

18 MARINE ARCHAEOLOGY

1. The existing environment of the marine archaeological interest of the potentially impacted area is described on the basis of a combination of desk-based review of data and, primarily, targeted survey work that has specifically been undertaken for the proposed development. The survey work comprised undertaking magnetometer and wide-swath bathymetric surveys and focused on the area to the west of the existing approach channel (see Figure 1, Appendix 9). This is because this area has the greatest potential for marine archaeology as (with the exception of some minimal deepening almost 100 years ago) it has not previously been impacted by capital dredging. In addition, boreholes and vibrocores that have been taken from the proposed dredge area have been inspected with a view to establishing the potential for submerged prehistoric archaeological interest of the area.

2. The potential impacts of the proposed dredging largely relate to direct loss of any wrecks and impact on submerged prehistoric archaeology. Further survey work is recommended in order to confirm the archaeological potential of the various anomalies that have been identified through the survey work.

18.1 EXISTING ENVIRONMENT

18.1.1 Desk-based review of archaeological potential

1. The marine archaeological potential of the Harbour area was determined through a search of the National Monuments Record (NMR) Centre database. The north-east corner of the search area was at grid reference TM 28420 33690 and the south-west corner was at TM 26420 30495.

2. Records exist for 110 features within this search area; the majority of features are modern (19th and 20th century) vessels that were lost in the area and many records indicate that the feature is no longer present. In most cases, it is not possible to define the precise location of the feature (because the location of the feature at the time it was lost was not known) and the features are recorded as being referenced to a point near the Port of Felixstowe or at the entrance to the Harbour.

3. Following the NMR data search described above, a meeting was held with English Heritage to discuss the marine archaeological potential of the proposed development area. As well as discussing the findings of the NMR data search, the history of capital dredging within the development area was described. The conclusion was that the majority of the area has previously been extensively dredged to various depths and accordingly that the marine archaeological potential of these areas was low and there was no concern regarding the potential impact on marine archaeology. These areas comprised the seabed to the east of the existing approach channel.

4. Most of the area to the west of the existing approach channel (i.e. 'The Shelf') has also previously been dredged. However, this dredging was some time ago (between 1901 and 1906) and minimal deepening (by about 1m from -5mCD to -6mCD) was undertaken. Therefore, the potential for impact on marine archaeology in this area is greater. English Heritage advised that further survey work to define the potential marine archaeological interest of this area should be undertaken. Details of this survey work and its findings are presented below.

18.1.2 Overview of marine archaeological surveys

1. In July and August 2003, geophysical surveys of the proposed dredge area to the west of the existing dredged approach channel were undertaken by Wessex Archaeology. The rationale for focusing surveys on this area was that this part of the seabed is the only area within the proposed development site that has not been dredged in the past and, therefore, it has the greatest archaeological potential. This approach was discussed and agreed within English Heritage. The survey area is shown in Figure 1 (Appendix 9).

2. The surveys comprised the collection of multibeam bathymetric and magnetometer data. The full technical details, and the findings of the survey work, are included in the full survey report in Appendix 9 (Part A).

18.1.3 Summary of potential wrecks and other features

1. In summary, the marine archaeological potential of the area can be summarised as follows (figures in brackets are site identification numbers as shown on Figures 4 to 8; Appendix 9):

- One confirmed wreck, a wooden hulled minesweeper (as shown on Admiralty Chart 2693) (9001);
- Two sites (9006, 9007) that may represent further wreckage from the site of the same wreck;
- Five sites with high archaeological potential (9008, 9009, 9010, 9011 and 9017) characterised by a correspondence between magnetic and bathymetric anomalies;
- Five sites (9012, 9013, 9019, 9020 and 9021) composed of bathymetric anomalies of sufficient dimensions to be considered to be of medium archaeological potential; and,
- Twenty five sites composed of either small bathymetric anomalies or small magnetic anomalies that are considered to be of low or very low archaeological potential.

2. The distribution of the geophysical anomalies within the survey area shows a distinct concentration of anomalies within the area where the survey lines cross the (undredged) seabed of The Shelf. This is likely to result from the fact that the existing deepwater channel (that forms the eastern side of the survey area) has been repeatedly dredged, largely removing any wreck-related archaeology.

18.1.4 Submerged prehistoric archaeology

1. The known history of human habitation in Britain covers at least 500,000 years. During this time the country has been subjected to several periods of glaciation during which vast quantities of water were trapped within the volume of the ice, and sea level was up to 120 metres lower than it is today. The main archaeological consequence of these massive changes to the environment is that relics of human occupation may be present within areas that are currently below mean low water.

2. An examination of the proposed dredge area in relation to sea level change indicates that there is potential for the presence of drowned land surfaces (and associated sites) dating from various periods between the Lower Palaeolithic and (at least) the later Neolithic (500,000 BP to 2,500 BC). Since the dredge area is located at the confluence of the Stour and Orwell Estuaries (and, therefore, not subject to the full force of the sea during transgression) it is likely that the seabed would be a suitable environment for preservation of these kinds of remains within alluvial mud deposits and peats.

3. In order to investigate the presence of submerged land surfaces and, therefore, the potential prehistoric archaeological interest of the survey area, vibrocores taken for the geotechnical site investigation were examined by Wessex Archaeology. Ten vibrocores from the western side of the existing approach channel and 5 from the area within the footprint of the proposed reclamation were examined. The locations of the vibrocores that were examined for their archaeological potential are shown on Figure 18.1.1 (note that the geotechnical site investigation included additional sites to those shown on Figure 18.1.1). The full archaeological report is included in Appendix 9 (Part B) and its findings are summarised below.

4. On the basis of the vibrocore recording and interpretation, the sedimentary sequence and archaeological potential of the area can be summarised as follows:

- The sedimentary sequence is typical of the Kent and Essex coasts, comprising sands and alluvium;
- Two events of sand deposition were identified on the Harwich Shelf that may have been shifting sand bars or the result of lateral accretion on the inside of the river meander of the Stour;
- The eastern side of the survey area is dominated by a dredged navigation channel which has disturbed the sequence and contains organic muds as a result of the dredging process; and,
- A buried soil was identified on the western side of the channel.

18.2 POTENTIAL IMPACTS DURING THE CONSTRUCTION PHASE

18.2.1 Removal of potential features (wrecks) of archaeological interest

1. The geophysical assessment revealed the existence of a number of anomalies that are considered to be of either very low, low, medium or high archaeological potential. Without mitigation, those features that are within the proposed dredge area would be directly disturbed by the dredging and it is assumed that the features would be lost entirely due to dredging.

2. Clearly, the significance of the potential impact on features of potential archaeological interest is dependant on the actual nature of the identified anomalies. However, it is not possible to determine the actual nature of the anomalies and, therefore, their archaeological potential on the basis of geophysical data alone. For this reason, a precautionary approach must be adopted and a worst case potential impact of **major adverse significance** must be assumed. This assumption is based on the fact

that the anomalies could be of considerable archaeological interest and they would be removed by capital dredging.

Mitigation and residual impact

3. In order to mitigate this potential impact, a staged approach to further investigation (diver survey) is proposed. Phase 1 of this investigation would involve diving on a number of anomalies to 'ground prove' the findings of the geophysical survey. Should this phase confirm that the anomalies were correctly assigned to the various categories of archaeological potential, it is recommended that all remaining anomalies within categories of proven potential should be inspected (Phase 2). On the basis of the Phase 2 survey, anomalies could be dismissed as not being of interest or identified as targets for further investigation.

4. As a final stage of mitigation, and dependant on the outcome of the phased diver survey described above, a watching brief should be included on the dredger during certain parts of the dredging works.

5. The net result of the above process should be that certain anomalies would be dismissed as being of little interest, whereas the nature of others would be recorded. Should the phased diver survey reveal that some anomalies are of considerable interest, discussions would need to take place with English Heritage to determine how best to deal with these features having regard to the nature and importance of the items discovered.

6. Assuming that the above mitigation process is followed, there is a minimal potential for loss of features of archaeological interest without their prior evaluation and recording. Therefore, the residual impact is considered to be of **minor adverse significance**.

18.2.2 Removal of known features of archaeological interest

1. One confirmed wreck is present within the area to be dredged, a wooden hulled minesweeper. If no mitigatory measures are taken this feature would be directly affected by the works and an impact of **major adverse significance** could arise.

Mitigation and residual impact

2. The mitigation strategy described for the potential resource would also apply here. The value of the remains of the minesweeper would, therefore, be assessed and recorded. On the basis of this assessment, English Heritage's advice would be sought on an appropriate mitigation strategy. As for the potential resource, therefore, following the implementation of the measures agreed, the residual impact is expected to be of **minor adverse significance**.

18.2.3 Potential for removal of submerged prehistoric archaeology

1. The archaeological assessment of vibrocores revealed that there is a possible buried soil layer to the west of the existing dredged channel. It is considered that this *may* represent soil of a former saltmarsh and could represent a horizon upon which archaeological evidence might occur.

Fig 18.1.1

Reverse of 18.1.1

2. The dredging of the area to the west of the existing approach channel would, therefore, cause the removal of features of archaeological interest should the horizon represent a former land surface. Given that it is not possible to determine the nature of the any potential archaeological features, it is necessary to assume a worst case potential impact of **major adverse significance**.

Mitigation and residual impact

3. In order to provide additional information on the environment and the suitability of landscape for exploitation and settlement (and hence to clarify the range of archaeological evidence that may occur) it is proposed that pollen and foraminifera samples are taken from the vibrocores to establish the character of the buried soil.

4. In addition, a watching brief should be included on the dredger during the dredging to the west of the existing approach channel.

5. The implementation of the above mitigation measures would further inform the nature of the potential archaeological interest of the proposed dredge area and would minimise the potential for features of archaeological interest being lost without evaluation and recording. The residual impact is considered to be of **minor adverse significance**.

18.3 POTENTIAL IMPACTS DURING THE OPERATIONAL PHASE

18.3.1 Potential for the erosion of archaeological features outside of the development area

1. Archaeological features that are buried in the intertidal and subtidal sediments of the estuarine system could potentially be exposed through an increase in the rate of intertidal erosion. However, during the operational phase it is predicted that the underlying rate of intertidal erosion of the system is expected to decrease as a result of the proposed development. In this respect, the proposed scheme would result in a beneficial impact on archaeological features that are potentially present within the intertidal sediments although this is considered to be of **negligible significance**.

Mitigation and residual impact

2. No mitigation measures are required and the residual impact would be of **negligible significance**.