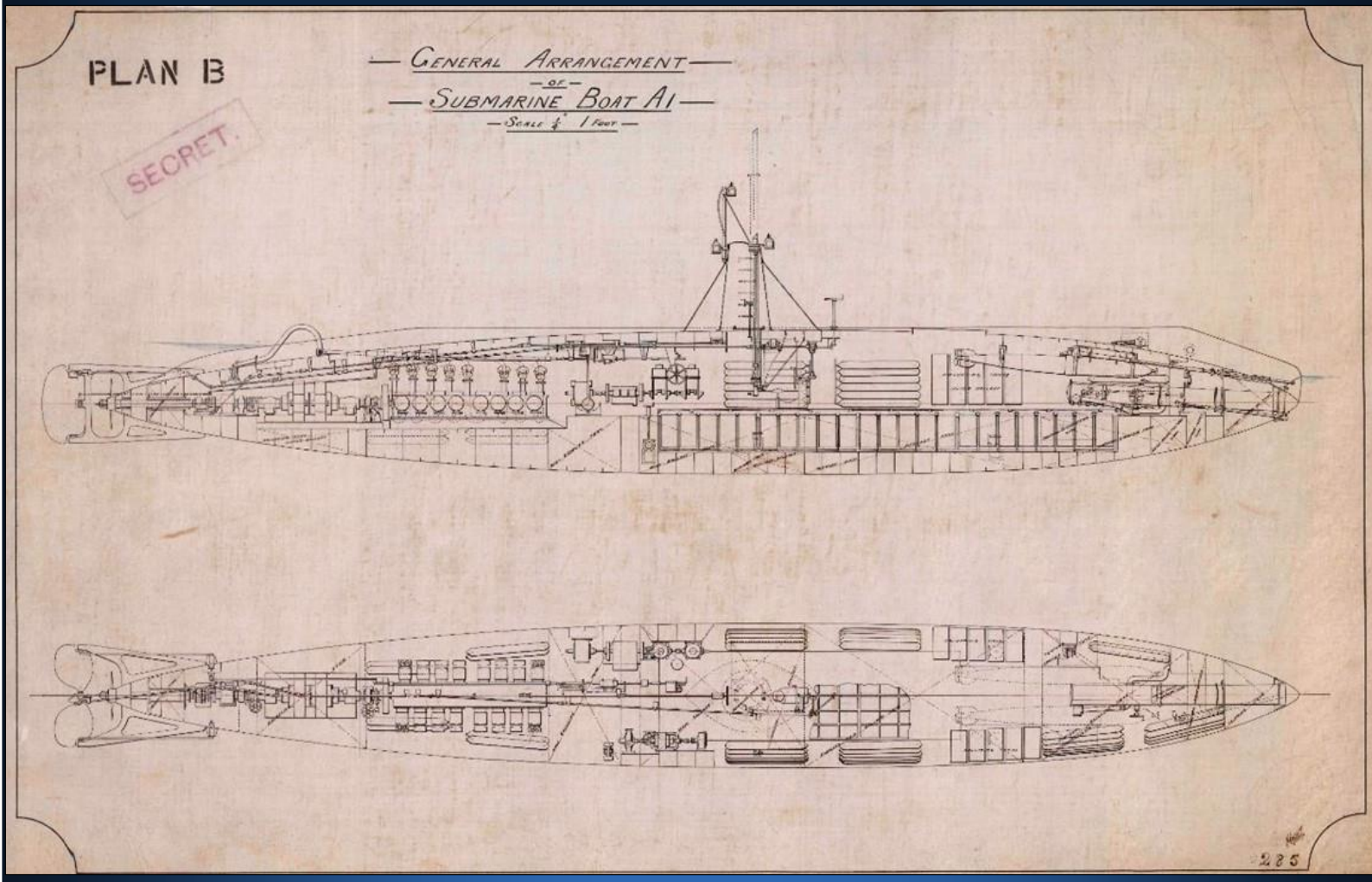
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# THE PROTECTED WRECK OF HIS MAJESTY'S SUBMARINE BOAT A1 (1902)

## CONSERVATION STATEMENT AND MANAGEMENT PLAN

Written by D.M. McElvogue of TrenDive for Historic England

PROTECTED WRECK OF*HIS MAJESTY'S SUBMARINE A1* (1902)

OFF EAST WITTERING, EASTERN SOLENT

CONSERVATION STATEMENT AND MANAGEMENT PLAN

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## *PROTECTED WRECK OF HIS MAJESTY'S SUBMARINE A1* (1902)

## *CONSERVATION STATEMENT AND MANAGEMENT PLAN*

## *EXECUTIVE SUMMARY*

The *A1* was the Royal Navy's (RN) first designed and commissioned submarine. It is also the first large submarine designed for both offensive and defensive operations. Much of *A1's* design incorporated or influenced a significant number of technical "firsts", proving that the submarine could become an effective offensive weapon of war. These features are still found in modern RN submarines and submersible vessels around the world. This includes the first conning tower, periscope, watertight hatch, welding, and bridge (see section 3 below).

The historical and archaeological significance of the *A1* has been formally acknowledged in 1998 through its designation under the Protection of Wrecks Act 1973. The legal protection for the wreck extends to an area 300m from the wreck (Historic England, 2023).

In May 2023, TrenDive was commissioned by Historic England to write a Conservation Statement and Management Plan (CSMP) for the submarine *A1*. The aim of this CSMP is to identify a shared vision amongst the prime and secondary stakeholders (see section 1.9) for how the significance of the Protected Wreck *HMS/m A1* can be conserved, maintained, and enhanced for current and future generations. The below policies outline how this is intended to be done.

**Management Policy 1**

We will continue to support current and future appropriate visitor access to the submarine *A1*. This will include virtual access via web-based diver tours, information boards and displays as a mechanism to develop its instrumental and consequential value, as well as assist stewardship and guardianship within the setting of the Eastern Solent. This will extend to the artefacts from the wreck site curated in the Isle of Wight based Shipwreck Centre and Maritime Museum.

**Management Policy 2**

We will encourage and facilitate the recording and expert appraisal of the artefact collection curated in the Isle of Wight based Shipwreck Centre and Maritime Museum.

**Management Policy 3**

Key gaps in understanding the significance of submarine *A1's* component parts will be identified, prioritised, and addressed so that these significances can contribute to informing the future conservation management of the place.

**Management Policy 4**

We will seek to commission a staged programme of assessment and research to contribute towards a fuller understanding of the site in its entirety.

**Management Policy 5**

We will encourage the investigation and survey of the area around the hull of *A1* to establish the full extent of the site including buried aspects of the site and those parts reported to have been dropped away for the *A1* submarine's hull.

**Management Policy 6**

We will facilitate investigations into the archaeological potential of the remains of the *A1*'s buried stern to establish its full extent.

**Management Policy 7**

We will facilitate investigations and survey to establish the full extent of the remaining survival of *A1*'s internal hull fittings.

**Management Policy 8**

We will continue to facilitate Licensee guardianship and monitoring of the condition of the *A1*.

**Management Policy 9**

We will seek to undertake a programme of research, investigation, and monitoring of the corrosion of the *A1*. This programme will build on previous work and will consider impacts and changes within the designated area for the continued survivability of the *A1*.

**Management Policy 10**

We will seek to minimise the risk of damage archaeological material because of unnecessary disturbance of the seabed within the restricted areas (by fishing, anchoring and/or diving). This will be done through outreach and engagement of local marine, diving and fishing communities and organisations.

**Management Policy 11**

We will ensure that this management plan remains current and reflects best practice by being reviewed and updated on a regular basis by stakeholders.

***PROTECTED WRECK of HMS/m A1 (1902)***

***CONSERVATION STATEMENT AND MANAGEMENT PLAN***


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# 1 Introduction

## 1.1 Background

1.1.1 England's marine historic environment is rich and varied (Cant, 2013). It is the UK Government's policy that our legacy should be protected, conserved, and enhanced for future generations (DEFRA, 2011).

1.1.2 The *A1* was the Royal Navy's (RN) first indigenously designed and commissioned submarine. It is also the first large submarine designed for both offensive and defensive operations. Much of *A1*'s design incorporated or influenced a significant number of technical "firsts", proving that the submarine could become an effective offensive weapon of war. These features are still found in modern RN submarines and submersible vessels around the world. This includes the first conning tower, periscope, watertight hatch, welding, and bridge (see Statement of Heritage Significance, section 3 below).

1.1.3 The historical and archaeological significance of the *A1* has been formally acknowledged in 1998 through its designation under the Protection of Wrecks Act 1973. The legal protection for the wreck extends to an area 300m from the wreck (Historic England, 2023).

| ***HMS/m A1* LOCATION (WGS84)** | |
|---|---|
| **Latitude:** | 50º.74251829 N |
| **Longitude:** | 00º.92132000 E |
| **Designated Area:** 300m radius | |
| **National Grid Reference:** SZ 76206 94211 | |

*Table 1 Location Details of the Protected Wreck of HMS/m A1.*

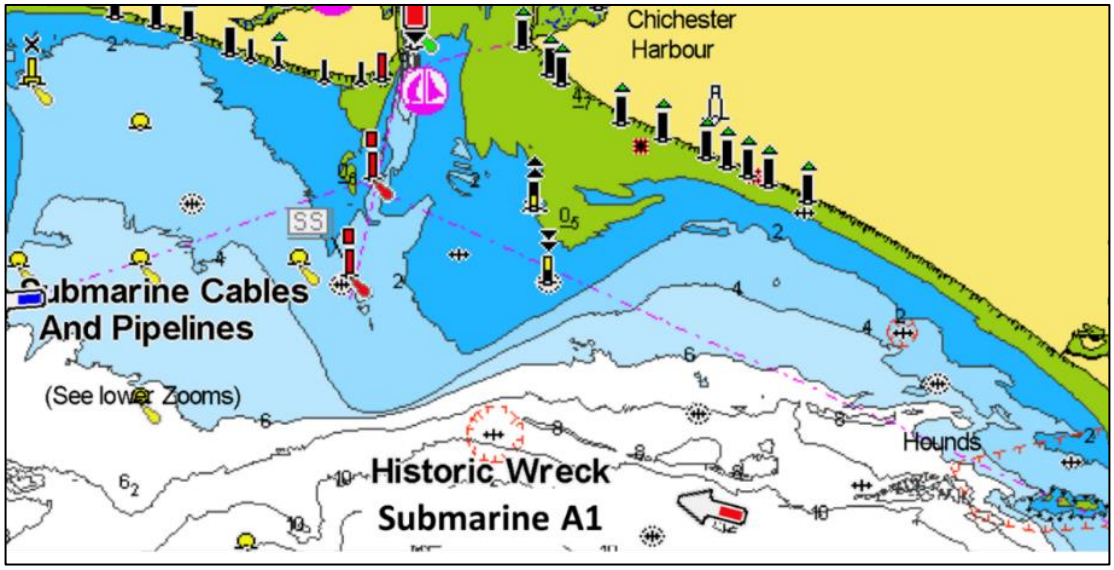



*Figure 1 Site Location Map of Protected Wreck of HMS/m A1 south of Chichester Harbour.*

## 1.2 Statutory Designations

1.2.1 *HMS/m A1* is protected by Designation Order under the Statutory Instruments (SI):

- Designation Order: (No 2), No 2708, 1998. Made: 4th November 1998. Laid before Parliament: 5th November 1998. Coming into force: 26th November 1998. Protected area: 100 metres within 50 44.52 N 000 55.19 W.
- Amended Designation Order: (No 2), No 2708 under Designation Order No 2393, 2004. Made: 12th September 2004. Laid before Parliament: 14th September 2004. Coming into force: 5th October 2004. Protected area 300 metres within 50 44.5511 N 000 55.2792 W.

1.2.2 The National Heritage List data for the site is (Historic England, 2023):

- Heritage Category: Maritime Wreck
- List Entry Number: 1000043
- Date First Listed: 04-Nov-1998
- Date of Most Recent Amendment: 05-Oct-2004
- Location Description: Eastern Solent, Off East Wittering, West Sussex.

## 1.3 Other Designations in Area

1.3.1 Archaeological interventions that impact the seabed may require a marine licence issued by the Marine Management Organisation under the Marine and Coastal Access Act 2009 and a licence from the Crown Estate.

1.3.2 The wreck of submarine *A1* is located adjacent to Solent Maritime SAC, Chichester & Langstone Harbour SPA, Chichester Harbour SSSI and Bracklesham Bay SSSI The *A1* wreck site lies within the Solent and Dorset Coast Special Protection Area (SPA) (Figure 2). Details of these designations can be found at:

- Solent Maritime SAC - Marine site detail (naturalengland.org.uk)
- Chichester & Langstone Harbour SPA - Marine site detail (naturalengland.org.uk)
- Chichester Harbour SSSI - SSSI detail (naturalengland.org.uk)
- Bracklesham Bay SSSI - SSSI detail (naturalengland.org.uk)

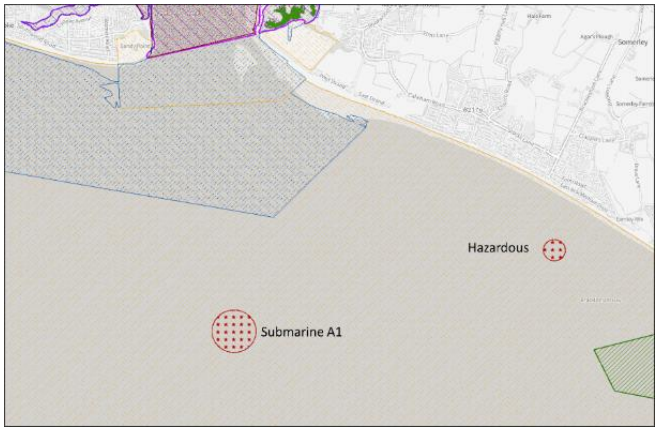



*Figure 2 A1 300m Designated protected (shaded red) and The Hazardous 100m protected wreck site (shaded red) to the northeast of the A1.Other conservation designations as per DEFRA (https://magic.defra.gov.uk/MagicMap.aspx). © Crown Copyright and database rights 2024. Ordnance Survey 100022861.*

1.3.3 In addition, Section 40 of the (Natural Environment and Rural Communities Act, 2006) places a duty on all public bodies to have regard to the conservation of biodiversity. Guidance for this delivery of this duty is set out in the document, Biodiversity 2020: A strategy for England's wildlife and ecosystem services (DEFRA, 2011).

## 1.4 Legislative and Statutory Framework

1.4.1 The Protection of Wrecks Act 1973 (PWA) gives the UK Government powers 'to secure the protection of wrecks in territorial waters and the sites of such wrecks, from interference by unauthorised persons. This is implemented by order of the Secretary of State designating an area around the wreck site as a restricted area (GOV.UK, 1973).

1.4.2 Historic wrecks are protected "…on account of the historical, archaeological or artistic importance of the vessel, or of any objects contained or formerly contained in it which may be lying on the seabed in or near the wreck" (GOV.UK, 1973, p. Section 1).

1.4.3 This means the remains of the vessel or parts therefore, including fittings, armaments, cargo and other associated objects or deposits, may be legally protected from interference if any part may contribute significantly to our understanding of our past. Diving and other activity on the site of *HMS/m A1* are licensable activities and overseen by the appointed Principal Licensee.

1.4.4 The National Heritage Act 2002 (GOV.UK, 2002) enabled English Heritage, replaced by Historic England, to assist in costs relating to works under the PWA. These costs, including those spent on *HMS/m A1*, must align with Historic England's strategic and research priorities (Historic England, 2021).

1.4.5 The UK Marine Policy Statement (2011),(DEFRA, 2011) provides the framework for Marine Plans and decisions affecting the UK's marine environment. It aims to contribute to the sustainable development of the UK marine area (DEFRA, 2011). An objective of its governance is that the protection and management needs of underwater cultural heritage are recognised (DEFRA, 2011, p. 21) and should be enjoyed for the quality of life it brings to this and future generations (DEFRA, 2011, p. 21). It also states that the UK's underwater cultural heritage should be conserved through marine planning in a manner appropriate and proportionate to its significance (DEFRA, 2011, p. 22).

## 1.5 Best Practice

1.5.1 Since 2008, the UK Government has adopted the Annex to the UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001 as best practice for Underwater Archaeology (UNESCO, 2015, p. 11). This provides a series of ethical rules for activities directed at underwater cultural heritage (UNESCO, 2001) and provides a management framework for the UK's underwater heritage.

1.5.2 Rule 1 of the General principles of the Convention states "…activities directed at underwater cultural heritage shall be authorized in a manner consistent with the protection of that heritage…" and requires that, under rule 9, "Prior to any activity directed at underwater cultural heritage, a project design [PD] for the activity shall be

developed and submitted to the competent authorities for authorization and appropriate peer review." (UNESCO, 2001).

1.5.3 As part of this PD preliminary works are required (UNESCO, 2001); Rule 10 (a) which "…shall include an assessment that evaluates the significance and vulnerability of the underwater cultural heritage and the surrounding natural environment to damage by the proposed project…" (UNESCO, 2001); Rule 14. This assessment should "include background studies of available historical and archaeological evidence, the archaeological and environmental characteristics of the site, and the consequences of any potential intrusion for the long-term stability of the underwater cultural heritage affected by the activities." (UNESCO, 2001); Rule 15.

1.5.4 It is within this legislative, regulatory, and best practice framework that the Protected Wreck of *HMS/m A1* is expected to be managed. This CSMP forms the lead strategy document for managing the Protected Wreck of *HMS/m A1*.

## 1.6 CSMP Guidance

1.6.1 Historic England is the recognised competent authority for the Protected Wreck of *HMS/m A1*. Therefore, its conservation management system documentation is utilised to produce this Conservation Statement and Management Plan. Further details of these principles and framework are set out in the following documents:

- Conservation Principles for the Sustainable Management of the Historic Environment (Historic England, 2008),
- Historic Wreck Sites at Risk: A Risk Management Toolkit (Historic England, 2017), and
- English Heritage Practical Building Conservation; Conservation Basics (Historic England, 2013).

1.6.2 The CSMP also draws on Historic England's Historic Environment Good Practice Advice in Planning notes; specifically:

- Managing Significance in Decision-Taking in the Historic Environment (Historic England, 2015)
- Heritage Crime Risk Assessment (Historic England, 2023), and
- Heritage Crime Prevention: Advice for those who care for heritage assets (Historic England, 2023).

1.6.3 These documents create a framework for the application of consistent, transparent, and sustainable management principles for heritage assets within the historic environment. As such, "Conservation" is taken to be the process of managing change to a heritage asset in ways that will best sustain its heritage values, whilst recognising opportunities to reveal and reinforce those values for present and future generations (Historic England, 2008) (Historic England, 2013, p. 344).

1.6.4 Furthermore, this CSMP draws on older but relevant documents such as:

- Conservation planning good practise guidance (HLF, 2024),
- Preparing a Heritage Management Plan (Natural England, 2008),

- Generic management plans for shipwreck sites (Cederlund, 2004; Kerr, 2013), and
- other Protected Wreck sites Conservation Statements and Management Plans (see References).

1.6.5 Terms used within this CSMP are derived, in the first instance, from National Planning Policy Framework (NPPF) Glossary of terms (GOV.UK, 2012).

## 1.7 Scope

1.7.1 The Scope of this CSMP is the Protected Wreck of *HMS/m A1*, including data and information related to its significance and setting. This includes:

- the submarine *HMS/m A1*, its history and known site intervention,
- early history of submarine development, specifically that pertaining to the Royal Navy Submarine Service including:
  - Holland boats, and
  - other A class submarines,
- shore based establishments and bases directly associated with the *A1*, such as *HMS Haslar*, *HMS Dolphin* and Haslar Creek,
- people of significance who are known to have interacted with the *A1* submarine, and
- the setting of the *A1*.

## 1.8 Authorship

1.8.1 This CSMP has been prepared by Dr Douglas M$^{c}$Elvogue of TrenDive on behalf of Historic England with contributions from Principal Licensee Martin Davies and Deputy Licensee Alison Mayor.

1.8.2 Contributions to this CSMP have been sought through a Stakeholder consultation exercise. Full acknowledgement of stakeholder contributions has been included in the final version of this document.

## 1.9 Stakeholders

1.9.1 Stakeholders, within the context of this CSMP, are defined as those organisations or persons without whose support *HMS/m A1* would cease to exist as a heritage asset. Stakeholders as defined within this CSMP as Primary and Secondary.

1.9.2 Primary Stakeholders are those with direct management, legal or funding responsibility for the heritage asset and include:

- Martin Davies (as Principal Licensee),
- Historic England, and
- Martin Woodward (as owner).

1.9.3 Secondary Stakeholders are those people or organisations not directly engaged with the heritage asset but may hold an interest in it, including an interest in its instrumental value.

1.9.4 A list of identified Stakeholders can be found in section 10.

## 1.10 Status

1.10.1 This report is the final form (Version 2.6, August 2024). Comments from Historic England have been incorporated as appropriate. This final version 2.5 reflects comments from Stakeholders following a consultation exercise. Notes on its status (in terms of consultation, adoption, and revision) are maintained in the document control grid at the front of this document.

## 1.11 Aims and Objectives

1.11.1 The aim of this CSMP is to identify a shared vision for how the significance of the Protected Wreck of *HMS/m A1* can be conserved, maintained, and enhanced for current and future generations.

1.11.2 This is achieved through the following objectives.

- Understanding the Protected Wreck site of *HMS/m A1,*
- Assessing the significance of the Protected Wreck site of *HMS/m A1,*
- Identifying where the significance of the Protected Wreck site of *HMS/m A1* is at risk,
- Identifying policies for conserving the significance of the Protected Wreck site of *HMS/m A1,*
- Identifying and engaging with local, regional, and national stakeholders who share Historic England's aspirations for the continued conservation management of the Protected Wreck of *HMS/m A1,* and
- Identifying policies that balance conservation with economic and social needs.

# *2* Understanding the Protected Wreck of *HMS/m A1*

2.1.1 It is a requirement to know the history and physical remains of a heritage asset so that its significance can be understood. This section outlines the interesting known headline facts and events that contribute to the Protected Wreck of *HMS/m A1* significance. The asset may also be referred to as '*A1'*, 'Submarine *A1'*, '*HMS A1', HMS/m A1, HMS/b A1* and 'boat no. 6' within this CSMP. The section then considers the main interventions after the *A1* was discovered to understand its current condition, environment, and any historical threats to the site.

## 2.2 Historical Context

2.2.1 At the Spithead review of 1897 the Royal Navy stood at the height of its power, showcasing the strongest naval force in the world. It could crush the combined battle fleets of two or more of its rivals, giving it effective command of the world's oceans (Lambert, 1999, p. 38). From the age of sail to the end of the nineteenth century the Board of Admiralty had maintained the same strategy, and saw no reason to change, least of all for the fledging experimental submarine boats that then existed (Lambert, 1999, p. 39). That is until it had been perfected as weapon of war.

2.2.2 From the 1856 Royal Naval officers discretely inspected all submarines developed by

both professional and amateurs and kept intelligence on those developed overseas (Lambert, 1999, pp. 39-40). The Admiralty knew that the successful development of the submarine as a weapon of war was reliant on the significant investment of a nation state. Until then, it could watch and wait. In 1887 the French Navy became the first major naval investor in submarine technology, and the Admiralty watched with interested intent. By 1900 the Admiralty recognised the time had come to invest in their own submarines. The French had "...seemed to overcome the difficulties of the submarine boat…" and they could no longer "…afford to disregard them and their increased proficiency" (Lambert, 1999, p. 43). Even the fledging American Navy were investing in submarine technology, in the guise of the newly designed Holland Boats.

2.2.3 The Admiralty's response was to invest in the purchase of a submarine "…for the purpose of ascertaining for ourselves the limits of the powers of these vessels and the best means of avoiding and destroying them" (Lambert, 1999, p. 45). The chosen vessels for these experiments would be the Holland class of the Electric Boat Company (EBC), licensed to be built by Messrs. Vickers, Sons & Maxim Ltd of Barrow-in-Furness. First approached in August 1900, the Holland boats, 1 to 5, were to be the first submarines built for the Royal Navy. At the instance of EBC more than one submarine had to be purchased. Five were ordered, as this was considered the minimum number required for a programme of antisubmarine experiments and the EBC refused to deal with a lesser order number (Lambert, 1999, p. 45).

2.2.4 Britain was playing catchup and knew it. No sooner had the Holland boats been ordered, and recognising their inadequacies, the Admiralty started to look at encouraging the development of more sophisticated and developed submarines, of a type that could meet and match those currently deployed by the French (Lambert, 1999, p. 47).

2.2.5 The Holland boats built for the RN were an improved design known as the *Fulton*. Even so the Admiralty knew they were not the answer. Despite this they progressed with the Holland boats, as practical experience was a premium to allow for informed judgements (Lambert, 1999, pp. 50-51). To provide this informed judgment the Admiralty appointed Capt. Reginald Bacon RN as the newly created position of Inspecting Captain of Submarines.

2.2.6 On the 23rd March 1901, Bacon was appointed to *HMS President* for "Special Service" at the Admiralty (ADM 196/42. f. 166). Bacon wrote that he served on the staff of the Controller, with an office at the Admiralty and that the 'Special Service' was to be "with the submarine boats, on which work had already been commenced." (Bacon, 1940, p. 50 and 54).

2.2.7 Upon seeing the Holland technical plans, as they were still under construction, Bacon stated that they would be too small and just "fair weather" submarines (Bacon, 1940, p. 61). To improve them he suggested alterations to the fourth and fifth Holland boats. However, the Admiralty Contracts department refused, sighting that J.P. Holland or the EBC would not accept any liability for them if altered. The Admiralty thus authorised the construction of a new vessel, a sixth submarine, this time built to "Admiralty", or more accurately described "Bacon", design (Evans, 1986, p. 17). The sixth submarine was recognised from the start as a separate design and new class of submarine.

Therefore, it was known as *A1*, the first of what was to be the early A Class.

## 2.3 Designing and Building *HMS/m A1*

2.3.1 The *A1* was designed (see below), then laid down on the 19th February 1902, built and then launched on the 9th July of the same year. It was completed by the 23rd July 1903 (Akermann, 1989, 120). A truly remarkable speed of delivery for what was in all intents and purpose a new design.

2.3.2 The principal designer of the *A1* was Captain Reginald Bacon RN (Sueter, 1907, p. 148), the newly appointed Inspecting Captain of Submarines. Appointed on the 20th August 1901 (Evans, 1986, p. 16), Bacon admitted he knew "nothing about submarines", or at least no more than anyone else in the Royal Navy (Bacon, 1940, p. 54). Bacon's appointment was due to being recognised as the most technically capable officer in the Royal Navy and he had torpedo boat experience. As stated by Admiral of the Fleet Sir Henry F. Oliver in his 1946 memoirs, "Bacon was about the ablest and cleverest Officer I have ever known." (James, 1956).

2.3.3 On taking up his post, Bacon found that the Admiralty had already contracted with Messrs Vickers, Sons & Maxim to build five American Holland type submarines under licence from the Electric Boat Company. The contract also included training of naval crews to have "…sufficient practical experience to enable the boats to be navigated during their official trials" (Bacon, 1940, p. 51). Bacon was on site at Barrow-in-Furness where the Holland boats were being built. He used this intimate knowledge of this new technology to consider "…what were the difficulties that we were likely to come across and arrive at methods by which they could be forestalled" (Bacon, 1940, p. 54).

2.3.4 Bacon oversaw the design of new innovations for the submarines. Whilst some were included (where allowed) and trialled in the Holland boats, improvements were designed into the *A1*. These included an "optical tube" to assist navigation. On the Holland boats it was hinged on a ball joint at the hull so it could lie flat when not used. With the assistance of Sir Howard Grubb, it developed into the modern-day periscope for the *A1*. The *A1* was the first submarine to deploy the periscope vertically from within a conning tower and to have a trailing motor fitted to rotate the periscope around its axis (Sueter, 1907, p. 241). Other innovations included air purifiers, required for extended time and range underwater, as was the use of white mice for carbon monoxide poisoning monitoring (the mice would die before the level of percentage of gas became toxic to humans). Issues with the compass binnacle were alleviated by mounting it outside the hull and viewing it through a port in the hull, whilst electromagnetic coupling, when the electric engine was engaged, was also alleviated. The key issues to overcome, in Bacon's mind, of the Holland boats were "…their size and speed above and below water, and also their sea-going qualities." (Bacon, 1940, p. 61). To do this required a new design.

2.3.5 From the beginning the *A1* was designed as a new vessel; as Bacon states "…the design of the new boat called *A.1*, or the first of the A class." (Bacon, 1940, p. 68). To meet the perceived weakness of the Holland boats, the prime initial requirement was an increase in speed. This necessitated, for surface speed, a larger engine; in this case an unbuilt or trialled 500hp petrol engine to be designed and built by the Wolseley

Motor Car Company. Underwater, accumulator batteries, of double the capacity of the Holland boats, were designed, and built by the Chloride Electrical Storage Company (Bacon, 1940, p. 61). Estimates of their size set the initial minimum displacement for *A1,* fixed at 113 on the surface and 122 tons submerged (Akermann, 1989, 117). This also allowed for "other improvements" such as the conning tower, at least six feet above the deck, with the new periscope passing up through it and raised and lowered vertically through it (Bacon, 1940, pp. 61-62).

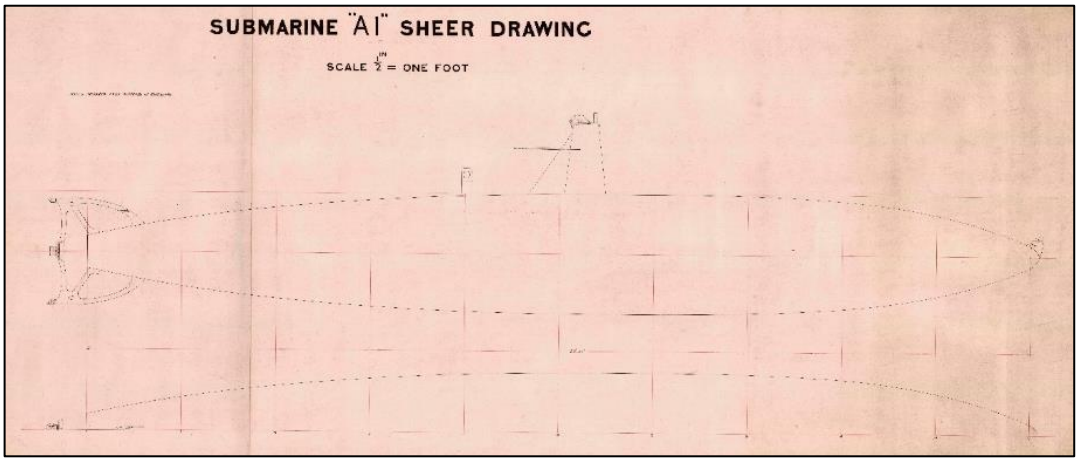



*Figure 3 Sheer plan of A1 drawn from Bacon's several sheets of paper (© National Maritime Museum, Greenwich. Image No:M4140).*

2.3.6 Bacon drew his original designs on several sheets of paper. These were combined into a single sheer plan (M4140). This drawing represents Bacon's original concept for the *A1* (Figure 3) and therefore that of the first British designed and built Royal Navy Submarine. To expediate the design for the new submarine Messrs, Vickers, Sons & Maxim placed at Bacon's disposal a drawing office at Barrow with two ship and two engine Draughtmen. Mr A. Terney was chief of boat design and L.G. McFarlane chief for engine work (Bacon, 1940, p. 61). After the *A1* was launched (Figure 4), the Admiralty commissioned "as is" drawings of the Submarine (M4142).

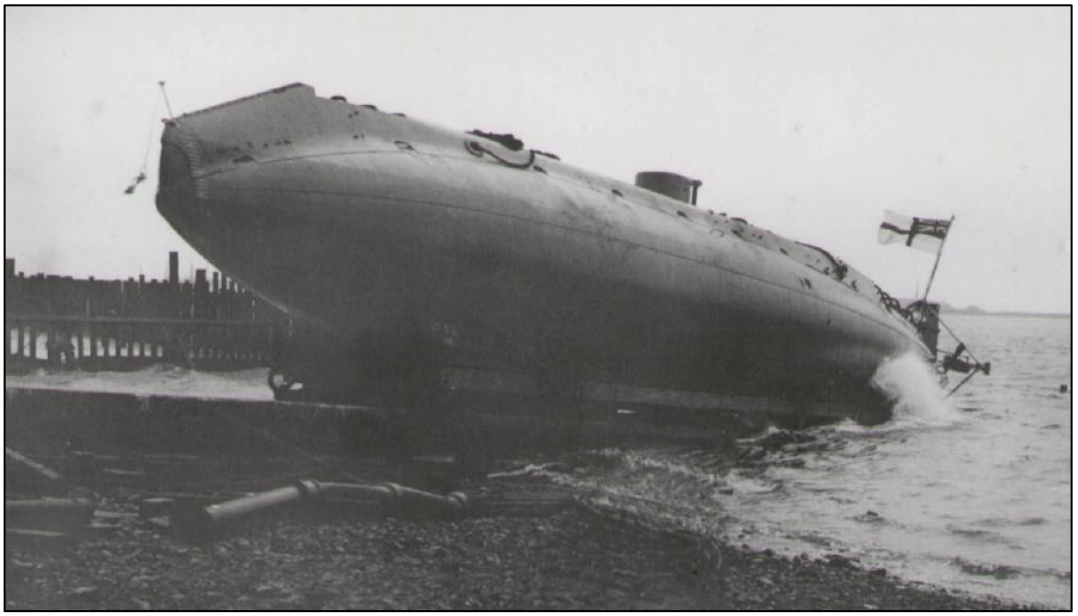


*Figure 4 The launch of HMS/m A1 (© National Museum of the Royal Navy).*

2.3.7 Bacon's original design for the conning tower survives in the National Maritime Museum. Labelled "Submarine No *A.1*. – Conning Tower and Fittings," it is drawn in pencil on oil-based tracing paper, which would have given it a translucent appearance (personal comment Jeremy Michell, 31 October 2023). This is a unique artefact. The conning tower concept includes the newly designed vertical periscope. Also within the collection is the design for "Submarine *A.1*. Bridge." This was a folding "fly bridge" that could be deployed on the surface and folded down and stowed on the deck when not in use (Sueter, 1907, p. 158). The requirement to move the binnacle suggests this was designed from experience of using the *A1*. It was dated "Approved 21.11.04" confirming this assumption.

2.3.8 To ensure his newly designed all British submarine would be safe in the water and meet his design requirement Bacon entrusted his design to engineer R.E. Froude an engineer and hydrodynamicist for the Admiralty Experimental Works at Haslar, Gosport. Froude tested the design between January and February 1902, including comparing the new *A1* (noted as *No. 6*) to the Holland boats (ADM226/11). These trials proved the design to be a success and allowed Bacon to confidently progress to construction at Barrow-in-Furness. They are also the first recorded hydrostatic hull design and tests recorded for a submarine.

## 2.4 Service History of *HMS/m A1*

2.4.1 The *A1* was ordered as the first of its class, there being an expectation that further such submarines would be built. Conceding that the output from the Wolsey engine was disappointing, Bacon however considered that the *A1* would still make a good experimental platform for further trials.

2.4.2 The *A1* was initially thought of as a "great success" (Sueter, 1907, p. 148). During trials off Barrow in the Irish Sea the *A1* proved that such large submarines could be kept on an "even depth-line at quite moderate speeds" (Sueter, 1907, p. 148) the *A1* presented itself so well during its deep-sea trials that the officer in charge offered to take it to the Isle of Man, all the way underwater (Sueter, 1907, p. 148).

2.4.3 Other innovations proved too difficult to implement. The original adjustable pitch propeller was one such thing. Designed to consider the variable revolution speeds between the petrol (650 revs) and electric (800 revs) engines, it proved at that time too difficult to work so was abandoned (Bacon, 1940, p. 70). The concept though would be taken up again by later submarines.

2.4.4 Other innovations came about through trial, error, and experience. They were either adopted or rejected according to how they worked (Sueter, 1907, p. 148). On its original delivery voyage from Barrow to Portsmouth, a gale and heavy seas caused damage to the batteries. This forced a redesign of the accumulator batteries and an improved method of supporting the plates. As Bacon put it, "…out of our trouble…valuable experience was gained for the boats that came after…" (Bacon, 1940, p. 71).

2.4.5 After designing the *A1*, Bacon went on to develop directly from the *A1* the next batch of three submarines *A.2, A3* and *A4* (Sueter, 1907, p. 157). The hull form was improved

by Froude improving its underwater efficiency and increased their size slightly and therefore displacement, and thus buoyancy, to consider the increases in weight required for all the new equipment and the redesigned Wolsey engines which were now heavier (Bacon, 1940, p. 68). In Bacon's own words "All the improvements suggested by the trials of *A1* entailed increases in weight; these, of course, the succeeding boats would have to carry." (Bacon, 1940, p. 71).

2.4.6 **Note:** Bacon suggested that the new 'all British' Submarines should be named after prehistoric reptiles with the *A1* to be called the "Ichthyosaur" (ADM/SC/185). The Admiralty disagreed, stating they would be numbered sequentially and that each "class" would be defined by a letter. Boat number 6, as first in class of the first class of all British submarines was thus called *A1*.

2.4.7 After delivery to Portsmouth, the *A1* was utilised during Top Secret trials in the Solent. Haslar Creek (Figure 5) in Gosport was chosen as the new submarine base. Haslar was the former Royal Engineers submarine mine depot, which were to be replaced by submarines for harbour defence (ADM 1/7717). *HMS Hazard* an ex-gunboat that had been commissioned as the original submarine "mothership" in Barrow (Bacon, 1940, p. 63) and the five Holland boats were initially stationed there along with the *A1*.

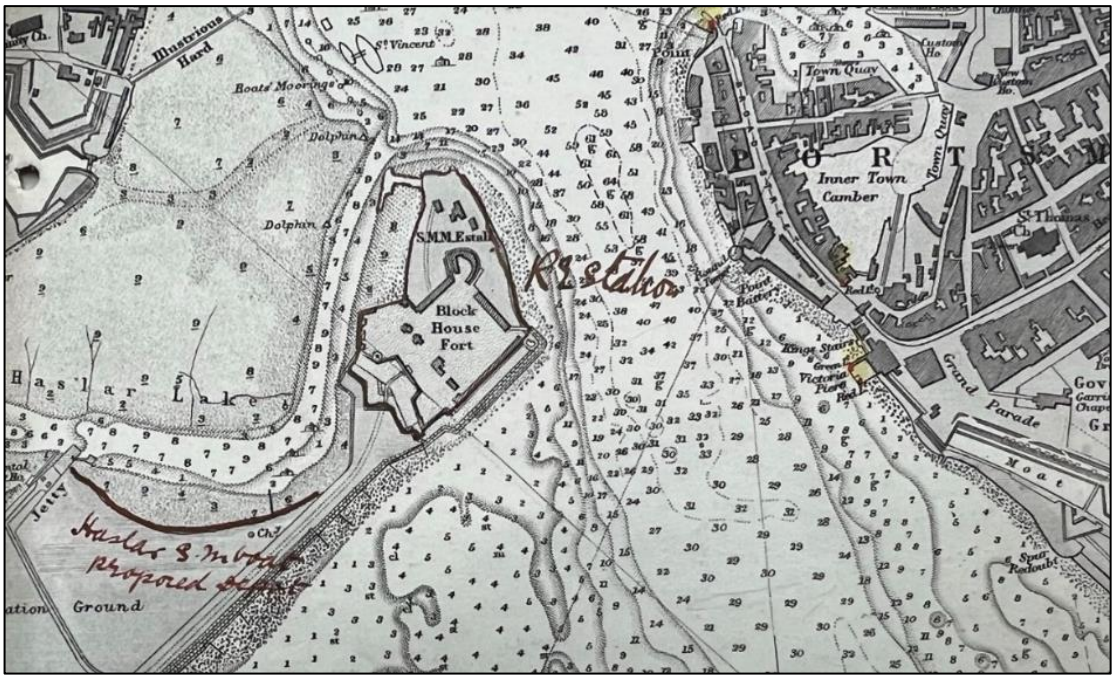



*Figure 5 Captain Bacon's original annotated chart marked "Haslar S.M. Boat Proposed Depot" on the lower left and "RE Station" in the middle by "Block House Fort" highlighting where the submarines and crews would be based (ADM1/7717).*

2.4.8 Whilst Barrow-in-Furness is the birthplace of the Royal Navy's submarines, Haslar Creek (the present-day site of Royal Navy Submarine Museum), was its original depot, operating base, and Headquarters. Fort Blockhouse was the former Royal Engineers submarine mine depot and chosen by Captain Bacon, on 13th December 1903, as suitable for the submarines (ADM 1/7717). By 1910, to provide living quarters and workshops, Submarine Headquarters at Portsmouth included the sea going depot ship *HMS Bonaventure* (a converted old cruiser) along with the hulks *HMS Mercury* and *Dolphin*; whilst the tenders *HMS Antelope* and *Hazard* (old torpedo gunboats) were

utilised to help serve the submarines. *HMS Thames* had also been stationed at Portsmouth but subsequently was stationed at Harwich along with its tender *HMS Hebe* (Winton, 1999).

2.4.9 Trials, experiments, and exercises involving submarines were caried out in Portsmouth Harbour, Spithead, and west into Stokes Bay and out as far east as Selsey Bill and south into St Catherines Deep and around the Nab light ship (Figure 6). Whilst the Irish Sea off Barrow is recognised as the area where the first British submarines conducted their sea trials, the Eastern Solent is the area where the Royal Navy perfected submarine use, tactics, and strategy.

2.4.10 It is noteworthy that during this period Admiral Sir John ("Jackie") Fisher was also stationed at Portsmouth. As noted by his biographer "…the most remarkable feature of Fisher's command at Portsmouth had been the development of his interest in submarines (MacKay, 1973, p. 424). Seeing at once the offence potential of the submarine, Fisher stated (1st April 1902) that "...we shall have another revolution in strategy and tactic and the Offensive will again regain the ascendancy" (MacKay, 1973, p. 425). Lord Kerr agreed arguing that "…Britain should not deny herself the offensive potential of submarines." (MacKay, 1973, p. 426). The only submarine at that time that could full fill that offensive capability was the *A1*.

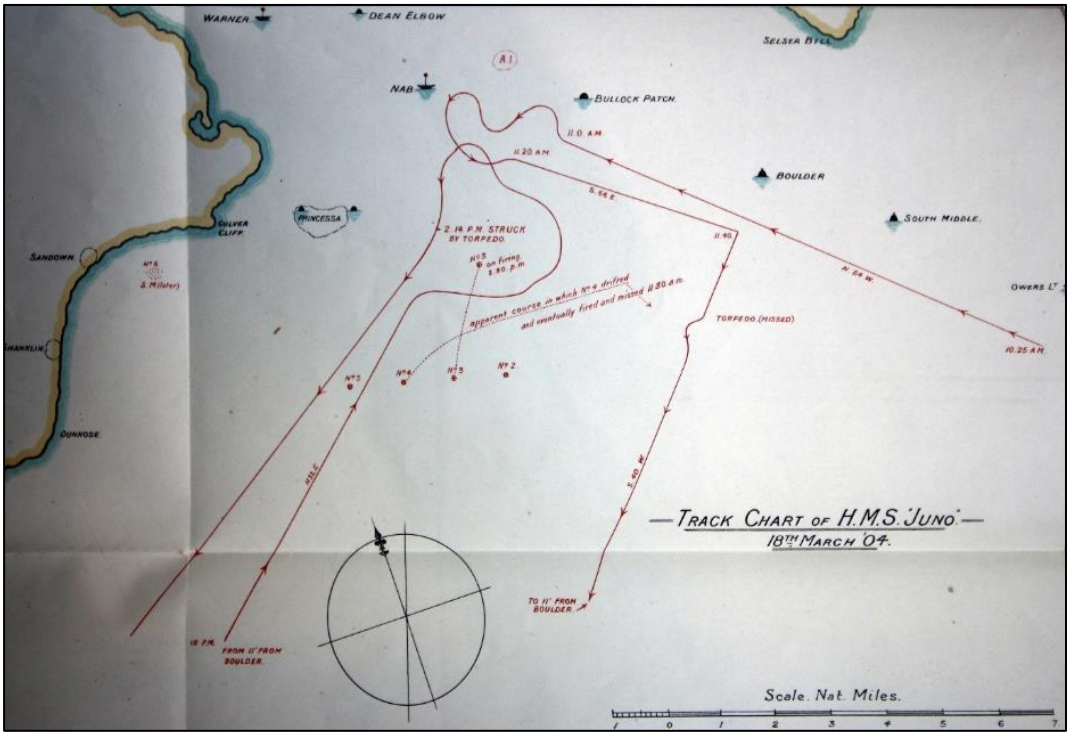



*Figure 6 The training ground at the entrance to the eastern Solent showing the track of HMS Juno on the fateful day the A1 was lost with all hands. A1's initial "holding" position is shown at centre top of the image (ADM 1/7795).*

2.4.11 It was of no coincidence that the *A1* was considered one of Admiral Fisher's favourite "showpieces" as he enjoyed showing off the latest technology to Politicians, Royalty, and Admiralty Officials (MacKay, 1973, p. 435). The then Prince of Wales had gone down in the *A1* at Portsmouth just a few days before she sank in March 1904, whilst the King and Duke of Connaught had also been aboard earlier that month (Compton-Hall, 1983, pp. 21-22).

2.4.12 Considered an unlucky submarine by some (Gray, 1986, p. 56), during its service history the *A1* had two internal explosions and sank three times. The first and last sinkings are discussed here due to their significance.

2.4.13 Little is currently known about the *A1*'s service history between these two events. Certain anecdotal history has come to light such as, in 1907 Lieutenant Geoffrey Biggs RN was unable to attend his brother's wedding due to being in command of "the famous submarine *A1*". On Monday the 11th November 1907, Kaiser Wilhelm II arrived in Portsmouth aboard his imperial yacht, the *SMY Hohenzollern*, for a week-long visit to Britain. At the time *HMS/m A1* was acting as escort for the German Emperor (Roath Local History Society, 2022).

## 2.5 First Loss of *HMS/m A1*

2.5.1 The *A1* was the Royal Navy's first submarine loss which sadly resulted in its first submarine service casualties (Akermann, 1989).

2.5.2 The *A1* was accidentally sunk in the Eastern Solent on 18th March 1904 whilst conducting a practice attack on the cruiser *HMS Juno*. The *A1* was part of the submarine flotilla that included the five Holland boats, which took part in the five-day exercise programmed in March 1904. The submarines were to defend Portsmouth from the Home Fleet, then stationed at Portland (ADM 1/7795). Under the command of Lieutenant Loftus Mansergh RN, on the fifth and final day of the exercise the *A1* was held in reserve, positioned near the Nab light ship whilst the Holland boats attacked the home fleet. Then Captain Bacon signalled the *A1* to attack the cruiser *HMS Juno* (See Figure 6). Mansergh submerged, took his bearing, and moved forward. As Mansergh was focused on his attack run, out of his sight and to the south of the *A1,* the mail steamer *SS Berwick Castle*, enroute from Southampton to Hamburg, was steaming through the eastern Solent past the Nab light. At 2.03 pm "…proceeding at a speed of nine knots, course S.E1/2 S Magnetic", put the *SS Berwick Castle* on a collision course with the submerged *A1*. The *Berwick Castle* struck the *A1* "At 2.11" reporting that it "…felt a double concussion on the port bow" (MT 23/170).

2.5.3 Being struck by *SS Berwick Castle* on the top of the starboard side of the conning tower, the top hatch opened and the *A1* flooded before the men inside could blow the ballast tanks. The entire crew were drowned. Aware of the submarines in the area the Master of the *Berwick Castle* reported hitting something to the guardship, only to be told they believed a practice torpedo had struck him, so he continued his journey. It was not until *A1* failed to return to harbour that the full scale of the disaster was known.

2.5.4 Sunk in only 39 ft (12 m) of water but in the fierce tidal water of the Solent. Despite significant efforts by Royal Navy and a professional salvor company the fierce tidal water of the Solent and poor weather conditions, meant that it took a month to recover the *A1*. Initial attempts at putting rope hawsers under the submarine were successful, but they parted on attempting to raise it (Sueter, 1907, p. 151) the submarine being full of water.

2.5.5 The Neptune Salvage Company of Stockholm was employed to recover the submarine. Divers working from the salvage steamer *Belos* plugged the hole in the

conning tower with concrete then cut a hole in the *A1's* hull and pumped air into it. Two 5-inch steel hawsers were secured fore and aft and the *A1* raised to 4ft (1.2m) off the bottom and slowly brough back into the harbour under the *Belos* and a Navy Lighter (see Figure 7).




*Figure 7 The Neptune salvage vessel 'Belos' towing the lighter which has A1 slung below it marked by an 'X'.*

2.5.6 On 18th April 1904, a month after it had sunk, the *A1* was recovered and towed back to Portsmouth (Figure 7). That night, the bodies of the crew were taken to Haslar Hospital and an inquest was convened the following day (19th April 1904). Captain Bacon was the principal witness and was questioned about the damage to the submarine. The outcome of the inquest was that all eleven of the crew had died from drowning (Figure 8).

2.5.7 Starting at 5pm on the 19th April 1904, the funeral procession left the mortuary with a cortege of gun carriages bearing the remains of *A1*'s crew. Proceeding along "Dead Man's Mile" the street was lined with thousands of members of the public who wished to pay their respects. Finally, the crew were laid to rest with full Naval honours at Plot H, Haslar Royal Naval Cemetery, Clayhall Road, Gosport, Hampshire. Approximately 700 officers and men took part in the proceedings, which constituted a Naval pageant on a scale that eclipsed anything of the kind witnessed at Haslar. In attendance were representatives of the Royal family, Admiral Fisher and Rear Admiral Orford Churchill, whose only son, Sub Lieutenant John Preston Churchill, aged just 21, was the youngest of *A1*'s crew.

2.5.8 The loss of the *A1* caused a national shock and outpouring of mourning. Or, as reported in Hansard, "Public attention was lately riveted on the submarine by the deplorable accident which happened off Portsmouth to Submarine *A1*." (Hansard, 1904).

2.5.9 Media coverage was immense, with over 8,700 newspaper reports on submarines, during the two months of March and April 1904. Reporting extending across the British Isles and overseas. Most of these reports related to the loss of *A1* and the efforts to recover the submarine and crew. The public shock at the loss and subsequent delays in recovering the submarine led to much speculation about the nature of the incident and frustration with the apparent inability of the Royal Navy to swiftly recover the ill-fated submarine and her crew.

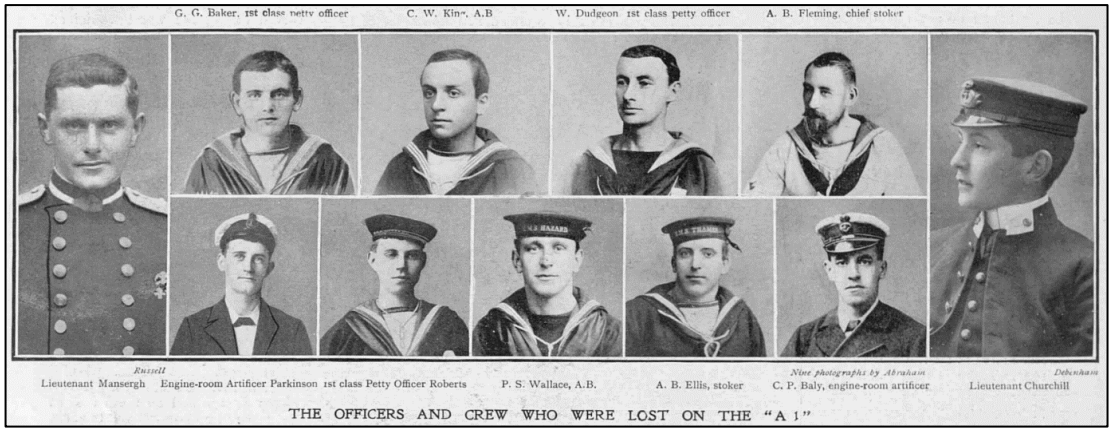



*Figure 8 HMS/b A1 crew who were lost - seven of them local to Portsmouth: Lieut. L.C.C. Mansergh ; Sub Lt. J.P. Churchill ; CERA Parkinson, W.J. ; CS Fleming, A.B. ; PO 1st Cl. Baker, G.G. ; PO 1st Cl. Roberts, V.W.L. ; PO Dudgeon, W. ; ERA Baly, C.P. ; AB Wallace, P.S. ; AB King, C.W. ; Stoker Ellis, A.B.*

2.5.10 After the experience of the salvage, all submarines were fitted with fore and aft ring bolts so that divers could quickly attach hawsers to aid recovery. Also, all submarines were fitted with watertight hatches between the conning tower and pressure hull. The construction of the *A2, A3 and A4* was delayed allowing for this work. The *A1* when put back into service was also fitted with such a hatch. Notices to mariners, telling them where and when submarines were exercising, were also instigated (Hansard, 1904).

2.5.11 However, several accidents in other A class submarines occurred in the years that followed, sadly resulting in more loss of life. An obelisk monument that commemorates the men who lost their lives on submarines *A1*, *A3, A5* and *A8* was erected at Plot H in 1920's. It is a Grade II listed monument (Historic England, 2023).

## 2.6 Final Loss of *HMS/m A1*

2.6.1 In August 1910, after an internal explosion that injured seven crew onboard, the *A1* was transferred to the Anti-Submarine Committee of the Royal Navy. Working out of Portsmouth, *A1* was used for conducting trials and experiments that would enable the Admiralty to improve the performance and safety of future submarines as well as how to detect and damage or destroy them.

2.6.2 The Admiralty carried out several experiments working out of Portsmouth harbour during the winter of 1910 and the summer of 1911. These experiments included firing Lyddite shells at the *A1* and *A2* to see if the submarine, or the equipment inside them (such as the periscope or compass), would be damaged (Northern Daily Telegraph, 31st August 1911). The submarines were partially submerged off the Isle of Wight then fired at by light quick firing guns of a gun boat (Northern Daily Telegraph, 31st August 1911). The experiments also used shells that were set to explode above the submarine's periscope, to see what damage might be done (McKee, 1993).

2.6.3 On 3rd January 1911, the *A1* was ordered to be taken in hand at Chatham (20th January 1911) and fitted out with "Secret" Alterations and Additions (ADM, 136/6). The work was completed by 18th March 1911. Whilst appearing to be routine works including checks of steering rods and cleaning of ballast tanks and valves, there also appears to have been fitted "...a sort of torpedo head, which enables the boat to be submerged

without a crew on board and to rise to the surface again, if uninjured" (Pall Mall Gazette, 30th August 1911). The works carried out in the first quarter of the year could be associated with this "Torpedo Head" and some form of automatic steering and diving equipment. If so, this would make the *A1* one of the first surviving Autonomous Underwater Vehicle (AUV).

2.6.4 In May 1911, the *A1* was sunk during depth charging and shell firing trials. It was lifted to be reused for "lifting Experiments" and further underwater "gun cotton" explosion trials (Shepton Mallet Journal 8th September 1911). These trials were the early trials for depth charges.

2.6.5 During August 1911, the trials were extended to hunting for the submerged submarines. On Saturday 19th August 1911, having been submerged in the shallow waters off Selsey via a "control from above water" (Northern Daily Telegraph, 31st August 1911), six torpedo boats came out of Portsmouth to hunt for the *A1* (Western Morning News 21st August 1911). If they had found it, they were to buoy the site and then sling it with the fixed slings attached to the *A1* and tow it back into harbour. However, they could not find the *A1*. After a fortnight of searching for the *A1* (The Civil and Military Gazette 29th September 1911) the Royal Navy accepted it was lost in the quick sands of the eastern approaches to Spithead (Western Morning News 21st August 1911).

2.6.6 Further details as to the experimental "apparatus" is given after the *A1* loss in August 1911. The apparatus is described as "attached to the Periscope and let down in the hull." The apparatus "was to move levers which would have admitted compressed air to "Blow" her submerging tank clear of the water, and so brought the submarine to the surface" (Shepton Mallet Journal 8th September 1911: The Civil and Military Gazette 29th September 1911). The *A2* may also have been fitted with the same equipment when experimented on in Torbay (Northern Daily Telegraph 31st August 1911). How the "apparatus" was controlled is hinted at in further newspaper reports.

2.6.7 In reference to experimental work carried out by Holland Boat *No.2*, The Globe (19th September 1911) states that, having been sunk but no damage being found on its hull that, "…she is to be minutely examined to see if the delicate apparatus for navigating her under water and for operating the trimming and diving tanks and electric machinery for the ship's submarine propulsion and steering has been put out of action." It noted that any results would be kept "secret". This is very similar to the description by Commander Murry Sueter's of the "Control of submarine and surface boats by Hertzian waves" (Sueter, 1907, pp. 360-364). In this he describes how submarines and possibly torpedoes can be controlled remotely by an early form of wireless (Hertzian waves) control, including blowing tanks to submerge the submarine, and then controlling it underwater including firing a torpedo.

2.6.8 The Birmingham Gazette and Express newspaper reports (6th October 1911) gave further detail stating that, staff of *HMS Vernon* Torpedo School at Portsmouth were conducting trials to control submarine solely by "Hertzian" wireless waves. Furthermore, "…the Admiralty have been for some time engaged in perfecting the wireless torpedo…now in an advanced stage." It states that the experiments with one of the Holland submarines was conducted off Selsey. It is known that Holland *No.2*

was sunk off Torquay and then towed into Portsmouth 18th September 1911 (The Globe 19th September 1911, and The Illustrated London News 23rd September 1911). It is more than likely that the *A1* suffered the same fate, malfunction of the automatic diving and steering equipment, and had the same "apparatus" including the new wireless controls fitted when it sank. This would explain why the bottom lens assemblage of the periscope was noted fitted, as noted by the Triton divers (Harriott, personal comment, 2023).

2.6.9 The tender of the submarine depot attended the time of the *A1* sinking (Shepton Mallet Journal 8th September 1911). This may have been confused with the tender to Vernon *HMS Furious*, which was the controlling "wireless ship".

## 2.7 Locating and Site Investigations into *HMS/m A1*

2.7.1 The submarine *HMS/m A1* was first found after its loss by fisherman Willy Pledger, of the Steel Princess from Itchenor, in early November 1987. Having snagged his fishing gear in something big he asked local diver Gordon Harriott to dive the site. On 22nd November 1987, Gordon and dive buddy Keith Lintock dived the site in near zero visibility. They managed to locate the submarine and recover the binnacle. A week later, with visibility being slightly better they realised they had found a submarine (Harriott, personal communication, November 2023). Gordon and colleagues then later made a visit to the Royal Navy library in Portsmouth and established that the submarine was most likely *HMS A1*.

2.7.2 Gordon informed local shipwreck expert, diver, and owner of the Shipwreck Centre at Bembridge, Martin Woodward of their find. On the 20th February 1988, Martin took his boat to relocate the wreck that Gordon and Keith had found to dive and survey it with his sonar and obtained a good sonar trace. However, by this time the underwater visibility for diving was zero. By the 5th March 1988, the visibility had improved, and Martin managed to recover the "flag holder" from the seabed and visually surveyed the whole wreck. This allowed him to conduct further research to identify the wreck as the submarine *A1*.

2.7.3 On 7th February 1989, Martin Woodward, with Gordon, Keith and a Southern TVS crew filmed a simulated the dive of the 'new discovery', for Southern television News. Although made public by the media, Martin and Gordon's "Triton" team of divers continued to dive the site without interference from other divers. On 25th May 1989, a photographic survey of the whole wreck was achieved by Martin Woodward. It was decided on the 12th June 1989 to conduct two one-hour dives to release the bronze hatch pin to the last ¼ inch of the shaft so that it could be safely recovered to avoid theft by unauthorised diving activity on a subsequent dive.

2.7.4 On the 13th June 1989, a video survey was conducted by Martin Woodward (on VHS(C)), after which the last ¼ inch section of shaft was released, and the hatch safely recovered to the surface. It is currently displayed in the Shipwreck Centre and Maritime Museum collection on the Isle of Wight.

2.7.5 The site was later dived by other divers who recovered certain artefacts such as the folding bridge. This was the first example of such a bridge and would be every

significant artefact if it had survived (contact is being sought with the diver who recovered part of the bridge structure). Original drawings of the bridge have been located in the National Maritime Museum Archives.

2.7.6 To offer the site some form of legal protection from other divers the wreck was bought from the Ministry of Defence (MOD) by Martin Woodward in 1994. Following the transfer of ownership an "artefact collection project" was undertaken. This resulted in over fifty individual items being recovered from the site, including from the internal lockers where the periscope head and other pieces were found. Members of Triton divers state the main recoveries were conducted in 1997.

2.7.7 In August 1997, having been made aware of the wreck by a local diver in 1996, the *A1* was dived by the Archaeological Diving Unit (ADU) of St Andrews University acting in their capacity as the Government's archaeological contractor. They reported that the *A1* lay virtually intact with the stern partially buried in a soft seabed and the torpedo loading hatches in front of the conning tower were open and it was possible to go inside the submarine. The ADU assessed the hull as being badly corroded in areas but the pressure hull being intact. Sections of the walkway were missing exposing pipe work aft of the conning tower and forwards of the hatches. The ADU noted evidence of "…interference on the site from divers, anchoring boats and fishermen." They also noted the height of sediment around the wreck and that the owner of the wreck has reported (to the RN Submarine Museum) that "…items, including navigation lights, have been stolen by divers in the recent past." (ADU, 1997, 2).

2.7.8 In 1998, the ADU dived the site again reporting continued interference and damage to the *A1* by unknown/unauthorised divers. They discussed protection and stewardship with *A1*'s owner Martin Woodward. External to the submarine the ADU noted a "…large piece of casing lies 14m to the east off the port side and smaller ferrous pieces are lying immediately adjacent to the starboard bow. A broken ceramic fuse holder lies just aft of the conning tower, suggesting that divers have probably penetrated the hull." (ADU, 1998, 2). The Triton Chichester BSAC divers were asked to replace the forward hatch cover to help protect the site. The ADU also noted that the "…sediment level on this visit was lower around the top of the hull at the base of the conning tower to starboard but the rake of the bow is still clear of the seabed with a large scour pit underneath." (ADU, 1998, 2). Upon their advice, Designation Order: (No 2), No 2708, 1998, was laid before Parliament on the 5th November 1998 and came into force on the 26th November with a 100m exclusion zone around the wreck (Wessex Archaeology, 2006).

2.7.9 In 1999, the ADU reported "…progressive degradation of the wreck due to diver theft and vandalism has been noted." (ADU, 1999) The forward torpedo loading hatches, which had previously been secured by Triton Divers, were found to have been forcibly opened to allow access to the hull interior. An internal inspection revealed that wooden fittings like stowage lockers were in an excellent condition, but several fittings had been removed and the "…one remaining circular and four large elliptical deadlights (from the conning tower) have all been unbolted and removed." (ADU 1999. 2). The ADU concluded that the "…wreck is under serious threat from unscrupulous divers who are determined to ignore the protected status of the site." (ADU 1999. 2). Consequently,

Clearance Divers from the Royal Navy's Southern Diving Unit Two were asked to seal access to the *A1*.

2.7.10 In June 2002, the ADU conducted an ROV inspection of the site noting no changes. In the following August of that year, they conducted a multibeam survey which showed both torpedo hatches were again missing, and the stern was still buried. This highlights the continued intrusive threat of illegal diving to the site (Wessex Archaeology, 2006).

2.7.11 During 2003, Wessex Archaeology who took over the role of the Government's archaeological contractor, conducted sub-bottom profile, magnetometer, and multibeam sonar surveys of the site. The following year (2004), the Protected area was increased from 100 to 300 metres within 50° 44.5511 N 000° 55.2792 W. Designation Order No 2393 (Wessex Archaeology, 2006).

2.7.12 In 2005, Wessex Archaeology surveyed the *A1* between September and October 2005. Two anomalies noted in remote sensing data were investigated. One, directly astern of the submarine was a metal buoy and interpreted as possibly part of the *A1*'s towing mechanism. The other anomaly remains an unidentified metal object not thought to be associated with the *A1* (Historic England, 2023).

2.7.13 In 2005, as part of an Aggregates Levey Sustainability Fund project, the ADU, conducted a high resolution multibeam survey of the site. This showed pockmarks along the outer hull, with concentrations at the bow and the stern. Diver ground truthing identify them as corrosion holes in the outer casing. They average between 100mm and 200mm in diameter but up to a metre in some instances (Wessex Archaeology, 2006). The holes allow elements of the exhaust and ventilation systems to be visible.

2.7.14 In 2006, Principal Licensee status was given to Martin Davies. Prior to this it had been held by Maritn Woodward, who due to working overseas on a diving project at the time, and therefore out of the country, had not received any renewal notices and therefore did not renew his licence (Woodward personal comment, October 2023). Diving on the site, including for visitors, has been facilitated by Martin Davies. Martin and members of Southsea branch of the BSAC have undertaken many dives recording and surveying the hull and sea life on and around it (Southsea Sub-Aqua Club, 2023). The site was also visited by Wessex Archaeology (2006) on behalf of Historic England (then English Heritage).

2.7.15 On the 30th and 31st May 2012, Wessex Archaeology (WA) was tasked by English Heritage (now Historic England) to investigate the hull thickness of *A1*, using a Cygnus ultrasonic thickness gauge, to ascertain the condition of the hull. Data was collated from three points around the submarine and reported on by WA (Dunkley, 2013). During this visit, WA noted a string of commercial fishing pots placed within the 300-metre exclusion zone, and commented they were a hazard whilst manoeuvring their boat on site (Davies, 2012). The Principal Licensee also noted fishing line entangled around the stern area of the *A1* (Davies, 2012, 2) and sediment in the forward area of the bow along with a large amount of seaweed. During 2012, MSDS Marine collected "…a couple of lines…" of Multibeam Bathymetry data from the *A1* (Historic England, 2023).

2.7.16 In 2013, the Nautical Archaeology Society with funding from English Heritage (now Historic England) established a diver visitor trail on the *A1*. The wreck of the *A1* had been identified as a suitable candidate as it is well documented, historically interesting to divers, substantial and upstanding (making it easier to locate by visiting groups) and is robust enough to withstand improved visitor access and finally, because it is lies in a geographical position where visiting the wreck is relatively simple and safe (Nautical Arcchaeology Society, 2013).

2.7.17 In 2021, the Principal Licensee noted that illegal potting on the site had caused substantial amounts of rope and cuttle fish pots to become entangled around the stern of the wreck (TrenDive, 2022). Wave and tidal action moved the pots around and eventually damaged the hull, breaking large chunks of the outer casing off. A pipe clamp was found after a storm had moved a lot of sediment from the bow area (Davies, 2021). Damage to the hull was reported to Historic England and Sussex police, but no perpetrator has been identified to date. Later it was noted that some of the pots had been recovered and owners' tags removed from those remaining on site (Davies, 2021). This it is an example of the threat of illicit diving on the site.

2.7.18 In 2022, Historic England funded TrenDive (Project Reference 8519), collaborating with the Principal Licensee, to undertake a project to recover what remained of the fishing gear. The creation of this CSMP was a recommendation of that project (TrenDive, 2022).

## 2.8 Description of Surviving Features

2.8.1 All interpretation of the surviving hull is based on the engineering drawings for the *A1* and the other A class submarines. This is so that any features that might not have been recorded on the *A1* plans could be interpreted if seen on the later A class plans.

2.8.2 The *A1*'s construction consists of a main "pressure hull" with an "outer casing" and "conning tower" along the upper centreline of the submarine. It is important to understand this basic construction to be able to judge the level of survival and therefore significance of the remains of the *A1*.

2.8.3 Furthermore, the *A1* is described in a formal process from the bow aft. The "bow" is the front of the submarine from the end of the outer casing from the torpedo tube cap to the walkway, including the anchor locker, where the lifting eyes are. The "forward section" is aft of the bow from the lifting eyes to the conning tower and dominated by the torpedo loading hatches. The "internal" parts of the *A1* refers to those parts accessible via the torpedo loading hatches and inside the pressure hull. The midship area around the "conning tower" and the "stern" aft of the conning tower to the propellers. When referring to the archaeological site the stern includes the buried parts of the aft quarter, rudder, propeller, and hydro planes.

2.8.4 The bow sits prominently above the seabed with the torpedo tube bow cap still in position (Figure 9). It is heavily concreted with no signs of damage and is in the closed position. Running aft along the upper side, the upper casing is degraded and is largely now missing, exposing the bow cap opening mechanism. Underneath the bow, the outer hull is complete although stands proud of the surrounding seabed by at least a

metre. There is a bow scour pit that extenuates the height of the bow around the seabed.

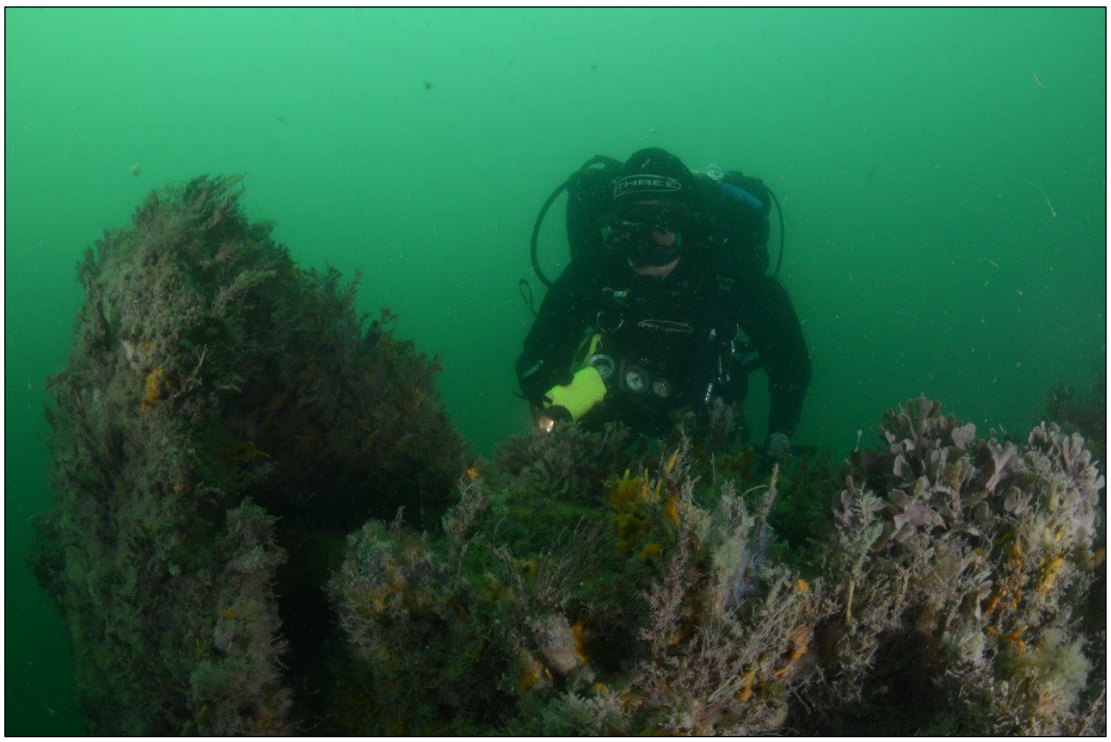


*Figure 9 The bow with raised bow cap to the left of the diver. (© Martin Davies, 2013)*

2.8.5 Running aft of the bow, the forward casing is heavily degraded and corroded. In this area there is a break in the upper casing, which has corroded away. There is a small recess under the casing exposing the forward anchor locker, which still has concreated chain and possibly the anchor still *in situ*. This is identified by the anchor chain and visible in the original general arrangement plans of the *A1* (Wessex Archaeology, 2006).

2.8.6 Further aft of this are the forward lifting rings and strop. These strops, whilst not a contemporary unique feature are the only identifiable remains of such early salvage equipment. They are located 1m forward of the forward torpedo hatch and are complete with their associated cables running down each side of the hull and underneath the hull itself.

2.8.7 Immediately aft of the lifting rings are the two torpedo loading hatches (Figure 10). Both hatch covers have been removed and may possibly be found on the seabed either side of the hull. Part of what appears to be hatch cover is lying on the starboard side. This uncovers at a time of low sediment cover. It is probable that the other hatch cover lies buried somewhere around the wreck. The hatch coamings and adjacent hull structure have been damage with some sections detached. The central coaming is still in place. Previously fragments of hatch covers and coaming were observed close to the open hatches (Wessex Archaeology, 2006) on top of the hull, but these might be the concretions observed lying on the seabed.

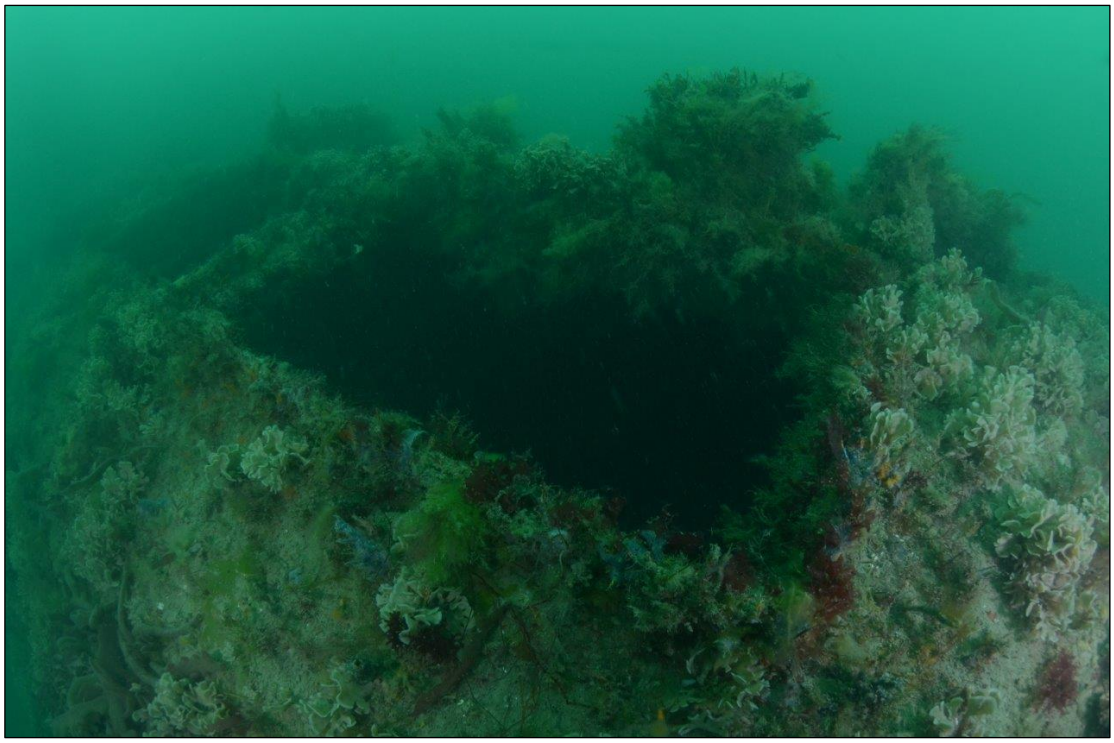


*Figure 10 The two torpedo loading hatches. (© Martin Davies, 2013).*

2.8.8 The outside of the hull is heavily concreated. However, the edge where the casing meets the hull plating can be seen as can the strake of the plating. These appear comparable to the original plating diagram.

2.8.9 The hull interior is accessible via the torpedo hatches. Evidence for the wooden lockers can be seen above the silt whilst piping, valves and gauges all remain *in situ*. This is the remains of the high-pressure air and machinery as noted on the plans of the *A1* and other A class submarines. The original torpedo tube is also still in place. Silt and seaweed have built up inside the wreck since the hatch covers were removed, so the top of the battery covers cannot be seen. Due to sediment reducing the visibility no penetration diving has been attempted aft of the loading bay.

2.8.10 Aft of the torpedo loading hatches, but in front of the conning tower, the upper casing is heavily corroded exposing the remains of the surface steering gear linkage. This mechanism is depicted on the contemporary General Arrangement plan.

2.8.11 The midship area is defined by the leading edge of the conning tower. The forward protective covering can no longer be discerned. The two pieces of plating appear to be separated creating what has been interpreted as a crack in the conning tower (Figure 11), which does not appear to be increasing. It has been monitored over time by the Principal Licensee. All the glass deadlights are now missing, leaving empty voids. There is a large hole on the portside above the join to the pressure hull, allowing visual access to the inside of the conning tower. Measuring roughly 450mm by 600mm, it corresponds to the position of an access hatch that was bolted at the base of the conning tower.



*Figure 11 The leading edge of the conning tower where the two pieces of plating appear to be separated creating what has been interpreted as a crack in the conning tower. (© Martin Davies, 2013).*

2.8.12 On top of the conning tower, four brass bolts can be seen that would have fitted the periscope mount (which is missing due to theft). The conning tower hatch hinges remain, the hatch having been removed for safety in the early days as it was deemed very vulnerable to theft. It is conserved and displayed in the Shipwreck Centre and Maritime Museum. It is possible to investigate the tower where there can be seen loose pipe work and a ladder (six rungs are evident). The top of the second hatch, which formed the first such watertight hatch to be fitted to the inside of a conning tower after the vessel first sank, and the gears for the periscope training gear are *in situ*.

2.8.13 The stern is immediately aft of the conning tower, where there are the two petrol filling points for the internal fuel tanks. The caps are probably those marked “p” for petrol that are in the Shipwreck Centre and Maritime Museum collection (this requires verification). It is of interest to note that those on Holland *No.5* are still in position. Aft of the fuelling point the upper casing is damaged exposing a small area of exhaust pipe. This has previously been used by diver to tie off down lines. It is in this area that the original bridge had been before it was removed by unauthorised by divers.

2.8.14 Aft of this area a ‘D’ shaped hole is evident in the upper casing. This exposes a circle base plate bolted to the pressure hull with four large bolts. This is where the compass binnacle had been until recovered on the first dive. It is now displayed in the Shipwreck Centre and Maritime Museum. The internal housing is still *in situ*. Further aft of the binnacle mount is a large hole in the upper casing measuring 3.0m by 2.2m. This exposes both the port and starboard exhaust pipes as they run aft inside the casing towards the buried part of the stern. There is also another small circular flange in this area, most probably for a fitting a radio mast or air pipe. A series of eight holes can be observed on top of the hull casing which form part of the exhaust system. Immediately

aft of this area are the stern lifting rings. They include their lifting wires the same as the forward ones. Aft of the lifting strops the hull curves down into the seabed where the remainder of the *A1* is buried, including the rudder, hydroplanes, and propeller, although these have never been seen.

2.8.15 Lying outside the submarines hull are several concretions and other features. This includes the possible remains of a hatch, a pipe flange, and a 4-inch (100mm) projectile. Positioned approximately 8 metres aft of the stern lifting ring, and in alignment with the hull, is the remains of a metal buoy. This may be associated with the submarine or may not. Off the bow, located 14 metres to the northeast, is a heavily concreted metal object and is roughly oval. It measures 1.02m long by 0.8m wide and is upstanding by 0.6m (Wessex Archaeology, 2006). It has a round object attached underneath it.

## 2.9 Site Environment

2.9.1 The wreck is orientated in a northeast to southwest position, with the bow towards the north and proud of the seabed by around 1m. The submarine lies at a 10-degree angle, down by the stern, which from the aft quarter (from the stern lifting rings aft) it is buried under the seabed. This includes the stern section, of about 6m to 7m, which consists of the hydroplanes, rudder and propeller and is buried in the seabed. This area has never been excavated, so it is not known if the propeller is still *in situ*.

2.9.2 A small scour pit, roughly 1.5m to 2m in width and up to 0.5 metres deep, starts under the bow and runs along the starboard side of the *A1* ending at the stern lifting rings. Running off the starboard bow area is a bank of sediment. This bank and scour are locally induced by the tidal flow, which is predominately easterly or westerly. Both the scour and sediment bank are noticeable on the multibeam surveys.

2.9.3 The seabed around the Protected Wreck of *HMS/m A1* consists of a fine, highly mobile alluvial silt overlying a medium to firm clay with patches of gravel and small stones in isolated hollows. Dead and dying seaweed and other seabed detritus lie along either side of the wreck and under the bow. This accumulation is seasonal.

2.9.4 The *A1* is noted to be home for several large conger eels, and families of tompot blenny, whilst shoals of bib or pout and other juvenile fish are noted around the site as well as taking shelter inside the hull. A few large wrasse are noted in the conning tower and inside the hull. Crustacean consisting of lobster, edible crabs, velvet crabs, spider crabs and molluscs such as whelks, native oysters and piddock colonise the submarines hull or seafloor. A full marine biological survey was undertaken in 2022, the results of which are published by TrenDive (2022).

2.9.5 It is worth noting that marine life present is not unusual but there have been notable changes over the years. Reporting has been made using the MCS Seasearch reporting tool (Seasearch, 2023).

## 2.10 Ownership

2.10.1 When discovered in 1987 the now Protected Wreck *HMS/M A1* was the property of the Ministry of Defence (MOD). The MOD sold the wreck to Martin Woodward in 1994 as

he was anxious to afford the wreck some protection from unauthorised interference.

2.10.2 Any artefacts previously raised or currently onsite, unless their title has been transferred to a salvor by the Receiver of Wreck in lieu of salvage award, belong to the site's owner Martin Woodward. Divers who raise an artefact retain "salvor in possession" unless a waiver has been signed or their rights have been transferred to another person. Currently this would only be relevant to those artefacts known to have been raised from the *A1* and known to exist. Any artefacts raised prior to 1994 will remain the property of the MOD unless otherwise proven.

2.10.3 Ownership of items belonging to the officers and crew will be vested in their descendants. It will not be possible to determine the original ownership of the items in many instances. However, given the communal nature of living in a confined space aboard a vessel, more significant personal possessions were often marked with the original owner's identity and where original ownership can be ascertained, title will now be vested in the relevant descendants. It is the responsibility of the Receiver of Wreck to identify the owners. Whilst all best endeavours will be made to identify the owners it is accepted that this may not be possible.

2.10.4 The seabed within the restricted area and around the *A1* submarine is owned by the Crown.

## 2.11 Site Management

2.11.1 As a Protected Wreck the site is managed by Historic England and has been assessed by the current and former contractors for Archaeological Services in Relation to Marine Protection, both the Archaeological Diving Unit of St Andrews University and Wessex Archaeology. However, on-going survey and monitoring work is largely undertaken through licensed activity by the current Principal Licensee and a team of volunteer divers, primarily for Southsea Sub-Aqua Club, BSAC branch No.0009 (Southsea Sub-Aqua Club, 2023).

2.11.2 The *HMS/m A1* is not located within a Marine Conservation Zone (MCZ) or Special Area of Conservation but does lies close by to both (see paragraph 1.3 and Figure 2).

2.11.3 The site lies within the Solent and Dorset Coast Special Protection Area (SPA) (see paragraph 1.3).

2.11.4 To undertake intrusive work on the site, such as excavation or recovery of artefacts, apart from authority from DCMS and the appropriate licence, it is expected that a Marine Management Organisation licence would be required and possibly a licence from the Crown Estate.

## 2.12 Artefact Management /Curation

2.12.1 Artefacts have been recovered from the *A1* since it was first found. The compass binnacle was the first artefact raised on the first dive. The conning tower hatch was also recovered early on and before the site was protected. These artefacts were either recovered by Martin Woodward or divers from Triton Chichester BSAC group. All such artefacts are held at the Isle of Wight Shipwreck Centre and Maritime Museum, which

is owned by Martin Woodward. The Maritime Archaeology Trust (MAT) manage the Shipwreck Centre and Maritime Museum, which gained accredited Museum status in 2022, and work with Martin Woodward on a recording and research programme for the artefacts.

2.12.2 There are ninety-six recorded artefacts ranging from a ladder to depth gauge, hatch covers, smoking pipe, tea urn, plates, and cups.

2.12.3 There is the possibility that some artefacts may be held in personal collections. It is known that the site was visited by divers other than Triton and Martin Woodward and that they recovered significant artefacts, least of all the original folding bridge. It is possible that these divers retained smaller "mementos" of their dives on the *A1*.




*Figure 12 Recovered artefacts, including the A1's bell, on display at the Isle of Wight Shipwreck Centre and Maritime Museum.*

## 2.13 Gaps in Existing Knowledge

2.13.1 The key gaps in knowledge that impact the heritage values of the *A1* asset are outlined in paragraphs 2.13.2 to 2.13.5 below.

2.13.2 Service history - whilst not comprehensively published, records to establish the build, use and loss of the Protected Wreck of *HMS/m A1* have been identified. This material includes details of the ship's crew at time of loss and details of the final voyages. However, we do not have details of the service history of the *A1* between its major events of initial and last loss, nor do we have details of modifications that happened since its first build, nor the service history of the crews, most specifically those that died during its first loss.

2.13.3 Comprehensive site record – the site has been intermittently investigated since 1987. These investigations included artefact recovery, digital stills, digital video, and geophysical surveys. The records are in different depositories both national, regional, and personal. There has been no comprehensive collation or study of the records pertaining to the Protected Wreck of *HMS/m A1*, what is on the seabed or has been recovered.

2.13.4 Changes to site environment – reoccurring themes in the descriptions of the seabed around the *A1* are, that the sediment has reduced over the years with seasonal storms directly impacting the site, there are artefacts on the seabed in and around and possibly as much as 15 metres away from the site. These are seen when sediments levels change on the site. Therefore, there is a gap in our knowledge about the impact of storm induced sediment changes and damage to the site. For example, is it a certain time of storm (for example winter or equinoctial) or strength or direction of wind that creates the most impact on the site.

2.13.5 Anomalies within the Designated Restricted Area – following sub-bottom profile, magnetometer, and multibeam sonar surveys in 2003, Wessex Archaeology undertook a series of dives in 2005, two anomalies lying close to the site were investigated. Other geophysical data has been collated but the full 300 metre Designated area has not been surveyed. An anonymous diver who dived the site in the 1980's states recovered metal work was dumped over the side of the dive boat in the vicinity of the wreck. There is a gap in the knowledge of what is buried around the *A1*.

# 3 Statement of Heritage Significance

## 3.1 Introduction

3.1.1 The significance of a heritage asset is the sum of its heritage interests (Historic England, 2008) (Historic England, 2013, p. 356) and NPPF Glossary (GOV.UK, 2012). It can be derived from the heritage assets physical presence, as well as its group value and setting (Historic England, 2017, p. 2).

3.1.2 Heritage interests are the things that tell people about something we want to know, and include archaeological, architectural, artistic, and historic interests, or a combination of these (Historic England, 2019, p. 3).

3.1.3 A holistic view of significance includes the heritage assets cultural and natural environment, otherwise termed setting. Setting is characterised by geographical location and common interests and values (Historic England, 2019) (GOV.UK, 2012).

3.1.4 The varying levels of significance should be considered, identifying the elements which are vital to the significance of the asset and therefore should not be lost or compromised (Historic England, 2019, p. 3). This should allow for the identification of elements which are of lesser or little value, and may detract from, the significance of the site or record (Historic England, 2019).

3.1.5 To understand the significance of the *HMS/m A1* heritage interests Historic England's Statement of Heritage Significance (Historic England, 2019) is used as framework.

## 3.2 Methodology

3.2.1 The assessment of significance has been conducted in two iterative stages (TrenDive, 2022). The first stage, "Understanding the Protected Wreck of *HMS/m A1*" (see section 2 above), consisted of a desk-based assessment (CIfA, 2014, p. a and b) of sources that would inform about *HMS/m A1*. As this should be proportionate to any impacts and the potential significance of the site, primary sources were consulted in national and local repositories. These included:

- identifiable and accessible grey literature such as Historic England commissioned site reports, reports in support of Designation and Licensee's reports,
- video or photographic record of the site's investigation, both pre and post Designation,
- identified secondary sources relevant to the site, such as local histories, divers' guides, biographies, contemporary newspaper accounts and published books on the subject matter, and
- primary sources that such as build and salvage reports in the National Archives, relevant museums, or archives (see references and acknowledgements).

3.2.2 To assess the significance of *HMS/m A1* the methodology as outlined in Statements of Heritage Significance: Analysing Significance in Heritage Assets was utilised (Historic England, 2019, pp. 16-19) within a significance matrix (TrenDive, 2022). This meant identifying and describing the various interests of the asset, then assessing the totality of these interests to ascertain the assets general heritage value and therefore significance. The assets group and setting values were then considered including any impacts on its significance. The output from the matrix (TrenDive, 2022) is presented below.

## 3.3 Archaeological Interests

3.3.1 The Protected Wreck *HMS/m A1* archaeological interests are those elements that hold, or potentially hold, evidence of past human activity worthy of expert investigation at some point (GOV.UK, 2012). Whilst contemporary historical documentation is known, including original drawings, descriptions and patents, the site itself has highlighted that the "as found" submarine (CIfA, 2014) represent the "as was" development from these original drawings and as such is of significant interests. Elements, both onsite and recovered that are worthy of further investigation include original fittings and fixtures such as:

- Evidence for welding* within the build of the submarine.
- Periscope assemblage*, particularly the training gear* and Grub periscope optical assemblage* (recovered and displayed in the Shipwreck Centre and Maritime Museum).
- Torpedo tube* and associated fittings.
- Anchor locker*.
- Conning tower* and its remaining fittings and fixtures including watertight lower hatch.
- Wolsey large petrol engine* and associated fittings.
- Battery racks*, electrical engine* and equipment with associated fittings*.

- Artefacts associated with the crew, both personal and Government owned, including those raised and those that might still be *in situ.*
- Any evidence for the use of radio frequency equipment* used to remotely control* the submarine.
- Salvage recovery system***.**
- Trim tanks and ballast mechanism*.
- Overall design* (*A1* was first of class).

**Note: *** denotes possibly first of its kind and therefore of national or international interest and significance.

## 3.4 Historic Interest

3.4.1 The Protected Wreck of *HMS/m A1* historic interests are its direct associations with past lives and events (GOV.UK, 2012). The *A1*, its recovered artefacts and associated historical documentation provides international historic interest as material from the beginnings of a new form of warfare and the Royal Navy's Submarine Service. It does and can provide meaning to people derived from their experience and interaction with it.

3.4.2 The historic interests of *HMS/m A1* as an artefact include:

- the history of *A1* as the first Admiralty designed, built, and commissioned operational submarine,
- the *A1's* role in the development of the adoption of submarines within the Royal Navy including its influence in the development of submarine warfare (operational and offensive) tactics and naval strategy as well as national strategy and the implications of such for international events (Lambert, 1999),
- technical developments such as the torpedo tube, periscope (Bowers, 1999, p. 193), submarine navigation (Sueter, 1907) and development of large petrol driven engines (Bacon, 1940),
- as the first submarine casualty and the outpouring of national shock and pride; and that events impact on submarine design (second watertight hatch in the conning tower) and requirements for salvage and submarine escape capabilities (Sueter, 1907),
- its influence on the design and development of later submarines in particular the A and B class of submarines,
- its role in the establishment of the submarine service, its traditions and culture,
- the *A1* as an early remotely controlled and Autonomous Underwater Vehicle (AUV),
- its role in experiments to develop methods of sinking enemy submarines by use of explosives (use of Lyddite shells and early depth charges),
- its role and evidence for early ventilation and air quality controls (scrubber) as the *A1* was known to have had a secret improved air/exhaust system that extended the range / duration below water, which was not required for the Holland boats, and
- the experimental design of propulsion and efficiency in submerging / raising submarines.

3.4.3 *HMS/m A1* has direct historical association with these significant historical figures:

- Admiral Sir John (Jackie) Fisher who reformed the Royal Navy and ushered in an era of modernisation, from training to the conversion of the fleet to oil fire not coal, and the introduction of all big gun battle ships (*Dreadnaught*), fast battlecruisers (*Invincible*), aircraft carriers and the submarine. His favourite submarine being the *A1*, described as his 'favourite toy'.
- The family of former First Lord of the Admiralty and Prime Minister Sir Winston Churchill.
- King Edward VII who had been onboard the *A1* prior to its first sinking (Figure 13).
- Prince of Wales and future King George V who also had been onboard the *A1* in the days prior to its first sinking (Compton-Hall, 1983, p. 21).



*Figure 13 King Edward VII and the Duke of Connaught inspecting the Holland Boats and A1 at Portsmouth 1904. Holland 1 is in the foreground, then another Holland Boat behind with the A1 alongside HMS Hazard.*

3.4.4 Lesser-known historical figures include:

- Admiral Sir Reginald Hugh Spencer Bacon, K.C.B., K.C.V.O., D.S.O., Royal Navy, the first Inspector of Submarines (as Captain RN), designer of the *A1*, early periscope and other submarine technology. Bacon was a leading figure in Admiral Fisher revolution which included direct oversight of setting up the early submarine service, its tactics and strategy and the development of the early A and B class submarines (Dash, 1990). Bacon went to become first Captain of the revolutionary *HMS Dreadnaught* and during the First World War commanded the Dover Patrol.
- Robert Edmund Froude, CB FRS (known as 'Eddie') was the third son of pioneering engineer William Froude who constructed the first experimental tank for testing ships, the fore runner of the Admiralty Experimental Works (AEW). This was first built in Torquay but moved to Haslar in 1886. Eddie had worked closely with his father and continued his program of experimentation for the Royal Navy. This included the first submarine tank testing, conducted on *HMS/m A1.*

3.4.5 *HMS/m A1* and its serving crew members is also of direct historic interest to the descendants of its crew and those who have or are serving in the Royal Navy especially the Submarine Service.

3.4.6 The *A1* has direct historical interest with the current setting of Haslar Creek and the heritage assets Fort Block House, the testing tanks, and the Royal Navy Submarine Museum, including the submarine Holland *No.1* and *HMS Alliance*.

## 3.5 Architectural Interest

3.5.1 The architectural interests of the *HMS/m A1* are defined in its archaeological and historical interests to the specific branch of naval architecture, the design and building of ship, boats (Rawson & Tupper, 2001) and after the *A1* submarine. The *A1* is the earliest tank tested designed submarine and its material remains and remaining drawings and plans are of national significance to the history of naval architecture specifically that of the new vessel type submarines. The vessel itself if therefore of international naval architectural significance.

## 3.6 Artistic Interest

3.6.1 These are interests in the design and general aesthetics of the asset. The *A1* does not have any decorations, such as a figure head, however the wreck itself and its associated parts can be considered from an artistic perspective and give people pleasure for a purely aesthetic perspective.

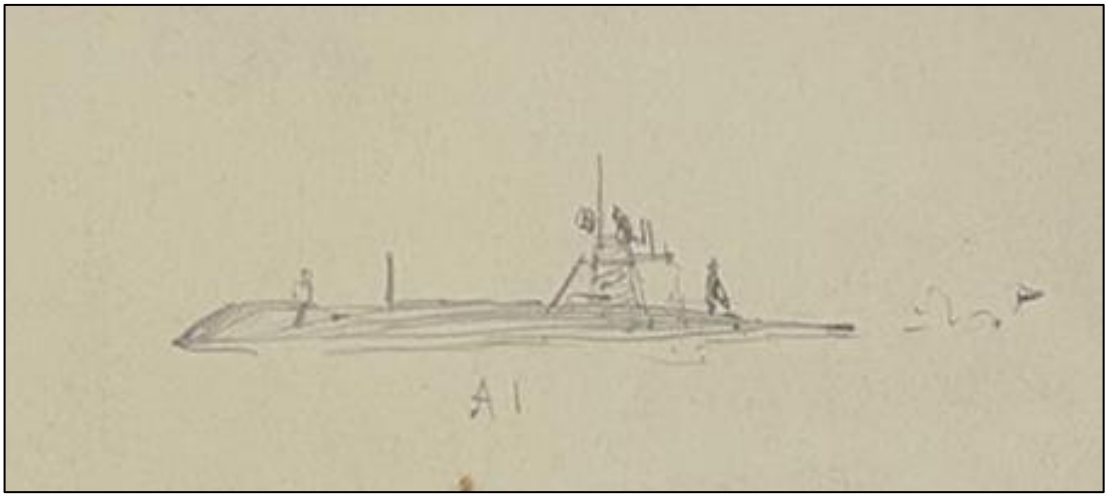



*Figure 14 A quick sketch of A1 by Wyllie (© National Maritime Museum, Object ID: PAE5036).*

3.6.2 Importantly, the *A1* has direct association with the famous marine artist William Lionel Wyllie. Wyllie is described as the “most distinguished marine artist of his day” (National Museum of the Royal Navy, 2018) with his work collected by the Tate, the Royal Academy, the Imperial War Museum, the National Maritime Museum (NMM) and the National Museum of the Royal Navy (NMRN). Wyllie portrayed the *A1* (NMM object ID: PAE5036) (Figure 14) and its salvage (NMM object ID: PAE0052 and PAE0056) in several of his drawings.

## 3.7 Group Interest

3.7.1 The *A1* was first in class of the A class, the last being *A13* which was laid up in 1914 due to engine unreliability (Paul, 1989). The A class saw active duty during World War I as harbour defence. After the war, the remaining A class boats were converted to training vessels and eventually sold in 1919–1920. The wrecked *A2* was finally sold in 1925. Only the *A1*, *A3* and *A7* survive as wrecks on the seabed.

3.7.2 The *A3* was built shortly after *A1* at the same site and by the same builders. It shares a similar history in that on 2nd February 1912, the *A3*, whilst conducting training exercises in the Solent and attacking the depot ship *HMS Hazard*, was hit by *Hazard* and sank with the loss of all hands. After being raised and repaired it was towed to Portland Naval Dockyard, used for experiments then sunk as a gunnery target on 17th May 1912. In July 2016, the wreck of *A3* was officially designated as a Protected Wreck site List Entry Number: 1422537 (Historic England, 2023).

3.7.3 The *A7* also sank during an exercise in Whitsand Bay, Cornwall on 16th January 1914. Whilst conducting dummy torpedo attacks on the tender *Pygmy* in conjunction with submarine *A9*. During one of these attacks the *A7* dived and was not seen again. All *A7*'s crew were lost. In 2001, *A7* was declared as one of 16 wrecks in British waters designated as "Controlled Sites" under the Protection of Military Remains Act (1986) (GOV.UK, 1986) and cannot be dived without permission from the UK Ministry of Defence (MOD). In 2014 the SHIPS Project team in Plymouth completed an archaeological investigation of the *A7* submarine, having been granted a license by the MOD (The SHIPS Project, 2023).

3.7.4 As the Royal Navy's first in class of its first class of submarine, the *A1* has high group interest, together with submarines of the Holland class (*No.1* and *No.5*) and remaining A Class (*A3* and *A7*), to inform on the development of early submarine experimentation and evolution in design, build, propulsion, and technical fittings.

3.7.5 In 1901, *HMS Hazard* was converted into the world's first submarine depot ship and functioned as the *A1*'s 'mother' ship throughout its service life (Figure 15). Commissioned on 20th August 1901 *Hazard*'s first Commanding Officer was Captain Reginald Bacon who was also "Inspecting Captain of Submarines". Dispatched to Barrow-in-Furness, in the summer of 1902, *Hazard* led the first Royal Navy Submarines, Holland *No.2* and *No.3*, with Torpedo Boat *No.42* to Portsmouth. Later, together with Holland boats *No.1, No.4* and *No.5* plus the *A1* they formed the Royal Navy's "First Submarine Flotilla" based at Haslar Creek. In 1912, *HMS Hazard* collided and sank the submarine *A3*.

3.7.6 In 1918, whilst in the eastern Solent, *Hazard* was cut in two by the hospital ship *SS Western Australia* and sank with the loss of four crew. Today, the wreck of *HMS Hazard* sits upside down in two parts where it was sunk, half a mile east of the Warner Buoy.

3.7.7 The survival of the archaeological record of *HMS Hazard*, which has a direct association and interest to the *A1*, adds to the group value to the *A1*.

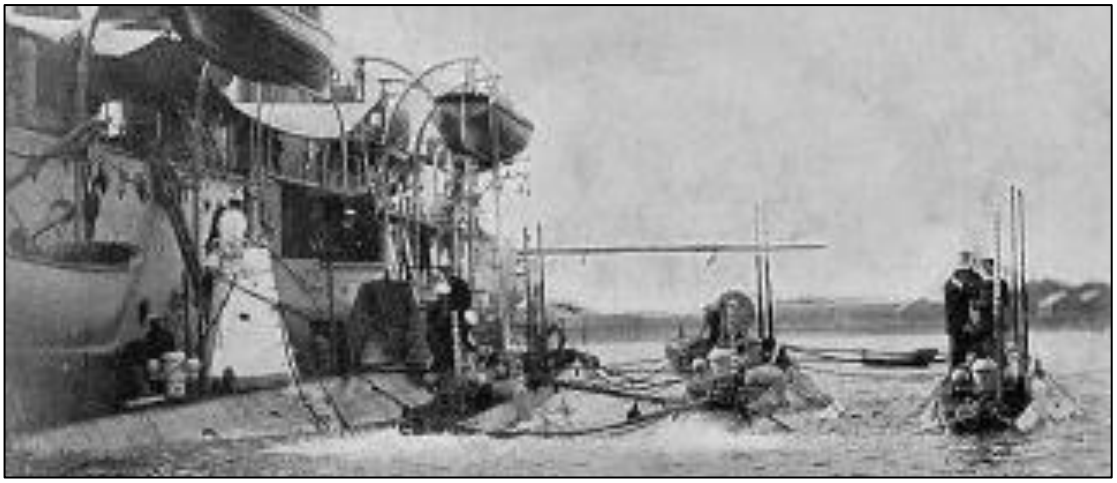


*Figure 15 HMS Hazard with the A1 alongside and three Holland boats outboard of it.*

## 3.8 Setting Interest

**3.8.1** The *A1* lies in the eastern Solent between Selsey Bill and Spithead. The area is the northern part of what is historically known as the Royal Navy's first submarine training ground (Davies, 2006). It is also the area off the Nab channel where the *A1* first sank (Figure 6) and where it had been used for experimental works.

3.8.2 The *A1* lies within the setting of the Royal Navy's first submarine training and experimental area, both of which it assisted in forming. Therefore, the *A1* setting increases its significance.

## 3.9 Heritage Values

3.9.1 The following table 2 summarises the identified cultural heritage values for the Protected Wreck of *HMS/m A1* and notes how these values relate to the heritage interests and therefore significance. Note a heritage assets interests do not directly equate to its value.

| Values / Interests | Meaning | Evidence |
|---|---|---|
| **Evidential** | The potential of the Protected Wreck of *HMS/m A1* to yield primary information about past human activity. | The *A1* has high evidential value as its physical remains will yield primary information on the first in type of submarine and submarine warfare. This includes its Wolsey engine, periscope, conning tower, batteries, electrical engine, and associated fittings. |
| **Historical** | The ways in which the Protected Wreck of *HMS/m A1* can provide direct links to past | The *A1* can provide direct links to past people, events, and aspects of life through that were instrumental in the development of RN submarines through its direct association and interaction with |

| | | |
|---|---|---|
| | people, events, and aspects of life. | Admiral Fisher, Captain Bacon, King Edward VII and George V as well as the marine artist Wyllie, engineer Froude and the *A1*'s crew. It also provides a direct link to local and nationally significant events such as the funeral of the crew of the first submarine casualty. |
| **Aesthetic** | The ways in which people respond to the Protected Wreck of *HMS/m A1* through sensory and intellectual experience of it. | The *A1* has high aesthetic value for people to respond to interacting with it and the recovered artefacts. This is through directly experiencing heritage interests intellectually and tactilely. |
| **Communal** | The meanings of the Protected Wreck of *HMS/m A1* for the people who identify with it, and whose collective memory it holds. | The *A1* has high communal value for local, military, and national communities. Locally it is known as a "Portsmouth submarine" and can create local pride. Nationally descendants of its crew show pride in knowing their family served on this historic submarine. Furthermore, these is communal pride in Barrow-in-Furness knowing that they are associated with the story of this innovative submarine. |
| **Instrumental** | Economic, educational, recreational, and other benefits which exist because of the cultural or natural heritage values / interests of the Protected Wreck of *HMS/m A1.* | The *A1* has high instrumental potential as an educational and tourist asset. Currently it is considered a low value recreational asset, but this does not realise its potential economic value. The *A1*'s economic and recreational value could be increased. |

*Table 2 A1 Cultural Heritage Values.*

3.9.2 The *A1* was designed as a large, fast, and technically advanced submarine and represent the epoch between earlier amateur developed small submarine craft of little tactical or strategic value to that of the modern submarine fleet. The *A1* proved to be a success from its first launch until its final loss as an experimental craft, developing leading edge technology a century ahead of its time.

3.9.3 The *A1* was paid for separately to the initial order for 5 Holland boats and was developed as a separate more advanced class of submarine. Bacon states that in 1903 "the Holland boats were too small…if submarines were to become vessels of practical value, their size and speed…would have to be increased. I start[ed] the design and manufacture of a larger vessel." He continues "…by the end of 1904 sufficient progress

had been made to provide a sure foundation…of submarine boats and their practical work at sea." (Bacon, 1940). Bacon's statements highlight that *HMS/m A1* was the submarine that proved technically that all other submarines could become a weapon of war, founding a new form of warfare, type of naval vessel and service.

3.9.4 *HMS/m A1* is of high significance because of its historical and technological heritage interests. These being, it is:

- one of only three A class submarines that survive,
- the first in its class, the first practical and useful submarine for the Royal Navy and the start of modern-day submarine design,
- an icon for the Royal Navy Submarine Service,
- almost entirely complete with significant artefacts preserved in a heritage collection,
- the result of a fast design process that is documented, and
- was used to develop the depth charge and anti-submarine warfare tactics.

and that:

- general arrangement engineering drawings have been located and in conjunction with the *A1* provide comparative evidence for the development of the early submarines,
- documents located combine with the physical remains of the submarine to allow us to reconstruct the operating procedures for the A class boats and the early submarine service, and
- the Wolseley designed petrol engine is the first example of such a large petrol-powered engine.

## 3.10 Gaps in Understanding of Significance

3.10.1 There are several gaps in understanding of heritage interests. These primarily concern the extent of the evidential interests from inside submarine. This means the present state and condition and therefore potential of heritage interest of the:

- Wolseley engine,
- periscope assemblage,
- use and extent of welding in the construction of the *A1,*
- electrical engine apparatus,
- air purification apparatus and assemblage,
- rudder and propeller assemblage, and
- any evidence for the early radio frequency equipment and "clockwork" automatic equipment.

3.10.2 This means the archaeological potential of the Protected Wreck of *HMS/m A1* is high and of National significance.

# 4 Issues and Vulnerability

## 4.1 Introduction

4.1.1 The *A1's* significance is vulnerable to environmental and anthropogenic threats. This section identifies the inherent (known threats to the *A1*) to its individual heritage interests and values. An Enterprise Risk Management (ERM) matrix tool, modified for underwater cultural heritage (TrenDive, 2022) is utilised to categorise these threats into risks and then to rank the risks. The headline conclusion of this process is detailed below. It is good practice to review risk assessments periodically or when new information becomes known.

## 4.2 Anthropogenic Threats

4.2.1 Anthropogenic threats to the Protected Wreck of *HMS/m A1* relate to or are created by human activity that may damage or remove its heritage interests (Historic England, 2023, p. 29). These can be direct and indirect. Direct anthropogenic threats include:

- uncontrolled (unlicenced) and unlawful activities on the site, whether it causes damage to the asset or not. For example, the known removal of evidence for the ownership of fishing gear (Davies, 2021), fishing on the site (Wessex Archaeology, 2006), Illegal dumping of materials over the site, accidental harm by anchor drags, or mooring on the site,
- work on a protected wreck site requires a licence under the Protection of Wrecks Act 1973, and potentially a marine licence from MMO. To conduct work without the correct licence is a threat to the site,
- unlawful salvage of parts of the *A1* including those parts lying on the seabed (Wessex Archaeology, 2006). This might include lack of reporting. Such as the *A1's* fly bridge, which was removed and not reported to the Receiver of Wreck, and
- interference, both direct and indirect, with the Protected Wreck of *HMS/m A1*. Direct impacts can be through activities such as fishing including "ghost" nets/equipment snagging the site. Indirect interference can be the depositing of sediments from dredging which can cause cloud blooms that settle on the wreck (Todd, 2015) or from land development that can cause changes in tidal regime impacting the burial environment.

## 4.3 Environmental Threats

4.3.1 Environmental threats to the Protected Wreck of *HMS/m A1* relate to the loss of heritage interests through impacts from water movements such as currents, swell and wave action and environmental impacts on the wreck.

4.3.2 The wave base, which is the depth of influence of a wave, is about half the wavelength. Lying at an average depth of 12 metres the seabed around the *A1* will be directly impacted by a wave base greater than 24 metres, whilst the top of the wreck will be impacted by anything greater than 20 metres. It is not unusual to have a wavelength greater than 10 metres during storms which directly impact the site.

4.3.3 Climate change is noted to increase the frequency and intensity of storms and raise

both the air and sea temperature. An increase in the intensity of storms will directly impact the *A1* due to the influence of storm induced waves on the submarine and the seabed around it.

4.3.4 A rise in sea temperature will directly impact the fauna and flora around and on the submarine. Increased flora will create increased impacts for water movements around the submarine. More fauna (fish and shellfish) will increase the likelihood of the site being fished.

4.3.5 The hull is known to be corroding but the rate is unknown. However, it is known that the rate of corrosion increases with water temperature (doubles with a 10-degree increase) and flow rate. In the Eastern Solent, the warmest sea temperature is in September with an average around 17.2°C (63°F). The coldest month is March with an average water temperature of 8.7°C (47.7°F) (Sea Temperature, 2023).With an increase in the number of storms there is more likely to be increased flow rate. Climate change will also increase the temperature with possible significant localised increases (Horton, 2023). Variation to seawater quality, for example, pH, salinity, dissolved oxygen etc may also impact on the corrosion of the wreck.

4.3.6 The local internal environment of the *A1* has not been studied. The submarine consists of different metals (iron, steel, and copper alloys) as well as unknown chemicals from the battery or corrosion products. The internal structures are now exposed allowing for an increase in flow rates within the submarine which will have a negative impact on the cathodic corrosive environment.

4.3.7 Pitting has been noted on the *A1*'s hull plating and conning tower. It is known that pitting develops into cracks. Such corrosive developments are known to lead to localised collapse of the hull plating. Ultimately corrosion could lead to the catastrophic collapse of the hull structure. Studies into the trajectory of the hull's continued corrosion and threat to hull integrity should continue.

# 5 Conserving the *A1*'s Significance

## 5.1 Conservation

5.1.1 Conservation is the process of managing change to a heritage asset in ways that will best sustain its significance. Conservation should reveal, reinforce, and enhance the *A1*'s significance for present and future generations (Historic England, 2008) (Historic England, 2013, p. 344).

5.1.2 The significance of the *A1* can be enhanced through its consequential benefits as an educational, recreational, or economic resource. Opportunities for such enhancement are considered below.

## 5.2 Mitigation Measures

5.2.1 Mitigation measures should be considered for the threats to the site's identifiable heritage interests, with the intention to reduce their risk and where possible enhance the site significance. The principal mitigation measures are outlined below, whilst

further detail can be found in Historic England Heritage Crime Risk Assessment (Historic England, 2023, pp. 30-31).

5.2.2 **Note:** Some mitigation measures may not be appropriate for the *A1* as they may cause damage or detract from the heritage interests and value of the asset.

5.2.3 The offshore maritime environment location of the *A1*, offers some degree of protection from casual or opportunistic anthropogenic threats to the site. Its location however also means it is not within view of the of capable guardians or community surveillance teams. Routine inspection of the site to detect damage is reliant on reporting by the volunteer and visiting divers. Encouraging increased stewardship visits and heritage awareness for visiting divers should be considered as a mitigation measure.

5.2.4 Also, the marine environment poses problems to suitable scientific and technological crime prevention measures to those that apply on land.

5.2.5 Principal mitigation measures to reduce the anthropogenic risks to the site may include:

- Considered management of publicly available information and imagery to balance the risk of cyber-enabled crime (thieves researching artefacts to steal) with heritage guardian ship and public interest.
- Information signage at appropriate sites, such as local boat launch sites, highlighting that security measures are in place. These should include information for reporting suspicious actions, such as vessels within the vicinity of the protected area.
- Prompt response to removal of unauthorised equipment on site including accumulation of marine rubbish and ghost fishing equipment to show that the assets *A1* is well maintained and regularly visited.
- Using crime prevention technology such buoyage and signage.
- Development of a site security protocol (https://protectedwrecks.org.uk/ ) and close cooperation with local police forces.
- Using forensic property marking on high intrinsic value heritage interests such as nonferrous metal artefacts sites, including unique identifier security marking to deter illicit activities on the site. This may require consent from the owner and the licencing bodies.
- Encouraging more ‘licensees’ to act as guardians for protected wreck sites in their area, such as those diving on the Invincible and Hazardous and vice versa.
- Establishing a physical ‘dive trail’ on the site thereby highlighting the wreck as a protected wreck and encouraging responsible diving on the site and deter.
- Establishing a local Heritage Watch scheme or linking with local Marine Watch schemes, diving clubs and other ‘capable guardians’ operating in the maritime environment.
- Developing bespoke social crime prevention initiatives to promote community guardianship in the maritime environment, including within the local fishing community.

## 5.3 Enforcement Opportunities

5.3.1 The *A1* has been the subject of unlicenced activity since designation (Wessex, 2006), most recently in 2021 (Davies, 2021). Enforcement of the Protection of Wrecks Act 1973 is the responsibility of the appropriate County Constabulary. However, such activities must be observed and reported for the Constabulary to be able to act.

5.3.2 Other local government agencies including the Maritime and Coastguard Agency as well as Border Patrol and Fisheries Protection may be able to provide oversight of activities within the designated area. Awareness and partnership initiatives can enhance the stewardship network for the *A1*. These initiatives could be extended to local fishing, sailing, and diving communities.

5.3.3 Consideration for engaging in education and briefings for police officers, Maritime and Coastguard Agency officers and other law enforcement personnel so that they are aware of the *A1* as a heritage asset and are alert to threats to it.

## 5.4 Visitor access management

5.4.1 Physical access to the site is as a licensed diver. The site was considered robust enough for managed licensed diving and a web-based diver trail to provide the required information. This facilitated open access to the site via the Principal Licensee and the Nautical Archaeology Society (Nautical Arcchaeology Society, 2013). This has enhanced the sites aesthetic and communal value as well as increased it economic value to the local community. These consequential benefits have extended beyond the local community with site visitors coming across the UK (Davies, Licensee report 2022 - 2023).

5.4.2 The number of recent visiting (named) divers to the site are summarised in the table below.

| Year | Visitor numbers |
|---|---|
| 2016 | 22 |
| 2017 | 28 |
| 2018 | 26 |
| 2019 | 17 |
| 2020 | 16 |
| 2021 | 23 |
| 2022 | 25 |
| 2023 | 33 |

*Table 3 Named visitor divers 2016 to 2023.*

5.4.3 Visitor access is also enabled through the Shipwreck Centre and Maritime Museum, Arreton, Isle of Wight. The museum has a specific cabinet that displays recovered artefacts from the *A1* (Figure 12), and display telling the story of service and its discovery. The Centre has over eight thousand visitors per year (Woodward personal comment, 2023).

5.4.4 Virtual access to the site is enabled through the online virtual dive trail. This has the

capability to engage non diving audiences who would otherwise not be able to access the *A1*. Information about the *A1* is accessible via websites such as:

- National Maritime Museum
- National Museum of the Royal Navy
- Royal Navy Submarine Museum
- RN Subs website
- Dreadnaught web site
- Wrecksite.eu website
- Historic England website
- *A1* web-based dive tour at: https://www.nauticalarchaeologysociety.org/a1-submarine-dive-trail.

5.4.5 There is additional information about the *A1* and its artefacts along with other submarines available at:

- https://museum.maritimearchaeologytrust.org/wp-content/uploads/2021/11/HMS-A-1-SWC-Roger-Burns_SWCSummary_WithCover.pdf,
- https://www.youtube.com/watch?v=McJvyPAkupc,
- https://museum.maritimearchaeologytrust.org/exhibits/submarines/.

5.4.6 These websites and the diver web tour can reach out to national and international audiences and increase the communal and aesthetic value of the site.

5.4.7 This CSMP has increased the information available about the *A1*. Consideration should be given to either enhancing the current online virtual dive trail and website information or the creation of a specific web page where this new data can be showcased and highlight the individual sources.

## 5.5 Enhancing Information and Understanding

5.5.1 Most work on the *A1* has been undertaken on a voluntary basis. Lacking adequate financial support for subsequent analysis and dissemination of the results, very little of this work has been formally published. What information that has been published is variable and in different formats and to differing standards, from popularists display or webpage to professional reports (see References).

5.5.2 A dissemination strategy for *HMS/m A1* should be considered. This should include all levels from popularist publicity news stories in social media to academic publications and information boards, both physical at identified locations and online.

5.5.3 To enhance the current record of the *A1* gaps in the understanding of its heritage interests and significance should be filled where possible. For example:

- details of the remaining hull structure, for example the hull plating, riveting pattern, and welding,
- enhance the site record to include the extent and significance of the anomalies around the hull,
- detailed record of the archaeological features and artefacts present within the hull,

- a catalogue of all known and accessible recovered artefacts which includes details of its interests,
- a record of the biology and environment of the site, both internal and external, and
- a strategic comparative study of the group value of the remaining A class submarines. Such a study would allow Historic England to make value-based judgements on the conservation of this significant group of protected wrecks.

# 6 Conservation Management Policies

## 6.1 Introduction

6.1.1 Conservation policies are developed from an understanding of the risks to the *A1*'s significance. They provide a framework for decision-making and management and of the Protected Wreck of *HMS/m A1*.

6.1.2 The policies create a framework for managing change to the Protected Wreck of *HMS/m A1*. This management framework should be clear in purpose, transparent and sustainable in its application. Implementation of the polices will be through the principles of shared ownership and inclusive partnership working and will balance conservation with economic and social needs.

6.1.3 Policies are also compatible with, and reflect, English Heritage's Conservation Principles for the Sustainable Management of the Historic Environment and its published policies and guidelines, as well as the wider statutory framework.

## 6.2 The Protected Wreck of *HMS/m A1* as a Shared Resource

6.2.1 The Protected Wreck of *HMS/m A1* forms a unique record of past human activity which reflects the aspirations, ingenuity, and investment of resources of previous generations. It is also an economic asset and can be a resource for education and enjoyment.

6.2.2 Consideration will be given to how best to reconcile access to *A1* within the restrictions imposed by conservation needs and legislative limitations, whilst limiting heritage crime risk. Therefore, we will sustain current direct visitor access, use innovative methods for future virtual assess that can engender feelings of steward and guardianship and enhance the *A1* as an economic asset and generator of tourism or inward economic investment.

6.2.3 Management Policy 1

We will continue to support current and future appropriate visitor access to the submarine *A1*. This will include virtual access via web-based diver tours, information boards and displays as a mechanism to develop its instrumental and consequential value, as well as assist stewardship and guardianship within the setting of the Eastern Solent. This will extend to the artefacts from the wreck site curated in the Isle of Wight based Shipwreck Centre and Maritime Museum.

## 6.3 Everyone can Participate in Sustaining the *A1*

6.3.1 Everyone should be able to participate in sustaining the Protected Wreck of *HMS/m A1*. Stakeholders will have the opportunity to contribute to its understanding and management. Judgements about its values and decisions about its future will be made in ways that are accessible, inclusive, and transparent.

6.3.2 Practitioners will use their knowledge, skills, and experience to encourage others to understand, value and care for the *A1* by communicating and sustaining its significance.

6.3.3 Education will facilitate awareness and understanding of the *A1*'s significance. This will include the different ways generations and communities perceive its significance. Education will also develop, maintain, and pass on previous and current knowledge and skills. Where appropriate the *A1* will be used as a training resource.

6.3.4 Management Policy 2

We will encourage and facilitate the recording and expert appraisal of *A1* and its artefact collection curated in the Isle of Wight based Shipwreck Centre and Maritime Museum.

## 6.4 Understanding the Significance of the *A1* is Vital

6.4.1 The significance of the Protected Wreck of *HMS/m A1* site is encapsulated within our knowledge of its heritage interests and values. It is vital to conduct research into these heritage interests and values at a level that is commensurate with the known or assumed significance of the *A1*.

6.4.2 To understand how its significance may have been altered it is vital to have a cumulative account of previous activities on the *A1*. Direct engagement with past divers and researchers will be encouraged and facilitated.

6.4.3 A formal programme of staged assessment, research and synthesis is required. Such work will conform to the Management of Research Projects in the Historic Environment (Historic England, 2015) and is likely to comprise the following stages:

- Collation of the *A1*'s artefactual and documentary archive,
- Assessment to determine academic potential of the archive,
- Determination of further work to fulfil this academic potential,
- Preparation of a research archive,
- Report text for publication, and finally,
- Publication.

6.4.4 Management Policy 3

Key gaps in understanding the significance of submarine *A1's* component parts will be identified, prioritised, and addressed, by research and recording, so that an understanding of these significances can contribute to informing the future conservation management of the site.

6.4.5 Management Policy 4

We will seek to commission a staged programme of assessment and research to contribute towards a fuller understanding of the site in its entirety.

6.4.6 Management Policy 5

We will encourage the investigation and survey of the area around the hull of *A1* to establish the full extent of the site including buried aspects of the site and those parts reported to have been dropped away for the *A1* submarine's hull.

6.4.7 Management Policy 6

We will facilitate investigations into the archaeological potential of the remains of the *A1*'s buried stern to establish its full extent.

6.4.8 Management Policy 7

We will facilitate investigations and survey to establish the full extent of the remaining survival of *A1*'s internal hull fittings.

## 6.5 The *A1* will be Managed to Sustain its Values

6.5.1 The conservation process should manage change to sustain and enhance the heritage interests and values of the *A1* and its contexts, whilst taking opportunities to reveal, reinforce or enhance those interest and values.

6.5.2 Change is inevitable and it is acknowledged that the *A1* is vulnerable due its natural environment (Historic England, 2008, p. b). Such naturally induced changes to the condition of the *A1* should be investigated, monitored, and evaluated to inform any subsequent actions. Such actions should ensure predicted losses to heritage interests and values can be mitigated.

6.5.3 Any measures taken to counter the effects of natural change will be proportionate to the identified risks and will be sustainable in the long term. This will include consideration for protection *in situ*.

6.5.4 The 2006 Management Report for the Protected Wreck of *HMS/m A1* (Wessex Archaeology 2006) defined a range of measures designed to sustain heritage values. We will build on this previous work to sustain heritage interests and values regardless of ownership or identity. It is therefore justifiable to use law and public policy to regulate the management of the Protected Wreck of *HMS/m A1* site as a place of established heritage value.

6.5.5 Direct intervention on the Protected Wreck of *HMS/m A1* may be justified so long as the impact is demonstrably proportionate to the expected benefits. Benefits should provide new information about the *A1* and reinforce, sustain, or enhance its heritage interest and values for future generations.

6.5.6 Management Policy 8

We will continue to facilitate Licensee guardianship and monitoring of the condition of the *A1*.

6.5.7 Management Policy 9

We will seek to undertake a programme of research, investigation, and monitoring of the corrosion of the *A1*. This programme will build on previous work and will consider impacts and changes within the designated area for the continued survivability of the *A1*.

6.5.8 Management Policy 10

We will seek to minimise the risk of damage archaeological material because of unnecessary disturbance of the seabed within the restricted areas (by fishing, anchoring and/or diving). This will be done through outreach and engagement of local marine, diving and fishing communities and organisations.

## 6.6 Management Decisions Concerning the *A1* will Reflect Best Practice

6.6.1 Best practice for management decision making is reasonable, transparent, consistent, documented, identifies lessons learnt and is reviewed at timely intervals.

6.6.2 Management Policy 11

We will ensure that this management plan remains current and reflects best practice by being reviewed and updated on a regular basis by stakeholders.

# 7 Forward Plan

## 7.1 Introduction

7.1.1 To deliver the Management Policies (see Section 6) Historic England will seek to commence a portfolio of projects that will facilitate or support the conservation and enhancement of the *A1*'s significance, its interests, and values. Where beneficial the projects will build on the outcomes of Historic England suite of delivered projects. These projects are divided into two programmes, that of non-site interventions and site interventions.

7.1.2 Non-site intervention projects will continue to enhance our understanding of the significance of the *A1* and its instrumental value. They will consist of research and archive enhancement projects or interpretation, awareness training and education projects.

7.1.3 Site interventions aim to enhance our understanding of the potential of the archaeology of the submarine *A1* and its environment. These projects will inform the development of a strategy to help conserve and protect the *A1*'s significance, its interests and value. They will also contribute to non-site intervention workstreams.

## 7.2 Documentary Research

7.2.1 There exist extensive primary documentary sources for the *A1*, its crew and association with historical figures. Research into these areas was conducted for this CSMP and will be continued by the Licensee team. This further work will only enhance the historical interests and value of the *A1*. However, this research should feed into a

recognised publication programme. Historic England will therefore facilitate the publication of this research by seeking to fund a series of publications on the *A1* submarine.

## 7.3 Archive Enhancement

7.3.1 The *A1*'s archive consists of the physical artefacts recovered from the site and the documents, photographic and multimedia videos of the site and other related artefacts e.g. such as original plans and logbooks. These are held in various locations and are owned by different individuals or organisations. To ensure this archive is conserved for current and future generation English Heritage will facilitate an archive enhancement project to collate all available archive material into a descriptive site catalogue.

## 7.4 Strategic Assessment

7.4.1 In conducting research into the significance of the *A1* original source documentation has been collated for the other surviving A class submarines (*A3* and *A7*) as well as the Holland boats (*No.1* and *No.5*). A strategic study of this group of heritage assets of early submarines will allow for a consider view of their significance. Such a study would allow Historic England and the MOD (as owners) to make consistent, informed, transparent and value-based judgements on the individual Protected Wrecks (Controlled Site) and inform a strategic management plan for this significant group of wrecks.

## 7.5 Guardian and Stewardship Initiatives

7.5.1 Awareness of the significance of the *A1* will help to engender guardian, stewardship, and crime prevention to conserve its significance for current and future generations. Therefore, Historic England will facilitate the generation of local initiatives within the setting of the *A1*. These will build on previous and current national or regional initiatives but be focused on the *A1* and its heritage values.

## 7.6 Diver-Based Survey and Ground Truthing

7.6.1 Diver-based survey and ground truthing of the protected restricted area will be encouraged. These will be aimed at enhancing the current baseline record to provide a detailed record of known outer hull and internal fixtures and fittings. Diver survey will be augmented by photogrammetry and metal detector surveys. To establish the archaeological potential and extent of the stern quarter and outlying buried anomalies English Heritage will facilitate a programme of site surveys and exploratory excavations.

## 7.7 Environmental Assessment

7.7.1 The Eastern Solent has several natural designations which means there is a wide range of data available on the long-term physical changes and trends in the area. There have also been number of site specific geophysical and biological surveys. A detailed assessment of all this environmental data in relation to the *A1* has yet to be undertaken. Furthermore, the internal environment of the *A1* is not understood.

Questions as to where or not it is a protective environment needs to be addressed. Therefore, Historic England will facilitate a programme of research into the sites internal and external environment.

# 8 Implementation

## 8.1 Consultation

8.1.1 This CSMP for the Protected Wreck of *HMS/m A1* has been developed following review by Historic England and after consultation with Stakeholders.

8.1.2 The CSMP for the Protected Wreck of *HMS/m A1* should be periodically reviewed to ensure it is updated and fit for purpose.

# 9 Adoption of Policies

9.1.1 The final CSMP will be adopted after final revision in 2024.

9.1.2 Historic England in conjunction with the site Principal Licensee will devise a programme that identifies a schedule for implementing the CSMP. The schedule will prioritise tasks that require immediate action, can be implemented over the medium or long term, and those which will be ongoing.

9.1.3 Responsibilities for implementation of the Management Plan lies with Historic England, though consultation with Stakeholders will be maintained throughout. In addition, provision will be made for periodic review and updating of the Management Plan.

# 10 Consultation

10.1.1 The following Primary and Secondary stakeholders, listed as individuals and organisations, will be invited to comment on the draft plan:

- Previous Licensee and owner.
- Current Principal Licensee.
- Historic England.
- West Sussex Inshore Fisheries and Conservation Authorities (IFCA).
- Natural England.
- Hampshire County Council.
- West Sussex County Council.
- Chichester District Council.
- Portsmouth City Council.
- Havant Borough Council.
- Gosport Borough Council.
- Chichester Harbour Conservancy.
- The Crown Estate.
- The Ministry of Defence (previous owners), Navy Command.

- The National Museum of the Royal Navy.
- The Nautical Archaeology Society.
- Members of Triton dive club.
- Maritime Archaeology Trust.
- Channel Coastal Observatory.
- Protected Wrecks Association.
- Maritime Coastguard Agency, Receiver of Wreck.
- British Sub-Aqua Club (as national governing body for UK diving).
- Barrow Submariners Association (RN Subs).
- Submariners Association (https://submarinersassociation.co.uk).
- Joint Nautical Archaeology Policy Committee (JNAPC)

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11.1.4 Martin Woodward facilitated visits to the *A1* collection at the Shipwreck Centre and Maritime Museum, Isle of Wight, and fielded questions on the early history of diving the site. His answers greatly assisted engagement with the original finders Triton divers, and an anonymous diver from the early diving period. MAT are thanked for their assistance with the artefact collection.

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