PROJECT CARDONNET

Report of WW2 wrecks of the Banc du Cardonnet, Normandy

Southsea Sub-Aqua Club | BSAC branch 0009 | December 2017

Front cover image US Soldiers recovering crew of lost LCT on D-Day. Walter Rosenblum

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Summary

Project Cardonnet aimed to investigate and record the WW2 Operation NEPTUNE wrecks of the Banc du Cardonnet, located in the Baie de Seine, Normandy. This ambitious project by a British recreational diving club investigated two wrecks believed to be US Landing Craft Tank and their cargo of DD tanks and M-7 Self Propelled Howitzers which were lost as they approached UTAH Beach on D-Day. Namely LCT(5) 458 and LCT(6) 593. Both vessels sank when they struck German mines and resulted in a tragic loss of life.

In addition to investigating and recording these wrecks our project aims were to raise awareness of Operation NEPTUNE and its place in modern history and the part recreational divers can play in informing the wider community of the historic environment that otherwise remains unseen and potentially forgotten.

Acknowledgments

Our sincere gratitude goes to the many people and organizations who have assisted and supported us in this challenge especially;

- Département des Recherches Archéologiques Subaquatiques et Sous-Marines (DRASSM) being the French organization responsible for the management of all subaquatic and submarine archaeological activities. DRASSM is qualified to deal with all matters of archaeological research that involve diving, is charged formally to control submarine archaeological research and discoveries, and to implement the legislation on maritime cultural goods. In particular we wish to thank Cécile Sauvage;
- The British Sub-Aqua Jubilee Trust (BSAJT) for its generous financial support;
- The British Sub-Aqua Club (BSAC) for its generous financial support;
- Chris Howlett – Subject matter expert on the Normandy Campaign and formerly of UKHO;
- Institut National de Plongée Professionnelle (INPP). The National Institute of Professional Diving (INPP) aims to participate in the development of activities related to professional diving, safety and intervention in the aquatic environment.

Copyright Statement

1. Project Cardonnet - Background

1.1 Introduction

Since 1954 members of Southsea Sub-Aqua Club (SSAC) have enjoyed exploring our underwater world and the history that lays hidden by the depths. Over time our members have contributed much to the recreational diving world and the wider community through their determination, skills and hard work. From the invention of Octopush (underwater hockey) to the discovery of the historic Tudor flagship 'Mary Rose'[1] SSAC Branch[2] have been one of the most active and productive branches of the British Sub-Aqua Club. For the last ten years the club have been actively recording many of the wrecks in its home waters along the south coast of England and in particular the many wrecks associated with the largest ever maritime invasion – the WW2 wrecks of 1944 Operation NEPTUNE[3]. It is a natural progression to extend this work to learn more about the Normandy campaign through the investigation and recording of unidentified wrecks of the Baie de Seine believed to be lost during this historic endeavour.

Project Cardonnet aims to investigate and record the WW2 Operation NEPTUNE wrecks of the Banc du Cardonnet, located in the Baie de Seine, Normandy. This ambitious project investigated two wrecks of US Landing Craft Tanks which were lost as they approached UTAH Beach as part of Operation NEPTUNE. US Landing Craft Tank (LCT(5) 458 and LCT(6) 593) both sank when they struck German mines and resulted in a tragic loss of life.

Shortly before dawn on 6 June 1944 eight US Navy LCTs carrying the 70th Tank Battalion's DD tanks approached UTAH beach. As LCT(6) 593, with four of Company A's DD Sherman tanks aboard, passed over the shallow Banc du Cardonnet it detonated an enormous German mine and was instantly broken in two. The power from the massive explosion propelled her men, vehicles and equipment into the air. Many lives were lost.

Just over 4 hours later LCT(5) 458 sank after hitting another mine while running into the beach. She was carrying 4 x M-7 Priests and supporting vehicles of Battery B, 29th Field Artillery. Many men lost their lives as the landing craft and her cargo of armoured fighting vehicles sank below the waves.

In 2013, in preparation for a planned TV program 'D-Day's Sunken Secrets' the French TV company MC4 funded a major survey of the wrecks of the Baie de Seine and located a number of wrecks on the Banc du Cardonnet. Some of these wrecks may be those of LCT(5) 458 and LCT(6) 593. Our project aimed to identify these wrecks from their construction and cargo much of which has been dispersed as a result of the explosions. We also intended to examine and record other wrecks in the area.

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[1] Led by Alexander McKee it was members of SSAC that found and identified the wreck of Henry VIII warship Mary Rose.
[2] Established in April 1954 as Branch 0009 of the British Sub Aqua Club
[3] Operation NEPTUNE was the maritime phase of Operation OVERLORD - The invasion of Normandy by sea and the liberation of France.

Our project has recorded the wrecks in detail using 3D images created by photogrammetric techniques as well as by video. The images and supporting documentation telling the story of the tragic events that led to the loss of these craft, vehicles and servicemen will be made fully accessible World Wide Web[4] and will allow use of Virtual Reality (VR) to visit the wrecks in a fully interactive way.

We recognized the sensitivities associated with diving on wrecks where brave men lost their lives and were determined to behave in a solemn and respectful way when diving the wrecks. We also have produced some guidance for British divers/clubs so that they too may be encouraged to visit France by better understanding the rules and regulations that apply when diving in French waters. Our diving operations fully met the requirements set out by DRASSM as a condition of the formal permission to conduct the survey.

1.2 Aims and Objectives

Project aim

To investigate and record wrecks believed to be US Navy Landing Craft Tanks LCT(5) 458 and LCT(6) 593 and associated sites of vehicle cargo with the aim of positively identifying them.

Project Objectives

Objective 1: undertake diver visual recording of the wrecks and using photogrammetry techniques to develop surveys of the seabed archive – the resultant documentation should confirm the extent and preservation of the vessels. Information gathered will allow for the planning of future work and can be fed into historic asset management datasets and programmes.

Objective 2: to contribute to the knowledge of the archaeological sites through production of a field report and photogrammetry models to assist in the interpretation of remains underwater. The survey will create an archive, which can then inform future work and become a baseline for current condition surveys and may be of use to professional archaeologists, avocational archaeologists, volunteers without archaeological training and also for recreational divers who only want to visit the wreck and enjoy the experience.

Objective 3: To share the experiences of diving in France and the knowledge gained in respect of French diving laws and regulations so that British recreational divers are aware of their obligations and can plan accordingly.

The Project Cardonnet team investigated a number of wrecks associated with the WW2 Normandy Campaign which are believed to be associated with the invasion of UTAH beach. The wrecks are located in the western end of the Baie de Seine in the vicinity of the Banc du Cardonnet and were believed to be the wrecks of US Landing Craft Tanks LCT(5)458 and LCT(6) 593 and their associated cargos of armoured fighting vehicles, predominantly Sherman

[4] To be hosted on Sketchfab.com

DD tanks and M7 Priests. Wreck sites – 'Contacts' were selected by the review and analysis of side scan sonar data from the MC4 sponsored survey and SHOM chart data.

2. Methodology

2.1 Diving Methodology

We were aware that in order to record and document the wrecks we would require permission from the Département des Recherches Archéologiques Subaquatiques et Sous-Marines (DRASSM). This was a daunting task as communications and application forms were necessarily to be conducted in French. Thankfully the Google translate site proved to be fairly reliable but we also contacted a former club member (Alain Demairé) who kindly provided a much needed conduit for conversations and his support to our project was highly valued.

Cécile Sauvage at DRASSM advised that in order to conduct the project all divers were required to obtain certification by the Institut National Plongee Professionnelle (INPP) equivalence at Level 1B. This required medical endorsement from a Hyperbaric Doctor and CMAS 3* or HSE commercial diver equivalence. Of the 8 divers who applied for INPP certification 7 were awarded INPP Level 1B. The other recreational divers who were part of the group were not permitted to dive on the same site at the same time that the project divers.

2.2 Project and diving management

The official approval and authorisation to conduct Project Cardonnet[5] was received on 29 May 2017 (copy at Appendix 1). The project leader was Martin Davies and the appointed Dive Operations Manager was Alain Demairé. The project team members and their roles are set out in table 1 below.

A comprehensive dive plan and risk assessment and incident plan were produced as part of the approved project plan submitted to DRASSM for consideration. All members had third party liability insurance (BSAC) plus travel and medical cover.

Following approval by DRASSM the French Coastguard (Maritime Prefecture) were notified and a notice was issued to mariners to inform them that the survey was taking place. Two INPP certified divers were required during diving operations to provide surface / rescue cover.

Before the project began and prior to each dive a comprehensive briefing was given to all taking part. Relevant information was provided including;

• Diving team composition • Boat details, including safety equipment • Dive times to coincide with slackest possible water • Pre-dive planning using French diving tables to back up computer calculations • Risk assessment including a daily risk assessment • Daily operations plan and weather.

All boat and diving equipment used were certified as in test/service. Oxygen and first aid equipment, boat radios and navigation equipment were checked each day.

[5] Ministère de la Culture et de la Communication arrêté du 29/05/2017 No 2017 – 210 OA 3206. See Appendix 1.

Figure 1 Launching 'Southsea Explorer' at Grandcamp-Maisy. (©Alison Mayor)

We chose to conduct our operations from the small harbour at Grandcamp-Maisy. We believed the marina and slipway would provide an opportunity for 2 dives each day, at high and low water slack times.

Figure 2 The marina at Grandcamp-Maisy (©Alison Mayor)

The survey was planned to coincide with a good neap tide. However after the first dive it became apparent that the slipway could not be used at low water. This had a dramatic impact to our diving plans as essentially it meant we could not launch the boat, nor leave the harbour because there was not enough depth of water. The Normandy beaches have vast expanses of sand and it was not possible to access deeper water at low tide.

Name	Qualifications	French Equivalence	Role
Martin Davies	HSE Scuba Diver BSAC Advanced diver Assistant Open Water Instructor Diver Coxswain/Boat handler O2 Administration First Aid for Divers DSC VHF Radio operator Technical Diver - Open Circuit Mixed Gas Diver (Nx/He) Accelerated Decompression Procedures (80%) Advanced Nitrox Diver Gas Blender O2/N2/He Nautical Archaeology Society Introduction/Part 1 RYA level 2 Powerboat RYA International Certificate of Competence RYA Day Skipper Compressor Operator/Instructor Automated External Defibrillator AED	INPP Level 1B* CMAS 3* diver BS EN 14153-3 ISO 24801-3	Project Leader Diving Officer for SSAC Photographer
Alain Demairé	MF2, DE plongée. Anteor and Nitrox advanced instructor, Instructeur Régional PM CMAS 3*** Instructor	INPP Level 1B* MF2 and Instructeur Régional CMAS 3*** Instructor	Diving Operations manager Survey Diver.
Doug Carter	BSAC Advanced diver Nautical Archaeology Society Introduction/Part 1 VHF/DSC radio operator Compressor Operator	INPP Level 1B* CMAS 3* diver BS EN 14153-3 ISO 24801-3	Survey Diver
Jim Fuller	BSAC Advanced diver BSAC Open Water Instructor VHF Radio Operator Nautical Archaeology Society Introduction/Part 1 O2 Administration First Aid for Divers Automated External Defibrillator AED RYA Power boat Level 2 Compressor Operator/Instructor	INPP Level 1B* CMAS 3* diver CMAS 2* Instructor BS EN 14153-3 ISO 24801-3	Survey Diver
Alison Mayor	BSAC Advanced diver Assistant Open Water Instructor Technical Diver - Open Circuit Mixed Gas Diver (Nx/He)	INPP Level 1B* CMAS 3* diver BS EN 14153-3	Surveyor Diver Photographer Report writer

	Accelerated Decompression Procedures (80%) Advanced Nitrox Diver Gas Blender O2/N2/He Compressor Operator Practical Rescue Management First Aid for Divers Oxygen Administration Chart work and Position Fixing RYA Powerboat Level 2 Underwater photographer Automated External Defibrillator (AED) Nautical Archaeology Society Intro, Part 1&2 Fellow of the Nautical Archaeology Society SeaSearch Observer	ISO 24801-3	
Tom Templeton	BSAC Advanced diver BSAC Open Water Instructor Boat Handling Diver Coxswain Award O2 Administration VHF Radio Certificate RYA Powerboat Level 2 Mixed Gas Blender Instructor Explorer Mixed Gas Diver Instructor (60m) Compressor Operator/Instructor	INPP Level 1B* CMAS 3* diver CMAS 2* Instructor BS EN 14153-3 ISO 24801-3	Survey Diver Photographer

Table 1 Project team and roles.

In addition, valuable logistical support was provided by Jenny Watkins, Robert Watkins and Alison Bessell. Historical and hydrographic expertise was provided by Chris Howlett.

2.3 Survey Methodology

Survey methods used in this survey included swim-over surveys to get a general impression of the wreck, and site recording using photography and video. The main reason for using photography was to be able to produce 3D images using photogrammetry[6]. Photogrammetry uses methods from many disciplines, including optics and projective geometry. Digital image capturing and photogrammetric processing includes several well defined stages, which allow the generation of 2D or 3D digital models of the object as an end product.

[6] Photogrammetry has been defined by the American Society for Photogrammetry and Remote Sensing (ASPRS) as the art, science, and technology of obtaining reliable information about physical objects and the environment through processes of recording, measuring and interpreting photographic images and patterns of recorded radiant electromagnetic energy and other phenomena.[1]

Images were processed using AGISOFT PhotoScan to produce 3D visualizations that can be converted to a pdf image and viewed using ADOBE pdf reader (via Google Chrome). Ultimately be viewed using Virtual Reality (VR) technology for a fully 'immersive' experience.

Photogrammetry relies on a disciplined approached to the survey process and is particularly challenging when underwater visibility and light penetration is poor. A degree of overlap and recognizable points assists the photogrammetry software to process multiple points (pixels) in a geometric space. In the underwater environment marine growth, movement and current provide additional challenges to obtaining a series of images that are capable of generating a 2D or 3D image.

Figure 3 Typical survey equipment used for the project. (© Martin Davies)

Additional survey equipment such as scale bars and unique circular 'targets' can help the software to identify control points and assist in the creation of the image. Targets are placed around an object. Each target has a unique identification symbol.

Figure 4 Use of photogrammetry targets (© Martin Davies)

Before each dive a survey strategy was briefed detailing the objectives for each diving pair and each site. Where known the relevant information on the vessel's history and possible orientation/features were included. Other sources were used to expand the details of the vessels, most particularly results of the MC4 surveys and Wreck Site at www.wrecksite.eu.

Following the dive, log sheets were completed and archived. From the log sheets it was possible to develop plans for future work. Recording sheets were those recommended by DRASSM Survey record sheets.

As this project was a non-disturbance survey project a finds index was not appropriate.

2.4 Skills Developed

Most of the work done was by video and photography. However the low visibility and poor light penetration proved challenging in obtaining photographs that could be used for the photogrammetry process. Numbered individual discs that assist with photograph alignment provided some benefit as did scale bars which also proved useful as a rough measurement guide underwater.

At the end of the diving day a debriefing session and log completing session allowed discussion of results and made sure that the record of the day's diving could be used to contribute to the outcomes of the project.

The collaborative feedback was really useful in helping people to understand what they had been recording and resulted in increased understanding of what had been observed and recorded. Where possible images were viewed to help identify key features of the wrecks.

2.5 Post Survey Tasks

The major post survey task was the processing of photographs to produce the photogrammetry 3D images.

At one site we observed what we believed to be a significant number of ammunition boxes. Details of the site and photographic images were reported to the Maritime Prefecture in accordance with the instructions from DRASSM.

Diving was not possible on two of the days due to adverse weather conditions. This was an ideal opportunity to visit museums and other places of interest in order to conduct research but also to better understand the context and challenges that were present during the historic events of 1944.

We also took the opportunity to locate and visit memorials and cemeteries that commemorated those who were killed or missing in action in order that we could pay our respects.

Figure 5 Some of the 14000 graves at the US cemetery (© Tom Templeton)

3. Project Results – Wreck Surveys

3.1 Summary

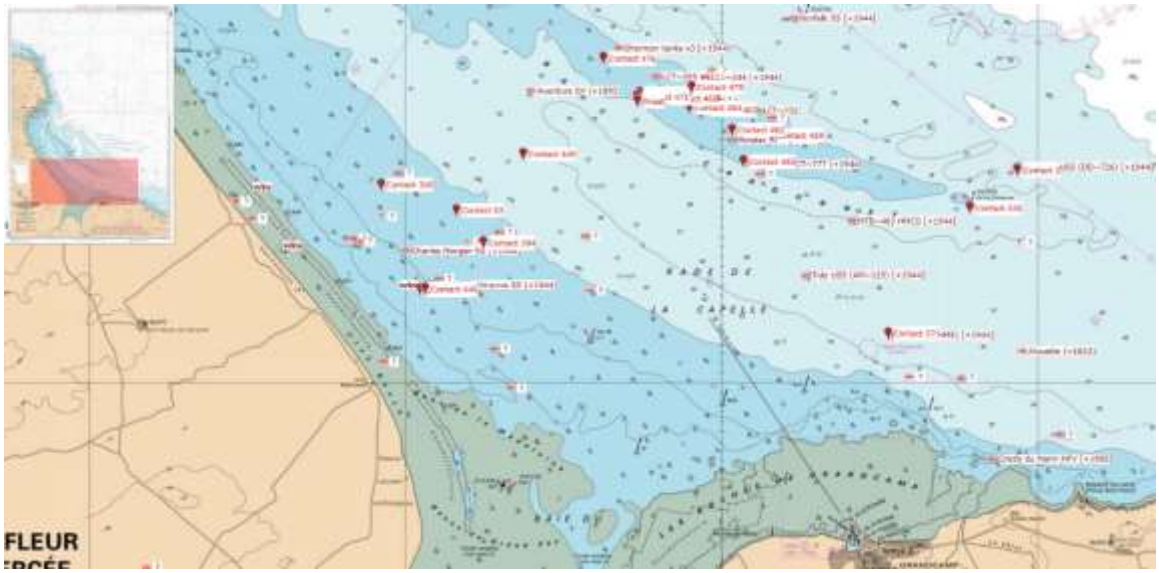

Figure 6 Extract from SHOM chart 7422 (De La Pointe de Barfleur a la Pointe de la Percee)

From our base of operations at Grandcamp-Maisy marina we had planned a total of 6 days of diving with opportunities to visit the selected sites on multiple occasions. However we were unable to complete this plan due to a combination of adverse weather and tidal conditions.

A total of 4 days of diving were achieved (25 individual dives) visiting six different wreck sites (Contacts). We were able to visit the majority of sites planned we were only able to dive them once and this severely limited the survey plans. On the final day of diving we were able to dive 3 different sites, this was achievable because the sites are extremely close together.

Two days were lost for adverse weather and as described earlier our proposed second dives each day (low water) could not be achieved. However the slack water periods were better than expected which meant that we could manage the diving operations to ensure safety cover was available in accordance with the dive plans. Underwater visibility also proved a challenge from the presence of plankton and other particulate matter in the water.

Despite the severe impact to the diving and survey plan a remarkable amount of data was successfully recorded which will help inform greater understanding of these sites.

Our findings from each dive site are summarised below:

3.2 Dive 1 - Contact 468

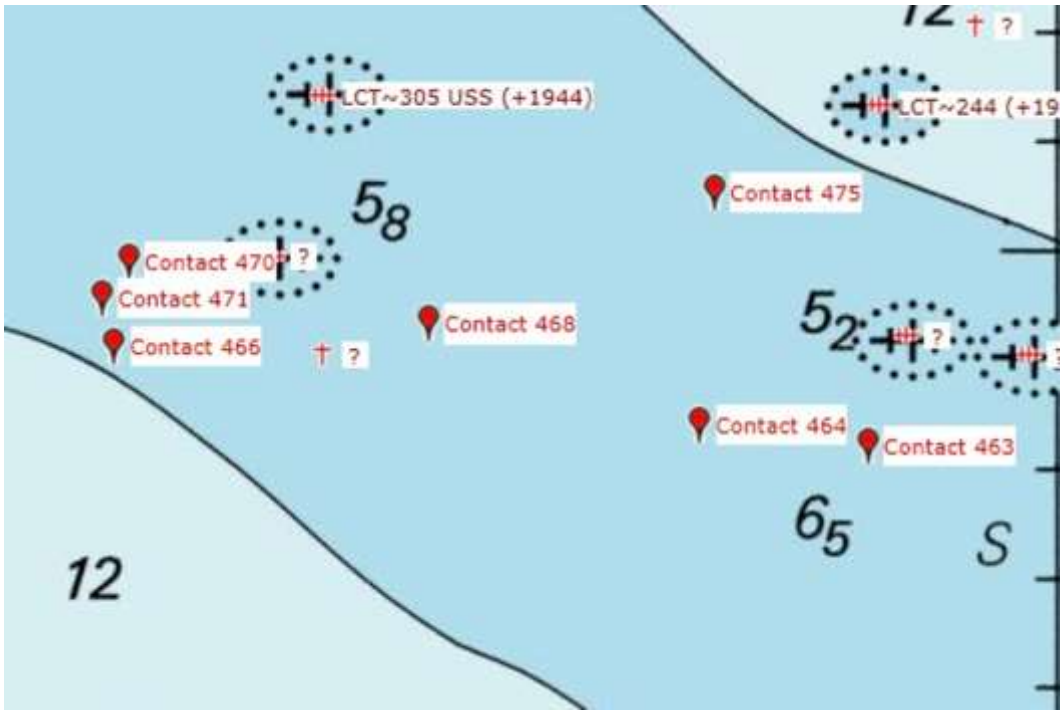

Figure 7 Extract from SHOM chart 7422 showing the position of Contact 468

Description: Buried wreck remains. Probably the remains of either LCT(5) 458 or LCT(6) 593.
Position (WGS 84): Latitude 49° 27.941760' N Longitude 1° 5.886300' W
Maximum Depth recorded on dive: : 14.1m
General height from sea bed 1.2m
Site Dimensions : 34.91m x 11.95m

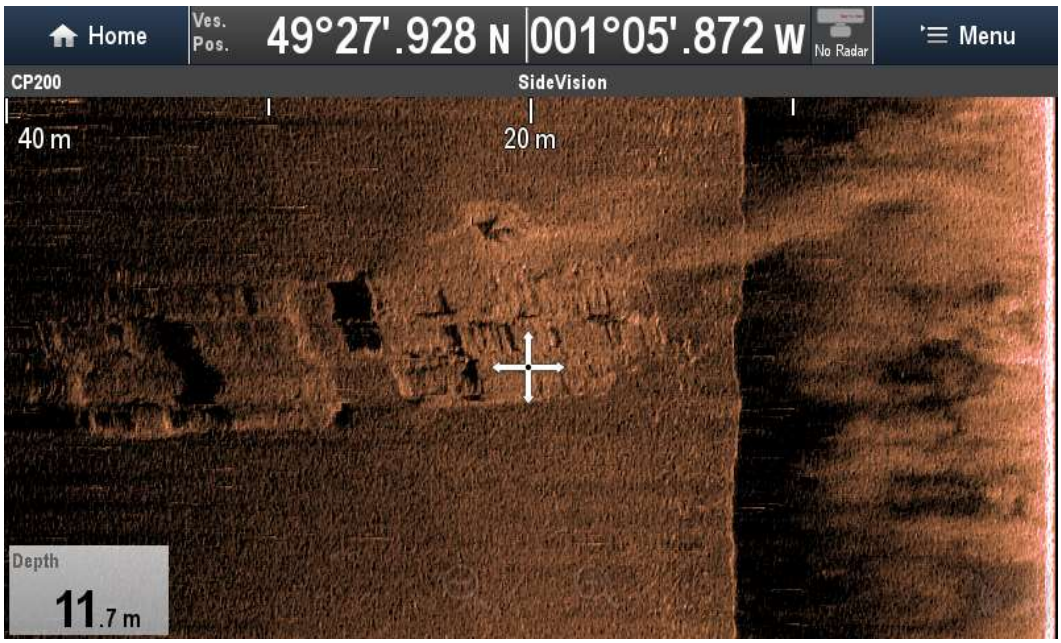

Figure 8 Side scan image of contact 468 taken from Southsea Explorer

The size and composition of this wreck site was consistent with that of a WW2 Landing Craft Tank with a flat bottomed hull comprised of 3 distinct sections. It is noted that most US built LCTs were constructed in 3 sections. The wreckage was dispersed over a flat sandy seabed with few recognisable features. The conditions on the dive were very poor (visibility 1-2m) and dark. However some key features were observed in particular;

- Bow door/ramp
- Engine
- Winch
- Various bollards
- Section of bridge (partly buried)
- Steering quadrant

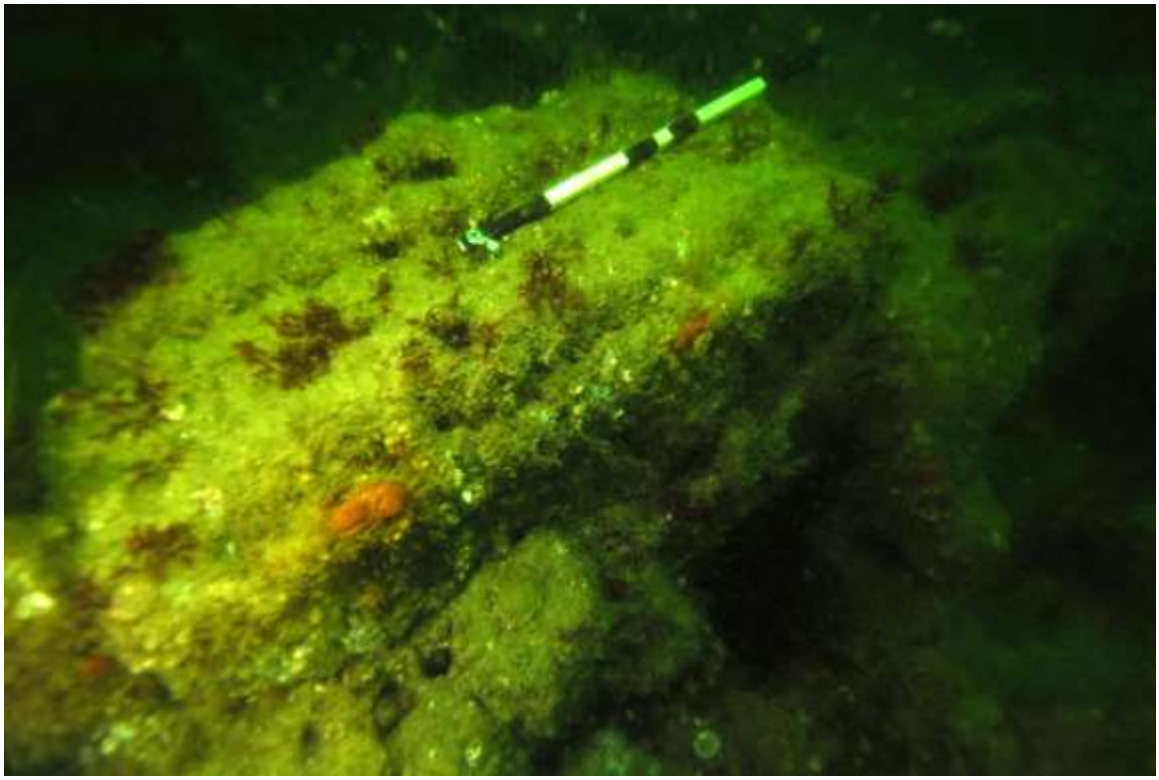

Figure 9 Engine block (© Alison Mayor)

Figure 10 Winch or capstan (© Martin Davies)

Figure 11 Steering quadrant (© Martin Davies)

There was no evidence of any cargo or vehicles present.

As can be seen from the above photographs the conditions were poor for photography and the wreck features are better viewed on the video.

The significant feature found here was the door ramp used to assist the launch of DD tanks.(see video MVI_5089 05:15 and 15:30). Only Mk 6 versions of US LCTs had this feature specifically designed for launch of Sherman DD Tanks.

Relevant video files : MVI_5089, MVI_5090 and MVI_5091 (Tom Templeton)

The location of this wreck and the nature of the wreckage are consistent with a US LCT lost during Operation NEPTUNE however the bow door DD launching feature specifically leads us to conclude that this may be the wreck of an LCT(6).

3.3 Dive 2 - Contact 464

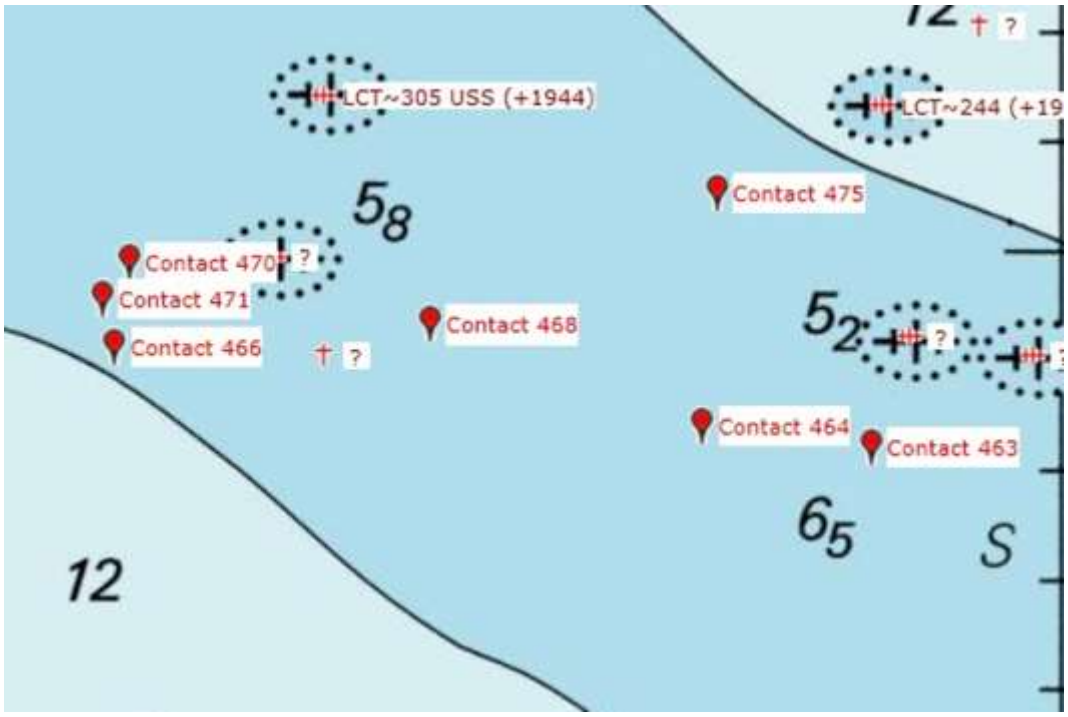

Figure 12 Extract from SHOM chart 7422 showing the position of Contact 464

Description: Buried wreck remains. Probably the remains of either LCT(5) 458 or LCT(6) 593.
Position (WGS84) : Latitude 49° 27.849000' N Longitude 1° 5.504340' W
Maximum Depth recorded on dive: 16m
General height from sea bed: 1.2m
Site Dimensions: 44.26m length x unknown width

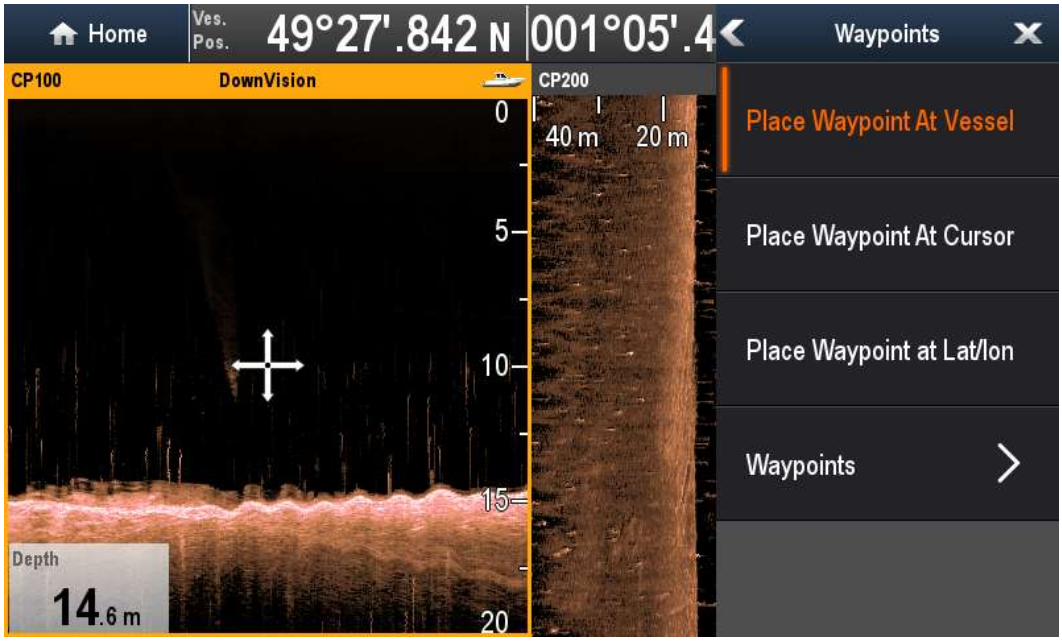

Figure 13 'Down Vision' view from Southsea Explorer sonar equipment.

This site appeared to be another flat hulled, vessel, almost certainly another Landing Craft of some description. Again it was partially buried resting on a sand seabed and broken into at least 2 possibly 3 separate sections.

The key observation from this dive was the significant amount of what appeared to be ammunition boxes (30+). Also observed were a large capstan and winch which appeared to be upside down. No propulsion mechanism or engine were observed however visibility and light conditions were again poor.

Some limited Photogrammetry was possible on this site, namely some of the ammunition boxes. Screen shots from the 3D models (plan view and side view are below.

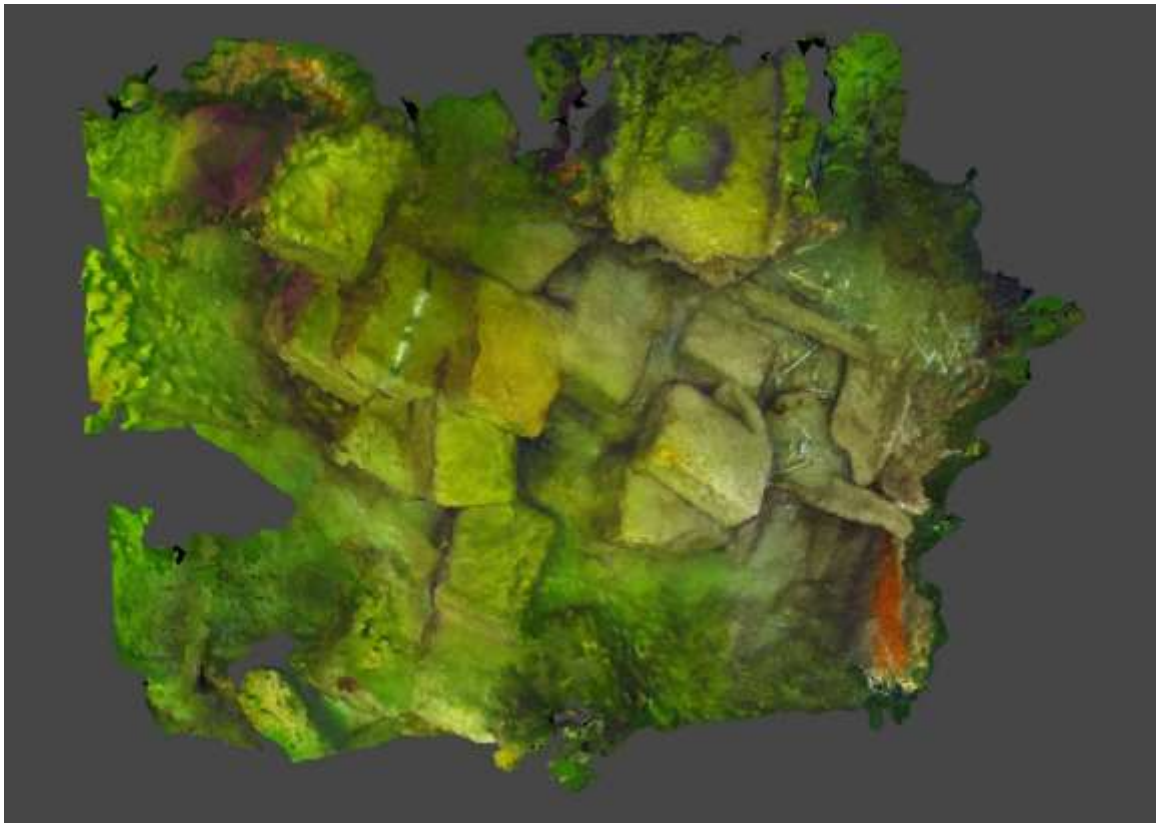

Figure 14 Plan view from photogrammetry model showing ammunition boxes. (© Martin Davies)

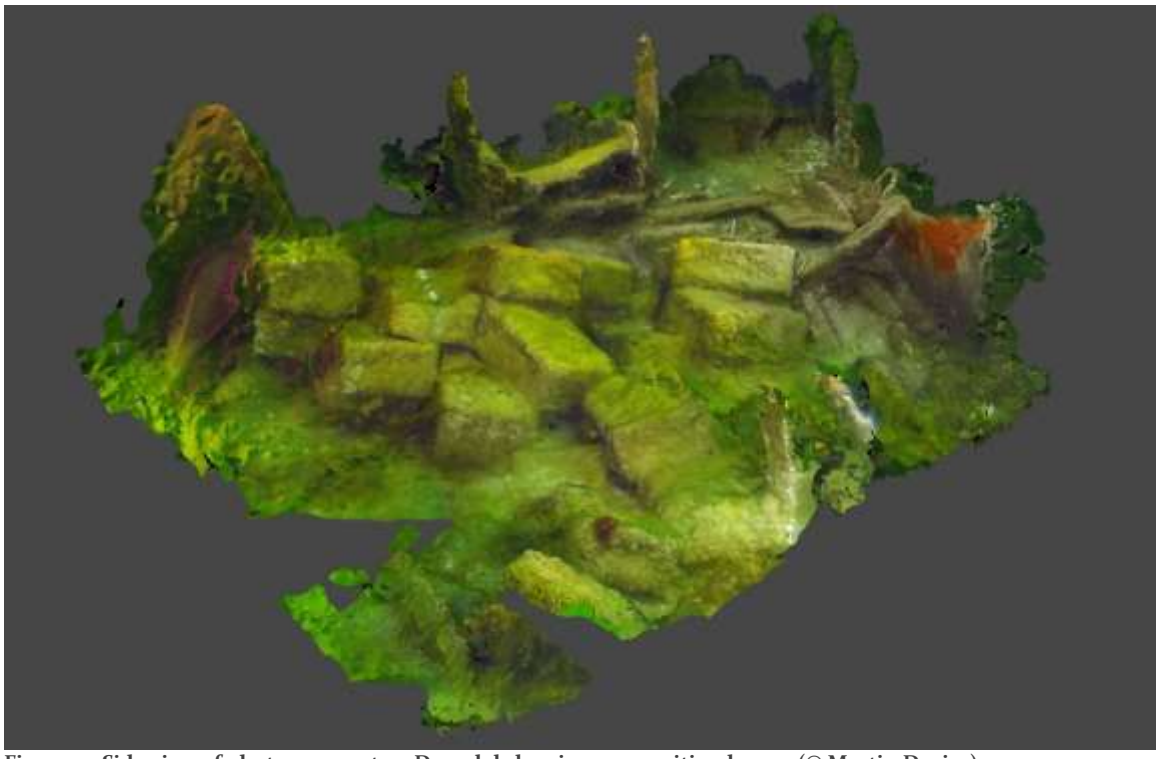

Figure 15 Side view of photogrammetry 3D model showing ammunition boxes. (© Martin Davies)

In accordance with DRASSM instructions we notified the appropriate authorities[7] of the possible presence of munitions on this site. Copies of relevant photographs were also supplied. At this point in time we are not aware of what action, if any has been taken, or indeed whether the boxes do indeed contain ammunition. It may help with vessel identification if we could establish what type of ammunition was contained in the boxes.

Relevant video MVI_5093, MVI_5094 and MVI_5095 (Tom Templeton)

Relevant Photogrammetry Images: Target 464 Cargo.pdf (Martin Davies)

In summary, we were unable to identify this wreck from the limited time spent on site. However it is likely to be a Landing Craft, though what type (Mk 5 or 6 or other) we do not yet know. The only cargo that appeared to be present was ammunition. We await information as to the action taken and if possible the type of ammunition that was present as this may help identify the craft from loading tables.

[7] Centre des opérations maritimes de Cherbourg (comar-manche.off-permanence.fct@intradef.gouv.fr) copied to CROSS Jobourg jobourg@mrccfr.eu), and Préfecture maritime.

3.4 Dive 3 - Contact 475

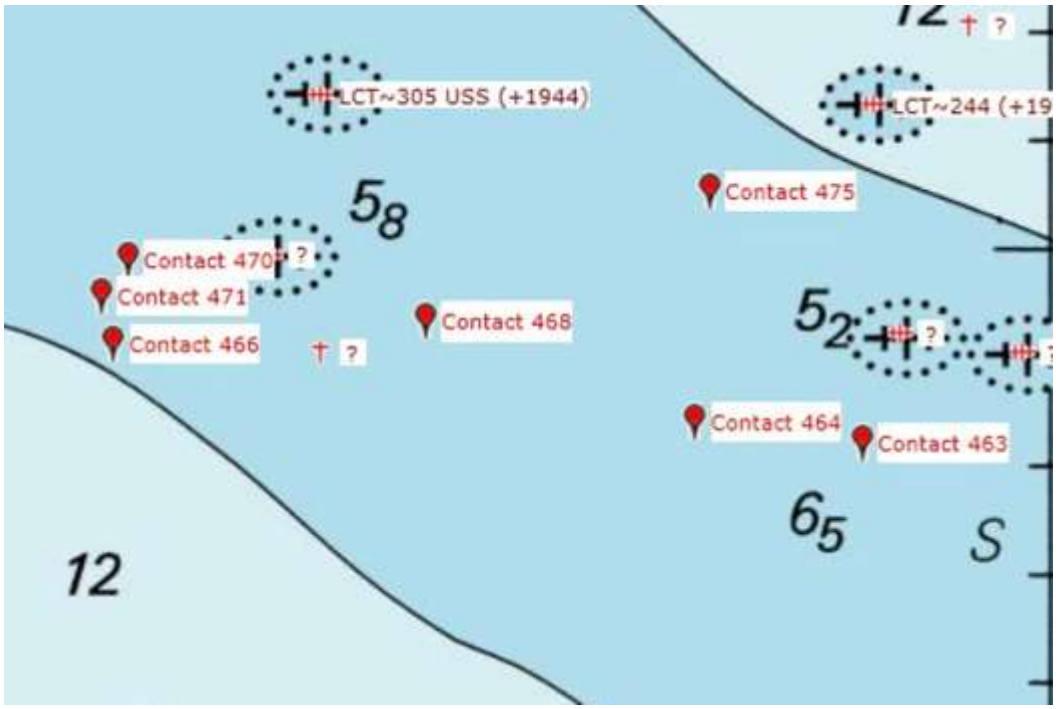

Figure 16 Extract from SHOM chart 7422 showing the position of Contact 475.

Description: Buried wreck remains. Probably the remains of either LCT(5) 458 or LCT(6) 593.
Position (WGS 84): Latitude 49° 28.061340' N Longitude 1° 5.486580' W
Maximum Depth recorded on dive: 17.3m
General height from sea bed 1.2m
Site Dimensions: 29.75m x 14.65m

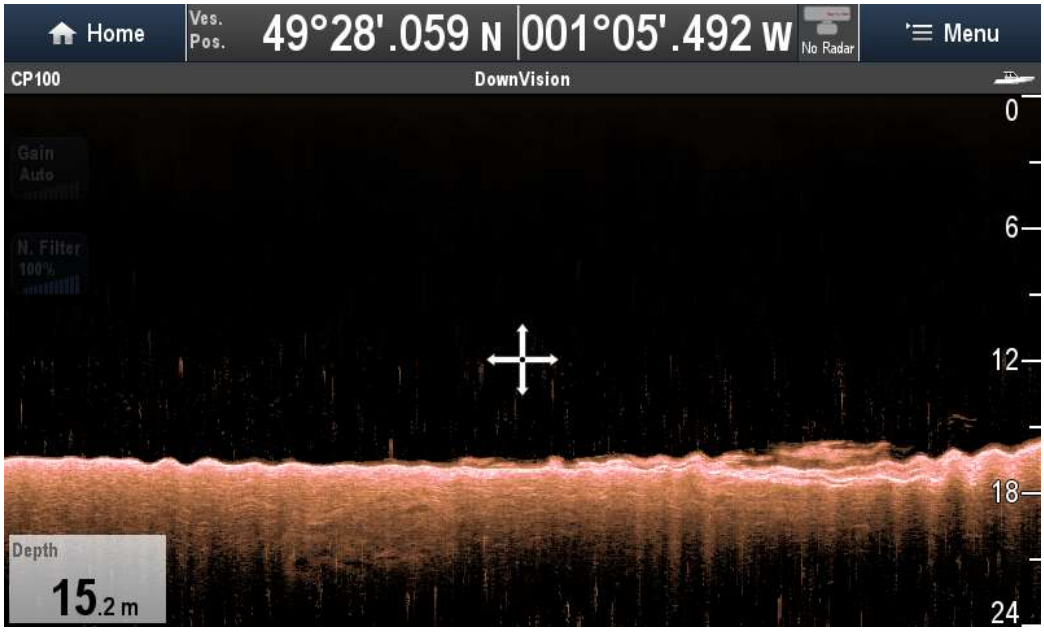

Figure 17 'Down Vision' view from Southsea Explorer sonar equipment.

The third Tank Landing Craft wreck site of our survey project. Despite being rather deeper we were pleasantly surprised to find the extra depth meant that conditions for this dive were slightly better than our previous dives with visibility 2-3 m.

The sea bed was again very sandy and the wreck was partially buried. The wreck had a similar construction to those dived on the previous days however there were more items of interest visible; specifically,

- Engine
- Winch
- Motor/Generator
- Bridge section
- Bollards and cleats
- Stern anchor launch slip with fairlead.
- Upturned Anti-Aircraft gun mounting base

Relevant video MVI_5093, MVI_5094 and MVI_5095 (Tom Templeton)

Relevant Photogrammetry Images: Landing Craft Site Target 475.pdf ;(Martin Davies)

Landing Craft Site Model 2 Target 475.pdf (Martin Davies)

view 3D image via this link - sketchfab

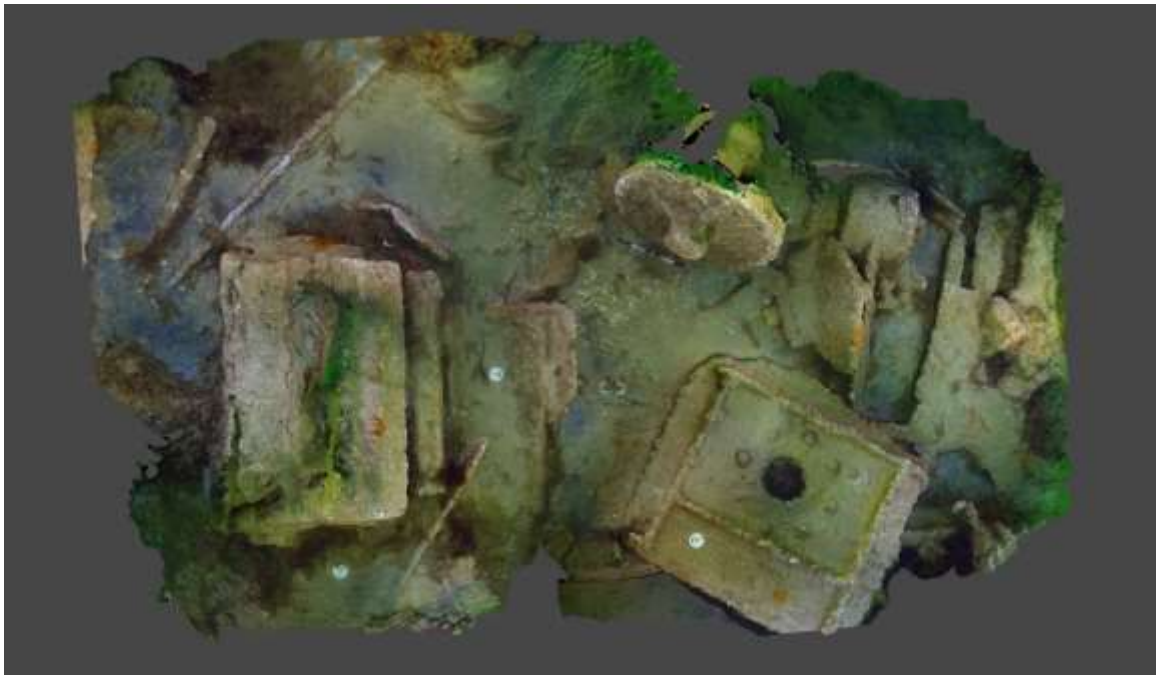

Figure 18 Photogrammetry image (Plan view) of part of wreck (© Martin Davies)

Figure 19 Side view of site from photogrammetry image. (© Martin Davies)

Figure 20 View of winch/capstan from photogrammetry model. (© Martin Davies)

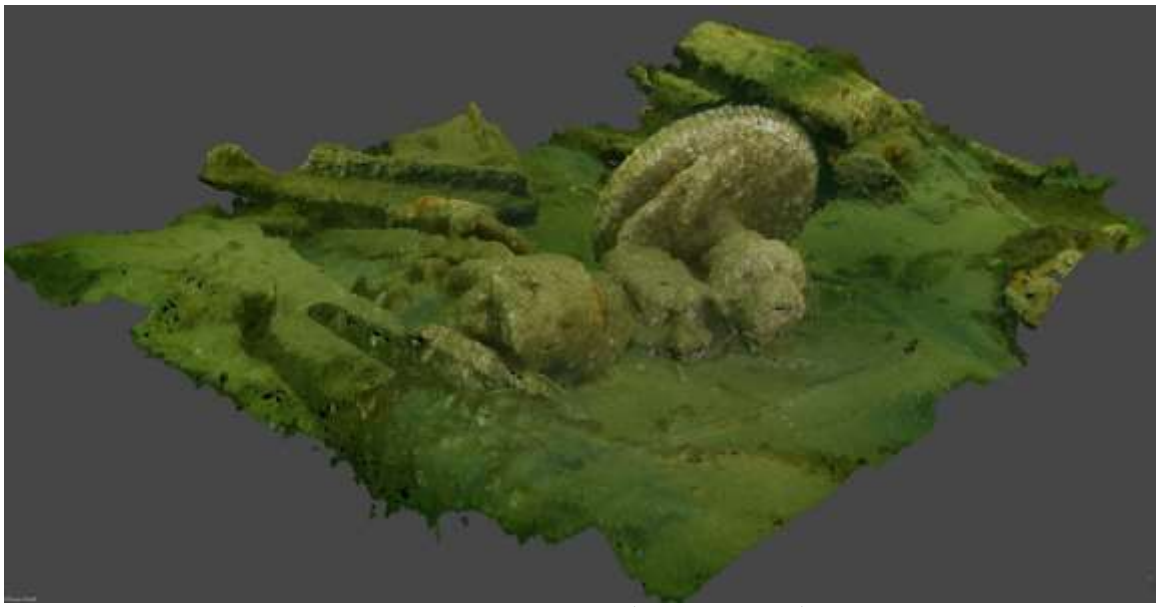

Figure 21 photogrammetry view of winch/capstan and engine. (© Martin Davies)

Figure 22 Photogrammetry view of motor. (© Martin Davies)

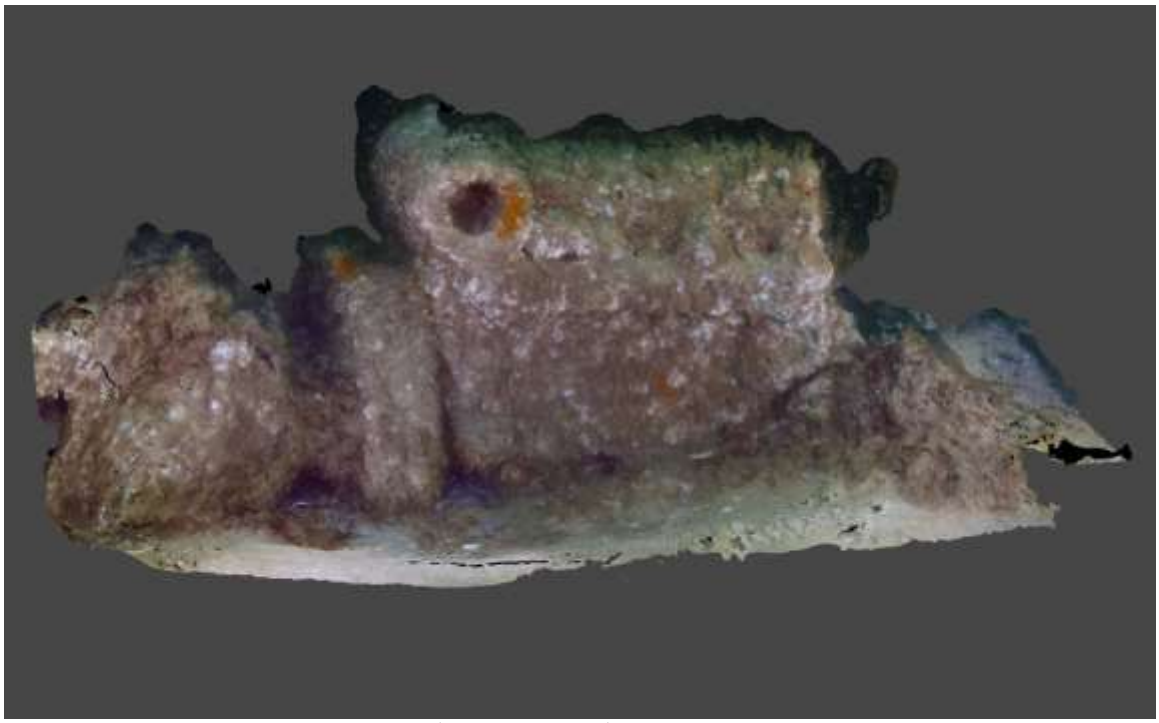

Figure 23 Photogrammetry view of motor. (© Martin Davies)

No vehicles or other cargo artefacts were observed. The bow door ramp was not seen.

As can be seen in the photogrammetry models the general arrangement of the wreck site closely resembled that of a LCT(6) and particularly the port side. The presence of a gun mount, engine, winch, motor, and anchor slip/fairlead plus the bridge section aligned closely to the construction drawing and photograph below at paragraph 5.3.

3.5 Dive 4 - Contact 471

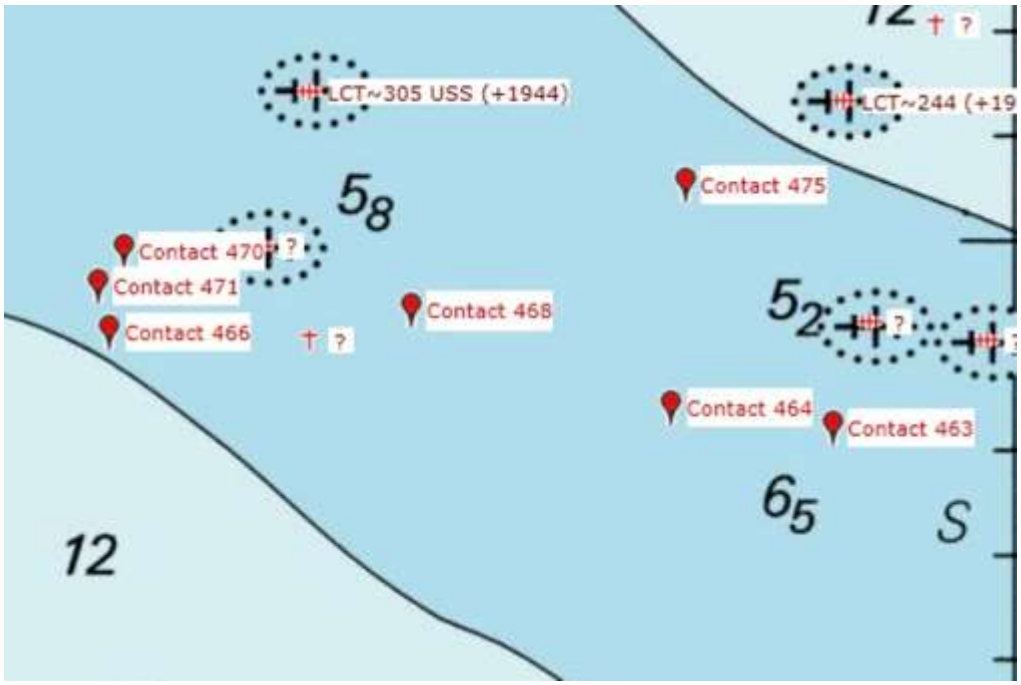

Figure 24 Extract from SHOM chart showing contact site 471

Description: 3x M7 Priests and vehicle remains. Several vehicle wheels lie around the Priests. Vehicles have disintegrated leaving axles and engine blocks only. Vehicles were: 4x M-10 ammunition trailers, 2x 2.5 ton trucks, 2x 3/4 ton weapons carrier and 3x Jeep.
Position (WGS 84): Latitude 49° 27.964320' N Longitude 1° 6.343740' W
Maximum Depth recorded on dive: 15.3m
General height from sea bed 1.5m

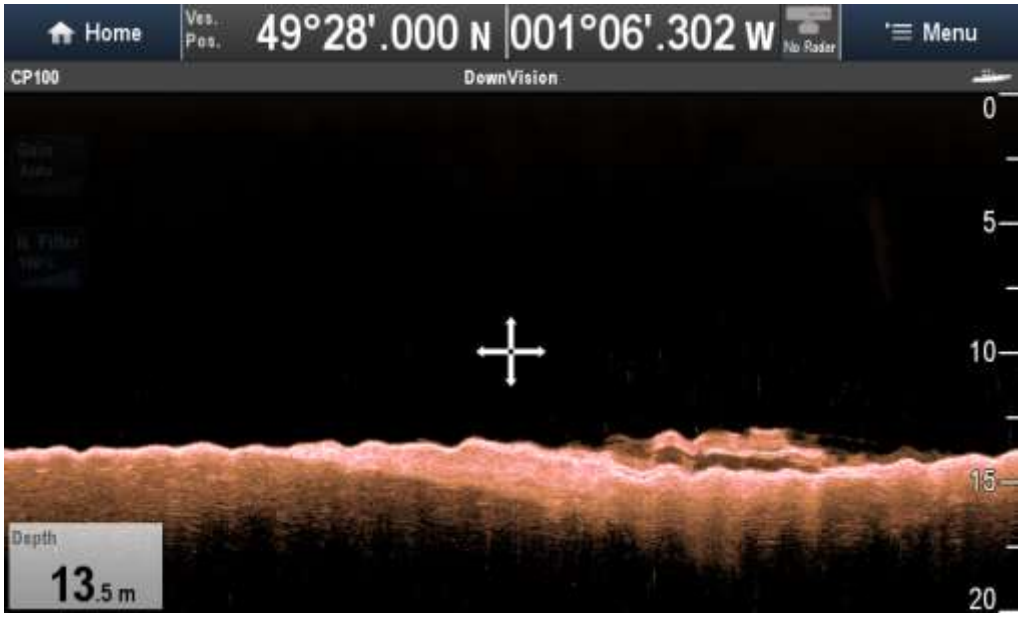

Figure 25 'Down Vision' view of site from Southsea Explorer sonar equipment.

This site comprised of three armoured fighting vehicles believed to be M7 self-propelled 105mm Howitzer guns plus a debris field of other vehicle assemblies just forward of the M7s. Two of the M7s were resting upright on the sea bed slightly parallel to each other and a third just ahead. In front of the M7s various parts of vehicles could be found, including tracks. It is believed that the vehicles are M3 'half-tracks' due to the presence of tracks at the site. This would align with the list of vehicles described in the loading tables for LCT(5) 458 at Annex C.

Relevant video: MVI_5144 (MP4 file) (Tom Templeton)

Relevant photogrammetry images: Half Track Site target 471.pdf (Martin Davies)

M7 target 471.pdf (martin Davies)

View 3D image here via sketchfab

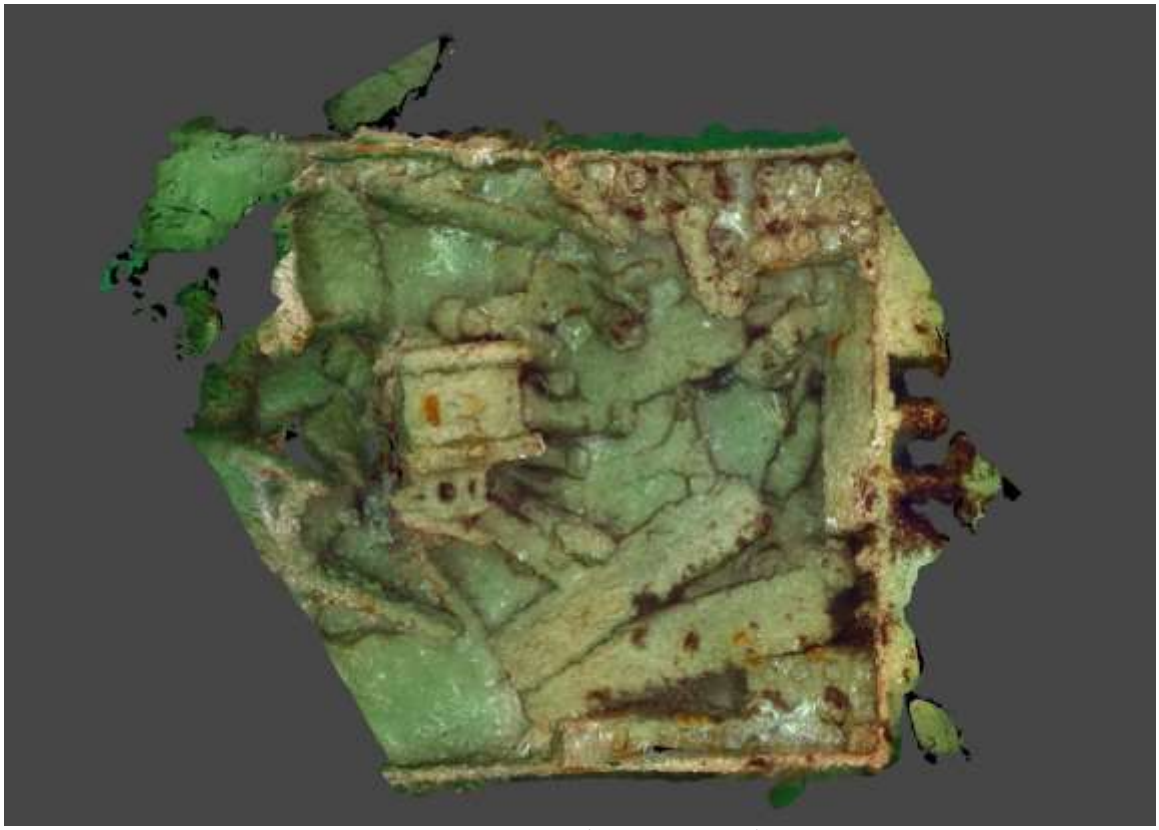

Figure 26 Photogrammetry Plan view of top of M7 Priest. (© Martin Davies)

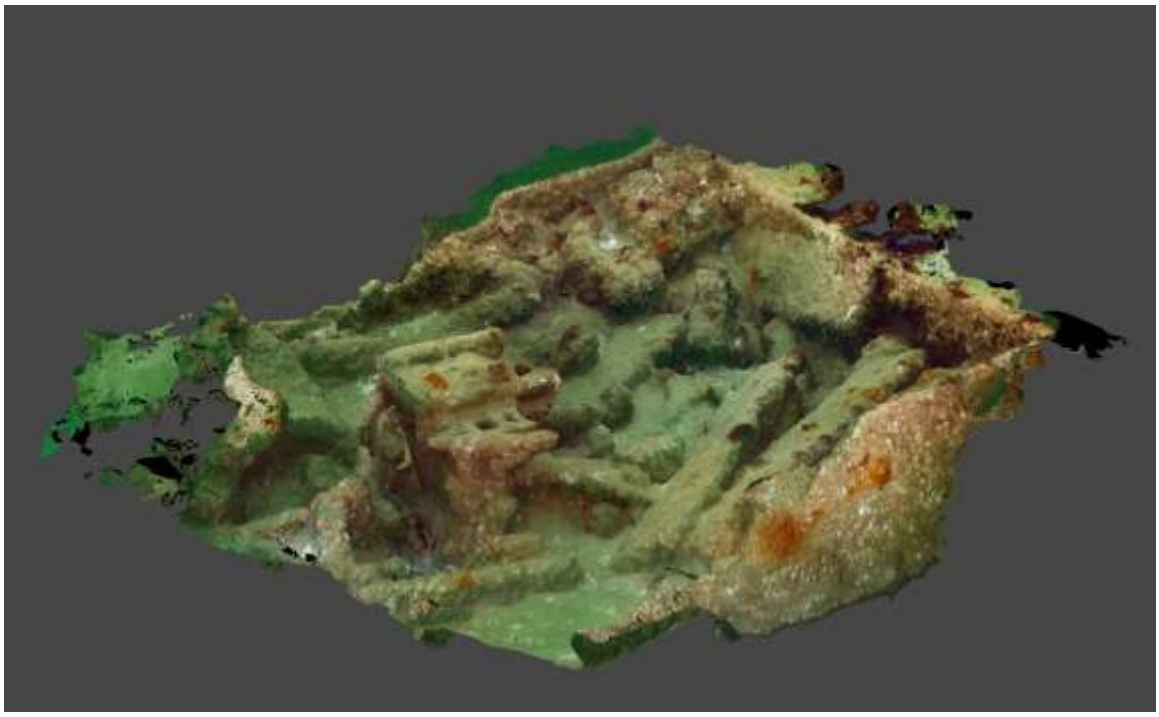

Figure 27 Side view of photogrammetry top of M7 Priest. (© Martin Davies)

Figure 28 Photogrammetry plan view of vehicle debris field. (© Martin Davies)

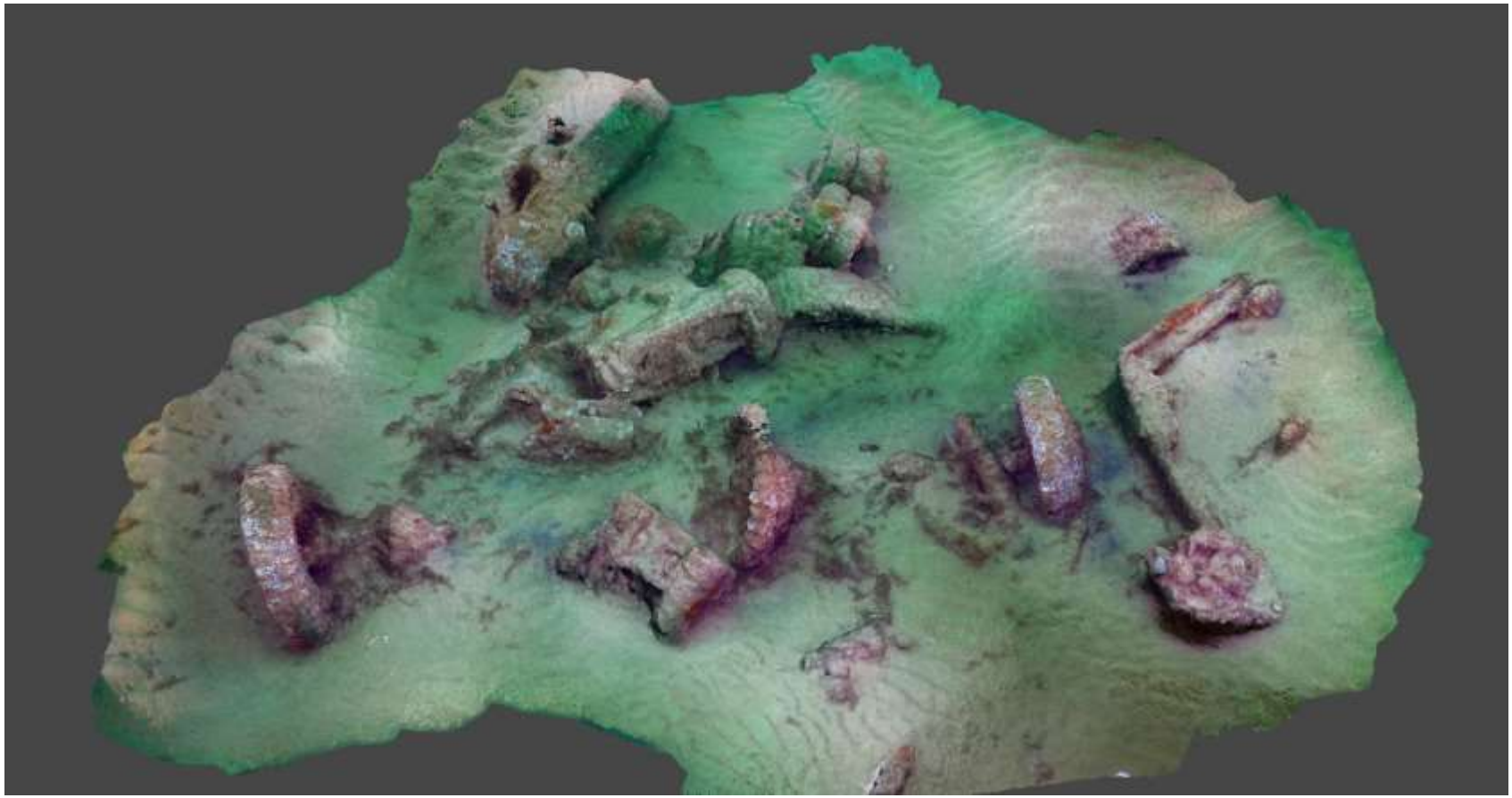

Figure 29 Photogrammetry side view of vehicle debris field. (© Martin Davies)

3.6 Dive 5 - Contact 470

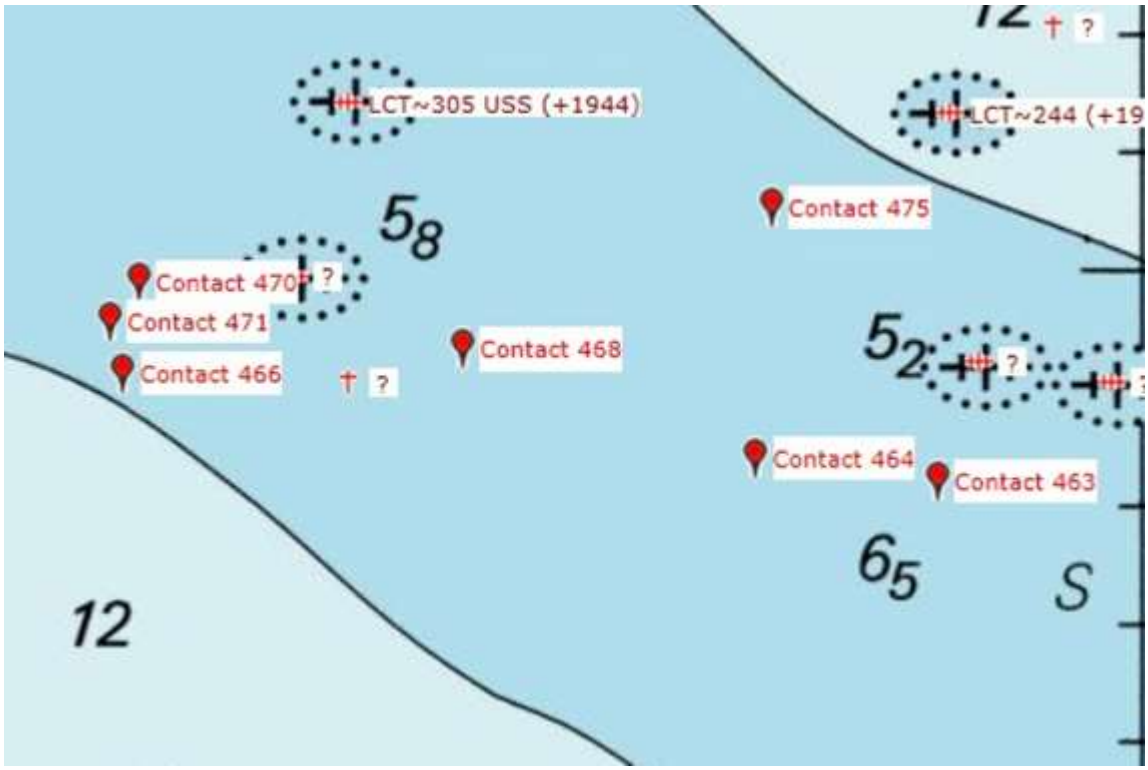

Figure 30 Extract from SHOM chart showing position of contact site 470.

Description: Possible tank
Position (WGS84): Latitude 49° 27.998' N Longitude 001° 06.307' W
Maximum depth recorded on Dive: 14.2m

Figure 31 M7 105mm Howitzer Self Propelled Gun.

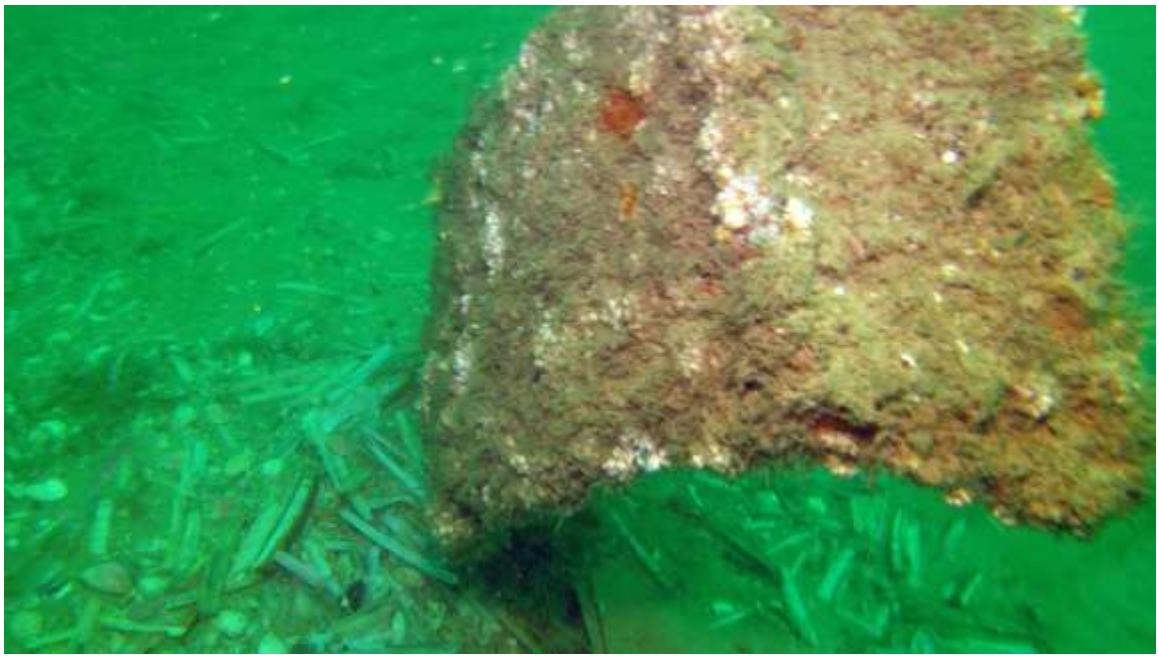

Figure 32 The curved metal 'pulpit' on the sea bed.

This wreck (470) is just 78m away from Contact 471 and 146m from Contact 466. The wreck was confirmed as that of an M7 105mm Howitzer self-propelled gun sitting upright with the undercarriage, tracks and wheels partially buried in the sand. The remains of the curved metal 'pulpit' as found on the right hand side near the front of the wreck.

Relevant video: GOPR7681 GOPR7731

3.7 Dive 6 - Contact 466

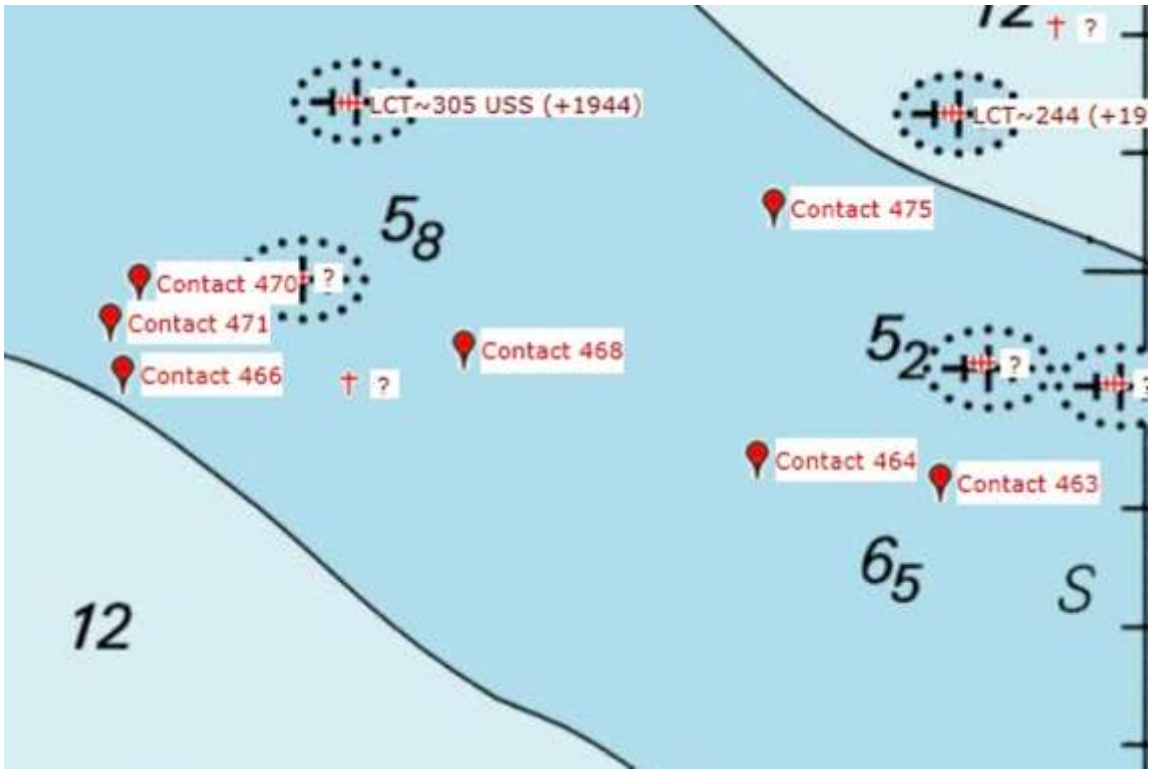

Figure 33 Extract from SHOM chart showing position of Contact site 466

Description: Wreck – possible Landing Craft Tank
Position (WGS84) :Latitude 49° 27.921'N Longitude 001° 06.329'W
Maximum depth recorded on dive: 14.6m
Site dimensions : 14m x 4.9m(?)

This site (466) is 84m (345°) away from Contact 471 and 146m (008°) from Contact 470. The wreckage is that of the bow of a Landing Craft Tank, and ramp. The metal is degrading and holes are starting to appear. There is some evidence of metal being bent as a result of explosion. (see video 2' 40")

There is a noticeable curve to the structure that is consistent with the bow of an US LCT and also a chain sheath which would have been part of the door release mechanism. Approximately 50cm in length it resembles that illustrated on the LCT(5) schematic at paragraph 5.2.

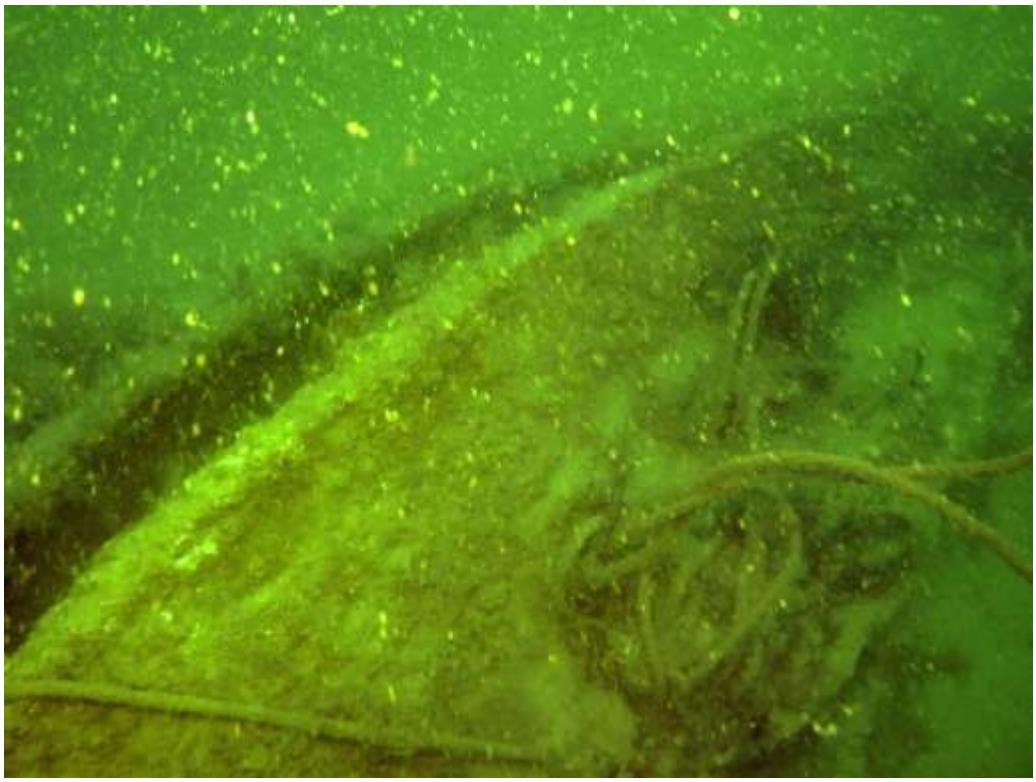

Figure 34 The curve of the wreck hull. (© Jim Fuller)

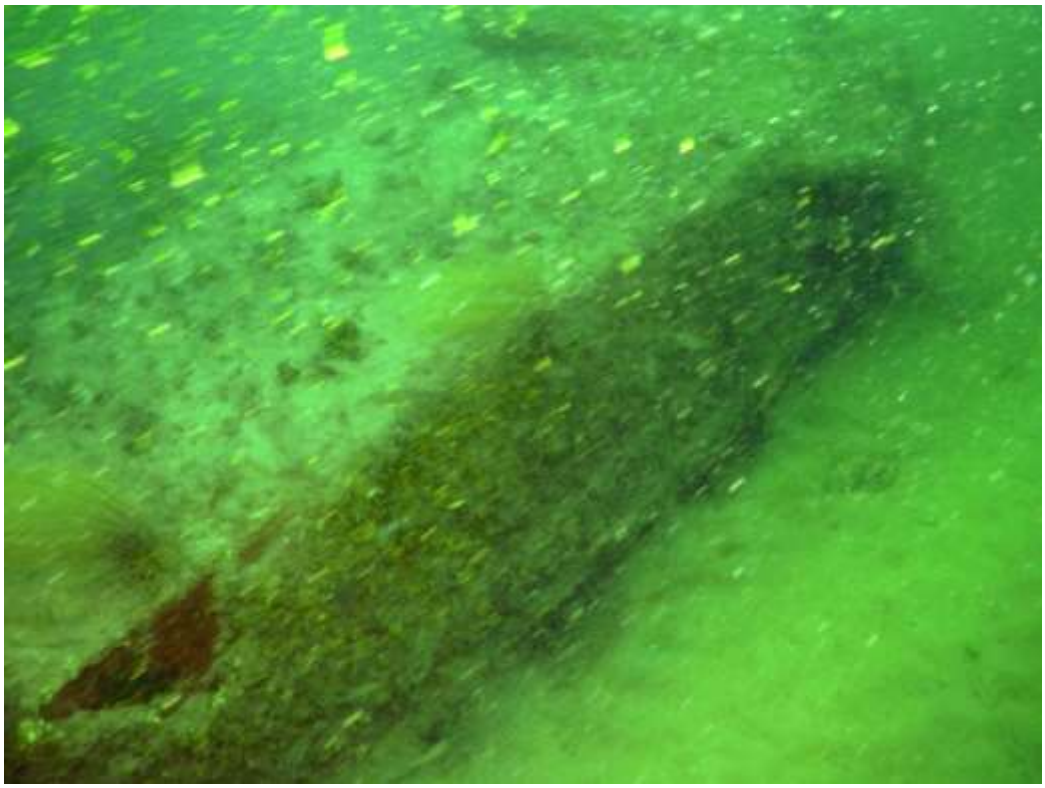

Figure 35 The curved side of the bow ramp. (© Jim Fuller)

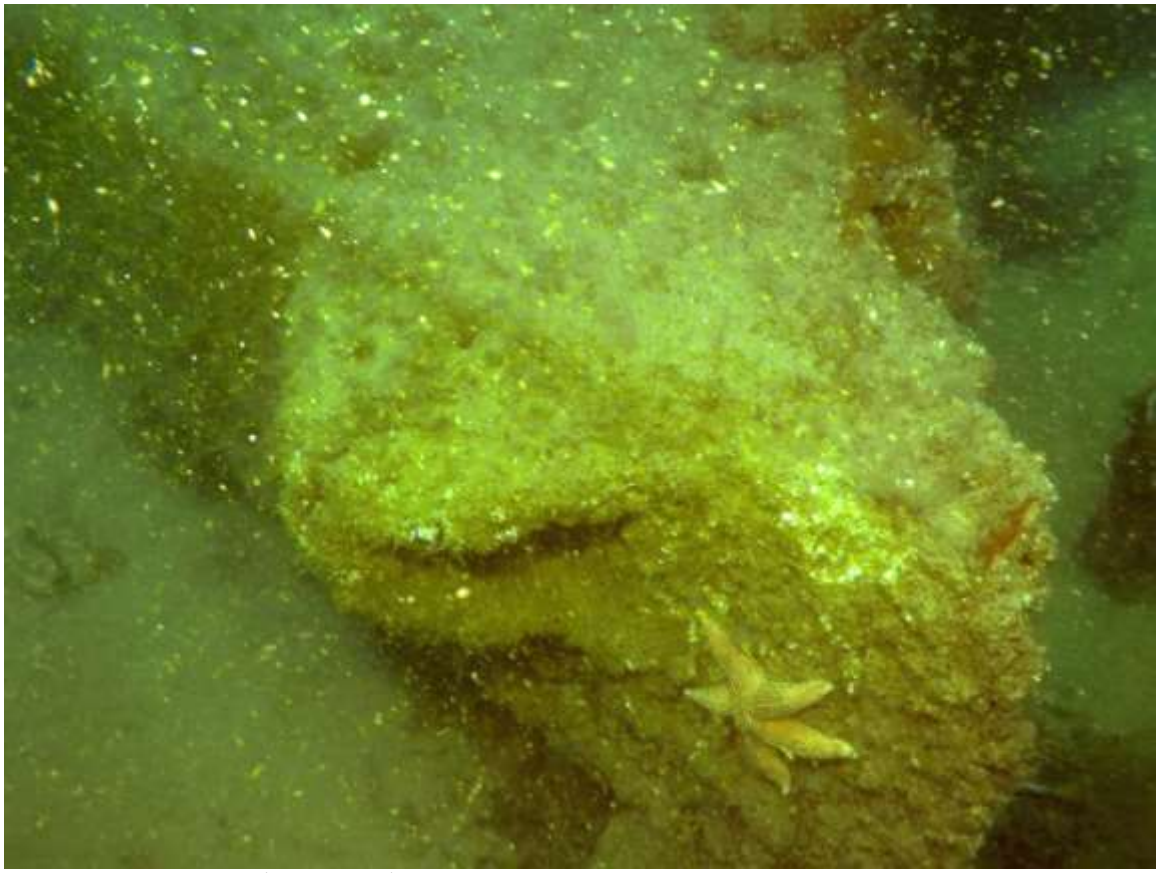

Figure 36 A chain sheath (© Jim Fuller)

Relevant Video: Contact 466 (Jim Fuller)

4. Operation NEPTUNE, Force U and the Loss of LCT(5) 458, LCT(6) 593 and LCT(6) 597

4.1 Operation NEPTUNE

Our project examines the loss of two LCTs and their cargo of armoured fighting vehicles which were part of Force 'U' due to land at UTAH beach. Both LCTs were lost before they could deliver their valuable cargo due to contact with German mines. The wrecks of these LCTs and their cargo are believed to be located on the Banc du Cardonnet. However our investigations have led us to examine a third Landing Craft Tank which was also reported as being sunk on 6 June 1944.

The Normandy landings (codenamed Operation NEPTUNE) were the landing operations which began on 6 June 1944 (termed D-Day) of the Allied invasion of Normandy in Operation Overlord during World War II.

The amphibious landings were preceded by extensive aerial and naval bombardment and an airborne assault—the landing of 24,000 American, British, and Canadian airborne troops shortly after midnight. Allied infantry and armoured divisions began landing on the coast of France at 06:30. The target 50-mile (80 km) stretch of the Normandy coast was divided into five sectors: UTAH, OMAHA, GOLD, JUNO, and SWORD. Strong winds blew the landing craft east of their intended positions, particularly at UTAH and OMAHA.

4.2 Force U

UTAH, commonly known as UTAH Beach, was the code name for one of the five sectors of the Allied invasion of German-occupied France in the Normandy landings on 6 June 1944 (D-Day), during World War II. The westernmost of the five code-named landing beaches in Normandy, UTAH is on the Cotentin Peninsula, west of the mouths of the Douve and Vire rivers. Amphibious landings at UTAH were undertaken by United States Army troops, with sea transport, mine sweeping, and a naval bombardment force provided by the United States Navy and Coast Guard as well as elements from the British, Canadian, Dutch and other Allied navies.

The objective at UTAH was to secure a beachhead on the Cotentin Peninsula, the location of important port facilities at Cherbourg. The amphibious assault, primarily by the US 4th Infantry Division and 70th Tank Battalion, was supported by airborne landings of the 82nd and 101st Airborne Division. The intention was to rapidly seal off the Cotentin Peninsula, prevent the Germans from reinforcing Cherbourg, and capture the port as quickly as possible.

On 4 June 1944 four Duplex Drive Sherman tanks from Company A, 70th Tank Battalion based at Torcross[8], Devon, England, embarked on Landing Craft Tank (Mk 6) – LCT(6) 593 at Torcross on the Helford River. See Loading table at Annex B;

[8] Torcross is a village in the South Hams district of Devon in England.

On the same day, four M7 'Priest' self-propelled guns from Battery B of the 29th Field Artillery Battalion based in Axminster, Dorset embarked on LCT(Mk 5) 458 at Dartmouth East (Axminster) on the River Dart. See Loading table at Annex C;

Both LCTs formed part of Invasion Force 'U' that sailed for UTAH Beach following a 24 hour postponement due to bad weather. They arrived at the Force U Transport Area approximately 11 miles off UTAH Beach early in the morning of 6 June 1944.

There are numerous, and understandably occasionally conflicting accounts of the events of D-Day. In producing this report a number of books and individual accounts [9] have been used for research purposes. This report is our interpretation of this information and should not be an authoritative statement of fact in respect of the events of the Normandy Campaign.

4.3 The Loss of LCT(6) 593

In accordance with the landing plan the first wave of Landing Craft Tanks departed the Transport Area, at 0445 on 6 June 1944. Eight LCTs formed two columns and headed for the Line of Departure at 4000 yards from the beach.

LCT(6) 593 was behind the lead LCT in the starboard column heading for Tare Green Sector of UTAH beach. Each landing craft was carrying four M4A1 DD (Duplex Drive) Sherman tanks scheduled to be launched at a distance of 4000 yards from the beach.

In his account of the events of that fateful day[10] Ensign Donald Eidemiller (268161) (D) USNR of LCT(6) 594 describes the loss of LCT(6) 593 as follows;

> *"Approximately one hour after leaving the transport area the LCTs' broke from the columnar formation to form a line abreast of each other. LCT (6) 594 veered to the starboard to take a position abeam the formation guide LCT 592. Before the manoeuvre was completed, LCT 593 which was about 150 yards on our port beam struck a mine. The mine seemed to explode near the bow of the LCT. The ramp, two "DD" tanks and the entire front section of the craft was lifted clear of the water end then settled and sank shortly afterwards. No personnel or the other two tanks were seen in the aft section after the smoke had cleared."*

A Sergeant in the adjacent LCT(6) 594 observed one of the tanks turning end-over-end at least 100 feet in the air. Staff Sergeant Glen Gibson of the 70th Tank Battalion was the only survivor.

[9] http://ww2lct.org/history/stories/JSuozzo_report.htm
[10] http://www.normandy1944.org.uk/lct_594.htm

Figure 37 Staff Sergeant Len Gibson - sole survivor of LCT(6) 593. (© Tom Templeton)

His watch stopped at 0547, the moment of the explosion and is proudly on display at the UTAH Beach Museum together with his account of the loss of his LCT and comrades.

Figure 38 Staff Sergeant Glen Gibson's watch - stopped at 0547 on D-Day when LCT (6) 594 sank (© Tom Templeton)

The 70th Tank battalion were equipped with Sherman M4A1 DD tanks. They were attached to the 4th US Infantry Division tasked to provide heavy support for the assault troops landing in the first wave on UTAH Beach. Of the 32 tanks that were embarked 28 were launched at a distance of 3000 yards from the beach. One tank was sunk in turbulence when an LCT(R) fired its rockets at the Beach defences and 27 tanks gained the beach to fight landing at 0650 approximately 20 minutes after the leading assault elements had landed. Four DD tanks were lost at sea in the LCT(6) 593 sinking. The decision to launch these DD tanks closer to shore saved the crews from the swamping in rough water that the majority of OMAHA Beach DD tanks suffered on D-Day.

4.4 The Loss of LCT(5) 458

LCT(5) 458 formed part of Wave 14. This landing craft was carrying Battery B of the 29th Field Artillery Battalion comprising four M7 armoured 105mm Howitzers and their trailers, two ¾ ton Weapons Carriers, two M3 Half Tracks[11] and three ¼ ton 4x4 Jeeps. Personnel on-board numbered 58 plus 2 from the battalion medical detachment. LCT(5) 458 was reported as hitting a mine on the Banc du Cardonnet at approximately 1000 hours on 6 June 1944. The LCT broke in two and sank. A total of 39 members of B Battery were killed and 22 were injured.

[11] The loading tables show 2.5 ton trucks or m3 Half Tracks. Our discovery of M3 wreckage in the debris field indicates that the M3s were loaded rather than the trucks.

4.5 The Loss of LCT(6) 597

Cdr Joe Souzzo's Action Report[12] states that the LCT(DD)s continued towards the beach through the line of departure and beached with anchor.

> *0600 LCG's and LCTR's fired at targets of opportunity. The remaining LCT(DD)'s moved to flank speed, moving through the Line of Departure.*
>
> *0630 (H-hour) Despite increasing gunfire from the shore batteries, the remaining LCT(DD)s continued toward the beach through the Line of Departure (3000 yards from the beach) and beached with anchor. After disgorging the tanks, the LCT(DD)'s retracted and headed for the transport area, dodging the incoming LCVP's and LCT(A)'s.* ***LCT(DD) 597*** *struck a mine and sank, the second of eight LCT(DD)'s that was lost.*
>
> *0630 (revised H-hour) the LCT(DD)'s landed their tanks under unsuccessful German gunfire. The oncoming LCT(A)'s faced more accurate, intense gunfire.*

However there are other conflicting reports[13] suggesting that LCT(6) 597 was shelled and damaged in the English Channel off the coast of Normandy by German shore-based artillery and was declared a total loss.

4.6 The loss of US Personnel

We have been unable to establish a definitive list of all casualties resulting from the loss of LCT(6) 593 and LCT(5) 458 in particular those Naval personnel who may have been killed as a result.

Attached at Annex A to this report is a list of those souls lost in the mining of LCTs off UTAH Beach. A total of 19 personnel were reported lost plus 1 survivor from 70th Tank Battalion in LCT593 and 39 personnel were reported lost and 22 wounded from Battery B, 29th Field Artillery Battalion, only two of whom returned to active service, in LCT 458. Some casualties are buried in the Cambridge and Ardennes American cemeteries. No one from these units died of their wounds on the 7 or 8 June 1944. There are 12 whose whereabouts are unknown, but may have been repatriated in 1948.

In addition to those listed at Annex A we have identified the records of two other causalities;

> **SCHMUCKER**, JOSEPH JAMES , Ensign (no. O-270185), LCT-593, US Navy Reserve, †06/06/1944, [Family] Parents, Mr. and Mrs. Joseph Messinger Schmucker, 801 Elmira St., Williamsport, Pa. [Casualty] Believed to have died of wounds, declared dead June 6, 1944
>
> **SOAP**, GLENN WILLIAM , Motor Machinist's Mate Second Class (no. 8463830), LCT-593, US Navy Reserve, †06/06/1944, [Family] Parents, Mr. and Mrs. Albert Frank

[12] http://ww2lct.org/history/stories/JSuozzo_report.htm
[13] Rohwer, Jürgen; Gerhard Hümmelchen. "Seekrieg 1944, Juni". Württembergische Landesbibliothek Stuttgart (in German).

Soap, 6019 Henderson St., Shreveport, La. [Casualty] Died in landing and occupation, declared dead June 6, 1944, Memorial: Normandy American Cemetery

ref. used: [1] Bureau of Naval Personnel, [2] US National Archives (WWII) and [3] Official Chronology of the US Navy in WW2, Cressman R. J.

We have been unable to identify which of the US Navy casualties on D-Day belonged to these LCTs. On both beaches 16 LCTs were lost (2 on UTAH), although another LCT (**LCT(6) 597**) was also mined on her return from UTAH beach.

According to the Landing Craft website history introduction, which states that it is not intended to be a thorough report of the UTAH Beach operation, there were only three US Navy survivors of ten from LCT(6) 593. The landing table identifies 20 army personnel, so there may be some doubt about there being 3 army survivors. However, 70th Tank battalion HQ staff may have been embarked at the last minute.

- 0430 Primary Control vessel PC 1176 was ordered to lead eight LCT(DD)'s in two columns (four assigned to Red Beach, four assigned to Green Beach) to the Line of Departure. The control vessel was underway at a speed of eight knots, with the LCT(DD)'s making flank speed to arrive at the Line of Departure at 0600. After hitting a mine at 0552, **LCT(DD) 593** sank, losing four tanks; only three of 22 army personnel survived, along with three navy crew members.
- 0547 LCT(DD) 593 hit a mine and sank, losing all four tanks.
- 0630 (**H-hour**) Despite increasing gunfire from the shore batteries, the remaining LCT(DD)s continued toward the beach through the Line of Departure (3000 yards from the beach) and beached with anchor. After disgorging the tanks, the LCT(DD)'s retracted and headed for the transport area, dodging the incoming LCVP's and LCT(A)'s. **LCT(DD) 597** struck a mine and sank, the second of eight LCT(DD)'s that was lost.
- 1000 The next LCT's were scheduled for the 13th wave, Flotilla 4. LCT 362 (one of five LCT's) was lost en route to the Uncle Red Beach. The 14th wave on Tare Green Beach, also Flotilla 4, lost **LCT 458**.

In summary, seven of the LCT(DD)s successfully landed 27 of 32 tanks on the beach. One LCT(DD) was lost returning to the Transport area. It is believed that the earlier reference to two LCT losses out of 16 on both beaches refers to (LCT DD)s only as LCT(5) 458 was not designated DD as she was carrying M7 Priests.

US Navy/Reserve casualties reported as a result of these losses - 4 Killed in Action (KIA), 5 Missing in Action (MIA) and 28 wounded. We can find no record of Navy casualties as a result of the loss of these vessels. However, but the LCT Veterans Association records that 16 LCTs were lost on both OMAHA and UTAH beaches, two of which were at UTAH, with 4 Killed In Action, 5 Missing in Action and 28 Wounded.

We have identified a series of very powerful images taken by photographer Walter Rosenblum[14], 163rd Signal Photographic Company, 1st US Army which are reported as being

[14] http://www.rosenblumphoto.org/wwii

the rescue of crewmen from LCT(5)458 and being helped ashore by US comrades. Our enquiries to find out more about these images have not yielded any further information to date.

Figure 39 US Soldiers recovering crew of lost LCT on D-Day. Walter Rosenblum © IWM (EA 26319)

5. Landing Craft Tanks, DD Sherman Tanks and M7 'Priests'

5.1 Landing Craft Tank (LCT) role and development

The landing craft, tank (or tank landing craft) was an amphibious assault craft for landing tanks on beachheads. They were initially developed by the British Royal Navy and later by the United States Navy during World War II in a series of versions. Initially known as the "tank landing craft" (TLC) by the British, they later adopted the U.S. nomenclature "landing craft, tank" (LCT).

5.2 Landing Craft Tank Mk 5 - LCT(5)

When the United States entered the war in December 1941, the U.S. Navy had no amphibious vessels at all, and found itself obliged to consider British designs already in existence. One of these, advanced by K.C. Barnaby of Thornycroft, was for a double-ended LCT to work with landing ships. The Bureau of Ships quickly set about drawing up plans for landing craft based on Barnaby's suggestions, although with only one ramp. The result, in early 1942, was the LCT Mark 5, a 117-foot craft with a beam of 32 feet that could accommodate five 30-ton or four 40-ton tanks or 150 tons of cargo. With a crew of twelve men and one officer, this 286 ton landing craft had the merit of being able to be shipped to combat areas in three separate water-tight sections aboard a cargo ship or carried pre-assembled on the flat deck of an LST. The Mk.5 would be launched by heeling the LST on its beam to let the craft slide off its chocks into the sea, or cargo ships could lower each of the three sections into the sea where they were joined together.[15]

Powered by three 225 hp Gray marine diesels, the Mk.5 had a range of only 700 nautical miles (1,300 km; 810 mi). They were only capable of making 8 knots (15 km/h; 9.2 mph) at best; a speed too slow for independent passage across the Pacific. Shipped aboard other vessels, Mk.5s soon proved themselves in operations. Inland yards would lead LCT production and it was not long before yard workers boasted that "they built them by the mile and cut them up in feet". Four hundred and seventy Mk.5s were built.

First used in the invasion of North Africa, the Mk.5 crews immediately earned a reputation for efficiency under fire and in the worst of weather or sea conditions. Enjoying little priority in fleet maintenance schedules, the LCT crews also gained a reputation for "finding" whatever they needed. Much of this lack of status within the amphibious forces was because the LCT was the smallest landing craft organized into independent assault flotillas. Almost entirely manned by reservists and draftees, LCT crews operated in a free and easy manner that horrified professional naval officers. By late 1943, most early Mk.5s were relegated to training or harbour duties in the United States.

[15] Hearde, Basil. "The Tin Armada: Saga of the LCT". World War II Landing Craft Tanks.

General characteristics [16]	
Displacement:	286 short tons (259 t) (landing)
Length:	117 ft 6 in (35.81 m)
Beam:	32 ft (9.8 m)
Draft:	‣2 ft 10 in (0.86 m) forward ‣4 ft 2 in (1.27 m) aft (landing)
Propulsion:	3 × 225 hp (168 kW) Gray marine diesels, 3 shafts
Speed:	8 knots (15 km/h; 9.2 mph)
Range:	700 nmi (1,300 km) at 7 kn (13 m/h)
Capacity:	5 × 30-ton or 4 × 40-ton or 3 × 50-ton tanks or 9 trucks or 150 short tons (136 t) of cargo
Complement:	13 (1 officer, 12 enlisted men)
Armament:	2 × single 20 mm AA gun mounts
Armour:	‣Wheelhouse 2.5 in (64 mm) ‣Gun shield 2 in (51 mm)

[16] The Evolution Of the Landing Craft Tank". World War II Landing Craft Tanks.

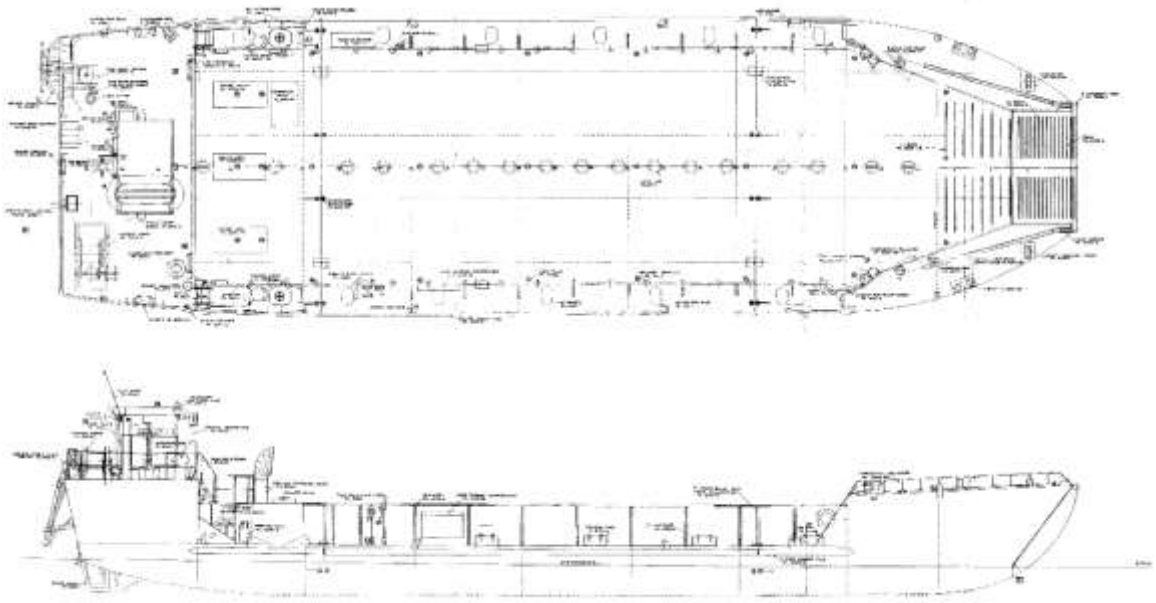

Figure 40 Schematic drawing of general arrangement LCT(5).

Figure 41 US LCT(5) 202 off the coast of England 1944 public domain www.wikimedia.org/wiki/File:LCT202.jpg

5.3 Landing Craft Tank Mk 6 - LCT(6)

The LCT Mark 6 had the same engines, equipment and crew as the Mk.5, but was a slightly longer, at 120-feet. The main difference was the addition of a stern gate that allowed the LCT to moor in front of larger LSTs to become a bridge for tanks and vehicles disembarking the deeper draft vessel. In practice, this method of use was more difficult to carry out than the vessel's designers anticipated. Strong tidal currents in the uncharted reef shoals of the Pacific limited the employment of this form of beaching to heavy armoured vehicles. To allow for the

passage of traffic, the small wheelhouse was moved to the starboard side of the fourteen-foot wide passageway. The winch for the stern kedge anchor was relocated atop the port side deckhouse, just aft of the port side 20 mm mount. Nine hundred and sixty Mk.6s were built. One hundred and sixty Mk.5 and Mk.6 LCTs were lend-leased to the Royal Navy, and a small number to the Soviet Union.

General characteristics [11]	
Displacement:	284 short tons (258 t)
Length:	119 ft 1 in (36.30 m)
Beam:	32 ft 8 in (9.96 m)
Draft:	3 ft 4 in (1.02 m) (forward)
Propulsion:	3 × 225 hp (168 kW) Gray marine diesels, 3 shafts
Speed:	7 knots (13 km/h; 8.1 mph)
Range:	700 nmi (1,300 km) at 7 kn (13 km/h)
Capacity:	150 short tons (136 t) of cargo
Complement:	12
Armament:	• 2 × single 20 mm AA gun mounts • Up to 4 × single 50 cal. machine guns
Armor:	• Wheelhouse : 20 lb • Gun shields : 10 lb

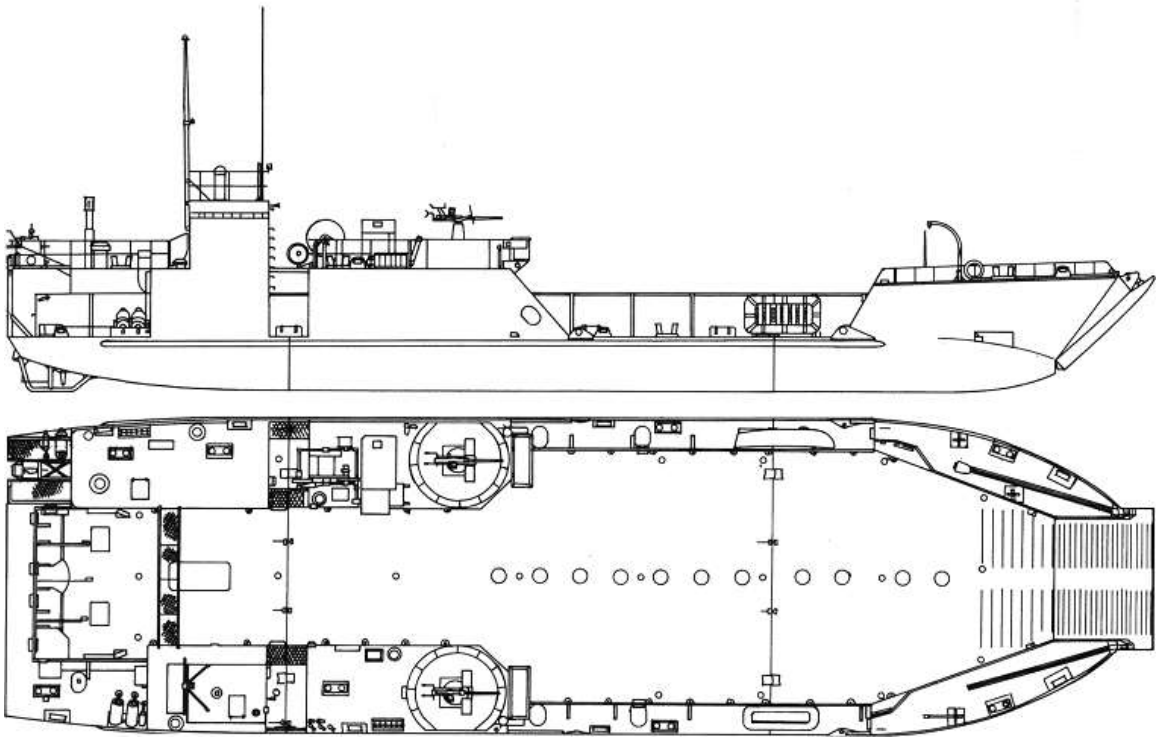

Figure 42 General arrangement of a LCT(6)

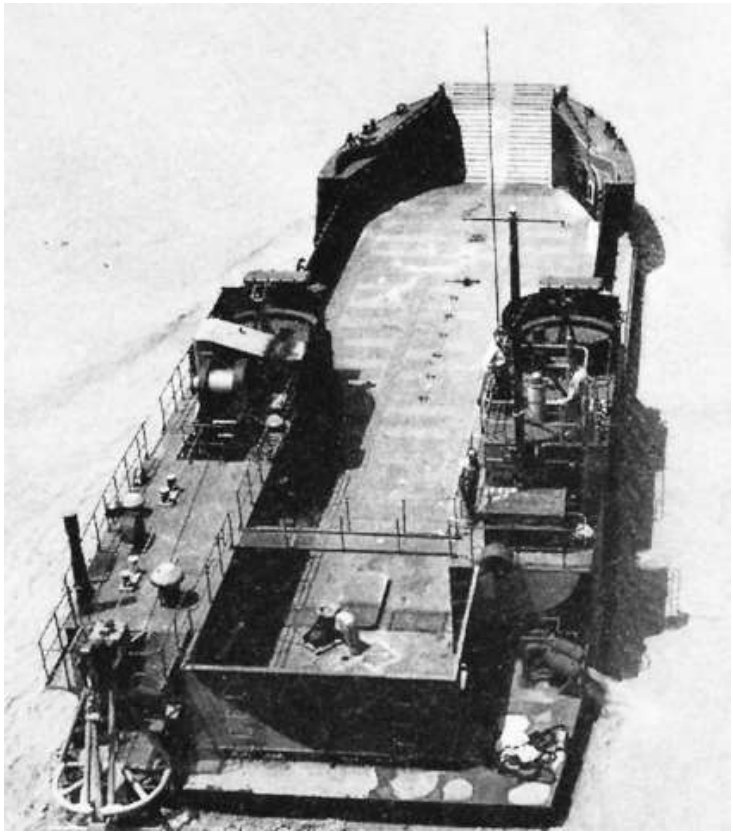

Figure 43 LCT(6) stern view

5.4 Sherman M4A1 DD tanks

DD or **Duplex Drive tanks**, nicknamed "Donald Duck tanks", were a type of amphibious swimming tank developed by the British during the Second World War. The phrase is mostly used for the Duplex Drive variant of the M4 Sherman medium tank, used by the Western Allies during and after the Normandy Landings in June 1944.

DD tanks worked by erecting a 'flotation screen' around the tank, which enabled it to float, and had two propellers powered by the tank's engine to drive them in the water.

Figure 44 © IWM (MH 3660) Sherman DD tank

The DD tanks were one of the many specialized assault vehicles, collectively known as Hobart's Funnies, devised to support the planned invasion of Europe.

The Duplex Drive (DD) version was an adaptation for launching the tank in water during beach assaults or for crossing inland water obstacles. The British engineer Nicholas Straussler developed the DD tank concept in early 1941. He tested an early version on a British Tetrarch light tank in June 1941 and later with a heavier Valentine tank in early 1942. In April 1943, the equipment was adapted to fit the standard Allied medium tank, the US-built M4 Sherman. The M4 Sherman with the DD system was used by US, British, Canadian and other Allied forces.

The Duplex-Drive system consisted of a collapsible canvas screen that was fixed to a boat-shaped platform of mild steel, in turn welded to the hull of the tank at the sponson line. The screen was supported by horizontal metal hoops, erected by thirty-six rubber tubes filled from compressed air

cylinders carried on the deck of the tank, held in place by lightweight jointed struts. When in the water, a properly rigged screen supported the tank in the water with the turret just above the water surface level. The device provided three feet of freeboard (just under one meter), with the screen extending 26 inches above the highest part of the turret. An evident drawback is that the screen prevented use of the tank's gun.

Figure 45 Rear of Sherman (DD) Duplex Drive, screens erected © IWM (MH 2214)

The tank hull was also waterproofed to the curtain base line and a bilge pump was installed to pump out water that may leak or splash into the tank. It took about 15 minutes to erect the screen and secure it properly; it could be collapsed in minutes to begin combat upon reaching shore.

The M4A1 Sherman tank had a complement of 5: Commander, Driver, Gunner, Loader, Co-driver/Hull Machine Gunner. The main armament was a 75mm M3 L 40 calibre gun firing HE and AP rounds. Two 0.30 calibre Browning machine guns, one in a ball mount in the hull and another next to the main gun in the turret made up the tanks armament. The tank had a cast hull and turret providing a sloping profile that helped to prevent penetration. The main propulsion was provided by a Continental R975 9 cylinder radial petrol engine developing 400 Horse Power. It had a speed of 30 mph and an operating range of 120 miles.

Sherman DD tank	
Service history	
In service	1944–1950s
Used by	United Kingdom Canada United States
Wars	World War II
Production history	
Designer	Nicholas Straussler
Designed	1941–44
Variants	DD Valentine, DD Sherman, DD M-10 Tank Destroyer
Specifications	
Speed	4 knots (7 km/h) swimming

D-Day

The DD Sherman was used to equip eight tank battalions of American, British, and Canadian forces for the D-Day landings. LCTs could normally carry nine Sherman tanks, but could fit fewer of the bulkier DDs. British and Canadian LCTs carried five tanks, the Americans carried four as their LCTs were shorter at about 120 feet (37 m).

The DDs would typically be launched around two miles from the shore, swim to the beaches and overpower the German defences. The DD tank's record was a mixture of success and failure, although they are mainly remembered for their disastrous performance on Omaha Beach.

5.5 M7B1 Howitzer Motor Carriage ('Priest')

The 105 mm Howitzer Motor Carriage M7 was an American self-propelled artillery vehicle produced during World War II. It was given the official service name 105 mm Self Propelled Gun, Priest by the British Army, due to the pulpit-like machine gun ring, and following on from the Bishop and the contemporary Deacon self-propelled guns.[17]

M7

The first M7s produced were based on modified M3 Lee medium tank chassis. To maintain a low silhouette, the howitzer elevation had to be restricted to 35°. In May 1942, after only a month of production, the vehicle was altered to increase its ammunition stowage from 57 to 69 rounds. This was achieved by placing seven rounds on the left wall and five on the right. The M7 also went through a fairly rapid shift from being based on the M3, to having more commonality with the M4 Sherman. The first major example was an adoption of the M4's three-piece housing, single-piece casting and suspension.

M7B1

Completing the shift, the M7B1 was fully based on the M4A3 Sherman chassis. A total of 826 M7B1 were produced from March 1944 to February 1945.

The M7B1 Howitzer Motor Carriage, designated Priest Self-Propelled Gun by the British, had a complement of 12 (normally 7) reduced to 6 for the run into UTAH Beach due to the high risk of casualties. The main armament was a 105mm Howitzer gun firing HE rounds. A 0.50 calibre M2 Browning heavy machine gun in a cupola made up the tracked vehicle armament carrying 69 x 105mm HE and 300 x 0.50 calibre rounds plus 45 105mm HE rounds in an M10 trailer. The gun was mounted on a Sherman M4 chassis and had a similar range to a Sherman tank, but a lower speed of 24 mph.

[17] Zaloga, Steven J. (2013). M7 Priest 105mm HMC. Oxford, United Kingdom: Osprey Publishing. ISBN 978-1-78096-023-4.

Figure 46 M7 Priest in Carantan 1944 . By U.S. Army Signal Corps – (www.archivesnormandie39-45.org/)National Archives Local Identifier: 111-SC-190413.

M7 Priest	
Type	Self-propelled artillery
Place of origin	United States
Service history	
Used by	U.S., Argentina, Belgium Britain, Canada, Israel, Norway, Pakistan, Philippines, Taiwan
Production history	
Manufacturer	American Locomotive Company (M7) Pressed Steel Car (M7B1) Federal Machine and Welder (M7)

Produced	April 1942–July 1945
No. built	M7: 3489, M7B1: 826 M7B2: 127 converted from M7B1
Variants	M7, M7B1, M7B2
Specifications	
Weight	50,640 lb (22.97 metric tons)
Length	19 ft 9 in (6.02 m)
Width	9 ft 5 in (2.87 m) with sand shields
Height	8 ft 4 in (2.54 m) 9 ft 8 in (2.95 m) over AA machine gun
Crew	8
Armour	12–62 mm
Main armament	105 mm M1/M2 Howitzer 69 rounds
Secondary armament	1 x 0.5 in (12.7 mm) M2 Browning machine gun 300 rounds
Engine	Continental R-975 C1/C4 Ford GAA (M7B1) 400 or 340 hp (298 or 254 kW)
Operational range	120 mi (193 km)
Speed	24 mph (39 km/h) on road 15 mph (24 km/h) off road

We were fortunate to see a M7 taking part in the D-Day historic vehicle displays as part of the annual D-Day commemoration activities. This allowed us to see for ourselves the construction and fitting out of the vehicle and compare to that we observed on the site. As can be seen from the photographs below these were identical to the vehicles seen on site Contact 471 (figures 23 and 24).

Figure 47 M7 Howitzer 105mm self-propelled gun (© Tom Templeton)

Figure 48 M7 Howitzer 105mm self-propelled gun (M7 Priest) (© Tom Templeton)

6. Environmental and Faunal Observations

6.1 Oceanography and Operation Neptune

D-Day has been described as the start of modern oceanography[18]. Weather and wave prediction was central to the decisions about the timing of the Normandy landings and in preparation for the invasion, a small group of scientists, led by George Deacon, was set up to compile data and investigate the Normandy coastline. The specialist group started to measure waves on the beach at Perranporth in North Cornwall, learning how to analyse waves and separate the effects of waves and swell.

In addition, Arthur Doodson (Director at the Liverpool Tidal Institute) produced all the tide and tidal-current prediction during the war[19]. He used two tide-predicting machines: the Kelvin machine, built in 1872 but overhauled in 1942, and the Roberts-designed machine, built in 1906. The only accurate data that the British had were for the two French ports that bracketed the beaches: Le Havre to the east and Cherbourg to the west. Simple interpolation would not work, because shallow-water conditions varied from place to place. Shallow-water distortion of the tide can speed up the rise from low to high water, giving the demolition teams, sent ashore to break through the German defences, less time to do their work. More accurate data was needed so British teams in small boats and midget submarines carried out several secret midnight reconnaissance missions on the enemy beaches. Those missions did yield a few tide and current measurements, but much less than is normally required for tidal analysis. However, once the invasion began, the tide predictions proved to be relatively accurate.

6.2 The Normandy Marine Environment Today.

Today the Bay of Seine is known as a quadrilateral embayment, around 65 by 140 km wide and from 5 to 30 m deep. Maximum tidal current velocities decrease from the north-western part, to the eastern part of the bay[20]. Tide induces a general drift of water masses to the east in the northern part of the bay, and to the west along the coasts of Calvados. Anticyclonic gyres are also generated that locally increase residence time of particles.

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[18] D-day – The starting point for modern UK oceanography, posted June 5, 2014, National Oceanography Centre web page, accessed October 2017 (NOC D-Day the starting point for modern UK oceanography)

[19] Parker, B. The tide predictions for D-day. Feature article in Physics Today, 2011, Accessed on line at www.physicstoday.org, October 2017.

[20] Chabert d'Hieres, G., 1986. La circulation des eaux en Baie de Seine. Actes de Colloques IFREMER 4: 15-23

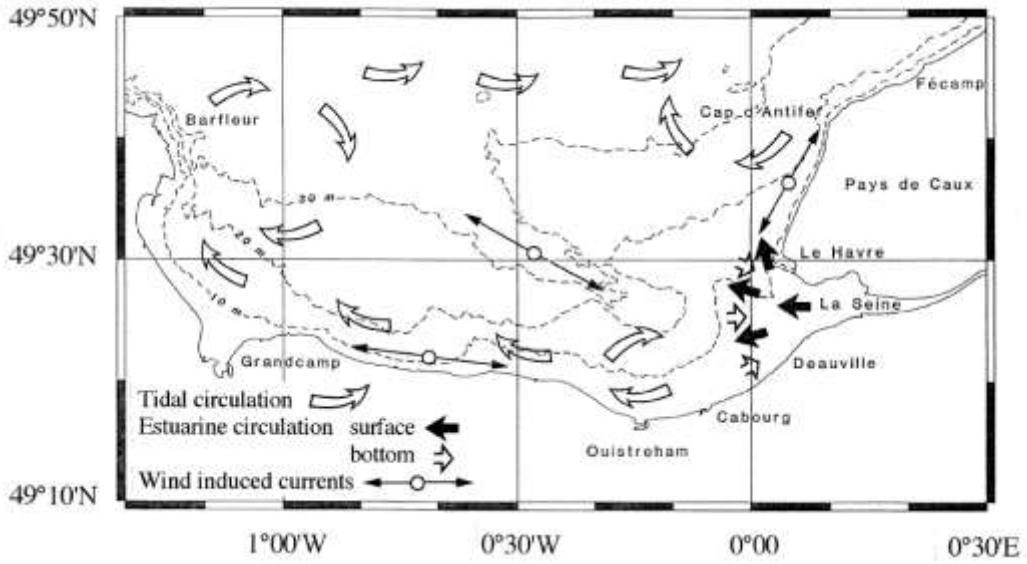

Figure 49: Schematic of residual circulation reproduced from Thiebaut et al., 1998

The eastern Bay of Seine is under the influence of 4 water basins, which means that it is subject to high nutrient inputs. The inputs prevent nitrogen depletion, allowing a succession of phytoplankton blooms. This does not result in oxygen depletion, probably due to the 'hydrodynamism' of the area[21]. At shallower coastal depths, wind causes an increase of residual current velocity[22]. Infaunal communities are distributed in response to hydrodynamic and sedimentary gradients and in the outer Seine area, in open sea, a sandy gravel *Glycymeris glycymeris* (large clam) community is noted[23].

The survey area (UTAH Beach), is part of a wider area well known for its inshore fisheries. During the war, the fishermen of the occupied zone were permitted by the Germans to continue their fishing, but only in small vessels with small crews, and restricted to areas just off the coast. A German patrol boat generally kept guard over the fishermen, though sometimes a squad of German soldiers would embark on the fastest boat in the fleet to maintain surveillance from there. French fishermen were not trusted by the Germans as fishing boats often attempted to carry young Frenchmen to England to re-enter the war, Allied aviators shot down over France, or secret intelligence agents. However, French fishing boats were the targets of Allied air raids, submarines and were innocent victims of mines laid by both sides. By November of 1942 the number of fishermen killed or missing mounted to 160 and grew to several times that by the end of the war[24].

[21] Bruchon, F., Nogues, L., Riou, P., LeGoff. R, and Nedelec, F., 2011. Combining Monitoring Networks, Hydrodynamic Modelling and Satellite Data to a better understanding of the Trophic Functioning of Coastal Waters of Normandy.
[22] Thiebaut, E., Lagadeuc, Y., Olivier, F., Dauvin, J.C., and Retiere, C.,1998. Do hydrodynamic factors affect the recruitment of marine invertebrates in a macrotidal area? Hydrobiologia 375/376: 165-176.
[23] Cabioch, L. and Gentil, F. 1975. Distribution des peuplements benthiques dans la partie orientale de la Baie de Seine. C. r. Acad. Sci., Paris 280D: 571-574.
[24] Auphan, P. and Mordal, J., 2016, The French Navy in WWII. US Naval Institute Press.

Figure 50 Area around a D-Day wreck from the current survey area, showing a variety of dead clam shells including the narrow, elongated razor clams, and a large scallop shell

Today, marine production in the area is dominated by molluscs (mainly oysters and mussels)[25]. This fishing activity is located in six areas, including: Lower Normandy, Brittany, and Pays de Loire. The wild mussel (*Mytilus edulis*) is emblematic of eastern Cotentin. The main mussel deposits at sea are located offshore of Barfleur, Moulard, Réville, Ravenoville-Saint Floxel for the department of Manche and offshore of Grandcamp-Maisy for Calvados, the port of our boat launch during the present survey (Figure 2). The Barfleur deposit, which is the most northern of the area, is the most important French fishing deposit of wild mussels, with more than 2000 hectares[26]. The resource is subject to a strict regulation, aiming for economic sustainability of the stock, to maintain this inshore fishery[27]. The high mussel growth in the area is a response to the phytoplankton density and turbidity[28].

[25] France, National Aquaculture Sector Review, Fisheries and Aquaculture Department, (FAO). Accessed on line October 2017

[26] Cochard, M-L and Morin, J., 2013. Les gisements mouliers de l'est Cotentin. Compte-rendu de la prospection 2013, Ifremer, July 2013, 27p.

[27] Picault D, Lesueur M, Noel J, Lepetit A, Nys C, Pellan C, Trougan M, Rezgani W, Souidi S, 2014. Inshore fisheries and governance (France): *The case of the commercially harvested mussel fishery of eastern Cotentin (Lower Normandy).* Study Report. GIFS project. Les publications du Pole halieutique AGROCAMPUS OUEST n 23, 32 p.

[28] Prou, J. and Goulletquer, P. 2002, The French Mussel Industry: Present Status and Perspectives.

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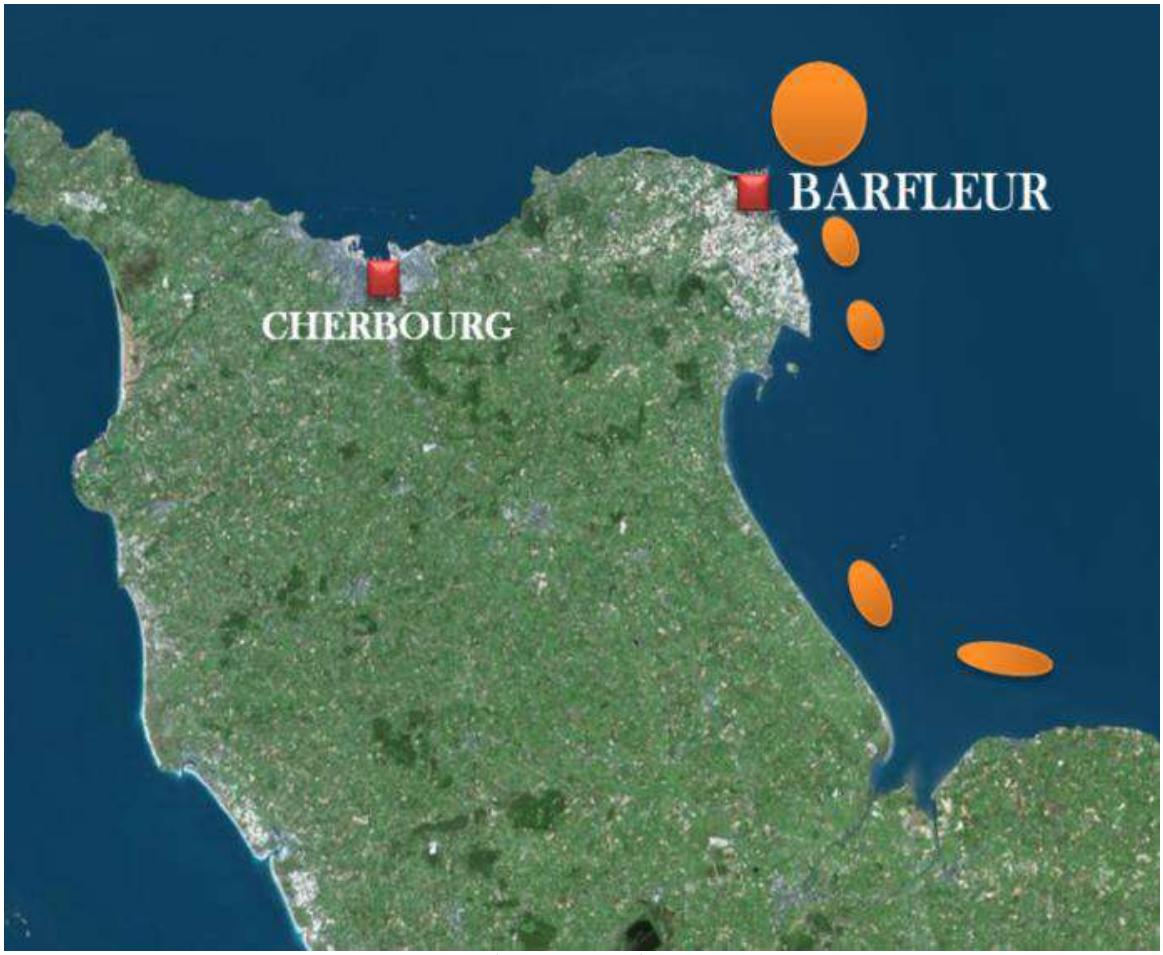


Figure 51 Distribution of the five natural mussel (*Mytilus edulis*) deposits of eastern Cotentin, reproduced from Picault et al. 2014.

As a British diver, used to diving the south-west and south coast of England, you become aware that as you travel east, you can make the flippant remark, that someone turned the lights off just past Bournemouth! An exaggeration but often a correct perception, depending on time of year (storms and phytoplankton density) and whether much dredging for shipping channels has been going on in the large port areas such as Southampton and Portsmouth. The vast expanse of sandy beaches along the eastern Cotentin area, the phytoplankton blooms, and the mass influx of water from river/estuarine sources all implied visibility during the current surveys might be seriously challenged.

The European Union has constructed the European Marine Observation and Data Network (EMODnet). It provides data on seabed sediments and habitats, from which the following images are extracted.

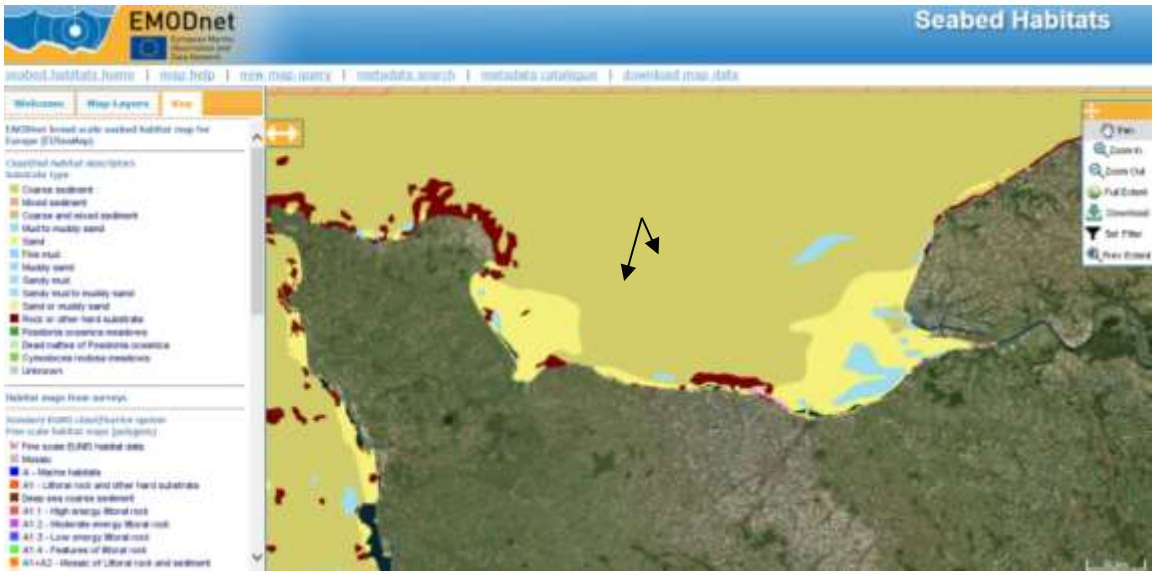


Figure 52 General survey area categorised as sand or muddy sand, bordering coarse sediment further offshore

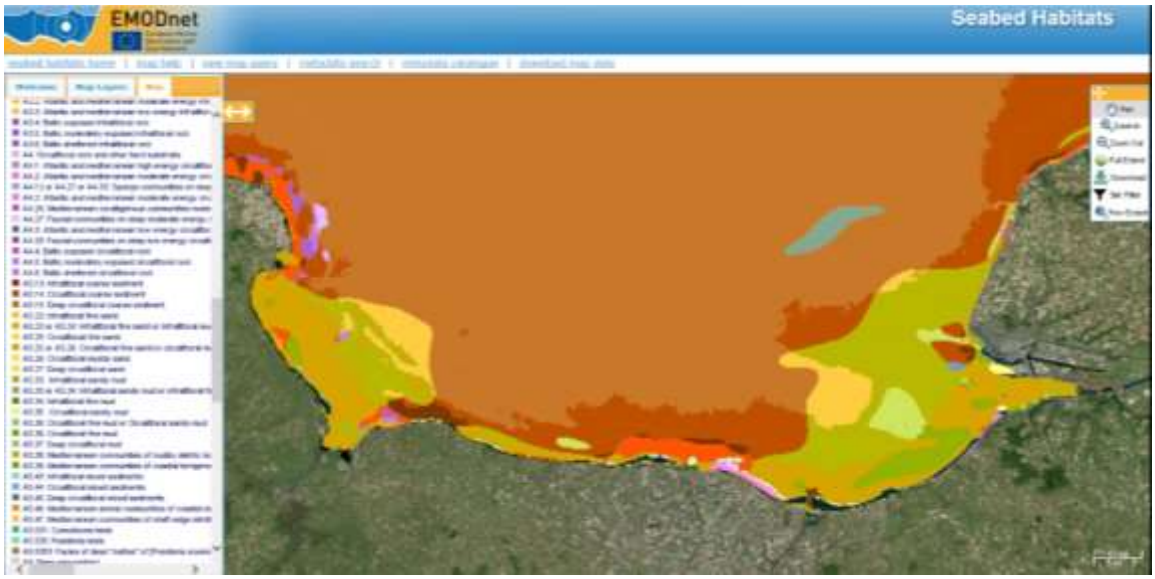


Figure 53 More in-depth seabed categorisation overview

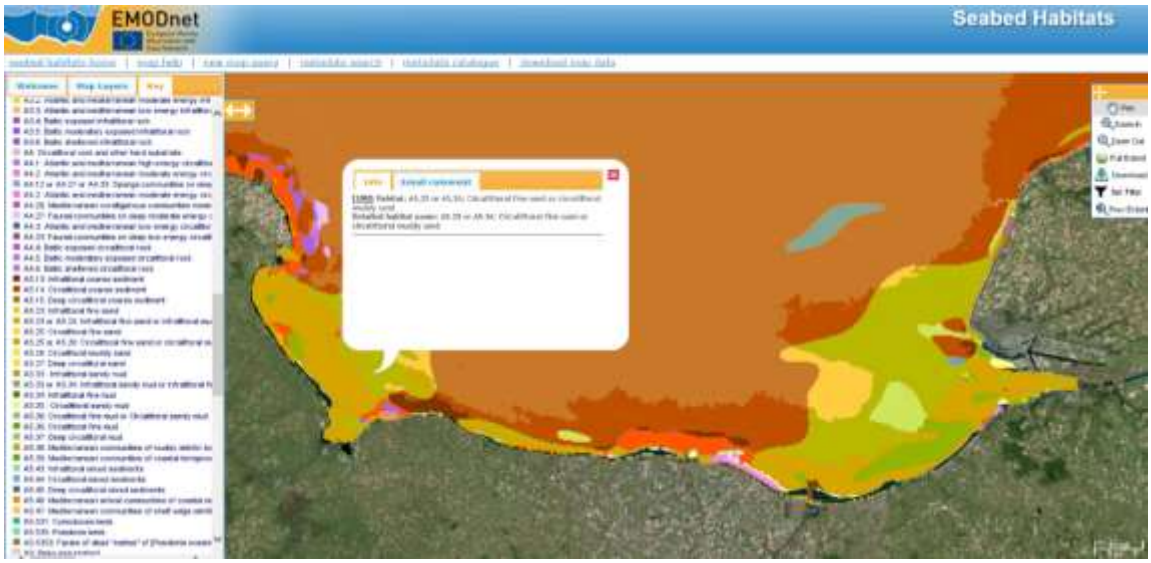


Figure 54 General survey area described as fine sand or muddy sand

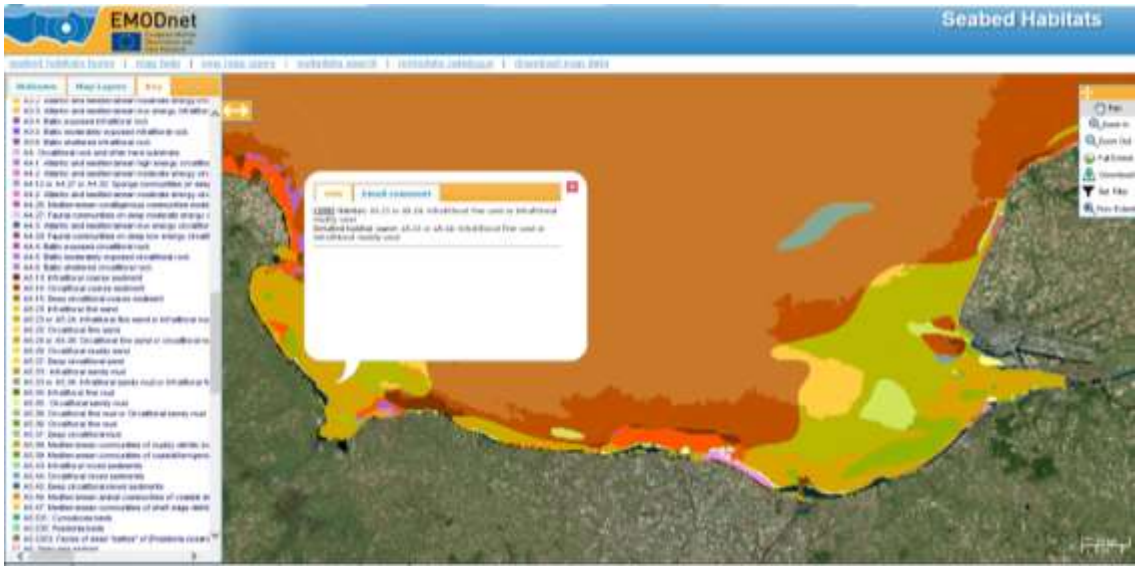


Figure 55 Shallower inshore area of fine sand or muddy sand.

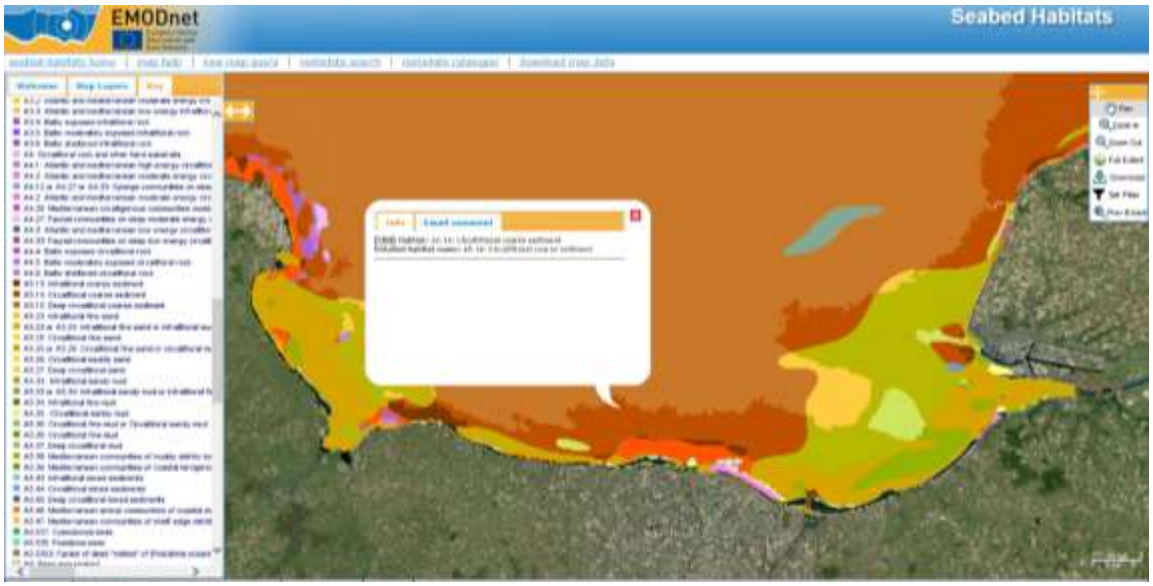


Figure 56 Extensive areas of coarse sediment in close proximity to the survey area

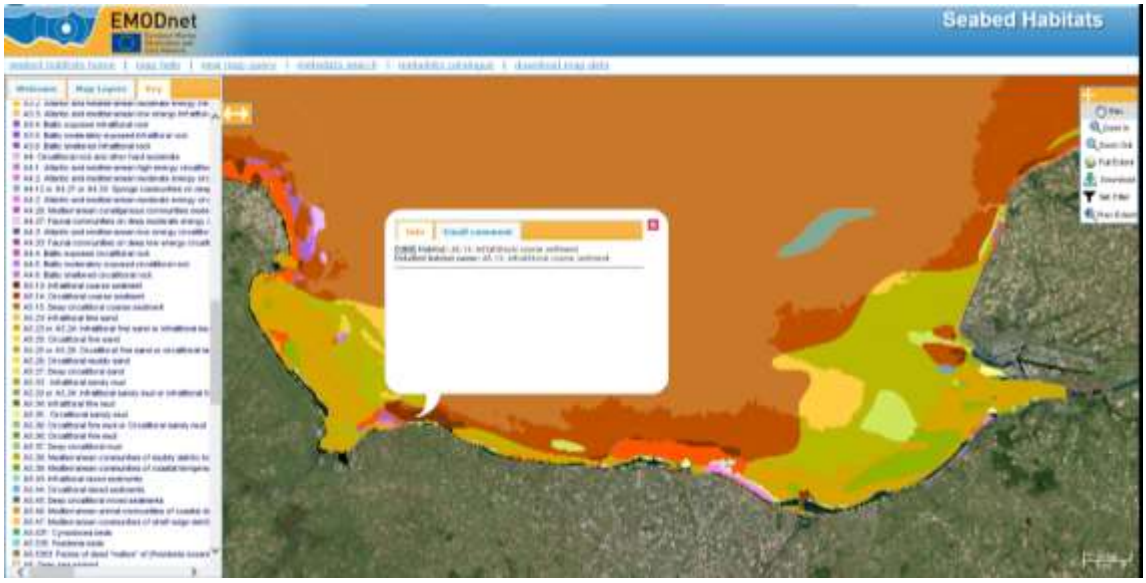


Figure 57 Shallow water areas of coarse sediment in close proximity to the survey area

The D-Day wrecks surveyed here are essentially sitting within a bay with strong water movements, scoured predominantly by sand, with some coarse sediment, resulting in a faunal coverage that is obviously tolerant of these conditions. As such, the faunal coverage was very reminiscent of that seen in the waters around Portsmouth and the Solent area in general. The D-Day wrecks were thickly covered in barnacles, along with a foliose faunal turf comprising short and long hydroid and bryozoan turf species (Figure 58). The images also show the surrounding sandy seabed with bivalve shell debris, predominantly razor clams, which were being fed on by the resident crabs and lobsters.

6.3 Marine Life Observations

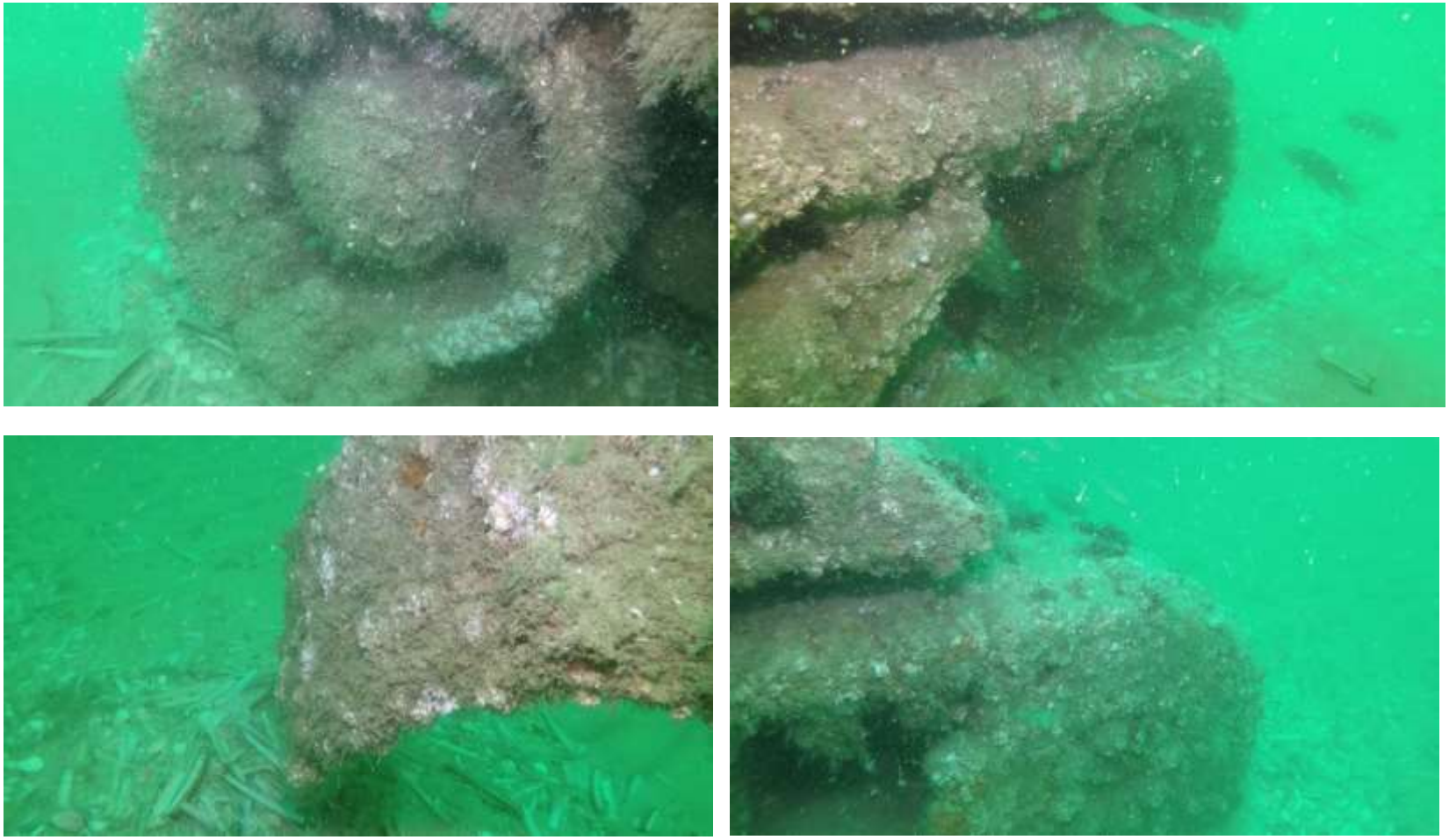


Figure 58 Sections of wreckage covered with barnacles, foliose hydroid and bryozoan turf, and surrounded by bivalve shell debris

Figure 59 Resident lobsters and crabs within wreckage

The foliose hydroid/bryozoan turf included a mixture of species often seen in the Solent and other turbid environments, including *Nemertesia antennina*, *Nemertesia ramosa*, *Hydrallmania falcata*, *Sertularia argentia*, *Flustra foliacea*, *Obelia* sp, *Tubularia indivisa*, and *Vesicularia spinosa.*

Figure 6o Top left, clockwise, *N. antennina*, *N.ramosa*, *Obelia* sp. and *Flustra foliacea*.

Anemones formed small carpets in places and were mainly found to be *Actinothoe sphyrodeta*, another very common species in the Solent area. If softer, sediment covered low lying turf could be seen, small siphons were often evident, indicating a sediment encrusted sea squirt turf. This is also often seen in the Solent area, and when sampled in British waters, is found to comprise a mixture of *Polycarpa* species, normally dominated by *P.fibrosa*, and often including *Molgula* sp and the slightly larger Pyuridae.

Figure 61 *Actinothoe sphydrodeta*. Arrows pointing toward the small siphons of sea squirts ***Actinothoe sphydrodeta*. Arrows pointing toward the small siphons of sea squirts**

Larger solitary ascidians were present, *Phallusia mammillata*, and the colonial ascidian *Diplosoma spongiforma*, could be seen forming small sheets in places. Various sheet forming ascidians are present in the Solent area, and the *D.spongiforma* seen here is present, but is more often noted further west, potentially more noticeable from the Dorset coast onwards (personal observations only).

Figure 62 : *Phallusia mammillata* on the left and sheets of *Diplosoma spongiforma* on the right.

Sponges were not seen in great abundance on the current survey sites, but occasionally the large yellow sponge *Cliona celata* was observed (Figure 63). This is also a sponge that is seen more commonly and in greater density in areas further west of the Solent area (personal observation).

Figure 63 Large boring sponge, *Cliona celata*

6.4 Environmental and Marine Life Summary

Despite the potential for low visibility diving in the survey area, which was experienced depending on the dive site being undertaken, the visibility overall was relatively good, assisted by the sandy seabed providing more reflected light at the relatively shallow depths being surveyed. Hopefully future surveys will allow a more in-depth faunal observations to be made to compliment the more extensive historical and archaeological investigations being undertaken.

7. Project Cardonnet - Conclusions

7.1 General

Although the diving programme was severely affected by both tide, underwater visibility and weather the project team were successful in gathering a significant amount of information about the wreck sites. This information and supporting images/video will help further understand the events of D-Day and future research.

Although we cannot be definitive in identifying the wrecks there are a number of possible hypotheses that may help inform future research. In the light of the information available our initial conclusions are;

7.1.1 Contact 468

We believe this may be an LCT(6) due to the presence of DD launching tracks on the bow door. The wreck is relatively complete (albeit in three sections). Possible identification: LCT(6) 593 or LCT(6) 597.

7.1.2 Contact 464

The wreck appears to be that of a Landing Craft. No vehicles present, no distinguishing features that assisted identification. Substantial amount of ammunition present. Bow door / ramp not apparent.

7.1.3 Contact 475

The arrangement of artefacts on the site appears to be consistent with the general lay out of an LCT(6). Possible identification: LCT(6) 593 or LCT(6) 597.

7.1.4 Contact 471

Present on the site are the remains of three M7 105mm Howitzer Self Propelled Gun and also M3 half-track vehicles. This is consistent with the cargo of LCT(5) 458 as confirmed in the Loading Table at Annex C. It also confirms that M3 Half-tracks were loaded rather than the 2 ½ ton trucks.

7.1.5 Contact 470

The M7 close to site 471 is almost certainly the fourth M7 lost from the same LCT(5) 458.

7.1.6 Contact 466

The dive confirmed that this site was a section of Landing Craft Tank, possibly the bow and door ramp, which is consistent with the reports that LCT(5) 458 was broken in two and that

the stern section floated adrift. We believe Contacts 466, 470, and 471 are part of LCT(5) 458 and her cargo.

7.2 Summary

Our expedition to Normandy to investigate and document wrecks of the Banc de Cardonnet has challenged us in many ways. Our team of divers has been supported throughout by many people and organisations who have helped us achieving our aims and objectives. With diving only possible on 4 days, and further restricted by tides and visibility we have gathered a remarkable amount of information.

This information has helped us to begin to understand these wrecks and their part in the events of D-Day. Two of the wrecks (contacts 468 and 475) are likely to be LCT(6)s though we cannot be sure of their identity. Contact 466 is likely to be the bow of LCT(5) 458 due to the vicinity of her cargo of vehicles at contacts 471 and 470. The other wreck (Contact 464) is unidentified but likely to be a landing craft. We await the outcome of French Navy bomb disposal team visit to this site.

Project Cardonnet has demonstrated our determination to conduct a responsible and carefully managed project, mindful always of the sensitive nature of these sites and that we were ambassadors for British diving by ensuring we met the requirements needed to conduct such a project in French waters. We hope that this report and our project will be viewed as a success and our sincere thanks to all those who have helped us with this remarkable endeavour to understand and honour the loss of those men of the Normandy Campaign.

Figure 64 Poppies at UTAH beach (© Alison Mayor)

Annex A Company A, 70th Tank Battalion – Normandy Campaign Losses

***Kline, William S.**, d. 6-Jun-1944, Second Lieutenant, 70th Tank Battalion, U.S. Army, Illinois, Purple Heart, Tablets of the Missing*

***Bergstresser, Glenn E.**, d. 6-Jun-1944, Technician Fourth Grade, 70th Tank Battalion, U.S. Army, Washington, Purple Heart, Tablets of the Missing*

***Callahan, John A.**, d. 6-Jun-1944, Sergeant, 70th Tank Battalion, U.S. Army Pennsylvania, Purple Heart, Tablets of the Missing*

***Clarke, John W.**, d. 6-Jun-1944, Sergeant, 70th Tank Battalion, U.S. Army, Pennsylvania, Plot C, Row 21, Grave 10, Purple Heart*

***Clear, Bert J.**, d. 6-Jun-1944, Technician Fourth Grade, 70th Tank Battalion, U.S. Army, Ohio, Plot H, Row 19, Grave 26, Purple Heart*

***Coughlin, Lawrence J.**, d. 6-Jun-1944, Private First Class, 70th Tank Battalion, U.S. Army, Ohio, Purple Heart, Tablets of the Missing*

***Foster, Norman B.**, d. 6-Jun-1944, Private, 70th Tank Battalion, U.S. Army, Colorado, Purple Heart, Tablets of the Missing*

***Goble, Francis W.**, d. 6-Jun-1944, Technician Fifth Grade, 70th Tank Battalion, U.S. Army, Kansas, Purple Heart, Tablets of the Missing*

***Gosnell, Hugh S.**, d. 6-Jun-1944, Private First Class, 70th Tank Battalion, U.S. Army, Tennessee, Plot E, Row 19, Grave 22, Purple Heart*

***Hernandez, Guadalupe P.**, d. 6-Jun-1944, Technician Fifth Grade, 70th Tank Battalion, U.S. Army, New Mexico, Purple Heart, Tablets of the Missing*

***Jaskulski, Stephen W.**, d. 6-Jun-1944, Private, 70th Tank Battalion, U.S. Army, Pennsylvania, Plot G, Row 15, Grave 29, Purple Heart*

***Jensen, Albert J.**, d. 6-Jun-1944, Corporal, 70th Tank Battalion, U.S. Army, Vermont, Plot B, Row 15, Grave 6, Purple Heart*

Marszalek, Stanley J.**, d. 6-Jun-1944, Corporal, 70th Tank Battalion, U.S. Army, **Whereabouts unknown

***Metz, Charles E.**, d. 6-Jun-1944, Private, 70th Tank Battalion, U.S. Army, New York, Purple Heart, Tablets of the Missing*

***Moyer, Robert H.**, d. 6-Jun-1944, Private, 70th Tank Battalion, U.S. Army, Pennsylvania, Purple Heart, Tablets of the Missing*

***Neal, Donald R.**, d. 6-Jun-1944, Corporal, 70th Tank Battalion, U.S. Army, Washington, Purple Heart, Silver Star, Tablets of the Missing*

***O'Brien, Gerard K.**, d. 6-Jun-1944, Private, 70th Tank Battalion, U.S. Army, New York, Cambridge American Cemetery, UK Plot C, Row 1, Grave 74, Purple Heart*

***Rhimer, Nicholas W.**, d. 6-Jun-1944, Corporal, 70th Tank Battalion, U.S. Army, Pennsylvania, Purple Heart, Tablets of the Missing*

***Saray, Lewis**, d. 6-Jun-1944, Private, 70th Tank Battalion, U.S. Army, Pennsylvania, Plot E, Row 1, Grave 8, Purple Heart*

B Battery, 29th Field Artillery Battalion

***Boylan, Richard E.**, d. 6-Jun-1944, Sergeant, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, New York, Purple Heart, Tablets of the Missing*

***Buckler, Mark E.**, d. 6-Jun-1944, Sergeant, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Maryland, Cambridge American Cemetery, UK Plot G, Row 1, Grave 160, Purple Heart*

***Dudgeon, Sidney G.**, d. 6-Jun-1944, Private First Class, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, New York, Purple Heart, Tablets of the Missing*

Fabiszak, Theodore**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

Fedish, Joseph**, d. 6-Jun-1944, Technician Fifth Grade, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

Giambrone, Charles**, d. 6-Jun-1944, Corporal, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Pennsylvania, Plot C, Row 5, Grave 4, Purple Heart **(see Figure 65 for gravestone photograph below)

Gregor, George P.**, d. 6-Jun-1944, Corporal, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

***Hardy, Joseph G.**, d. 6-Jun-1944, Technician Fifth Grade, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Georgia, Purple Heart, Tablets of the Missing*

***Hardzog, Floyd**, d. 6-Jun-1944, Private First Class, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Tennessee, Purple Heart, Tablets of the Missing*

***Harper, Felix M.**, d. 6-Jun-1944, Technician Fifth Grade, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, North Carolina, Purple Heart, Tablets of the Missing*

***Hershman, Ralph W.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Maryland, Purple Heart, Tablets of the Missing*

***Ingenito, Harold E.**, d. 6-Jun-1944, Private First Class, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, New York, Purple Heart, Tablets of the Missing*

***Jezak, Joseph**, d. 6-Jun-1944, Corporal, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Pennsylvania, Purple Heart, Tablets of the Missing*

Johnson, Ervin T.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

***Keller, William B.**, d. 6-Jun-1944, Corporal, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Tennessee, Purple Heart, Tablets of the Missing*

Kozlowski, Edward J.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

Lake, James D.**, d. 6-Jun-1944, Private First Class, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, West Virginia, Plot H, Row 16, Grave 10, Purple Heart **(see Figure 65 for gravestone photograph below)

Leavor, Michael**, d. 6-Jun-1944, Corporal, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Pennsylvania, Plot C, Row 11, Grave 18, Purple Heart **(see Figure 65 for gravestone photograph below)

***Mahoney, James P.**, d. 6-Jun-1944, Private First Class, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, New Jersey, Ardennes American Cemetery Plot C, Row 25 Grave 21, Purple Heart*

***Mason, Conrad C.**, d. 6-Jun-1944, Private First Class, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, West Virginia, Purple Heart, Tablets of the Missing*

Miller, James H.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

Morgan, Carrol A.**, d. 6-Jun-1944, Private First Class, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

***Morgia, Anthony C.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, New York, Purple Heart, Tablets of the Missing*

Newton, Fred M.**, d. 6-Jun-1944, Technician Fifth Grade, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

***Nichols, Noel N.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Alabama, Purple Heart, Tablets of the Missing*

***Pataky, Bernard L.**, d. 6-Jun-1944, Technician Fourth Grade, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Pennsylvania, Purple Heart, Tablets of the Missing*

Relosky, Andrew J.**, d. 6-Jun-1944, Private First Class, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Pennsylvania, Plot E, Row 16, Grave 3, Purple Heart (**see Figure 65 for gravestone photograph below)

***Schlott, Robert**, d. 6-Jun-1944, Staff Sergeant, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Pennsylvania, Purple Heart, Tablets of the Missing*

Shanley, Robert J.**, d. 6-Jun-1944, Technician Fourth Grade, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

Singleton, John B.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

***Smart, Sidney R.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, South Carolina, Ardennes American Cemetery Plot A, Row 31 Grave 48, Purple Heart*

Smith, Daniel C.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

***Smith, Harry J.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, New Jersey, Purple Heart, Tablets of the Missing*

***Spina, Thomas**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, New Jersey, Purple Heart, Tablets of the Missing*

***Stephens, Horace S.**, d. 6-Jun-1944, Private First Class, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Tennessee, Purple Heart, Tablets of the Missing*

Turner, Robert H.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Indiana, Plot A, Row 12, Grave 30, Purple Heart (**see Figure 65 for gravestone photograph below)

***Vosen, Raymond F.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Wisconsin, Purple Heart, Tablets of the Missing*

***Waugh, Luther L.**, d. 6-Jun-1944, Technician Fifth Grade, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, Kentucky, Purple Heart, Tablets of the Missing*

Williams, Benjamin E.**, d. 6-Jun-1944, Private, 29th Field Artillery Battalion, 4th Infantry Division, U.S. Army, **Whereabouts unknown

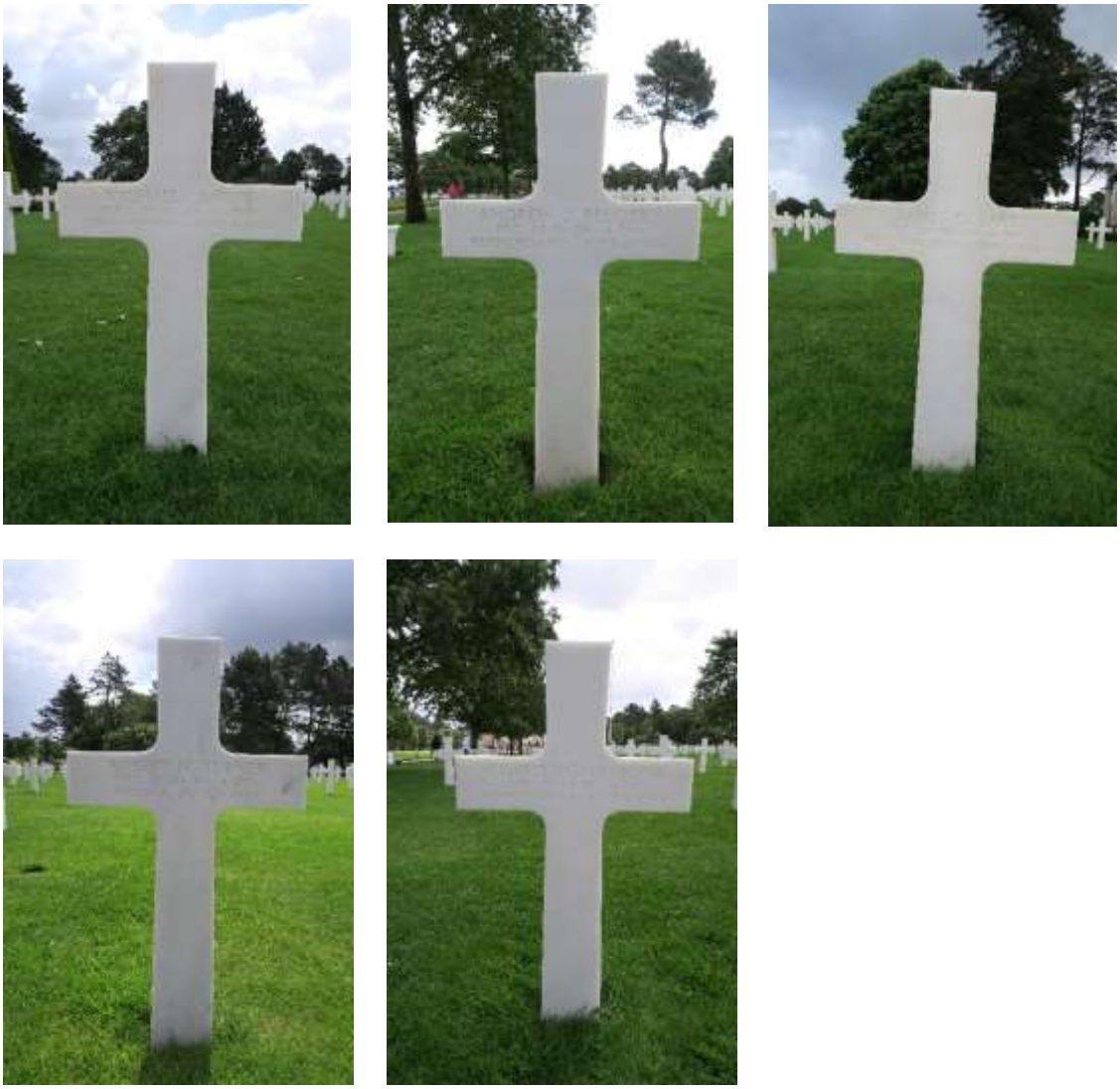
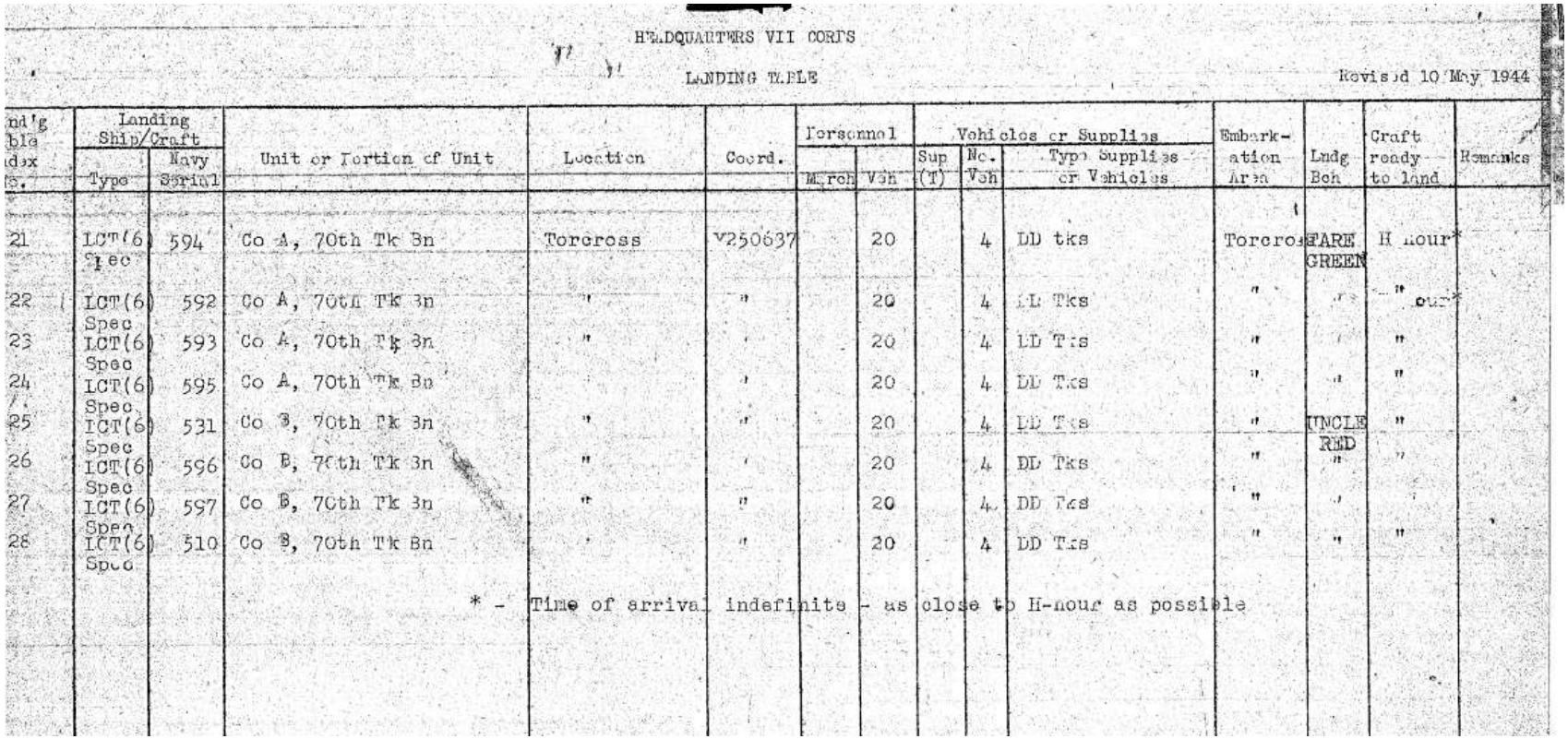


Figure 65 Gravestones of some of the men lost from Company A 70th Tank Battalion at the American Cemetery (© Tom Templeton)

Annex B Loading Table for LCT(6) 593 and LCT(6) 597



HEADQUARTERS VII CORPS

LANDING TABLE

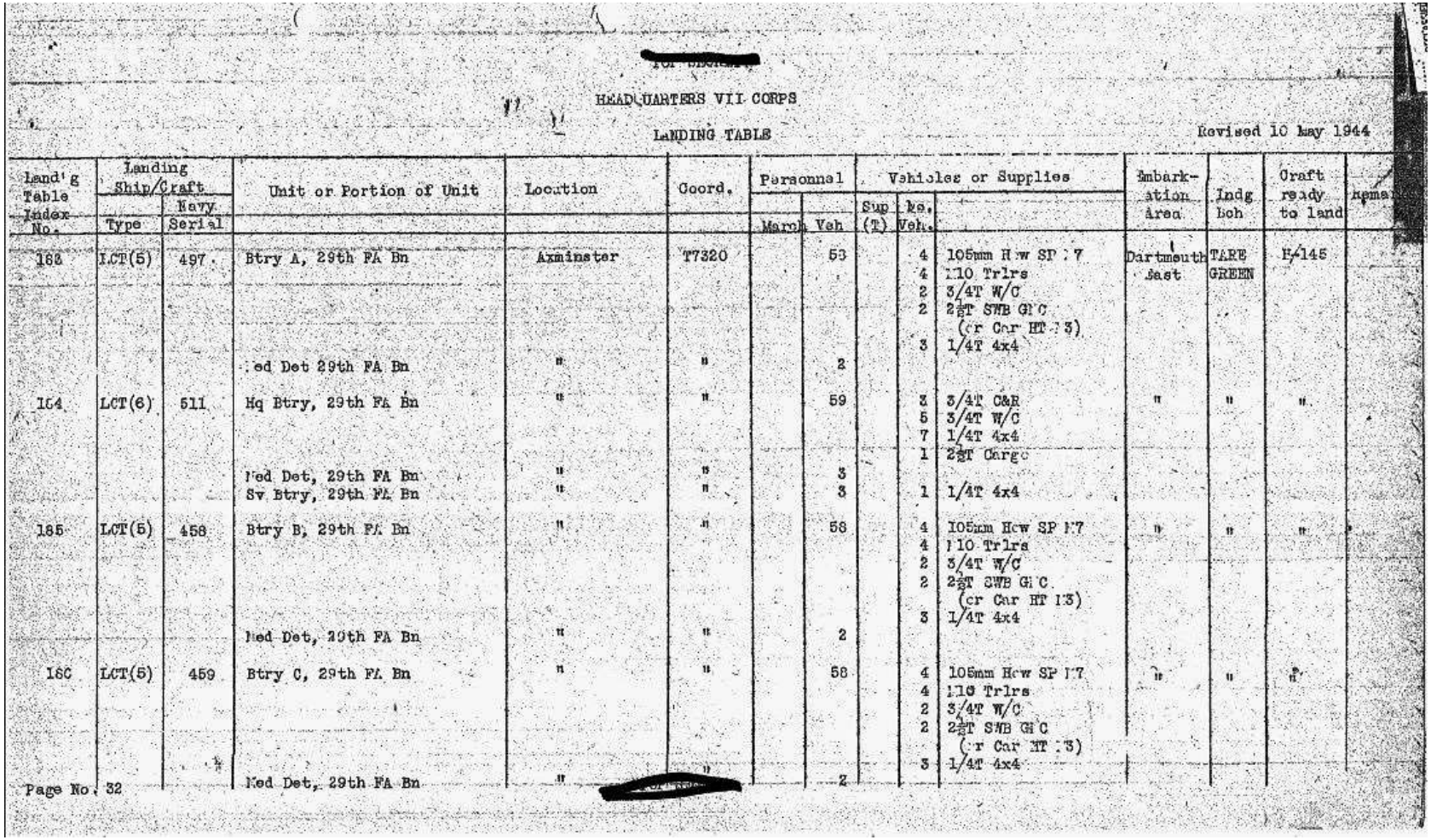
Revised 10 May 1944

Ldg'g Table Index No.	Landing Ship/Craft Type	Landing Ship/Craft Navy Serial	Unit or Portion of Unit	Location	Coord.	Personnel March	Personnel Veh	Vehicles or Supplies Sup (T)	Vehicles or Supplies No. Veh	Vehicles or Supplies Type Supplies or Vehicles	Embarkation Area	Ldg Beh	Craft ready to land	Remarks
21	LCT(6) Spec	594	Co A, 70th Tk Bn	Torcross	V250637		20		4	DD tks	Torcross	FARE GREEN	H Hour*	
22	LCT(6) Spec	592	Co A, 70th Tk Bn	"	"		20		4	DD Tks	"	"	" Hour*	
23	LCT(6) Spec	593	Co A, 70th Tk Bn	"	"		20		4	DD Tks	"	"	"	
24	LCT(6) Spec	595	Co A, 70th Tk Bn	"	"		20		4	DD Tks	"	"	"	
25	LCT(6) Spec	531	Co B, 70th Tk Bn	"	"		20		4	DD Tks	"	UNCLE RED	"	
26	LCT(6) Spec	596	Co B, 70th Tk Bn	"	"		20		4	DD Tks	"	"	"	
27	LCT(6) Spec	597	Co B, 70th Tk Bn	"	"		20		4	DD Tks	"	"	"	
28	LCT(6) Spec	510	Co B, 70th Tk Bn	"	"		20		4	DD Tks	"	"	"	

* - Time of arrival indefinite - as close to H-hour as possible

Figure 66 Loading table Company A 70th Tank Battalion. Load at Torcross . 4 DD tanks and 20 personnel

Annex C Loading Table for LCT(5) 458



HEAD QUARTERS VII CORPS

LANDING TABLE

Revised 10 May 1944

Land'g Table Index No.	Landing Ship/Craft Type	Landing Ship/Craft Navy Serial	Unit or Portion of Unit	Location	Coord.	Personnel March Veh	Vehicles or Supplies Sup (T)	Vehicles or Supplies No. Veh.	Vehicles or Supplies	Embark-ation Area	Indg Beh	Craft ready to land	Remarks
182	LCT(5)	497	Btry A, 29th FA Bn	Axminster	T7320	53		4	105mm How SP M7	Dartmouth East	TARE GREEN	H/145	
								4	M10 Trlrs				
								2	3/4T W/C				
								2	2½T SWB G'C (or Car HT M3)				
								3	1/4T 4x4				
			Med Det 29th FA Bn	"	"	2							
184	LCT(6)	511	Hq Btry, 29th FA Bn	"	"	59		3	3/4T C&R	"	"	"	
								5	3/4T W/C				
								7	1/4T 4x4				
								1	2½T Cargo				
			Med Det, 29th FA Bn	"	"	3							
			Sv Btry, 29th FA Bn	"	"	3		1	1/4T 4x4				
185	LCT(5)	458	Btry B, 29th FA Bn	"	"	58		4	105mm How SP M7	"	"	"	
								4	M10 Trlrs				
								2	3/4T W/C				
								2	2½T SWB G'C (or Car HT M3)				
								3	1/4T 4x4				
			Med Det, 29th FA Bn	"	"	2							
186	LCT(5)	459	Btry C, 29th FA Bn	"	"	58		4	105mm How SP M7	"	"	"	
								4	M10 Trlrs				
								2	3/4T W/C				
								2	2½T SWB G'C (or Car HT M3)				
								3	1/4T 4x4				
			Med Det, 29th FA Bn	"	[redacted]	2							

Page No. 32

Figure 67 Loading table for LCT(5)458. Battery B, 29th Field Artillery Battalion. Load at Axminster. 58 personnel. 4 x 105mm Howitzer SP M7, and other vehicles.

Appendix 1 – Letters of Authorisation

Copies of Letters of Authorisation for Project Cardonnet.

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

Ministère Culture Communication

MINISTERE DE LA CULTURE ET DE LA COMMUNICATION

Arrêté du 29/05/2017 n° 2017 – 210
Relatif à une opération d'archéologie sous-marine
OA 3206

000621

Direction générale des Patrimoines

Département des Recherches Archéologiques Subaquatiques et Sous-Marines

Affaire suivie par

poste

Références

DRASSM
147 plage de l'Estaque
13016 Marseille
(France)
Tél. +33 (0)4 91 14 28 00
Fax + 33 (0)4 91 14 28 14
www.archeologie-sous-marine.culture.fr

La Ministre de la Culture et de la Communication,

Vu le Code du Patrimoine ;

Considérant la demande présentée par M. Martin DAVIES, le 23/05/2017;

Arrête

Art. 1 – M. Martin DAVIES est autorisé à procéder, en qualité de responsable scientifique, à une opération archéologique d'identification de biens culturels maritimes, avec plongée humaine et utilisation de matériel spécialisé, à compter du 03/06/2017 jusqu'au 08/06/2017.

- Façade maritime : Manche
- Département : Manche (50) et Calvados (14)
- Communes : de Saint-Martin-de-Varreville (50) à Cricqueville-en-Bessin (14)
- Intitulé de l'opération : Cardonnet 2017
- Coordonnées géographiques (rayon de 100 m autour de chaque point mentionné ci-dessous) :

49° 27' 849 N / 1° 05' 5043 O
49° 27' 9417 N / 1° 05' 886 O
49° 27' 9216 N / 1° 06' 3292 O
49° 28' 000 N / 1° 06' 300 O
49° 27' 9989 N / 1° 06' 3078 O
49° 27' 9643 N / 1° 06' 3437 O
49° 28' 0613 N / 1° 05' 4865 O
49° 28' 3577 N / 1° 06' 8710 O
49° 28' 3666 N / 1° 06' 8166 O
49° 27' 3684 N / 1° 08' 1408 O
49° 26' 4542 N / 1° 08' 7789 O
49° 25' 9728 N / 1° 09' 7675 O
49° 25' 9861 N / 1° 09' 695 O

- Numéro de la carte marine : 7422 (SHOM)
- Profondeur : 30 m maximum

Art. 2 – Conformément à l'article L. 532-8 du Code du Patrimoine, l'opération est exécutée sous la direction effective du titulaire de l'autorisation et placée sous sa responsabilité.

Art. 3 – L'opération est effectuée sous le contrôle du Directeur du Département des recherches archéologiques subaquatiques et sous-marines, qui prescrit toutes mesures qu'il juge utiles pour assurer le bon déroulement scientifique de l'opération.
Le titulaire de l'autorisation doit présenter, à toute demande des autorités compétentes, une copie de ces documents.
Le titulaire de l'autorisation tient régulièrement informé le Directeur du Département des recherches archéologiques subaquatiques et sous-marines de ses travaux et découvertes. Il lui signale immédiatement toute découverte importante de caractère mobilier ou immobilier. Les mesures nécessaires à la conservation de ces vestiges doivent être prises après son accord.
A la fin de l'opération et **avant le 1er décembre**, le titulaire de l'autorisation adresse au Directeur du Département des recherches archéologiques subaquatiques et sous-marines, en double exemplaire plus une version numérique, **un rapport final d'opération** accompagné des plans précis, des photographies nécessaires à la compréhension du texte et d'un résumé illustré destiné au *Bilan scientifique du Drassm*.
Le contenu de ce rapport devra être conforme au document de *Recommandations pour le rapport final d'opération dans le domaine public maritime* transmis au responsable de l'opération.
Les coordonnées géographiques mentionnées dans le rapport devront être exprimées en WGS 84 (degrés minutes décimales). Enfin, les archives éventuellement consultées seront indiquées et des copies des éléments pertinents seront jointes au dossier et indexées. Le rapport indiquera aussi les études complémentaires à envisager.
Il est attendu que le contenu et la présentation du rapport soient soignés, notamment dans le rendu des textes et illustrations.

L'ensemble des documents relatifs à l'opération (notes, photographies, relevés, correspondances, etc.) est remis au Directeur du Département des recherches archéologiques subaquatiques et sous-marines aussitôt que sont rédigés les rapports, notes ou publications scientifiques sur les recherches effectuées.

Art. 4 – Prescriptions particulières à l'opération :
Cette opération d'identification de biens culturels maritimes a pour but de poursuivre la documentation de vestiges du Débarquement de Normandie situés dans le secteur du banc du Cardonnet. Cette zone a déjà fait l'objet de campagnes géophysiques et archéologiques, pilotées notamment l'US Navy (dir. Robert Neyland, entre 2000 et 2002).
L'opération 2017 a pour but de préciser la localisation de ces éléments, d'en assurer une documentation plus fine, au moyen de plongées humaines et de recherches documentaires, et d'en confirmer ou d'en préciser l'identification.
Un maximum d'informations sera recueilli sur ces sites à cette occasion : dimensions, nature des vestiges, enfouissement, degré de conservation, etc. Chaque site fera *a minima* l'objet de la rédaction d'une fiche épave, en vue de son inventaire dans la carte archéologique nationale. Le propos devra s'appuyer sur des prises de mesures ainsi que la réalisation de croquis et de photographies. Ces éléments seront mis en parallèle avec les données documentaires ou archivistiques disponibles, afin de proposer de premières identifications.
L'utilisation d'un sondeur ou d'un sonar à balayage latéral est autorisée sur ces sites afin de compléter l'imagerie qui pourra être acquise par photographie sous-marine.
Les photographies réalisées serviront également à la réalisation d'une photogrammétrie 3D des sites étudiés.

Concernant le mobilier archéologique :
Aucun vestige archéologique mobilier ne sera prélevé lors de cette opération.

Concernant les conditions d'intervention :
Les interventions s'effectueront conformément au *Manuel des procédures de sécurité en milieu hyperbare applicable aux activités placées sous le contrôle du Drassm* (manuel téléchargeable sur le site du ministère chargé de la Culture : http://www.culturecommunication.gouv.fr/Politiques-ministerielles/Archeologie/Archeologie-sous-les-eaux/Documentation-scientifique). Il est notamment rappelé que **seuls les participants disposant d'un certificat d'aptitude à l'hyperbarie (minimum classe I) valide et à jour de leur visite médicale,** sont habilités à participer à cette opération.

Art. 5 – Le titulaire de la présente autorisation se conformera strictement aux prescriptions émises par le Préfet Maritime de la Manche et de la Mer du Nord, qui sont annexées au présent arrêté.

Il est notamment tenu de signaler, sans délai, au Centre des Opérations Maritimes de Cherbourg, toute découverte ou suspicion de munition ou d'élément explosif.

Art. 6 – Le Directeur du Département des recherches archéologiques subaquatiques et sous-marines est chargé de l'exécution du présent arrêté.

Pour la Ministre et par délégation

Pour le Directeur
Le Secrétaire Général du DRASSM
Xavier TRAUTMANN

Copie :
- Préfet maritime de la Manche et de la Mer du Nord

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RÉPUBLIQUE FRANÇAISE

PRÉFECTURE MARITIME DE LA MANCHE ET DE LA MER DU NORD

Cherbourg, le 24 mai 2017

N° 0-18983-2017/PREMAR MANCHE/AEM/NP

PRÉFECTURE MARITIME DE LA MANCHE ET DE LA MER DU NORD

Division « action de l'État en mer »

Bureau « Domanialité »

Le vice amiral d'escadre Pascal Ausseur
préfet maritime de la Manche et de la mer du Nord

à

Monsieur le directeur du département
des recherches archéologiques subaquatiques et sous-marines

OBJET : avis du préfet maritime de la Manche et de la mer du Nord relatif à la demande d'autorisation de recherche archéologique sous-marine formulée par Monsieur DAVIES (référence OA 3206).

RÉFÉRENCE : courriel du DRASSM du 17 mai 2017.

Vous m'avez adressé pour avis une demande d'autorisation d'études archéologiques sous-marines sur diverses épaves du Débarquement de 1944 au large de la commune de Grandcamp-Maisy, pour identification et prises de vues. Cette campagne d'études, qui se déroulera du 3 au 8 juin 2017, à bord du navire « *Southsea explorer* » inclut des plongées sous-marines.

Au regard des responsabilités dont j'ai la charge, en application de l'article R532-7 du code du patrimoine, j'émets un avis favorable.

Pour l'ensemble de sa campagne, le pétitionnaire veillera à respecter les règles de la navigation et à prévenir les autorités maritimes 72 heures avant le début des opérations, ainsi que de toute modification ou annulation de celles-ci :

- au **secrétariat de la division « action de l'État en mer » :**
  Fax : 02.33.92.59.26 Mél : sec.aem@premar-manche.gouv.fr ;
- au **centre des opérations maritimes de Cherbourg :**
  Fax : 02.33.92.60.77 Mél : comar.manche.off.permanence.fct@intradef.gouv.fr ;
- au **CROSS Jobourg :**
  Fax : 02.33.52.71.72 Mél : jobourg@cross.fr ;
- au **sémaphore de Port-en-Bessin :**
  Mél : port.en.bessin.ops.fct@intradef.gouv.fr

Préfecture maritime de la Manche et de la mer du Nord – CC 01 – 50115 Cherbourg-en-Cotentin cedex
Dossier suivi par l'administrateur des affaires maritimes Anna Melesi
Tél : 02.33.92.60.57 – Fax : 02.33.92.59.26 – sec.aem@premar-manche.gouv.fr

Si des engins de pêche devaient se trouver sur votre zone de travail, je vous demande d'y prêter attention.

En cas d'incident en mer, vous pourrez à tout moment contacter le CROSS Jobourg par VHF 16 ou par téléphone en composant le 196. Pour information, si à l'issue d'une conférence médicale une évacuation est préconisée par le médecin, la personne impliquée sera transportée vers un caisson hyperbare civil. En effet, la référence du demandeur (§ 8.2) au Centre Hospitalier des Armées à Cherbourg est obsolète, depuis sa fermeture en 2002.

Enfin, en cas de découverte d'engins explosifs, le pétitionnaire devra alerter sans délai le centre des opérations maritimes de Cherbourg via le CROSS Jobourg (VHF 16 ou téléphone : 196) ou le sémaphore de Port-en-Bessin (VHF 71) conformément à l'arrêté n°03/2017 du 23 février 2017 relatif aux engins suspects trouvés en mer. Il veillera à limiter les manipulations de l'engin, à éviter les chocs et à rester éloigné de l'engin qui devra être considéré comme dangereux.

Le préfet maritime de la Manche et de la mer du Nord,
par délégation, l'administrateur en chef de 1ère classe
des affaires maritimes Jean-Michel Chevalier
adjoint pour l'action de l'Etat en mer
Original signé : ACAM Jean-Michel Chevalier

DESTINATAIRE :

- Monsieur le directeur du département des recherches archéologiques subaquatiques et sous marines

COPIES :

- DDTM/DML 14
- CROSS Jobourg
- COM Cherbourg
- FOSIT Manche – mer du Nord (servir sémaphore de Port-en-Bessin)
- GPD Manche
- Archives (AEM n° 3.6.3.0 - chrono)

Ministère de la Culture et de la Communication
Direction générale des patrimoines
Sous-direction de l'archéologie
Département des recherches archéologiques subaquatiques et sous-marines

Cadre réservé au DRASSM
Façade : MMAN OA : 3206
N° d'enregistrement DRASSM : Date :
Le directeur du Département des Recherches Archéologiques Subaquatiques et Sous-marines
Sébastien Legrand
Contrôleur de sécurité hyperbare
Visa du contrôleur de sécurité hyperbare
Michel L'HOUR
Visa du directeur du DRASSM

DOCUMENT DE CHANTIER
ANNEXE 2

Commune : Grandcamp Maisy, Normandie
Intitulé de l'opération : Projet Cardonnet
Date de l'opération : **Du** 03/06/2017 **au** 08/06/2017
Profondeur(s): < 24m
Navire(s) support : N/A
Embarcation(s) de sécurité : Southsea Explorer 6.5m RHIB

Caisson hyperbare référent : ~~Caisson Militaire Cherbourg~~ HOPITAL RAYMOND-POINCARÉ N° de téléphone : ~~02 33 92 78 00~~ 01-47-10-79-00
Chef de service : ~~Docteur RIOU - Service de Médecine~~ MEDECIN DE GARDE N° de téléphone : Tel: 02 33 92 77 31 01 47 10 77 78

SAMU, SMUR : **15** POMPIERS : **18/112** (portable)
CROSS (Med, Etel, Corsen, Jobourg, etc.) : **VHF canal 16 ou 13 / Tél : 196**

Procédure utilisée/ DRASSM / Manuel de procédure ou autre : Drassm
Données de plongée utilisées : MT12
Paliers (air / oxygène) : Air
Majoration (temps, altitude) :

Non

Profondeur	Temps	Paliers
24	45	10@3m

Conditions particulières du site : non
Consignes générales de plongée en rapport avec le site : Fr Fed + BSAC procédures de plongée sécuritaire
Procédure de rappel d'urgence : Écoulement continu audible de l'échelle de bateau en métal
Procédure d'appareillage d'urgence du site : Alert Coastguard par DSC radio Ch 16 administration de 02

Responsable d'opération :
Martin Davies
Signature
Martin Davies

Chef(s) d'opération hyperbare :
Alain Demaré
Signature(s)

C.O.H.	Météorologie	FICHE DE SECURITE - DRASSM	Date
Surveillant Surface	Etat du plan d'eau	Marée PM : BM : ALT. :	Lieu

Intervalles	PERSONNEL SECOURS	PLONGEURS	Immersion h	Immersion mn	Prof.	Durée (fond)	1er palier 0° h	1er palier 0° mn	Paliers 9 m	Paliers 6 m	Paliers 3 m	Air / O2	Surface h	Surface mn	Durée Totale	Pression Départ	Pression Arrivée	Travail effectué / Observations
Total temps de plongées :																		

Ministère de la Culture et de la Communication
Direction générale des patrimoines
Département des recherches archéologiques subaquatiques et sous-marines

Cadre réservé au DRASSM
Façade : MED N OA : 326
N° d'enregistrement DRASSM : Date :
Sébastien [illegible]
Contrôleur de sécurité hyperbare
Visa du contrôleur de sécurité hyperbare
Le directeur du Département des Recherches Archéologiques Subaquatiques et Sous-Marines
Michel L'HOUR
Visa du directeur du DRASSM

PLAN DE PREVENTION DES RISQUES
ANNEXE 3

√ *Réponse demandée en respectant la trame du document et la numérotation*

1- Renseignements généraux

1.1- Nature des travaux

Pour plonger et enregistrer les épaves du Banc du Cardonnet au moyen de mesures vidéo, photographiques et de sites. Création d'images 3D des épaves.

1.2- Horaires et hébergement

03/06/2017 - 08/06/2017 Grandcamp Maisy, Calvados, Normandie

1.3- Effectifs

6 plongeurs plongeant chaque jour pendant 6 jours

1.4- Avis d'ouverture de chantier

Notifier le garde-côtes via la radio VHF du début et de l'achèvement des opérations de plongée

1.5- Médecine du travail

Urgence Thérapeutique d'urgence et boîte de premiers secours présente sur bateau. Oxygène supplémentaire disponible sur terre (Grandcamp Maisy marina). Les plongeurs sont formés aux premiers secours et aux procédures de sauvetage.

1.6- Accès au batcau support ou au lieu du chantier

Bateau de soutien pour plongeur présent en tout temps. Accès au batcau par l'intermédiaire d'une échelle ou par manutention manuelle.

1.7- Liste du matériel utilisé

open and closed circuit recreational scuba equipment. Photographic equipment, measurement equipment.

2- Installation du chantier

L'emplacement du site sera marqué avec une bouée temporaire pour la durée des opérations de plongée.

3- Risques inhérents au chantier

Faible visibilité sous-marine. Courant des marées. Conditions météorologiques défavorisées.

4- Matériel utilisé sur le chantier

4.1- Bateau support et embarcations annexes

Aucun applicable

4.2- Appareils à pression de gaz

Tous les bouteilles de plongée sont confirmés en date de test obligatoire et remplis d'air d'un compresseur portatif selon la norme EN12021.

4.3- Moyens logistiques

La logistique et les fournitures disponibles de Marina à Grandcamp Maisey. Une équipe de soutien de 4 personnes est disponible.

5- Mode opératoire

Les opérations débuteront quotidiennement depuis le port de plaisance de Grandcamp Maisy. Les conditions météorologiques et maritimes seront examinées avant le départ et tous les participants seront informés de l'exercice de la journée et de tout risque. À l'arrivée sur le site de plongée, l'emplacement de l'épave sera marqué par une bouée. Les opérations de plongée seront organisées en 2 groupes. Chaque groupe fournira une couverture de sécurité de surface tandis que l'autre groupe plongera. Le bateau Coxswain sera qualifié pour faire fonctionner le bateau dans les eaux françaises. Les plongeurs fonctionneront par paires dans le plan de plongée convenu. Sous l'eau, les épaves seront photographiées et des mesures de base seront prises.

6- Moyens de protection collective

6.1- Protection contre les chutes

Pas de travail en hauteur

6.2- Protection particulière applicable aux scaphandriers

Tous les plongeurs porteront des costumes secs pour la protection de l'exposition

6.3- Protection contre le feu

Le bateau est équipé d'un extincteur portatif.

6.4- Stockage des carburants et des huiles

Le bateau a un réservoir d'essence intégré sous le pont plus un réservoir dans la console du bateau. L'huile moteur est stockée dans le réservoir dans la console.

6.5- Manipulation de l'oxygène

Tous les plongeurs sont formés à l'utilisation et à l'administration de l'oxygène thérapeutique. L'oxygène est transporté sur le bateau dans un récipient étanche.

7- Moyens de protection individuelle

7.1-Habilitations et assurances

Tous les plongeurs ont une assurance personnelle pour la plongée et la responsabilité civile (£10,000,000). Tous les plongeurs détiennent une assurance voyage et des cartes européennes d'assurance maladie. Le bateau est également assuré pour des pertes, des dégâts et des opérations à l'étranger.

7.2-Démobilisation des plongeurs à l'issue de leur séjour

Pendant la durée du projet, les plongeurs seront hébergés dans une maison à Grandcamp maisy où ils retourneront chaque jour.

7.3-Protection particulière lors des manutentions

Aucune protection spéciale n'est requise.

7.4-Armement des embarcations

Équipement de sécurité pour bateaux: 2 x radio DSC VHF, 2 systèmes de navigation GPS, évasements, 6 x gilets de sauvetage, corner audio, extincteur, boîte de premiers secours, frein à remorquage, oxygène médical 600L, réflecteur radar, Flag Alpha,Rames, pompe de cale automatique, échelle, feux de navigation et sonar.

7.5-Information au personnel

Toutes les personnes recevront un briefing sur la sécurité des bateaux et de la plongée. Les procédures d'urgence ont également été documentées et conservées dans la console du bateau

8- Procédure en cas d'accident

8.1-Accident non lié à la plongée

Évaluer la situation / le danger et administrer les premiers soins, le cas échéant. Appel / radio pour assistance et assistance médicale si nécessaire. Coastguard Ch 16. Docteur à Grandcamp Maisy Olivier Royer
Adresse: 65, Rue Aristide Briand, 14450 Grandcamp Maisy
Téléphone: +33 2 31 22 60 44
Services d'urgence appel 112

8.2-Accident lié à la plongée

Urgences en mer impliquant des plongeurs. Évaluez la situation et informez Coastguard Ch16 (MAYDAY ou PAN PAN) en précisant le bateau, l'emplacement et la nature de l'urgence. Administrer les premiers soins et l'oxygène, le cas échéant. Tous les plongeurs doivent être récupérés à l'aide d'un système de rappel. Suivez les instructions du garde-côtes.
Incident medical impliquant des plongeurs sur terre. Évaluer la situation, administrer les premiers soins / l'oxygène si nécessaire. Appeler URGENCE MÉDICALE - Tél: 15
Chambre hyperbare la plus proche:
~~Caisson Militaire~~
~~Centre Hospitalier des Armées René la Bas~~
~~Docteur RIOU - Service de réanimation~~
~~64 Rue de l'Abbaye - BP3~~
~~50110 CHERBOURG-NAVAL~~
~~Tél: 02 33 92 73 00~~

HOPITAL RAYMOND - POINCARE
104 Boulevard Raymond Poincaré
92380 GARCHES
TEL: 01.47.10.79.00
Médecin GARDE
TEL: 01.47.10.77.78

9- Documents régissant le chantier

Rappel des textes :

- décret n° 90-277 du 28 mars 1990, modifié par le décret n°2011-45 du 11 janvier 2011, et ses arrêtés d'application et ses annexes,
- décret n° 95-608 du 06 mai 1995,
- décret n° 96-364 du 30 avril 1996,
- arrêté du 21 avril 2016,
- le *Manuel des Procédures de Sécurité en milieu hyperbare* du DRASSM (version 2016),
- le document de chantier,
- le plan de prévention des risques.

Signatures du directeur du DRASSM, du contrôleur de sécurité hyperbare référent pour la zone, du chef d'opérations hyperbares et de chaque intéressé lors de la diffusion.

Signatures:

Responsable d'opération :

Martin Davies

Chef(s) d'opération hyperbare :

Directeur du Drassm :

Le directeur du Département des Recherches
Archéologiques Subaquatiques et Sous-marines

Michel L'HOUR

Contrôleur de sécurité hyperbare :

Sébastien Lee
Contrôleur de sécurité
Hyperbare