



# Queen Elizabeth Class Capital Dredge Project Her Majesty's Naval Base Portsmouth

Post-Excavation Assessment Report



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Portway House  
Old Sarum Park  
Salisbury  
Wiltshire  
SP4 6EB

[www.wessexarch.co.uk](http://www.wessexarch.co.uk)

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Wessex Archaeology project code	111320
Project management by	J. Russell, A.Hamel and T.Gane
Document compiled by	P.Croce, T.Gane and A. Hamel
Contributions from	Lynn Wooton, Lorraine Mephram
Graphics by	Kitty Foster

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## Summary

Wessex Archaeology was commissioned by Boskalis Westminster Limited (BWL), the dredging contractor, on behalf of the Defence Infrastructure Organisation (DIO) to undertake quayside archaeological monitoring as part of the Queen Elizabeth Class (QEC) Capital Dredge Project at Her Majesty's Naval Base (HMNB) Portsmouth.

Over a thousand objects were recovered and subsequently recorded as part of the capital dredge works. The archaeological material inspected on the Quayside is predominantly associated with marine activities and includes material accidentally or deliberately lost overboard such as anchors, personal objects and ordnance but also material from shipwrecks such as timbers and fittings.

The core of the archaeological resource is dated to the 20th century, with periods of the Second World War and late 20th century particularly well represented. The long frequentation of Portsmouth by the Royal Navy, which dates from the medieval period, is demonstrated by the presence of a variety of finds that were issued by the Navy, a number of which are marked with the broad arrow. Significantly, the earliest datable finds are ordnance of the 16th century. This is part of a relatively numerous group of objects recovered that are associated with military actions. Although in smaller numbers, aviation material such as aircraft engines, are also represented in the assemblage.

The context of recovery means that many of the finds can be associated with the harbour operations and navigation activities. Amongst the numerous finds, the remains of an early 19th century buoy are highly significant.

This report assesses the potential of this archive to generate a significant contribution to the archaeological knowledge of Portsmouth, the region and wider area, themes (such as trade and warfare), and time periods (such as the Second World War), and it contains proposals for further analyses and dissemination work identifying suitable techniques and the resources required.

Finally, the report advises on conservation strategies and storage options that have been identified for the archive.





## Acknowledgements

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Wessex Archaeology would like to thank David Pearson and Eleanor Schofield at the Mary Rose Trust for their assistance.

The following staff from Royal HaskoningDHV, DIO's environmental consultants, also contributed to the project: Victoria Cooper and Jackie Lavender.

Katy Bell from Portsmouth Museum provided information regarding the objects of interest for accessioning.

Although all of the finds are within the jurisdiction of the Queen's Harbour Master Portsmouth, finds from dredging zone A have been reported to the Receiver of Wreck as a courtesy, and Wessex Archaeology would like to thank Alison Kentuck, Receiver of Wreck, and Imogen Smart, Assistant Receiver of Wreck for their work processing the reports and looking into possible repositories for the finds.

Fieldwork was undertaken by Graham Scott, Paolo Croce, Tom Harrison, Alistair Byford-Bates, Peta Knott and Andrea Hamel. This report was compiled by Paolo Croce. Lorraine Mephram carried out the finds assessment. Advice about finds conservation was provided by Lynn Wootten. The figures were prepared by Kitty Foster. Toby Gane, Jack Russell and Andrea Hamel managed the project on behalf of Wessex Archaeology and provided quality assurance.



# Portsmouth QEC Capital Dredge

## Post-Excavation Assessment Report

### 1 INTRODUCTION

- 1.1.1 Wessex Archaeology was commissioned by Boskalis Westminster Limited (BWL), the dredging contractor, on behalf of the Defence Infrastructure Organisation (DIO) to undertake quayside archaeological monitoring and administer an on-board finds reporting protocol (hereafter the 'Protocol') undertaken as part of the Queen Elizabeth Class (QEC) Capital Dredge Project at Her Majesty's Naval Base (HMNB) Portsmouth. This fulfils two of the conditions from the MMO Consent Decision document (MLA/2012/00474).
- 1.1.2 Works were undertaken in line with the Written Scheme of Investigation (WSI) (Wessex Archaeology 2015a) and the Method Statement for On-board Finds Reporting Protocol and Quay Side Archaeological Monitoring (Wessex Archaeology 2015b).
- 1.1.3 The Protocol set out a framework to facilitate the reporting of finds of archaeological interest that were discovered during clearance operations and dredging works. The vessel crews, dive teams, and UXO operatives were made aware of the Protocol and their responsibilities through awareness presentations prior to work commencing. Reports of discoveries were forwarded to Wessex Archaeology for initial archaeological assessment, and actions were taken to determine the level of investigation appropriate for each discovery. Finds were then transferred to the quay side for archaeological assessment.
- 1.1.4 Quayside archaeological monitoring took place once the items of archaeological interest had been delivered to the quay. The material was visually reviewed and recorded by suitably qualified marine archaeologists.
- 1.1.5 A report on the finds recovered during the dredging operation has been prepared by Wessex Archaeology (2018). The report presents an overview of the dredging operations together with an initial assessment of the finds recovered during the clearance.

### 1.2 Development Description

- 1.2.1 The project comprised the capital dredging of areas within Her Majesty's Naval Base (HMNB) Portsmouth, Hampshire (**Figure 1**) in order to allow access for QEC aircraft carriers.
- 1.2.2 The scheme involved deepening the main Harbour approach channel and Harbour entrance to 10.8 m below Chart Datum (CD). As a result, the inner harbour channel was dredged to a depth of 11.0 m below CD and the berthing pocket to 13.8 m below CD. The total volume of dredged material arising from the capital dredging activities was approximately 3.2 million m<sup>3</sup>.
- 1.2.3 The five zones that have been actively dredged are shown in **Figure 1**.
- 1.2.4 As the areas subject to dredging all fall within the jurisdiction of the Harbour Master the ownership of all finds raised from the seabed within these areas lies with the Royal Navy.

This has been confirmed through consultation with the Receiver of Wreck and informs the post-excavation strategy set out in this report.

### **1.3 Previous work**

1.3.1 Several documents have been produced with regards to the archaeological assessment for the QEC project. A summary including a description of the previous works is included in the WSI (Wessex Archaeology 2015a).

1.3.2 Several stages of assessment and archaeological works have been undertaken for the QEC project. In summary:

- Desk-based assessment undertaken by Wessex Archaeology 2003;
- Archaeological assessment of geophysical data acquired from the approach channel undertaken by Wessex Archaeology in 2004 (Wessex Archaeology 2004a and b);
- Archaeological assessment of cores and grab samples undertaken by Maritime Archaeology Limited in 2006;
- Updated desk-based assessment, diver survey and impact assessment undertaken by Maritime Archaeology Limited in 2007 (Maritime Archaeology Limited 2007a);
- Field Activity and Site Inspection undertaken by Maritime Archaeology Limited in 2007 (Maritime Archaeology Limited 2007b)
- Environmental Statement prepared by Royal HaskoningDHV in 2012 (RoyalHaskoningDHV 2012 a and b);
- Written Scheme of Investigation for HMNB Portsmouth Approach Channel Dredging and Associated Works prepared by Royal HaskoningDHV in 2013;
- Written Scheme of Investigation for HMNB Portsmouth Approach Channel Dredging and Associated Works prepared by Royal HaskoningDHV in 2015 (Royal HaskoningDHV 2015a and b);
- Preparation of Written Scheme of Investigation and Protocol for Archaeological Discoveries by Wessex Archaeology in 2015 (Wessex Archaeology 2015a);
- Preparation of a Method Statement for on-board finds reporting protocol and Quay side archaeological monitoring by Wessex Archaeology in 2015 (Wessex Archaeology 2015b);
- Implementation of Protocol for Archaeological Discoveries and quayside monitoring by Wessex Archaeology 2016-2017;
- Post-dredging finds assessment undertaken by Wessex Archaeology in 2017;
- Post-excavation assessment undertaken by Wessex Archaeology (this document) in 2018; and
- Geoarchaeological assessment and creation of a deposit model by Wessex Archaeology (ongoing).

- 1.3.3 Consultation with Historic England has been carried out at each stage of the assessment and subsequently to agree the archaeological works and the approach to mitigation post-consent, as set out in the WSI. During pre-dredge UXO clearance and the capital dredging regular communication was maintained between key stakeholders as necessary to agree appropriate responses to specific discoveries. Following completion of the dredge, the approach to post-excavation assessment, as set out in this document, has also been subject to ongoing consultation with Historic England, the Receiver of Wreck and DIO on behalf of the Navy as owner of the archive.

## 1.4 Scope of Document

- 1.4.1 This report is a post excavation assessment. The purpose of this assessment is to present recommendations regarding further finds analysis, conservation, storage, discard, deposition/acquisition and publication of the archive, in line with Chartered Institute for Archaeologists (CIfA) guidelines (CIfA 2014a and b).

## 2 METHODOLOGY

- 2.1.1 The full methodology of the archaeological watching brief is described in the Archaeological Assessment report (Wessex Archaeology 2018, section 4).
- 2.1.2 As stated within the WSI (Wessex Archaeology 2015a) further analysis of finds will constitute a separate item of work, for which an updated project design will be prepared by Wessex Archaeology for approval by DIO and the Archaeological Curator(s). This post-excavation report contains updates to certain aspects of the project design and is considered to meet the requirements of an updated project design.

## 3 FINDS ASSESSMENT

- 3.1.1 Over a thousand objects were recovered and subsequently recorded as part of the capital dredge works. The number of finds of some level of archaeological significance that were assessed by Wessex Archaeology includes 539 individual artefacts together with more than 100 pieces of wood relating to a single shipwreck (**Appendix 1**). The remaining artefacts were considered to be of no archaeological significance, as they included natural stone and modern debris.
- 3.1.2 The finds of archaeological interest were reported via 265 individual reports, which often comprised multiple objects. Nine additional reports refer to voided numbers or natural stones and have been disregarded in this assessment. A full description of the finds is given in the Archaeological Assessment report (Wessex Archaeology 2018, section 5).
- 3.1.3 From an archaeological perspective, it is important to maintain an awareness that the main recovery method (TSHD) is likely to have heavily influenced the character and quantity of the archaeological resource recovered, as smaller finds are less likely to get caught into the screen of the drag head unless they are trapped in larger objects or jammed into groups. This also means that the exact positions for a number of finds are unavailable as their discovery can be registered only after the drag head is lifted and the dredge track completed. However, although the recovery method poses these challenges, it is an established and approved approach for dredging operations in these conditions offshore, as established through industry guidance (Cooper and Gane 2016 p. 41-43) and was implemented in full agreement with Historic England.
- 3.1.4 The use of a crane barge and the backhoe dredger allowed for increased spatial control. However, it should be remembered that, as with TSHD, during clearance by grabbing most

of the archaeological contexts are disturbed and some information held within the archaeological deposits will have been lost.

## 4 STATEMENT OF SIGNIFICANCE AND ASSESSMENT OF POTENTIAL

### 4.1 Introduction

4.1.1 A basic catalogue in the form of individual record sheets has been created for all the objects recovered during dredging, in some cases grouping objects found together by material type. It is recognised that this assemblage is essentially unstratified, and most of it cannot be related to specific shipping activities or historical episodes of activity.

4.1.2 The assemblage contains finds that have been dated from the 16th century to the 20th century which encompass the large range of activities that have been carried out within the harbour during its use.

4.1.3 Portsmouth is the Navy's oldest operational base and the continuity of the Navy's occupation of the harbour is very well represented in material recovered during the dredging.

### 4.2 Methodology

4.2.1 The archaeological significance of the assets is assessed as follows:

**Table 1: Value of archaeological assets**

Value	Definition
High	<ul style="list-style-type: none"><li>• Best known, only example, or above average example and/ or high potential to contribute to knowledge and understanding and/ or outreach.</li><li>• Receptors with a demonstrable international dimension to their importance are likely to fall within this category.</li><li>• Wrecked ships and aircraft that are protected under the Protection of Wrecks Act 1973, Ancient Monuments and Archaeological Areas Act 1979 or Protection of Military Remains Act 1986 with an international dimension to their importance, plus as-yet undesignated sites that are demonstrably of equivalent archaeological value.</li><li>• Known submerged prehistoric sites and landscapes with the confirmed presence of largely in situ artefactual material. Paleogeographic features with demonstrable potential to include artefactual and/or paleoenvironmental material, possibly as part of a prehistoric site or landscape.</li></ul>
Medium	<ul style="list-style-type: none"><li>• Average example and/ or moderate potential to contribute to knowledge and understanding and/ or outreach.</li><li>• Receptors with a demonstrable district level dimension to their importance are likely to fall within this category.</li><li>• Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have moderate potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation.</li><li>• Prehistoric deposits with moderate potential to contribute to an understanding of the paleoenvironment.</li></ul>

<b>Low</b>	<ul style="list-style-type: none"><li>• Below average example and/ or low potential to contribute to knowledge and understanding and/ or outreach.</li><li>• Receptors with a demonstrable local dimension to their importance are likely to fall within this category.</li><li>• Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have low potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation.</li><li>• Prehistoric deposits with low potential to contribute to an understanding of the paleoenvironment.</li></ul>
<b>Negligible</b>	<ul style="list-style-type: none"><li>• Poor example and/ or little or no potential to contribute to knowledge and understanding and/ or outreach. Assets with little or no surviving archaeological interest.</li></ul>
<b>Unknown</b>	<ul style="list-style-type: none"><li>• There is not presently enough information available about the site to assess its value.</li></ul>

4.2.2 As a rule of thumb, finds that can be dated to the early period of the dockyard's development (pre-1815) are usually of some level of significance due to their intrinsic value associated with their age. Furthermore, well preserved surviving assets of this period are rare.

4.2.3 Later finds (1815-1914) cover the period generally referred to as Britain's imperial century and are dated from the end of the Napoleonic Wars up to the outbreak of the First World War. These finds include many technical innovations which characterised the industrial revolutions and the naval arms race between Germany and Britain in the latter part of the 19th century/early 20th century. Although these finds, especially those produced from the latter part of the 19th century, are generally more common, certain assets retain high significance due to their uniqueness, often because they are experimental items, or because they are seen as a remarkably well-preserved example that is representative of their class.

4.2.4 The finds dated during and between the two World Wars (1914-1945) can be significant if related to specific events, people and places and/or if they are linked to the early developments of aerial and submarine warfare and defence.

4.2.5 Later finds are generally not significant from an archaeological perspective unless they can be associated with important historical events or have aesthetic merits or special relevance to a particular community.

### 4.3 Discussion

4.3.1 The finds that have been assessed as having some level of significance are presented below.

#### *Human Skull*

4.3.2 The human skull (BWL6\_0008) was acquired by the relevant authorities (Hampshire Constabulary) after discovery and has been considered as not modern in date.

4.3.3 It is unclear whether the find belongs to a larger site or it is an isolated item as the circumstances of recovery meant that the findspot could not be located and the exact position for the skull is unknown.

- 4.3.4 Because of the absence of a context of recovery and the lack of a more precise date the archaeological value of this find is currently assessed as **unknown**.
- 4.3.5 In order to understand more on the archaeological significance of the item, the skull has been transferred to Wessex Archaeology where it was examined by Jacqueline McKinley, Principal Osteoarchaeologist, to determine the presence/absence of pathologies, possible geographical origin, sex and diet. The skull appears to be from a young to mid-adult male, approximately 25-45 years old. The teeth exhibit no evidence of dental work, and although there is not heavy wear, nor do they appear to have been exposed to considerable quantities of sugar, there are several teeth missing, with some indications of antemortem tooth loss and a possible carious lesion. One of the front teeth may have been used as a tool, as it appears to have been broken, although this is difficult to confirm without the presence of the adjacent teeth. The lack of heavy wear to the teeth means that the skull is not prehistoric in date, but more recent, and it likely dates to the medieval or early post-medieval period.
- 4.3.6 It is advised that radiocarbon analyses are carried out on the remains to provide more precise dating evidence. In addition, isotope analysis should be carried out on one of the teeth to provide more information about diet and geographical origin.
- 4.3.7 Well preserved human remains from submerged sites are uncommon finds and should be treated with care and respect hence an appropriate repository should be identified.

#### *Aircraft Engine*

- 4.3.8 The aircraft engine (BWL1\_0050) has been provisionally identified as a *Junkers Motoren Werke* (Jumo) 211 which was used to power a number of Luftwaffe bomber types during the Second World War.
- 4.3.9 Although this type of engine is not rare and is well attested in museums collections, the aircraft that it belonged to has not yet been identified so further historical research is recommended to ascertain whether the event in which the engine was lost has any specific historical relevance for the harbour and the town of Portsmouth. Further, partial cleaning and disassembly of the engine may locate potential manufacturer marks. The archaeological significance of the engine is assessed as **medium**.

#### *Cannons*

- 4.3.10 Eight cast iron smooth bore muzzle loading cannons (BWL1\_0035, BWL1\_0036, BWL1\_0051, BWL1\_0077, BWL1\_0078, BWL1\_0079, BWL1\_0080, BWL1\_0081) were recovered within Dredging Zone D South, in positions close to the historic harbour. These are being held in passive conservation at the Mary Rose Trust in preparation for active conservation. This assemblage constitutes an important collection of early small calibre cannons ranging from the late 16th century to the early 18th century. This is a period in which the ordnance development is not fully understood as the styles and patterns of the guns were not yet standardised hence its importance.
- 4.3.11 Early cannons in relatively good condition are very rare finds, so the archaeological significance of these guns is assessed as **high**. Additionally, the association of this assemblage with the occupation of Portsmouth Harbour and the activities of the Navy adds value to the historical importance of these finds, possibly offering an insight on the supply chain of ordnance for the Navy.



- 4.3.12 On 18 December 2017, historic artillery specialist Charles Trollope - one of the leading ordnance specialists in the country - visited the Mary Rose Trust and assessed the ordnance. He was able to record two of the guns (BWL1\_0051 and BWL1\_0080), but the remaining ordnance was too heavily concreted to be able to extract any useful information.
- 4.3.13 It is recommended that the cannons are further recorded to a publication standard and assessed by Charles Trollope with a view to publish the material in a specialised journal. Two of the guns are still completely covered by concretion and these should be assessed and recorded when the concretion is removed, and the features of the guns are visible.
- 4.3.14 The cannons recorded by Charles Trollope have been illustrated by Richard Enzo, and it is recommended that he illustrate the remaining cannons following the removal of concretions.
- 4.3.15 Further historical research on the ordnance could shed light on the circumstances of deposition of the cannons and help reveal whether the guns were deposited during a single event or as a phased occurrence. This work will be carried out by Wessex Archaeology with the involvement of historical ordnance specialist Charles Trollope.
- 4.3.16 BWL1\_0080 bears an official survey mark so has a significant potential for further research. The National Archive holds documents such as the Board of Ordnance Bill Book and Brown's survey which may help to reconstruct details of the history of the gun.
- 4.3.17 Further archival research on ship losses within the harbour of Portsmouth should also be undertaken as although it has been suggested that the cannons may have been part of an anchorage and used as moorings, the presence of a possible tampion on BWL1\_0077 would suggest that at least one of the guns was lost whilst in use. This research should also take into consideration the new evidence revealed by the removal of the concretion of guns BWL1\_0078 and BWL1\_0081. The archival research will be undertaken by Wessex Archaeology.
- 4.3.18 The eight cannons are currently held at the Mary Rose Trust and are in the process of being conserved by specialist conservators. The cannons will be deposited with the DIO/ Navy/MoD. The budget for conservation is administered between DIO and the Mary Rose Trust, and Wessex Archaeology is not party to these negotiations (see **Appendix 3**)

#### *Anchors*

- 4.3.19 The 37 anchors recovered during the dredging probably constitute the largest and most varied assemblage of anchors that has been found in English waters to date. These anchors are representative of the unique history of the harbour and provide a window on the development of anchors adopted by the Royal Navy through history.
- 4.3.20 Although the collection is significant as a whole, the majority of the anchors are assessed as having **low** level of archaeological or historical importance as they are relatively modern and commonly represented within the archaeological record. The admiralty long shank anchors BWL1\_0032 and BWL1\_0054, BWL1\_0082, BWL9\_0072 are the most significant of the assemblage as they could potentially date to the late 18th century or earlier. Also of significance is the wide range of anchor types of the second half of the 19th century as some of these are uncommon and demonstrate the range of solutions, some probably experimental, adopted in this period.
- 4.3.21 Precise spatial information is provided for most of the anchors, so there is scope for research that aims to correlate the recovery locations with the positions of known and unknown historic anchorages. The assemblage has good potential to contribute to the



understanding of the range of activities and disposition of anchorages through the development of the harbour.

- 4.3.22 The preservation of the whole collection is considered not to be a viable or cost-effective long-term solution, hence preservation by record by fully recording the collection is recommended (drawn, photographic, photogrammetric etc.). Additionally, it is suggested that, as most of the anchors have been recorded with photogrammetry, the 3D archive produced during the recording of the items could be digitally displayed in the future. This would constitute an exceptional resource with significant educational potential.

#### *Cannon balls and other projectiles*

- 4.3.23 A total of 107 iron shot and three stone shot were found during the project. The largest group amounts to 67 balls and was recovered within Dredging Zone E. A rapid assessment of the cannon balls demonstrated the large variety in sizes and types of naval armaments and it is recommended that a representative sample of shot is recorded in detail to determine the broad signature of the collection.
- 4.3.24 The archaeological significance of the collection is assessed as **low** and full analyses of all the shots is considered impractical and not conducive to meaningful results when considered that most of the finds are poorly located. However, due to the large number of shot, the uniformity of the collection and low archaeological significance, the cannon balls could have some potential to help research in the field of conservation of archaeological iron from marine context.
- 4.3.25 One find previously identified as a barshot (BWL6\_0019 7/10) has since been identified by Portsmouth Museum as a rare Napoleonic grenade, as treatment undertaken so far had revealed further details of the object. It is assessed as of **high** archaeological value.
- 4.3.26 The Whitworth shot (BWL1\_0028) is relatively uncommon and as it is a relatively late date (first patented 1855), it is assessed as of **low** archaeological value.

#### *Ship's launch*

- 4.3.27 The late 19th century work boat (BWL1\_0069) is possibly the earliest surviving example of its kind. Only two other 42ft Royal Naval open pulling launches, *Cyclops* and *Dorian*, are known to survive and both were built later, in 1915. They both survived the First and Second World War after which their significance was recognised by their registration in the National Register of Historic Vessels. The history of these two boats indicate that these rowing craft usually started their life as tenders for carrying supplies to large Naval ships and often later used as mooring buoy tenders, general work boats and small ferries or pleasure craft.
- 4.3.28 The likely connection of this wreck with the recent history of the Portsmouth harbour is particularly significant. As the two identical craft were built at the Royal Naval Dockyard at Portsmouth, it is reasonable to assume that this vessel was also built locally. Although built relatively recently, the rarity of the vessel type and the close association with the activities of the harbour mean that its archaeological significance is assessed as **medium**, despite its condition. Although the means of discovery meant that further contextual data, which may have been contained within the deposits from which the archaeological material was recovered, could not be fully recorded, it is believed by Wessex Archaeology that due to the relatively recent loss of the vessel that further historical research in the local and National archives and newspapers of the time may help to identify the boat and learn about the circumstances that led to its loss.

4.3.29 This research should aim to find records of the loss of the vessel so that the historical significance of the archaeological material can be ascertained. In addition, detailed recording of the material should aim to reconstruct the build of the boat so to understand whether the construction techniques are consistent with the description contained in later manuals or whether it was subject to adaptations by the local shipyard. During this phase the analyses of diagnostic elements might help to reconstruct the history of the use of the vessel, for example if there was any repair or alteration. The launch has the potential to provide insights into both the use of Portsmouth Harbour and naval construction techniques in the 19th century.

4.3.30 In view of its significance and relevance to local history and strong association with Portsmouth Naval Base, and as a way to mitigate the impact on the archaeological record caused by the removal of the vessel, it is advised that the results of this research are published in an appropriate journal, such as the *Hampshire Field Club and Archaeological Society Journal* or the *International Journal of Nautical Archaeology*

*Unidentified composite wood and metal object*

4.3.31 This object (BWL1\_0018) has not been identified and further research is required to assess its historical and archaeological value. The materials used in its construction suggest that it was produced in the 20th century but at present its significance from an archaeological and historical perspective is **unknown**.

*Ships' timbers*

4.3.32 There are 37 entries of wooden material in the project catalogue equating to a total of 48 wooden objects, including one entry each for the buoy (BWL7\_0001) and the boat (BWL1\_0069).

4.3.33 Timbers BWL9\_0014, BWL9\_0023, BWL1\_0092, BWL9\_0086, BWL1\_0019, BWL7\_0016 have been assessed as of **unknown** archaeological value as they could date to well before the start of the 19th century. Due to the number of rings, these timbers are considered suitable for dendrochronological analyses and it is recommended that samples are taken.

4.3.34 Ships' timbers from unstratified contexts are notoriously difficult to date due to the continuity of shipbuilding traditions. Hence elements of identified ship structure that cannot be conclusively assessed as modern should be recorded to an archaeological standard with drawings and subject to dendrochronological analyses to establish a fell date. If these analyses provide inconclusive results it is advised to carry out Radiocarbon wiggle-match<sup>1</sup> dating, as this may provide a date for the timbers.

4.3.35 There is limited scope for undertaking metallurgical analyses of the copper that is used in the sheathing of the assembly BWL1\_0092 and use them as a tool for dating by comparing its mineralogical composition with similar samples. It is suggested that the metallurgical analyses and texture analyses are carried out by P. Northover, at the University of Exeter. Lead isotope analysis of the lead sheathing could identify its provenance and composition but these investigation objectives are considered not worth pursuing at this stage of the

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<sup>1</sup> 'Wiggle-match' is defined by Historic England (formerly English Heritage) as the 'comparison of a series of radiocarbon dates, produced from samples of wood separated by intervals of real years, against a radiocarbon calibration curve to produce a more precise date in the absence of a tree-ring date' (English Heritage 2004 p. 37).

research, as it is possible that this is an isolated timber representing discarded material, and therefore further assessment would be of limited value.

#### *19th century Buoy*

- 4.3.36 The 19th century buoy (BWL7\_0001) is archaeologically significant due to its date and rarity. Investigation is at an early stage, but it is probably the only artefact of its type that it is known in England and its value is further enhanced by the context of recovery and the presence of rase marks. The rase marks are evidence of the management of timber within the Royal Dockyards, with marks possibly indicating the type of species, date of felling, initials of dock yard officials processing the timbers, size in cubic feet, and the broad arrows indicating ownership by the Royal Navy. The construction of buoys of the early 19th century is a neglected area within the archaeological and historical studies so it is important to produce an appropriate record of the construction.
- 4.3.37 The find is assessed as of **high** archaeological importance and it is likely to be a unique item so it is suggested that it should be investigated thoroughly. The results of the investigation should be published in an appropriate journal.
- 4.3.38 Due to the limited storage space on the quay side and the fact that the significance of the find was not fully understood until further assessment had been undertaken, unmarked sections of the buoy were disposed of during the fieldwork. However, it is believed that the preliminary recording that was carried out at the quay side together with study of the parts that are now in storage at Wessex Archaeology should be sufficient to allow the production of drawings to a publication standard so that the construction sequence of the object can be understood. This should provide insights into an aspect of naval construction of the early 19th century that to the knowledge of the author has not been investigated before from archaeological sources. Historic England, in their response the Archaeological Assessment Report (dated 18 December 2017), has recommended that the subsequent analysis programme should include accurate modelling and reconstruction to illustrate its possible original form. This can be achieved by a photogrammetric, structured light or laser scanner survey of the remains.
- 4.3.39 Metallurgical and texture analyses on a selection of copper sheathing fragments could help to narrow down the date of use of the buoy by comparison with other samples from identified wrecks of this period such as HMS *Pomone* and HMS *Primrose*. As discussed by Satchell and Whitewright (Satchell 2014) the nuances in the change over time of impurities such as arsenic have potential in dating wrecks in the absence of other methods. It is suggested that the metallurgical analyses and texture analyses are carried out by P. Northover., at the University of Exeter. This research could shed light on the origin of the supply of copper used by the Royal Navy for the construction of naval infrastructures and will also provide another important element to the corpus of material already existing which is principally sourced from wreck sites. The question of the recycling of copper within dockyards could also be addressed.
- 4.3.40 Analyses designed to ascertain the composition and geographical origin of the caulking and luting material are also recommended as despite the use of caulking material on a large scale, the analyses of its composition are sparse in archaeological literature. Furthermore, the identification of potential animal hair or other botanical macro remains present in the pitch/tar together with pollen analyses has demonstrated potential to better understand the geographical provenance of shipwrecks (Deforce 2014). The results should be then assessed against the analyses of comparable samples from Naval vessels in order to understand whether the buoy was caulked in a similar way to the Royal Navy ships of the

time or if different methods were used. These analyses will be undertaken by the Wessex Archaeology environmental team.

- 4.3.41 Finally, limited historical research should be undertaken to assess whether it is possible to tie the archaeological evidence with historical sources such as navigation guides, in particular those that might mention this particular buoy in an attempt to place this artefact within the local historical context.
- 4.3.42 Due to the exceptionality of the discovery, it is suggested that the results of the research should be published in a specialist journal and disseminated to a specialist audience in a paper to be presented at a relevant conference.

#### *Pottery*

- 4.3.43 Full recording of all the material of the assemblage is not considered worth pursuing as it is believed it would not provide valuable return in terms of information. This is due to the fact that the majority of the items recovered were manufactured in the later part of the 19th and 20th century, and they are considered to have no significant archaeological value.
- 4.3.44 However, amongst this more recent pottery assemblage there are around 70 vessels/fragments that can be related to Naval or Crown supplies of which many bear manufacturer backstamps with dates and sometimes mess numbers. This complements that published for the early 20th century naval victualling ceramics from the Royal Clarence Yard in Gosport (Jarrett and Thompson 2012) and illustrates the continuing supply to naval shipping into the early 21st century. This collection might warrant a short publication note in the local archaeological/historical journal and should be accompanied by further photography to highlight the detail of individual objects and stamps.
- 4.3.45 The pre-19th century material is assessed as of **low/medium** archaeological significance and recommended for full recording. This includes a German stoneware jug (BWL9\_0041), some fragments of a Spanish olive jar of globular and carrot form (BWL9\_0051 and BWL9\_0095), three possible chamberpots (BWL9\_0095), a two-handled jug from continental Europe (BWL9\_0078), the *Warren's Liquid Blacking* stoneware vessel (BWL9\_0097), a plate in tinglazed earthenware (BWL9\_0045).
- 4.3.46 Some limited consultation of trade directories could provide refinement of the dating, in particular for some of the pottery vessels.

#### *Glass*

- 4.3.47 Full recording of the entire glassware collection is not advised but detailed recording of the pre-19th century glass material is recommended. This consists of five wine bottles dating to the 18th century (BWL9\_0092 and BWL1\_0085) which are assessed as being of **medium** archaeological value.
- 4.3.48 The remaining glassware of the 19th and 20th centuries have very **low** archaeological significance but have some limited potential for educational and exhibition purposes. For example, material that illustrates the development of beverage bottles of the 'torpedo' types of the mid-late 19th century to 20th Coca-Cola bottles, as well as glassware marked with local place names and companies.

#### *Clay tobacco pipes*

- 4.3.49 Of nineteen fragments of clay tobacco pipe, ten bowls present diagnostic elements that allowed the specialist to date them to between c. 1680 and 1910 (BWL1\_0068 and

BWL9\_0090). This assemblage has **low** archaeological value and has some limited potential to contribute to the study of local industries. It is advised that the archive is deposited with a full record of all ten pieces.

#### *Footwear*

- 4.3.50 The small assemblage of leather boots/shoes is fragmentary, but still has the potential to provide useful information on the development of footwear during the post-medieval period, as this field of study has as yet received relatively little specialist attention. The assemblage is hence considered of **low-medium** archaeological significance. Assessment carried out by leather specialist Quita Mould has been undertaken and has identified typology, manufacturing techniques, repairs and attempted to date each footwear element. A short summary of the results are as follows.
- 4.3.51 The leather comprises principally of a range of footwear, along with two sections cut from a hose. When excavated nine unique identifying numbers had been allocated to the items of leather (BWL1 0043, BWL4 0013, BWL8 002, BWL9 0004, 0007, 0013, 0030, 0058, 0079). During this initial examination it was possible to recognise a minimum of sixteen individual items of footwear and these have been numbered Cat Nos 1-8, 10-17 in the catalogue and in the table below. In addition, two pieces cut from leather hose pipe were present, item nine in the catalogue.
- 4.3.52 The shoe remains fell into two distinct groups: an earlier group which may be considered 'Georgian' dating no later than the beginning of the 19th century, and a later group dating to the 19th and 20th centuries, Victorian to c. 1930s.
- 4.3.53 Close dating is difficult. The bottom shapes of ten shoes suggest a 20th century date. Two shoes had enough of their uppers surviving to suggest they came from front lacing footwear, one a Derby boot with iron hobnailing (Cat. No 16), the other more likely to be a shoe of Oxford style (Cat No 14). One shoe (Cat No 3) had a peaked toe cap popular in the 1860s (Swann 1982: 48), another (Cat No 2) had brogue detailing popular at the end of the 19th and beginning of the 20th century. One shoe (Cat No 11) had a rubber sole, a feature that came into general use during the First World War (Swann 1982: 56). It is likely that these shoes date to the later 19th/first half of the 20th century.
- 4.3.54 A basic record of the leather has been made and the group has been summarised above. No further work is considered necessary. Currently the recommendation is that all archaeologically recovered leather is conserved to permit safe storage and make it available for study (English Heritage: 2012). This is because of the relative rarity of the survival of organic materials in the archaeological record and the wealth of information that can be recovered from them. In this case, however, the leather comes from dredged material not a wreck site, and so may be considered unprovenanced. All the material is clearly of post-medieval date and no item is complete. It has been recorded and catalogued. Unless the leather can be used for educational purposes, there is no strong case for the material to be conserved or retained.

#### *Underwater Warfare Material*

- 4.3.55 These finds include the degaussing unit and the torpedo elements and the two Mark II mine cradles, and they possess some value in representing the development of underwater warfare of the 20th century. The two Mark II mine cradles in particular are believed to be relatively uncommon and may have **low** archaeological value and educational potential.



- 4.3.56 The Receiver of Wreck (RoW) contacted the National Museum of the Royal Navy (NMRN) with regards to accessioning the mine cradles. However, the NMRN has determined that the objects were beyond cost-effective conservation and therefore are not interested in accessioning them

#### Miscellanea

- 4.3.57 The plaque of the shore establishment of HMS *Ganges* (BWL1\_0042) and the possibly associated elephant plaque that has been found nearby (BWL7\_0002) have a special importance because they provide a tangible connection to the many sailors that were trained at the Royal Navy Training Establishment. The two items are assessed as of historical significance because of its association with the recent history and the community of Naval personnel that attended this establishment. In view of the good state of preservation and the aesthetic qualities of this object, the rectangular plate (BWL1\_0042) is considered of **medium** historical value.

## 5 RECOMENDATIONS

- 5.1.1 The recommendations that are suggested aim to ascertain the significance of the assets of unknown archaeological value and to provide adequate recording to the assets that have been identified as having some level of archaeological value. They also advance proposals for further researches and programmes of dissemination on assemblages that have potential to contribute significantly to the archaeological knowledge.
- 5.1.2 The table below contains a summary of further actions that have been identified in the assessment. These recommendations identify analytical techniques that that could help to ascertain and enhance the archaeological value of the assets.

**Table 2: List of Recommendations and repositories**

Find	Qnt.	Recommendation	Repository
Human skull (BWL6_0008)	1	<ul style="list-style-type: none"> <li>Specialist Assessment (Osteoarchaeologist WA)</li> <li>Radiocarbon analyses (TBC)</li> </ul>	<ul style="list-style-type: none"> <li>TBC</li> </ul>
Aircraft engine (BWL1_0050)	1	<ul style="list-style-type: none"> <li>Further archival research</li> </ul>	<ul style="list-style-type: none"> <li>TBC</li> </ul>
Cannons (BWL1_0035, BWL1_0036, BWL1_0051, BWL1_0077, BWL1_0078, BWL1_0079, BWL1_0080, BWL1_0081)	8	<ul style="list-style-type: none"> <li>Conservation (Mary Rose Trust)</li> <li>Specialist Assessment (C. Trollope)</li> <li>Further archival research (C. Trollope / WA)</li> <li>Produce a record of cannons to publication standard (WA)</li> <li>Spatial Analysis (C. Trollope)</li> <li>Publication of article in a specialist journal (C. Trollope / WA)</li> </ul>	<ul style="list-style-type: none"> <li>TBC</li> </ul>
Anchors (37 in total)	37	<ul style="list-style-type: none"> <li>Finalisation and publication of 3D archive (WA)</li> </ul>	<ul style="list-style-type: none"> <li>Some have been retained by DIO – see specifics in <b>Appendix 2</b></li> <li>Remaining anchors have been agreed for discard</li> </ul>
Cannonballs/round shot	104	<ul style="list-style-type: none"> <li>Produce a record of representative sample to an archaeological standard. The representative sample will be based on the cannonballs selected for acquisition by Portsmouth Museum, as these</li> </ul>	<ul style="list-style-type: none"> <li>There are presently 49 cannonballs at Wessex Archaeology. These will be accessioned by</li> </ul>



		<p>represent the most archaeologically interesting and/or complete examples. Any additional examples may be selected based on professional judgement (WA).</p> <ul style="list-style-type: none"><li>• Spatial analysis (WA)</li><li>• Conservation (Mary Rose Trust)</li></ul>	<p>Portsmouth Museum and DIO (?). Some cannonballs were provided to Mary Rose Trust for an iron experiment. Others were discarded. See <b>Appendix 2</b> for specifics.</p>
Ship's launch (BWL1_0069)	135	<ul style="list-style-type: none"><li>• Further historical research (WA)</li><li>• Enhance the archive by recording of selection of material (WA)</li><li>• Publication of article in a local journal (WA)</li></ul>	<ul style="list-style-type: none"><li>• TBC</li></ul>
Unidentified object (BWL1_0018)	1	<ul style="list-style-type: none"><li>• Further inquiries involving external specialists (TBC)</li></ul>	<ul style="list-style-type: none"><li>• Portsmouth Museum – following review of photographs</li></ul>
Ships' timber (BWL9_0014, BWL9_0023, BWL1_0092, BWL9_0086, BWL1_0019, BWL7_0016)	6	<ul style="list-style-type: none"><li>• Record to an archaeological standard (WA)</li><li>• Sample for dendrochronology (WA)</li><li>• Dendrochronological analysis (SUERC – R. Howard)</li><li>• Sample for metallurgical analyses of the copper sheathing (<b>BWL1_0092</b>) (WA / P. Northover)</li></ul>	<ul style="list-style-type: none"><li>• TBC</li></ul>
Buoy (BWL7_0001)	5	<ul style="list-style-type: none"><li>• Conservation (WA)</li><li>• Production of drawings to a publication standard (WA)</li><li>• Modelling and reconstruction (WA)</li><li>• Sample for metallurgical analyses on a selection of copper elements (WA)</li><li>• Metallurgical analyses of copper sheathing (P. Northover)</li><li>• Sample for dendrochronology/C14 (WA)</li><li>• Dendrochronological/C14 analyses (SUERC – R. Howard)</li><li>• Identification of caulking material (WA)</li><li>• Historical research (WA)</li><li>• Publication of an article in archaeological journal (WA)</li></ul>	<ul style="list-style-type: none"><li>• Portsmouth Museum will decide following review of photographs</li></ul>
Pottery	79	<ul style="list-style-type: none"><li>• Record of pre-19th century material (WA)</li><li>• Photographic record of backstamps of Naval or Crown supplies (WA)</li><li>• Publication of a short note on local journal (WA)</li></ul>	<ul style="list-style-type: none"><li>• See <b>Appendix 2</b> for details.</li></ul>
Glass	5	<ul style="list-style-type: none"><li>• Record of five 18th century bottles (BWL9_0092 and BWL1_0085) (WA)</li></ul>	<ul style="list-style-type: none"><li>• Portsmouth Museum</li></ul>
Clay Tobacco Pipes	19	<ul style="list-style-type: none"><li>• Record of diagnostic elements</li></ul>	<ul style="list-style-type: none"><li>• Portsmouth Museum</li></ul>
Footwear	17	<ul style="list-style-type: none"><li>• Specialist assessment (Quita Mould) completed</li></ul>	<ul style="list-style-type: none"><li>• TBC</li></ul>
Plaques (BWL1_0042; BWL7_0002)	2	<ul style="list-style-type: none"><li>• Conservation (WA)</li></ul>	<ul style="list-style-type: none"><li>• Portsmouth Museum</li></ul>
Underwater Warfare Material	2	<ul style="list-style-type: none"><li>• Specialist assessment</li><li>• Conservation (WA)</li></ul>	<ul style="list-style-type: none"><li>• TBC</li></ul>



## 6 RESEARCH FRAMEWORKS

6.1.1 In the table below the research questions proposed for this project are set against the key Narrative themes and research priorities listed in the HE funded project 'Portsmouth Harbour Hinterland Project Research Toolkit (MOLA 2016)'

**Table 3: Research questions against key research priorities (MOLA 2016)**

Key research priorities (MOLA 2016)	Research questions/ Outcomes
1.Ship building, fitting out and armaments	<ul style="list-style-type: none"> <li>• What is the construction sequence of the buoy? Early 19th century buoys have not been previously documented in the archaeological literature.</li> <li>• Where was the copper used for sheathing was sourced from and how was it worked? Was it the same used for ships? The analyses of the copper will contribute to understand the provision of this kind of material in the early 19th century.</li> <li>• Where was the timber sourced for ships and buoys? What do the rase marks tell us about the management of timbers in the dockyards?</li> <li>• What do the collections of guns tell us about the early suppliers of Navy ordnance? What is the origin of the guns and the use at the end of their life?</li> </ul>
2. Food Production and processing	<ul style="list-style-type: none"> <li>• What is the weight of local producers in the Navy supply chain? How has this changed between the late 19th and the 21st century?</li> </ul>
3. Comparison of the archaeological finds with other harbours as to ascertain whether the military presence had repercussion on the coastal trade.	<ul style="list-style-type: none"> <li>• Spatial characterisation of anchorages and finds to understand whether part of the material can be associated to coastal trade.</li> </ul>

6.1.2 The table below sets the research questions within wider research agendas as these are presented in the publications 'People and the Sea: A Maritime Archaeological Research Agenda for England' (Ransley *et al.* 2013) and 'Solent-Thames Research Framework for the Historic Environment' (Hey and Hind 2014).

**Table 4: Research questions against research agendas priorities**

Maritime Research Framework key research areas and Solent Thames (Ransley <i>et al.</i> 2013)	Research questions
Post Medieval and Modern Period: research agenda (Hey and Hind 2014)	
The expansion of archaeologies of port infrastructure into reconstructions of the port as a whole, e.g. what did material changes in port infrastructure reflect about their position in the wider social and physical landscape? (Ransley <i>et al.</i> 2013)	<ul style="list-style-type: none"> <li>• Is there any relation to the position of the historical anchorages and the archaeology found on the seabed? How is this connected with the wider changes on the port infrastructure?</li> <li>• What evidence do we have of underwater warfare material and could this be directly associated with the development of the Gosport base?</li> </ul>

Mariner communities and identities, e.g. Is there a distinct archaeology of mariner communities in ports? Is this discernibly different to 'international' communities of the larger ports? (Ransley <i>et al.</i> 2013)	<ul style="list-style-type: none"> <li>Documentation of the pottery assemblage of Naval or Crown which illustrates the continuing supply to naval shipping into the early 21st century. How is the archaeological record from a military harbour different from that of a commercial harbour?</li> </ul>
The reliability of chronological markers, particularly for the 16th to 18th century, needs to be tested (Ransley <i>et al.</i> 2013).	<ul style="list-style-type: none"> <li>Analyses of copper sheathing and comparison with other similar samples will augment the reliability of this tool for dating wrecksite material.</li> </ul>

## 7 ARCHIVE

### 7.1 Storage

- 7.1.1 The bulk of the material archive is currently stored at Wessex Archaeology's facilities (**Appendix 2**). This includes the glassware and the pottery, the small iron objects such as the round shots and the plates and a selection of timbers including the buoy timbers, a large selection of the timbers of the naval launch and few unidentified ships' timbers.
- 7.1.2 In July 2017, all the finds were offered to Portsmouth Museum and an expression of interest for acquisition was made against 81 of the catalogue entries. These included a selection of shot, the Whitworth projectile, the timbers of the 19th century buoy, a large selection of pottery, a selection of the glassware, the clay pipes, and the HMS *Ganges* and elephant plaques. On 9 May 2018, Katy Ball, the Portsmouth Museum Collections Registrar, and Jennifer Macey, Portsmouth City Council's HER Officer, visited Wessex Archaeology to review the finds for accessioning, and made their selection. Their selections have been recorded on the master Portsmouth Dredge Discoveries spreadsheet and are indicated on the Finds List in **Appendix 2**. Some of the artefacts are still being assessed for potential accession, and Portsmouth Museum will review them with specialists, based on photographs of the finds. Once the research and conservation requirements are satisfied, the finds will be processed for archiving and delivered to Portsmouth Museum. As specified above Wessex Archaeology follows ClfA guidelines (ClfA 2014a and 2014b) with regards to the preparation for the archive transfer so the finds and other material will be sorted, cleaned, marked or labelled and packed in accordance with recognised standards as summarised in AAF 2007 and Portsmouth Museum Service's *Guidelines for the Acceptance of Archaeological Archives* (see Appendix 6 of the *Method Statement for On-board Finds Reporting Protocol and Quayside Archaeological Monitoring* (Wessex Archaeology 2015b)).
- 7.1.3 The transfer is planned to take place within the year 2019.
- 7.1.4 Large objects that were not practical to store at Wessex Archaeology's facilities were stored at H.T. Hughes and Sons' yard on Portsea Island, where they are left in an open environment exposed to the weather. Due to their size and varying condition they were not selected for retention by Portsmouth Museum and as of June 2018 are in the process of disposal. These finds are considered impractical to conserve and currently no repository with an interest in acquiring them has been identified.
- 7.1.5 The NMRN are not interested in accessioning the mine cradles, and no other suitable repository has been found.
- 7.1.6 Timbers BWL9\_0086, BWL1\_0092, BWL7\_0016, which were stored at Hughes Yard and include metal tangles, sheathing or other fittings, have been recorded and sampled for dendrochronological and metallurgical analyses. The wood and metal samples are stored

at Wessex Archaeology's facilities. It is Wessex Archaeology's view that there is no need for further research on these items and the remaining timbers. As previously agreed by Historic England the timber have been discarded and the samples retained for further assessment.

- 7.1.7 It is anticipated that the remaining archaeological timbers that have not been flagged for retention by Portsmouth Museum and are now in storage at Wessex Archaeology will be discarded after appropriate samples for dendrochronology are taken. Wessex Archaeology will make sure that the appropriate approvals are obtained before discarding any item.
- 7.1.8 The aircraft engine will be offered to the Boscombe Down Aviation Collection if no other repository is willing to acquire it.
- 7.1.9 The human remains have been transferred to Wessex Archaeology and will be offered to Portsmouth Museum in first instance following analysis. If Portsmouth Museum is not interested in the finds, they will not be disposed of but will be kept at Wessex Archaeology until a suitable archive has been identified.

## **7.2 Archive**

- 7.2.1 The entire archive has been offered to Portsmouth Museum and the project archives, including written, drawn, photographic, digital and material elements (together with a summary of the contents of the archive) will be prepared and deposited by Wessex Archaeology in accordance with the requirements of Portsmouth Museum. Best practice will be adhered to in line with Archaeology Archives Forum, *Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation* (2007) and ClfAs *Standard and Guidance for the creation, compilation, transfer and deposition of archaeological archives* (2014).
- 7.2.2 The project record will be logged on OASIS – Online Access to the Index of Archaeological Investigations (<http://oasis.ac.uk/>). OASIS is an online archive managed by the Archaeological Data Service, the aim of which is to provide information about archaeological investigations and so to facilitate access to and dissemination of 'grey literature' that is produced in the course of archaeological fieldwork of all kinds.
- 7.2.3 Once the catalogue has been enhanced and the de-concretion, recording and analysis has been completed for the cannon, it is recommended that the results are published. It is recommended that a monograph style publication would be the most appropriate form of publication. As specified within the WSI (Wessex Archaeology 2015b), in consultation with DIO, and the Environmental Consultant who will seek the approval of the Archaeological Curator(s), Wessex Archaeology will ensure that the results of archaeological discoveries made, and investigations undertaken in connection with the project will be published in an integrated manner, where warranted by the results of the archaeological work.
- 7.2.4 The archaeological report will be submitted to the Local Authority HER, the NRHE and the Archaeological Data Service (ADS). Portsmouth Museum has agreed to accession the paper and digital archive for long term curation (pers. comm. 17/09/2018). The 3D data created by the project will be held by Portsmouth Museum and will be publicly accessible through the Wessex Archaeology website once approval for public dissemination has been confirmed.

## 8 CONSERVATION

- 8.1.1 At Historic England's request (letter dated 17/08/2018), active conservation will only be started for those artefacts where a repository has been found and acceptance has been agreed.
- 8.1.2 The aircraft engine (BWL1\_0050) has been dried as much as possible with silica gel and it has been assessed by Wessex Archaeology's conservator as in relatively poor condition in places, but with no sign of exudation of salts. It is recommended that the engine is dry stored with silica gel and periodically monitored by a specialist until an appropriate repository has been identified.
- 8.1.3 It is recommended that the five timbers of the buoy (BWL7\_0001) are cleaned, desalinated and then conserved and appropriately stored with substantial amounts of buffering silica gel. Once the pieces have all reached an acceptable moisture level and are no longer exuding crystals, they can be stably stored with more buffering silica gel. The condition of the copper alloy and caulking will need to be monitored during the drying process and may affect the final storage arrangements. Samples of the attached copper alloy and caulking can be taken during the cleaning process.
- 8.1.4 The HMS *Ganges* (BWL1\_0042) and elephant (BWL7\_0002) plaques are currently stored in water in passive conservation and it is advised that they continue to be desalinated. They are currently being monitored by Wessex Archaeology's conservator before a long-term conservation solution is implemented. This will include careful removal of surface corrosion product, consolidation of paint with acrylic consolidant that is water soluble and controlled drying.
- 8.1.5 A total of 48 cannon balls, a barshot, and an item formerly identified as a barshot but subsequently determined to be a grenade during Portsmouth Museum staff's visit, are passively stored in water and monitored by Wessex Archaeology's conservator. During the visit of Portsmouth Museum staff on 9 May 2018, Portsmouth Museum has confirmed that they will accession 14 of these (including the barshot and the grenade), and they have expressed possible interest in accessioning a further 11, following assessment of photographs and discussion with ordnance specialists. Three cannonballs of c. 80 mm in size (as well as any iron nails) have been transferred to the Mary Rose Trust for research on the conservation of marine iron. With regard to the remaining shot, the Navy has expressed that they will retain a selection to be mounted on plinths and gifted to notary individuals. These alternative uses for the cannonballs have been discussed in consultation with Historic England. Once the required shot for these uses has been allocated, any remaining shot could be held until another suitable repository has been found or retained by Wessex Archaeology for conservation research or for their educational collection.
- 8.1.6 The Whitworth shot (BWL1\_0028) is also under passive conservation and it is advised that the desalination process continues under the control of Wessex Archaeology's conservator. When the salt levels are sufficiently benign, the shell will be controlled dried to minimise flash corrosion and then dry stored. Once stabilised it will be accessioned by Portsmouth Museum.
- 8.1.7 The cannons (BWL1\_0035, BWL1\_0036, BWL1\_0051, BWL1\_0077, BWL1\_0078, BWL1\_0079, BWL1\_0080, BWL1\_0081) and anchor (BWL1\_0032) are being conserved by the Mary Rose Trust and a long-term storage solution has been found by the DIO. Once the concretion has been removed the opportunity to record them should be taken before

they are moved to their final storage location as this may not be as accessible for the purposes of further research.

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## APPENDICES

### Appendix 1: Number of finds per type

Finds	Quantities
Anchors	37
Bone Animal (assessed by Wessex Archaeology – details in individual finds reports. No further work is recommended.)	18
Bone Human	1
Cannons	8
Ceramics sherds (inc. complete)	183
Pipes fragments	19
Glass (fragments and complete)	245
Leather	28
Cannonballs (metal)	104
Cutlery (assessed by Wessex Archaeology – details in individual finds reports. No further work is recommended.)	48
Stone	9
Wood (inc. buoy and boat)	48
Boat fragments (BWL1_0069)	135



## Appendix 2: Location of finds and repositories

Unique ID	Number of finds	Description	Current Location	Repository – updated following Portsmouth Museum review of material 9 May 2018
BWL1_0001	1	Anchor, stockless	Hughes Yard	Recommended for discard
BWL1_0002	1	Worked timber. No report	Discarded	Discarded
BWL1_0003	1	Anchor and mooring	Hughes Yard	Recommended for discard
BWL1_0004	1	Wooden pile	Discarded	Discarded
BWL1_0005	1	Ovoidal glass bottle (broken in transit)	Arrived at Wessex Archaeology broken	Recommended for discard
BWL1_0006	1	Inkwell	Wessex Archaeology	Recommended for discard
BWL1_0007	Object reported but not found during Quay Side Archaeological Monitoring. No report			
BWL1_0008	1	Brick	Wessex Archaeology	Recommended for discard
BWL1_0009	1	Glass bottle	Wessex Archaeology	Recommended for discard
BWL1_0010	1	Cut bone	Wessex Archaeology	Portsmouth Museum
BWL1_0011	2	Ceramic sherds	Wessex Archaeology	Recommended for discard
BWL1_0012	15	Ceramic sherds	Wessex Archaeology	Recommended for discard
BWL1_0013	1	Imperial wrench	Discarded	Discarded
BWL1_0014	38	Ceramic sherds	Wessex Archaeology	Portsmouth Museum – selection of pottery, and the clay pipe, the remainder is recommended for discard
BWL1_0015	43	Bottles	Wessex Archaeology	Portsmouth Museum – selection, the remainder is recommended for discard
BWL1_0016	1	Metal valve casing and axle	Discarded	Discarded
BWL1_0017	1	Two-ton Trotman anchor and chain	Hughes Yard	Recommended for discard



BWL1_0018	1	Composite wood, metal and cement object	Wessex Archaeology	Portsmouth Museum – will decide following review of photographs
BWL1_0019	1	Ship timber	Discarded	Discarded
BWL1_0020	1	Anchor - stockless	Hughes Yard	Recommended for discard
BWL1_0021	1	Mushroom anchor	DIO	DIO
BWL1_0022	1	Anchor - Admiralty Pattern	Hughes Yard	Recommended for discard
BWL1_0023	1	Anchor	Hughes Yard	Recommended for discard
BWL1_0024	1	Anchor - Trotman type	DIO	DIO
BWL1_0025	1	Timber pile	Cut up and discarded	Discarded
BWL1_0026	1	Mooring anchor	Hughes Yard	Recommended for discard
BWL1_0027	1	Byers Improved Stockless Anchor	DIO	DIO
BWL1_0028	1	Solid shot	Wessex Archaeology	Portsmouth Museum
BWL1_0029	1	Wooden structure with cuprous nails	Wessex Archaeology	Recommended for discard
BWL1_0030	1	Large anchor	Hughes Yard	Recommended for discard
BWL1_0031	1	Admiralty anchor	Hughes Yard	Recommended for discard
BWL1_0032	1	Angle crown admiralty anchor	Mary Rose Trust	TBC
BWL1_0033	1	Anchor - Hall's improved patent	Used as temporary mooring buoy	Recommended for discard
BWL1_0034	1	Ship timber, possible stringer/keelson	Wessex Archaeology	Recommended for discard
BWL1_0035	1	Cannon	Mary Rose Trust	TBC
BWL1_0036	1	Cannon	Mary Rose Trust	TBC
BWL1_0037	1	Anchor	DIO	DIO
BWL1_0038	1	Stocked anchor - Admiralty long shank	Hughes Yard	Recommended for discard
BWL1_0039	3	Natural boulder	Discarded	Discarded



BWL1_0040	1	Stone Metal - cannonball	Wessex Archaeology	Portsmouth Museum
BWL1_0041	1	Bone	Wessex Archaeology	Portsmouth Museum
BWL1_0042	1	Ganges plaque	Wessex Archaeology	Portsmouth Museum
BWL1_0043	126	2 black boxes of mixed small finds	Wessex Archaeology	Portsmouth Museum – selection (bowl, 7 bottles, 1 metal object, 1 plate, 1 dish, 1 mug) – remainder recommended for discard
BWL1_0044	5	Gold watch	Wessex Archaeology	Portsmouth Museum
BWL1_0045	1	Metal - cannonball 5 inch	Wessex Archaeology	Portsmouth Museum
BWL1_0046	Reported but not found by Wessex Archaeology for inspection			
BWL1_0047	1	Warren liquid blackening bottle	Wessex Archaeology	Portsmouth Museum
BWL1_0048	1	Condensing bulb for a steam pressure transmitter	Wessex Archaeology	Portsmouth Museum – will decide following review of photographs
BWL1_0049	1	Possible stone shot	Wessex Archaeology	Portsmouth Museum
BWL1_0050	1	Military aircraft engine (Jumo 211b)	Wessex Archaeology	TBC
BWL1_0051	1	Cannon	Mary Rose Trust	TBC
BWL1_0052	1	Metal - cannonball	Wessex Archaeology	Portsmouth Museum – will decide following review of photographs
BWL1_0053	1	Ceramic plate (fragment)	Wessex Archaeology	Portsmouth Museum
BWL1_0054	1	Large angle crown anchor	Hughes Yard	Recommended for discard
BWL1_0055	1	Glass bottle	Wessex Archaeology	Portsmouth Museum
BWL1_0056	2	Steel object	Discarded	Discarded
BWL1_0057	1	Rudder	Wessex Archaeology	Recommended for discard
BWL1_0058	1	Brown, Lenox & Co. stockless anchor	Discarded	Recommended for discard
BWL1_0059	1	Admiralty pattern anchor (broken arm)	Hughes Yard	Recommended for discard



BWL1_0060	1	Iron block (poss part of engine casing?)	Discarded	Discarded
BWL1_0061	4	Glass bottles	Wessex Archaeology	Portsmouth Museum – selection (2 bottles) – remainder recommended for discard
BWL1_0062	4	Modern plate, bowl and sherd	Wessex Archaeology	Portsmouth Museum – selection (2 fragments of same bowl) – remainder recommended for discard
BWL1_0063	1	Stoneware jug (complete)	Wessex Archaeology	Recommended for discard
BWL1_0064	1	Bishopsgate stoneware jug	Wessex Archaeology	Portsmouth Museum
BWL1_0065	2	Stoneware sherds	Wessex Archaeology	Recommended for discard
BWL1_0066	1	Animal jawbone	Wessex Archaeology	Portsmouth Museum
BWL1_0067	1	Glass bowl sherd	Wessex Archaeology	Recommended for discard
BWL1_0068	3	Clay pipe (3 parts)	Wessex Archaeology	Portsmouth Museum
BWL1_0069	Numerous	Wreck	Wessex Archaeology & Hughes Yard	Recommended for discard
BWL1_0070	1	Balanced spade rudder	Discarded	Discarded
BWL1_0071	1	Section of vessel structure?	Unknown, not seen by Wessex Archaeology	
BWL1_0072	1	Anchor	Hughes Yard	Recommended for discard
BWL1_0073	1	Mk2 mine cradle	Hughes Yard	The RoW has confirmed that NMRN have deemed the mine cradles beyond cost effective conservation. No suitable repository found.
BWL1_0074	1	Mk2 mine cradle	Hughes Yard	The RoW has confirmed that NMRN have deemed the mine cradles beyond cost effective conservation. No suitable repository found.
BWL1_0075	1	Small engine	Hughes Yard	Recommended for discard
BWL1_0076	1	Aircraft ADF unit	NMRN	NMRN



BWL1_0077	1	Cannon	Mary Rose Trust	TBC
BWL1_0078	1	Cannon	Mary Rose Trust	TBC
BWL1_0079	1	Cannon	Mary Rose Trust	TBC
BWL1_0080	1	Cannon	Mary Rose Trust	TBC
BWL1_0081	1	Cannon	Mary Rose Trust	TBC
BWL1_0082	1	Angle crown Admiralty anchor	Hughes Yard	Recommended for discard
BWL1_0083	1	Balanced spade rudder	Hughes Yard	Recommended for discard
BWL1_0084	1	Small propeller	Wessex Archaeology	Portsmouth Museum
BWL1_0085	18	16x Glass bottles, 2x animal bone	Wessex Archaeology	Portsmouth Museum – selection (1 jar, 1 codd bottle, 2 bones) – remainder recommended for discard
BWL1_0086	19	Glass bottles and deck light	Wessex Archaeology	Portsmouth Museum - selection
BWL1_0087	2	Spring and oil lamp	Wessex Archaeology	Recommended for discard
BWL1_0088	8	Ceramics	Wessex Archaeology	Portsmouth Museum – selection (1 whole jar, 1 broken bowl) – remainder recommended for discard
BWL1_0089	1	Large stocked Admiralty anchor	Hughes Yard	Recommended for discard
BWL1_0090	1	Balanced spade rudder	Discarded	Discarded
BWL1_0091	1	Stocked anchor	Hughes Yard	Recommended for discard
BWL1_0092	1	Possible ships' timber	Hughes Yard	Recommended for discard
BWL2_0001	1	Animal bone	Discarded	Discarded
BWL4_0001	1	Worked timber	Wessex Archaeology	Recommended for discard
BWL4_0002	1	Worked timber with brass nails	Wessex Archaeology	Recommended for discard
BWL4_0003	1	Worked timber with treenail	Wessex Archaeology	Recommended for discard



BWL4_0004	1	Worked timber with treenail	Wessex Archaeology	Recommended for discard
BWL4_0005	1	Worked timber with circular hole	Wessex Archaeology	Recommended for discard
BWL4_0006	1	Worked timber with soft copper nails	Wessex Archaeology	Recommended for discard
BWL4_0007	1	Worked timber	Wessex Archaeology	Recommended for discard
BWL4_0008	1	Bone	Wessex Archaeology	Portsmouth Museum
BWL4_0009	1	Bone	Wessex Archaeology	Portsmouth Museum
BWL4_0010	1	Metal - cannonball	Wessex Archaeology	Portsmouth Museum – to decide following review of photographs
BWL4_0011	1	Worked timber	Wessex Archaeology	Recommended for discard
BWL4_0012	1	Metal - cannonball	Wessex Archaeology	Portsmouth Museum
BWL4_0013	1	Shoe sole	Wessex Archaeology	Recommended for discard
BWL4_0014	1	Metal - cannonball	Wessex Archaeology	Portsmouth Museum – to decide following review of photographs
BWL4_0015	1	Flag pole	Wessex Archaeology	Portsmouth Museum
BWL4_0016	1	Brass hoop	Wessex Archaeology	Portsmouth Museum – will make final decision following review of photographs
BWL4_0017	1	Bullet	Wessex Archaeology	Portsmouth Museum
BWL4_0018	1	Possible counter weight	Wessex Archaeology	Recommended for discard
BWL4_0019	1	Copper fence/flag pole topper	Wessex Archaeology	Portsmouth Museum
BWL4_0020	1	Rubber ball	Wessex Archaeology	Recommended for discard
BWL4_0021	Natural Stone - no report			
BWL4_0022	1	Worked timber	Wessex Archaeology	Recommended for discard
BWL4_0023	2	Glass bottles	Wessex Archaeology	Recommended for discard





BWL4_0024	1	Ceramic drainpipe	Wessex Archaeology	Recommended for discard
BWL4_0025	1	Worked wood	Wessex Archaeology	Recommended for discard
BWL6_0001	2	Metal - cannonballs	Wessex Archaeology	Portsmouth Museum – to decide following review of photographs
BWL6_0002	3	Metal - cannonballs	Wessex Archaeology	Portsmouth Museum – to decide following review of photographs
BWL6_0003	2	Metal - cannonballs	Wessex Archaeology	Portsmouth Museum – to decide following review of photographs
BWL6_0004	1	Metal - cannonball	Wessex Archaeology	Portsmouth Museum – to decide following review of photographs
BWL6_0005	1	Bar-shot	Wessex Archaeology	Portsmouth Museum
BWL6_0006	2	Metal - cannonballs	Discarded	Discarded
BWL6_0007	1	Metal - cannonball	Discarded	Discarded
BWL6_0008	1	Human skull	Wessex Archaeology	TBC
BWL6_0009	Void - no find			
BWL6_0010	1	Metal - cannonball	Discarded	Discarded
BWL6_0011	1	Metal - cannonball	Discarded	Discarded
BWL6_0012	1	Possible ship timber	Wessex Archaeology	Recommended for discard
BWL6_0013	1	Possible ship timber	Wessex Archaeology	Recommended for discard
BWL6_0014	1	Possible ship timber	Wessex Archaeology	Recommended for discard
BWL6_0015	1	Metal - cannonball	Discarded	Discarded
BWL6_0016	3	Timber and 2x metal cannonballs	Cannonballs discarded. Timber at Wessex Archaeology	Cannonballs discarded, timber recommended for discard
BWL6_0016	1	Wooden object	Wessex Archaeology	Recommended for discard
BWL6_0017	1	Metal - cannonball	Discarded	Discarded



BWL6_0018	4	Metal - cannonballs	Discarded	Discarded
BWL6_0019	10	9x Iron Metal - cannonballs, 1x stone shot	Wessex Archaeology	Portsmouth Museum – selection (2/10, 6/10, 7/10 (grenade), 9/10)
BWL6_0020	1	Small boats tiller	Wessex Archaeology	Recommended for discard
BWL6_0021	1	Quern stone	Wessex Archaeology	Portsmouth Museum
BWL7_0001		19th century buoy	Discarded / Wessex Archaeology	Portsmouth Museum – will decide following review of photographs
BWL7_0002	1	Elephant badge	Wessex Archaeology	Portsmouth Museum
BWL7_0003	1	Metal - cannonball	Wessex Archaeology	DIO?
BWL7_0004	1	Metal - cannonball	Wessex Archaeology	DIO?
BWL7_0005	1	Anchor	Discarded	Discarded
BWL7_0006	1	Possible sword/iron spike	Discarded	Discarded
BWL7_0007	2	Saw? and projectile from concretion	Wessex Archaeology/Disposed	Recommended for discard
BWL7_0008	1	Anchor	Wessex Archaeology	Recommended for discard
BWL7_0009	67	Iron Metal - cannonballs	20x Wessex Archaeology / the rest were Discarded	DIO? Portsmouth Museum – selection (4/20, 7/20, 13/20, 16/20, 20/20)
BWL7_0010	1	Stone shot	Wessex Archaeology	Portsmouth Museum
BWL7_0011	Void - number unused			
BWL7_0012	Void - number unused			
BWL7_0013	Void - number unused			
BWL7_0014	3	Degaussing units and sinker	Hughes Yard	Recommended for discard
BWL7_0015	1	Shotgun fragment	Wessex Archaeology	Portsmouth Museum
BWL7_0016	1	Timber	Hughes Yard	Recommended for discard
BWL7_0017	5	5 plaques	Wessex Archaeology	Portsmouth Museum



BWL7_0018	4	4x ceramics	Wessex Archaeology	Portsmouth Museum – selection (brown jar, stoneware bottle and broken dish)
BWL7_0019	22	19x glass bottles, 3x glass rods	Wessex Archaeology	Portsmouth Museum – selection (1 tear shaped bottle, 2 deck light rods), the remainder to be discarded
BWL7_0020	12	12x metal objects	Wessex Archaeology	Portsmouth Museum
BWL7_0021	5	5x World War II fuse caps	Wessex Archaeology	Portsmouth Museum
BWL7_0022	12	Ceramic sherds and glass	Wessex Archaeology	Portsmouth Museum – selection (Mumby & Co sherd and large rim sherd), the remainder to be discarded
BWL8_0001	1	Small anchor	Wessex Archaeology	Recommended for discard
BWL8_0002	3	Leather shoes	Wessex Archaeology	Portsmouth Museum
BWL9_0001	1	Angle bar	Discarded	Discarded
BWL9_0002	1	Girder	Discarded	Discarded
BWL9_0003	1	Dock/piling timber	Discarded	Discarded
BWL9_0004	38	Miscellaneous finds reported with BWL1_0013, BWL1_0014, BWL1_0015 and BWL_0016	Wessex Archaeology	Portsmouth Museum – selection (small bag of items), remainder to be discarded
BWL9_0005	1	Eroded plank with fastenings	Wessex Archaeology	Recommended for discard
BWL9_0006	1	Martin anchor	Hughes Yard	Recommended for discard
BWL9_0007	30	Various small finds	Wessex Archaeology	Recommended for discard
BWL9_0008	Numerous	Various dock or harbour timbers	Discarded	Discarded
BWL9_0009	1	Timber strake	Discarded	Discarded
BWL9_0010	1	Iron stock	Discarded	Discarded
BWL9_0011	1	Timber piling	Discarded	Discarded
BWL9_0012	1	Dock timber	Discarded	Discarded



BWL9_0013	36	Various small finds	Wessex Archaeology	Portsmouth Museum – selection (spanner, 3 plates), leather recommended for discard, remainder to be discarded
BWL9_0014	1	Cant frame	Wessex Archaeology	Recommended for discard
BWL9_0015	1	Timber	Wessex Archaeology	Recommended for discard
BWL9_0016	7	Glass bottles	Wessex Archaeology	Recommended for discard
BWL9_0017	1	Ceramic attached to concretion	Wessex Archaeology	Recommended for discard
BWL9_0018	1	Large tool	Wessex Archaeology	Recommended for discard
BWL9_0019	1	Possible aircraft frag	Wessex Archaeology	Recommended for discard
BWL9_0020	1	Possible aircraft frag	Wessex Archaeology	Recommended for discard
BWL9_0021	1	Possible aircraft frag	Wessex Archaeology	Recommended for discard
BWL9_0022	1	Silver fork	Wessex Archaeology	Recommended for discard
BWL9_0023	1	Floor timber	Wessex Archaeology	Recommended for discard
BWL9_0024	1	Timber piles	Discarded	Discarded
BWL9_0025	1	Timber piles	Discarded	Discarded
BWL9_0026	1	Timber piles	Discarded	Discarded
BWL9_0027	1	Timber piles	Discarded	Discarded
BWL9_0028	1	Metal lid/hatch	Discarded	Discarded
BWL9_0029	1	Large exploded bomb	Discarded	Discarded
BWL9_0030	2	2x leather shoe soles	Wessex Archaeology	Recommended for discard
BWL9_0031	1	Porthole	Wessex Archaeology	Recommended for discard
BWL9_0032	1	Wooden lid/hatch cover marked 'MOYLE' & '1966'	Wessex Archaeology	Recommended for discard
BWL9_0033	1	Copper plaque '45ft motor launch'	Wessex Archaeology	Portsmouth Museum



BWL9_0034	1	Stockless anchor	Discarded	Discarded
BWL9_0035	1	Metal - cannonball	Wessex Archaeology	DIO?
BWL9_0036	Void - renumbered as BWL1_0050: Aircraft engine			
BWL9_0037	1	Torpedo mid section	Discarded	Discarded
BWL9_0038	1	Torpedo engine	Discarded	Discarded
BWL9_0039	1	Metal - cannonball	Wessex Archaeology	DIO?
BWL9_0040	1	Stoneware Genever bottle	Wessex Archaeology	Portsmouth Museum
BWL9_0041	1	Stoneware jug handle	Wessex Archaeology	Portsmouth Museum
BWL9_0042	11	11x glass bottles	Wessex Archaeology	Recommended for discard
BWL9_0043	1	W.P. Hartley jam jar	Wessex Archaeology	Recommended for discard
BWL9_0044	1	Pulley wheel	Wessex Archaeology	Portsmouth Museum
BWL9_0045	1	Tin glaze plate	Wessex Archaeology	Portsmouth Museum
BWL9_0046	1	Rolls razor tin lid	Wessex Archaeology	Portsmouth Museum
BWL9_0047	1	Air vent cover	Wessex Archaeology	Recommended for discard
BWL9_0048	1	Deck light glass	Wessex Archaeology	Recommended for discard
BWL9_0049	1	Speaking tube	Wessex Archaeology	Portsmouth Museum
BWL9_0050	2	2x animal bone	Wessex Archaeology	Portsmouth Museum
BWL9_0051	6	Olive jar	Wessex Archaeology	Portsmouth Museum
BWL9_0052	10	Modern plates	Wessex Archaeology	Portsmouth Museum – selection (1 patterned plate), remainder to be discarded
BWL9_0053	Void - number unused			
BWL9_0054	1	Possible ship timber	Wessex Archaeology	Recommended for discard



BWL9_0055	1	Possible ship timber	Wessex Archaeology	Recommended for discard
BWL9_0056	Natural Stone - no report			
BWL9_0057		Possible ship timbers	Wessex Archaeology	Recommended for discard
BWL9_0058	3	Shoe fragments	Wessex Archaeology	Recommended for discard
BWL9_0059	1	Danger sign	Wessex Archaeology	Recommended for discard
BWL9_0060	1	Copper dish	Wessex Archaeology	Portsmouth Museum
BWL9_0061	1	Shell casing	Wessex Archaeology	Portsmouth Museum
BWL9_0062	1	Sign backing	Wessex Archaeology	Recommended for discard
BWL9_0063	6	Cutlery	Wessex Archaeology	Recommended for discard
BWL9_0064	1	Iron eye	Wessex Archaeology	Recommended for discard
BWL9_0065	1	Flat iron	Wessex Archaeology	Recommended for discard
BWL9_0066	1	Y-shaped hook	Wessex Archaeology	Portsmouth Museum
BWL9_0067	1	Large Doulton stoneware jug	Wessex Archaeology	Recommended for discard
BWL9_0068	10	10x stoneware jars	Wessex Archaeology	Portsmouth Museum – selection (1 small bottle, 1 larger bottle), remainder recommended for discard
BWL9_0069	1	Stone base	Discarded	Discarded
BWL9_0070	10	10x glass bottles	Wessex Archaeology	Portsmouth Museum – selection (1 codd bottle), remainder recommended for discard
BWL9_0071	4	Ceramics, 1x plate, 2x jars, 1x sherd	Wessex Archaeology	Recommended for discard
BWL9_0072	1	Angle crown anchor	Hughes Yard	Recommended for discard
BWL9_0073	1	Stockless anchor	Discarded	Discarded
BWL9_0074	1	Large stocked anchor	Hughes Yard	Recommended for discard



BWL9_0075	1	Possible ships' timber	Wessex Archaeology	Recommended for discard
BWL9_0076	1	Iron grapnel	Discarded	Discarded
BWL9_0077	6	Assorted metal objects	Wessex Archaeology	Recommended for discard
BWL9_0078	1	Jug	Wessex Archaeology	Portsmouth Museum
BWL9_0079	6	Assorted objects	Wessex Archaeology	Recommended for discard
BWL9_0080	3	3x iron hooks	Wessex Archaeology	Portsmouth Museum
BWL9_0081	1	Stockless anchor	Hughes Yard	Recommended for discard
BWL9_0082	1	Folding stock anchor	Hughes Yard	Recommended for discard
BWL9_0083	1	Possible ships' timber	Discarded	Discarded
BWL9_0084	1	Timber with pulley wheel	Discarded	Discarded
BWL9_0085	1	Section of ships' planking	Discarded	Discarded
BWL9_0086	1	Stringer	Hughes Yard	Recommended for discard
BWL9_0087	1	Wood/iron wheel object	Wessex Archaeology	Recommended for discard
BWL9_0088	6	Copper sheathing	Wessex Archaeology	Portsmouth Museum
BWL9_0089	1	Barrel lid	Wessex Archaeology	Portsmouth Museum – to decide following review of photographs
BWL9_0090	16	Clay pipe fragments	Wessex Archaeology	Portsmouth Museum
BWL9_0091	7	Stoneware	Wessex Archaeology	Recommended for discard
BWL9_0092	14	Glass bottles	Wessex Archaeology	Portsmouth Museum – selection of early bottles, remainder to be discarded
BWL9_0093	10	10x metal objects	Wessex Archaeology	Portsmouth Museum
BWL9_0094	9	Preserve jars and a mug	Wessex Archaeology	Portsmouth Museum – selection (raspberry jar only), remainder to be discarded
BWL9_0095	6	Olive jar fragments and glazed redwares	Wessex Archaeology	Portsmouth Museum





BWL9_0096	2	Pulley wheel and brush	Wessex Archaeology	Portsmouth Museum
BWL9_0097	19	Ceramic sherds	Wessex Archaeology	Portsmouth Museum
BWL9_0098	1	Stockless anchor	Hughes Yard	Recommended for discard
BWL9_0099	1	Degaussing unit	Hughes Yard	Recommended for discard
BWL9_0100	1	Folding stock mooring anchor	Hughes Yard	Recommended for discard
BWL9_0101	1	Mast boom	Hughes Yard	Recommended for discard
BWL9_0102	1	Lead ingot	Wessex Archaeology	Portsmouth Museum
BWL9_0103	2	Wooden coil core and tool	Wessex Archaeology	Portsmouth Museum – selection (longest object only), remainder recommended for discard
BWL9_0104	4	Glass bottles	Wessex Archaeology	Recommended for discard
BWL9_0105	1	Base of iron cooking pot	Wessex Archaeology	Recommended for discard
BWL9_0106	1	Sounding lead with broad arrow	Wessex Archaeology	Portsmouth Museum
BWL9_0107	14	Metal objects, including silver tray and brass brackets	Wessex Archaeology	Recommended for discard
BWL9_0108	1	Fire hose coupling	Wessex Archaeology	Portsmouth Museum – to decide following review of photographs



### Appendix 3: Post Ex, Analysis, Synthesis and Publication Cost Estimate

Item	Item Ref.	Find	Recommendation	Stage	Resource	Unit	Price	Quantity	Cost
1	1.1	Human skull (BWL6_0008)	Specialist Assessment (Osteoarchaeologist)	Analysis	PM	day	480	2	£ 960.00
	1.2		Isotope analyses	Analysis	Lab	sample	300	2	£ 600.00
	1.3		Radiocarbon analyses	Analysis	Lab	sample	320	2	£ 640.00
2	2.1	Aircraft engine (BWL1_0050)	Further archival research	PX	SPO	day	360	2.5	£ 900.00
3	3.1	Cannons (BWL1_0035, BWL1_0036, BWL1_0077, BWL1_0079, BWL1_0080, BWL1_0081)	Conservation (Mary Rose Trust)	Conservation	Mary Rose Trust				
	3.2		Specialist Assessment (Ordnance)	Analysis	Ext. Specialist	day	320	5	£ 1,600.00
	3.3		Further archival research	Research	TS	day	420	4	£ 1,680.00
	3.4		Produce a record of cannons to publication standard	PX	SPO	day	360	5	£ 1,800.00
	3.5		Spatial analysis	Analysis	SPO	day	360	2	£ 720.00
	3.6		Publication of article in a specialist journal	Publication	TS	day	420	4	£ 1,680.00
4	4.1	Anchors (37 in total)	Review of drawings and record to an archaeological standard	PX	SPO	day	360	8	£ 2,880.00
	4.2		Finalisation and publication of 3D archive	Publication	SPO	day	360	6	£ 2,160.00
5	5.1	Cannon balls/round shot	Produce a record of representative sample to an archaeological standard	PX	SPO	day	360	4	£ 1,440.00
	5.2		Spatial analysis	Analysis	SPO	day	360	2	£ 720.00



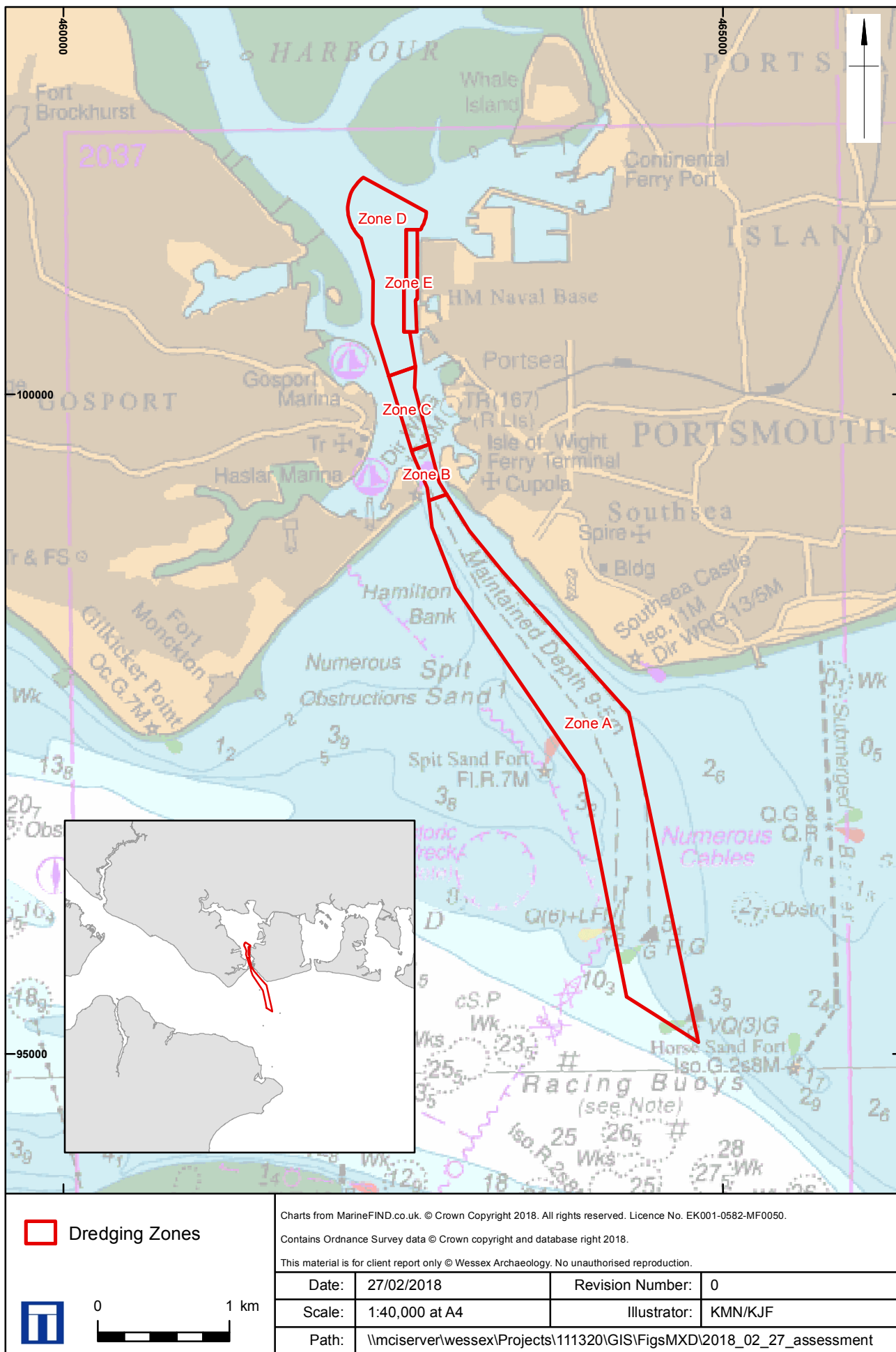
	5.3		Conservation (Mary Rose Trust)	Conservation	Mary Rose Trust				
6	6.1	Ship's launch (BWL1_0069)	Further historical research	Research	TS	day	420	3	£ 1,260.00
	6.2		Enhance the archive by recording of selection of material	PX	SPO	day	360	2	£ 720.00
	6.3		Publication of article in a local journal	Publication	TS	day	420	4	£ 1,680.00
7	7.1	Unidentified object (BWL1_0018)	Further inquiries involving external specialists	PX	SPO	day	360	5	£ 1,800.00
8	8.1	Ships' timber (BWL9_0014, BWL9_0023, BWL9_0086, BWL1_0092, BWL1_0019, BWL7_0016)	Record to an archaeological standard	PX	SPO	day	360	2.5	£ 900.00
	8.2		Sample for dendrochronology	Analysis	SPO	day	360	2	£ 720.00
	8.3		Dendrochronological analysis	Analysis	Lab	sample	320	7	£ 2,240.00
	8.4		Sampling for metallurgical analyses of copper sheathing (BWL1_0092)	Analysis	SPO	day	360	2	£ 720.00
	8.5		Metallurgical analyses of copper sheathing (BWL1_0092)	Analysis	Lab	sample	300	6	£ 1,800.00
9	9.1	Buoy (BWL7_0001)	Conservation (WA)	Conservation	PM	day	480	6	£ 2,880.00
	9.2		Production of drawings to a publication standard	PX	SPO	day	360	2	£ 720.00
	9.3		Modelling and reconstruction	PX	DO	day	300	5	£ 1,500.00
	9.4		Sample for metallurgical analyses on a selection of copper elements	Analysis	SPO	day	360	2	£ 720.00
	9.5		Metallurgical analyses of copper sheathing	Analysis	Lab	sample	300	4	£ 1,200.00
	9.6		Sample for dendrochronology/C14	Analysis	SPO	day	360	1.5	£ 540.00



	9.7		Dendrochronological/C14 analysis	Analysis	Lab	sample	320	4	£	1,280.00
	9.8		Identification of caulking material	Analysis	Ext. Specialist	day	320	5	£	1,600.00
	9.9		Historical research	PX	SPO	day	360	5	£	1,800.00
	9.10		Publication of an article in archaeological journal	Publication	SPO	day	360	5	£	1,800.00
10	10.1	Pottery	Record of pre-19 <sup>th</sup> century material	PX	SPO	day	360	4	£	1,440.00
	10.2		Photographic record of backstamps of Naval or Crown supplies	PX	DO	day	300	2	£	600.00
	10.3		Publication of a short note on local journal	Publication	PM	day	480	3	£	1,440.00
11	11.1	Glass	Record of five 18 <sup>th</sup> century bottles (BWL9_0092 and BWL1_0085)	PX	SPO	day	360	1	£	360.00
12	12.1	Clay Tobacco Pipes	Record of diagnostic elements	PX	SPO	day	360	1	£	360.00
13	13.1	Footwear	Specialist assessment	Analysis	Ext. Specialist	day	320	6	£	1,920.00
14	14.1	Plaques (BWL1_0042; BWL7_0002)	Conservation (WA)	Conservation	PM	day	480	2.5	£	1,200.00
	14.2	Miscellanea (general)	Conservation (WA)	Conservation	PM	day	480	1.5	£	720.00
15	15.1		Archive Transfer	PX	PM	day	480	9	£	4,320.00
16	16.1		Project Management	PX	PM	day	480	9	£	4,320.00
17	17.1		Final Report/Publication	Publication	PM	day	480	9	£	4,320.00
	17.2			Publication	TS	day	420	12	£	5,040.00
	17.3			Publication	SPO	day	360	12	£	4,320.00



	17.4			Publication	DO	day	300	6	£ 1,800.00
	17.5			Publication	Peer Review	day	350	4	£ 1,400.00
				Publication	Indexing	day	350	3	£ 1,050.00
	17.6			Publication	PRINTING	TBC	TBC	TBC	
								<b>206.5</b>	<b>£ 78,270.00</b>



Location of Dredging Zones

Figure 1



Wessex Archaeology Ltd registered office Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB  
Tel: 01722 326867 Fax: 01722 337562 [info@wessexarch.co.uk](mailto:info@wessexarch.co.uk) [www.wessexarch.co.uk](http://www.wessexarch.co.uk)

