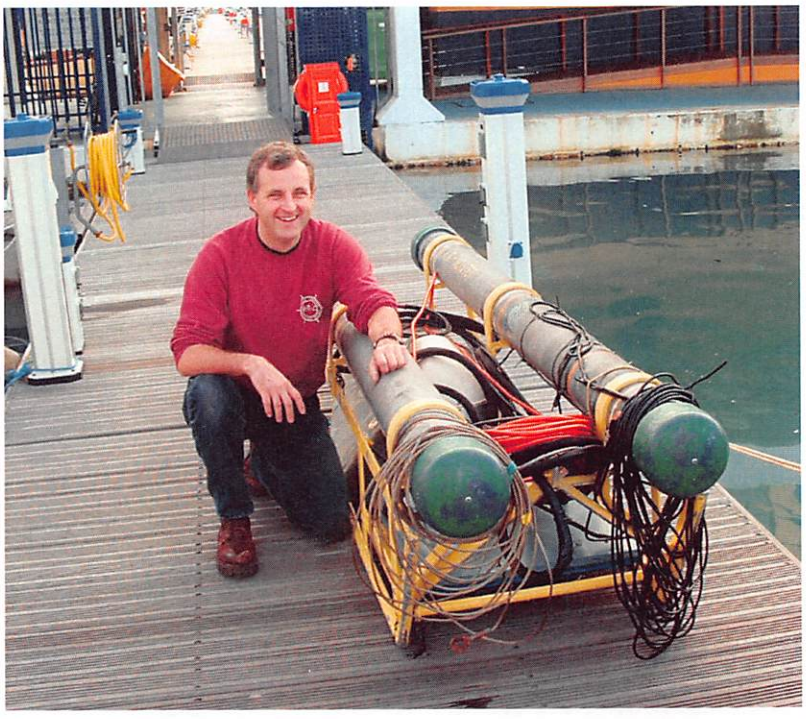
BSAC Jubilee Trust Fund Report

The Brighton Marina Protected Wreck Project (2004 – 2005)

Keith Clark



Acknowledgements

The author is indebted to the following: -

The British Sub Aqua Club Jubilee Trust Fund for providing the bulk of the funds used to carry out the geophysical survey. In addition the grant provided by the Pilgrim Trust allowed the previous surveys to be located and deposited in the National Monuments Records Office (Swindon).

Stan Merralls for generously allowing access to his personal archives of the diving records and survey plans gained during the 1970's and 1980's.

Dr Jim Bennell, Mike Edgar and The University of Wales for providing and operating the geophysics equipment and for putting up with the cramped conditions.

Members of the Brighton Branch of the British Sub-Aqua Club who provided some of the skippers and the use of "*Nikaria*"

Premier Marinas for their generosity for providing a free berth for *Nikaria* during the survey and their patience when weather conditions prevented us from retrieving it for a week after the completion of the activities.

Dr. Douglas McElvogue and Dave Parham without them the initial conversation that started this project would never have taken place. In addition Dave provided much of the archaeological guidance and historical perspective used throughout the project.

Finally to Ali Wheeler for use of her home as crew accommodation and base camp and her understanding as support diver for the many hours of fruitless searching!

Thank you everyone.

Keith Clark

(Submitted May 2006).

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1 Abstract

The south coast of England has one of the highest concentrations of shipwrecks in the world. Many examples of these are represented in the area around Brighton, one of the earliest being the protected wreck at Brighton Marina. The finds from this site included one of the earliest pieces of ordinance recovered from the seabed – the hackbutt gun. The site was protected in 1983 and little further work has been carried out since. The aim of this project was to recover as much of the previously unpublished surveys as could be found and place them in the public domain. In addition a non-intrusive geophysical survey was to be carried out along with limited diving to confirm "ground truth" for any anomalies discovered.

2 Background

In June 2003 Sussex University tried to run a part-time course in marine archaeology unfortunately due to lack of numbers it did not proceed. The author was keen to attend the module so contacted the speaker and organised an alternate venue and group of students, primarily members of Brighton Sub-Aqua Club. The course entitled "Treasure of the Sea" (Appendix A), ran over two consecutive Sundays in November 2003, covered the history of sea faring from the Bronze Age to World War II and also covered the history of diving. During the lunch break the topic of the protected wreck at Brighton marina came up. The two presenters Dr Douglas McElvogue a Senior Research Fellow at the Mary Rose Trust and Dave Parham a research Fellow at Bournemouth University expressed interest in carrying out a joint project. They were keen to visit a number of protected wreck sites in the UK and discover their current condition. The author enthusiastically agreed to this and fronted a grant application to the Local Heritage Initiative. However after a meeting with the Local Heritage representative it was clear that the scope and aims of the two parties was not mutual as the need to involve schools with an "outreach program" was beyond the resources of the part-time participants. A new grant application was made to the British Sub-Aqua Club Jubilee Trust Fund. The same fund had, some years before, provided funds for the surveying of the Brighton Marina wreck and was quickly persuaded to provide a further grant of £1,000 to carry out a geophysical survey of the site. A further grant of £3000 was received from the Pilgrim Foundation to ensure that records from previous surveys as well as the proposed project were housed with the National Monuments Records Office (Swindon).

3 The Brighton Marina Wreck Site

As the author rapidly discovered when investigating historic wrecks things are rarely straight forward and the "truth" about their discovery often difficult to discover. There have been several cannon discovered on or about the Black rocks. In 1963 Dave Berry discovered a cannon, which was eventually handed over to the Royal Armouries (Appendix C).

The first clue that there was a site of some significance on the Brighton Marina site (Sussex, UK) occurred on 4th August 1974 when Stan Merralls a member of the "Black Cats" and newly qualified Dive Leader, discovered an heavily concreted iron cannon (Appendix D) some 100 metres

from the newly built Brighton Marina (Figure 1) during a dive to 7.5 meters in visibility of 2.5 metres. The walls of the breakwater comprised some 35 caissons weighing 3,000 tons (Fenwick, 1998, *pp 60-62)* each and stretched 630 metres into the sea and were a dive site often used by the "Black Cats" the local Basildon British Sub Aqua Club (BSAC) Branch. Realising that this could form an interesting activity the Brighton Cannon Project was born. Stan collected together several like-minded individuals who took on a variety of roles including Project Leader, surveyor, researcher, secretary, records and equipments officers. The first task was to relocate the gun but poor visibility and shifting silt defeated them for several years during which time the project was nearly scrapped. However, on 3rd July 1977 Stan's son, Robert, found the cannon once again as the silt had disappeared and visibility improved to 6 metres. A week later a most significant find was made that of the bronze hackbutt gun. Typically iron guns are difficult to put an exact date on however, bronze guns are a lot easier and the gun dated the site to *c.*1474. The iron cannon turned out to be a stave built gun with the staves held in place by a series of heat shrunk reinforcing rings. Several of theses guns were recovered during 1977, as were several swivels and lead shot released from concretion (Appendix D).

Figure 1 Location of the Brighton Marina Protected Wreck

At this point Adrian Barak a member of Brighton BSAC and Diving Officer of the *Mary Rose* project became involved along with Margaret Rule also from the *Mary Rose.* They provided very useful assistance in lifting and conservation techniques.

In 1982 a further stave built gun was raised along with remains of its wooden carriage, wooden tampion and stone cannon ball. It was not until 1983, some 11 years after the initial discovery of the iron gun, that the site was designated (Appendix B) despite a earlier application. During the period

leading up to this it was common for carefully laid out rope grids and buoys to be torn out by fisherman's nets or anchors. In the years that followed a set of moorings were added which allowed a new grid to be set up. This formed the basis of a grid search with metal detectors in which more small artefacts were found. In the years that followed (see Section 4.1) the sand gradually started to bury the remains and the ADU (Archaeological Diving Unit) made periodic visits to the site carrying out visual surveys.

4 The Paper Chase

As with all archaeological projects one of the first steps is to inspect the evidence of any previous work undertaken. In the case of the Brighton Marina wreck site the bulk of the work had been carried out by Stan Merralls and his team (Appendix D). However, the work had never been published or centrally stored. Using the funds donated from the Pilgrim Trust Dave Parham tracked down Stan Merralls and was able to borrow the original documentation, essentially comprising a chronology of the site and set of plans showing the location of all artefacts prior to their removal and any left *in situ*, and create copies. The copies of these documents were the basis of a detailed site plan produced (see Figure 7) by Wessex Archaeology once again using Pilgrim Trust funds. Finally Dr Douglas McElvogue produced detailed drawings of the major finds (Figure 2, Figure 3, Figure 4, Figure 5 and Figure 6). All documents pertaining to the site will be deposited with the National Monuments Records office based at Swindon.

4.1 Brighton Marina Wreck Site Chronology

(Provided by Dave Parham from Stan Merralls notes)

1977:

- The cannon, originally discovered in 1974 was relocated by the Black Cat Sub Aqua Club and positively identified by Margaret Rule and Adrian Barak as a wrought iron stave built cannon circa 1545 (Figure 4).
- A large concretion was raised and deposited with Margaret Rule for x-ray and metal detector tests. It was subsequently shown to contain a stave built breech chamber, three 2 inch diameter lead shots, several various sized swivels (Figure 2 & Figure 3) and some unidentifiable pieces of iron.
- Mention was made of previous finds, namely The Brighton Minion, a bronze cannon (Figure 5) recovered in July 1963. A stone cannon ball had also been found in 1968/69 in the same area along with a large wooden and iron anchor and another possible cannon.
- The cannon was raised and removed to Margaret Rule's house. The wooden and iron anchor was relocated, measured and left as it was found for raising at a later date.
- A bronze hackbutt (circa 1475) was raised (Figure 6).
- Conservation carried out at Southsea Castle.
- A framework of heavy timbers found on the last dive of the year but not fully investigated.

1979:

- The Black Cat Sub Aqua Club received the Peter Small Trophy presented by the British Sub Aqua Club for the "Project of the Year".
- A donation of £1000 from Carreras Rothman Ltd. was used to purchase metal detecting equipment, which was employed on the site.

1982:

- Barrel was raised prior to the designation order. Conservation treatment completed.

1983:

- The site was designated a restricted area under the Protection of Wrecks Act of 1973 and S. Merralls was granted a license to survey the site of the vessel which was believed to be lying wrecked in the restricted area.

1984:

- Five moorings were constructed on the seabed and an East-West aligned base line of 100m length established. The area was searched visually and with metal detectors in 3m. square grids. Further survey work on the site revealed two more breech chambers, both heavily concreted, which were raised with the permission of the Dept. of Transport and sent to Southend for conservation.

1985:

- A visual search conducted in the area relocated the large iron and wooden anchor and a small, loose piece of concretion that was raised and found to be a hollow iron cannon ball. It was sent for conservation treatment. Various sizes of timbers were also discovered.

1986:

- Further survey work suspended due to confrontations with anglers, inclement weather and poor underwater visibility.

1987:

- Slowly encroaching sand discouraged the Basildon divers, many of whom had been made redundant by Gallaghers, from further work, but an ADU report recorded no visible archaeological material and no obvious threats to the site.

1989:

- No further diving by Basildon divers. ADU report again shows no archaeological material exposed and that a slowly increasing blanket of sand was helping to protect the site.

1990:

- A visual assessment of the site and removal of modern debris was carried out by the Brighton Marina Site Survey Group. The original north and central sinkers were located but no wreck artefacts were recovered.

1992:

- An ADU inspection reported no archaeological material visible and no obvious threats to the site apart from the possibility of rubble from construction work on shore.

1995:

- The ADU report on the site again shows no archaeological remains seen and the site protected by a covering of sand.

1999:

- An ADU inspection concluded that most of the archaeological remains on the site are obscured by high sand levels and is not currently threatened. A local contractor reported seeing exposed ship timbers on the edge of the designated area and that it should be extended by 10 metres to guarantee their inclusion.

2004:

- The current team carried out geophysical Survey using a magnetometer.

2005:

- Limited diving inspection carried out by the author. No sign of any archaeological remains.

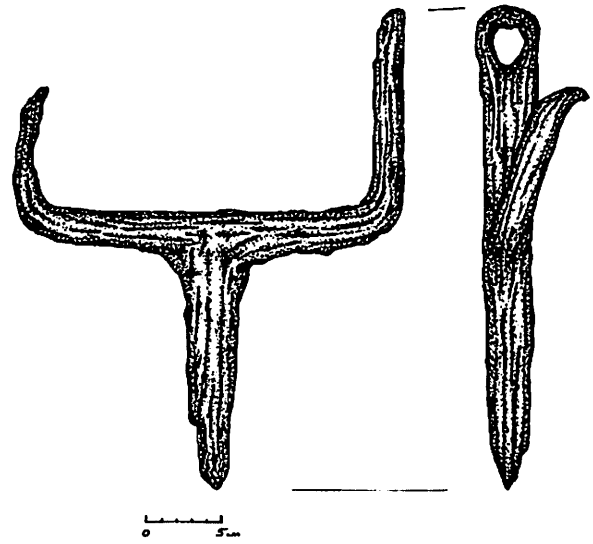


Figure 2 Iron Swivel (1)

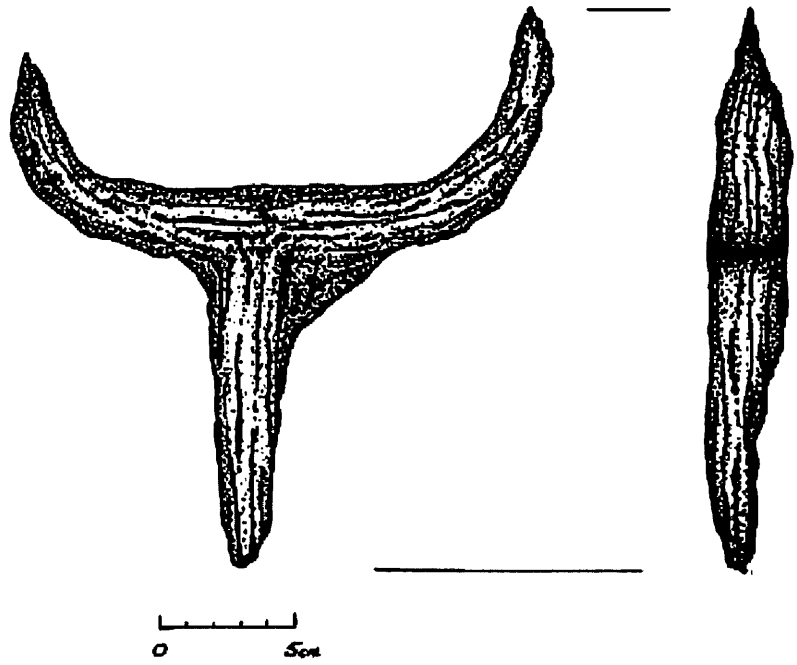


Figure 3 Iron Swivel (2)

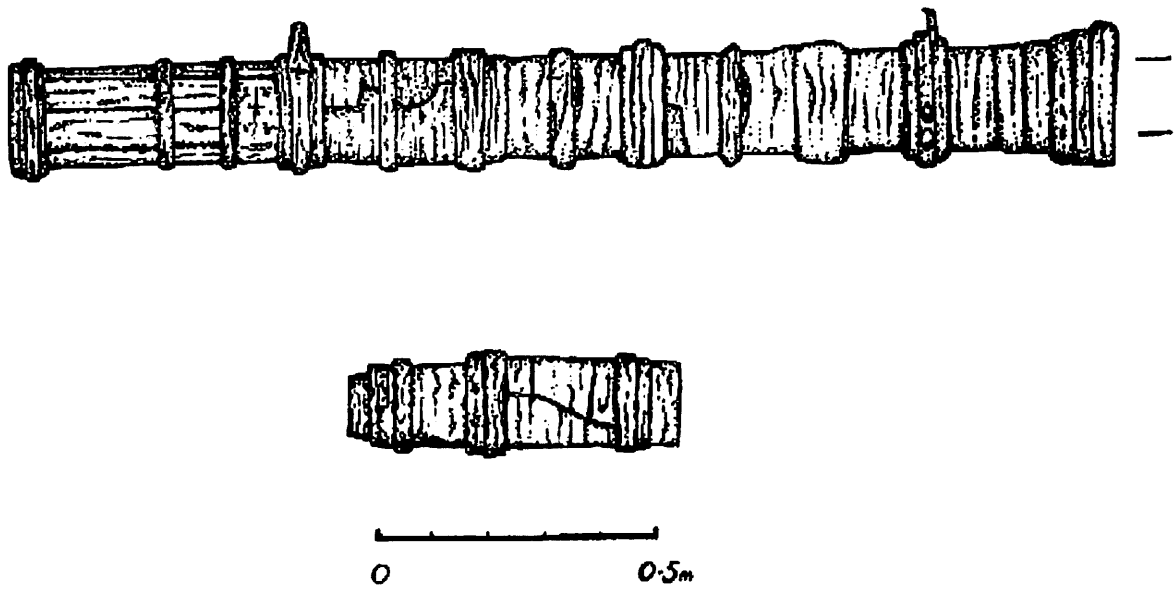


Figure 4 Iron Stave Built Cannon and Breech Block

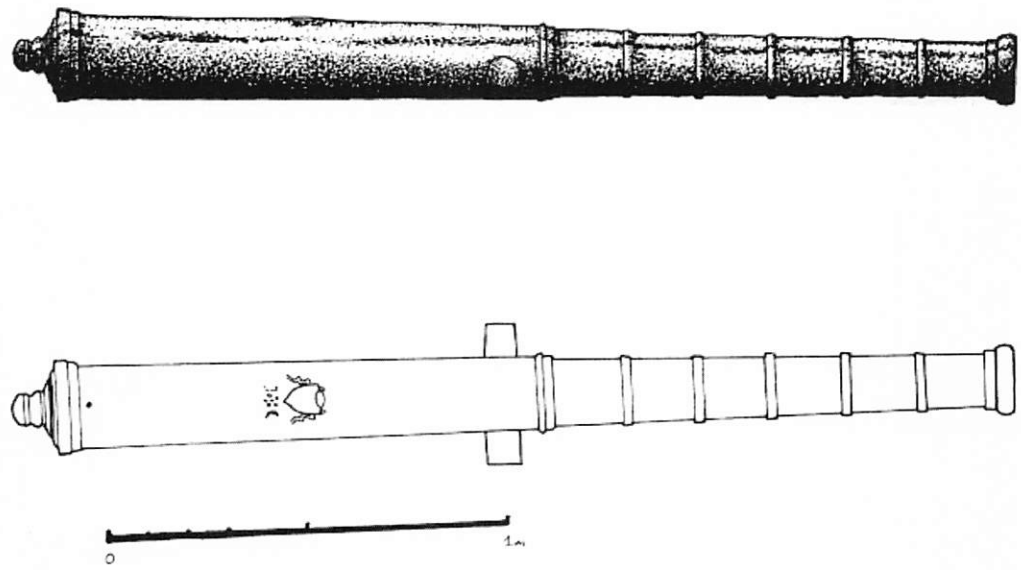


Figure 5 Bronze Minion (Now in Fort Nelson)

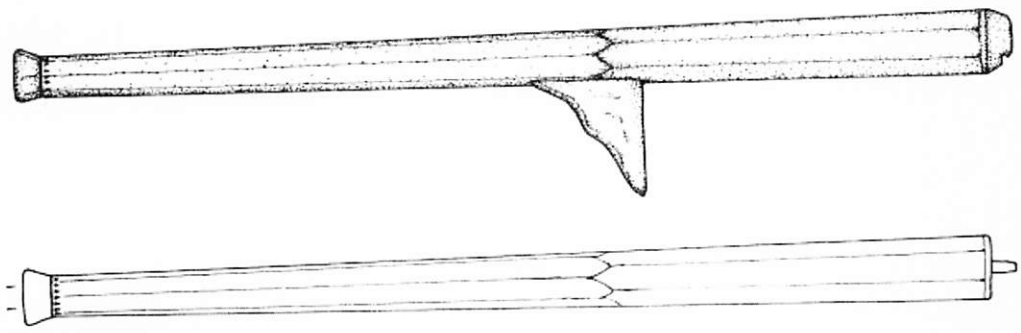


Figure 6 The Bronze Hackbutt Gun

Brighton Marina designated wreck site plan (After S.Holmes 1977) Figure 5

Figure 7 Site Plan Created From Stan Merralls Survey By Wessex Archaeology

5 Local Geology

An understanding of the local coast geology helps explain the current condition of the Brighton marina wreck site. Huge chalk cliffs (Figure 8) stretching (See Section 15) from Black Rock in the west to Castle Hill at Newhaven in the east dominate the coastal geology around the marina site (chalk was once an important local produce used in the production of cement). The cliffs are designated a Site of Special Scientific Interest (SSSI), a Regionally Important Geological Site (RIGS) and a Geological Conservation Review site (GCR).

A significant feature of this region is the extensive wave-cut platform cut into the chalk and extending a considerable distance from the shore. The marina itself and protected wreck site both exist on this platform. The chalk contains characteristic veins of flint and underwater the chalk platform has been eroded by the action of the sea into long gullies radiating from the shoreline. These gullies are constantly filled by and emptied of the fine gravel and chalk sands that are brought by long shore drift from the west. Local sea conditions have been modified by the comparatively recent addition of the marina, the western breakwater adds to the problem of a constantly shifting underwater landscape.

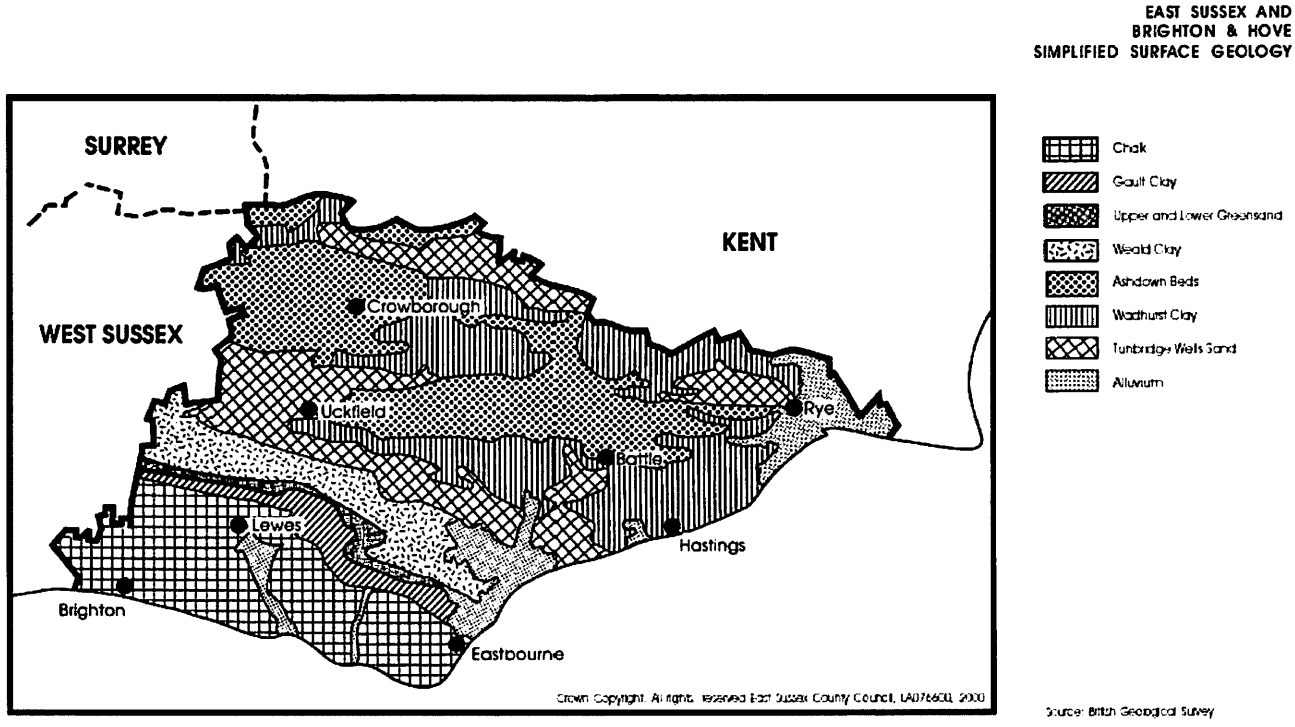


Figure 8 The Geology of Sussex

6 General Description of Underwater Site Surveying Equipment

What follows is a general description of the types of equipment used on maritime archaeological sites followed by a more detailed description of their use on the Brighton Marina site.

6.1 Survey Boat

Most remote surveys require a survey boat capable of accommodating skipper, deck crew, equipment operators and some combination of magnetometers, side scan sonar, sub-bottom profilers, GPS, generators, large lengths of cables and buoys. The boat could be hired locally in which case the skipper's competency and boat certification must be checked. However, if brought along by the survey team then access to and from the waters edge must be planned. Hiring a local boat is generally more cost effective than transporting a dedicated vessel.

6.2 Global Positioning System (GPS)

Given the size of the search area and target it is essential to be able to accurately relocate the position of any returns. GPS is a system of geolocation that utilizes radio beacons mounted on a constellation of satellites orbiting the Earth. A GPS receiver picks up position and time information from several satellites to trilaterate an unambiguous position. The system has two accuracies one associated with the Precise Positioning Service (PPS) and the other Standard Positioning Service (SPS). However, all commercial receivers now have access to PPS accuracy via the SPS. The accuracy of PPS is typically quoted as four metres but in times of war the accuracy of the SPS can be deliberately downgraded to around one hundred metres. For high accuracy measurements differential GPS can be used. This requires the use of a GPS receiver at a known geodetic position transmitting data to the mobile unit. Many commercial receivers now have differential capability built in. This portable equipment now has proven terrestrial (Figure 9) and maritime heritage and the cost of a receiver is very cheap.

Figure 9 Terrestrial archaeologists using Differential GPS

6.3 Side Scan Sonar

A derivative of the simple echo sounder, side scan sonar utilises a towed "fish" with ultrasonic transducers on either side to build up an extensive view of the lakebed topography. Short pulses of

high frequency sound waves (100 – 500 kHz) are transmitted from each side of the "fish" in a fan shaped beam as it travels through the water (Delgado, 1997, p.384). Echoes from underwater obstructions such as wrecks and the lakebed are returned to the tow fish and passed, via a cable, to a signal processor unit. These units provide both a visual output on a screen or paper roll and a method of long-term data storage. Typically units also accept GPS signal data so that underwater features of interest can be quickly relocated for further investigation. The traces of side scan sonar surveys can be affected by changes in water salinity, seabed texture (for example silt or gravel bottom), shadowing (where one object is hidden by the shadow of another) and underwater vegetation, (such as kelp or weed). Side scan works best in flat unobstructed areas of constant salinity with little vegetation. George Bass successfully used this equipment in 1967 to locate a 2,000 year-old ship in ninety-five metres of water off the coast of Turkey (Delgado 1997 p.385).

Side scan data is only useful if all or part of the target lies above the seabed. Figure 10 shows the side scan return for Donald Campbell's "Bluebird" discovered in Coniston Water in 2001. For accurate readings and ease of interpretation the fish must be towed at a known height and the display equipment kept dry. The tow fish and associated cables are bulky and require adequate deck space for ease of operation.

Figure 10 Side Scan Image of "Bluebird" at the bottom of Coniston Water

6.4 Sub-Bottom Profiler

Sub-bottom profiler's work in a similar way to side scan sonar but utilises lower frequencies (3 – 15 kHz) and direct the sound downwards rather than outwards (Delgado 1997 p.406). The sound waves penetrate the seabed and are reflected by different strata and obstructions. Thus the instrument produces a record of the time it takes the sound wave to return and the acoustic reflectivity of the sediment. The system once again requires a bulky towed fish and associated cables, power source and dry area for the display equipment. The advantages of the system are that it can produce a picture of what lies beneath the seabed whether made of ferromagnetic material or wood. Surprisingly the sub-bottom profiler is capable of detecting changes in the acoustic properties of the seabed up to 100 meters below the surface, this includes both archaeological and geological features.

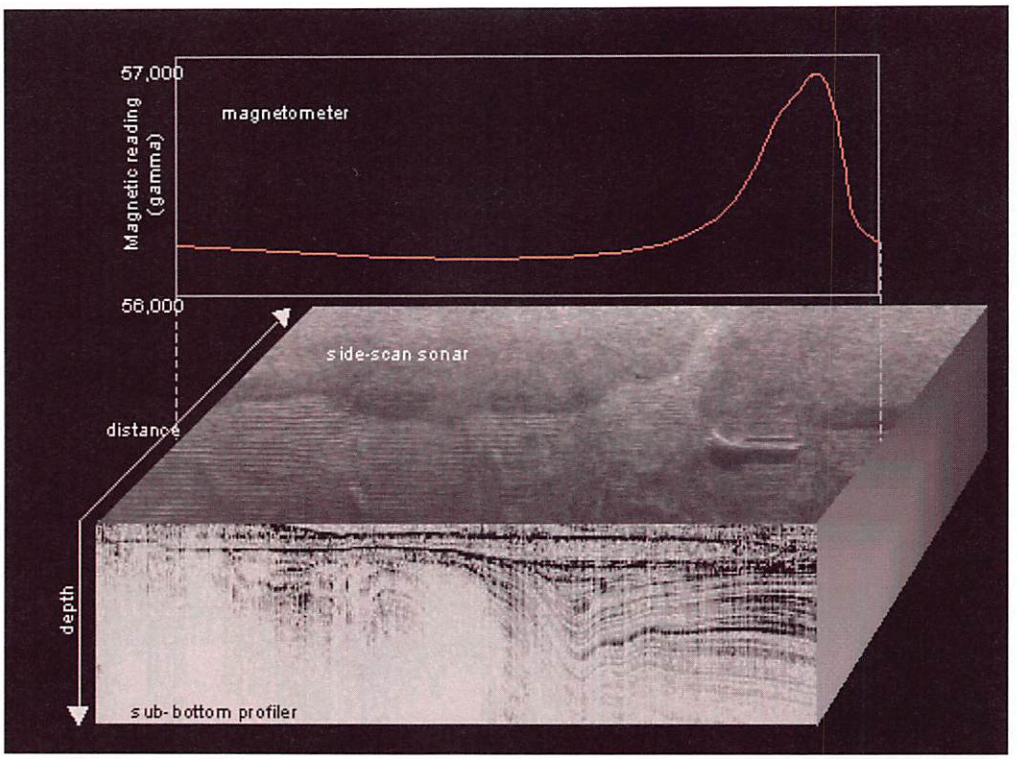


Figure 11 Comparing the responses of side-scan sonar, sub-bottom profilers and magnetometers

6.5 Magnetometer

Magnetometers are primarily used to detect buried or submerged ferromagnetic materials such as iron (Delgado 1997 p.253). They work by measuring the Earth's magnetic field, sources of ferromagnetic material (and thermoremenant materials such as pottery) cause local distortions within this field known as anomalies. The sensor head of this equipment must be kept well clear of local sources of variation for example the survey vessel. Usually the magnetometer head is towed behind the survey boat. GPS data is often saved at the same time as magnetometer information to stamp both time and position details so that the site can be easily re-visited. The processed display will typically consist of contours of constant magnetic field. Magnetometer data is historically more difficult to interpret than side scan data as many different parameters can combine so as to produce the same magnetic signature. Quasi-empirical techniques are often used to analyse the data. Advantages of this system are that both buried and unburied material can be found and large areas can be quickly covered. Disadvantages are that only ferromagnetic material can be found, the equipment is prone to snagging and a dry area is required for the display and processing equipment.

7 The Geophysical Survey

It was quickly apparent that the proposed project would be cash rather than volunteer limited. Although funds of some £4,000 had been raised this was very restrictive for such an undertaking, favours were called in and the goodwill and patience of those involved in the project tested. Many people and organisations provided equipment, personnel, food and accommodation so that the project could proceed.

Brighton BSAC graciously agreed to donate the use of their dive boat "*Nikaria*" (a Lockin 33 hard boat) for the cost of fuel. This boat was ideal for use on the survey as it had a large open deck to house the sensors, cables and generators required. There was a small dry cabin that could be used to house the various signal processors, plotters and computers used to record and observe the progress of the search. In addition members of the club acted as skipper due to their previous handling of the craft. These members provided additional help at configuring the equipment, providing accommodation and food. Premiere Marinas – owners of Brighton Marina and previous benefactors of the "Black Cat" divers during the surveys of the 1980's generously provided free berthing for "*Nikaria*" for the period of the survey (and beyond, as will be revealed). The University of Wales provided the side scan sonar, magnetometer, sub-bottom profiler, experienced operator and student support. Finally, Bournemouth University provided one of their top archaeologists (Dave Parham) to supervise proceedings.

Telephone and personal meetings between the author and Dave Parham established a period of three days in 2004 when the required personnel and equipment were all available at a mutually convenient time – all that was required, was good weather!

On Sunday 17th October 2004 several members of Brighton BSAC ferried "*Nikaria*" from her usual berth at Shoreham to her temporary home at Brighton marina. On the same evening Jim Bennell and Mike Edgar arrived from Bangor with a large van containing all the geophysical equipment. Dave Parham arrived and all were soon locked in discussions for the following days surveying activities. A concentrated look at the weather forecast showed that the hoped for good weather was unlikely to occur! Day one would comprise arriving at the marina, transporting the equipment to the boat and configuring all the equipment. If time permitted a quick magnetometer and sub-bottom profiler survey would be carried out. On day two the sub-bottom profiler and side scan surveys would be carried out. The final day would be used to complete any outstanding activities and packing the equipment up for transport to Bangor.

7.1 Monday 18th October 2004

After a good nights sleep the team members took the equipment to Brighton marina and spent several strenuous hours transporting the equipment in small yachting trolleys to "*Nikaria*". A vast array of generators, computers, submersible and "dry" electronics were soon configured on the boat. Opportunities were taken to show all-present how the equipment was connected together and checked for correct operation.

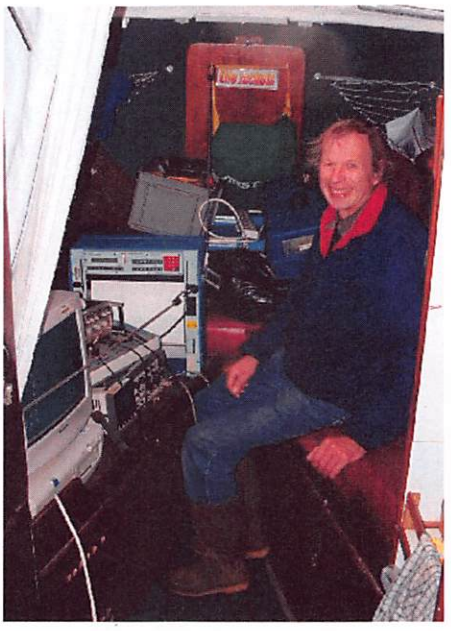


Figure 12 Dr Jim Bennell With The Dry Equipment

Figure 13 Survey Boat "Nikaria" With Sub-Bottom Profiler in Foreground

The amount of electrical equipment required for the survey could not be serviced by the on board generator so two petrol generators were used. One powered the "boomer" (sub-bottom profiler) and the other the computers and associated signal processing equipment. This arrangement helped ensure that the signals recorded were free of the electrical noise that the pulsed operation of the boomer could cause.

Figure 14 shows the sub-bottom profiler configuration used during the survey. It can be seen that a trigger pulse from the pulse generator was amplified and used to fire the transmission transducer (basically two large metal plates that were clashed together). The resulting acoustic wave travelled through the water to the seabed where it was reflected back to the receiver (a glorified microphone). The returned signal was cleaned up and displayed on a thermal printer and oscilloscope. At the same time the data was digitally recorded every 50 milliseconds. A differential GPS unit was used to position stamp all the sub-bottom profiler signals so that they could be plotted on a chart at a later date. Figure 15 shows the tow fish on the marina prior to deployment. The tow fish was trailed 5 metres behind the boat using a rope; the signal cable was loosely taped to the rope.

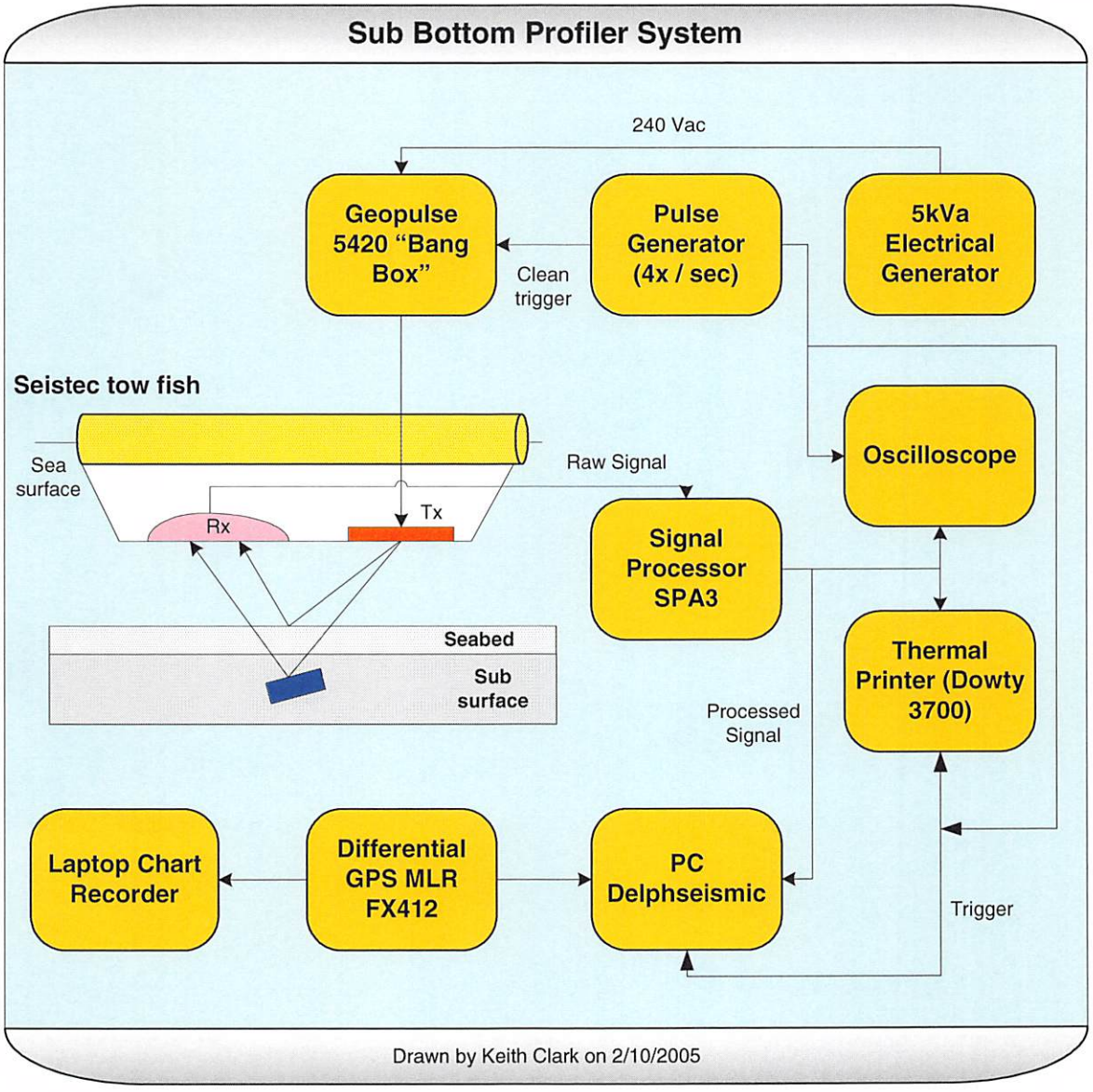


Figure 14 Sub-Bottom Profiler Equipment Configuration

Figure 15 The Sub-Bottom Profiler Transmit / Receiver Tow Fish

Figure 17 shows the significantly more simple equipment set-up used for the magnetometer. In essence the magnetometer sensor head (Figure 16) was trailed some 30 meters behind *Nikaria,* this was plugged into the digital processing box and memory store. Outputs were also sent to an external back-up store and plotter that allowed instant evaluation of magnetic anomalies. The information recorded by the data recorder was time locked to the differential GPS signals to allow them to be plotted as latitude and longitude on a WGS84 geoid at a later date. Some post processing was required to allow for the 30 meters of cable between the magnetometer sensor head and GPS antenna.

Figure 16 Magnetometer Sensor Head, Feed Cable & Generator

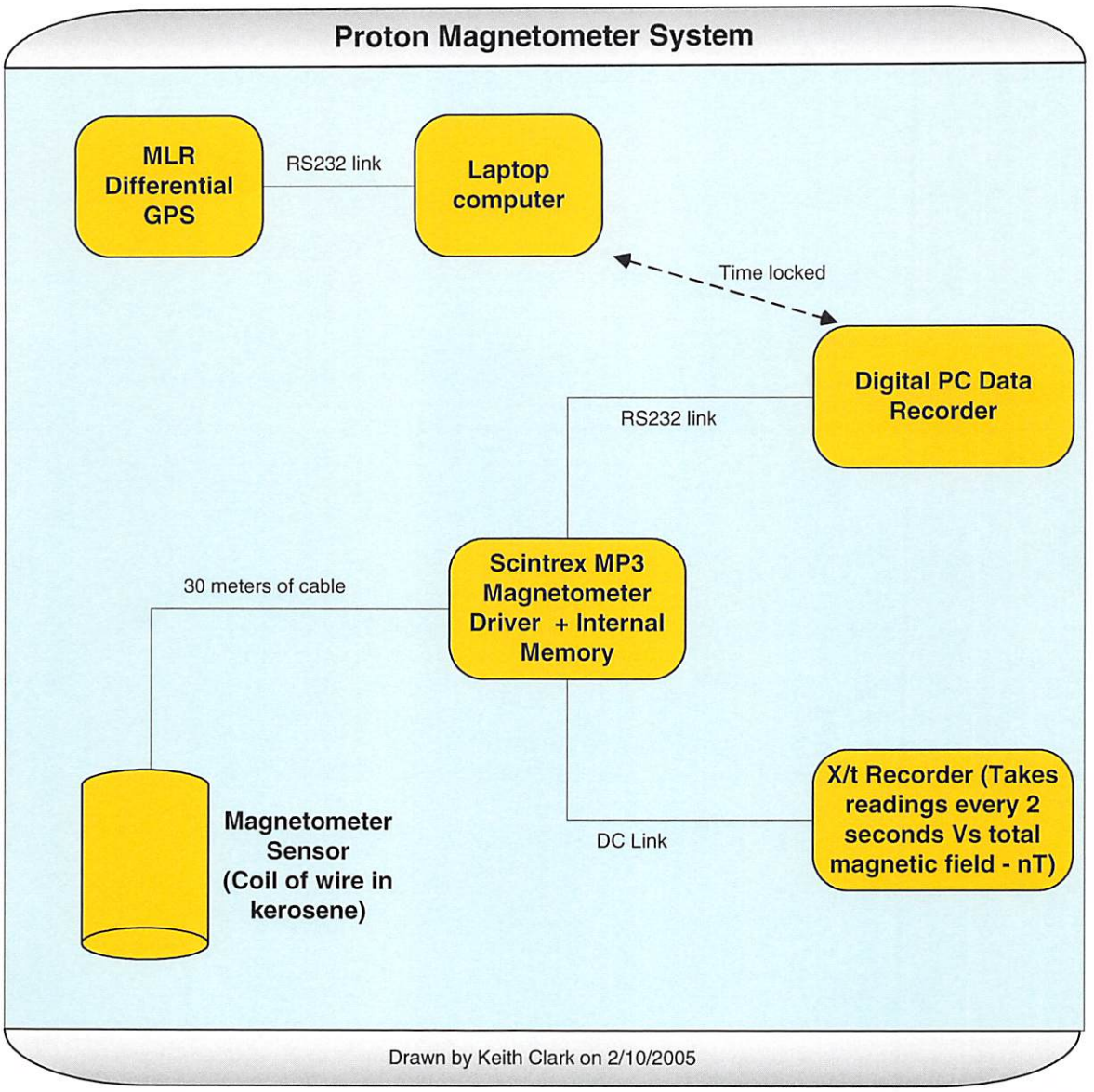


Figure 17 Proton Magnetometer Equipment Configuration

Figure 18 shows the configuration applied to the side-scan sonar equipment. The main part of the side scan unit comprised the fish and signal processor. The tow fish was the interface between the pulse producing processor kept in the "dry" cabin and the artefacts in the sea. The tow fish, as its name suggests, is towed some 5 meters behind the survey vessel and out of the boats wake. Two banks of ultrasonic transducers, one on either side of the fish, send out and receive the ultrasonic signals. The fish used was capable of seeing 50 meters either side of the towpath and operated at a frequency of 325 kHz.

The fish was also equipped with stabilising fins to ensure a consistent view of the seabed. There was a "dead zone" immediately beneath the fish (where no returns could be seen), which could be thought of as a blind spot and helps explain why a significant overlay between tracks was required. The fish acted like two echo sounders looking at an angle either side of boats path. The signals reflected from the seabed and targets was picked up by the transducers and fed back to the boat via a cable located in the centre of a Kevlar cable used to tow the fish.

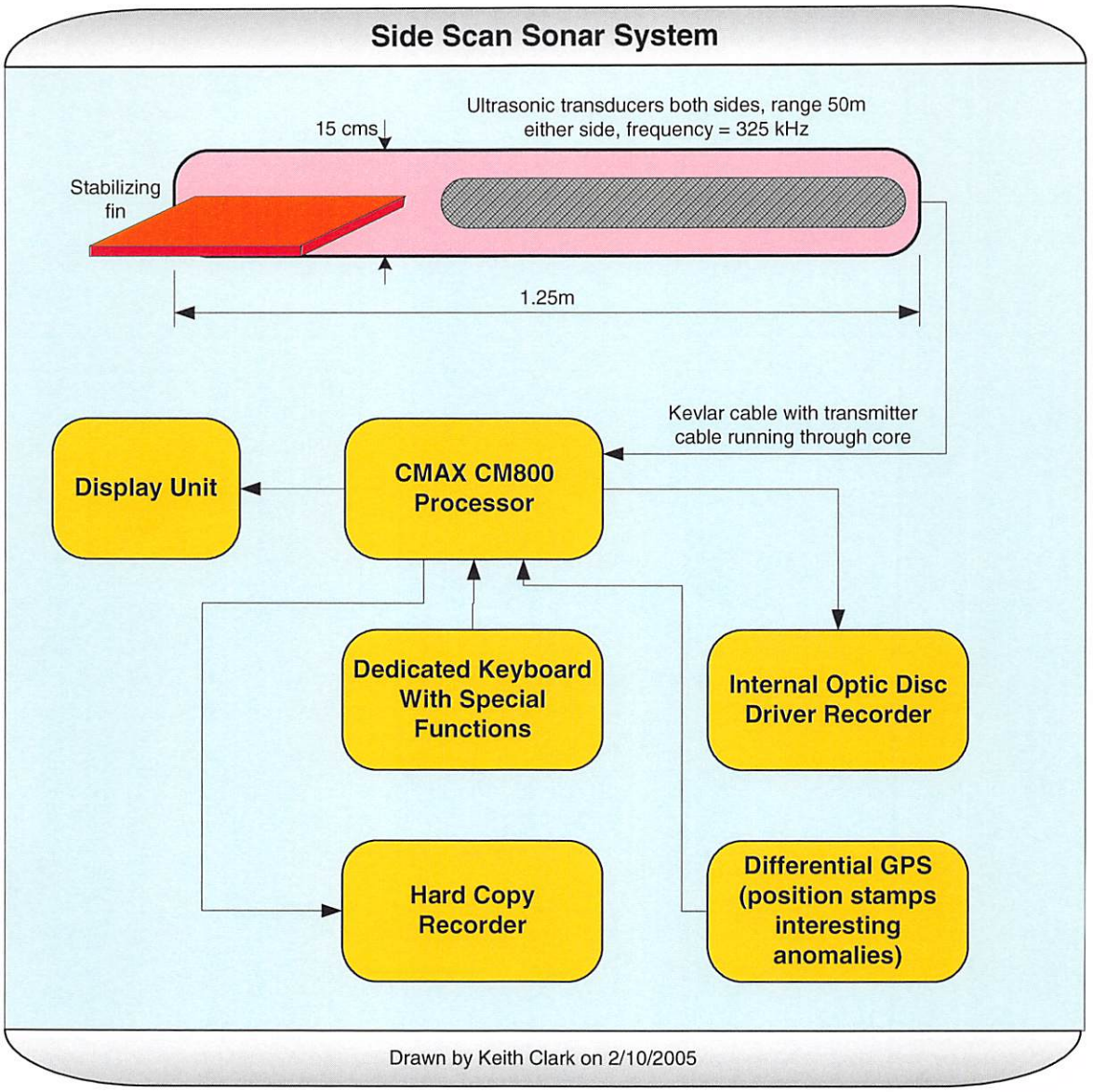


Figure 18 Side Scan Sonar Equipment Configuration

The signal processing electronics and dedicated keyboard was interfaced with a differential GPS unit which position stamped the location of the tow fish. Data was stored on an internal optic disc drive whilst a display unit allowed real time inspection of the view of the seabed.

By mid-afternoon "*Nikaria*" left her berth and started the first of her sorties to look for any remains of the original "Black Cat" wreck site using the sub-bottom profiler. It was decided to carry out a series of tracks using the sub-bottom profiler for a few hours and then swap to using the magnetometer – just in case the weather got worse in the following days.

Figure 19 Side Scan Tow Fish With Three of The Project Crew

The location of the protected wreck site was easy to see as written in very large yellow letters on the west arm of the marina was "NO DIVING WITHIN 200 METRES" – this was used as the centre of each sweep. To ensure no widely scattered remains were lost the length of tracks was extended, as far along the wall as water depth and safe distance from the marina entrance would

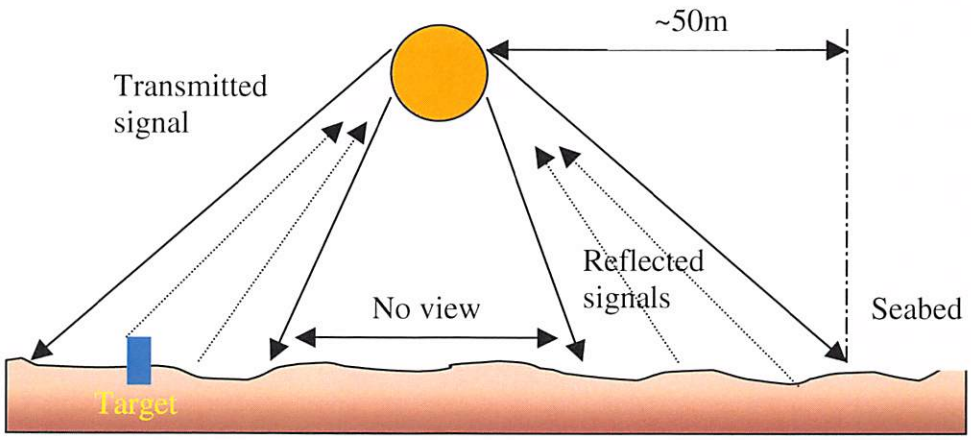


Figure 20 Side Scan Field of View

allow. Despite the government licence and liaison with the marina the local fishermen were still upset at our proximity to "their" fishing area and were quick to let us know in no uncertain terms – this was to set the general tone experienced between the team and fishermen for the remainder of the project. The author and other members of the team took turns in monitoring the sub-bottom profiler data, manoeuvring the substantial boomer and skippering the boat. All data obtained was successfully stored for later processing – however no large cannon shapes jumped out of the screen.

Nikaria returned to her berth after two hours and the sub-bottom profiler detached and stored on the pontoon and the magnetometer head stored ready for deployment.

Once clear of the harbour entrance the magnetometer head was trailed exactly 30 meters behind the boat. (The length on line was important as this had to be taken into account when calculating the position of any anomalies). Once deployed it was clear that the weather was

deteriorating, this instilled a sense of quiet urgency in the team. The instrumentation was fine tuned before starting the first of the many tracks undertaken. The initial tracks were taken closest to the marina wall since if, as expected, the weather got worse this would not be possible later. Having calibrated the equipment the team soon settled into a finely tuned routine of dragging the head along a narrow corridor before warning those on the deck to watch the tow cable to ensure it was not snagged when the boat was turned in a wide arc for an overlapping return course. Once again everyone monitored the electronics looking for anomalies, ensured the data was recording successfully, kept the cables free and skippered the boat. By now the sea was becoming very choppy so the remaining tracks were taken further out to sea. Operations continued until dusk when *Nikaria* returned to her temporary berth at the marina and all the equipment was stored for the night and the generators refilled for an early start in the morning.

The team returned to our temporary base camp and put all the digital memories and laptops onto charge for the night. Data was transferred from the mobile units to an optic disc as a back up against unexpected machine failure. After a fine homemade meal and obligatory alcohol the weather forecast was minutely inspected – things didn't look good for the following day.

7.2 Tuesday 19th October 2004

On Tuesday the team were awoken to the sound of what heard like a howling gale, convinced that this was just a passing breeze, the group quickly ate breakfast, donned their waterproofs, picked up all the portable electronics and ventured to the marina. White horse covered the sea as far as the eye could see and Dr Bennell was understandably reluctant to risk all the expensive geophysical surveying equipment in such poor conditions. Close to the shore the numerous one and a half meter square concrete blocks of the old Victorian "Daddy Long Legs" (see Section 11) railway proved an insubstantial barrier to the ferocious waves that pounded the shore.

An alternative plan was created to ensure that people were not idle and the project could move forward. It was decided to visit the local country records office and see if any reference to wrecks at the Black rock site could be found. The five core team members crowded into a single car and set off for Lewes. Entering the town it was noticed that several traffic lights were not working. On arrival at the records office the group was greeted by a sign stating that at storm had caused a power cut and would remain shut until power was re-established. This was not our day! A local pub was found with hand pulled beer, after a couple of pints power was restored and the records office opened.

With the aid of a council officer the building was scoured for records of the Brighton Marina site – none were discovered. However, "A History of Sussex" (Page, 1907, pp125 – 167) provided a useful context to the state of sea fairing along the coast during the fifteenth and sixteenth centuries. The cost of photocopying at the records office was prohibitive and the article we wanted would have cost over £33. It was discovered that a local library had the same book so we went there and acquired the copy for just £4 a saving of £29 (this was enough to cover the cost of the generator fuel).

Tuesday was completed with another homemade meal and a visit to a local pub. Whilst looking around several diving photo's were seen that lead to a long discussion with the landlord. He informed us that his friend regularly dived the protected wreck (unsurprising as the location is accurately described in local dive books - McDonald, 1989, p.117) at the marina and had recently found a stone cannon ball (that hadn't been declared to the receiver of wreck), were we interested? The name and address of the finder was duly taken, the landlord blissfully unaware of the duty to declare such items.

7.3 Wednesday 20th October 2004

The weather on Wednesday was no better than Tuesday and was a bitter disappointment to all involved. The length of the survey could not be extended as the equipment had to be returned to Bangor. There was, once again, no chance of carrying out any further survey work on the wreck site. However, determined to make best use of the equipment and experienced personnel it was decided to make this an instructional day, to this end the side scan sonar was configured on a short tow and a series of runs made inside the west and south arms of the marina wall. Due to the bad weather there was little boat traffic and the crew soon became proficient at spotting the dredged channels inside the marina. This in itself was useful and showed it was very unlikely that any scattered remains of the wreck would be present within the marina boundaries. All the team took turns at recording and interpreting the data, skippering the boat and tending the tow fish.

In the afternoon the long task of dismantling the equipment and packing the vans was carried out in good humour knowing that everyone had carried out the best job that could be expected in the circumstances. At the end of the day everyone was treated to a slap-up meal as a "thank-you" for a job well done.

8 Results from the Survey

Despite the effects of the weather during the three-day project useful information about the site was gained from the magnetometer. The side scan sonar and sub-bottom profiler was also successful operated, but with less useful results. Data accumulated during the three-day survey period was downloaded to conventional hard disc drive and optic disc and returned to University of Wales for post processing by Jim Bennell and his student Mike Edgar.

In the meantime the survey data recovered during the "paper chase" section of the project was collated and sent to Wessex Archaeology to be accurately plotted on a chart of the marina. The map produced (Figure 7) in this phase was used as a basis for all dive recording carried out in the following year.

8.1 Sub-Bottom Profiler Results

Several runs were made with the sub-bottom profiler outside the western breakwater wall on 18th October. However; little information was gleaned from these measurements.

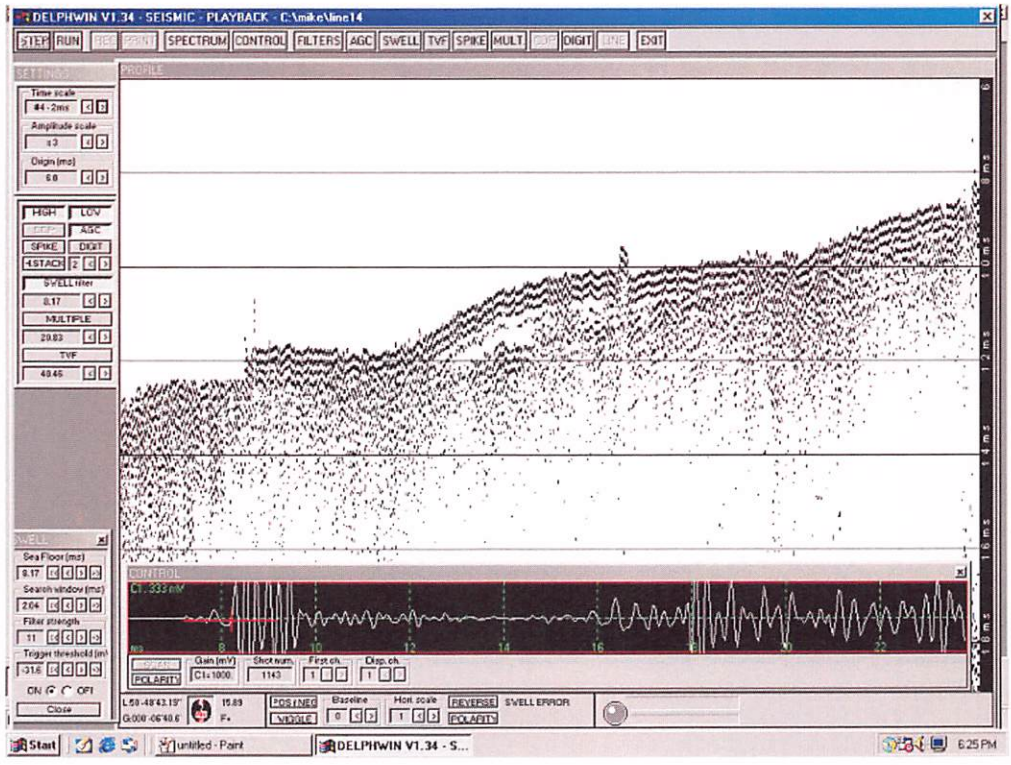


Figure 21 Sub-Bottom Profiler Results – Western Breakwater Wall

Figure 21 shows the results of one sweep along the western breakwater running from south to north. First of all it can be seen that the water is deeper at the southern most tip and becomes progressively shallower as the boat made its way towards the shore (as one would expect). There are no strong anomalies suggesting that this run did not pass over any unfound cannon or large timbers. The lack of strong returns suggests that the seabed was absorbing much of the transmitted signal – this would be a characteristic of sand and chalk – exactly what was found on the subsequent dives.

Although several runs were made across the site all the returns were similar to those shown above. Since no further information was gained the use of the sub-bottom profiler was suspended and the magnetometer towed out to sea instead.

8.2 Side-Scan Results.

Essentially the side-scan equipment was only used for training purpose within the confines of the marina due to poor weather conditions. However, even this proved useful and many geophysical survey techniques were tried for the first time using this expensive equipment.

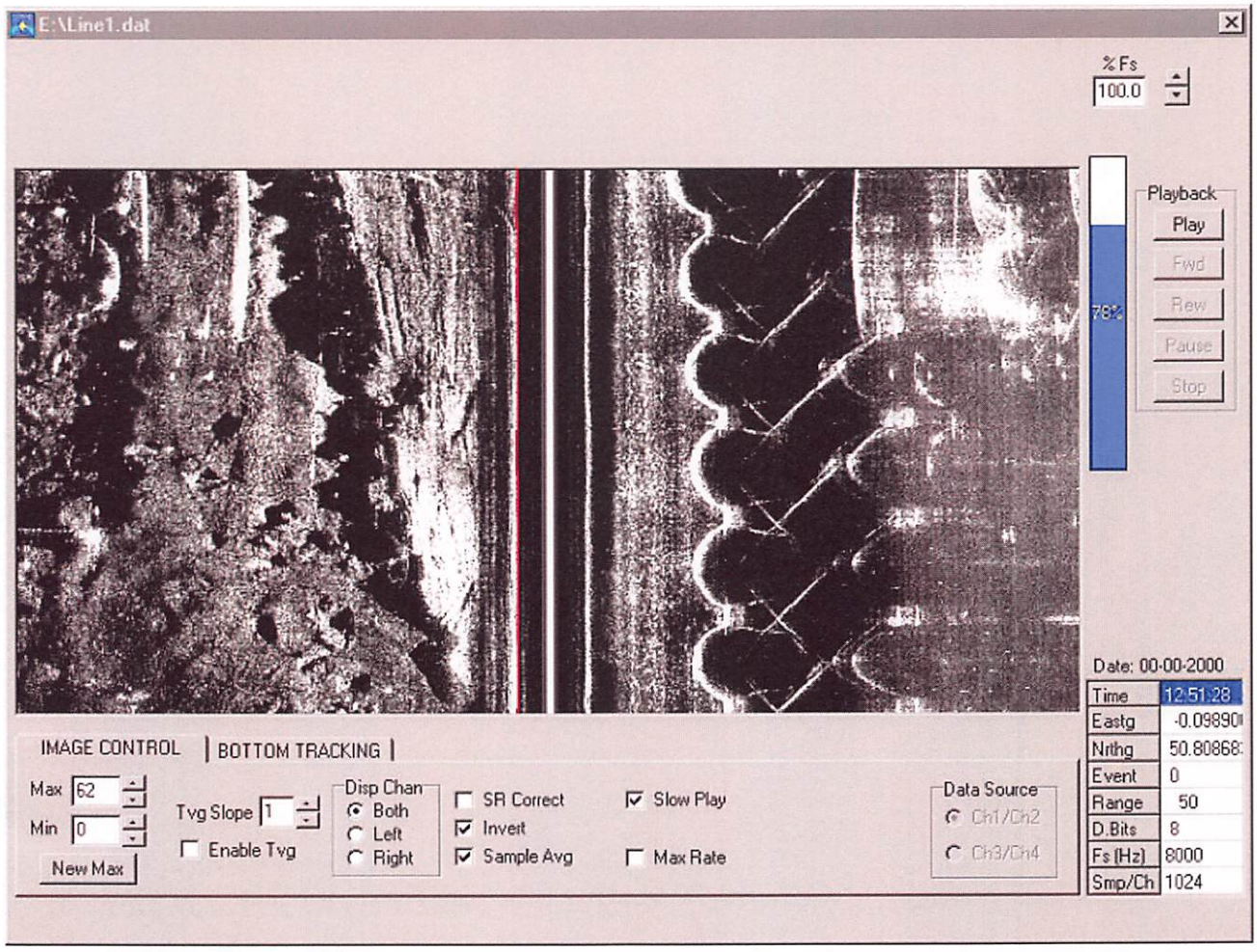


Figure 22 Side-Scan Image of Marina Breakwater

Figure 22, taken on 20th October, clearly shows the semicircular outlines of the breakwater caissons (right hand side of image) and immediately beneath the survey boat is the characteristic "blind spot". The left hand side of the image show the effects of dredging to keep the marina clear. The deeper part of the trench is closest to the central blind spot and expands towards the top of the image. The pair of parallel straight white lines in the top left hand corner of the image was caused by the acoustic reflection of signals due to a floating fuel pontoon within the marina.

Several more side scan runs were made within the west wall of the harbour but none showed any signs of wreckage associated with the protected site.

8.3 Magnetometer Results

The most productive results were obtained from the magnetometer. The processing of the data took several months as it was carried out free of charge by, primarily, student effort. However, in August the results of the magnetometer data were ready (Figure 24). Unfortunately, it arrived in eastings and westings (Ordinance Survey Map co-ordinate system) and the map (Figure 7) previously obtained, had no grid system applied to it!

Figure 23 Satellite Image with The Protection Area Overlaid

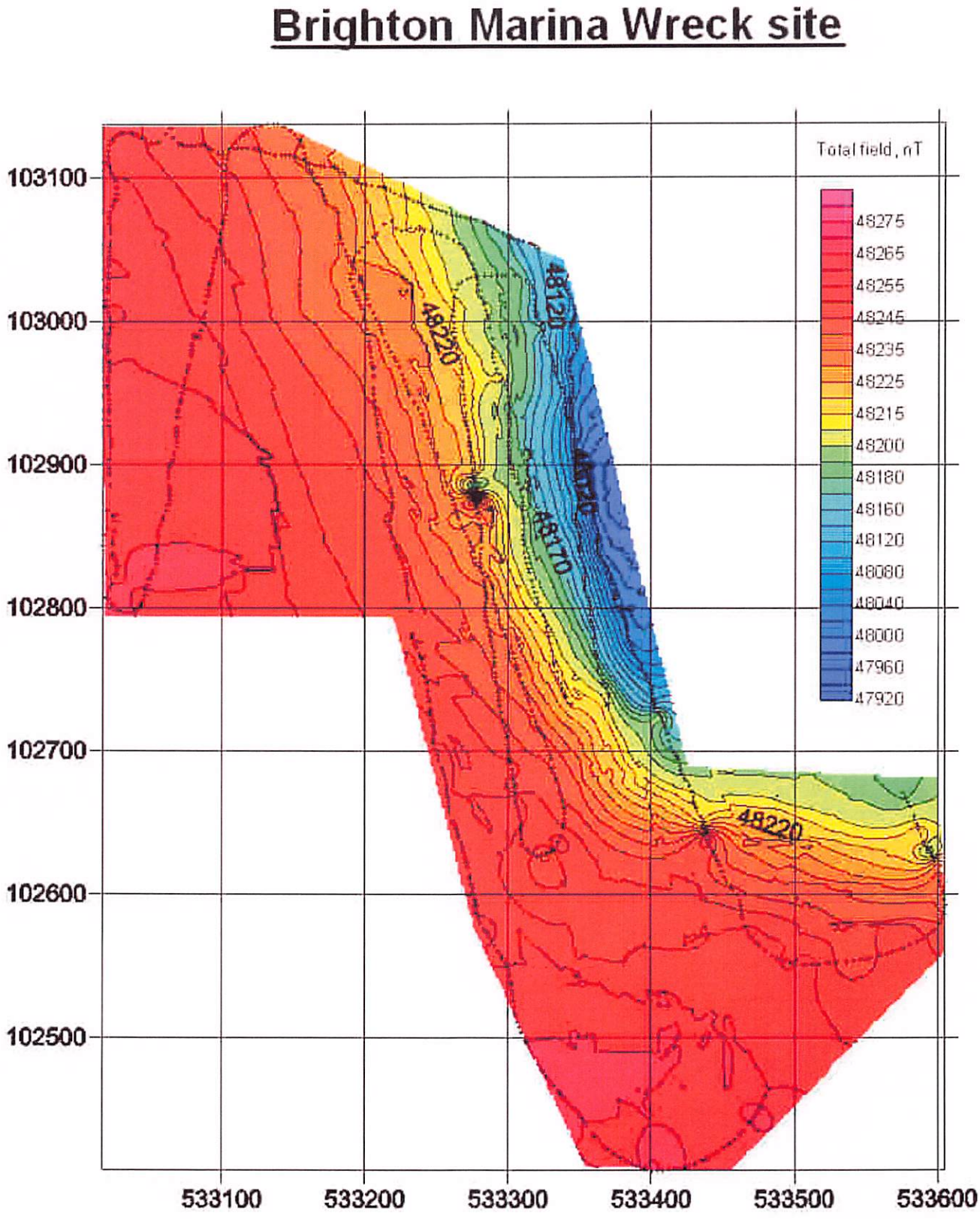


Figure 24 Results of the Magnetometer Survey

However, as a first step the trail of the boat whilst towing the magnetometer head was superimposed onto a satellite image to allow visualisation of the area covered by the survey. In addition, the size of the protection area (200m x 200m) was also overlaid to ensure that an adequate number of sweeps was carried out over the actual protected site. It can be seen in Figure 23 that there was 6 tracks made across this area – sufficient to locate larger objects such as iron or bronze cannons. (Note that the raw data set provided by Jim Bennell had some 1100 data points containing data on field strength, time and location. The *Google E*arth program used to produces Figure 23 & Figure 25 could only cope with 100 points so the data set shows only every eleventh point).

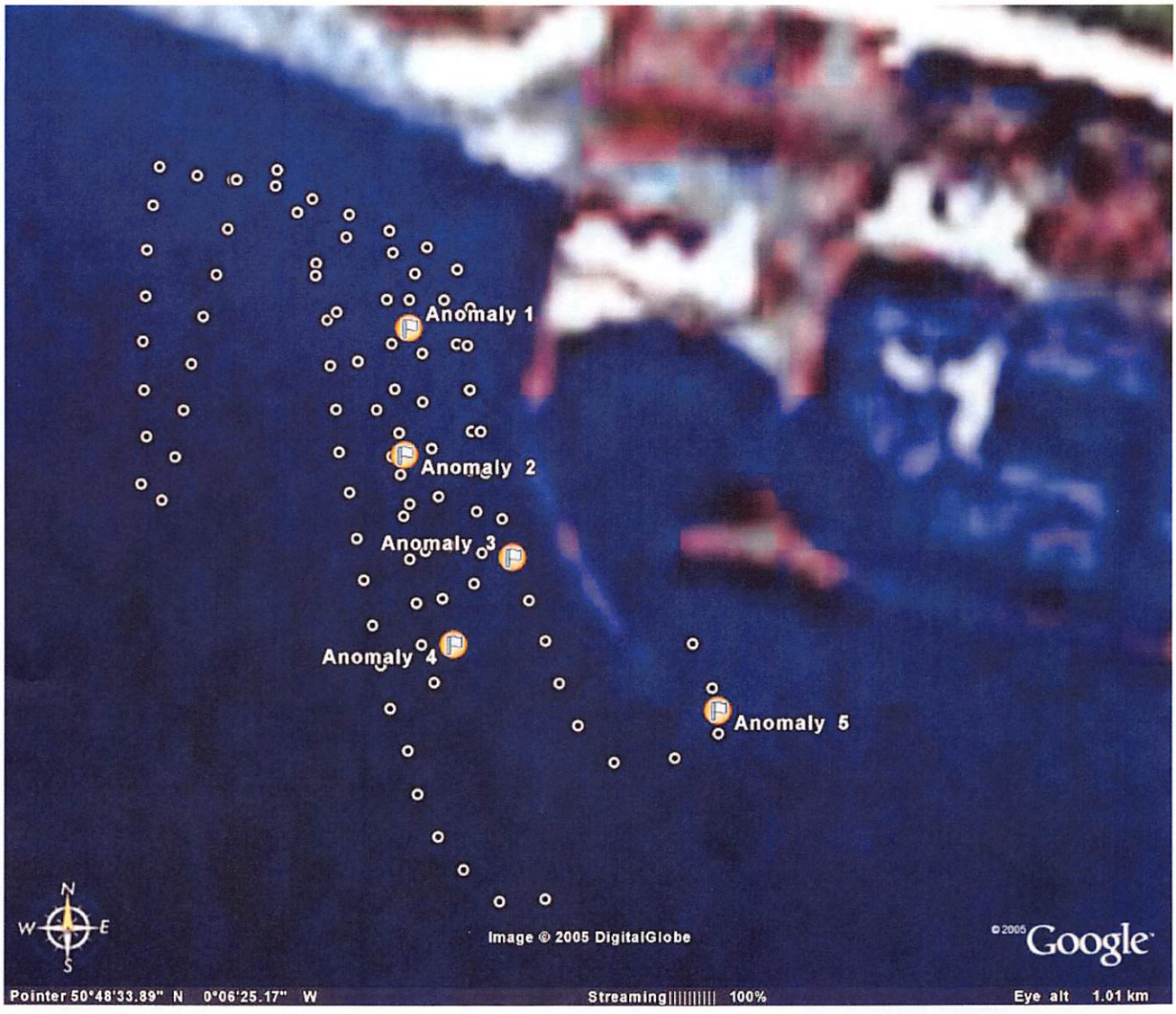


Figure 25 Satellite Image with Overlay of Magnetometer Trail and Anomalies

Figure 25 shows the five major anomalies discovered during analysis of the data by Mike Edgar (see also Table 1). It is clear that anomaly 5 was outside the search area and would be difficult to examine whilst diving, as it was located at the mouth of the marina. Anomaly 4 was too far from the shore to be able to investigate without the aid of a boat and hence no effort was made to discover the cause of this magnetic disturbance. However, anomalies 1-3 could comfortably be investigated with a degree of confidence. Figure 26 shows the relationship of these anomalies to the protected area. The protection area is defined from the designation centre and forms a box of sides 200 metres.

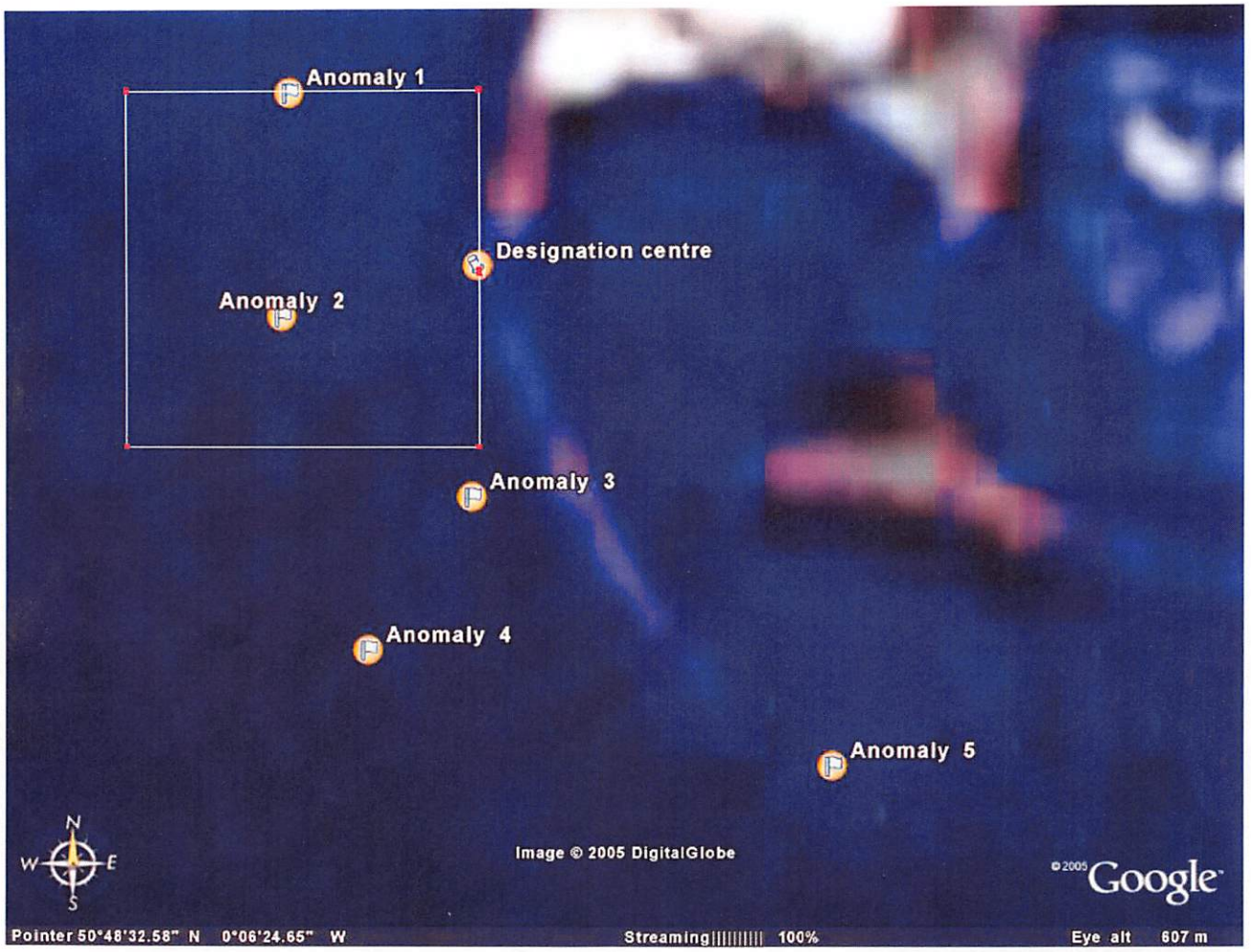


Figure 26 Close up of Protected Area and Major Anomalies

Tabular results for the positions of the five main anomalies are shown in Table 1. Raw data was provided in northings and eastings. It was necessary to convert these to latitude and longitude using a converter from the Internet (http://www.streetmap.co.uk/gridconvert.html) so that they could be used in the "*Google Earth*" plotting program.

	Northings	Eastings	Latitude	Longitude
Anomaly 1	102975N	533288E	N50:48:40	W000:06:34
Anomaly 2	102852N	533281E	N50:48:36	W000:06:35
Anomaly 3	102753N	533395E	N50:48:32	W000:06:29
Anomaly 4	102665N	533337E	N50:48:30	W000:06:32
Anomaly 5	102605N	533602E	N50:48:27	W000:06:19

Table 1 Tabular Position for the Anomalies

9 Diving Activities

During the initial stages of 2005 the diving licence and detailed results from the geophysical survey were not available. However, as soon as the new 2005 Department of Culture, Media and Sport Licence arrived, limited diving was started. The aim of these dives was to discover some of the sources of preliminary magnetic anomalies discovered during the magnetometer survey. It was decided that initial diving activities would be carried out from the shore. This allowed every opportunity involving good visibility, suitable tides and flat seas to be taken without the need to book expensive boats. Additionally, it was realised that relations with the marina fishermen would be "delicate" and it was decided not to risk possible damage to the club dive boat.

It would have been nice to take photos of any items found which may have caused anomalies however, the authors camera equipment failed during this period and could not be repaired in time. As in other "real" surveys an alternative had to be sort, in this case a description accompanied by measurements had to suffice.

9.1 Dive 1, 10th August 2005

The first dive took place in ideal conditions on 10th August 2005. The aim of the dive was simply to acclimatise the author to the general "lay of the land", to look for any obvious signs of wreckage, to investigate the access to the site and discover the state of the seabed.

The car park used was located very close to a set of steps descending to the beach adjacent to the west breakwater of the marina. The car park was well lit and offered a convenient base of operations moreover the facilities were free after 6 p.m. A copy of the designated wreck site plan was printed and laminated to allow orientation whilst underwater, the caissons of the marina providing a simple point of reference. From previous visits to the marina it was known that the phrase "No Diving Within 200 Metres" was written across caissons 11,12 and 13 and corresponded to the centre of the site.

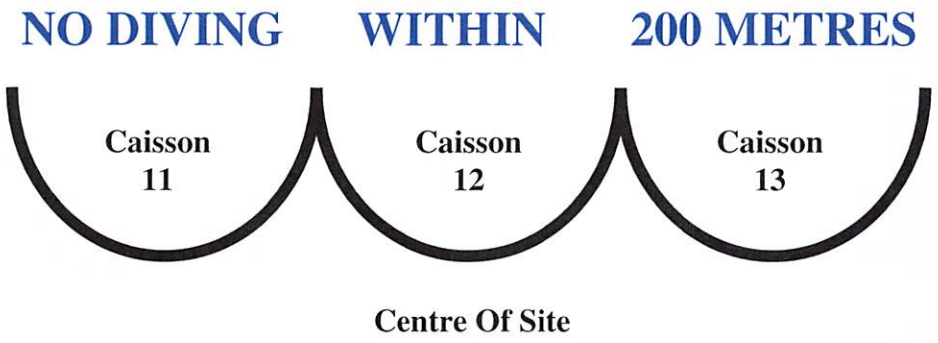


Figure 27 Caisson Markings

The first dive took place at 6 p.m. a beach entry was made through a gentle surf line; Alison Wheeler acted as surface support using snorkelling equipment whilst the author used scuba equipment and a surface marker buoy. In this way any large features could be quickly identified by the snorkeller whilst the scuba diver could examine items of interest in more detail. The initial sweep

of the area was some 40 metres from the breakwater running parallel to it (see Appendix G). The seabed at this distance comprised a series of exposed chalk reefs containing veins of flint surrounded by a bed of fine light brown sand. No signs of any wreckage either large or small were discovered, the visibility at this time being in excess of 10 metres. The sweep was made some 200 metres beyond the area of protection to ensure there were no further artefacts outside the protected area. The direction of the sweep was then reversed and an area a further 20 metres from the breakwater examined, once again no wreckage was discovered but the seabed was slowly becoming dominated by sand rather than chalk reefs. It was then decided to carry out a final sweep closer to the marina breakwater. During this phase the sand gave way to a solid chalk seabed but once again no signs of wreckage was seen.

At the conclusion of the dive the snorkel support diver had found a large block but time and lack of daylight prevented further investigations. However, an approximate position had been taken and this was to be investigated on the next dive. The access to the site had proved easy but the divers had received considerable verbal abuse from local fishermen even when the aim and authority to dive carefully explained. There had been no sightings of wreckage but the state of the seabed discovered (a chalk bed near the marina wall and a fine sand some 50 metres from the wall). The first dive had lasted 63 minutes at a maximum depth of 6.1 metres.

9.2 Dive 2, 17th August 2005

The second dive took place on the evening of 17th August 2005, the aim of which was to concentrate the search on the protected site area and in particular see if the concrete block observed by the snorkel support could be located and measured (it was thought possible that if these were steel reinforced concrete they could be one of the anomalies discovered). Once again this was run as a shore dive in very flat conditions with 8 – 10 metres visibility. Before entry a handheld GPS reading of the end of the groyne was taken as a reference point (50°48.784N, 000°06.540W, WGS84). The entry was made from the beach between the breakwater and groyne. Concrete blocks were observed running parallel to the shore and leading from the groyne to the breakwater. It was known that these formed part of the Victorian "Daddy Long Legs" railway (see section 11). A compass bearing was taken from the end of the groyne to ensure that the dive took place through the area where cannon balls had been found during the early 1980's – none were found but the area was heavily covered in fine sand – possibly deposited as a result of the building of the marina? The concrete block found on the previous dive was soon relocated and measured (~1.5m x 1.5m x 1m), it was noticed that these were of similar dimensions to those located nearer the shore. It is possible that it had been moved here to act as a site marker during earlier, unrecorded, activities?

Figure 28 Concrete Foundations of the "Daddy Long Legs" Railway

The dive continued to see if there was any further metal cable on the site. Sure enough some 30 metres away to the southeast 7 metres of rusty steel cable (Appendix H) was found on top of a chalk reef and disappeared into the surrounding sand. It was in this area that guns and breechblocks had been found in the original survey however; none were seen during this dive. Continuing southeast the looped steel hawser was rediscovered.

At this point the author returned to shore via a zigzag route to once again look for evidence of iron fittings, wooden remains, gun, breechblocks or cannon balls – none were seen.

The second dive showed that it was possible to relocate items found in previous dives and to make accurate measurements. Once again fishermen proved difficult and the author was at one stage snagged by large fishing hooks. Dive time for this phase was 61 minutes at a maximum depth of 6.8 metres.

9.3 Dive 3, 21st August 2005

In preparation for this dive a land based visit to the marina was made. GPS locations were taken for a number of key points along the marina wall and the number of caissons counted to ensure that the Wessex Archaeology map of the area tied up with the building found in practice. There were 35 caissons in total which agreed with the map, the GPS locations (all in WGS84 format were taken with a handheld GPS unit) are shown in Table 2.

Location of Measurement	GPS Reading
Start of caisson 1	50°48.723N 000°06.468W
Intersection of caissons 10 and 11 (start of the phrase "NO DIVING WITHIN 200 METRES" on breakwater).	50°48.655N 000°06.490W
Intersection of caissons 13 and 14 (end of the phrase "NO DIVING WITHIN 200 METRES" on breakwater).	50°48.634N 000°06.490W
Intersection of caissons 26 and 27 (lighthouse)	50°48.552N 000°06.443W
End of caisson 35 (end of breakwater)	50°48.504N 000°06.388W
End of groyne (more accurate than the reading taken on 17th August as the tide was out further).	50°48.791N 000°06.536W

Table 2 GPS Location of Key Land Features

The aim of this dive was to try and locate the anchor found by Stan Merrill's in the 1980's. However, this was thought to be something of a long shot as the accuracy of the map had not been tested and it was likely that the building of the marina had changed the way sand was deposited in this region and it was now likely to be covered by a sand bar – but without looking nothing would be known for certain!

In order to start the search in the right area it was proposed to plot two bearings on the Wessex Archaeology map, one to the start of the first caisson the other to the caisson supporting the lighthouse – both points easily identifiable by a diver in the water. Once again the map with bearings 58° to the first caisson and 98° to the lighthouse was laminated and taken with the author.

On this occasion the start of the dive was made some 320 metres west of the groyne on a low tide under "choppy" conditions (Appendix I and Appendix J). However, upon entering the water it was immediately apparent that success was likely to elude us. The current running from west to east was very strong and visibility was a between 1 and 2.5 metres. It was extremely difficult to stay on a straight compass bearing as the tide combined with the surface marker buoy tended to pull the diver to the east. After surfacing several times in an attempt to keep on track it was discovered that the tide had pulled the author to the foot of the marina wall (by now visibility had fallen to a consistent 1metre). It was clear that no useful work could be done and the dive was abandoned for safety's sake.

Dive time was 29 minutes and maximum depth achieved was 4.2 metres. The dive also showed that it was better to dive the higher water tides as visibility degradation due to the effects of swell were reduced.

9.4 Dive 4, 29th August 2005

Dive four (Appendix K) took place on the 29th August (Bank Holiday Monday), the aim was to find the exact location of the concrete block and triangulate its position using compass bearings of known positions on the breakwater wall. In addition the base of the caissons were to be examined for evidence of recent fortifications. (Anecdotal evidence suggested that at one time timbers could be seen protruding from the base of the caissons – potentially remains of the wreck)?

Entry was made from the end of the groyne and a bearing taken to arrive at the base of caisson 13. After a dive of 15 minutes I surfaced to the usual abuse from fishermen and once again explained my purpose. However, this time they were aiming their lines and fishing weights directly at the SMB and hooks and weights once again snagged the author. The base of at least two caissons were inspected and it could be seen that there was evidence of modern reinforcement of the caisson bases using large concrete filled bags, these would have covered any timbers that may once have protruded the base (see Figure 29).

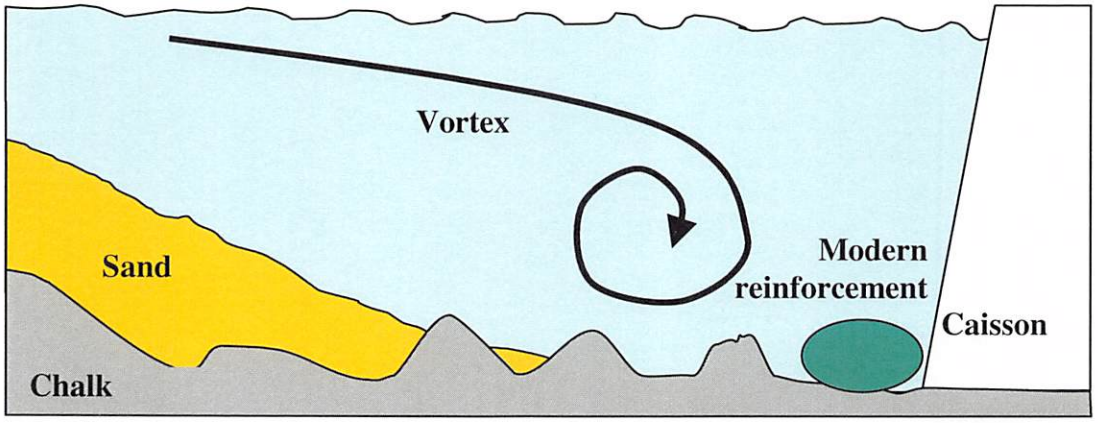


Figure 29 Scouring of the Seabed

For safety's the dive was redirected further west to escape the fishermen's abuse and weights but concrete block was seen on dive two was not relocated. After a further 20 minutes the dive was terminated and the author made his way to the shore. The next dive would take place without an SMB target for the fishermen and when there were fewer people about. (However, dives where already being undertaken as late in the day as possible within the confines of available light the only other option was to run the dives midweek).

Dive time was 48 minutes, maximum depth was 7.5 metres and visibility was 5 metres.

9.5 Dive 5, 31st August 2005

Dive 5 (Appendix L) was undertaken on 31st August without an SMB target! The aim of this dive was to carry out a detailed search of the chalk gullies for any evidence, however small, of wreckage that may have been from the protected wreck. The shore entry took place at low tide where the foundations of the "Daddy Long Legs" were clearly visible. The west wall of the marina was

closely followed and it was seen that modern reinforcement of the caissons had been undertaken for a considerable distance. At the base of caisson 12 some 12 metres from the breakwater a modern metal security fence was found partially buried beneath some of the modern caisson reinforcement. Once again this would have been sufficiently large to produce a magnetic anomaly. A systematic search of all exposed gullies was undertaken (in poor visibility of 1-3 metres) but no evidence of wreckage discovered. Gullies close to the breakwater had evidence of modern junk, golf balls, clothes and videocassettes and considerable quantities of fishermen's lead weights. At some 50 metres from the breakwater the chalk floor gave way to banks of sand. It is possible that this sand still has some secrets hidden?

Dive time was 56 minutes to a maximum depth of 5.6 metres. Local people on the beach very interested in the history of the site so spent 30 minutes talking to them as an "outreach" activity!

9.6 Dive 6, 7th September 2005

By the 7th September the amount of daylight available after work was rapidly diminishing. Since the author had to travel from Guildford to Brighton after work midweek (to avoid the bulk of the fishermen) it was apparent that this would probably be the last dive of the season. The aim of the dive was to locate the concrete block and coil of steel cable and accurately mark their position using compass triangulation (a method that could easily be accomplished by a very small group of divers). For once everything went well, the fishermen were few in number the seas were reasonably calm and visibility good (7 – 8 metres). The coil of cable and concrete block were soon discovered, in addition a second concrete block was also located. The system for calculating their position was the same for all of them. Once discovered a buoy was deployed to the surface attached to a reel. The reel was fastened to the object and the diver rose to the surface where at least three compass bearings were taken to three identifiable targets, the results being recorded on a waterproof slate with a pencil. Accuracy of the readings were estimated at ± 5° due to the rolling action of the sea. (Note conventional pencil leads are easily broken when in the "goody bag" the NAS propelling pencils would be a sound investment in the future)! The magnetic compass bearings recorded are shown in Table 3.

Item	Intersection of Caisson's	Other object	Bearing (Magnetic)
Concrete Block 1	3 - 4	---------	60°
Concrete Block 1	10 - 11	---------	100°
Concrete Block 1	16 - 17	---------	130°
Concrete Block 2	3 - 4	---------	70°

Concrete Block 2	7 - 8	---------	110°
Concrete Block 2	10 - 11	---------	135°
Coil of Steel Cable	10 - 11	---------	65°
Coil of Steel Cable	---------	Mid point of 13	95°
Coil of Steel Cable	16 - 17	---------	125°
Coil of Steel Cable	---------	End of Groyne	0°

Table 3 Bearing of Anomalies

The position of these anomalies can be seen in Appendix M. Dive time was 49 minutes to a maximum depth of 4.4 metres.

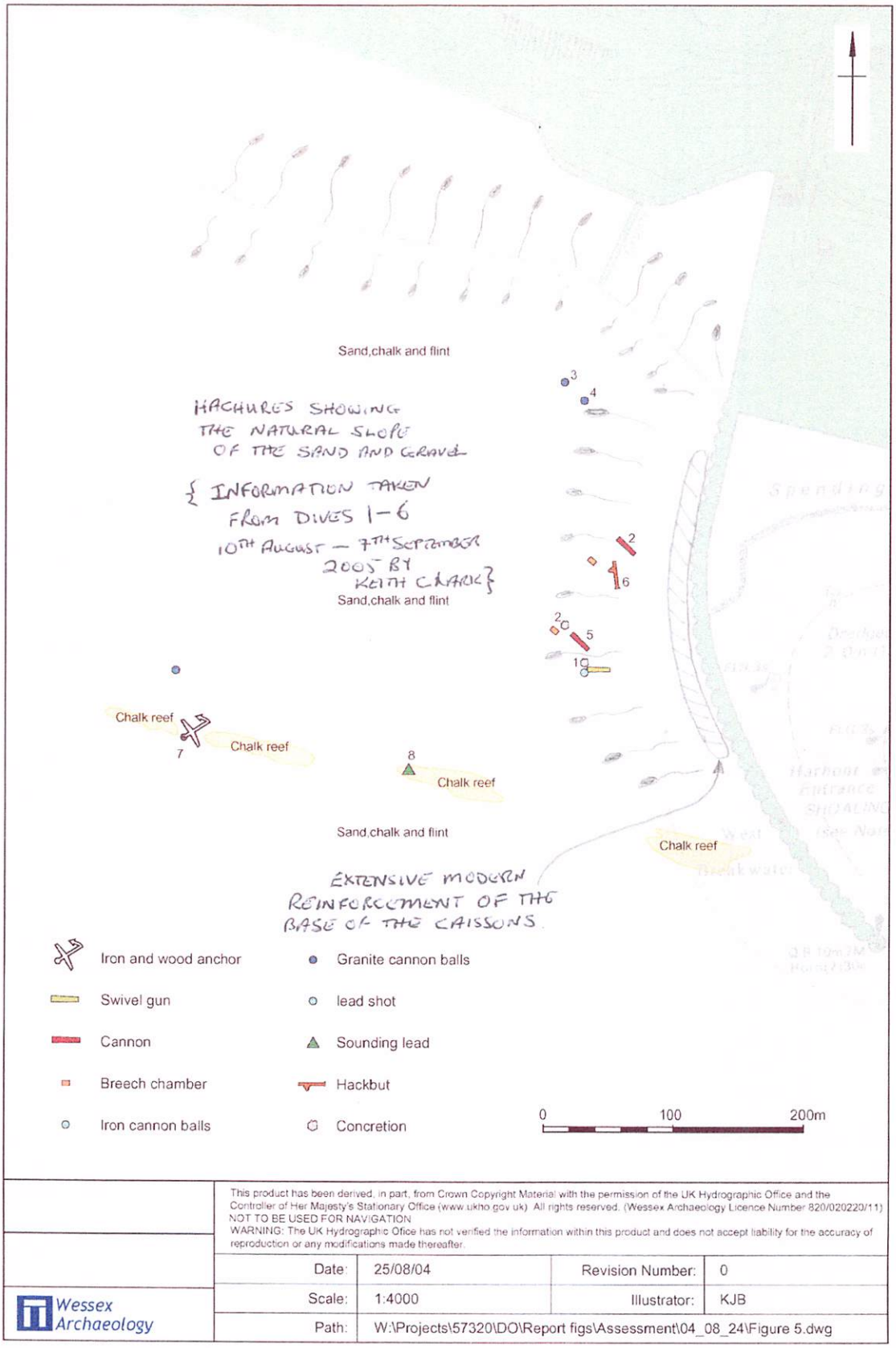
9.7 Comments on Diving Activities

The limited amount of diving that took place with such a small group of divers (2) can be, at best, regarded as a brief pre-disturbance survey. Whilst the location of several possible anomalies were recorded using compass bearings in relation to the breakwater no GPS locations were taken. More accurate reading could be taken if a boat carrying GPS equipment was used in conjunction with divers. That having been said, the information above is certainly accurate enough to revisit the anomalies. Ideally the results of dive 6 (Appendix M) would be superimposed onto the plots of anomalies in Figure 26 however without GPS co-ordinates this was not possible. However, it is possible to directly compare the position of the magnetic anomalies with the plot of items discovered during the diving activities (see Figure 31).

In Figure 31 the square boxes define the protected area, it is clear that none of the items discovered during the diving activities corresponded to any of the anomalies recorded. From the diving undertaken it is known that the concrete blocks are located at the edge of the sand / chalk interface. Nearer the breakwater the seabed is almost clean chalk, towards the west the seabed is sand (Figure 30) – becoming thicker the further west travelled. Thus anomaly 1 is almost certainly under a layer of sand whilst anomaly 2 may be exposed during favourable tidal conditions but was not seen during the diving phase. Nothing found on the seabed could explain anomaly 3. What is more curious is that the spool of steel cable found (well embedded into the chalk and had evidently been there some considerable time) had not been discovered on the geophysical survey – no explanation has been found for this.

If boat were to be used then it would be essential to have fishing from the breakwater restricted whilst surveying / diving activities were undertaken. The divers in the 1980's and those associated with the project in 2005 were subjected to both verbal abuse and "low flying fishing weights" making activities hazardous. It is interesting to note that once in possession of a licence from the Department of Culture, Media and Sport there should be a degree of protection available to the divers under section 1 (6) of the Protection of Wreck Act 1973 (Appendix B). However, this seems heavy handed and a less formal agreement between parties would be far more desirable.

The location of the anchor (outside the protected area) and magnetic anomalies at the mouth of the marina has not been investigated. These would require the use of a boat (in the case of the anchor) and agreement of the marina authorities (in the case of the anomalies at the entrance to the marina) and were outside the scope of the limited team available.



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Wessex Archaeology

Brighton Marina designated wreck site plan (After S.Holmes 1977) Figure 5

Figure 30 Diagram Showing Slope of Sand Banks

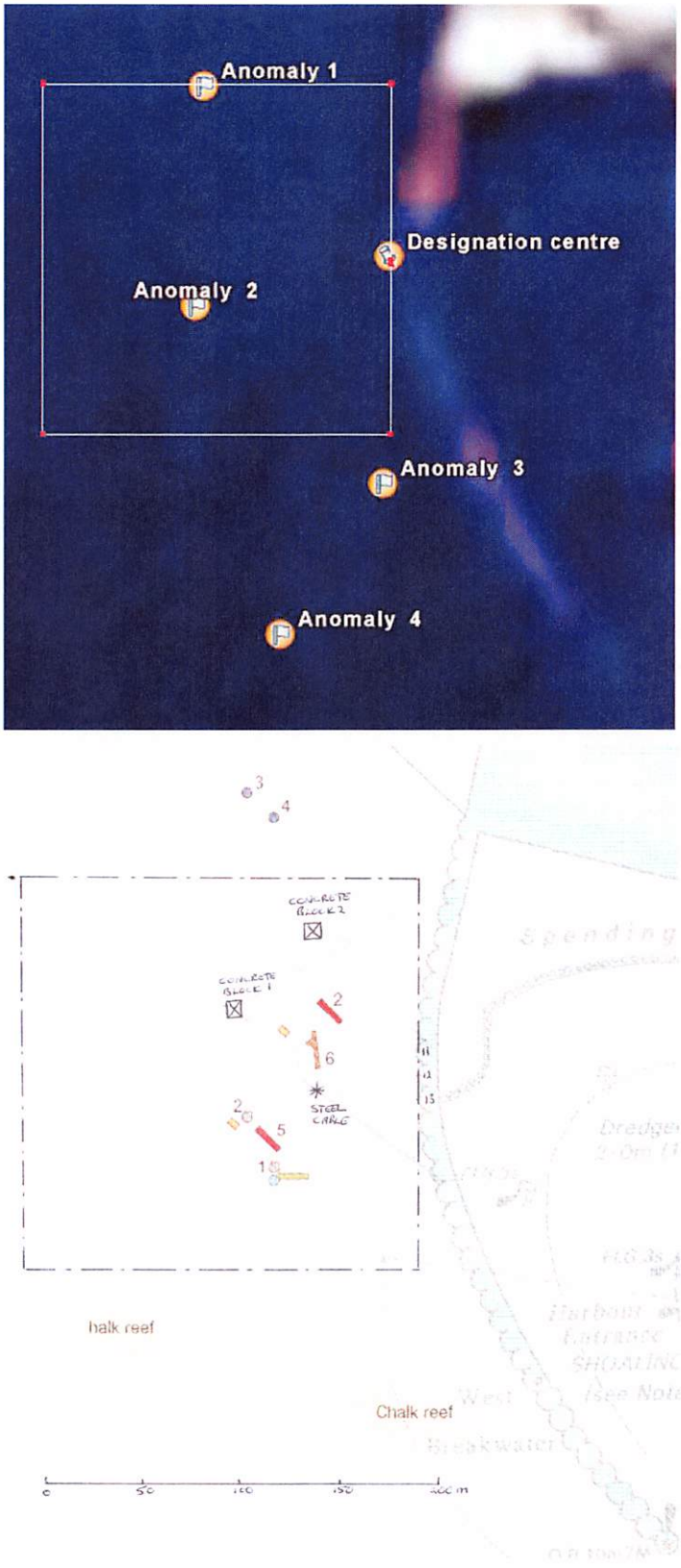

Figure 31 Comparing Magnetic and "Ground Truth" Plots

10 Where has all the Wood Gone?

Classically when people other than archaeologists think of wooden wrecks they conjure up whimsical images of galleons in full sail sitting squarely on the seabed in clear waters, the reality is somewhat different. So where then was all the wood one would associate with a sixteenth century sailing ship?

There are a number of factors which would help reduce or even erase the remains of the Brighton Marina Wreck from the sea bed these include:-

- Attack by marine animals
- Movement by long shore drift.
- Covering by sand
- Erosion by wave and sand action
- Deliberate removal by developers prior to protection.

10.1 Attack by marine animals

Many animals can cause extensive damage to wooden structures in the marine environment these include piddocks (Barnea candida), gribbles (Eurydice pulchra) and shipworms (Limnoria lignorum). (Wood, E., 1988, pp 48-53 & Campbell, A., 1988, pp. 188 – 189). Certainly evidence of piddocks has been seen in the chalk bedrock during diving operations in the 2005 season. Large (4cm diameter) holes could be seen bored into the chalk and the remains of their shells seen within the rock. The action of gribbles produces a characteristic sponge like appearance on timbers and is frequently seen on wooden structures in shallow waters off the Brighton coast. Finally, shipworm infestation of wooden ships is well documented and in later times was combated by sheathing ships in copper. However, wrecks are often perforated by the distinguishing holes of the shipworm.

10.2 Movement by long shore drift.

During diving activities it was noticed there was significant long shore drift running from west to east. Unanchored sections of wreck could quite easily have been swept away by the tides. The effects of wood boring animals would have accelerated this effect. The action of this wildlife would have been to reduce the strength of the structure allowing the agitation of the sea to break the wreck into smaller pieces making their transportation by the sea easier. This effect would have been more pronounced on the lighter hull planks and less noticeable on the heavier framing timbers.

10.3 Covering by sand

During the discovery of cannon by Dave Berry in 1963 there was no marina and the seabed was essentially a bare chalk wave-cut platform. The construction of the marina breakwaters altered the local flow of the sea and sand is now regularly deposited on the site. Immediately adjacent to the walls localised scouring of the site keeps the sand covering at bay however, beyond one hundred metres from the walls the thickness of sand deposits greatly increases. It is possible that there are some timber remnants under the sand in these locations but it must be remembered that the area was

exposed for at least four hundred years before the marina was built so the chances are that all wood remains have been eliminated.

10.4 Erosion by wave and sand action

The wreck site is located some 150 metres from the present chalk cliff shore line in shallow waters. The beaches in this area comprise chalk, sand and flint pebbles and there is a strong long shore drift element. The area can be characterised as a high-energy environment where the abrasive action of water borne sand and destructive pounding and movement by wave action is likely to greatly accelerate the degradation of the wreck site.

10.5 Deliberate removal by developers prior to protection.

The site was given protection in 1983 and construction of the western breakwater was carried out in 1973. There is anecdotal evidence that during construction large square timbers were discovered by workmen but quickly and quietly removed from the site. This suggests that their archaeological importance was at least suspected but it was recognised that the intervention of archaeologists would potentially slow down or at worse prevent work continuing. No proof of this could be found. However the close proximity of the site to the breakwater suggests that if timbers had survived then some would have been located in the vicinity of the wall. Given that each caisson weighs some 3,000 tonnes it seems unlikely they will ever be moved to see if anything remains underneath them.

11 The "Daddy Long Legs" Railway

During the course of the project a series of concrete blocks (Appendix H) were seen close to the shore, despite being obviously much newer than the wreck it was possible that several of these blocks were moved at sometime to help define the site. Investigations showed that the blocks formed part of the "Daddy Long Legs" railway. Built in 1894 by Magnus Volk this railway was unique to Britain in that the railway travelled through the sea. The guides comprised two separate 2ft 8½" gauge tracks, each set of rails 18 foot apart. The tracks were supported on concrete blocks secured into the chalk bedrock. The carriage, *Pioneer* (Figure 32*)*, comprised a 45 ton deck, 45 foot long, supported by four 23 foot long tubular legs. The carriage was powered by an overhead line, which drove 2 electric motors, powering one boogie on each side. The carriage included a promenade deck and ornate saloon complete with leather chairs!

Opened in 1896 the railway was almost destroyed by a storm in its first week of operation but was rebuilt and open for service again in 1897. In 1901 the local council added sea defences that forced the early closure of the system. The "Daddy Long Legs" was never a viable form of transport since it was underpowered and during high tides was barely able to make 2 mph. For all of its shortcomings it will be remembered as something truly eccentric and British!

Figure 32 The Daddy Long Legs In Its Heyday

12 How Useful Is The Protection Of Wrecks Act?

Currently around the UK there are some 50 protected wrecks of which the Brighton Marina Site is just one. The "Protection of Wrecks Act 1973" (Appendix B) provides a boundary around sites of archaeological, historical or artistic interest, within that area activities such as diving, excavation, deposition of materials and salvage are prohibited. But just how effective is this act; does it actually make any significant difference? During the authors association with the site many direct violations of the act were seen. Divers were seen on the site that most certainly did not have a licence to do so. Modern marina fortifications extended across part of the site and a modern metal fence section was seen under these reinforcements. The site was scattered with lead weights and discarded nylon line from local fishermen. These same fishermen also greatly hindered access to the site by aiming their fishing weights at the safety buoy and on more than one occasion "snagging" the author with large hooks.

People freely admit to finding and removing items from the site (see Section 7.2).

The restricted area should be free of modern "depositions" but a large coil of steel cable, possibly a section of old trawling equipment, was bundled up with rope and placed on the site. This was probably the cause of one of the magnetic anomaly pursued with such interest.

The Brighton site is blessed and cursed with its location. Being so close to the shore allows regular visits to the site with a minimum of equipment (no boat is required) and the caissons allow swift orientation. However, what makes access easy for the licensees makes it just as easy for those looking for "treasure". The site even appears in local dive guides (McDonald, 1989, p.117) with details of what one would expect to find but does warn divers to stay clear – however, what is the point of telling one what the seabed is like if one cannot dive it?

The marina site should be one of the easiest to police in the UK one can literally peer over the marina wall and see the law being broken but the local authorities do nothing to prevent it. The archaeological heritage of the nation comes a poor second to the higher priorities of the general public. What level of protection then can wrecks expect further out to sea? One suspects that it would be a case of "out of sight out of mind". It is interesting to note that the Protection of Wrecks Act 1973 makes no specific reference to which agency is responsible for policing the act (coastguard, police or other agency) However, it is understood that English Heritage is currently accountable.

A further point to consider would be "should the Brighton Marina Site continue to be protected"? No evidence of any ancient wreck was seen at all during the preliminary investigations – maybe there is nothing left to protect?

13 Threats to the Wreck Site

The marina and nearby "Black Rock" sites are now prime areas for concentrated development. There are currently expansion plans for two ice rinks capable of supporting crowds of up to 11,000 people (Appendix N) and a block of flats at the marina. Whilst neither site encroaches directly on the wreck site the supporting activities, use of barges, gravel extraction and floating cranes etc may well have an effect. In addition it has recently been suggested that the protected wreck site be used as an anchoring area for boats wishing to enter the marina at times of high use! All of these threats point to the need for continued vigilance to ensure the site is not damaged.

14 Conclusions

This project has shown that it is possible to fuse the efforts of both professional and amateur archaeologists to achieve professional results with limited financial and manpower resources.

The aim of this project was three fold, to archive survey information on the Brighton Marina protected wreck site taken in the 70's and 80's, to carry out a geophysical survey of the site and to hold a series of dives to discover "ground truth".

The material previously collated by Stan Merralls from his activities were located, copied and converted into a professional site plan (see Figure 7). The documents will be passed across to the National Monuments Records office at the completion of this phase of the project.

Despite poor weather conditions a magnetometer survey was carried out over the expanse of the protection area. The data produced a number of anomalies, which were investigated as far as possible using shore diving techniques.

The previous finds of the ADU were confirmed, the site surveyed in the 1980's has, to a large degree, now disappeared into a bank of sand deposited over the area due to a change in currents caused by the building of the west breakwater of Brighton Marina. The exception to this is a band of chalk reefs some 50 metres wide running adjacent to the breakwater. The supposition is that the action of waves breaking on the wall creates a vortex that scours the seabed free of sand. No wreckage or artefacts of archaeological significance were discovered.

The author has seen evidence that the protection afforded the site is to a large degree being disregarded. Divers regularly visit the site and occasional artefacts appear to have been removed. Additionally there are signs that in recent years steel hawser cable has been dumped on the site causing the magnetic anomalies seen on the geophysical survey.

The outstanding anomalies still need to be investigated however; this is complicated by the presence of somewhat aggressive fishermen and close location of some of the anomalies to the marina entrance. To safely continue the access of fishermen to the breakwater may need to be suspended and similarly the entrance to the marine closed off. It is felt beyond the scope of this project to attempt such action.

It was apparent that due to the weather conditions during the geophysical survey that the area supposedly containing the anchor found by Stan Merralls in 1977 was not covered. Dave Parham has recently obtained a magnetometer and it is likely that the team will carry out a new magnetic survey next year. This will be somewhat easier than the one carried out in 2005 as this will take place some distance from the breakwater, (away from the fishermen) and outside the protection area (no need for a licence). There is also some discussion of doing a search using an underwater metal detector in 2006. However, this would require a new licence, careful planning with respect to local anglers and would be difficult due to the large number of assorted lead weights and other fishing equipment on the seabed. Finally, there may be an application made to carry out limited excavation of a small area with a water dredge looking for small artefacts. However, this would require an excavation licence from the Department of Culture, Media and Sport.

In essence, many of the major artefacts have been recovered during earlier surveys and the deposition of sand over the last three decades has covered much of the remaining site. The magnetometer survey produced several anomalies that may still be buried though why the large coil of wire discovered did not show up more prominently is still a mystery. Future work is planned on the site and includes a new magnetometer search for the missing anchor, a metal detector search on the protected area and even some small-scale excavations.

This project has been an excellent training ground for an aspiring archaeologist giving him exposure to the joys and frustrations of working on a real site with "high tech" equipment, the vagaries of the weather and local interest groups. The professional archaeologists have been outstanding at providing help and information and it is hoped that this is the beginning of a long and fruitful relationship.

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16 Picture Credits

Figure 1 Google Earth using author's data.

Figure 2 Dr Douglas McElvogue

Figure 3 Dr Douglas McElvogue

Figure 4 Dr Douglas McElvogue

Figure 5 Dr Douglas McElvogue

Figure 6 Dr Douglas McElvogue

Figure 7 Wessex Archaeology

Figure 8 http://www.eastsussexcc.gov.uk/NR/rdonlyres/5C2C4386-3C56-4D3A-8603-DD6679422DE8/0/map1.pdf#search='geology%20brighton'

Figure 9 http://www.saa.org/publications/saabulletin/16-1/SAA17.html#global

Figure 10 http://www.bluebirdproject.com/

Figure 11 http://www.ulst.ac.uk/faculty/science/crg/marimage/images.htm#rathlin,.

Figure 12 Author

Figure 13 Author

Figure 14 Author

Figure 15 Author

Figure 16 Author

Figure 17 Author

Figure 18 Author

Figure 19 Author

Figure 20 Author

Figure 21 Jim Bennell & Mike Edgar

Figure 22 Jim Bennell & Mike Edgar

Figure 23 Google Earth using author's data plus that of Jim Bennell & Mike Edgar

Figure 24 Jim Bennell & Mike Edgar

Figure 25 Google Earth using author's data plus that of Jim Bennell & Mike Edgar

Figure 26 Google Earth using author's data plus that of Jim Bennell & Mike Edgar

Figure 27 Author

Figure 28 Author

Figure 29 Author

Figure 30 Author

Figure 31 Google Earth using author's data plus that of Jim Bennell & Mike Edgar

Figure 32 http://whitstablepier.com/volks/dll.htm

Figure 33 Triton Magazine Vol. 8, Number 7.

Figure 34 Diver Magazine25.2

Figure 35 Department Culture, Media and Sport

Figure 36 Department Culture, Media and Sport

Figure 37 Author

Figure 38 Author

Figure 39 Author

Figure 40 Author

Figure 41 Author

Figure 42 Author

Figure 43 Author

Figure 44 http://www.brightonbusiness.co.uk/documents/potential_sites.pdf

Figure 45http://www.brightonbusiness.co.uk/documents/potential_sites.pdf

Appendix A. Treasures from The Sea

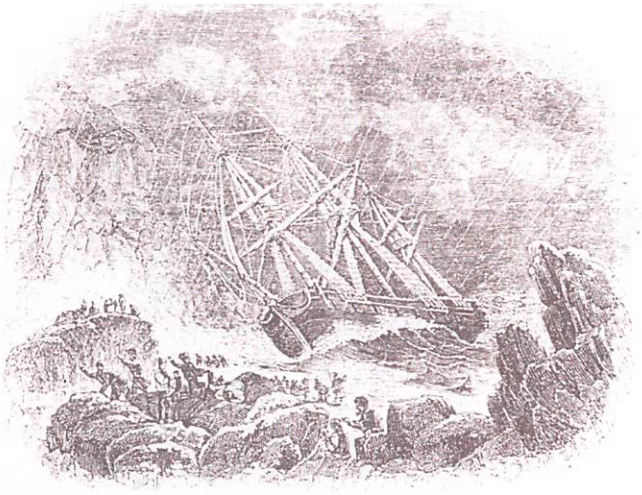
The following flyer is for the maritime archaeology course organised by the author in 2003 and lead to an increased interest in marine archaeology within the branch diving club and the formation of the idea for the Brighton Marina Wreck site project.

Treasures From The Sea

Underwater Archaeology And Historic Wrecks

Fascinated by programs such as "*Wreck Detectives*", "*Time Team*" and "*Discoveries Underwater*"? Then we have just the programme of events for you! Brighton BSAC is pleased to be able to offer an exciting short two-day course on the investigations of shipwrecks throughout history from the time of Alexander the Great to present day. The course is ideally suited to divers and non-divers alike. Since the waters around Brighton are getting cooler and winter's drawing in why not take this opportunity to find out what can be learnt from the type of wrecks we so often visit?
Lectures will include –

- "Delving into the past - a history of underwater wreck explorations"
- "Hordes of the Bronze age seafarers"
- "Treasures from beyond the pillars of Hercules"
- "Viking raiders"
- "The treasures of the Hansiatic traders"
- "Ocean traders and the riches of Cathay"
- "The battle for Britain"
- "From nuggets to priceless treasure from the seas".



The course will be on Sunday 23rd & 30th November starting at 9 a.m. at :-

Sussex Yacht Club
85/89 Brighton Road
Shoreham-by-Sea

The total cost for the two days will be £35
The yacht club has a bar and restaurant available to course participants.
Places are limited so please book your places early, contact Keith Clark

Tel. 01483 729476

E-mail **k.clark@sstl.co.uk**

Dr Douglas McElvogue
Currently Senior Research Fellow at the Mary Rose Trust. Douglas has been actively involved in Maritime archaeology since leaving school, and has lectured on the subject both nationally and internationally. A recognized ship expert and diving archaeologist he has directed work on sites from the Mesolithic to the modern day. Current investigations, apart from the Mary Rose, include an East Indiaman in the Shetlands, Spanish Armada ships off Ireland and the remains of HMS Seripus off the southern shores of Mozambique

Dave Parham
Currently a research Fellow at Bournemouth University, Dave has had a lifelong passion for shipwrecks and has worked and lectured on underwater sites from far-flung Madagascar to the remote Shetlands. Now as a full time professional diving archaeologist he is leading research into the Studland Bay shipwreck, Prehistoric sea faring, the Archaeology of the Battle of the Atlantic, South Edinburgh Channel shipwreck, and the local historic shipwreck at Brighton Marina.

Appendix B. Protection Of Wrecks Act 1973

ELIZABETH II

Protection of Wrecks Act 1973

1973 CHAPTER 33

An Act to secure the protection of wrecks in territorial waters and the sites of such wrecks, from interference by unauthorised persons; and for connected purposes.

[18th July 1973]

BE IT ENACTED by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

Protection of sites of historic wrecks.

1.—(1) If the Secretary of State is satisfied with respect to any site in United Kingdom waters that—

(*a*) it is, or may prove to be, the site of a vessel lying wrecked on or in the sea bed; and

(*b*) on account of the historical, archaeological or artistic importance of the vessel, or of any objects contained or formerly contained in it which may be lying on the sea bed in or near the wreck, the site ought to be protected from unauthorised interference,

he may by order designate an area round the site as a restricted area.

(2) An order under this section shall identify the site where the vessel lies or formerly lay, or is supposed to lie or have lain, and—

(*a*) the restricted area shall be all within such distance of the site (so identified) as is specified in the order, but excluding any area above high water mark of ordinary spring tides; and

(*b*) the distance specified for the purposes of paragraph (*a*) above shall be whatever the Secretary of State thinks appropriate to ensure protection for the wreck.

(3) Subject to section 3(3) below, a person commits an offence if, in a restricted area, he does any of the following things otherwise than under the authority of a licence granted by the Secretary of State—

(*a*) he tampers with, damages or removes any part of a vessel lying wrecked on or in the sea bed, or any object formerly contained in such a vessel; or

(*b*) he carries out diving or salvage operations directed to the exploration of any wreck or to removing objects from it or from the sea bed, or uses equipment constructed or adapted for any purpose of diving or salvage operations; or

(*c*) he deposits, so as to fall and lie abandoned on the sea bed, anything which, if it were to fall on the site of a wreck (whether it so falls or not), would wholly or partly obliterate the site or obstruct access to it, or damage any part of the wreck;

and also commits an offence if he causes or permits any of those things to be done by others in a restricted area, otherwise than under the authority of such a licence.

(4) Before making an order under this section, the Secretary of State shall consult with such persons as he considers appropriate having regard to the purposes of the order; but this consultation may be dispensed with if he is satisfied that the case is one in which an order should be made as a matter of immediate urgency.

(5) A licence granted by the Secretary of State for the purposes of subsection (3) above shall be in writing and—

(*a*) the Secretary of State shall in respect of a restricted area grant licences only to persons who appear to him either—

(i) to be competent, and properly equipped, to carry out salvage operations in a manner appropriate to the historical, archaeological or artistic importance of any wreck which may be lying in the area and of any objects contained or formerly contained in a wreck, or

(ii) to have any other legitimate reason for doing in the area that which can only be done under the authority of a licence;

(*b*) a licence may be granted subject to conditions or restrictions, and may be varied or revoked by the Secretary of State at any time after giving not less than one week's notice to the licensee; and

(*c*) anything done contrary to any condition or restriction of a licence shall be treated for purposes of subsection (3) above as done otherwise than under the authority of the licence.

(6) Where a person is authorised, by a licence of the Secretary of State granted under this section, to carry out diving or salvage operations, it is an offence for any other person to obstruct him, or cause or permit him to be obstructed, in doing anything which is authorised by the licence, subject however to section 3(3) below.

Prohibition on approaching dangerous wrecks.

2.—(1) If the Secretary of State is satisfied with respect to a vessel lying wrecked in United Kingdom waters that—

(*a*) because of anything contained in it, the vessel is in a condition which makes it a potential danger to life or property; and

(*b*) on that account it ought to be protected from unauthorised interference,

he may by order designate an area round the vessel as a prohibited area.

(2) An order under this section shall identify the vessel and the place where it is lying and—

(*a*) the prohibited area shall be all within such distance of the vessel as is specified by the order, excluding any area above high water mark of ordinary spring tides; and

(*b*) the distance specified for the purposes of paragraph (*a*) above shall be whatever the Secretary of State thinks appropriate to ensure that unauthorised persons are kept away from the vessel.

(3) Subject to section 3(3) below, a person commits an offence if, without authority in writing granted by the Secretary of State, he enters a prohibited area, whether on the surface or under water.

Supplementary provisions.

3.—(1) In this Act—

"United Kingdom waters" means any part of the sea within the seaward limits of United Kingdom territorial waters and includes any part of a river within the ebb and flow of ordinary spring tides;

"the sea" includes any estuary or arm of the sea; and

references to the sea bed include any area submerged at high water of ordinary spring tides.

(2) An order under section 1 or section 2 above shall be made by statutory instrument subject to annulment in pursuance of a resolution of either House of Parliament and may be varied or revoked by a subsequent order under the section; and the Secretary of State shall revoke any such order if—

(*a*) in the case of an order under section 1 designating a restricted area, he is of opinion that there is not, or is no longer, any wreck in the area which requires protection under this Act;

(*b*) in the case of an order under section 2 designating a prohibited area, he is satisfied that the vessel is no longer in a condition which makes it a potential danger to life or property.

(3) Nothing is to be regarded as constituting an offence under this Act where it is done by a person—

(*a*) in the course of any action taken by him for the sole purpose of dealing with an emergency of any description; or

(*b*) in exercising, or seeing to the exercise of, functions conferred by or under an enactment (local or other) on him or a body for which he acts; or

(*c*) out of necessity due to stress of weather or navigational hazards.

(4) A person guilty of an offence under section 1 or section 2 above shall be liable on summary conviction to a fine of not more than £400, or on conviction on indictment to a fine; and proceedings for such an offence may be taken, and the offence may for all incidental purposes be treated as having been committed, at any place in the United Kingdom where he is for the time being.

Citation.

4. This Act may be cited as the Protection of Wrecks Act 1973.

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Controller of Her Majesty's Stationery Office and Queen's Printer of Acts of Parliament

Appendix C. "The Brighton Banger"

The Brighton Banger

by Dave Berry

What has since been called "Berry's Banger" is now in the Brighton Museum, whose curator is carrying out considerable research to try to identify the gun and give us its history.

It was first located in the sea at Black Rock near Brighton by Mike O'Brien and myself one evening in the middle of last year, and on subsequent dives it was buoyed and cleared of all obstructions.

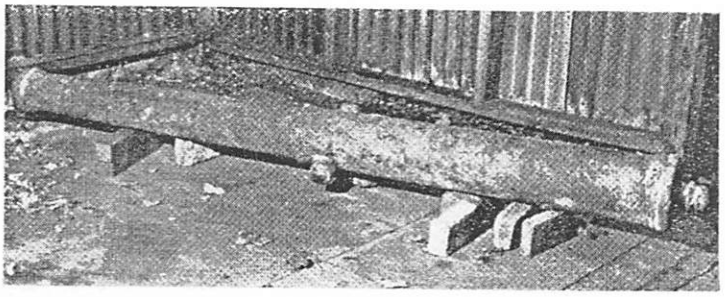
Three vain attempts were made to raise it, using small boats, and finally a plea for help was made to the Brighton Fishermen's Association. They made a trawler available, and we were all set early one morning for *Operation Lift*.

It all proved ridiculously easy. Divers attached the vessel's lifting gear to the cannon, it was raised in position under the hull of the trawler and then towed to Brighton beach. There it was dropped in the shallows so that it could be winched up the beach when the tide receded, and this was later successfully done.

This much we now know about the gun: It is not a cannon but a minion. It is made of bronze, weighs over half a ton, is about 8 feet long, and has a calibre of some 3 inches. An indecipherable coat of arms and a barely legible monogram AE or AG have led to the theory that it is of Dutch origin and about 350 years old.

The gun has several puzzling features, for the breech end is different from that of any other cannon whose records are in local libraries. What, for instance, is the purpose of the three transverse slots and the square hole in the breech knob? Have we stumbled across an early breech loader? Even the experts are confounded. Perhaps a reader has seen a similarly equipped gun and can help.

Since the discovery, I have found another cannon, this time of cast iron and completely encased in charred wood. It is still there, under the sea, but one day I expect we shall try to lift it.

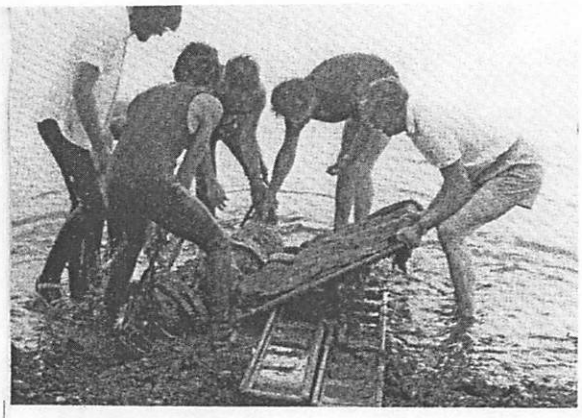


(Above): The Brighton minion home and dry.

(Right): Two puzzling features on the breech end: the transverse slots and the square hole. (Photographs: D. Cullen).

Figure 33 "Berry's Banger" Now Located at Fort Nelson

Appendix D. Black Cat Report



TIDES OF

A routine dive, an exciting find and thoughts build up—of the work that will go into a lift . . . and of possible wealth. In two special articles DIVER displays the reality behind both these aspirations

1 Black Cat catches the Brighton Cannon

by STAN MERRALLS

On my first dive as dive-leader I found a cannon. It was soon after my introduction to diving. Black Cat BS-AC was formed in January 1974 and on August 4 that year, at Brighton, I found the cannon.

My buddy diver and I returned to the beach and informed our fellow members. In less time than it takes to say "Gun", eight divers were swarming all over the cannon, digging and probing with their diving knives.

It was heavily concreted and after a short time it became clear that it was iron, not bronze as we had hoped. A brief look round and we left the cannon to rest in peace. The depth at the time of this dive was 7.5m and the visibility 2.5m.

Feeling some time later that I wanted more from my diving (fishing for crabs, lobsters, and so on, holds no interest for me) I decided to gather together a group of like-minded divers and the Brighton Cannon Project was conceived. The seven involved were: Stan Merralls (Project Leader); Stan Holmes (Surveying); John Nightingale (Research); Barry Hall (Records); Ian O'Riley (Secretary); Keith Benterman (Equipment); Larry Ryland (Equipment).

The first task was to relocate the cannon, and our immediate problem became the viz, which had dropped to under a metre. Subsequent dives proved that viz and silt were becoming worse and the project was almost abandoned.

It was July 3, 1977 that my son Robert on his first sea dive, in viz of 6m, found the cannon. The silt had disappeared and the seabed was almost clear of sand, although the gulleys were still quite full.

A week later, in the same conditions, a bronze hackbutt was found by Ian O'Riley and Barry Hall—and almost tossed aside as it was thought to be an old gatepost or pier-stanchion. But at the surface, coxswain Ken Saunders realised it was some type of gun.

Research led us to believe that the iron cannon was of stave construction—built the same way as a beer barrel, with iron staves formed into a tube and reinforcing rings placed along the length. At this stage Margaret Rule was informed and she asked to dive with us to survey the cannon.

She brought with her Adrian Barak, of Brighton BS-AC and DO of the *Mary Rose* team, as her buddy diver, and on July 31, 1977, in viz of about 3m the cannon was positively identified as a wrought iron, stave-built cannon, circa 1545. Margaret and Adrian were quite excited about it and arrangements were begun to excavate and raise it.

The weeks preceding the actual raising were spent excavating the cannon from the seabed, which consists of flint, chalk and sand-filled gulleys. A piece of concretion, accidentally dislodged, was brought ashore and, on opening, was found to contain the ghost image of an iron ring six inches in diameter.

We also discovered that after a whole day's excavation we would return the next week to find the work all nicely filled in again for us.

We decided to build an airlift, and we begged and borrowed a two-inch hose and air-line from Carreras Rothman, our Club's parent company, and a small compressor from an engineering company in Wickford.

Then, on the weekend of August 28, 1977, 12 divers from our club spent the Saturday preparing the site for the big lift, which was to be on the following day. The weather on the Saturday was quite rough and a limited amount of excavation was carried out (without the aid of the airlift), and the cannon was buoyed in readiness for the Sunday lift.

Sunday proved to be absolutely perfect, flat calm, brilliant sunshine and the tide just right.

The airlift was ferried out to the site in an inflatable and began to work beautifully. After about 10 minutes the compressor died and just refused to start again!

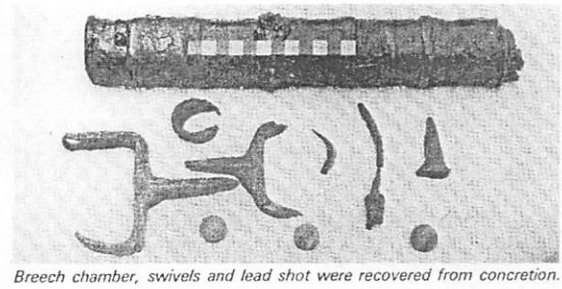
Margaret Rule arrived with Adrian Barak and two members of Brighton BS-AC who had kindly offered the use of their 22ft hard boat for towing the cannon. Margaret had also brought along her son Nicky whose first open-water dive this was to be. This made a total of 17 divers, and the organisation of this group into a team, plus the organisation of the lift, took a tremendous amount of effort and co-operation.

From top of page down, three pictures that show the haul from the sea as members of Black Cat get their gun ashore.

We had purchased two 400lb lifting-bags for the event and had worked out a plan for lifting the cannon without damaging it. On the day, Margaret and Adrian came up with a different idea and had brought along some equipment to assist us. This consisted of a short 6ft length of scaffold-pole, 8ft of fire-hose and a wire bond approximately 14ft in length.

16

FORTUNE



Breech chamber, swivels and lead shot were recovered from concretion.

Their method was to thread the wire bond through the scaffold-pole which would be laid along the top of the cannon; the fire-hose would then be wrapped around both cannon and scaffold-pole and secured at either end. Each end of the wire bond would then be connected to a shackle and the whole thing could be lifted, with the pole and fire-hose spreading the weight of the cannon evenly.

We decided, after some argument, to use Margaret's method and Stan Holmes and I dived to try to free the cannon from the seabed. This was purposely left to the last to prevent the cannon being moved should there be a storm.

We began to dig under the cannon and soon found this was much harder than anticipated. We decided to attach a lifting-bag to one end of the cannon and partially inflate it to give some leverage. In the event, the bag was fully inflated and nothing happened.

We carried on with the excavation. Suddenly the cannon moved and literally stood on one end, supported by the bag. After some tense moments, amid clouds of silt, we surfaced to decide our next move. We decided to deflate the airbag and the whole thing was gently lowered to the seabed. The fire-hose and scaffold-pole were positioned around the cannon and the two airbags were attached and fully inflated. The cannon rose gracefully to the surface with the tow-line fastened to the pole, the tow to the beach began.

Two divers were to ride along with the cannon to prevent it from damage by stopping the tow before the cannon hit the gradually shelving seabed. While still 185m from the beach we received a signal that the water was becoming too shallow, so the tow was halted. The airbags were deflated and the ropes attaching them to the cannon were shortened. After reinflating the bags the tow was continued, and with the cannon now riding higher in the water, we could get quite close to the beach.

A rope was taken to a group of divers on the beach, and the cannon was hauled as near as was possible. The timing was perfect, and the receding tide left the gun high and dry. All that remained was to haul it up the beach into a van loaned to the *Mary Rose* committee, and remove it to Margaret's house. And here we had a lot of help from the security guard at the Brighton Marina, Bill Pears, who not only provided us with ramps, liquid soap and a lot of effort in the haul up the beach, but also made tea for everybody at the end of an exhausting, but successful day.

The next few dives re-located the iron-and-wood anchor by a stroke of sheer luck. One of the inflatables had a spot of engine trouble and drifted towards a small white plastic float. Written on it were the words "Anchor, please leave alone".

After repairs to the boat we descended the rope from the float and found the iron-and-wood anchor we had been searching for. Obviously some other diver or divers had buoyed it hoping to return at a later date.

We took careful measurements and left it as we had found it. Later visits to the site proved that though the float had disappeared, the anchor remained where it was and does so to this day. We hope to raise it as soon as conservation facilities have been arranged. The measurements we made were: length 11ft, width of wooden stock 9ft 10ins, circumference of iron ring 22ins, thickness of ring 4ins, diameter of shank 6ins. The one remaining fluke was spade-shaped and 21ins by 23ins.

We now found visibility dropping and silt beginning to cover everything again. An iron stake, placed into the seabed where the cannon had lain, was left protruding 2ft 6ins from the chalk strata and now had disappeared.

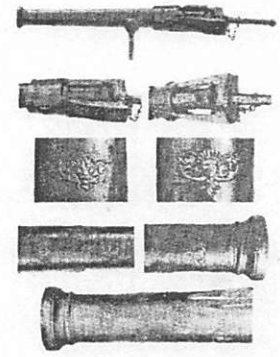
Our most urgent need was somehow to acquire an underwater metal detector and to grid the site for a proper survey. We managed to borrow a detector from the Chief Executive of our parent company, who just happens to be a diver, but once more the weather intervened and we had to return it before we could make use of it.

Eventually, with the help of Ken Clark, who was at that time Projects Advisor to the BS-AC we managed to convince Carreras Rothman of our urgent need, and were absolutely delighted with the result—a £1000 Aquapulse II underwater metal detector. With the aid of this we have so far located and positioned six contacts.

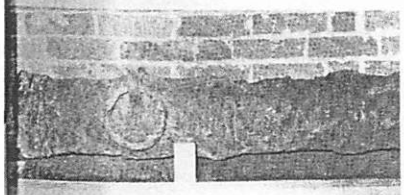
As we have been unable to acquire protection for the site, we have to lay out our 10m grid-system, then remove it after every dive. This takes up a considerable amount of time, but is necessary to prevent divers or fishermen from fouling the rope grid with their anchors. It also helps to prevent possible looting of the site and the irreparable damage that could occur.

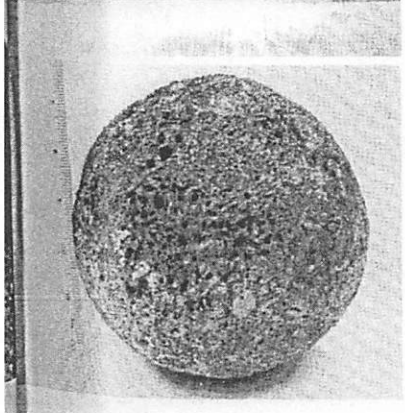
We are now trying to obtain the donation or lease of a "Hookah" compressor to enable us to discover exactly what the six contacts found by the detector are, and for the use of an airlift and air supply for two divers.

The last dive of 1979 on the site involved two novice divers, Ron Ramsey and Sid Tideswell, who found what appeared to be a framework of heavy timbers. This has yet to be fully investigated, and could well be the remains of the actual wreck. Viz was now under 2m with the silt still growing deeper. We are praying that the winter storms will do our work for us and remove as much silt as possible before the diving season really gets under way once more. ■



Details of rare 16th century swivel gun which brought £4000 recently at auction at Plymouth. See below.





Far left: rare bronze hackbutt, a handgun, was also discovered along with (left, top) cleaned-up cannon and (below) stone ball.

2 Do you sincerely expect to get rich?

by NIGEL EATON

So, like the Black Cat Club, you've found your wreck. Can you get rich from it?

You've buoyed her, and announced your possession to the diving world and the local press. Maybe you've been lucky enough to find something of real archaeological importance, and have successfully applied for a designation order.

Having contacted an archaeologist prepared to supervise the site, and a museum willing and capable of laying on conservation facilities, you've begun the arduous and time-consuming task of bringing your finds to the surface.

Can you now expect to realise any financial reward for all your toil and dedication? Is "treasure" an arbitrary glamorisation of relics known to the commercial world simply as "wreck"? Or does a wealth of rare and beautiful objects really await the curious and the persistent?

In due course, and after treatment for

17

Figure 34 Diver Magazine Report on the "Black Cat" Wreck Site

Appendix E. 2004 Brighton Marina Licence

PROTECTION OF WRECKS ACT 1973
LICENCE UNDER SECTION 1 TO SURVEY THE SITE OF A WRECK OF HISTORICAL AND ARCHAEOLOGICAL IMPORTANCE LYING ON OR IN THE SEA BED AT BRIGHTON MARINA

Whereas, by the Protection of Wrecks (Designation No 1) Order 1983 No. 1400 the area (hereinafter called "the restricted area") within an area of the point where a vessel lies wrecked on or in the sea bed, is the area bounded by straight lines between the following Ordnance Survey National Grid Co -ordinates viz. 533370 East, 103025 North; 533370 East, 102875 North; 533170 East, 102875 North; and 533170 East, 103025 North is designated a restricted area for the purposes of the Protection of Wrecks Act 1973;

.nd whereas by virtue of the operation of the said Act and Order, tampering with, damaging or removing any part of the wreck, or diving operations directed to the exploration of the wreck, are prohibited in the restricted area otherwise than under the authority of a licence granted by the Secretary of State;

And whereas, David Parham, School of Conservation Science, Bournemouth University, Talbot Campus, Fern Barrow, Poole, BH12 5BB, desires to dive and survey the site of the said vessel lying wrecked in the restricted area;

And whereas the Secretary of State is satisfied that Mr Parham and the other persons named in the Schedule (hereinafter called "the Licensees") have a legitimate reason to carry out the said operations;

NOW THE SECRETARY OF STATE FOR CULTURE, MEDIA AND SPORT, in exercise of her powers under Section 1(3) and (5) of the Protection of Wrecks Act 1973, HEREBY AUTHORISES the Licensees during the period 1 December 2003 to 31 October 2004 ·clusive to dive in the restricted area for the purpose of surveying the site of the said vessel, using such equipment as may be necessary or expedient for that same purpose.

This licence is granted on condition that:

1. the licensee submits a report on the progress of the said operations to English Heritage no later than 31 October 2004;
2. the archive of the project be deposited at the National Monuments Record of England;
3. any diving operations in the restricted area are carried out in accordance with the application submitted to English Heritage; and
4. during the carrying out of the said diving operations no objects are recovered.

Signed this 1st day of December 2003
for the Secretary of State

A Grade B in the Department for Culture, Media and Sport

Figure 35 Licence Issued for the 2004 Survey

Appendix F. 2005 Brighton Marina Licence

PROTECTION OF WRECKS ACT 1973
LICENCE UNDER SECTION 1 TO SURVEY THE SITE OF A WRECK
OF HISTORICAL AND ARCHAEOLOGICAL IMPORTANCE LYING
ON OR IN THE SEA BED AT BRIGHTON MARINA

WRECK SITE:	*BRIGHTON MARINA*
NAME:	*DAVID PARHAM*
LICENCE TYPE:	*SURVEY*

Whereas, by the Protection of Wrecks (Designation **No 1**) **Order 1983 No. 1400** the area (hereinafter called "the restricted area") within an area of the point where a vessel lies wrecked on or in the sea bed, **is the area bounded by straight lines between the following Ordnance Survey National Grid Co -ordinates viz. 533370 East, 103025 North; 533370 East, 102875 North; 533170 East, 102875 North; and 533170 East, 103025 North** is designated a restricted area for the purposes of the Protection of Wrecks Act 1973;

And whereas by virtue of the operation of the said Act and Order, tampering with, damaging or removing any part of the wreck, or diving operations directed to the exploration of the wreck, are prohibited in the restricted area otherwise than under the authority of a licence granted by the Secretary of State;

And whereas, **David Parham, School of Conservation Science, Bournemouth University, Talbot Campus, Fern Barrow Poole** desires to dive and **survey** the site of the said vessel lying wrecked in the restricted area;

And whereas the Secretary of State is satisfied that **Mr Parham** and the other persons named in the Schedule (hereinafter called "the Licensees") have a legitimate reason to carry out the said operations;

NOW THE SECRETARY OF STATE FOR CULTURE, MEDIA AND SPORT, in exercise of her powers under Section 1(3) and (5) of the Protection of Wrecks Act 1973, HEREBY AUTHORISES the Licensees during the period **1st December 2004 to 30th November 2005** inclusive to dive in the restricted area for the purpose of **surveying** the site of the said vessel, using such equipment as may be necessary or expedient for that same purpose.

This licence is granted on condition that:

i) the licensee submits a report on the progress of the said operations to English Heritage no later than **31st October 2005**;

ii) a copy of the archive of the project be deposited at the National Monuments Record of England;

iii) diving must be carried out to an approved code of practice as indicated on the application form;

iv) any necessary consents from other marine regulating bodies must be obtained:

v) **during the carrying out of the said diving operations no objects are recovered;** and,

vi) **any diving operations within the restricted area are carried out in accordance with the application submitted to English Heritage dated 28th October 2004.**

Signed this 9th day of December 2004
for the Secretary of State

Leila Al-Kazwini
Department for Culture, Media and Sport

Figure 36 Licence Issued for the 2005 Survey

Appendix G. Dive 1

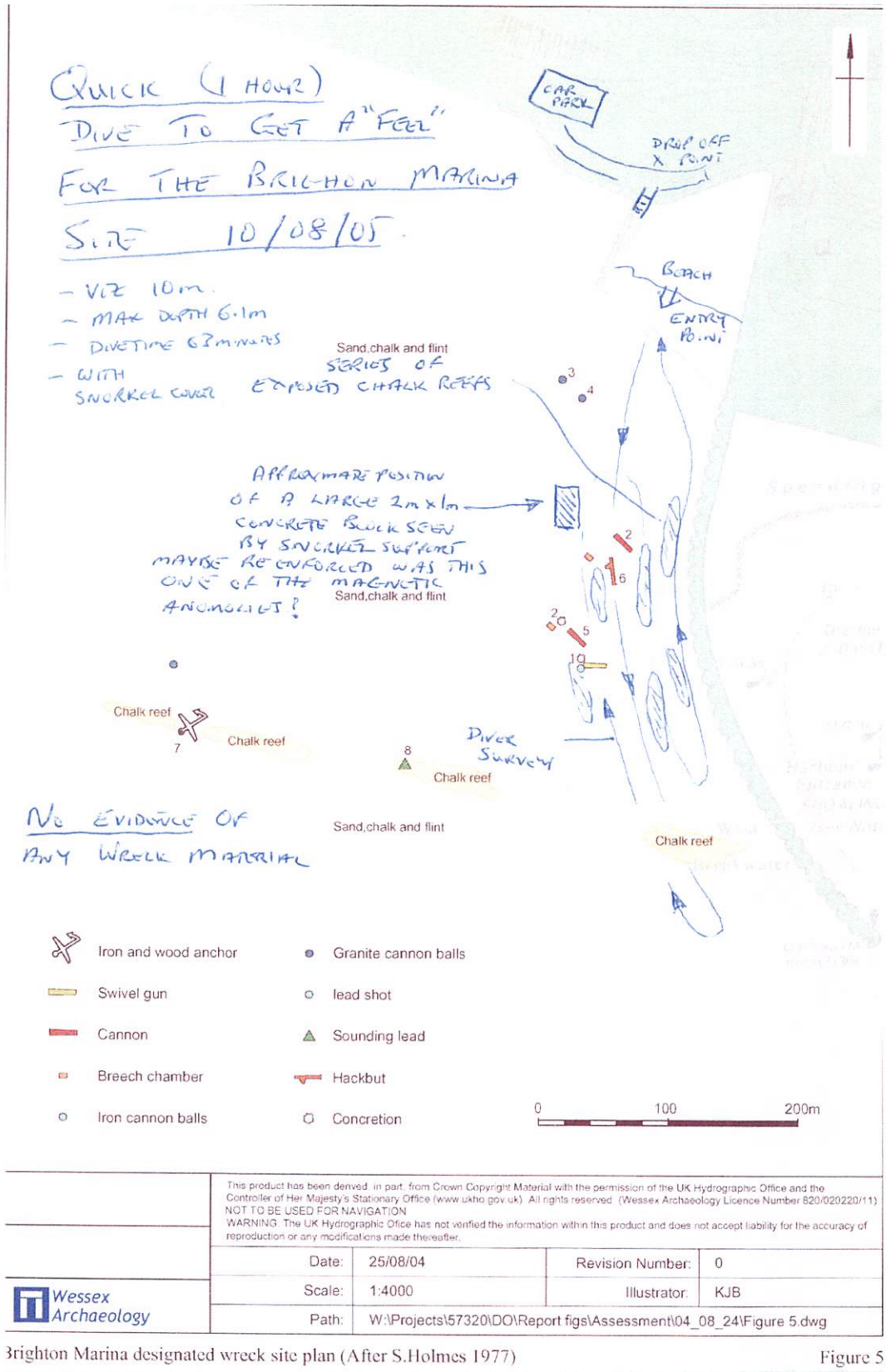


Figure 37 Extract From Logbook Entries for 10th August 2005

Appendix H. Dive 2

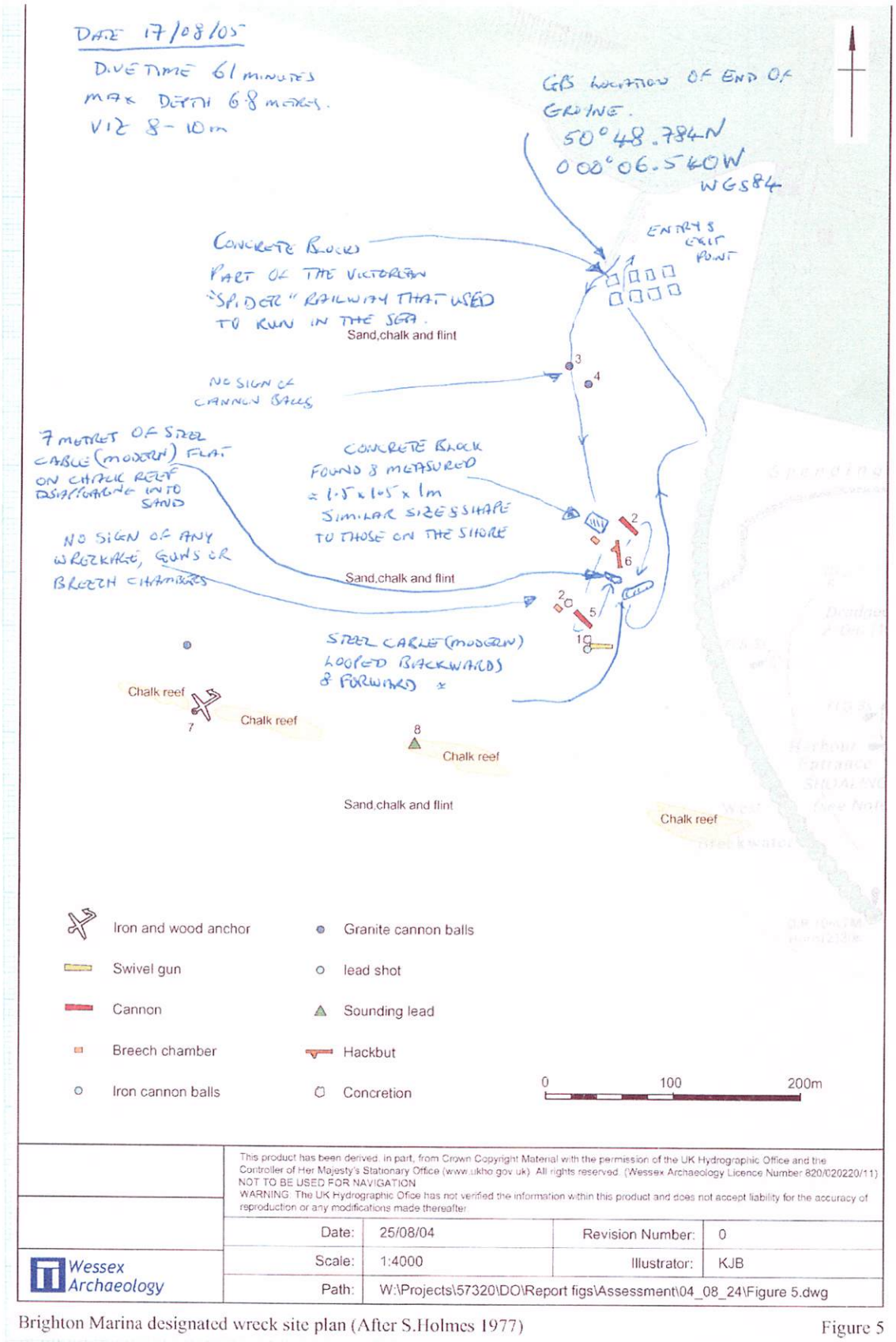


Figure 38 Extract From Logbook Entries for 17th August 2005

Appendix I. Dive 3 (a)

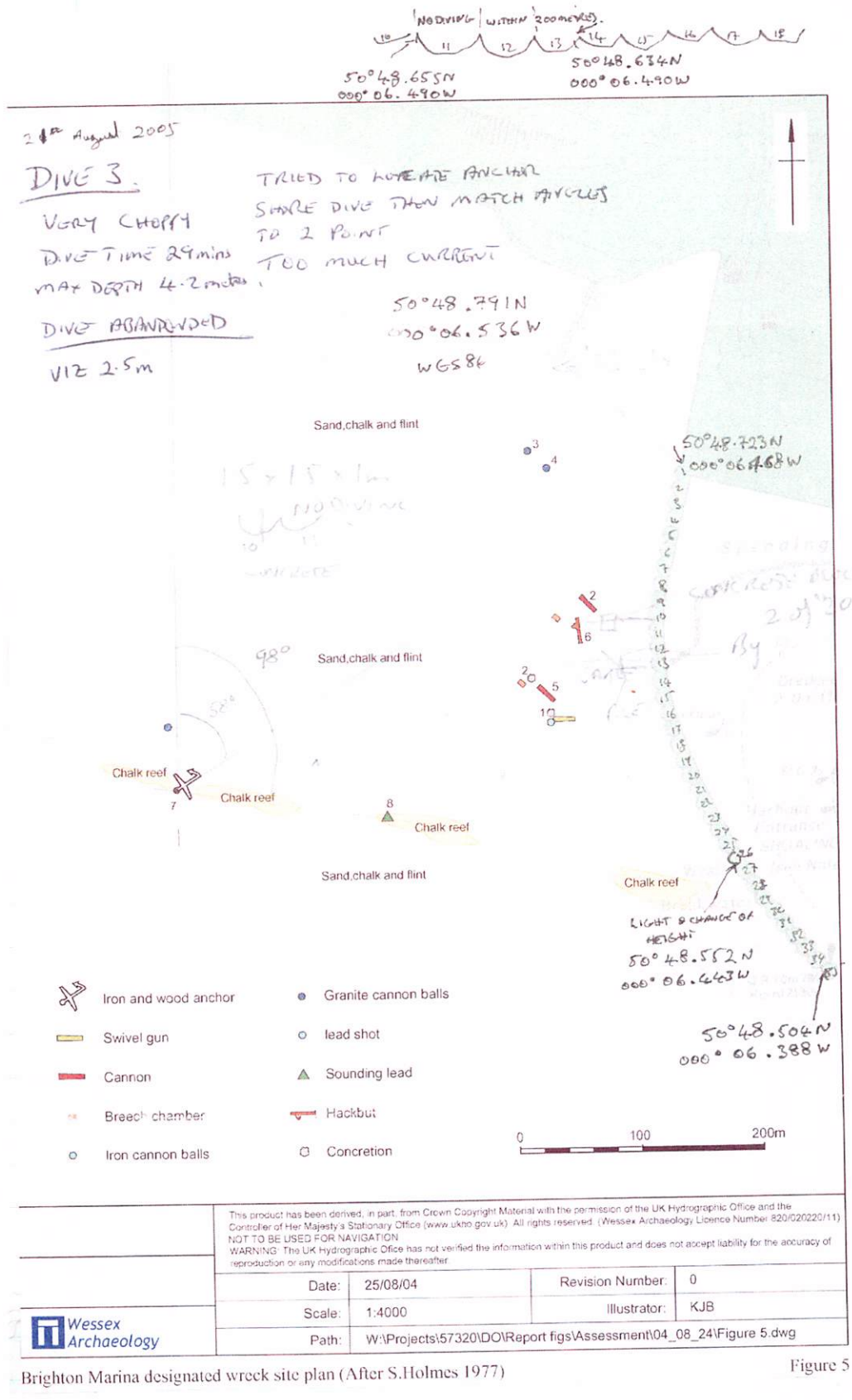
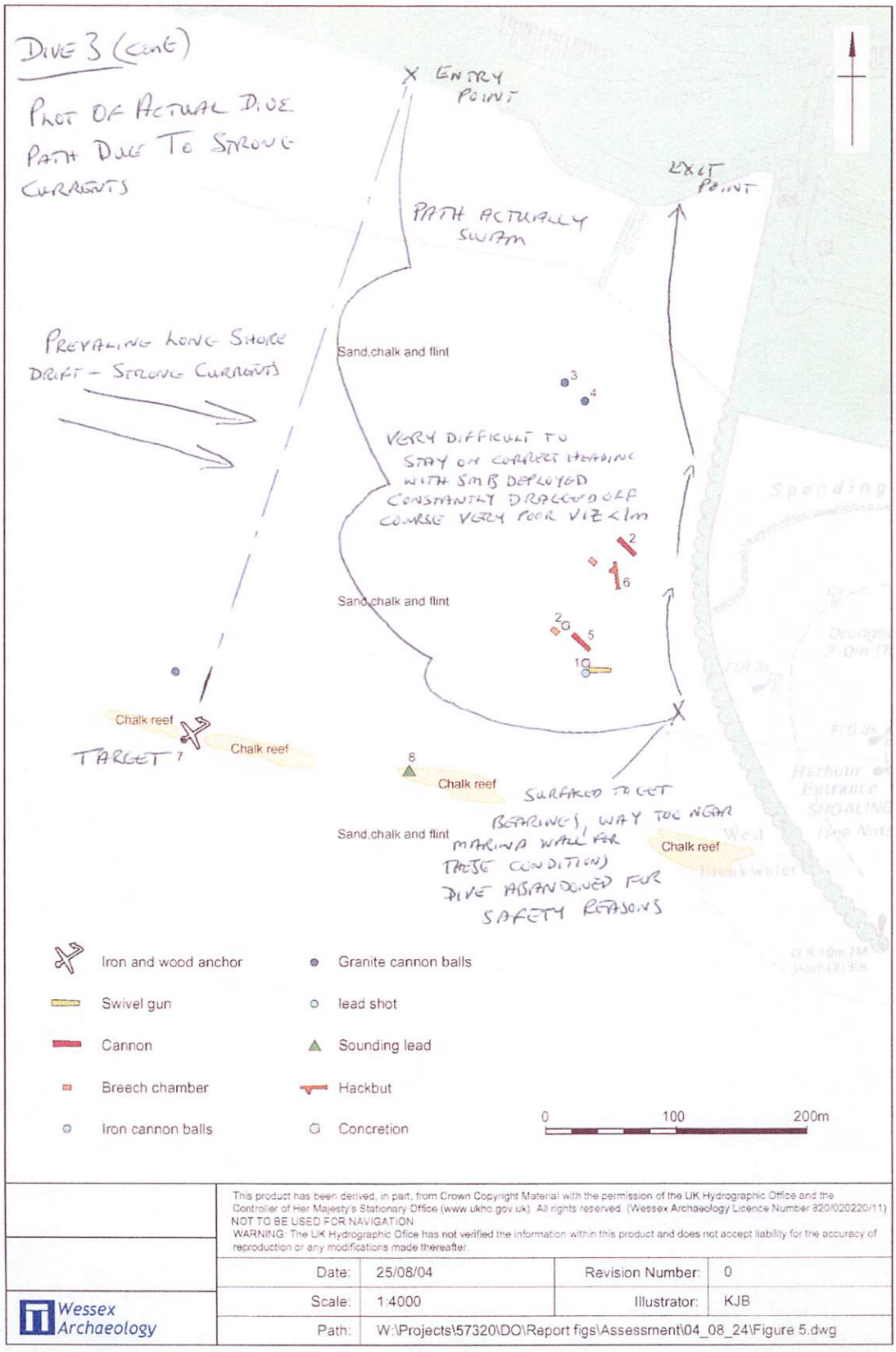


Figure 39 Extract From Logbook Entries for 21st August 2005

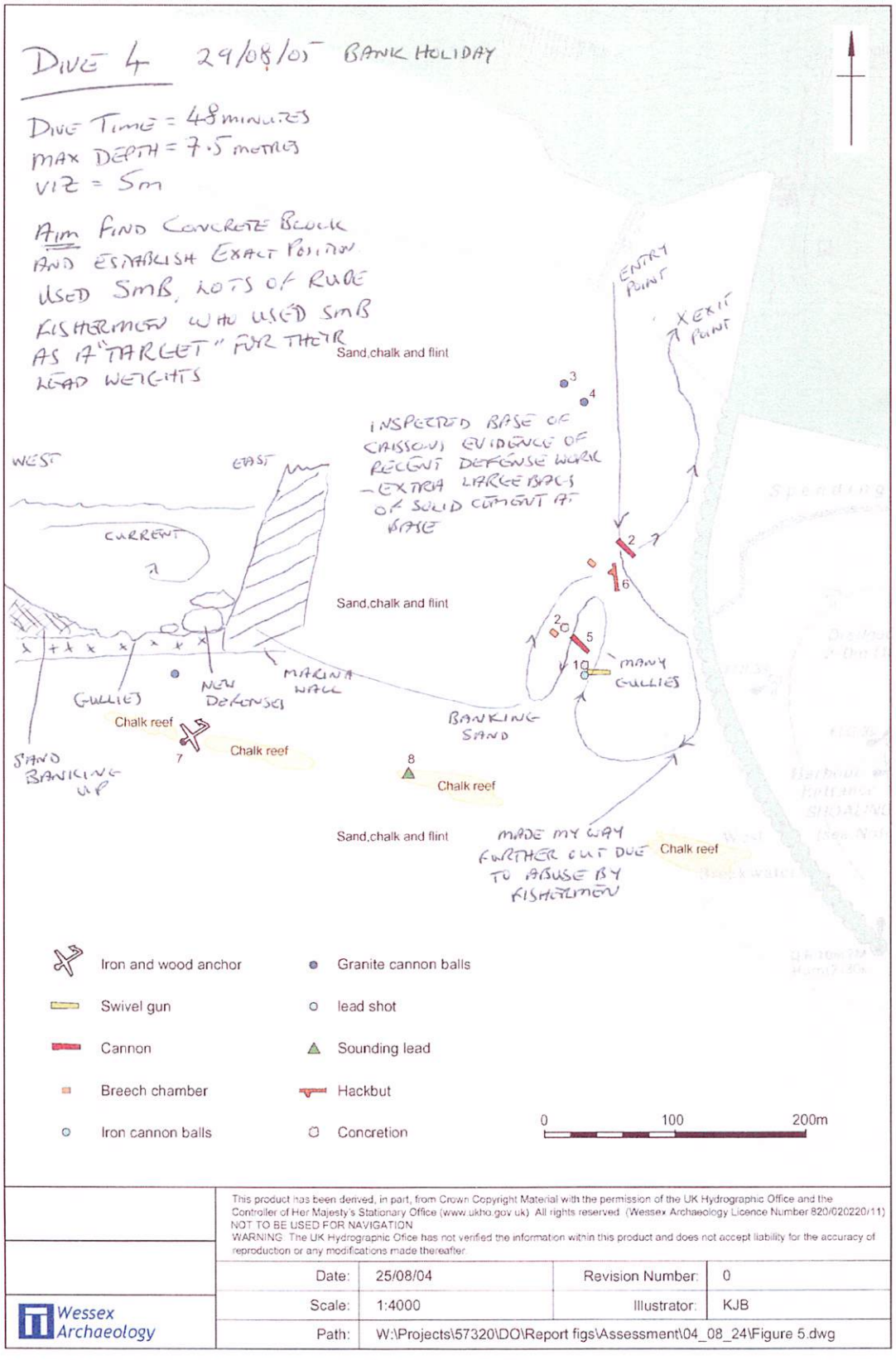
Appendix J. Dive 3 (b)



Brighton Marina designated wreck site plan (After S.Holmes 1977) Figure 5

Figure 40 Further Extract From Logbook Entries for 21st August 2005

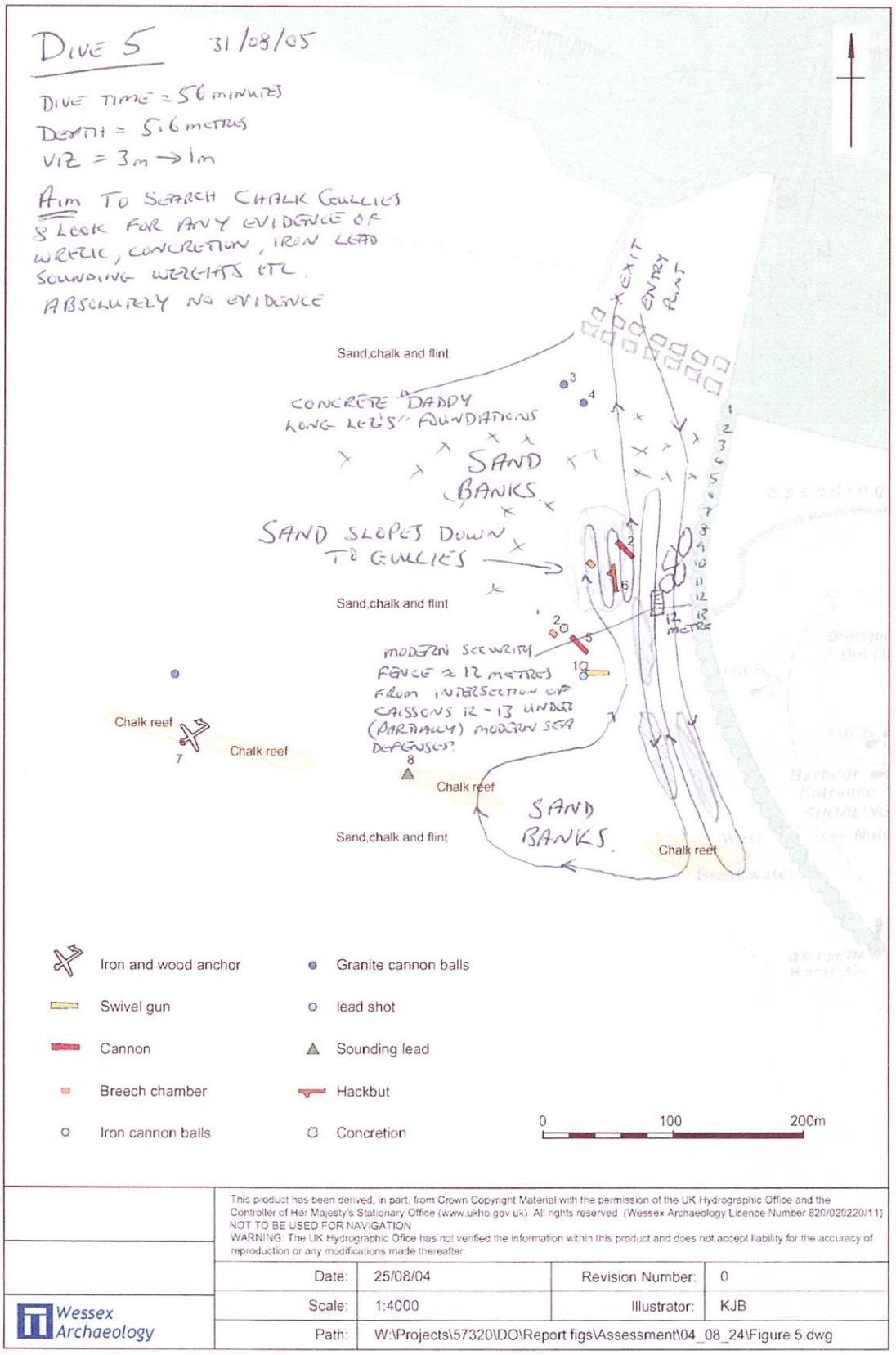
Appendix K. Dive 4



Brighton Marina designated wreck site plan (After S.Holmes 1977) Figure 5

Figure 41 Extract From Logbook Entries for 29th August 2005

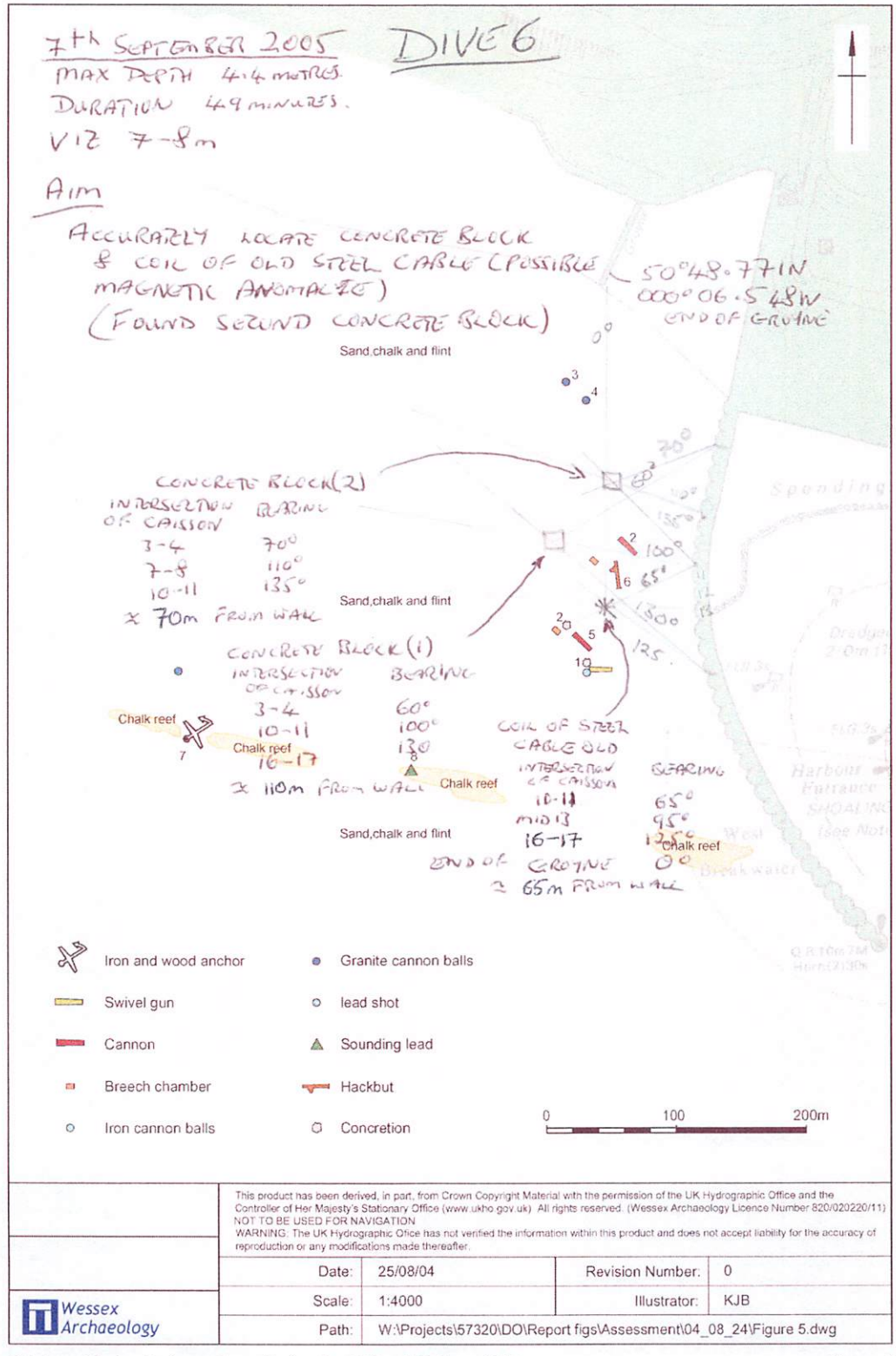
Appendix L. Dive 5



Brighton Marina designated wreck site plan (After S.Holmes 1977) Figure 5

Figure 42 Extract From Logbook Entries for 31st August 2005

Appendix M. Dive 6

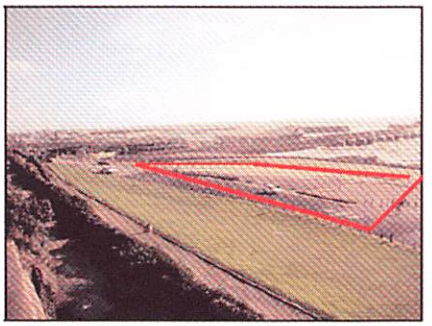


Brighton Marina designated wreck site plan (After S.Holmes 1977) Figure 5

Figure 43 Extract From Logbook Entries for 7th September 2005

Appendix N. Development Threats

OS Map 199 Grid Ref TQ033333



The site viewed from the A259

Artist's impression of the International Ice Arena

Black Rock

Size	0.8 ha
Local Plan Designation	Recreation / Leisure
Ownership / Tenure	Brighton & Hove City Council

The Vision:
The aim is to deliver a development that will provide all-year-round attraction for residents and visitors. The development should compliment but not duplicate facilities already available at the adjacent Marina. A development brief was produced for the site in 2001 following extensive public consultation with local residents.

Economic Partnership Comment

This site must be seen in the context of the other seafront developments in the city and the Marina outer harbour development.

As a venue for events it should be distinctly different from the offer at the Brighton Centre and other music / conference venues. Transport to accommodate up to 11,000 visitors at a single event will be the greatest problem to overcome.

Site History:
This is a flagship recreation site on the seafront. The City Council has agreed the preferred developer as Brighton International Arena with S&P Architects. The (approx) £50m bid encompasses two ice hockey rinks to include public facilities as well as an Arena suitable for ice hockey, major sporting events and concerts, capable of seating up to 11,000 people

Enhanced transport links along the sea-front and additional park & ride facilities on the outskirts of the city will be essential if this is to be a successful venue, enhancing both the marina and the city centre.

Figure 44 Threats From Local Foreshore Development