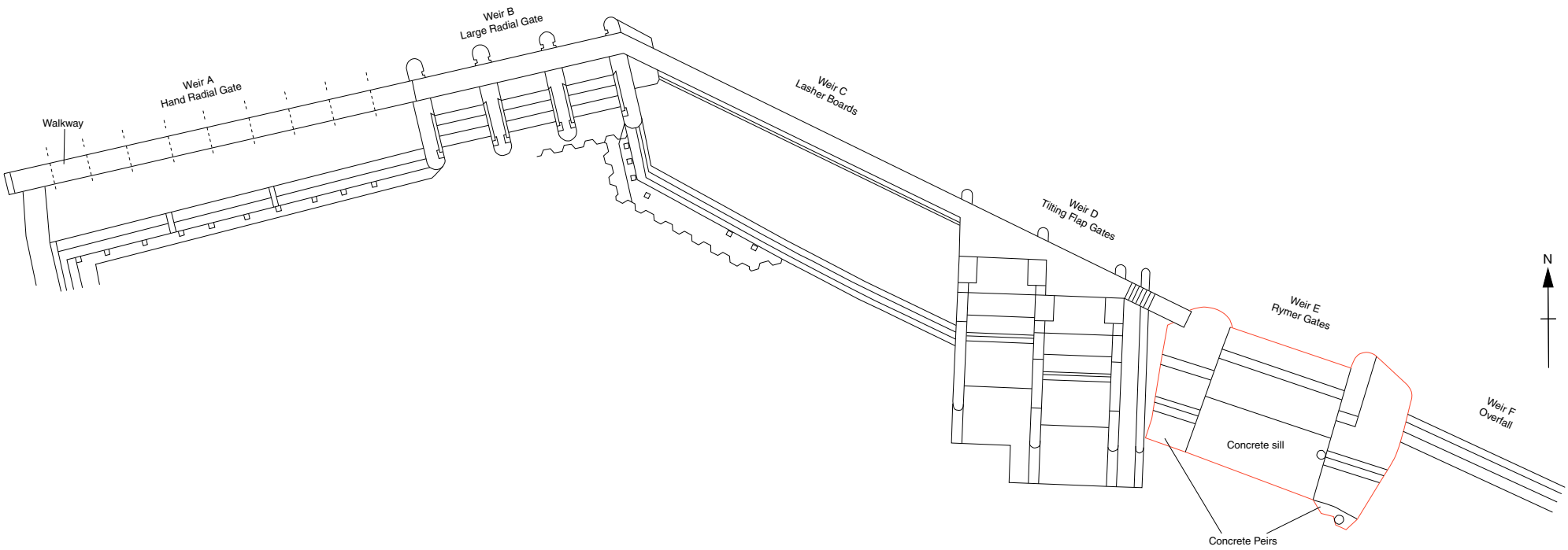


Figure 5: Site location and 1879 1st Edition OS Map; Mapledurham Weir

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Plan of Mapledurham Weir complex; showing paddle and rymer weir (weir E)

Figure 6: Plan of Mapledurham Weir

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Figure 7: Site location Blakes Weir

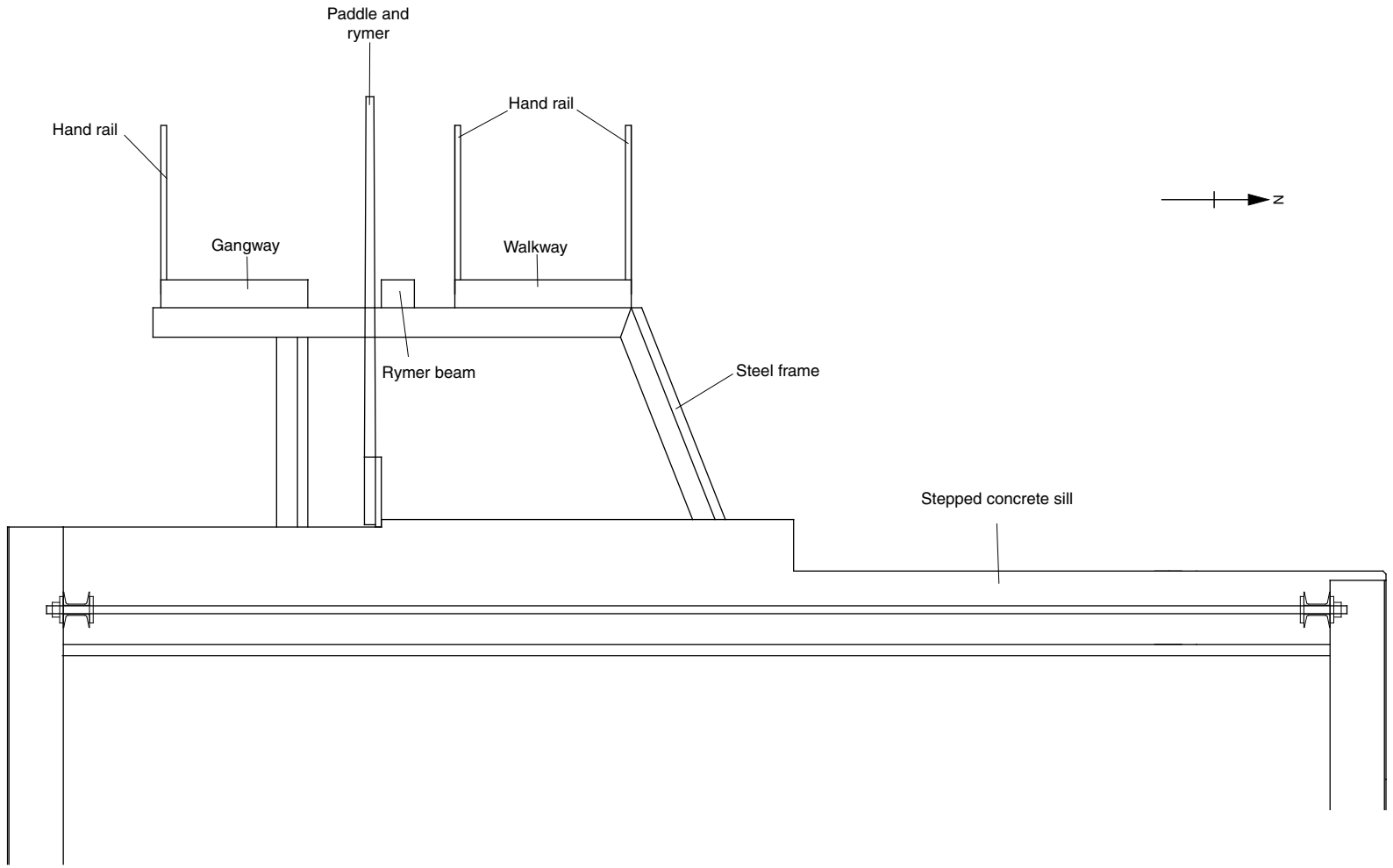


Figure 8: Section through Blakes Weir

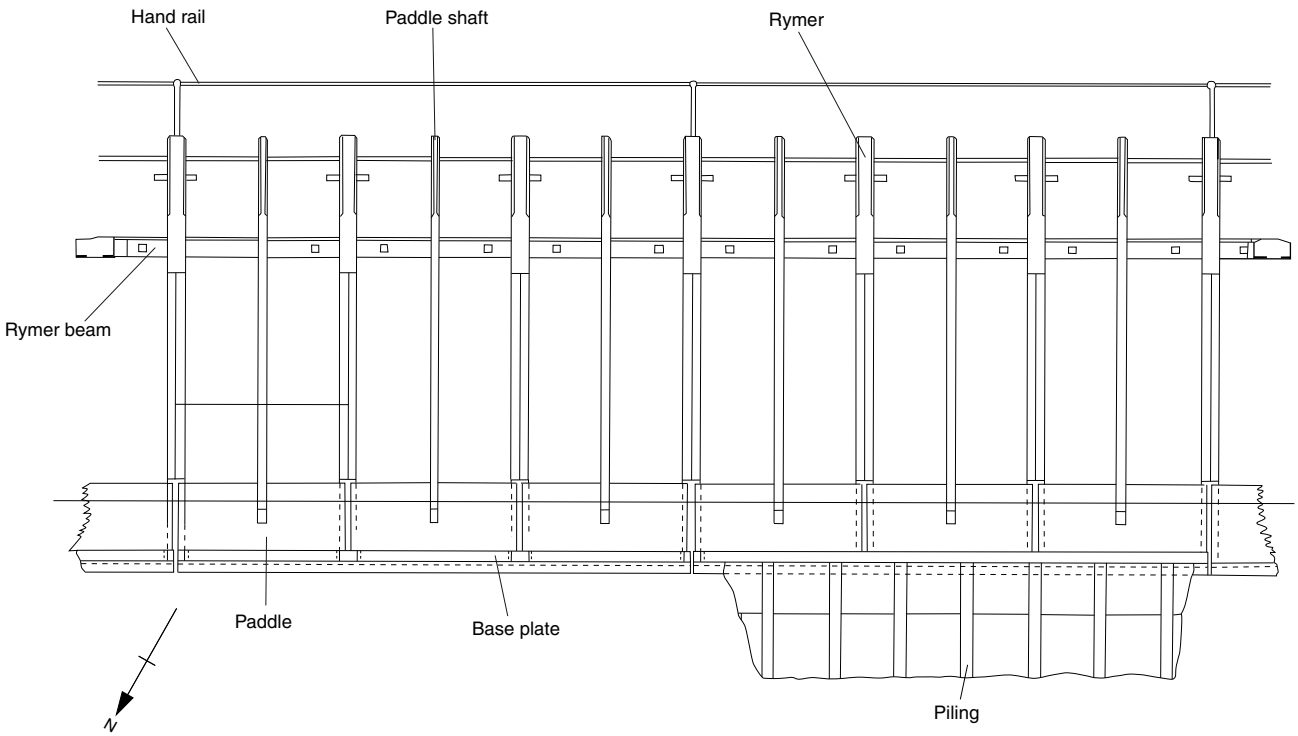
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Figure 9: Site location and 1865 1st Edition OS Map; Molesey Weir

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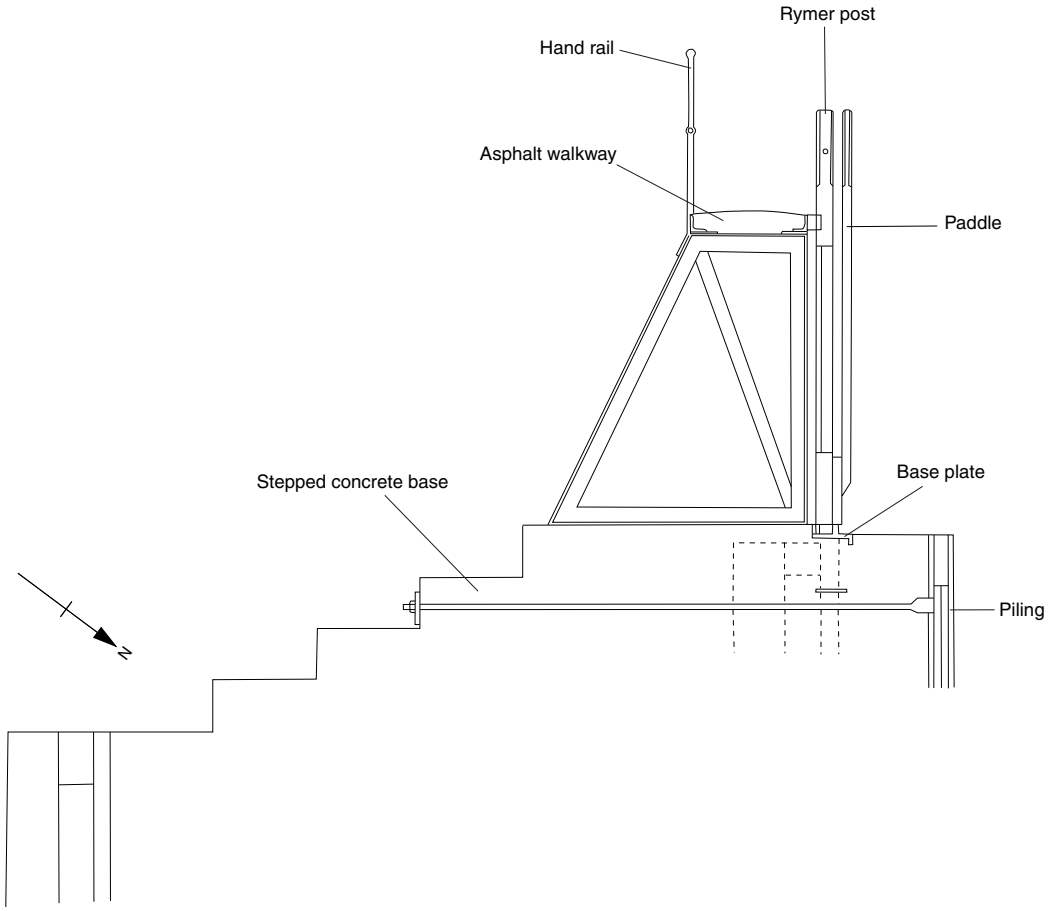


Figure 10: Partial elevation and section through Molesey Weir

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Plate 1: Radcot Weir, facing north west



Plate 2: Radcot Weir, facing north

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Plate 3: Radcot Weir, scarfed beam for rymers



Plate 4: Radcot Weir, paddles

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Plate 5: Northmoor Weir, facing south



Plate 6: Northmoor Lock, facing north west

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Plate 7: Northmoor Weir, facing north east



Plate 8: Northmoor Weir, facing west

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Plate 9: Northmoor Weir, paddles



Plate 10: Mapledurham Weir, facing east

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Plate 11: Mapledurham Weir, paddles and rymers



Plate 12: Mapledurham Weir, paddles and rymers

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Plate 13: Mapledurham Weir, walkway facing east



Plate 14: Mapldurham Lock, facing north

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Plate 15: Blakes Weir, facing south east



Plate 16: Blakes Weir, facing south east

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Plate 17: Blakes Weir, paddles



Plate 18: Blakes Lock, facing east

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Plate 19: Molesey Weir, facing north west



Plate 20: Molesey Weir, radial gate weir facing south

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Plate 21: Molesey Weir, paddle and rymer weir facing north



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