



**WELLINGTON DOCK,
REGENT ROAD,**

Liverpool,

Merseyside

**Closure of the Dock Gates
Archaeological Watching
Brief Report**



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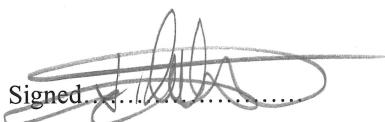
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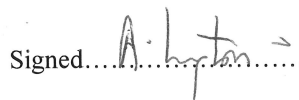
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SUMMARY

Wellington Dock is owned by Peel Ports Ltd and held on a long-term lease by United Utilities (UU). UU is currently seeking to develop an extension to the existing Liverpool Waste Water Treatment Works (WWTW) by constructing a new Sequencing Batch Reactor (SBR) within Wellington Dock (NGR 333530 392670). The development has entailed the infilling of Wellington Dock and the construction of new buildings in and around the dock. As part of the recommended mitigation measures for this development, Oxford Archaeology North were commissioned to undertake a scheme of historic building recording of Wellington Dock to English Heritage Level 3 standards to provide a record of the structure in its current form and setting. Following the completion of this part of the project (OA North 2011) it was determined that an intermittent watching brief to monitor preparations for the infilling of the dock would be required. This short document deals with the final closure of the Wellington Dock Gates.

Wellington Dock (Fig 1) was constructed as part of the northern expansion of the Liverpool Docks, under the renowned Dock Engineer, Jesse Hartley. The dock and its half-tide dock, were originally constructed in 1848 and opened in 1851 and were used to receive mixed cargo, principally that imported from the Americas (Baines 1859, 52).

There has been little major alteration to the dock itself, and the fabric survey indicates that the principal elements of the original construction, implemented by Jesse Hartley, are still *in situ*. The characteristic Cyclopean masonry dock walls remain, for the most part, intact and the majority of coping stones and original dock furniture are present, although sometimes in a less than perfect condition. Although the dock was still full of water at the time of investigation, it may be assumed that the Cyclopean granite retaining walls remain largely extant to the full depth of the dock.

The Wellington Dock gates that are presently *in-situ* are not the original gates, and it is likely that this is the third or fourth set of gates to have been installed within this part of the dock system. Only one documentary reference could be found relating to gate replacement within this area of the northern docks and that took place in 1902. It is also unknown how long since the Wellington Dock Gates was last closed.

Between 30th January 2012 and the 6th February 2012 an intermittent watching brief was maintained while a team from Salvesen UK closed the dock gates. The objective of the watching brief was to monitor the process and create a visual record of the closure of the gates.

Following their closure it was determined that the gates were in a good condition with only limited damage and weathering visible above the water line. The chain connections, buffers and deck plates are still present and are in good condition, but are obscured in places by foliage and debris. The divers assessed that the condition of the gates below the waterline was good.

The gates have been closed with a small gap (*c* 0.4m) left between the mitre posts to accommodate changes in water levels while the dock is still full of water. Following the closure of the gates it is anticipated that additional work will be carried out in this area to protect and seal them prior to the dock being drained in preparation for backfilling.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank United Utilities for commissioning the project. Thanks to Sarah Jakubiak, and John Redford of United Utilities, Salvesen UK Ltd and the crew of the dive support vessel *Halcyon Days*, who were responsible for examining and closing the dock gates.

The watching brief was undertaken by Caroline Raynor, and the drawings produced by Ann Stewardson. The project was managed by Jamie Quartermaine, who also edited the report.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

- 1.1.1 Wellington Dock is owned by Peel Ports Ltd and held on a long term lease by United Utilities (UU). UU have submitted a planning application for the extension of the existing Liverpool Waste Water Treatment Works (WWTW) by constructing a new Sequencing Batch Reactor (SBR) within Wellington Dock (Fig 1). The proposed development will result in the infilling of Wellington Dock and the construction of new buildings in and around the dock. As part of the recommended mitigation measures (Jacobs 2011) for this development, OA North were commissioned to undertake a scheme of historic building recording of Wellington Dock to Level 3 standards (English Heritage 2006) to provide a record of the structure in its current form and setting (OA North 2011). Following on from this it was recommended that an intermittent watching brief be maintained during key phases of work associated with the preparation for the infilling of the dock and works on the quayside.
- 1.1.2 English Heritage have stipulated that prior to the infilling of Wellington Dock, it is desirable that the gates are closed, secured and protected. This will ensure not only the preservation of the dock gates but will also act as a clear physical and visual boundary between Wellington Dock and the functioning section of the dock system to the west and north, specifically Sandon Half-Tide Dock.
- 1.1.3 The Wellington Dock is located beyond the northern limit of The Maritime Mercantile City of Liverpool World Heritage Site Boundary but falls within the Buffer Zone (Fig 1). The dock and its associated dock furniture are not listed and are not Scheduled Monuments. The eastern boundary to the site is formed by the Grade II Listed Wellington Dock Perimeter Wall, which is located within the World Heritage Site.
- 1.1.4 This report sets out the results of the intermittent watching brief investigation undertaken between the 30th of January 2012 and the 6th of February 2012, relating to the closure of the Wellington Dock Gates, in the form of a short document with accompanying photographs and plans.
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1.2 LOCATION, TOPOGRAPHY AND GEOLOGY

- 1.2.1 Wellington Dock (Plate 1) is constructed on reclaimed land which extends into the River Mersey; it is located on the west side of Regent Road, at NGR 333530 392670, and occupies approximately 28,900m² (Fig 1). The site is bounded to the north by the former site of the Sandon Dock, now the Liverpool WWTW, to the east by the Regent Road and the original dock boundary wall constructed by Hartley in his signature Cyclopean granite design; to the south by Bramley-Moore Dock and its associated quays and warehouses, and to the west by Sandon Half-Tide Dock. Wellington Dock is orientated east/west on its long axis and the neck of the dock feeds into Sandon Half-Tide Dock.

1.3 HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

- 1.3.1 For a more comprehensive overview of Liverpool's maritime mercantile development, including the initial development of the earliest docks and pre-nineteenth century expansion, please refer to the original Wellington Dock report (OA North 2011).
- 1.3.2 **Jesse Hartley:** Wellington Dock was designed and built by Jesse Hartley, one of Liverpool's most prolific and innovative dock engineers. Jesse Hartley was born in Pontefract, Yorkshire in 1780 and as a youth was apprenticed to his father, Bernard Hartley, himself a noted stone-mason and bridge builder in the employ of the Duke of Bridgewater (Skempton 2002, 302). Hartley employed his bridge building skills in Ireland between 1808 and 1818 before returning to England where he was employed as Bridgemaster in Salford (*ibid*).
- 1.3.3 In 1823 the Liverpool Dock Trustees were seeking to employ a deputy dock surveyor who could make up for, or at least detract in some way from the shortcomings of the existing Dock Surveyor, John Foster, who was embroiled in financial scandal. It has been remarked that a stone mason with expertise in bridge building but no formal training in the design of docks seemed to be an odd choice for the post of Deputy Dock Surveyor. However, the local newspaper, the Liverpool Mercury, postulated that rather than engineering expertise, the Dock Trustees were instead seeking honesty, force of character and managerial skills (*ibid*). Hartley was employed for only two weeks as Deputy before taking on the role of Dock Surveyor, a role which he would fulfil with both flair and ingenuity from 1824 till his death in 1860, as can be seen from the table below which shows the sequential construction dates of docks erected during Hartley's tenure as Dock Engineer.

Dock	Opened	Closed	Function (where specific)
Clarence Dock	1830	-	Principal dock for steamships
Brunswick Dock	1832	-	Timber Trade
Waterloo Dock	1834	Modified but still present	Site of the original Observatory and later used for grain and seed importing
Victoria Dock	1836	1988	Deep sea / Atlantic traffic
Trafalgar Dock	1836	Modified but still present	Deep sea / Atlantic traffic
Canning Half Tide Dock	1837	-	Access to river from Canning Dock
Toxteth Dock	1842	1884	
Albert Dock	1845	-	Deep sea shipping and warehousing
Salisbury Dock	1848	-	
Bramley-Moore	1848	-	Coal import
Collingwood	1848	-	Coastal Trade
Nelson Dock	1848	-	
Sandon Dock	1849	-	Ship Building/ Repair
Stanley Dock Complex	1848	Part infilled in 1897	Coastal and Canal Trade

Wellington	1851	-	
Huskisson Dock	1852	-	Timber Trade
Canada Dock	1859	-	Timber Trade

- 1.3.4 Initially, Hartley was forced to address issues created by his predecessor, which largely involved focusing on management issues ranging from regaining control of the finances and procurement issues, as well as addressing safety and maintenance issues. He expanded the draughtsman's office and brought the design work in-house, allowing him to exercise greater control over the smallest elements of his design. By 1828, a mere four years into his tenure, the dock estate was already beginning to take on a more integrated form with the completion of the long awaited Princes Dock and the formative stages of the Brunswick Dock's construction (*ibid*).
- 1.3.5 Hartley went further to stamp out corruption that had been prevalent within the procurement of raw materials by leasing two quarries in Scotland (one in 1826 and another in 1830). From these quarries he sourced the granite for his trademark 'Cyclopean granite' masonry style, which comprised a wall core, constructed from readily available sandstone rubble, and then faced with the irregular pieces of granite which locked together to create very durable retaining walls.
- 1.3.6 The first area of the docks to be designed and built by Hartley from start to finish was the Clarence Dock, which was begun in 1825 and opened in 1830. As well as the principal wet dock, Hartley also included a complex of half-tide dock, graving dock basin and two large graving docks which are now Grade II listed (LCC 2005, 68). This initial work set a benchmark for Hartley and amply demonstrated the scope of his ambition and engineering skills.
- 1.3.7 Further docks followed soon after, and included Brunswick in 1832 (part of the southern docks complex) Waterloo (1834), Victoria (1836) and Trafalgar Docks (1836, south of the Wellington Dock), and were constructed in the fire-gap that had originally been left between Clarence and Prince's Docks (Skempton 2002, 302). In 1842 Hartley set about remodelling the Canning Dock, making significant alterations to the orientation and size of the dock which had previously operated as the old Dry Basin, that had originally been constructed in 1740.
- 1.3.8 Three years later, in 1845, Hartley had completed the construction of the Albert Dock, the complex for which he is best remembered. The central dock and the iconic fireproof warehousing system, with the distinctive colonnade which surrounds it, are probably the most admired elements of Hartley's legacy to the city of Liverpool and now represent the largest group of Grade I listed buildings in the UK. This structure forms a core element of the southern part of the World Heritage Site. In 1848 the Dock Traffic Office was added to the complex and modifications were made, including the installation of the first hydraulic cranes.
- 1.3.9 One year before the completion of the Albert Dock a further Act of Parliament was passed to continue the expansion of the docks. The 1844 Dock act stated; *'the increasing commerce of the Town and Port of Liverpool requires that additional Docks, Basins and other works should be forthwith provided for the further Accommodation of Vessels trading to and from the said Town and Port'* (Section 83, 1844 Dock Act) (Jacobs 2011, 5). This Act enabled the construction of the

Salisbury, Collingwood, Stanley, Nelson, Bramley-Moore, Sandon and Wellington Docks (LCC 2005, 131).

- 1.3.10 Hartley held the position of Dock Engineer for 36 years, in which time he had proved his excellence and versatility as an engineer through the development and expansion of the world's first enclosed dock system (McIntyre-Brown 2001, 77). During Hartley's tenure as Dock Engineer, the dock accommodation was more than doubled (Jacobs 2011). Hartley was succeeded in his position by another equally dynamic engineer, George Lyster, who continued to add to the dock system; however, his impact was not as dramatic as Hartley's. The formal post of Liverpool Dock Engineer ceased to exist in 1917.
- 1.3.11 **Wellington Dock:** Wellington Dock, and the accompanying Wellington Half-Tide dock (later known as the Sandon Half-Tide Dock) were constructed in their original configuration between 1848 and 1851. The Wellington Dock occupied 7 acres, 4,120 square yards, of enclosed water and 820 linear yards of quay space, while the Half-Tide dock was smaller and encompassed 3 acres, 813 square yards, of enclosed water and 400 linear yards of quay space (Baines 1859, 84). Baines noted that the sill of the Wellington Half-Tide Dock was six feet and nine inches under the sill of the Old Dock datum with the average water over the Wellington Dock sill at ordinary springs being twenty-four feet and three inches (Baines 1859, 84). At the time that Baines wrote his description of the waterfront, Wellington Dock was still accessed via a 70 foot wide passage from the Half-Tide Dock, which in turn fed into the Sandon Basin via two entrances.
- 1.3.12 Despite the Wellington Dock being of new construction, and of the most up to date design, its location and size still posed problems for ships wishing to berth there. In April 1855, Captain Hardy, part owner and Captain of the *Harvest Queen* (a ship of 1556 tons with a draught of 21 feet when fully laden), testified to the Dock Committee that he had been putting into port at Liverpool for over six years, but was finding it difficult to negotiate the currents putting to port in the winter months. Hardy stated that,

"The North Docks are well suited for our trade in that large class of vessel as regards convenience when you are in [port]; but I have always a dread of going in, in the winter season; difficulty is constantly occurring and it is unsafe for larger vessels to dock there...".
- 1.3.13 He goes on to explain that *"I tried to dock in the Wellington Dock, the last voyage and I knocked the carved work off my stern and was very glad to get my ship off."* By way of further explanation he noted that the area of the river where ships were detained had a high enough level of water during the spring tide, but not during the rest of the year. The general consensus was that there was not enough water lying across the sills at all times of the year and that the entrances to the northern docks (those at Waterloo, Salisbury and Sandon Dock) were unsafe and difficult to navigate, especially during high winds (Webster 1857, 176).
- 1.3.14 In 1857 the management of the docks underwent a dramatic alteration when an Act of Parliament created the Mersey Docks and Harbour Board, effectively removing control of the docks from the town council (McIntyre-Brown 2001, 77) which had been largely responsible for the finances, expansion and property of the dock estate since it was conceived as an enterprise in 1715.

- 1.3.15 Baines, writing in his book *Liverpool* in 1859, noted that '*The amount of tonnage which entered the Wellington Dock in the financial year ending 24th June 1858 was 135,474 tons*' (Baines 1859, 85). He also noted that the total revenue of the dock was £17,611 8s.4d and that this revenue was generated through trade with the Mediterranean, the United States of America, British American Colonies, the West Coast of Africa, the Brazils, the Baltics, as well as other European ports (*ibid*).
- 1.3.16 In 1859, the bulk of shipping entering and leaving the Wellington Dock was bound for the coast of West Africa. The dock was used by the African Steam Ship Company who operated services from Wellington Dock to numerous West African ports, including Bathurst, Sierra Leone, Cape Palmas, Monrovia, Accra, Lagos, Benin, Old Calabar and Cameroon. The African Steam Ship Company was heavily involved in the rubber trade and helped to support the exploitative activities of King Leopold II of Belgium. The company was run by Elder-Dempster who still operate today. Also operating from the dock were smaller companies including the Londonderry Steam Boat Company (services to Londonderry, Ireland) and steam ship passenger services to Hamburg.
- 1.3.17 In 1861, the efficiency and shortcomings of Wellington Dock were once again a focus of dispute, this time between the Mersey Docks and Harbour Board and the owner of the ship *Sierra Nevada*, one Mr Penhallow. In a case, heard at the Court of the Exchequer, Penhallow accused the Mersey Docks and Harbour Board of mismanagement of the docks and of being negligent in their duties, especially with regard to dredging the docks and keeping the entrances free from silts and other obstructions. Penhallow brought this case against the Board because his ship, *Sierra Nevada*, had been endeavouring to put into port via the Wellington Half-Tide Dock when the hull of the ship struck against, and became embedded within, a large mass of mud in the entrance lock (Hurlstone and Coltman 1862, 331).
- 1.3.18 The 1885 Map of Liverpool (MDHB/LEGAL/A56/4) shows the Wellington Half-Tide and Sandon Half Tide Basins as being small irregular-shaped structures, with only the Sandon Half-Tide Basin having a gate linking it to the river. All traffic wishing to pass into the Wellington Dock had to first negotiate either the Sandon Half-Tide Basin or traverse the Salisbury, Nelson and Bramley-Moore Docks if moving from south to north up the dock system. At this time, the Wellington Dock was completely surrounded by transit sheds on the northern, eastern and southern sides. Although there are no depictions of cranes and other ancillary dock furniture, it is likely that they were present.
- 1.3.19 The 1890 Ordnance Survey Map of Liverpool (Fig 2) provides a very clear image of Wellington Dock just prior to major alteration work. The north side of the dock was lined with an extensive complex of transit sheds which were divided into Shed 1, Shed 1a, Shed 2 and Shed 3. The centre of the shed complex featured a recess which housed a crane. Similarly, two cranes were located on the east side of the dock, although in this area the transit sheds had disappeared to make way for the High Level Coal Railway which terminated to the north at Shed No 3 and continued southwards, towards the Bramley-Moore Dock. One large shed, lacking in any remarkable features, was located parallel to the edge of the quay at the south side of the dock. In 1890 the gated entrance between Bramley-Moore Dock and Wellington Half-Tide Dock was spanned by a central swing bridge.
- 1.3.20 The 1890s saw a significant period of alteration to the docks. This included the alteration and reconstruction of Huskisson Dock, Sandon Dock, Sandon Basin and

Wellington Half-Tide Docks. The six graving docks at Sandon Dock were replaced by an extension of a new branch dock as part of Huskisson Dock, and Wellington Half-Tide Dock and Sandon Basin were replaced by Sandon Half-Tide Dock (Jacobs 2011, 6), which is still extant today.

- 1.3.21 At the same time that this overhaul was effected, several of the docks in the North Docks complex were fitted with new gates. Brysson Cunningham noted in his 1910 volume on Dock Engineering, that *'The greenheart storm gates of the Sandon entrance, built about the year 1848, were taken to pieces in 1902 and found to be in excellent condition. The Bramley-Moore Dock gate, of english oak, built about 1835, were overhauled in 1902; below the water line, the wood was in perfect preservation'* (Cunningham 1910, 307). Cunningham also noted that *'The 100-foot greenheart gates at the Canada Lock of the same port were in active use for a like period, 1856 to 1895 and when removed... and taken assunder, were found to be in an absolutely sound condition and as good as on the day when they were built'* (*op cit*, 306). Although there is no direct evidence, it is not unreasonable to suppose that the Wellington Dock gates were replaced during the same 1902 phase of alteration and maintenance work.
- 1.3.22 By the time of the Ordnance Survey Map of 1908 (Fig 3), the work to remove Sandon and Wellington Half-Tide docks was complete. The extensive Sandon Half-Tide Dock spanned the entrances of both Wellington and Sandon Dock, creating a larger, more easily navigable stretch of inland waterway, linked to the river by a double, gated entrance in its south-west corner. At this time the swing bridge, which was previously located between the dock gates, was replaced with a smaller foot bridge.
- 1.3.23 Liverpool played a strategic part in the war efforts of both World War I and World War II and there was considerable expansion of trade and shipping between the wars. However, the city was targeted for its strategic importance during World War II and, as a result, suffered heavily as it was bombed extensively during a series of air raids between August and November 1940. The docks and the surrounding area were targeted and suffered from structural damage, with large areas adjacent to the waterfront being levelled.
- 1.3.24 The northern end of the docks were badly affected by the bombings, particularly the Huskisson Dock to the north of Sandon Dock which was damaged when a munitions supply ship was hit while still berthed in the dock. Following World War II, Liverpool experienced a decline in shipping as the nature of imports changed and transport techniques, including air freight and container shipping, were introduced.
- 1.3.25 The Ordnance Survey Map of 1954 (Fig 4) shows further alterations to the areas around the quayside including the addition of the T-shaped mooring bollards. These are arrayed along the north and south sides of Wellington Dock and along the south-east side of Sandon-Half Tide Dock. At this time, all of the previously described transit sheds are still *in situ*, but their internal subdivisions have disappeared, suggesting that they were by then all owned by the same group or company.
- 1.3.26 Further additions were made to the south-west side of Wellington Dock at some point between 1954 and 1967 (Ordnance Survey Map 1968, Fig 5), most notably the High Level Coal Railway is no longer shown on the 1968 Ordnance Survey

map. In 1989, the Sandon Dock, to the north of Wellington Dock, was in-filled to facilitate the construction of the Liverpool WWTW. This sewerage treatment plant was designed by Athanassios Migos for Kingham Knight Associates and is characterised by its post-modern trim which is very characteristic of the period (Pevsner *et al* 2006, 279). In 2008 a permanent barrier, in the form of an isolation structure, was erected at the gates between the Bramley-Moore and Nelson Dock. This was carried out as part of the construction of the Liverpool Canal Link which created a new 1.4 mile stretch of navigable waterway linking the Albert Dock with the Leeds-Liverpool Canal (OA North 2009).

2. METHODOLOGY

2.1 WATCHING BRIEF TO EXAMINE THE DOCK GATES

- 2.1.1 An intermittent archaeological presence was maintained during the works which were necessary to prepare the dock for infilling. The purpose of this monitoring was to identify, investigate and record any archaeological remains encountered and, in the case of structures associated with the functioning of Wellington Dock, such as the dock gates, to record any elements which have been modified or obscured by the preparatory works.
- 2.1.2 A daily record of the nature, structure and extent of features was maintained throughout the duration of the project. With usual practice context numbers would be assigned and archaeological contexts would be recorded on OA North's *pro-forma* sheets, using a system based on that of the English Heritage former Centre for Archaeology. In this instance, however, as the dock gates are an extant engineered feature of a visible structure, rather than a discrete archaeological deposit, no numbers were assigned but *pro-forma* watching brief record sheets were maintained in order to describe the processes taking place on site. A digital photographic record was maintained throughout.

2.2 LIMITATIONS TO RECORDING PROGRAMME

- 2.2.1 Health and safety constraints meant that it was not possible to record the interior of the gate winding machines, and associated voids. The dock was wet throughout the recording programme and it was not possible to record the dock walls below the water line. Following on from the main programme of recording there were also constraints and limitations placed on the recording of the dock gates; specifically no suitable vantage point could be gained in order to photograph the west-facing elevations of the north and south dock gates nor was there a suitable point from which a close up image of the interface between the closed gates could be taken.

2.3 ARCHIVE

- 2.3.1 A full professional archive has been compiled in accordance with current IfA and English Heritage guidelines (English Heritage 1991; IFA 2008). The paper and digital archive will be deposited with the Merseyside Record Office on completion of the project, and a paper copy will be sent to Merseyside Archaeological Service.

3. WATCHING BRIEF RESULTS

3.1 INTRODUCTION

- 3.1.1 On the 14th of June 2011, Oxford Archaeology North undertook a survey of Wellington Dock (OA North 2011). At this time the dock gates were still in the open position and both the north and south gates were secured in their respective gate recesses (Figs 6 and 7). At this stage, the exterior elevation of both dock gates, as visible above the water line, was recorded by hi-resolution digital photography and had also been recorded by the laser scanning as part of the initial dock survey (OA North 2011). Between the gate piers was a platform and sill which were permanently beneath the water line; the sill was intended to provide a water-tight seal with the gates and any build up of material on top of the sill would restrict closure operations. It is not known how much time has passed since the dock gates were last closed or when this set of gates was installed, but it is likely that these gates have been *in-situ* since the early twentieth century (*Section 1.3.21*).
- 3.1.2 Between 30th January 2012 and the 6th February 2012 an intermittent watching brief was maintained while a team from Salvesen UK closed the dock gates. The objective of the watching brief was to monitor the works and create a visual record of the process of closure of the gates. If it had been determined from the initial survey by the dive team that the gates could not be closed then they would have been detached and lifted from the dock; at this juncture the watching brief would have entailed the detailed measurement and examination of the gates and their salient features with the aim of creating a 3D model of each gate using Agisoft photographic software. In the event, this proved unnecessary, as it was possible to close the gates.
- 3.1.3 The procedure to clear the debris and silt from the sill took longer than had initially been anticipated due to the large deposits of silt that had accumulated. Once clearance was completed, the gates were hauled into position, and a photographic record of the closed gates and the newly exposed gate recesses on the north and south gate piers was compiled. The location of the gates is highlighted in Figure 6 and shown in Figure 7. Due to the nature of this work, no finds were recovered and no context numbers were assigned.

3.2 WATCHING BRIEF RESULTS: CLOSURE OF THE DOCK GATES

- 3.2.1 As the closure of the dock gates proved to be more time consuming than originally anticipated, after two site visits the gates had still not been closed. A number of processes were carried out by the dive team from Salvesen UK in order to facilitate the closure and these included:
1. An assessment of the gates, their condition and the amount of debris on the sill;
 2. Water jetting of the north and south gates and an assessment of the debris exposed beneath the silts;
 3. General inspection of the north and south gates following the removal of debris;
 4. Burning off the chains from the north and south gates;

5. TIRFOR winches were attached to both gates and collar straps were fitted to mitre posts;
 6. The gates were heaved into position and secured in the closed position.
- 3.2.2 During the water jetting and assessment phase, it was noted by the divers that the lip of the sill had originally been clad with timber; however, a number of pieces had been dislodged and were now lying across the sill rather than flush with its surface; these therefore obstructed the movement of the gates. These loose timbers were removed from the sill and were suspended from the southern gate pier wall below the high water mark.
- 3.2.3 Silting caused by activity within Wellington and Sandon Half-Tide Docks had resulted in a deep (c 1m) layer of silts that had accumulating on the sill and around the base of the gates. In order to close the gates, trenches were dug in line with the mitre post in order to help move the gate into the closed position.
- 3.2.4 **The Gates:** the Wellington Dock gates are typical of those of the North Dock complex having a twin leaf design (Plates 2 and 3). Twin-leaf gates are symmetrical in design with each gate measuring a little longer than half the width of the neck of the dock so that the centre line of the closed gates points in the direction of the impounded water (within Wellington Dock and not Sandon Half-Tide Dock), and the water pressure forces the gates closed, ensuring a good seal. The gates are constructed of Greenheart frames with substantial squared heel posts and mitre posts and a number of cast-iron fixtures and fittings, including rivets, chains, metal plate and bracing (Plate 4).
- 3.2.5 The inside (east-facing) elevation of the gates (Plate 5) are convex and covered with skin plates (timber planking) which are held in place with a parallel arrangement of cast iron rivets attached to the web plates; only the rivets above the water line were visible during the watching brief. The east-facing elevation had a number of cast iron fixtures, including chain connection points and L-shaped metal plates, spanning the front of the mitre post and the lip of the deck plate to a depth of five skin plates (Plate 5). The upper edge of the east-facing elevation was also trimmed with thin sections of timber beading which acted as a cushion between the concave face of the gate and the stone walls of the dock gate recess.
- 3.2.6 The outside (west-facing) elevation is a vertical face without skin plates and the web plates are clearly visible (Plate 6). Due to access limitations and the fact that the dive support vessel, *Halcyon Days*, was still moored against the west-facing elevation of the gates, it was not possible to study this portion of the gate at the time of closure; however, this face of the gates was recorded during the original photographic and laser scanning process (OA North 2011). The top of each gate is capped by a curved deck plate (Plate 7) which is recessed around the mitre posts. The deck plates were covered in foliage and detritus and, while their shape was clearly visible, the surface of the timber was not. The mitre posts themselves are braced with a cast iron collar.
- 3.2.7 Less than 1/7th of the dock gates are visible above the high water mark and the exposed areas appear to be in generally good condition despite some damage caused by environmental factors, such as water and mechanical erosion and exposure to the effects of sun and wind. A number of small holes are visible in the skin plates of the southern dock gate, as well as a small patched area adjacent to the heel post. A circular hole is present on the upper section of the north dock gate

which suggests the loss of a metal fixture or chain connection point rather than a hole caused by damage or erosion.

- 3.2.8 **The Gate Recesses:** following the closure of the dock gates, the southern and northern side recesses for the gates were fully exposed above the water line (Plates 8 and 9). The gate recess situated on the northern gate pier is constructed of pink sandstone, some of which shows signs of wear through erosion, arranged in an irregular bond type which is markedly different from the dock wall and the perimeter wall of the gate pier. The rest of the dock and gate pier is built from large granite blocks arranged in the Cyclopean Granite-style pioneered by Dock Engineer, Jesse Hartley. The side recesses are curved in form and sufficiently deep to admit the gate, allowing it to recede beyond the line of the walls of the gate piers, thus ensuring that they were not at risk of being struck by vessels as they passed in and out of the dock. The gate recesses terminate in two returns; the hollow quoin and the square quoin. Within each gate recesses are further vertical rectangular recesses which are present as mirror images on both the north-and south- facing elevations of the recess.
- 3.2.9 Following the closure of the gates, it was anticipated that hi-resolution photographs would be used to generate 3D images (using Agisoft applications) of the dock gates and the dock gate recesses. However, due to the limited angle options for the photographs, which were dependent on the available vantage points from the north and south gate piers, it proved not possible to create sufficient variable view point images to generate the photogrammetric modelling. It is anticipated that subsequent to the gate closure, an additional watching brief will be maintained when the water level in the dock is reduced as part of the infilling process, and it is proposed to take further photographs at this juncture.

4. CONCLUSION

4.1 DISCUSSION

- 4.1.1 Following the closure of the dock gates it was determined that the gates were in a good condition with only limited damage and weathering visible above the water line. The chain connections, buffers and deck plates are still present and are in good condition, but are obscured in places by foliage and debris. The divers assessed that the condition of the gates below the waterline was good.
- 4.1.2 The gates have been closed with a small gap (*c* 0.4m) left between the mitre posts to accommodate changes in water levels while the dock is still full of water. Following the closure of the gates it is anticipated that additional work will be carried out in this area to protect and seal them, prior to the dock being drained in preparation for backfilling.

5. BIBLIOGRAPHY

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5.1.1 Cartographic Sources

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Figure 4: Extract from Ordnance Survey 1:2,500 map, 1954

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Figure 6: General site plan of Wellington Dock

Figure 7: Plan view of Wellington Dock gates and gate piers (gates in open position)

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Plate 6: Exterior elevation of dock gates (while still housed in dock gate recess on the north gate pier)

Plate 7: View of deck plate on the north dock gate

Plate 8: Gate recess in the north-facing elevation of the south gate pier

Plate 9: Gate recess in the south-facing elevation of the north gate pier

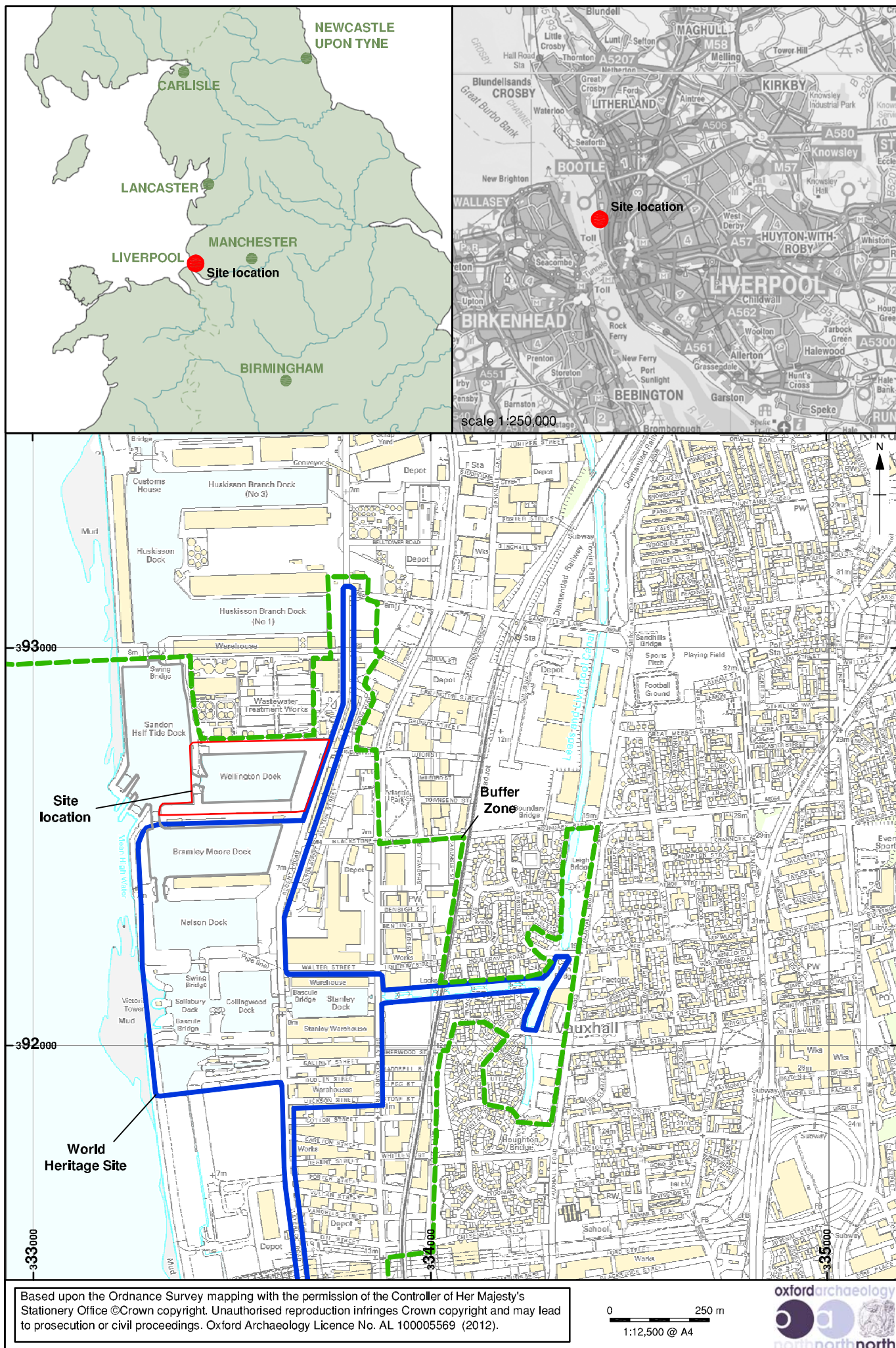


Figure 1: Site location

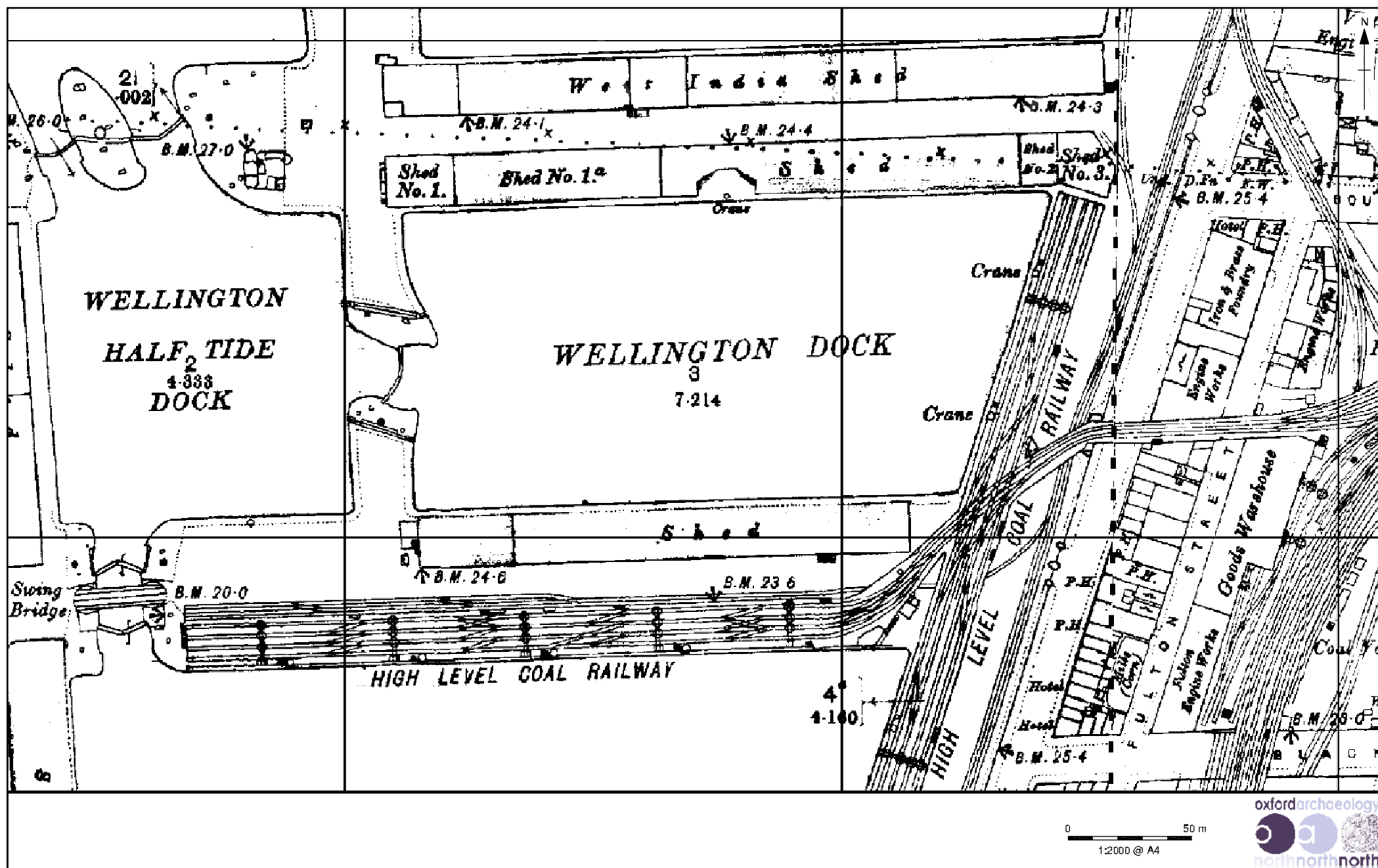


Figure 2: Extract from Ordnance Survey 1:2,500 map, 1890

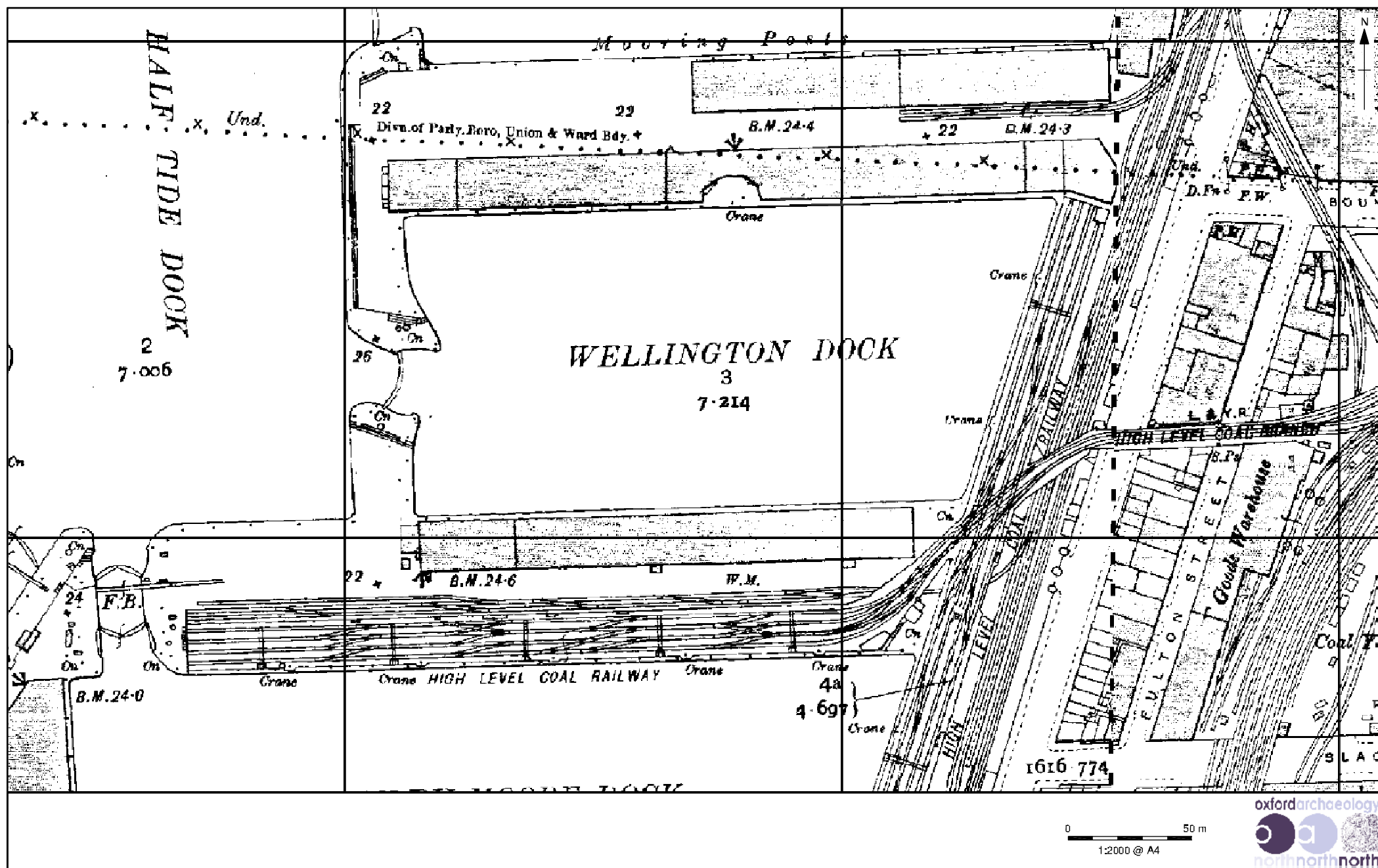


Figure 3: Extract from Ordnance Survey 1:2,500 map, 1908

Figure 4: Extract from Ordnance Survey 1:2,500 map, 1954

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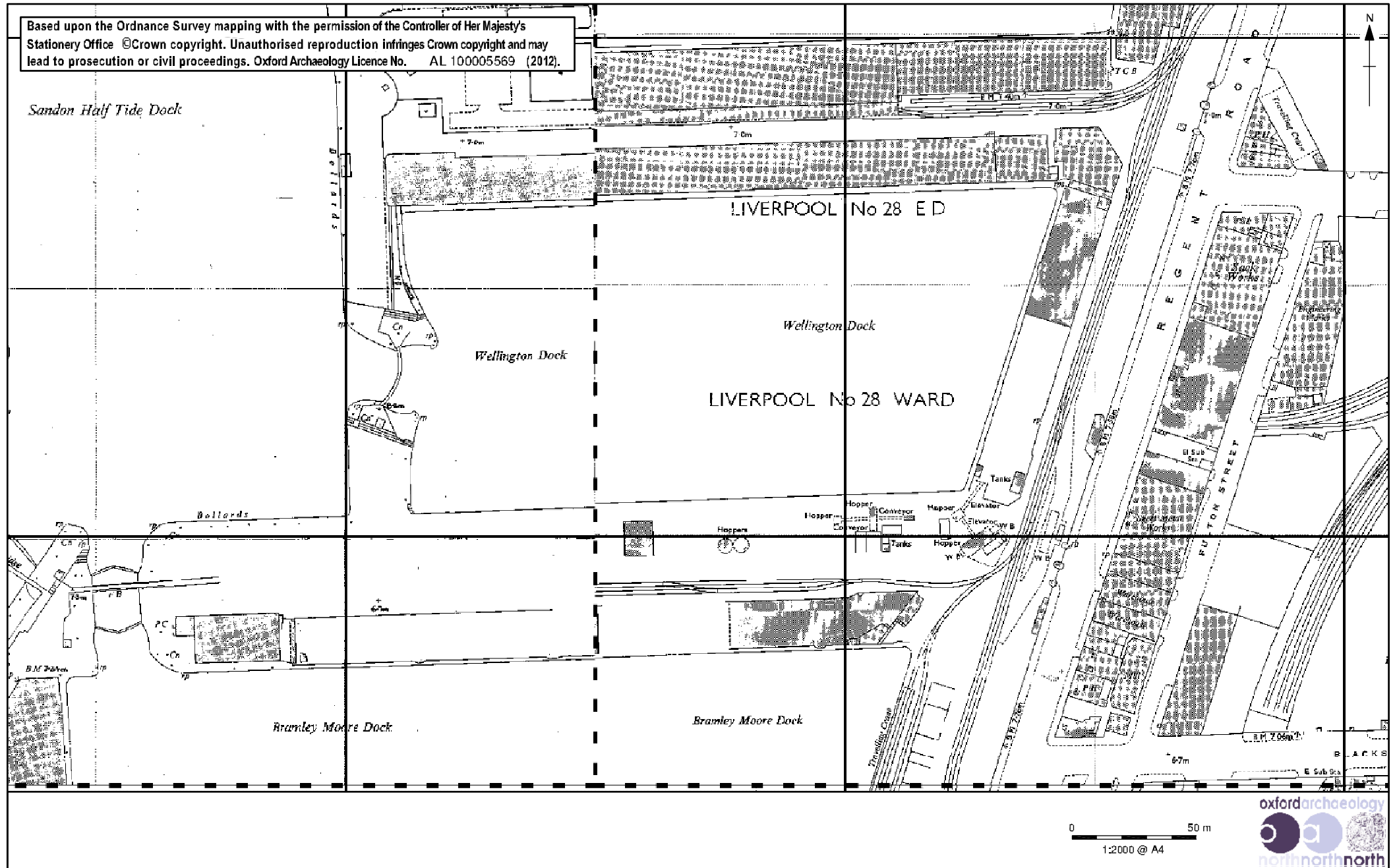
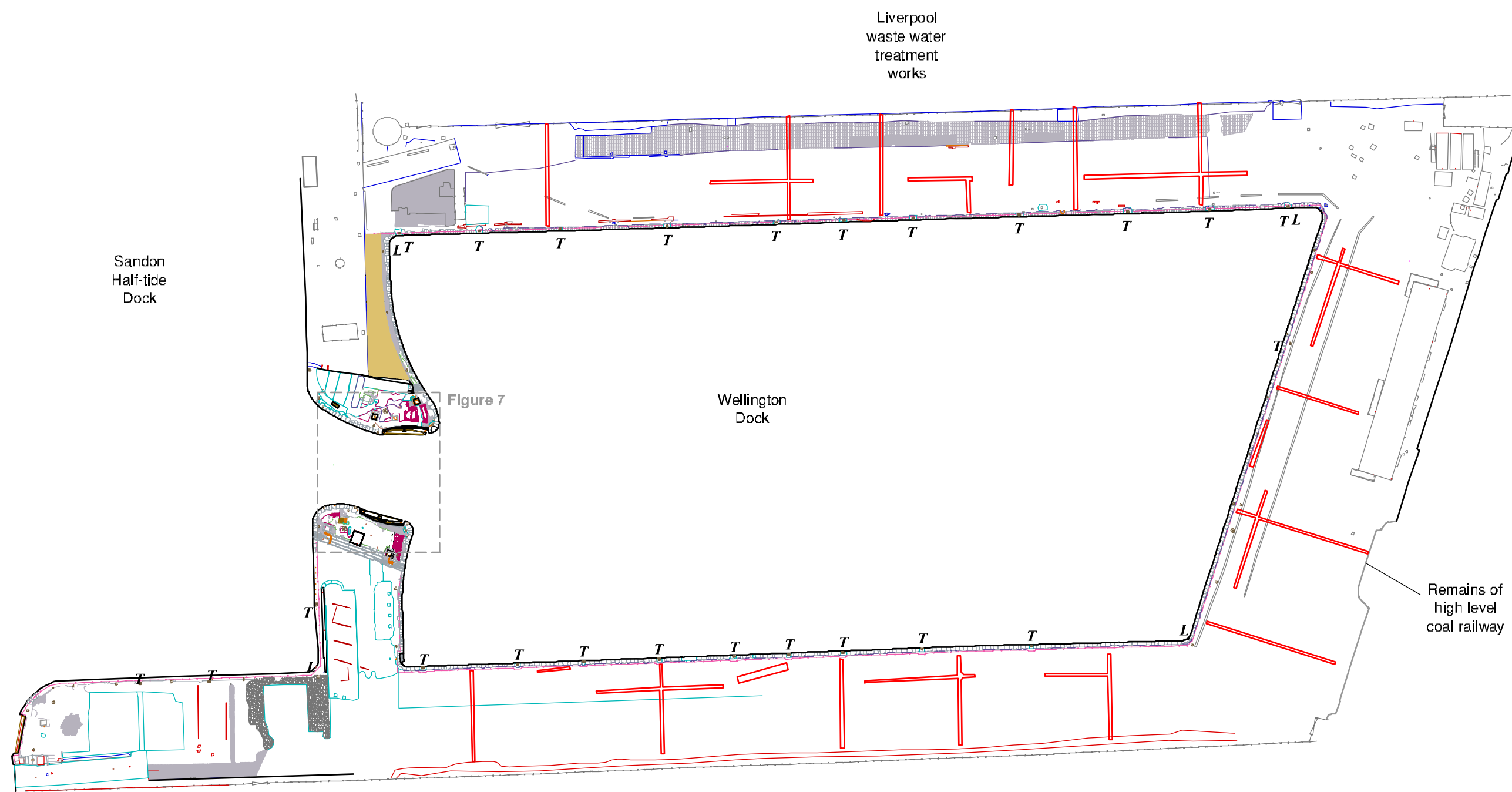


Figure 5: Extract from Ordnance Survey 1:2,500 map, 1968



- | | | | | | |
|---|----------------|----------|--------------------|--|-------------------------------------|
| — | Dock wall | <i>T</i> | 'T' shaped bollard | | Ground Investigation Trial Trenches |
| | Granite edging | <i>L</i> | Ladder | | |
| | Contours | | Pedestrian barrier | | |

0 25 m
1:1250 @ A3



Figure 6: General Site Plan

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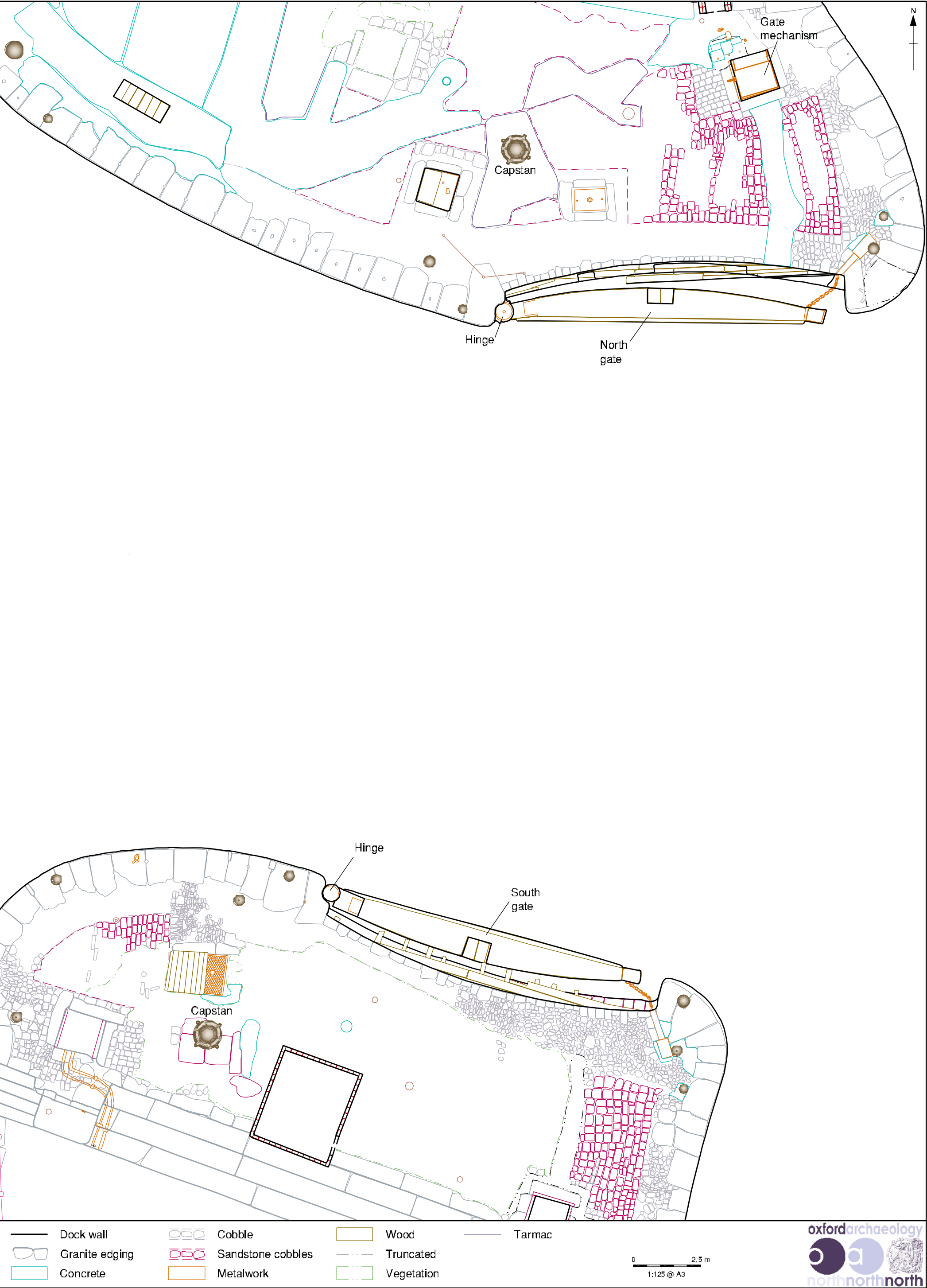


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Plate 9: Gate recess in the south-facing elevation of the north gate pier