CONTENTS

15 MARINE ARCHAEOLOGY

15.1 Introduction

This section describes the existing baseline environment relevant to the maritime archaeological resource and assesses the potential impacts of the Thanet Offshore Wind Farm (Thanet) project on this resource, during construction, operation and decommissioning. The marine study area covers all development below Mean Low (MLW) (see **Figure 15.1)**. The archaeological resource above MLW is detailed in **Section 22, Terrestrial Archaeology and Cultural Heritage**.

15.2 Assessment Methodology

15.2.1 Data collection and review

A desktop archaeological assessment was undertaken by Wessex Archaeology, which covered an area 2km either side of the export cable route and the wind farm boundary. Cartographic sources were collated from the Centre for Kentish Studies in Maidstone and the East Kent Archives Centre, Whitchurch, Dover. Wreck data was collected from the United Kingdom Hydrographic Office (UKHO) via SeaZone, and from the Maritime and Coastguard Agency Receiver of Wreck.

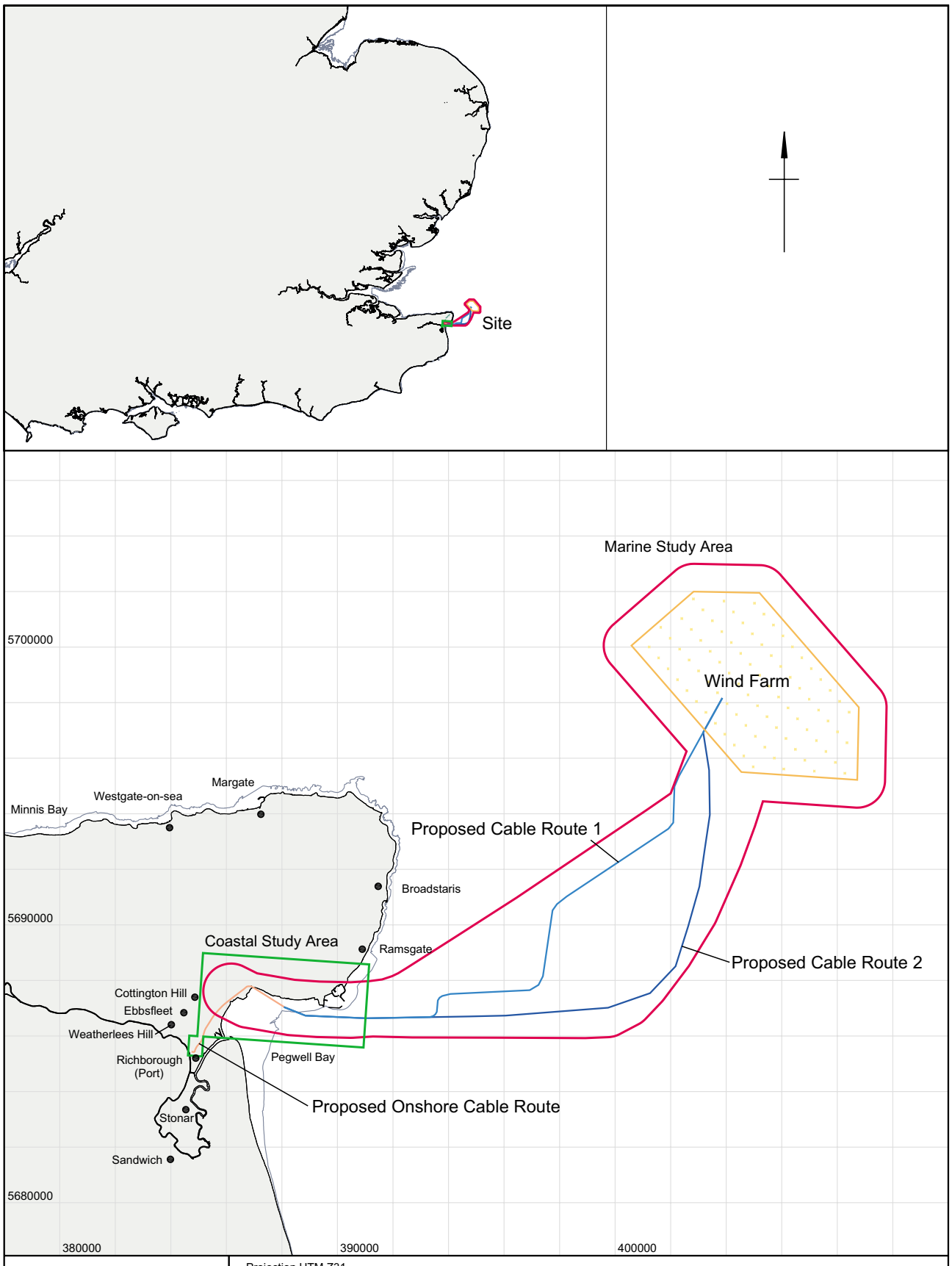
Data from the desktop investigation were used to assess the archaeological potential in four broad temporal zones, defined as follows:

- Prehistoric and Lower, Middle and Upper Palaeolithic remains, either as derived artefacts, or possibly as *in situ* remains;
- Late Upper Palaeolithic to Medieval artefacts and/or sites;
- Post Medieval to Modern artefacts and/or sites; and
- Wrecks and maritime related sites from Prehistoric to Modern times.

Whilst the assessment covers the 2km buffer zone described above, it focuses on an area 500m either side of the export cable route, as the potential physical disturbance caused by the installation of the export cables is considered to be small. The full 2km buffer zone is assessed for this element of the project due to the wider anticipated impacts of the wind farm footprint.

Although much of this assessment is based on secondary sources, provision was also made for the archaeological interpretation of new primary data arising from the marine geophysical survey undertaken as part of the study (see **Section 6, Hydrodynamics and Geomorphology**). The assessment was undertaken with regard to the relevant legislative and policy guidance outlined in the following section. Further details of the archaeological desktop assessment are provided in **Appendix 15.1.**

The methodology adopted reflects best practice in carrying out archaeological desktop assessments, as codified by the Institute of Field Archaeologists (IFA) *Standard and Guidance for Archaeological Desk-based Assessment (IFA 1999).*



Coastal Study Area
Marine Study Area

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Wessex Archaeology

Location of the proposed windfarm and cable routes and the Marine and Coastal Study Areas Figure 15.1

15.2.2 Legislation and guidance

There are a number of relevant Acts of Parliament specific to the protection of archaeological and historical sites and wrecks. In addition, a number of guidance documents have been produced. The legislation and guidance is presented here and has been considered, where necessary, in this assessment.

- Protection of Wrecks Act 1973 protects wrecks and wreckage of historical or archaeological importance designated as Historic Wrecks; and
- Ancient Monuments and Archaeological Areas Act 1979 protects monuments that are of national importance including buildings, structures, caves, excavations and their sites, vehicles, vessels, aircraft or other moveable structures.

Planning Policy Guidance (PPG) notes relevant to archaeology and heritage include:

- Planning Policy Guidance: Planning and the Historic Environment (PPG15);
- Planning Policy Guidance: Archaeology and Planning (PPG16); and
- Planning Policy Guidance: Coastal Planning (PPG20).

Other applicable non-statutory policies and codes of practice, which set out a number of principles for managing coastal archaeology include:

- England's Coastal Heritage: A Statement on the Management of Coastal Archaeology;
- Protecting Palaeolithic Remains: Archaeological Guidance for Planning Authorities and Developers; and
- Military Aircraft Crash Sites: Archaeological guidance on their significance and future management.

Version 7 of the Joint Nautical Archaeology Policy Committee (JNAP) Code of Practice for Seabed Development is currently undergoing consultation. The British Wind Energy Association (BWEA) has welcomed the general approach of the document, which has been adopted for the archaeological assessment for the Thanet project.

15.3 Existing Environment

15.3.1 Archaeological potential: Palaeo-landscapes

Changes in the physical environment relating to variations in climate, and controlled by factors such as glaciation and sea level change, have played an important part in determining the character of the environment available for human habitation and economic activity in the study area. Continuous changes in sea level have been such that the position of the shoreline in the region has migrated repeatedly, frequently over large distances and sometimes within relatively short time periods. Thus, areas of human occupation that were once on dry land may now lie submerged on the seabed. Likewise, land that is inhabited today may have been submerged at various times throughout prehistory.

For this reason, a review of the study area with particular reference to sea level change is necessary when considering archaeological potential for submerged palaeo-landscapes. It is also useful to consider the bathymetry, topography and geology of the region alongside existing archaeological and environmental evidence to inform the identification of possible areas of human occupation and to assess the significance of any potential impacts of the Thanet project.

The geology of the area is characterised by Upper Cretaceous Chalk (98-65 million years ago) overlain by silts and sands known as the Thanet Beds, the oldest Tertiary formation of the Palaeocene era in this region (BGS 1989). This geology underwent massive changes over the next 65 million years leading to the formation of the Isle of Thanet and the Wantsum Channel, which separated Thanet from the rest of the North Downs for several millennia.

Phases of glaciation transformed the geology during the Pleistocene (1.6 million years ago to 10,000 BP) by stripping the Thanet Beds from the bedrock and depositing the material to form new landscapes. The Thanet Beds do not survive within the area of the export cable route apart from a small projection extending eastwards from Pegwell Bay (BGS 1990). The Thanet site does however, lie upon Thanet Beds and later tertiary deposits covered by deep layers of quaternary sediments.

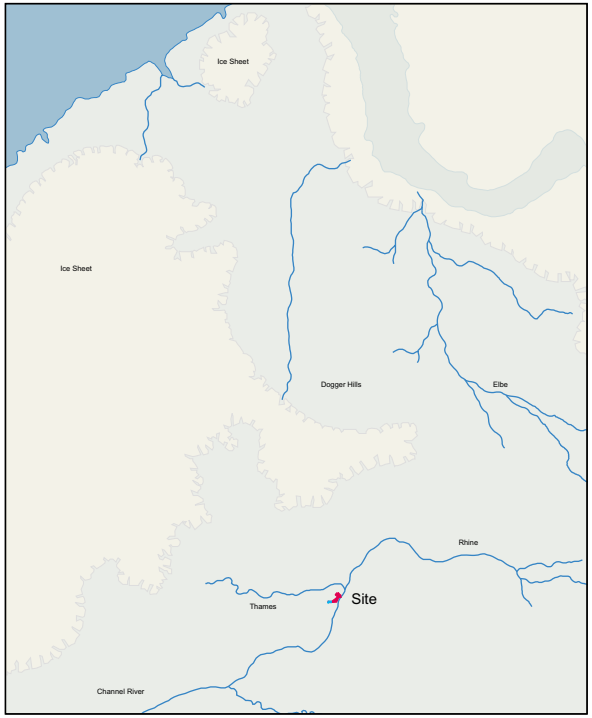
Human occupation of Britain dates back to 500,000 years ago, since when there have been three glacial periods. Whilst there were variations in sea level during these periods, geological and topographical evidence has been impacted by the latest glacial episode, the Devensian, which ran from 70,000 years ago until approximately 12,000 BP. Periods of glaciation significantly alter the position and size of waterways, and present day positions were set at the end of the Devensian period.

Sea levels began to rise once ice sheets melted between 13,000 and 11,400 BP (Cameron *et al*, 1992:120) and evidence for human reoccupation of Britain correlates with these dates (Wessex Archaeology, 2005). Sea levels by 10,000 BP were still in excess of 60m below current levels. Schematic representations of the changing coastline (see **Figure 15.2**) indicate that during the Upper Palaeolithic and Early Mesolithic the marine study area would have been partially inundated. The environment was likely to have been intertidal mudflats and saltmarsh, and there is potential for human activities within the coastal tracts providing a focus for human occupation.

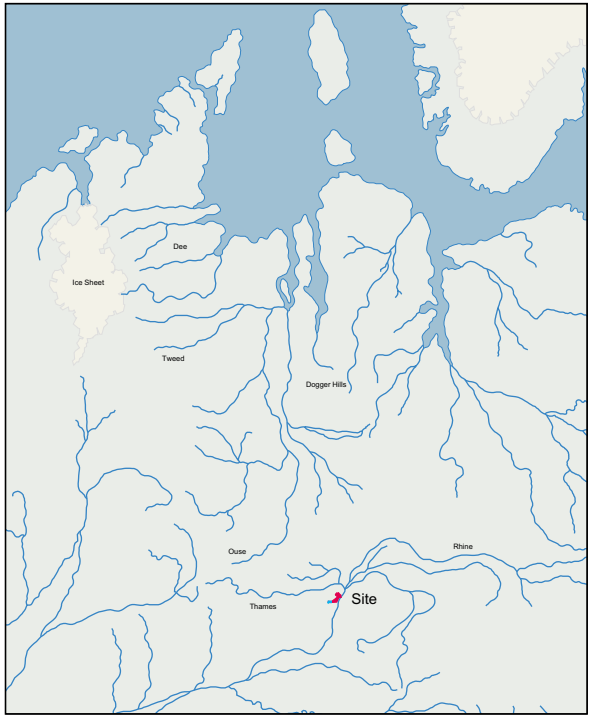
Sea levels by 6,000 BP were approximately 7m below current levels and it was around this time that Britain became an island again (Coles, 1998:67). The great plain to the north of Thanet flooded to become the North Sea and water filled the Wantsum syncline and joined with the River Stour, creating the Isle of Thanet, which was an island from this time until the medieval period when the Wantsum silted up.

Current sea levels were reached during medieval times and human settlement within the area has changed to reflect continuing developments in technology and culture. The potential for archaeological remains over these time periods is discussed below.

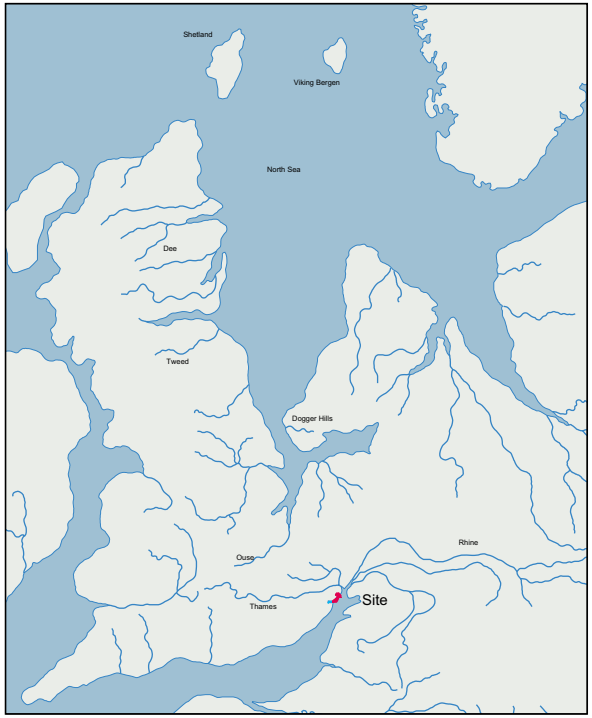
Full details of the history of environmental conditions within the study area that are of relevance to the potential archaeological interest, e.g. sea level change, are provided in **Appendix 15.1**.



18,000 BP



13,000 BP



10,000 BP

5,000 BP

Based on Coles 1998

Sea
Land
Main rivers
Ice sheet

Wessex Archaeology

Projection OS GB

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Changing coastline in response to sea-level from 18,000BP

Figure 15.2

15.3.2 Maritime sites and finds

The known post-Roman maritime resource is summarised in **Table 15.1**:

Table 15.1 Summary of the known post-Roman maritime archaeological resource in the study area

Site type	Total in study area
Live Wrecks (maritime vessels)	25
Salvaged Wrecks (maritime vessels)	2
Dead Wrecks (not detected by repeated surveys and therefore considered to not exist by the UKHO)	11
Live Fouls/Obstructions	18
Reported losses (maritime vessels)	203
Reported Losses (aircraft)	13
Total	**272**

Of the 25 live wrecks found within the study area, five are located within the wind farm array, four in the 2km buffer zone around the wind farm, seven within 2km of cable route one and 16 within the cable route area (see **Figure 15.3**).

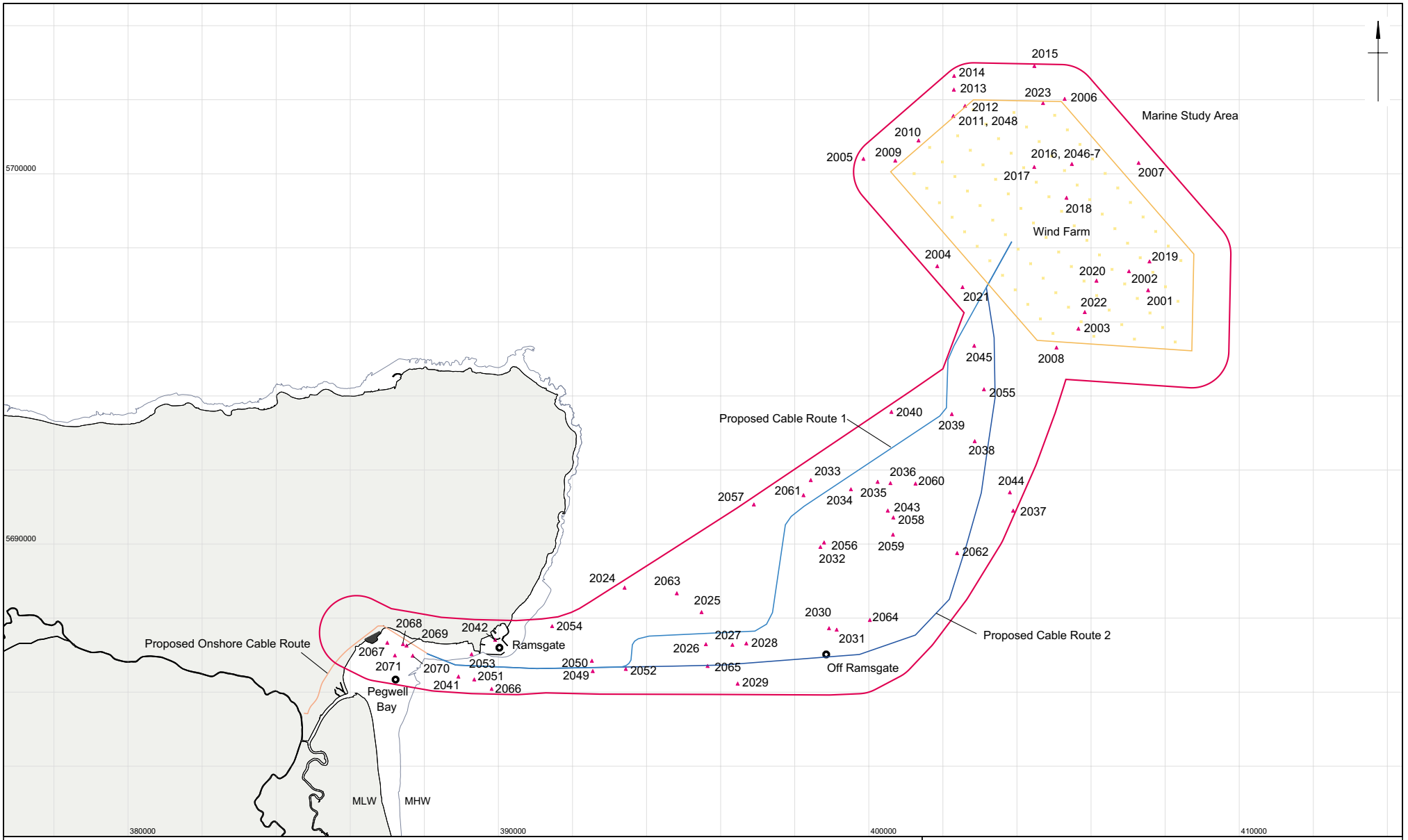
Three unidentified shipwrecks lie within the Thanet site buffer, and one within the export cable route one buffer. Reports provided by the Receiver of Wreck may help to identify these, although the accuracy of this information is not considered to be high.

No protected wrecks were found within the study area. All the known wrecks date to the 20th Century and include cargo, fishing and military ships. Those associated with loss of life have additional importance with regard to this and their association with the two World Wars. Further details are provided in **Appendix 15.1**.

15.3.3 Summary of potential for archaeological remains

The Quaternary geology of the area is characterised by gravels, sands and smaller muddier deposits. It is possible that remains of lower or middle Palaeolithic (50,000 to 30,000 BP) activity may survive buried within or beneath these deposits on the surviving Tertiary formations within the Thanet area. However, the glacial action within the Devensian period (70,000 to 12,000 BP) is likely to have reworked and redeposited sediments containing artefacts from these temporal periods. Thus, any artefacts that predate the Devensian glaciation are likely to be reworked in secondary contexts.

Evidence suggests that the marine study area has had the potential for wrecks since the Late Neolithic (7,500 to 6,500 BP). The proximity of the Kent coastline to the continent has provided a convenient landfall for migrants and traders and, as such, the area has seen a steady increase in shipwrecks reflecting human development.



Named locations reported losses

Wrecks/obstructions

Proposed turbines

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Wrecks, obstructions and reported losses within the Marine Study Area

Figure 15.3

Bronze Age (2,200 to 700 BC) and Iron Age (7th Century BC to 5th Century AD) Thanet represented a gateway community and a prehistoric socio-economic centre, and it is probable therefore, that high volumes of watercraft were operating in the area. Hence there is high potential for discovery of wrecks within the thick alluvial layers beneath the development area.

The Wantsum Channel was an open and navigable waterway up to and including the Roman period (44 to 410 AD). The exact timing of the inundation of the Wantsum syncline is unclear with some evidence suggesting flooding occurred in the Early Mesolithic, whilst others suggest the much earlier Late Upper Palaeolithic period. Sea levels are estimated to have been between 35 and 55m below present levels at the beginning of the Mesolithic (10,000 to 6,000 BP). Finds from the seabed from up to 6km offshore from the coast of Kent suggest that Mesolithic communities were exploiting these areas prior to submergence. Although there are no known finds within the marine study area, the discovery potential of Mesolithic sites to the north of Thanet indicates the possibility of similar finds within the wind farm area or export cable routes.

The importance of the Wanstum Channel in terms of trade and defence in more recent times is reflected in the two stone Saxon shore forts built in the late 3rd Century. Whilst no vessel remains from the Roman period have been recorded within the study area, there is high potential for such remains to be preserved in the alluvial deposits, which characterise the development area.

Seafaring activity within the area continued into the Viking era and there is also potential for remains from this period to be present.

With the silting up of the Wantsum Channel in post Roman times, other ports in the Thames Estuary area became increasingly important. This area combined with the Straits of Dover formed one of the biggest shipping routes in the world throughout the Medieval and later periods. The high volume of shipping indicates a high potential for the discovery of as yet unknown maritime remains dating from the medieval period to the present day.

The continued development of Ramsgate as a port from medieval times onwards supported an increasing volume of vessels, and therefore more shipwrecks. This, combined with the extensive silting that has taken place suggests that maritime remains may be preserved within the sediment covering the marine study area. The presence of the Goodwin Sands just off the coast also serves to increase the number of shipwrecks. Numerous discoveries dating from the Roman period have been reported on this constantly shifting sandbank. Highly mobile sediments are also a feature of Pegwell Bay. Remains washed up on the beach are likely to be quickly incorporated into the waterlogged sediments and this combined with the large amount of wreckage known from the shore, indicates a high potential for the recovery of further maritime remains in the intertidal areas.

More than 100,000 tons of dredged material since 1986 has been disposed of at a site 1.8km offshore at Pegwell Bay. This material has mostly consisted of maintenance dredging from Richborough Quay and the Port of Ramsgate. Increased sedimentation within the marine study area as a result of this may have increased the depths of sediment overlying identified and unidentified archaeological remains.

15.4 Impacts during Construction

15.4.1 Direct and indirect disturbance to the archaeological resource

On the basis of their age and the rarity of Palaeolithic and Mesolithic finds underwater, any such sites which were found would be of high, and probably national archaeological importance. The English Heritage guidance note published in 1998, 'Identifying and Protecting Palaeolithic Remains; archaeological guidance for planning authorities and developers', notes that sites containing Palaeolithic features are so rare in Britain that they should be regarded as of national importance and whenever possible should remain undisturbed.

The discovery of terrestrial sites from later periods within the marine study area is also possible. Any such sites would provide evidence for the lost coastline of their period, and thus are likely to be of high local or regional importance.

There are no protected wrecks within the marine study area. All the known wrecks date to the 20th Century and represent a range of cargo, fishing and military vessels.

Vessels lost in times of war, or any vessel associated with loss of life at the time of sinking, may have an importance associated with that loss of life. Of the 26 vessels within the study area, two were attacked and sunk by hostile aircraft during World War II, 14 were lost after striking a mine, one was sunk by an armed vessel during World War I, one was torpedoed and another was sunk by a U-Boat. Each of these vessels will have additional importance with regard to their associations with the World Wars and a significant loss of life.

Further to the sites recorded by the UKHO, there is potential for the presence of unknown and undocumented wrecks and/or isolated artefacts from various periods dating back to the Mesolithic or earlier. Given the long history of maritime activity in the region, it is possible that the remains of vessels of regional, national and even international importance might be discovered.

The construction of the Thanet project may have a number of impacts on the potential archaeology of the area. Potentially damaging aspects of construction include foundation and cable installation, scour protection, and anchoring vessels.

In addition to these direct impacts, the longer term changes in the scouring and sedimentation patterns may expose previously buried sites to degradation, destabilisation and corrosion.

Any Prehistoric deposits and artefacts, and shipwrecks at depths reached by construction within the footprint of the export cable route and wind farm, would also be directly impacted.

All impacts upon known archaeology would be permanent and thus of significance. The scale of significance would depend upon the strength of the impact. There are four marine sites recorded within 150m of the export cable routes and 12 within the footprint of the Thanet site. The importance of these sites is not yet known to the level required for an accurate assessment of significance. However, if any of the sites were found to be of medium or high importance, then direct impacts upon them would have a

significant effect. There is also potential for many unknown sites within the marine study area. However, it is not possible to determine the significance of effects upon potential sites with any confidence.

The basic principle with regard to any known archaeological sites is one of avoidance. Where this is not possible, the site would normally be investigated such that its importance could be determined, and a suitable level of mitigation works undertaken.

In order to effectively mitigate any potential impacts on known sites and palaeo-landscapes within the study area, all aspects of any further archaeological work will be detailed by a Written Scheme of Investigation (WSI). This would make provision for other forms of archaeological mitigation that might be required in the light of pre- and post-construction investigations, including archiving and dissemination of results. It will be subject to the approval of Kent County Council Heritage Conservation Group's Principal Archaeological Officer and English Heritage's Maritime Team. Further details are provided below.

Wreck sites

In order to prevent damage to known wreck sites and geophysical anomalies with archaeological potential, it may be appropriate to place Construction Exclusion Zones around each site. Their size would depend upon the extent of the known or suspected archaeology, although they may be subject to movement, reduction or removal following further survey work prior to construction.

If the project plans cannot be altered to avoid an archaeological site, then the site would be subject to a process of evaluation to establish importance and extent followed by excavation if necessary. This work would be required prior to any construction in the vicinity of the potential site.

Palaeo-landscapes

In order to provide further information on the submerged prehistoric landscapes within the area of impact, vibrocore and borehole surveys undertaken as part of the detailed design on the Thanet project would, wherever possible be subject to phased archaeological analysis. This method provides a means of obtaining archaeological information for submerged landscapes without the need for expensive diver surveys. This is currently considered to be the most cost effective and reasonable way of mitigating the effect of development impacts upon submerged prehistoric sites.

In view of the potential for the presence of drowned land surfaces and associated prehistoric sites, and as yet unknown wrecks, there will be archaeological involvement during the pre-construction cable route clearance, and any similar activity undertaken within the vicinity of the wind farm.

A protocol would be developed for reporting archaeological finds that may be discovered during the course of development. This would make provision for the institution of temporary exclusion zones, and for the provision of prompt archaeological advice combined with inspection of important features prior to further construction within the immediate vicinity.

15.5 Impacts during Operation

No impacts are envisaged during operation, as no areas that have not already been disturbed during construction would be affected.

15.6 Impacts during Decommissioning

It is anticipated that the decommissioning method would involve similar activities to the construction phase whereby the structures and equipment are removed using similar techniques and facilities. Again, no additional impacts over and above those experienced during the construction phase are anticipated.

15.7 Summary

A desktop assessment of the potential impact of the Thanet project on the archaeological resources below mean low water (MLW) was undertaken by Wessex Archaeology. A variety of sources have been examined, including the National Monuments Record, the Kent Sites and Monuments Record, the UK Hydrographic Office and marine geophysical data. In addition, a variety of topographic, sea level, historical and archaeological data has been studied to assess the known and potential archaeological resource within the development area. The archaeological potential may be defined as follows:

- Submerged palaeo-landscapes or derived artefacts; and
- Wrecks and related maritime remains.

On the basis of their age, and the rarity of Palaeolithic and Mesolithic finds underwater, any such sites which are found would be of high, and probably national archaeological importance. The discovery of terrestrial sites from later periods within the marine study area is also possible. Any such sites would provide evidence for the lost coastline of that period, and thus are likely to be of high local or regional importance.

The desktop assessment identified a number of wrecks and features of archaeological interest within the footprint of the wind farm and the 2km buffer zones around the export cable routes. Any of these located at the surface or at depth reached by construction could be directly impacted by excavations and foundation installation. Four marine sites are recorded within 150m of the export cable routes and 12 within the footprint of the wind farm array.

All impacts to archaeology would be permanent and any direct impacts on these sites would have a permanent and potentially significant effect if they were shown to be of archaeological importance.

Construction Exclusion Zones would be applied to prevent damage to known wreck sites and geophysical anomalies with archaeological potential. If plans cannot be altered to avoid an archaeological site, then a process of evaluation followed by excavation if necessary would be undertaken.

Any further archaeological work would be detailed in a Written Scheme of Investigation (WSI), which would be subject to the approval of Kent County Council Heritage Conservation Group's Principal Archaeologist and English Heritage's Maritime Team.

No impacts over and above those experienced during the construction phase are anticipated.