

London Protected Wreck Site



Tracked Diver Survey and Affiliated Volunteer Capacity Building

Project Report

Historic England Project Number 7892

MSDS Marine

London Protected Wreck Site: Tracked Diver Survey and Affiliated Volunteer Capacity Building

Project Report

Project Name	London Protected Wreck Site: Tracked Diver Survey and Affiliated Volunteer Capacity Building	
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Cover Images:

Top Row Left to Right: Flying the Historic England flag on the Diving Support Vessel, Dive control with the dive supervisor and nominated archaeologist on comms, SSDE equipment including a diver tracking beacon.

Bottom Row Left to Right: Divers talking to licensee Steven Ellis, Nominated Archaeologist Mark Beattie Edwards preparing to dive.

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1.0 Summary

- 1.0.1 The *London* is an important 17th Century Protected Wreck Site comprising two areas of extensive submerged archaeological remains lying in the Thames Estuary off Southend on Sea. This project follows on from the earlier stages of Historic England funded project 7892 as an additional stage following a single tender action from Historic England.
- 1.0.2 The project addresses the recommendation for a diver survey with acoustic tracking that was made in September 2019 and will help inform future management and the possible re-designation of the extents of the site to include all archaeological material related to the *London*¹.
- 1.0.3 This project enabled the team of affiliated volunteers working on the *London* protected wreck site to be embedded within the project team to enable a tracked diver survey of the site. The Stage 3 multibeam bathymetry collected by MSDS Marine in May 2020 formed the base map for the diver tracked survey in this project.
- 1.0.4 Following fieldwork, a specialist archaeologist from MSDS Marine worked with the affiliated team of volunteers during the post-fieldwork recording process to digitise the existing site plan and to combine the multibeam bathymetry for the site with the existing site plan and dive track data. Training and equipment has been, and will continue to be, provided to ensure the team of affiliated volunteers are able to maintain, and add to, the site records in future.

¹ MSDS Marine, 2019, *London* Protected Wreck: Remote Sensing Stage 2: Assessment of 2009 and 2016 datasets, unpublished report for Historic England 2019/MSDS19115/2

2.0 Acknowledgements

2.0.1 The project was commissioned by Historic England through the Heritage Protection Commissions Fund. The assistance and support of the Historic England Grants Team, Debbie Hickman, Esther Blaine, Hefin Meara and Paul Jeffery is gratefully acknowledged.

2.0.2 MSDS Marine would also like to thank the following people for their help, support and enthusiasm during the project:

- Steven and Carol Ellis, Licensed divers
- Mark Beattie- Edwards, Nominated Archaeologist
- Tom Acton and Edmund Ceurstemont, Sonardyne
- Stewart Olley and the crew of *Predator*

2.0.3 The project was managed for MSDS Marine by Alison James. Fieldwork was carried out by Mark James, Tom Harrison, Phoebe Wild, Rodrigo Ortiz, Tom Flatt, Mark Hobbs, Steven Ellis, and Mark Beattie Edwards. Diving operations were supervised by Mark James. Phoebe Wild managed the diver tracking. The report was compiled by Alison James and Phoebe Wild with contributions from Mark James and Tom Harrison.

3.0 Background

- 3.0.1 The *London* is an important 17th Century Protected Wreck Site comprising two areas of extensive submerged archaeological remains lying in the Thames Estuary off Southend on Sea. First designated in October 2008, the site(s) has been subject to detailed, but limited, archaeological investigation in order to provide specific information to manage items at risk from natural and anthropogenic erosion and accretion. Recovered material has formed a key feature of a new gallery in the Central Museum in Southend on Sea and significant artefacts have been loaned to the National Maritime Museum's gallery on Tudor and Stuart Seafarers.
- 3.0.2 The wreck is managed by Historic England for the Department for Digital, Culture, Media and Sport but despite a recent programme of evaluation and regular monitoring by the highly-motivated voluntary Licensed team led by Steven Ellis, with oversight provided by the Nominated Archaeologist Mark Beattie-Edwards, understanding of the depth of stratigraphy across the two areas remains incomplete.
- 3.0.3 This lack of knowledge regarding the extent and depth of buried archaeological remains across the two designated areas is a key gap in our understanding of the *London* Protected Wreck Site.
- 3.0.4 In 2019 Historic England identified a lack of knowledge regarding the extent and depth of buried archaeological remains across the two designated areas as a key gap in their understanding of the *London* Protected Wreck Site. Following a tender process, MSDS Marine were contracted to provide a short programme of geophysical survey across both sites in order to provide full and definitive information about the nature and extent of buried deposits associated with the *London* protected wreck site.
- 3.0.5 The staged project included a review of existing data-sets and reprocessing of existing data to gain as complete a picture of the wreck as possible. The Stage 2 report submitted in September 2019 made a series of recommendations to help enable Historic England, and their partners, to move from reactive management to proactive management of the wreck site. Recommendation two was a diver survey with acoustic tracking².

Recommendation 2 – Diver Survey with Acoustic Tracking

Since the start of intrusive investigations in 2014, there has been no survey of the site using an acoustic diver tracking system. Whilst this was planned during the excavation in 2016, time and equipment constraints made this not feasible in practice at the time. As a result, all survey has been undertaken using traditional methods; this coupled with the poor visibility and challenging conditions means that positional accuracy of features cannot be guaranteed. Discussions with the current licensee suggest not all of the outlying, and unidentified features have been investigated due to limited dive time and challenging conditions for navigation.

The second recommendation is that a program of ground truthing and feature positioning be undertaken on both sites following the collection of current multibeam data. This will allow divers to be guided, using the multibeam as a base map, to outlying features for identification. It will further allow the accurate positioning of known feature on the site to create a

² MSDS Marine, 2019, 7892: *London* Protected Wreck: Remote Sensing. Stage 2: Assessment of 2009 and 2016 Datasets, unpublished report for Historic England. Ref. 2019/MSDS19115/2

comprehensive digital site plan. In addition, it will help inform future management and the possible re-designation of the sites to include all archaeological material related to the *London*.

- 3.0.6 Stage 3 involved the collection of high resolution multibeam bathymetry data in May 2020. This was reported on in August 2020³.
- 3.0.7 This project follows on from the earlier stages of 7892 as an additional stage following a single tender action from Historic England. It addresses Recommendation 2 made in September 2019 and will help inform future management and the possible re-designation of the sites to include all archaeological material related to the *London*.

³ MSDS Marine, 2020 *HE Project 7892 London Protected Wreck Site: Remote Sensing. Stage 3: High Resolution Multibeam Bathymetry Report*, unpublished report for Historic England. Ref 2020/MSDS19115/3

4.0 Aims and Objectives

4.1 Aims

4.1.1 The aims of the project were to:

1. Undertake a tracked diver survey of the *London*, ensuring that the team of affiliated volunteers are engaged and supported
2. Create a digitised and accurately positioned site plan
3. Provide training and equipment to the team of affiliated volunteers to enable them to have the skills required to maintain the site plan in future and to enable increased accuracy in the positioning of finds and features

4.2 Objectives

4.2.1 The objectives from the original project design were achieved as follows:

- Aim 1 was achieved by the mobilisation of an HSE compliant dive team by MSDS Marine embedding Licensee Steven Ellis topside and Mark Beattie Edwards, the sites nominated archaeologist, within the dive team. Acoustic tracking was provided that enabled key features and artefacts within the site to be positioned accurately.
- Aim 2 was achieved following fieldwork. MSDS Marine worked with the affiliated volunteer team to create a digitised and accurately positioned site plan that can be imported into the existing Site Recorder project for the site. This has created an accurate site plan that the affiliated volunteer team can add to and maintain using existing control points which were plotted in during the tracked diver survey.
- Aim 3 was achieved by providing training and equipment that the affiliate volunteer team need to maintain the site plan in future. MSDS Marine hosted an intensive residential training session to enable the team to develop the skills they need internally to maintain the site plan going forwards. In addition, MSDS Marine will continue to provide support services to the team once they are back in their own setting and as they start to use the system. This will ensure the knowledge learned during the training becomes fully imbedded and that the team have the skills needed to put the knowledge into practice and are supported in their development.

5.0 Methodology

5.1 Fieldwork

- 5.1.1 The project enabled Steven Ellis, a member of the team of affiliated volunteers working on the *London* protected wreck site, and nominated archaeologist Mark Beattie-Edwards to contribute to a tracked diver survey of the site. The Stage 3 multibeam bathymetry (MBES) collected in May 2020 formed the base map for this tracked survey (see Figure 1) and the Micro-Ranger 2 and Mini-Ranger 2 USBL systems were used to track the divers and collect positions on features and control points.
- 5.1.2 The project was undertaken using a modified version of Stage 4b of the methodology outlined in the project design⁴.
- 5.1.3 A five-day tracked diver survey was proposed for this project across the week 15-20th August 2021 to record and position key features and artefacts on both sites of the *London*, referred to throughout as Site 1 and Site 2.
- 5.1.4 The diving operations were originally intended to be undertaken using SCUBA equipment, however, a decision by the Port of London Authority (PLA) shortly before the project commenced meant that the operation had to undertake using Surface Supply Diving Equipment (SSDE). This adjustment to the project meant that Licensee Steven Ellis was unable to participate in the diving activities due requirements for an SSDE qualification, however following discussion with Steven and Historic England, it was agreed that Steven would provide topside guidance for the divers during dive operations. Nominated archaeologist, Mark Beattie-Edwards was able to form part of the dive team.
- 5.1.5 Diving activities within the scope of this project conformed to the Diving at Work Regulations 1997 (DWR 1997) and followed the best practise laid out in the Inland/Inshore Approved Code of Practise (ACoP). Potential risks were mitigated through the use of risk assessments before diving commenced. A full methodology for diving operations and risk assessments are contained within the *London* Hazard Identification and Risk Assessment (HIRA) document⁵.
- 5.1.6 The SSDE team consisted of a six-person dive team comprising a supervisor, three divers, and two tenders.
- 5.1.7 Diving was undertaken from the diving support vessel *Predator* operated by Predator Charters Marine Ltd.

⁴ MSDS Marine (2020) *London* Protected Wreck Site: Tracked Diver Survey and Affiliated Volunteer Capacity Building- Tender.

⁵ MSDS Marine (2021) *London* Wreck: Diver Project Plan including Hazard Identification and Risk Assessment. 2021/MSDS19127/1

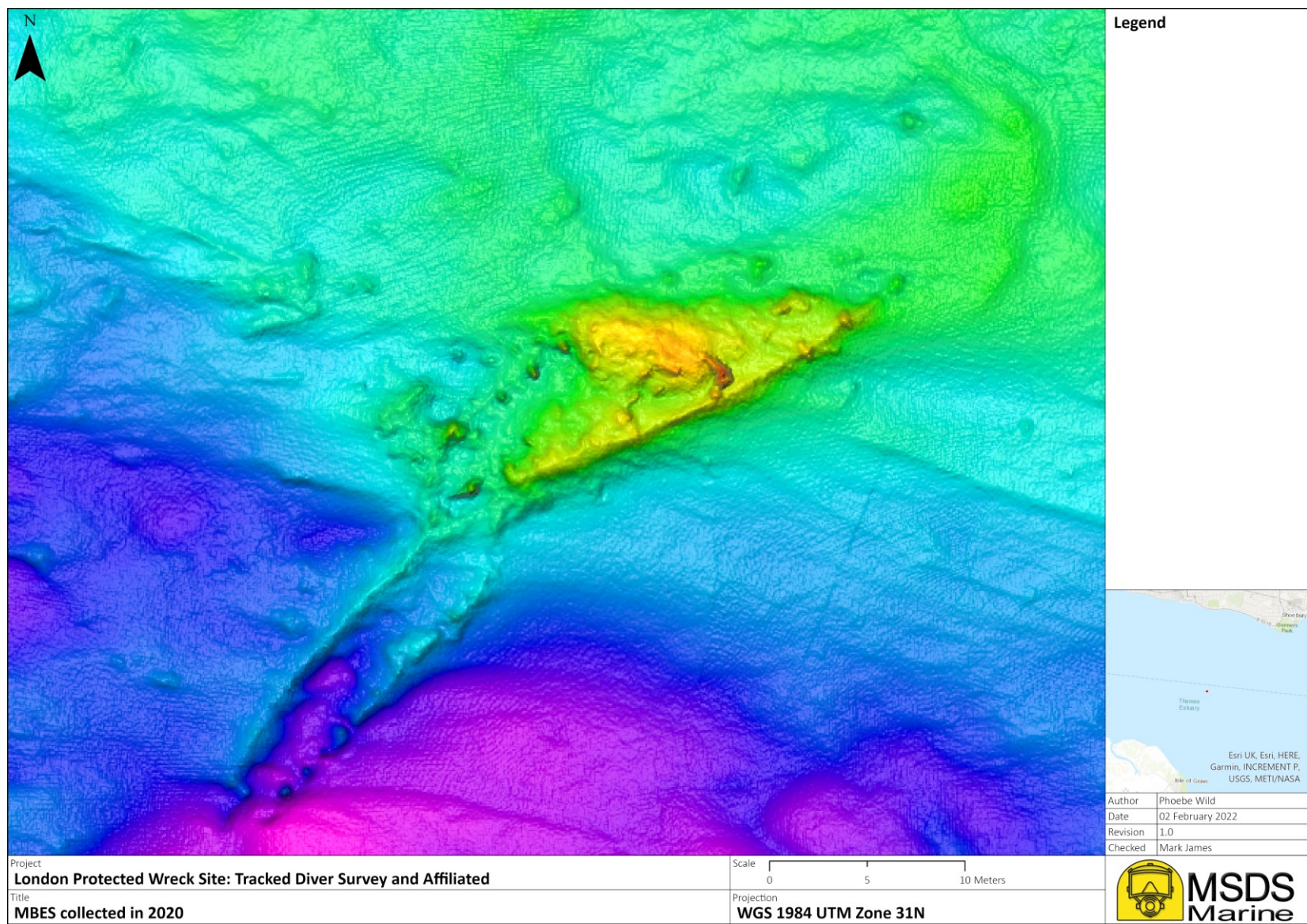


Figure 1: MBES collected over the site in 2020

Diver Tracking

- 5.1.8 Acoustic tracking was used throughout diving fieldwork activities. The systems used were the Sonardyne Micro-Ranger 2 and the Mini-Ranger 2, Ultra Short Base Line (USBL) systems. These systems work by calculating the range and bearing of diver-mounted transponders from the vessel mounted transceivers. The Two transceivers were mounted to the vessel below the water line on a side mounted survey pole. The system was coupled to a DGPS vector heading sensor ensuring a high level of positional accuracy, the antenna of which were mounted to the top of the side mounted survey pole. The hardware was wired to a Topside Processing Unit (TPU) which was itself connected to laptops housed in the vessel wheelhouse via an ethernet cable.
- 5.1.9 The system was mobilised and set up in such a way as to simultaneously track the position of the vessel as well as the diver on the seabed on separate laptops. Tidal influence caused the vessel to swing significantly while at anchor, so it was key for dive management that the location of the vessel relative to the diver and the site was always available.
- 5.1.10 Divers were deployed with one acoustic transponder, affixed to the helmet or dive harness of the diver. These automatically activated upon contact with water.
- 5.1.11 Ranger 2 software, produced by Sonardyne for use with their USBL products, was used to plot the positions of the divers. In order to ensure positional accuracy, a range of offsets including position of the side mounted survey pole on the vessel, the depth of the transceiver and height of the GPS units was input into Ranger 2. Using this program, the position of the diver-mounted transponder could be viewed in real time relative to the vessel location, although not relative to features on the site. In order to track the location of divers and the vessel relative to the site, Ranger 2 was interfaced via two virtual COM ports to QGIS installed on each laptop, both of which were set up with the multibeam bathymetry collected in 2020. The diver routes were projected in real time into QGIS and could be saved as polylines and then manually simplified. Using this set up, along with the voice and video communication system used, divers could be verbally guided around the site and features that were identified could be accurately recorded and positioned.
- 5.1.12 Steven Ellis provided topside guidance to divers through the communication system to ensure that divers benefitted from his knowledge of the site.

Control Points

- 5.1.13 The project design included an aim to create a digitised and accurately positioned site plan, part of which would be achieved by installing Control Points tags (CPs) on the site to enable the accurate and positional recording of features and structures. CPs were either attached to reinforcing bar (rebar) rods that were hammered into the seabed or were affixed to existing structures on the seabed. Positions were taken of all newly installed, and previously installed, CPs by the diver placing the acoustic transponder on top of CP. All positions were recorded in the QGIS project. The locations of the installed CPs were determined by Steve Ellis using the diver tracking system and QGIS project to identify where to place each point to ensure their long term use by the team.

Photography and Videography

5.1.14 Cameras mounted on the diving helmets were used to record the dives and collect images and footage of features and activities during dive operations. Stills were taken from the video footage after completion of fieldwork.

5.1.15 Videography was undertaken using a GoPro in an underwater housing.

5.2 Site Recorder Training

5.2.1 Following fieldwork, in January 2022, *London* licensed team members Steven and Carol Ellis, and nominated archaeologist Mark Beattie-Edwards were provided with training in using Site Recorder, a data management software package developed for use on maritime and intertidal archaeological projects, produced by 3H Consulting Ltd.

5.2.2 Training was delivered in person at the MSDS Marine head office in Derbyshire in January 2022. The licensed team worked alongside MSDS Marine archaeologist and digitisation specialist Tom Harrison to set up a project work space in Site Recorder. The 2020 multibeam bathymetry was used as the site base map and CP's and features identified during the August 2021 fieldwork were input. Tom was able to provide training in the use of the system to support the team in adding previous recoveries to the work space.

5.2.3 The site plan was created using the system developed, and successfully implemented, by the same team on the *Rooswijk* project. The original site plan was manipulated in Photoshop and the sections were aligned and scaled by making the drawn plan transparent and layering it on top of the Multibeam.

5.2.4 The adjusted plan was then imported into the Procreate App on the iPad where the stylus was used to draw over the top of the plan as a new layer. The drawn layer was then exported back to the computer as a transparent PNG. This was imported into Site Recorder and aligned to the Multibeam using the align tool.

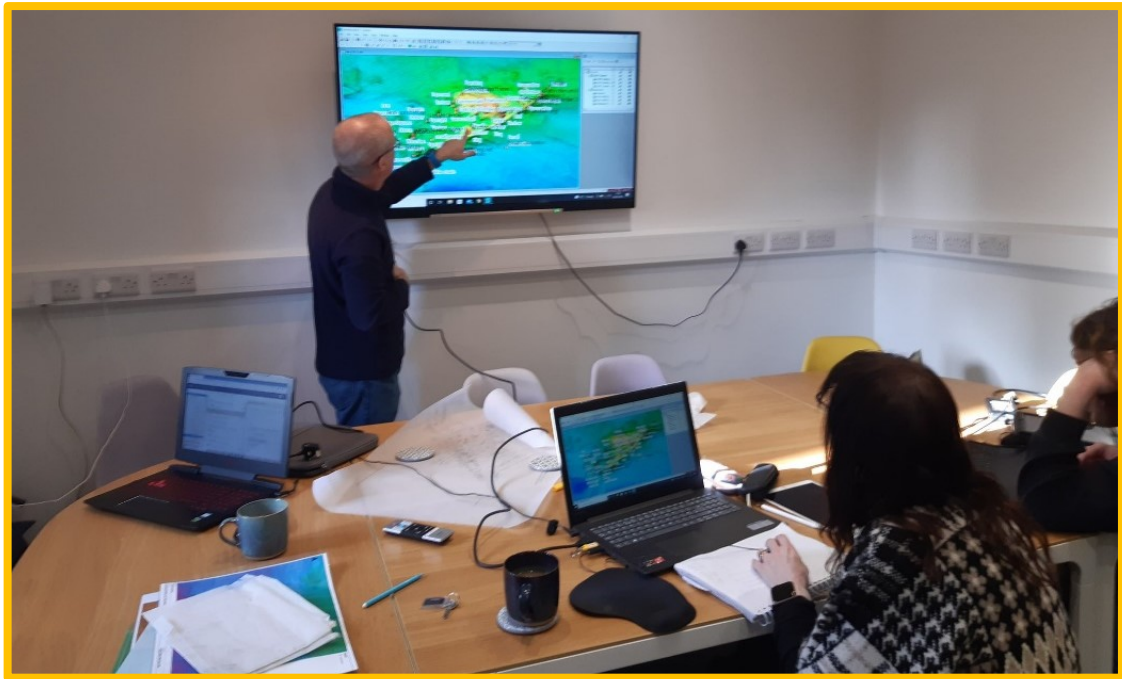


Figure 2: Post fieldwork training and discussion at the MSDS Marine office.

- 5.2.5 The method allows for the site plan to be easily updated by the project team in future as they further record the site. An iPad and stylus were provided to the licensed team members to use for the ongoing site recording and future site plan creation.

6.0 Results

6.1 Fieldwork

- 6.1.1 Fieldwork was proposed to take place over five days; however, adverse weather reduced the available diving days to two. As a consequence, only Site 2 was targeted as part of the survey as it is adjacent to the shipping channel and therefore considered at higher risk of immediate loss.
- 6.1.2 Two dives were undertaken each day during periods of slack water. On the 19th August two slack water periods were dived, and on the 20th August two dives took place during an early long slack water. For each dive, a single diver was deployed as dictated by the risk assessment. Table 1 includes details of the activities undertaken during diving operations.

Date	Dive No.	Bottom Time (minutes)	Activity
19.08.2021	1	53	Installation and positioning of CPs
	2	61	Installation and positioning of CPs
20.08.2021	3	49	Photography
	4	51	Installation and positioning of CPs

Table 1 Diving activities

- 6.1.3 During all dives, divers reported structure, features, and objects that they identified on the seabed, and these were positioned using the diver tracking system.
- 6.1.4 The project team used the weather down time to work with Steven and Mark to further understand the site and start to plan where the most appropriate positions would be for the CPs. Mark was also provided with a SSDE orientation dive in the marina to refresh his skills.

Diver Tracking

- 6.1.5 Diver tracking was used on all four dives to enable the positioning of CPs and other features identified on the site, as well as to track the diver and boat to enable safe diving operations. Whilst diver tracking was predominantly used for fixing positions of CP's diver tracks were also taken when possible. An example route for Dive 4 saved as polylines in the QGIS project is given in Figure 3. Features reported by divers were positioned using the diver tracking system (see Figure 4) and a verbal description recorded within the attributes.

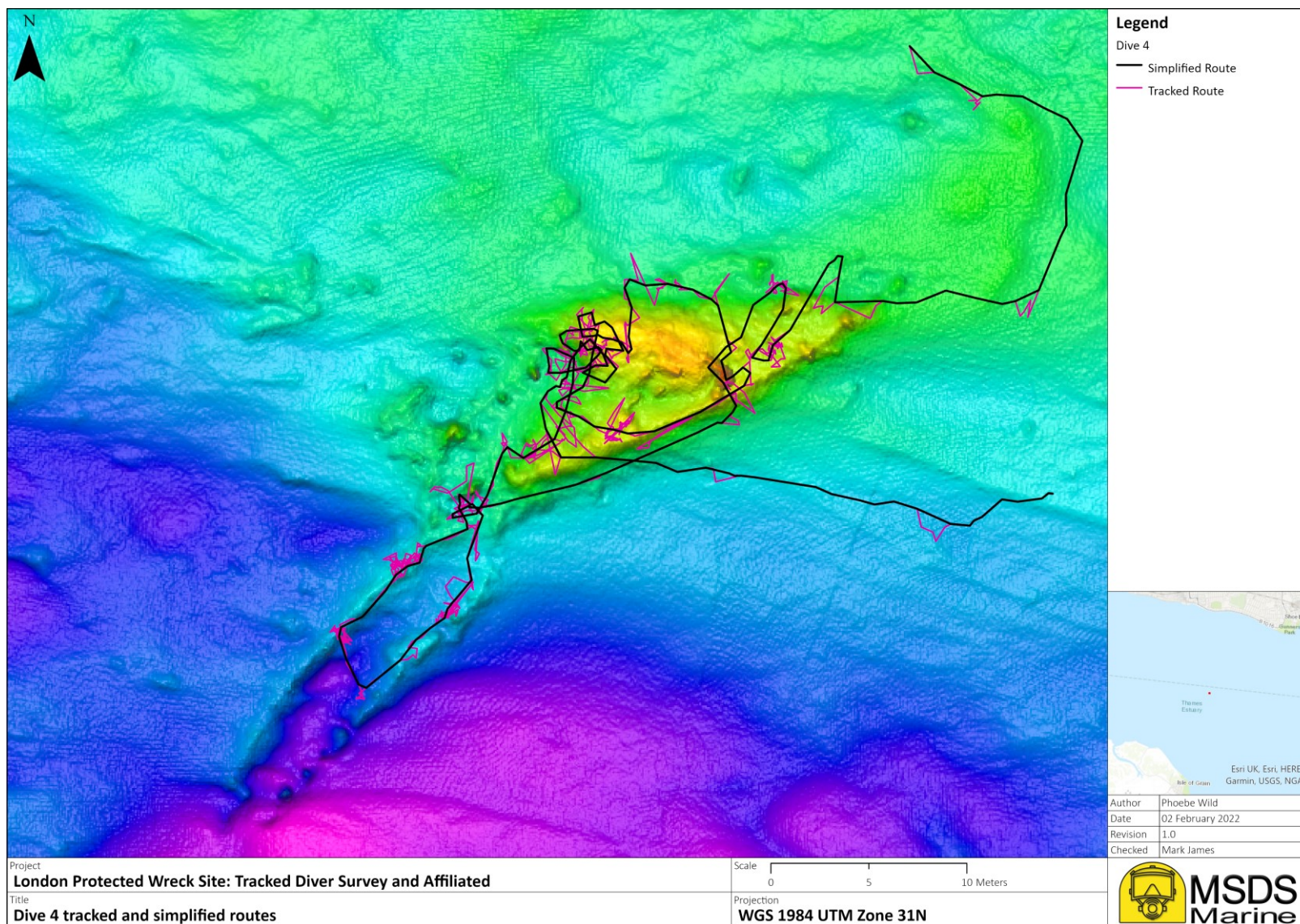


Figure 3: Dive 4 tracked and simplified routes

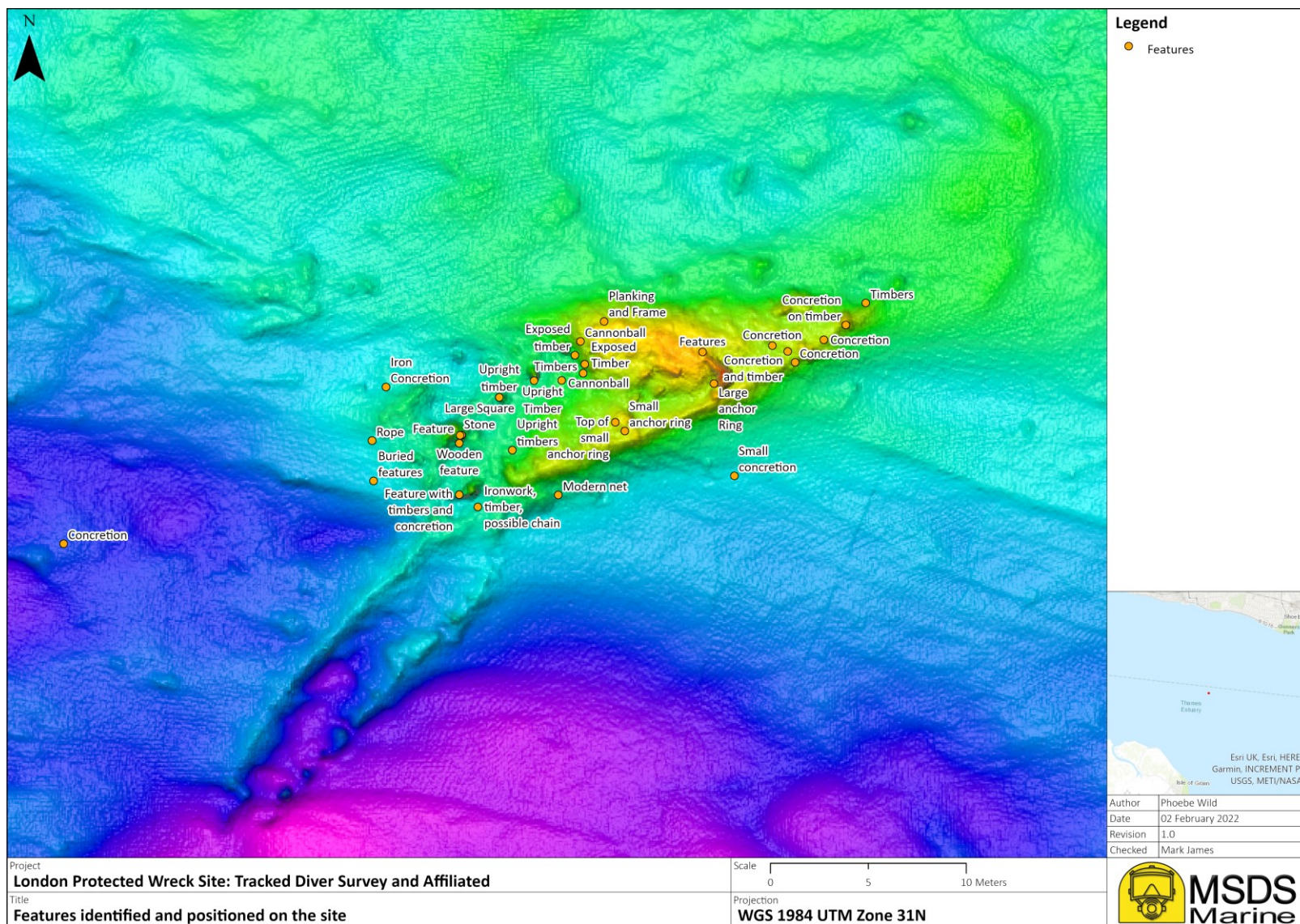


Figure 4: Features identified and positioned on the site

Control Points

- 6.1.6 A total of ten new CPs were installed on the site and positioned during dive operations, and the positions of two existing CP's were recorded using the diver tracking (see Figure 5).
- 6.1.7 Six CP tags were affixed to rebar poles that were hammered into the seabed. Four CP tags were affixed to the upstanding frames of the modern wreck to the southwest of the *London* Site 2. Whilst not located on the site of the *London* the positions were determined by Steve Ellis to be effective for easy location and ongoing recording on the *London* site.

Control Point	Type	New or Existing?	Location
6F	Rebar and Tag	New	<i>London</i>
7G	Rebar and Tag	New	<i>London</i>
3C	Rebar and Tag	Existing	<i>London</i>
8I	Rebar and Tag	New	<i>London</i>
5E	Rebar and Tag	New	<i>London</i>
1A	Rebar and Tag	Existing	<i>London</i>
4D	Rebar and Tag	New	<i>London</i>
9J	Rebar and Tag	New	<i>London</i>
16	Tag	New	Modern wreck
17	Tag	New	Modern wreck
18	Tag	New	Modern wreck
19	Tag	New	Modern wreck

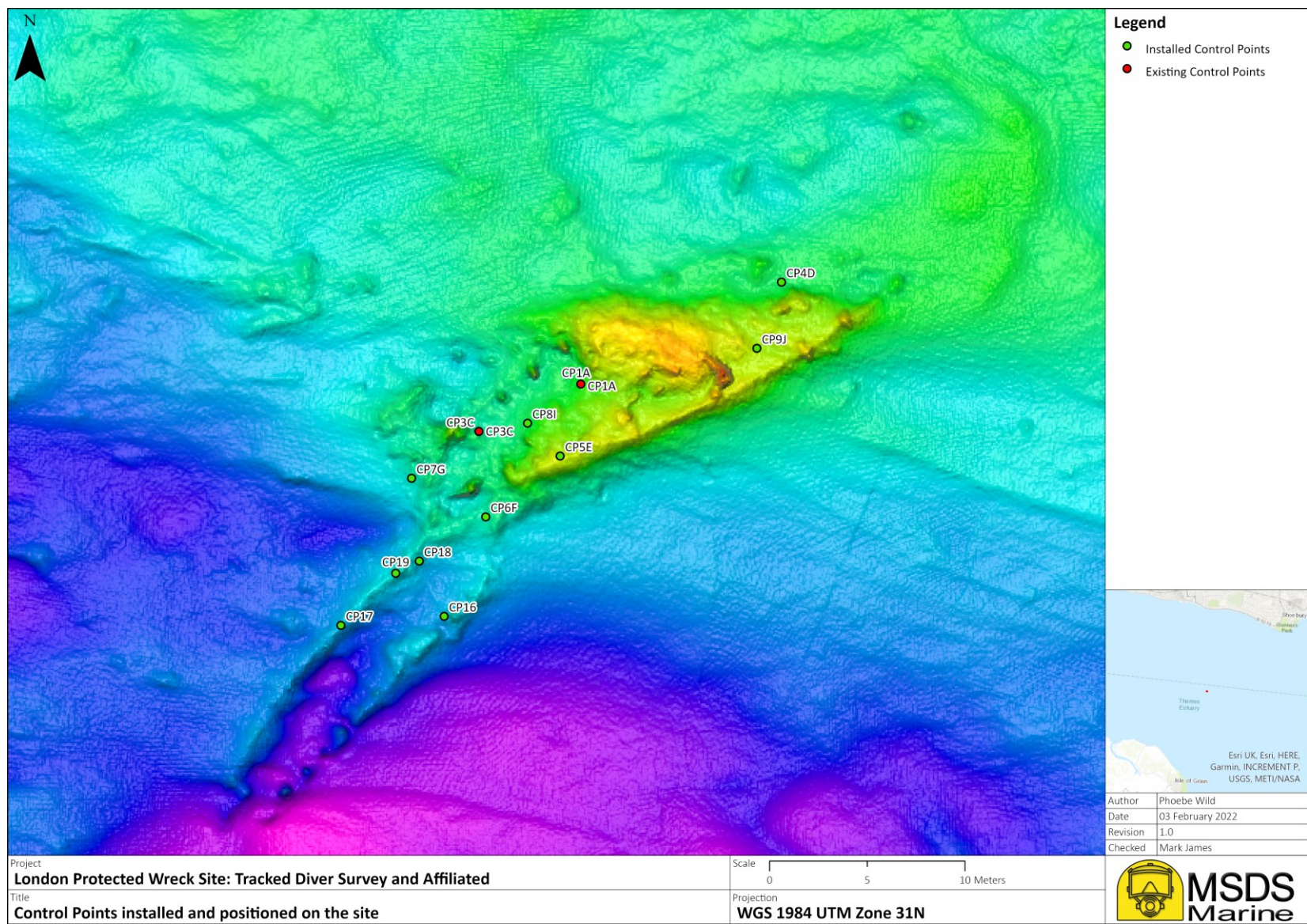


Figure 5: Control Points installed and positioned on the site

Photography and Videography

- 6.1.8 Images and footage of features and CPs were collected during diving operations.
- 6.1.9 Videography using a GoPro was undertaken on the area around the 'Large Anchor Ring' identified in previous surveys of the site, see **Error! Reference source not found..** The footage was collected with the intention of being used to create a photogrammetry model, however, visibility was too poor to enable a model to be created. Despite this, the footage provides a useful record of the feature.



Figure 6: 'Large Anchor Ring' with 0.5m scale bar and transponder

6.2 Site Plan Creation

- 6.2.1 The MSDS Marine team worked alongside the licensed team during the training to create a site plan in Site Recorder, following the process set out in Section 5.2, see Figure 6.
- 6.2.2 The site plan was then imported into Site Recorder and used as a base map to add the positions of finds and control points to, see Figure 7. The site recorder file is a work in progress and is now being added to by Steven and Carol to ensure material from all years of work on the site is included.

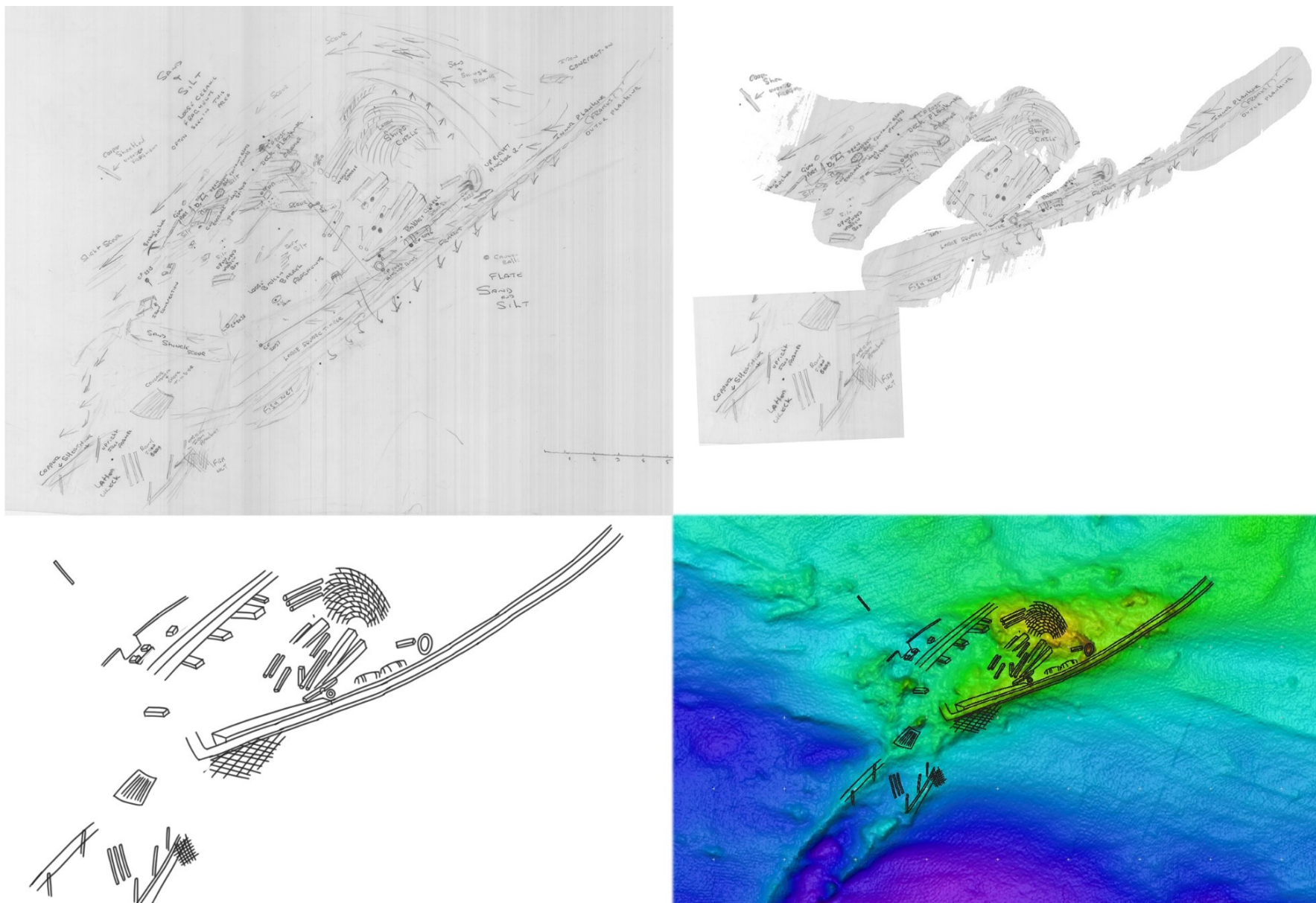


Figure 6: The process of creating the digital site plan. Top left: Licensed teams original site plan provided by Steve Ellis. Top Right: The site plan adjusted in Photoshop. Bottom Left: The site plan drawn in Procreate. Bottom Right: The drawn site plan overlaid on the Multibeam.

Credit: Steven Ellis and the Licensed Team, Save the London and MSDS Marine.

7.0 Project Evaluation and Impact Assessment

- 7.0.1 It is important that all projects commissioned by Historic England make an impact. The 2017 report *Delivering better outcomes for citizens: practical steps for unlocking public value*⁶ recognised the importance of measuring and improving public sector productivity - doing more with less – and one way of ensuring improved public value it to assess the impact of a project. The report, led by Sir Michael Barber, recommended that for every major area of public expenditure it should be customary that good data is gathered and analysed in a timely manner to allow informed decisions to be made by those responsible for blocks of expenditure. MSDS Marine will ensure that good data is gathered and analysed to assess impact as part of this project. This evaluation will be comprehensive but proportionate.
- 7.0.2 Impact assessment is a means of measuring the effectiveness of activities and projects and judging the significance of the changes or benefits brought about by these actions. Impact can be gauged in terms of reach (e.g. how many people/organisations were influenced by the work) and significance (e.g. the difference it made to these people/organisations).
- 7.0.3 Here, ‘impact’ is defined as the broad or longer-term effects of this project. This can include effects on people who are direct users of a project or Historic England’s work, effects on those who are not direct users, or effects on a wider field such as heritage policy. Gathering, assessing and presenting evidence of impact is therefore part of this project under the following three broad headings: Individuals & Communities; Organisations; Practice & Policy.

7.1 Individuals and Communities

- 7.1.1 Three volunteers participated in the project.
- 7.1.2 Two desk-based training days and a surface supply refresher training day were provided.
- 7.1.3 The project had a significant impact on the ability of the volunteer team to record the site. The project has enabled enhanced site recording to take place which will enable informed, proactive management by Historic England in future.

⁶ *Delivering better outcomes for citizens: practical steps for unlocking public value*
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/660408/P_U2105_Delivering_better_outcomes_for_citizens_practical_steps_for_unlocking_public_value_web.pdf,
accessed 1st November 2019.

Social Media

7.1.4 The following social media posts went out from MSDS Marine channels.

Twitter					
Date	Tweet Content	Theme	Impressions	Engagements	Detail Expands
15/8/21	We are excited to be heading back out to the #LondonWreck1665 #ProtectedWreck this week for @HistoricEngland with the licensee @StevenEllis3 and nominated archaeologist from @NautArchSoc. We will be sharing daily updates so stay posted!				
15/8/21	Mobilising in the sun for our upcoming diver survey of the #LondonWreck1665 for @HistoricEngland- packing the van and testing the dive spread and the @sonardyne diver tracking system #ReadyToGo	Fieldwork	749	65	14
15/8/21	A beautiful evening for setting up our @sonardyne diving tracking system all ready for surveying the #LondonWreck1665 tomorrow for @HistoricEngland (if the wind dies down). Excited to be trying the Mini Ranger against the Micro Ranger we've been using this year!	Fieldwork	1,417	108	19
16/8/21	A lesson for @PhoebeRonn in using the @sonardyne Ranger2 software by @ECeurstemont ready for tracking our divers on the #Londonwreck1665 later in the week	Fieldwork	682	68	12
16/8/21	Testing our kit out while we wait for conditions to improve to allow us to get in the water! It's windy in Essex today. @DiveKirbyMorgan #SurfaceSupplyDiving	Fieldwork	984	54	8
17/8/21	Brill day testing the @sonardyne Mini and Micro Ranger systems for tracking our divers and shot lines in advance of heading out to the #LondonWreck1665 The systems not only allow us to monitor where our divers are but also help us to accurately position features on the seabed	Fieldwork	1,276	94	8
19/8/21	Aaaaand we're off! Finally heading out to the #LondonWreck1665 for a day of diving!	Fieldwork	767	46	9

19/8/21	We're using the @sonardyne Mini and Micro Rangers to track our divers movements on the #LondonWreck1665 and collect positions on features. These systems allow us to guide our divers around the wreck in real time via their helmet comms.	Fieldwork	980	80	14
19/8/21	One of the aims of this project is to support the excellent work by the #LondonWreck1665 Licensee @StevenEllis3 and the site nominated archaeologist from @NautArchSoc	Fieldwork	1,547	86	23
24/8/21	We had a great time using the Mini and Micro Rangers from @sonardyne on this fascinating site! (Quoting the @HistoricEngland Tweet)	Fieldwork	1,502	18	5
7/9/21	Our second diving project of the day: briefing underway and @nautarchsoc diver ready for a surface supply refresher diver at Stoney Cove	Training	1423	178	34
11/10/21	The first @InstituteArch #MarineMonday paper is underway! Mark James and @Phoebe__Wild are talking about using technology to go back to basics with case studies from the @HE_Maritime London and @CHERISHproj Bronze Bell work.	Professional Practice	597	38	2
18/1/21	Great to have @StevenEllis3 and Carol @LondonShipWreck and their nominated archaeologist Mark Beattie Edwards from the @NautArchSoc with us for a couple of days this week. Funding from @HistoricEngland & @HE_Maritime is helping us create an updated digital site plan together	Training	1,021	26	4

7.1.5 The following posts went out from non MSDS Marine channels. As the channels are not managed by MSDS Marine it is not possible to provide enhanced analytics as above.

Twitter					
Date	Tweet Content	Account	Likes	Retweets	Comments
20/8/21	With great thanks for the support this week from @HistoricEngland @HE_Maritime @NautArchSoc @MSDSMarine and their divers. Enabling the volunteer dive team of the #Londonwreck1665 to continue to record the wreckage a lot more precisely thanks to the @sonardyne tracking system.	@StevenEllis3	27	5	1

19/8/21	After a few days of bad weather was great to get the @sonardyne tracking system on #LondonWreck1665 Site 2 with the @MSDSMarine divers & @StevenEllis3. Made for some funny comms – “@R_OrtizV can you describe what you are feeling for me?”	@NautArchSoc	22	7	0
31/8/21	One of England’s most important 17 th -century shipwrecks, The London, is being brought back to life by experts.	@ITVanglia	38	21	1
31/8/21	An awesome piece of history (almost) right on my doorstep. Find out more about the work @HistoricEngland @SaveTheLondon @StevenEllis3 & @NautArchSoc are doing to try to preserve 17 th century ship ‘The London’ in my full report	@frostreports	23	11	2
18/1/22	Great day with @MSDSMarine @StevenEllis3 and Carol Ellis and @NautArchSoc for #LondonWreck1665. Building a digital site plan for future mapping of the #ProtectedWreck - thanks to @HE_Maritime @HistoricEngland #LearningDay #SaveTheLondon	@savethelondon	15	4	0
19/1/22	A big thank you to @AlisonJames81 @Mark__James82 @TomHarrison_88 of @MSDSMarine nominated archaeologist Mark Beattie-Edwards and @HE_Maritime for a couple of fantastic days archaeological site plan training. This will really aid our work and understanding of the #Londonwreck1665	@StevenEllis3	11	2	2
28/1/22	It's starting to become addictive adding the artefacts recoveries to the new digital site plan of the #Londonwreck1665. Thanks to the support from @3HConsultingLtd @MSDSMarine @NautArchSoc @HE_Maritime @HistoricEngland #savethelondon #maritimearchaeology #ThamesEstuary	@StevenEllis3	24	2	3

Traditional Media

7.1.6 Historic England issued a press release about the project on 23rd August 2021. The following coverage was recorded by Historic England:

- Mail Online
- Express Digest
- Girl Sun
- Scuba Diver magazine
- Divers 24
- The Echo
- Echo online
- Express Digest
- Basildon Echo
- Hydro International
- BBC News online
- ITV.com
- ITV Anglia News (6pm, 10pm bulletins)
- ITV Meridian East (6pm bulletin)

7.1.7 In addition, the press release was hosted as a blog on the Historic England website⁷. This has had 1,790 public views (as of 03/02/2022). However, Historic England have added the caveat that a change to the website tracking cookie in 2021 means that this is likely to be under reporting and therefore it is likely the actual view figure is much higher.

7.1.8 The project made the cover of Underwater Contractor International. Unfortunately, a link to the full article is no longer available as the magazine has gone into administration.



Figure 8: The cover of Underwater Contractor International featuring the project

⁷ <https://historicengland.org.uk/whats-new/news/divers-map-condition-of-the-london-wreck/>

7.2 Policy and Practice

ClfA Innovation Festival

- 7.2.1 Phoebe Ronn and Mark James from MSDS Marine presented a paper, *Using technology to go back to basics*, at the October 2021 Chartered Institute for Archaeologists Innovation Festival as part of a #MarineMonday session looking at technology and methodology in marine archaeology.
- 7.2.2 Over the last twenty years marine archaeology as a discipline has seen a dramatic increase in the use of technology such as multibeam bathymetry and diver tracking used to identify, record, and investigate archaeological sites. The same period has seen this technology increase in capability, and decrease in cost, to a point where it is almost commonplace during funded wreck investigations. Whilst this technology is available to commercial contractors, it is still often beyond the reach of the volunteer archaeological dive community who rely on more traditional methods of recording and investigation.
- 7.2.3 Using two case studies, the *London* as well as the Bronze Bell protected wreck site in Wales, the paper looked at the prevalence of technology at a commercial level and how it can be used to aid the volunteer archaeological dive community during their work.
- 7.2.4 The paper presented the methodology and results of this project to a professional audience and helped inform a discussion on future practice. The session was attended by over 40 professional archaeologists.

Sonardyne Video

- 7.2.5 The project, and in particular the use of the diver tracking technology, was the focus of a Sonardyne video diary⁸. The video has now been viewed 415 times (as at 09/02/22).

7.3 Affiliated Volunteer Case Study

- 7.3.1 The project worked directly with volunteers Steven and Carol Ellis and nominated archaeologist Mark Beattie Edwards. The role of nominated archaeologist within the Protection of Wrecks Act licensing system is a voluntary one.
- 7.3.2 Steven Ellis believes the project has had a real positive impact on the work of the licensed team and will continue to do so for future work on the site⁹

'The greatest support the project has given us is having control points, and features of the wreckage precisely georeferenced. The project has greatly enhanced our mapping, monitoring of the silt levels, and recording positions of any future at-risk recoveries. Especially, with the combined use of 3H Site Recorder and the latest multibeam survey, digitising site two of the London. Achieving far more than we could have achieved using paper plans. I think this project has been the best assistance yet the volunteer team have had in properly recording the site'

Steven Ellis, 2022

⁸ <https://www.youtube.com/watch?v=kq0H98tCpYg>

⁹ Steven Ellis, pers comm.

8.0 Recommendations

- 8.0.1 The project has been highly successful at forming a partnership between a range of stakeholders for the site, namely Historic England, the licensee and his team and MSDS Marine, to ensure proactive management of the site is taken.

8.1 Recommendation 1 – Further Diver Survey with Acoustic Tracking

- 8.1.1 Unfortunately, due to weather conditions, it was only possible to undertake the tracked diver survey on Site 2. It is now recommended that further acoustic tracking takes place on Site 1 to ensure a full record across both areas of the site is achieved to enable Historic England's future management of the site.
- 8.1.2 In addition, the recommendations made by MSDS Marine in the Remote Sensing Stage 3 report remain and are repeated here for completeness.

8.2 Recommendation 2 (2020 Recommendation 3) – Intrusive Investigation

- 8.2.1 Three high potential areas for additional wreck material on Site Two were identified during the review of sub-bottom data, the identity of which is unknown or not confirmed, and the size of which could alter the constraints of the wreck. The review of the 2020 multibeam has shown that some of these areas have become slightly more uncovered, however the 2019 interpretation remains valid.
- 8.2.2 The third recommendation, should it still be considered appropriate following ground truthing, is that a programme of intrusive investigation be undertaken in the three high potential areas identified during this review, or other areas identified during ground truthing. This will allow the constraints of the wreck, and additional depth of burial data, to be established and lead to a fuller understanding of the remaining wreck structure.

8.3 Recommendation 3 (2020 Recommendation 4) – Biannual Survey Programme

- 8.3.1 The 2020 report recommended high resolution multibeam surveys are undertaken on a regular basis and various times of the year to allow for an assessment of seasonal variation. This will allow for a greater archive of data to be established from which changes to seabed and the site can be accurately and visually monitored and areas of the site prioritised for future works.
- 8.3.2 Previously the recommendation made was for biennial surveys (once every two years), however the results of the comparison made within this report suggest significant changes that need to be quantified as to the overall speed and impact of sediment loss. This would be better achieved through biannual surveys (twice a year) and at varying times of year to account for and understand any cyclic variation in seabed levels.
- 8.3.3 It is now nearly two years since the last survey and as such a high resolution multibeam survey of the site is now overdue.

9.0 References

MSDS Marine (2019) 7892: *London* Protected Wreck: Remote Sensing. Stage 2: Assessment of 2009 and 2016 Datasets, unpublished report for Historic England. Ref. 2019/MSDS19115/2

MSDS Marine (2020) HE Project 7892 *London* Protected Wreck Site: Remote Sensing. Stage 3: High Resolution Multibeam Bathymetry Report, unpublished report for Historic England. Ref 2020/MSDS19115/3

MSDS Marine (2020) *London* Protected Wreck Site: Tracked Diver Survey and Affiliated Volunteer Capacity Building- Tender.

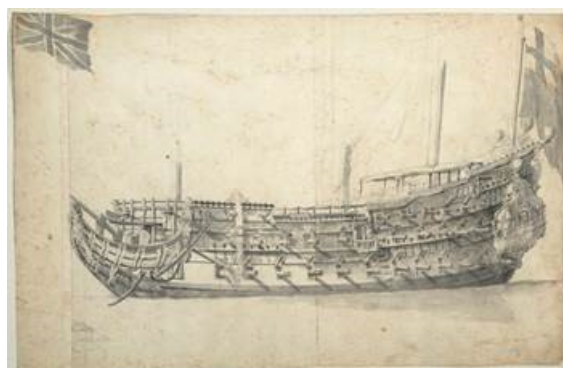
MSDS Marine (2021) *London* Wreck: Diver Project Plan including Hazard Identification and Risk Assessment. 2021/MSDS19127/1

10.0 Annex A – Press Release

HISTORIC ENGLAND PRESS RELEASE: 23 AUGUST 2021

DIVERS MAP CONDITION OF ONE OF ENGLAND'S MOST IMPORTANT 17th CENTURY SHIPWRECKS

- Divers investigate remains of a 355 year-old shipwreck called the *London* which blew up in 1665 off Southend Pier in Essex
- State-of-the art underwater diver tracking system used to accurately digitally map it
- The warship played a significant role in British history and was part of a squadron that brought back Charles II from the Netherlands in 1660 to restore him to the throne
- Images of divers and artefacts recovered from the *London* can be downloaded [here](#) (For caption and copyright information click on the image and the '...') B-roll footage from the boat is also available for broadcasters



A team of divers have been investigating the remains of one of England's most important 17th century shipwrecks - the *London*, which accidentally blew up in 1665 in the Thames Estuary near Southend Pier in Essex. The diving project is funded by Historic England, working with MSDS Marine and Licensee Steve Ellis from the London Shipwreck Trust. It aims to accurately map the layout of the wreck which has been lying in two parts on the seabed.

The *London* was one of only three completed wooden Second Rate 'Large Ships' that were built between 1600-1642 and is the only one whose wreck still survives. Built in Chatham in Kent, it played a significant role in British history, serving in both the Cromwellian and Restoration navies. It formed part of the fleet that brought Charles II back from the Netherlands in 1660 to restore him to the throne, to end the anarchy which followed the death of Oliver Cromwell in 1658 and his son Richard Cromwell taking power. It blew up when gunpowder on board caught fire as the ship was en-route to collect supplies after being mobilised to take part in the Second Anglo-Dutch War of 1665-67.

Using a state-of-the art underwater diver tracking system, developed by marine technology company Sonardyne, the ship's features can be accurately located and parts of the ship that have been picked up by previous surveys can be recorded. This technology - which works in a similar way to satellite navigation - is important because the diving conditions and murky waters are so bad that 50cm visibility is considered good by the diving team.

The data that has been collected will be used to create a comprehensive digital site plan. This detailed map will be fundamental to informing the ongoing management of this protected wreck site. It is

managed by Historic England on behalf of the Department for Digital, Culture, Media and Sport. The wreck is regularly dived by the volunteer licenced team led by diver Steve Ellis.

The *London* is on Historic England's [Heritage at Risk Register](#), due to the wreck's ongoing erosion. Strong currents and exposure to destructive wood-boring organisms which are moving into warmer English waters pose a great risk to artefacts and the surviving ship's structure. In 2020 Historic England funded a multibeam geophysical survey of the wreck site. The survey allowed for the detailed comparison of the state of the wreck compared to previous surveys and revealed significant loss of sediment in some locations, further endangering the wreck.

Historic England Maritime Archaeologist Hefin Meara said: "This project and the diving undertaken by licenced diver Steve Ellis and his team in the challenging conditions of the Thames Estuary are vital to inform our understanding of the deteriorating condition of the *London* protected wreck site. We're excited to be leading this project working with partners using new technology which will enable us to accurately map the wreck and help to inform how best we can protect it from further erosion."

The wreck was partially excavated in 2014-2016 and finds included leather shoes, glass bottles and an incredibly rare and extremely well-preserved 350-year-old wooden gun carriage which was raised from the seabed. These artefacts provide greater understanding of our seafaring past.

- Ends -