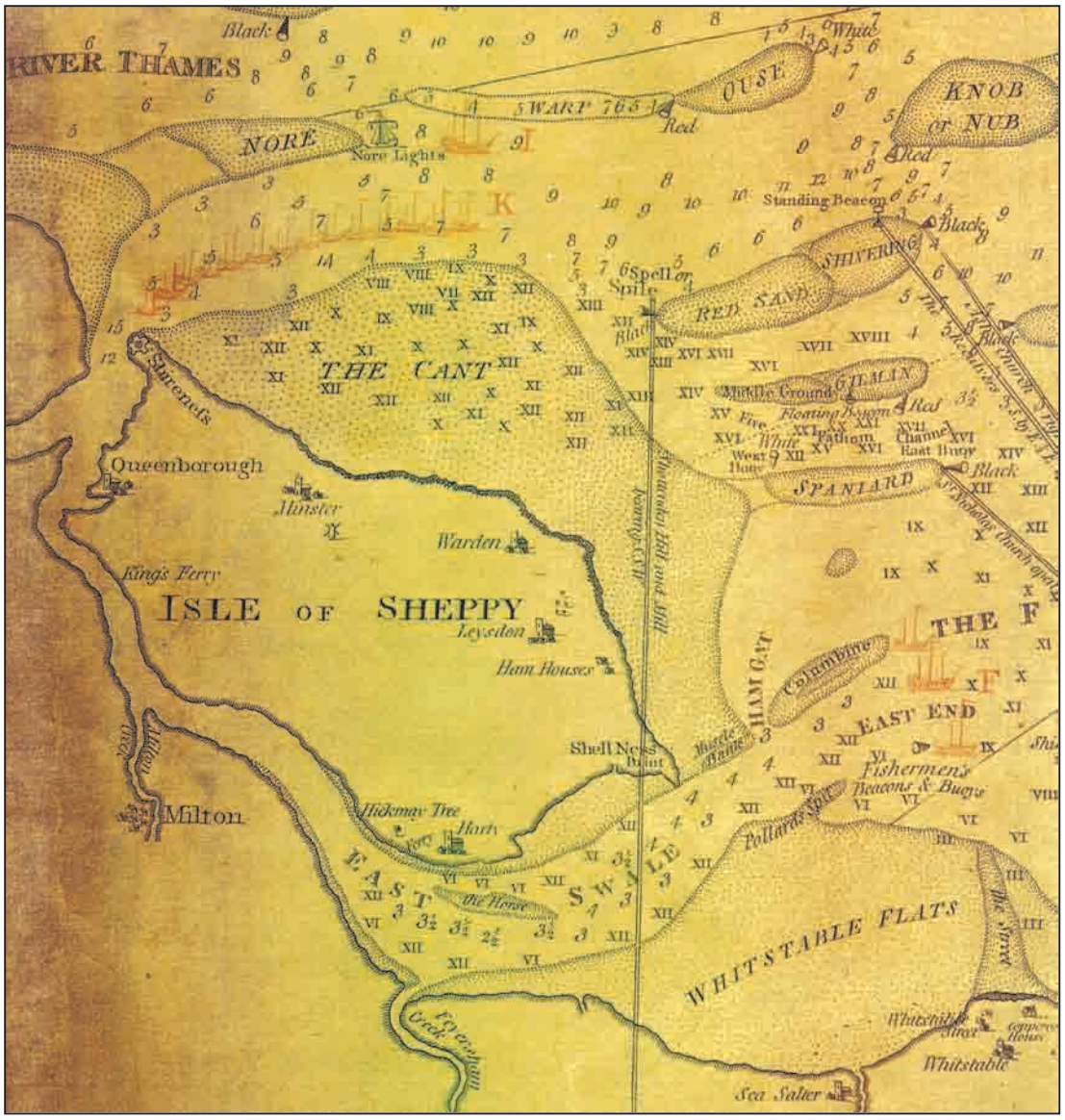
Wessex Archaeology

Historic Environment of the North Kent Coast

Rapid Coastal Zone Assessment Survey

Survey Phase 1

FINAL REPORT



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November 2000

Historic Environment of the North Kent Coast
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Survey Phase I

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prepared for

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Summary

Kent County Council, supported by English Heritage and the ERDF Interreg IIC North Western Metropolitan Area Programme, commissioned Wessex Archaeology to undertake Phase I of a Rapid Coastal Zone Assessment Survey of the Historic Environment of the North Kent Coast. The aim of the Rapid Coastal Zone Assessment Survey is to enhance the Kent Sites and Monuments Record (and thereby the National Monuments Record) in order to permit an improved curatorial response to strategic coastal planning and management initiatives, and to individual development or works proposals.

Phase I addressed a Survey Area (defined generally by the +5 m OD contour and Mean Low Water) set within a Broader Study Area that was used for collating sources and setting the results in a wider context. The project made use of the ExeGesIS SMR database (including existing records for the Broader Study Area from the Kent SMR) combined with ArcView. In addition, bespoke databases were designed to collate sources such as air photographs, and to summarise the results of the project.

Phase I commenced on 29 November 1999. The enhanced dataset arising from the Survey was delivered on 25 August 2000. Submission of this Final Report, together with a draft Specification for Survey Phase II, marks the end of Phase I.

A wide range of sources was addressed, historic cartographic sources (maps and charts) and air photographs being the most significant. Phase I also examined existing archaeological datasets, topographical, geological and land-use data, secondary sources (published and unpublished), statutory information, museum records, and information held by local individuals and societies.

Phase I recorded 1864 ‘new’ monuments overall. Within the Survey Area, the project doubled the number of recorded monuments from 1756 to 3520. A considerable number of existing monument records were enhanced with additional details and cross-references to sources. Phase I also recorded archaeological ‘Events’ and indexed the sources referred to.

Phase I also defined 20 coastal Stretches and assessed them in terms of their potential, importance and threat to the historic environment. The results of the assessment were used to prioritise the Stretches for field evaluation, and to identify four Stretches to undergo pilot surveys in Phase II. A series of discrete monuments was also prioritised for pilot survey, which will be used to refine the recording system developed for Phase II.

This report reviews the methodology and results of Phase I and includes both an interpretative overview of the historic environment of the North Kent Coast and proposals for Phase II.

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Acknowledgements

The project was commissioned by Kent County Council. Wessex Archaeology would like to thank John Williams, Lis Dyson and Paul Cumings of KCC for their assistance. Support for the project was provided by English Heritage and by ERDF through the Interreg IIC North Western Metropolitan Area Programme. Wessex Archaeology would like to thank Sarah Jennings, Peter Kendall and Steve Trow of EH. The project was monitored by Lis Dyson and Sarah Jennings.

Many organisations that hold information about the historic environment of the North Kent Coast provided assistance including the Centre for Kentish Studies, Medway Archive and Local Studies, the UK Hydrographic Office, the Public Record Office, the Environment Agency, Cambridge Collection of Air Photographs, Canterbury Archaeological Trust and the many museums mentioned in the text below. Wessex Archaeology would like to thank the staff of all these organisations for their help.

Wessex Archaeology would also like to thank the many individuals and members of societies with an interest in the historic environment of the North Kent Coast who answered letters and telephone calls and attended meetings.

David Parham and Mark Dunkley implemented Phase I of the project with the assistance of Adele Campbell. Emma Loader and Karen Nichols managed the database and mapping systems. David Parham and Antony Firth prepared this report. The project was managed for Wessex Archaeology by Antony Firth.

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1. SCOPE

1.1. BACKGROUND

Project

1.1.1. Kent County Council (KCC) commissioned Wessex Archaeology to carry out Survey Phase I of a Rapid Coastal Zone Assessment Survey of the Historic Environment of the North Kent Coast. The project was supported by English Heritage.

1.1.2. Wessex Archaeology was previously commissioned to prepare a Specification for Survey Phase I (Wessex Archaeology October 1999), based on:

- the draft *Brief for Rapid Coastal Zone Assessment Surveys* (release 2) prepared by English Heritage/RCHME;
- *Management of Archaeological Projects* (MAP2) (English Heritage 1991), notably Appendix II;
- *An Archaeological Research Framework for the Greater Thames Estuary* (Williams and Brown 1999).
- *England's Coastal Heritage: a statement on the management of coastal archaeology* (English Heritage/RCHME March 1996).

1.1.3. Survey Phase I also received support from the Planarch project of which it is a part and with which it is closely linked. Planarch is a project for the North Western Metropolitan Area of the European Union under the Community Initiative concerning Transnational Co-operation on Spatial Planning 1997 – 1999 (Interreg II C) of the European Regional Development Fund. Nine partners from England, Holland, France and Belgium are carrying out the project, which aims to:

a) share experience and academic knowledge.

b) develop methodologies for improving archaeological decision-making based on desk assessment, field evaluation and predictive modelling both at a regional and local level.

c) take forward into the spatial planning process best practice for mitigation of impacts on the archaeological resource, based on b) above in relation to statutory land-use plans, the planning of major infrastructure projects and more general regulation of development.

d) investigate approaches of conserving sites and presenting archaeology to the public.

The development of data systems and monument inventories that are integrated and networked through GIS is identified as a key aspect of the project.

1.1.4. Planarch includes four area-wide projects. The area-wide project for England addresses erosion, development and archaeological heritage management in the Thames Estuary. Broad area survey of the Kent side of the Thames, including the littoral, the intertidal zone and the immediate hinterland of the coast, forms one of the main components of the area-wide project. The area-wide project includes the following objectives:

1. to develop a more comprehensive model of the surface and buried archaeological landscape;
2. to obtain a better understanding of the impact of erosion and other natural pressures on the resource;
3. to develop methodologies for rapid and accurate identification of the archaeological resource, particularly in relation to informing decision making within the land-use planning system.

1.1.5. Survey Phase I commenced on 29 November 1999. The enhanced dataset arising from the Survey was delivered on 25 August 2000. Submission of this Final Report, together with a draft Specification for Survey Phase II, marks the end of Phase I.

1.1.6. This final report builds upon earlier project reports, namely:

'Historic Environment of the North Kent Coast – Rapid Coastal Zone Assessment Survey: survey phase 1 interim report on sources' (Wessex Archaeology April 2000).

'Historic Environment of the North Kent Coast – Rapid Coastal Zone Assessment Survey: survey phase 1 interpretative overview' (Wessex Archaeology May 2000).

'Historic Environment of the North Kent Coast: proposals for field evaluation including a review of stage 2' (Wessex Archaeology August 2000).

Archaeology and Sea-level

1.1.7. The national archaeological and sea-level background for the project is set out in *England's Coastal Heritage: a survey for English Heritage and the RCHME* (Fulford, Champion and Long 1997), which includes a regional review of the archaeological resource of Kent for Prehistoric and Roman periods (Fulford, Champion and Long 1997: 162-166).

1.1.8. The regional archaeological background of the Survey Area is set out in *An Archaeological Research Framework for the Greater Thames Estuary* and in published and unpublished material cited in that document. The Themes, Framework Objectives, Specific Objectives and Areas of Research of *An Archaeological Research Framework for the Greater Thames Estuary* were set out in Appendix II of the Survey Phase I Specification.

1.1.9. Archaeological investigations of intertidal environments in Essex have been published recently (Wilkinson and Murphy 1995), as has a 'speculative survey' of the early Holocene palaeo-environmental and archaeological development of the southern North Sea Basin (Coles 1998). The archaeological potential of coastal environments in North Kent has also been discussed by Firth (Firth forthcoming).

1.1.10. The generally-accepted framework for sea-level change in the Thames estuary is that developed on the basis of Devoy's analysis of a sequence from Tilbury (Devoy 1980, 1982; and see Long 1995, Haggart 1995, and Wilkinson and Murphy 1995). Devoy identified five transgressions (Thames I-V) separated by stabilisations (indicated by biogenic deposits) in the early Mesolithic (Tilbury I), later Mesolithic (Tilbury II), the Late Neolithic/Early Bronze Age (Tilbury III), the Late Bronze Age/Early Iron Age (Tilbury IV), and the Roman period (Tilbury V). It is generally accepted that this general framework requires further clarification, and the implications of the framework for specific stretches of the estuary have to be considered in the context of local geological, topographic and hydrological factors.

Shoreline Management

1.1.11. The project was carried out in the light of the national and regional framework for shoreline management. The Survey Area falls within coastal cell 4 – The Thames to Selsey Bill (MAFF 1995). Subcell 4a covers the shoreline from the Isle of Grain to North Foreland. No subcell covers the shoreline of the Thames upstream of a line between the Isle of Grain and Canvey Island, so the shoreline of the Study Area between the River Darent and Yantlet Creek is not covered.

1.1.12. The shoreline between the Isle of Grain and North Foreland is covered by the North Kent Coast Shoreline Management Plan (Halcrow August 1996), which also covers Subcell 4b from North Foreland to Dover Harbour. However, the SMP makes no detailed divisions, observations or recommendations in respect of the Medway or the Swale.

1.1.13. The SMP divides the shoreline into Process Units that are further divided into Management Units. Data relating to shoreline change, landuse and the proposed strategic defence option (SDO) for each Management Unit have been incorporated within the Assessment stage of this project (see below).

1.2. AIMS AND OBJECTIVES

1.2.1. The aim of the Rapid Coastal Zone Assessment Survey is to enhance the Kent Sites and Monuments Record (and thereby the National Monuments Record) in order to permit an improved curatorial response to strategic coastal planning and management initiatives, and to individual development or works proposals. The record will be enhanced to a common national data standard, and be compatible with the data requirements of other coastal managers and researchers.

1.2.2. The objectives of Survey Phase I are as follows:

- to collate and enhance all readily available archaeological, documentary cartographic and air photographic sources within a regional or wider context;

- to provide a provisional model of coastal change from the Late Upper Palaeolithic onwards;
- to provide a broad interpretative overview of the coastal historic environment;
- to discern the potential for as yet unrecorded components of the historic environment;
- to provide an assessment of the importance of the coastal historic environment and of the degree and character of threat to which it is subject, having regard to forecasts of coastal change;
- to clarify the scope of research topics to which future work in the Survey Area can be directed;
- to identify stretches and components that warrant field evaluation in Survey Phase II;
- to provide a reliable map base for Survey Phase II;
- to define the scope and methodology of Survey Phase II.

1.3. SURVEY AREA

1.3.1. The project has addressed a Survey Area defined by the extents described below (see Fig. 1). The Survey Area is set within a Broader Study Area (defined below).

Lateral Extent

1.3.2. The western limit of the Survey Area is set by the county boundary of Kent, which follows the centre line of the River Darent as it enters the River Thames. As such the boundary of the Survey Area abuts the survey area of the Thames Foreshore Survey.

1.3.3. The eastern limit of the Survey Area is North Foreland, defined as the eastward limit of Subcell 4a. This limit respects the relevant SMP.

Vertical Extent

1.3.4. The vertical extent of the Survey Area is 0 m OD (MLW) to +5 m OD, except where the landward or seaward limit of the Survey Area extends beyond this range (see below). Mean Low Water generally represents the county boundary, and is the average seaward limit of intertidal survey. The +5 m OD contour generally indicates the lie of pre-Holocene geology and is above the average seaward limit of intertidal survey.

1.3.5. Within the limits of the Survey Area however, the potential for deposits to c. -50 m OD will be considered. This depth represents the likely maximum depth to pre-Holocene geology within the Thames Estuary as a whole.

1.3.6. In seeking to place components within their topographic context, especially in relation to sea-level change, reference is made to a digital elevation model derived from bathymetric and topographic contours from 30m below Chart Datum to 50m above Ordnance Datum. In the course of the project, all heights have been expressed relative to OD.

Landward Extent

1.3.7. The landward limit of the Survey Area is shown on the attached plan (Fig. 1). In general, the landward limit comprises the +5 m OD contour.

1.3.8. In carrying out the survey, inferences will be drawn from monuments outside the landward limit of the Survey Area but within the Broader Study Area (see below).

Seaward Extent

1.3.9. The seaward limit of the Survey Area is Mean Low Water or the seaward limit of the county boundary, whichever is furthest seaward.

1.3.10. In carrying out the survey, inferences will be drawn from components just outside the seaward limit of the Survey Area but within the Broader Study Area. In particular, attention has been paid to the submerged topography of the coast indicated by bathymetric contours to -30 m CD.

Indentations

1.3.11. The coast between the River Darent and North Foreland is indented by a number of significant rivers and creeks, and includes numerous islands in the Medway. The majority of these indentations and islands fall within the Survey Area as defined by the +5 m OD contour or the county boundary. There are two exceptions where an arbitrary cut line has been adopted, as follows:

River Medway	Chatham Reach
Wantsum	a line running approximately between Under the Wood and St. Nicholas at Wade

Local and Regional Context

1.3.12. As noted above, the Survey Area is set within a Broader Study Area, comprising an irregular polygon as shown in Figure 1. The Broader Study Area was used in the initial collation of archaeological records, and to place monuments within the Survey Area in their local context.

1.3.13. Where appropriate, the historic environment of the North Kent Coast is discussed in its regional context with reference to the Thames Estuary, the county of Kent, South East England and the southern North Sea Basin.

1.4. SOURCES

1.4.1. The principle sources anticipated in the Specification comprised the following:

- Current Cartography
  - Ordnance Survey
  - Published Admiralty Charts
  - Geological maps
- Archaeological Datasets

Sites and Monuments Record
National Monuments Record
Scheduled Monuments
Listed Buildings
Conservation Areas
Protected Wrecks
Parks and Gardens
Historic Battlefields
Receiver of Wreck

- Secondary Sources
- Historic Cartography
  Maps
  Charts
- Air Photographs
  NMR Air Photographic Collections
  Kent County Council
  Cambridge University Collection of Aerial Photographs
  Environment Agency
- Museums
- Shoreline Management
- Land Ownership and Access
- Local Organisations and Individuals

1.5. RECORDING SYSTEM

1.5.1. The Specification provided that the project dataset would be delivered to KCC as ExeGesIS and ArcView files. ExeGesIS is a software company that has designed a recording system for Sites and Monuments Records (SMRs) based on an MS Access database. The ExeGesIS system has a mapping module, which in the case of KCC is based on ArcView.

1.5.2. Wessex Archaeology used the ExeGesIS/ArcView system as provided by KCC. Additionally, bespoke databases were designed to summarise and assess information about each stretch of coastline (the 'Stretch Database'), to collate and record information from Air Photographs, and to facilitate the recording and bulk loading of information gathered in external record offices.

1.5.3. As noted above, the ExeGesIS and ArcView files enhanced by Phase I were delivered to KCC in August 2000.

2. METHODOLOGY

SECTION 1.1. COMPILE EXISTING COMPONENT RECORDS

Task	
1.1.1.	Incorporate SMR dataset in project database and mapping system (KCC, digital alphanumeric/vector)
1.1.2.	Incorporate Scheduled Monument dataset in project database and mapping system (KCC, digital alphanumeric/vector)
1.1.3.	Examine constraint maps and associated documentation (KCC, hard copy)
1.1.4.	Digitise and incorporate details of Listed Buildings in project database and mapping system
1.1.5.	Digitise and incorporate details of Conservation Areas in project database and mapping system
1.1.6.	Request and incorporate details of Protected Wrecks in project database and mapping system (DCMS, hard copy)
1.1.7.	Request and incorporate details of historic wreck in project database and mapping system (Receiver of Wreck, hard copy)
1.1.8.	Incorporate Parks and Gardens dataset in project database and mapping system (KCC, digital alphanumeric/vector)

Task 1.1.1. Incorporate SMR dataset

2.1. A subset of existing SMR records, corresponding to the Broader Study Area, formed the base dataset for Phase I. These records are prefixed 'KE', in contrast to records added by Wessex Archaeology, which are prefixed 'WX'.

2.2. The existing SMR dataset for the Broader Study Area was late in arriving because it had to be split from the overall Kent SMR by the ExeGesIS company. After the subset was delivered an apparent mismatch between records and points lead to the discovery that the data had been incorrectly split. Consequently, Wessex Archaeology developed a means to do the splitting itself.

Task 1.1.2. Incorporate Scheduled Monument dataset

2.3. The existing SMR dataset already included details of Scheduled Monuments.

Task 1.1.3. Examine constraint maps and associated documentation

2.4. Details of Ancient Woodland were provided as digital information by KCC. Maps of Areas of Archaeological Potential for the Broader Study Area were held by KCC and by Canterbury Archaeological Trust. These maps were copied and digitised.

2.5. Wessex Archaeology advised that the Areas of Archaeological Potential and Areas of Ancient Woodland could be entered as monuments in ExeGesIS. KCC decided that the relevant information should continue to be accessed through ArcView. The presence of Areas of Archaeological Potential and Areas of Ancient Woodland is noted in the Stretch Database.

2.6. Details of Landscape Character Areas were provided digitally by KCC but were superseded in the course of the project by Landscape Assessment areas, which were also provided digitally in due course. The Landscape Assessment is noted in the Stretch Database.

2.7. Details of Land Liable to Flooding and Undeveloped Coast were provided digitally by KCC and noted in the Stretch Database.

2.8. Details of areas owned or operated by Kent Wildlife Trust, the National Trust and the MoD – together with Commons -- were also provided digitally by KCC and noted in the Stretch Database.

2.9. WA contacted and met David Elliott of Cluttons Daniel Smith, agents for the marine Crown Estate off Kent. Cluttons Daniel Smith maintains an extensive account of foreshore and subtidal land ownership as hard copy maps. Although it would be possible to digitise details of ownership, this would be a fairly time-consuming task. The task could be carried out as an initial action in Phase II (see 8.4. below), or Cluttons Daniel Smith could be approached on a stretch-by-stretch basis as fieldwork progresses.

Task 1.1.4. Digitise and incorporate details of Listed Buildings

Task 1.1.5. Digitise and incorporate details of Conservation Areas

2.10. The 1:10,000 sheets showing Listed Buildings were examined at KCC. Any Listed Building found to be within the Survey Area but outside a Conservation Area had its position mapped and its ID number recorded. A copy of the relevant Listed Building description was taken from the *List of Buildings of Special Architectural or Historic Interest* ('Greenbacks') for inclusion into the project database. A number of buildings identified on the KCC 1:10,000 sheets had no corresponding 'Greenback' reference. These buildings were recorded as not listed. English Heritage has advised that these buildings were recommended for listing but that the recommendation was not accepted by the Secretary of State.

2.11. The extent of each Conservation Area was supplied digitally by KCC. Additional details have been received from Dartford DC (Dartford and Greenhithe) and Thanet DC (Westgate) and Gravesham. Rochester upon Medway CC has provided digital information. Swale DC is in the process of an extensive review of its Conservation Areas and is compiling character appraisals. However, the exercise will not be completed for a number of years. Canterbury DC has reviewed documents for its Conservation Areas.

2.12. Wessex Archaeology advised that the Conservation Areas could be entered as monuments in ExeGesIS. KCC decided that this information should continue to be accessed through ArcView. The presence of Conservation Areas is noted in the Stretch Database.

2.13. Information about Listed Buildings and Conservation Areas was difficult to track down and a disproportionate amount of time seemed to be required to incorporate hard copy sources held by KCC and/or district authorities. With hindsight, it would be more efficient for sources such as the Listed Buildings and Conservation Area to have been collated directly by KCC and only then handed to Wessex Archaeology for digitising and data entry.

Task 1.1.6. Request and incorporate details of Protected Wrecks

2.14. No vessels designated under Section 1 of the Protection of Wrecks Act 1973 by virtue of their archaeological, historic or artistic importance fall within the Broader Study Area. One site within the Broader Study Area is designated as a prohibited area under Section 2 of the 1973 Act, namely the wreck of the SS *Richard Montgomery*, a WWII munitions carrier that is still considered dangerous.

Task 1.1.7. Request and incorporate details of historic wreck

2.15. The Receiver of Wreck has advised that their records only go back as far as 1993. Since that date they have received no reports of historic wreck from the Broader Study Area.

Task 1.1.8. Incorporate Parks and Gardens dataset

2.16. Details of Parks and Gardens were provided digitally by KCC. The presence of Parks and Gardens is noted in the Stretch Database (see below).

SECTION 1.2. OBTAIN SECONDARY, CARTOGRAPHIC, AIR PHOTOGRAPHIC AND MUSEUM SOURCES

Task	
1.2.1.	Appraise, select, log, examine and copy secondary sources (various, hard copy)
1.2.2.	Copy OS First Edition 1" Series (CKS, hard copy)
1.2.3.	Incorporate OS First-Fourth Edition 25" Series into project database and mapping system (KCC, digital raster)
1.2.4.	Digitise OS First Edition 25" Series land boundaries within Survey Area
1.2.5.	Appraise, select, log, examine and copy Tithe Maps and Apportionments (PRO/CKS/MALS, hard copy)
1.2.6.	Appraise, select, log, examine and copy OS First Edition 6" field drawings (BL, hard copy)
1.2.7.	Appraise, select, log, examine and copy additional early map sources (PRO/CKS/MALS, hard copy)
1.2.8.	Appraise (via index search) published charts, unpublished charts and surveys (UKHO, hard copy)
1.2.9.	Select, log, examine and copy published charts, unpublished charts and surveys (UKHO, hard copy)
1.2.10.	Scan, rectify and geo-reference copied cartographic sources
1.2.11.	Appraise (via commissioned coversearch) NMR vertical and specialist AP collections (NMR, digital alphanumeric)
1.2.12.	Select and log frames from NMR collections (NMR, hard copy)
1.2.13.	Examine and scan selected frames from NMR collections
1.2.14.	Appraise, examine, select, log and scan frames from KCC AP collection (KCC, hard copy)
1.2.15.	Appraise Cambridge AP collection (CUCAP, hard copy)
1.2.16.	Select and log frames from Cambridge AP collection
1.2.17.	Examine and scan selected frames from Cambridge AP collection
1.2.18.	Appraise, select, log, examine and scan frames from Environment Agency AP collection (EA, hard copy)
1.2.19.	Rectify and geo-reference scanned AP sources
1.2.20.	Appraise, select, log, examine and copy available records from museums (various, hard copy)

Task 1.2.1. Appraise, select, log, examine and copy secondary sources

Secondary Sources

2.17. Secondary sources were located by visual search of the British and Irish Archaeology Bibliography from 1990 onwards and by using their online services for previous years. Key word searches were made using all of the parish and major town names in the Broader Study Area as well as 'Kent', 'Thames', 'coastal', 'underwater' and 'wreck'.

2.18. Further references to secondary sources were identified within *The Victoria History of the County of Kent* (VCH), Edward Hasted's *The History and Topographical Survey of the County of Kent*, and 'Kent Maritime Sites Monuments Record: an assessment of potential sources' (Gale 1994).

2.19. The references produced by these searches were scanned to remove those that fell outside the Survey Area and those that were not relevant.

2.20. The selected sources were examined at the Centre for Kentish Studies (CKS), the Medway Archives and Local Studies Centre (MALS), The Hartly Library, University of Southampton and Southampton City Library. Articles that were relevant to the study were copied, while the location and library reference was recorded for monographs and books too large to copy.

2.21. References found to lie outside the Survey Area, or found to be not relevant, were not copied and were marked as such in the database. Copies of sources were sorted and filed by parish.

PPG16 Archaeological Reports

2.22. KCC supplied a complete list of PPG16 reports for the whole of Kent. Those reports that fell outside the Broader Study Area were immediately discarded, while ArcView was used to further reduce the reports to those that fell within the Survey Area. The remaining reports that had sufficient detail to enable them to be mapped were copied.

Survey of Kent post-1500 defence sites

2.23. KCC supplied ArcView polygons and points for all sites identified by the Survey of Kent post-1500 defence sites within the Broader Study Area. Where the polygons and points corresponded to existing monuments within the Survey Area then the post-1500 defence site survey was added as a source. Defence sites within the Survey Area that were not already recorded in ExeGesIS were given a new record.

Kent Historic Towns Survey

2.24. KCC advise that the Kent Historic Towns Survey is currently in draft form and is not yet suitable for release.

Kent Maritime SMR Development

2.25. The document 'Kent Maritime Sites Monuments Record: an assessment of potential sources' (Gale 1994) was examined and its points noted.

English Heritage Strategic Initiatives

2.26. Copies of documents arising from Thames Gateway studies were obtained from English Heritage.

2.27. Enquiries were made regarding the dataset thought to have been prepared in the course of the England's Coastal Heritage (ECH) project, but it appears that information collated during ECH was not entered in a database. The ECH archive has been made available by the NMR and has been examined. Selected items were copied and have been entered into the project database as secondary sources.

Local Initiatives, Groups and Individuals

2.28. WA contacted individuals who are knowledgeable about the historic environment of the North Kent Coast based on a list provided by KCC, as follows:

- Paul Bennett, Canterbury Archaeological Trust‡
- Ian Jackson, Upchurch Archaeological Research Group‡
- Kent Oyster Coast Environmental Survey‡
- Dr. Robert Baxter, Sittingbourne Archaeological Society‡
- Paul Wilkinson, Swale Archaeological Survey Group‡
- Chris Baker, Dartford and District Archaeological Group
- RAC Crocket, Fawkham and Ash Archaeological Group
- Sandra Soder, Gravesend Historical Society
- Gustav Milne, Institute of Archaeology
- Brian Philp, Kent Archaeological Rescue Unit
- Dana Alder, Lower Medway Archaeological Research Group
- Albert Daniels, Maidstone Archaeological Research Group
- Amanda Hebbert, Otford District Archaeological Group
- Brian Slade, Sheppey Archaeological Society
- David Perkins, Trust for Thanet Archaeology
- Andrew I. Moffat, Kent Archaeological Society
- Jim Shepherd, Author of 'The Industrial Archaeology of the Medway' *

* Came forward as a result of WA enquires.

2.29. The individuals marked ‡ were selected for further consultation.

Paul Bennett, Canterbury Archaeological Trust

2.30. Canterbury Archaeological Trust holds a Sites and Monuments Record for the District of Canterbury. This SMR is a paper-based archive comprising quarter sheets and record cards. Work on computerising the District SMR is about to commence and an exchange of data with the County SMR is to be to be put in place. CAT has advised WA that to extract information for a survey such as Survey Phase I would be a time-consuming task. A list of the available CAT information has been supplied, and WA visited the offices of CAT to copy relevant summary SMR details from the quarter sheets. CAT also advised that all the relevant data that they hold for the survey area has been incorporated into the Oyster Coast Survey (see below).

Ian Jackson, Upchurch Archaeological Research Group

2.31. UARG has been working in the area for over 30 years, starting initially in the Upchurch marshes, but later expanding their activities into a large area of the Upper Medway. They monitor and record sites as they gradually erode away, rather than attempting excavation, which their experience has shown to be a difficult and less effective process. UARG has two concerns that they have asked to be noted:

- In the past, UARG sites have been interfered with by other groups / individuals and hence the group has provided a diagrammatic map rather than NGR for site locations;
- UARG are concerned that attempts to excavate sites in the area will lose more information than will be gained. They consider that their approach has proved its worth over many years.

2.32. UARG tends to concentrate on sites that are Medieval or older, but has good relations with individuals and groups working on sites of other periods in the area. They also have good relations with local landowners in the area and WA was informed that the landowners had requested that any proposals for archaeological work in the area should be carried out via the UARG. They would be happy to do this and have offered help in any fieldwork to be carried out in the area. UARG appear to have a high level of archaeological expertise.

Kent Oyster Coast Environmental Survey

2.33. This survey is carried out by Mark Harrison, a local resident with an interest in palaeontology and archaeology, in conjunction with other organisations including Canterbury Archaeological Trust. The area covered by the survey is the foreshore between the Sportsman Public House (606200 E), the traditional end of the Swale and also of the Swale Archaeological Survey, and the East of Beltinge (622000 E). Mr. Harrison has recorded a great quantity of material uncovered as a result of coastal erosion, dating from the Mesolithic onwards. Mr. Harrison has provided WA with an interim report and some cartographic material. The bulk of the data is, however, held as an archive of observations rather than as a collated record of sites.

Dr. Robert Baxter, Sittingbourne Archaeological Society

2.34. The society has only worked on one site within the survey area, Castle Rough, which was published in *Kent Archaeological Review*, Volume 31 page 15 and Volume 32 page 60. In addition the society supplied a list of sites lying within the Survey Area.

Paul Wilkinson, Swale Archaeological Survey Group

2.35. The Swale District Archaeological Survey covers the land between 189000 E and 606200 E, with its southernmost point being 162000 N. As part of the methodological approach to the survey the foreshore was not given a high priority. The gazetteer of sites from the survey has been supplied; sites within the Survey Area have been incorporated within the project database.

2.36. Mr. Wilkinson has also completed a PhD relevant to the Survey Area. A copy of the PhD has been examined and relevant maps have been copied and digitised.

David Perkins, Trust for Thanet Archaeology

2.37. The Trust is carrying out an on-going reconnaissance of the cliffs, wave cut shelf and soft shores of Thanet in order to register changes brought about by coastal erosion. In the past the Trust has carried out evaluations and rescue excavations on nationally important sites threatened by coastal erosion. However, since the Thanet beaches have been made an SSSI this activity has had to stop. A précis of data was supplied by the Trust and incorporated within the project database.

Chris Baker, Dartford and District Archaeological Group

2.38. Only one site that the society has been involved with falls within the Survey Area.

Sandra Soder, Gravesend Historical Society

2.39. The society holds data on over one thousand sites within the Gravesham area. This information is presently being entered in the society's 'Historical Resource Database'.

Dana Alder, Lower Medway Archaeological Research Group

2.40. All of the work of the group is submitted to the County SMR as a matter of course. A report on the Group's latest work within the Survey Area was provided. WA received a further letter from the society offering a somewhat hostile view to data sharing.

Jim Shepherd, Author of 'The Industrial Archaeology of the Medway'

2.41. Mr. Shepherd came forward as a result of WA enquires to another group. He hoped to supply a map showing the industrial archaeology of the Medway within the Survey Area with accompanying information. However, this information was not forthcoming before the end of the project.

Albert Daniels, Maidstone Archaeological Research Group

2.42. A reply was received stating that the group held no records for the Survey Area.

Task 1.2.2. Copy OS First Edition 1" Series

2.43. The OS First Edition 1" Series was acquired as hard copy, scanned and geo-referenced as a layer in ArcView.

Task 1.2.3. Incorporate OS First-Fourth Edition 25" Series into project database and mapping system

2.44. The first to fourth editions were provided digitally by KCC and incorporated as layers in ArcView. Delivery of the mapping was delayed, which had a knock-on effect on the preparation of base maps for AP interpretation as well as on the process of recording mapped features.

2.45. Some tiles from the third and fourth editions were not supplied; these omissions – which may relate to gaps in the coverage – were brought to the attention of the KCC GIS team.

Task 1.2.4. Digitise OS First Edition 25" Series land boundaries within Survey Area

2.46. The need for this task was rendered unnecessary by the availability of hard copies of Tithe maps.

Task 1.2.5. Appraise, select, log, examine and copy Tithe Maps and Apportionments

2.47. All of the Tithe Maps and Apportionments for the parishes listed in the specification were viewed on microfilm at the Centre for Kentish Studies, with the exception of the parishes of Queenborough, Harty and Rochester Cathedral which were exempted from the tax and therefore have no map. Copies were made from a microfilm printer and then pasted together to form copy maps. Unfortunately, some plot numbers are not easily readable from the microfilm copies.

2.48. A pilot study of parts of the parishes of Hoo St Mary and Murston within the Survey Area was carried out. Field boundaries were digitised as an ArcView layer and apportionment details were entered into an attached database, enabling thematic mapping of land use, ownership etc.

2.49. Given the 'rapid' character of Survey Phase I, the results of this exercise did not – on balance – warrant the amount of time required to digitise boundaries and apportionment details. The exercise could, however, form the core of a specific project on the history of reclamation and land use in the region (see 7.3. and 8.6. below).

Task 1.2.6. Appraise, select, log, examine and copy OS First Edition 6" field drawings

2.50. The British Library advised that they held field drawings for the first edition, which are usually at a scale of either one inch to the mile, three inches to the mile or occasionally six inches to the mile. The field drawings are in colour with some extra detail to the published sheets, such as field boundaries or garden details. However, appraisal of microfilm copies of these drawings at KCC indicated that the field drawings are unlikely to add additional detail to the map sources already obtained. No further work was carried out on this source.

Task 1.2.7. Appraise, select, log, examine and copy additional early map sources

2.51. Searches were made of the Centre for Kentish Studies' card index of printed maps, *Kent Maps and Plans* (Burgess, W. 1992) and *Catalogue of Estate Maps 1590-1840 in the Kent County Archives Office* (KCC 1973). All maps that predated the First Edition Ordnance Survey 1" series were examined; maps that contained features of interest were copied. No historic maps pertaining to the Survey Area were identified at MALS.

Task 1.2.8. Appraise (via index search) published charts, unpublished charts and surveys

Task 1.2.9. Select, log, examine and copy published charts, unpublished charts and surveys

2.52. Searches were made at the United Kingdom Hydrographic Office Data Centre and the Centre for Kentish Studies (CKS) via their respective indexes for published charts, unpublished charts and surveys.

2.53. Copies of each of the oldest published charts (largely 1830/40s) covering either part or all of the Broader Study Area were obtained. All published charts, unpublished charts and surveys before this date were examined and relevant documents that contained features/detail of interest were copied and scanned.

2.54. Details of published charts, unpublished charts and surveys that cover the Survey Area either in part or in total were recorded at the Centre for Kentish Studies. CKS ID number, date, title and other relevant details were recorded. Copies of some of the CKS sources were made but it was found that in all cases better copies were available at the UKHO.

2.55. At Medway Archives and Local Studies centre (MALS) a total of 12 unpublished charts and surveys were found to cover the Survey Area either in part or in total. MALS ID number, date, title and surveyor and other relevant details were recorded for each source. None of the sources were copied as the MALS copying facilities are poor.

Task 1.2.10. Scan, rectify and geo-reference copied cartographic sources

2.56. Scanning etc. has been carried out in the course of obtaining hard copies. Scanned cartographic sources were geo-referenced and made available as ArcView layers.

Task 1.2.11. Appraise (via commissioned coversearch) NMR vertical and specialist AP collections

2.57. A coversearch of the vertical and oblique air photographic collections covering the Broader Study Area held by the NMR was commissioned. The results were provided as two digital delimited lists of frames and sorties that have been incorporated into a database attached to ArcView.

2.58. The vertical coversearch identified 1629 sorties, comprising 20592 frames. The oblique coversearch identified 1081 frames.

Task 1.2.12. Select and log frames from NMR collections

Task 1.2.13. Examine and scan selected frames from NMR collections

2.59. Oblique photographs with a given central NGR within the Survey Area or within 500m of the Survey Area were selected and viewed, totalling 968 frames (see Fig. 2). The following information was recorded:

- Image quality;
- The character of the general landscape shown in the photograph;
- SMR features visible on the photograph;
- The position and brief notes on the form and possible function of features not recorded on the SMR but visible on the photograph.

2.60. Vertical photographs taken during the 1940s that crossed any part of the Survey Area were selected and viewed, totalling 370 sorties / 3881 frames (see Fig. 2). The following information was recorded:

- Image quality;
- The character of the general landscape shown in the photograph;
- SMR features visible on the photograph;
- The position and brief notes on the form and possible function of features not recorded on the SMR but visible on the photograph.

2.61. Kent has already been subject to a pilot air photographic project as part of the National Mapping Programme. Consequently, examination of air photographs and mapping of components was confined to the Survey Area rather than covering whole quarter sheets.

2.62. Selected APs were scanned.

Task 1.2.14. Appraise, examine, select, log and scan frames from KCC AP collection

2.63. The runs for the KCC AP collection were obtained as hard copy. The KCC APs are small scale and fall between the earliest and latest APs available, so no further work was carried out on this source.

2.64. In autumn 2000, KCC obtained a new series of APs of the North Kent Coast taken at very low tide. Future use of this series is discussed in section 8.3.3.

Task 1.2.15. Appraise Cambridge AP collection

Task 1.2.16. Select and log frames from Cambridge AP collection

Task 1.2.17. Examine and scan selected frames from Cambridge AP collection

2.65. A coversearch of the vertical and oblique photographs held by the Cambridge University Collection of Air Photographs (CUCAP) covering the Broader Study Area was commissioned. Both vertical and oblique APs, totalling 68 vertical sorties / 672 vertical frames and 284 obliques were incorporated into a database attached to ArcView.

2.66. Oblique APs with a given central NGR within the Survey Area or within 500m of the Survey Area were selected and viewed, totalling 54 frames (see Fig. 2). The following information was recorded:

- Image quality;
- The character of the general landscape shown in the photograph;
- SMR features visible on the photograph;
- The position and brief notes on the form and possible function of features not recorded on the SMR but visible on the photograph.

2.67. As the CUCAP verticals fell between the earliest and latest APs available, no further work was carried out on this source.

Task 1.2.18. Appraise, select, log, examine and scan frames from Environment Agency AP collection

2.68. The Environment Agency (EA) supplied WA with Flight Diagrams for the 1996-8 Flood Plain Mapping survey for the North Kent Coast. The flight diagrams, which cover the Darent, Medway and Swale, were scanned to form a layer in ArcView. The frames were not viewed, however, as they were being held in Scotland.

2.69. The Environment Agency later supplied WA with details of the 1998 *Annual Beach Monitoring Survey* of North Kent plus *Annual Beach Monitoring Survey* (Additional Areas) for 1999. The 1998 survey covers the intertidal zone form North Foreland to Sheerness, while the 1999 survey covered the intertidal zone from Sheerness to Gravesend, including both the Medway Estuary and the Swale. The flight diagrams were digitised and incorporated into a database attached to ArcView, totalling 54 sorties.

2.70. Thirty nine sorties, totalling 838 frames (see Fig. 2), were examined and the following information was recorded:

- Image quality;
- The character of the general landscape shown in the photograph;
- SMR features visible on the photograph;
- The position and brief notes on the form and possible function of features not recorded on the SMR but visible on the photograph.

2.71. Selected APs were scanned.

Task 1.2.19. Rectify and geo-reference scanned AP sources

2.72. A selection of scanned APs were rectified and geo-referenced and made available as layers in ArcView. However, as many of the features identified on APs could – once identified – be traced on historic maps (notably the OS 25” series first edition), then the maps were used for plotting in preference to the APs.

Task 1.2.20. Appraise, select, log, examine and copy available records from museums

2.73. Twelve museums in North Kent were contacted in order to appraise any relevant information that they might hold:

- Dolphin Sailing Barge Museum‡
- Whitstable Museum‡
- Whitstable Oyster Coast Exhibition‡
- Medway Heritage Centre‡
- Herne Bay Museum‡
- Chatham Historic Dockyard‡
- Royal Engineers Museum‡
- Guildhall Museum, Rochester
- East Kent Maritime Museum, Ramsgate
- Dartford Borough Museum
- Fleur de Lis Heritage Centre
- Gravesend Museum

2.74. From the written/telephone enquiries, several museums (indicated ‡) were identified as holding material/information relevant to the study and therefore selected for visits.

Dolphin Sailing Barge Museum

2.75. The museum is based in a nineteenth century barge building yard and its accompanying facilities. The museum contains several displays about the building and use of Thames sailing barges. The museum acts as an informal base for individuals storing/repairing barges and has several barges in varying states of repair on the premises. Whilst not containing anything of direct use to the desk–based stage of this project it does contain a wealth of detail that may be relevant to later fieldwork.

Whitstable Museum

2.76. A search of Whitstable Museum catalogue produced the following list of finds recovered form the sea:

Accession No.	Description	Date	Location and Remarks
W1988.1000.76	Large green salt-glazed jar	C17th	Wreck at very low water off Tankerton
W1985.13	Long necked terracotta bottle with dragon design		Seabed off Whitstable
W1993.28	Bronze Pintle		From a wreck
W1993.32	4 metal items believed to have come from a crashed WWII German Dornier bomber	C20th	Sea near to Old Neptune Pub
W1991.29	Gallo-Belgic gold quarter stater	65-50BC	Seashore at Long Rock Swalecliffe. Declared to coroner, stolen from museum
	Beaker pot	1800BC	Cliffs at Long Rock at Swalecliff. Reassembled at Institute of Archaeology, London

W1988.1000.31	Thames picks & Antler pick	Mesolithic	Cliff at Priest & Sow, Tankerton. Site destroyed in 1960's by grading
W1993.53.1	Cooper Bolt from *Hindustan* wreck	1803	Wedge Sand, off Reculver
W1993.53.2	Item of Rigging from *Hindustan* wreck	1803	Wedge Sand, off Reculver
W1989.42.1	Copper token from *Hindustan* wreck	1803	Wedge Sand, off Reculver
W1989.42.2	Copper token from *Hindustan* wreck	1803	Wedge Sand, off Reculver
Numerous	Material from Pudding Pan	Roman	Pudding Pan
	Bartholomew de Badlesmere claims in his Manor of Whitstable to have a wreck of the sea, and the jury present that a boat cast upon a place called the greystone in Whitstable was taken by Alexander de Baliol then Lord of the manor of Whitstable as wreck	1313	Greystone off Whitstable. Written reference from Placita de Quo Waranto, Kent, 6th Edward II

Whitstable Oyster Coast Exhibition

2.77. This is a display primarily dealing with modern shellfish fishing/farming and the development of the techniques used today. However, it includes a display on the oyster industry in the past which is largely 19th century and early 20th century in its content, although its does include some material dating back to the 16th century.

2.78. There is also some material recovered from the sea on display, consisting largely of 19th and 20th century bottles, WWII debris and some Pan Sands pottery. None of the recovered material is provenanced.

2.79. The exhibition is run by Seasalter Shellfish Ltd., which is the company that developed the modern techniques on display. The company has an extensive but apparently disorganised archive which includes historical maps produced as a result of the many disputes arising over the oyster grounds. Two of these maps are on display in the exhibition and are of sufficient detail and quality to be of interest to our survey. The maps are, however, legal documents and permission from Seasalter Shellfish Ltd. is required before they can be used .

2.80. Archives for other oysters fisheries are held at:

Seasalter and Ham	Seasalter Shellfish Ltd.	Also hold archives for other companies that have traded in the area
Faversham	Dudley Cramp and Co. High Street Sittingborune ME10 4PB	Oldest limited company in the world, formed in 12th century. Exist as a legal body but no longer trades.
Whitstable	Barry Green Whitstable Oyster Company Horsebridge Road Whitstable	

2.81. Publications dealing with the history of oyster fisheries include:

Collade, A.O 1902 *The Oyster Dredgers of Whitstable* Cambridge

Goodsawl, R.H. 1938 *Whitstable, Seasalter and Swalecliffe* Cambridge

Medway Heritage Centre

2.82. This is an exhibition displaying the history of River Medway and activities that occur on its shores from the mouth of the river to Abington. It contains very little in the way of artefacts as it concentrates on pictorial displays. These displays did, however, provide information on a number of sites, as follows:

Site	No.	Date	Notes
Grain Fort	5899	1760	Offshore battery of Grain Fort, built 1867
Kingsnorton Farm, Hoo	5806	1727	Royal Navy Airship Station 1913-1920. May be on 1932 OS map
Rhoda Mary	5775	1712	One of the fastest coastal schooners ever built. Built in Flamouth in 1868 and wrecked in 1940 after dragging her anchors. North of gashouse point
Frinsbury Slipway	5745	1694	Site of the yard of Joseph and Thomas Brindly, shipbuilders. Amongst other vessels the Royal Navy frigates *Shannon* and *Pomone* were built here. Later became a barge yard.

Herne Bay Museum

2.83. The following sites and finds were identified from Herne Bay Museum:

Accession No.	Description	Date	Location
	Practice Bouncing Bomb	1943	Sea off Reculver
H449	Roof Finial	Medieval	Cliff opposite Queensbridge Drive
H299.3	Flint fake and three blades	Palaeolithic	Shore east of Reculver Fort
H375	6 Shards	Iron Age	Cliff west of Reculver Fort
H394	Leaf shaped Spearhead	Saxon	Cliff at Reculver
H422	Pot, course sandy grey ware	Roman	Cliff west of Reculver Fort
H431	Pot	Roman	Reculver foreshore, in a well.
H432	Pot	Roman	Reculver foreshore, in a well.
H527	Samian shard & Course pinch spout flagon	Roman	Cliff at Reculver
H528	Many shards, Samian & course	Roman	Beach at Reculver
H1160	Earthenware pot	Roman	Reculver foreshore, in a well.
H1161	Sandy buffware pot	Roman	Reculver foreshore, in a well.
H303	Thames pick x3 & core x2	Mesolithic	Hampton Foreshore
H1421	Handaxe	Palaeolithic	Foreshore between Reculver Tower & Coastguard Tower
H1415	Flake	Mesolithic	Cliff at Bishopstone Coastguard Tower
H318	Polished axe	Neolithic	Bishopstone Foreshore
H248	Acheulian handaxe	Palaeolithic	Cliff at Bishopstone
H241	Acheulian handaxe x7	Palaeolithic	Cliff at Bishopstone
H1276	End scrapper	Neolithic	Herne Bay foreshore, east of Kings Hall

H480	Water jar, cream coloured, globular in shape	Post Medieval	Sea off Herne Bay
H476	Globular pot	Post Medieval	Sea off Herne Bay, 50 yards out from seawall
H474	Jug	Post Medieval	Sea, 3miles north of Hunlston, 1 mile north of Studd Hill buoy
H472	Flagon	Post Medieval	Sea off Herne Bay
H417	Flagon neck	Roman	Sea, east of 100 steps at Hampton
H364	Flake	Palaeolithic	Sea off Herne Bay, opposite clock tower
H351	Axe	Neolithic	Cat Island in the sea off Herne Bay
H350	Thames Pick	Mesolithic	Cat Island in the sea off Herne Bay
H349	Thames Pick	Mesolithic	Cat Island in the sea off Herne Bay
H348	Flake	Mesolithic	Cat Island in the sea off Herne Bay
H347	Axe	Mesolithic	Cat Island in the sea off Herne Bay
H346	Thames Pick	Mesolithic	Cat Island in the sea off Herne Bay
H345	Axe	Neolithic	Cat Island in the sea off Herne Bay
H344	Flake	Mesolithic	Cat Island in the sea off Herne Bay
H343	Flake	Mesolithic	Cat Island in the sea off Herne Bay, west of Pier
H342	Axe	Neolithic	Sea, west of Herne Bay Pier
H341	Thames pick	Mesolithic	
H340	Flake	Mesolithic	Sea, East of Herne Bay Pier
H339	Thames Pick	Mesolithic	Sea, near to last buoy off Herne Bay
H338	Thanes Pick	Mesolithic	Sea off Herne Bay
H337	Core	Neolithic	Sea off Herne Bay
H336	Flake	Mesolithic	Sea off Herne Bay
H335	Flake	Mesolithic	Sea off Herne Bay
H334	Thames Pick	Mesolithic	Sea off Herne Bay
H330	Thames Pick	Mesolithic	Sea off Herne Bay
H329	Thames Pick	Mesolithic	Sea off Herne Bay
H311	Axe x2	Neolithic	Sea off Herne Bay
H242	Flake	Palaeolithic	Cat Island in the sea off Herne Bay
H1114	Flake x2	Palaeolithic	Birchington foreshore
H428	Sandy ware pot base	Roman	Sea off Whitstable
Numerous	Material from Pudding Pan	Roman	Pudding Pan

Chatham Historic Dockyard

2.84. This is a very impressive display that deals solely with the history and development of the dockyard and the activities of the vessels that were built/based there. It contains no information relevant to this study.

Royal Engineers Museum

2.85. This deals with the world-wide activities of the Corps, which has included some works within the Survey Area. Two activities of relevance are the diving activities of the Royal Sappers and Miners in the local area and the presence of the Royal Engineers' school at Chatham, within the Survey Area. These sites have been incorporated within the project database.

SECTION 1.3. COMPILE EVENT DATA USING SECONDARY AND MUSEUM SOURCES

Task
1.3.1 Identify, digitise and record Events from secondary and museum sources

2.86. The source and archive information collated during the data collection phase of the project was entered into the ExeGesIS database. The collated material provided the means for the initial identification of both Monuments and Events within the Survey Area.

2.87. Where appropriate, the archaeological information identified within the sources was classed as an Event (defined as *any activity which has enabled information to be gathered or a judgement to be made about a monument or its particular locality*). Using ExeGesIS, the ArcView map module was viewed in order to identify the precise location (NGR) of the Event and to determine whether it lay within the Survey Area.

2.88. Where the Event was discovered to have an existing ExeGesIS record then the record was enhanced, if appropriate, with any new sources identified. Where the Event was discovered not to have an existing record then a record was created and cross-referenced to all available sources and information. As many record fields were completed as possible, utilising the ExeGesIS and RCHME Thesauri to standardise words and phrases. A geo-referenced point was created in ArcView for each new record.

2.89. All newly identified bibliographic sources collected during the project were entered into ExeGesIS as sources and cross-referenced with all relevant Monuments and Events.

2.90. The totals for Events and for Sources were increased substantially during Survey Phase I, as follows:

	KE prefix	**WX prefix**	**Total**
Events	3931	3244	7175
Sources	1892	5145	7037

SECTION 1.4. COMPILE STRETCH DATA

Task	
1.4.1.	Divide coastline into Stretches
1.4.2.	Define and digitise Stretch boundaries
1.4.3.	Incorporate Topography and Geology datasets in project database and mapping system (KCC, digital alphanumeric/vector)
1.4.4.	Incorporate shoreline management dataset (WA (SMP), digital alphanumeric)
1.4.5.	Appraise, select, log, examine and copy available data relating to actual and forecast shoreline change (Canterbury City Council, hard copy)
1.4.6.	Select, record and digitise shorelines from available cartographic sources
1.4.7.	Incorporate available information about other forms of coastal impact
1.4.8.	Enhance Stretch data with shoreline information

Task 1.4.1 Divide coastline into Stretches

2.91. The stretches were defined by reference to Management Units identified by the North Kent Coast Shoreline Management Plan (SMP), to apparent patterns of land use and character, and to readily identifiable features that could be used as boundaries. Twenty stretches were defined in this way.

2.92. A ‘Stretch Database’ was designed in order to record and summarise information about each stretch.

Task 1.4.2. Define and digitise Stretch boundaries

2.93. The boundaries of each stretch were digitised (see Fig. 1) and the extents described in the Stretch Database.

2.94. Each stretch was split into three zones corresponding to the relevant INSCRIPTION wordlist for landuse, as used in ExeGesIS, i.e: CO1 marine; CO2 intertidal; and CO3 above high water. These zone boundaries were digitised on the basis of OS lines for mean high water and mean low water. The mean high water line provided in the OS boundary line dataset does not include all the minor islets of the deeply indented saltmarsh, so line lengths previously digitised from the 1:25,000 Explorer series were also summed for stretches containing large areas of saltmarsh. Although taken from a larger scale map, the 1:25,000 MHW lengths provide a useful corrective to the MHW lengths indicated by the 1:10,000 data.

2.95. The area and length of coast in each stretch were determined by reference to these zones using AutoCAD. The overall area and length of the Survey Area are as follows:

CO1 marine (ha)	CO2 intertidal (ha)	CO3 above high water (ha)	MLW length (km)	MHW length[1] (km)	MHW length[2] (km)
5471.9718	9013.7443	21152.782	474.546	343.597	597.891

NB: 1) Length based on OS 1:10,000 boundary line data
2) Length based on OS 1:25,000 Explorer maps digitised by WA

2.96. The polygon formed by the digitised outline of each Stretch was used to query the recorded monuments in ArcView. As a result, the ExeGesIS record for each monument was updated with the identification number of the stretch within which it is located, using the hitherto unused OldMat field.

2.97. The polygon formed by the boundary of each zone (CO1-CO3) was used to query the recorded monuments in ArcView. As a result, the ExeGesIS record for each monument was updated with the relevant landuse code in the Landuse/Geology/Soils etc. Classification field.

2.98. As a result of these actions, the Stretch Database can be used to summarise monument records by Stretch and by Zone.

Task 1.4.3. Incorporate Topography and Geology datasets in project database and mapping system

2.99. All topographic, geological and landuse datasets supplied by KCC were incorporated into the project GIS, so that they could be overlaid with the stretch boundaries. Notes were made in the Stretch Database about the geology of the Above High Water zone, Intertidal zone and Marine zone.

Task 1.4.4. Incorporate shoreline management dataset

2.100. A full copy of the North Kent Coast Shoreline Management Plan was made available by KCC. The SMP was examined and relevant data incorporated within the Stretch Database.

Task 1.4.5. Appraise, select, log, examine and copy available data relating to actual and forecast shoreline change

2.101. Data within the SMP relating to forecast shoreline change was incorporated within the Stretch Database. It should be noted that as the SMP does not cover the entire North Kent Coast (see Section 1.1), there is no data for forecast shoreline change for many stretches.

Task 1.4.6. Select, record and digitise shorelines from available cartographic sources

2.102. Mean High Water shorelines from the 1997 1:25000 and 1:10,000 were digitised and incorporated into ArcView. Shorelines from historic maps and charts were made available in ArcView as raster images. Notes were made in the Stretch Database about the degree of historic shoreline change for the Above High Water zone, the Intertidal zone and the Marine zone.

Task 1.4.7. Incorporate available information about other forms of coastal impact

2.103. Information about landuse designations (parks and gardens; land liable to flooding; undeveloped coast; land operated by MOD, RSPB, KTNC etc) contained in ArcView layers has been summarised in the Stretch Database. Notes were also made about the level of development in each stretch, based on historic cartographic sources.

Task 1.4.8. Enhance Stretch data with shoreline information

2.104. As noted above, all available information relating to stretches was noted or summarised in the Stretch Database. The contents of the Stretch Database were made available to KCC/EH as Appendix I of the 'Proposals for Field Evaluation' (Wessex Archaeology August 2000).

SECTION 1.5. MAP COMPONENTS ON AIR PHOTOGRAPHS

Task
1.5.1. Identify, digitise and record existing and new Components on Air Photographs

2.105. Features recognised on Air Photographs were compared to historic OS mapping and the KCC database in an attempt to identify them. If the feature appeared on the mapping and was considered to form part of the contemporary landscape it was given the date of the map in question. If this was not the case, or the feature was not apparent on any mapping, the feature was recorded but given an 'unknown' date (which in ExeGesIS leaves the 'date' box blank).

2.106. Extensive features were digitised as polygons. Only those scanned frames that include extensive features were rectified and geo-referenced.

SECTION 1.6. MAP COMPONENTS ON CARTOGRAPHIC SOURCES

Task	
1.6.1.	Identify, digitise and record existing and new Components on Cartographic Sources

2.107. All historic charts were examined and features considered to be of interest were entered as monuments. Examples include:

- All features shown within the contemporary intertidal and marine zones within the Survey Area, i.e. saltpans, hards, anchorages and piers;
- Features in the marine zone beyond the Survey Area but within the Broader Study Area were recorded opportunistically if they appeared in sources that were being examined for details of the Survey Area, but there was no systematic search of the marine zone beyond the Survey Area.
- Features on land that could be identified and whose position was considered to be accurate. It became apparent during the project that many of these features had been mapped to aid navigation, and that the position mapped relates to features as perceived rather than actual positions.

2.108. All historic maps were examined and features considered to be of interest were entered as monuments. Examples include:

- All features shown within the contemporary intertidal and marine zones within the Survey Area, i.e. saltpans, hardways, oyster pits and navigation beacons;
- Features on land that is immediately adjacent to the intertidal and marine zones.

2.109. Where a feature was already recorded in ExeGeslS the relevant map or chart was entered as a source.

2.110. Features were given the date of the map or chart in question if it was considered that the feature formed part of the contemporary landscape. If this was not the case, the feature was recorded but given an 'unknown' date (which in ExeGesIS leaves the 'date' field blank).

SECTION 1.7. ENHANCE EVENT AND COMPONENT DATA USING SECONDARY, CARTOGRAPHIC, AIR PHOTOGRAPHIC AND MUSEUM SOURCES

Task	
1.7.1.	Digitise and record additional information from secondary, cartographic, air photographic and museum sources
1.7.2.	Enhance new and existing Component data with information from secondary and museum sources
1.7.3.	Assess and record discrimination criteria for each Component
1.7.4.	Enhance Event data with information from secondary and museum sources
1.7.5.	Check internal cross-referencing between Component, Event and Source datasets

Task 1.7.1. Digitise and record additional information from secondary, cartographic, air photographic and museum sources

Task 1.7.2. Enhance new and existing Component data with information from secondary and museum sources

2.111. Existing monument records were enhanced and new records created in the course of studying secondary, cartographic, air photographic and museum sources. In the case of secondary and museum sources, collated information was read and existing/new monuments identified. In the case of graphic sources such as historic maps, charts and air photographs, then the sources were overlain or otherwise compared with existing mapping.

2.112. As records provided from the Kent SMR are prefixed 'KE' and records added by Wessex Archaeology are prefixed 'WX', then (in general terms) KE prefix records refer to 'existing' monuments and WX prefix records to 'new' monuments.

2.113. It should be noted that ExeGesIS does not distinguish between initial and supplementary sources in recording each monument. Hence there is no way to show, for example, whether a monument that appears on a map and on an air photograph was 'discovered' on the former or the latter. Consequently, it is not possible to provide quantitative data on the relative usefulness of each source.

2.114. In ExeGesIS/ArcView, monuments are generally represented by records and by points. Past recording practices are such that many KE monuments (and two stray WX records) are represented by multiple points, so there are more points than records. The totals for KE and WX prefix monuments are as follows:

		KE prefix	WX prefix	Total
Broader Study Area	Records	1772	102	1874
	Points	1833	102	1935
Survey Area	Records	1756	1764	3520
	Points	1821	1764	3585
Overall	Records	3529	1864	5393
	Points	3654	1868	5522

2.115. The 'bottom line' is perhaps best expressed as follows: Survey Phase I recorded 1864 'new' monuments overall. Within the Survey Area, the project doubled the number of recorded monuments from 1756 to 3520.

Task 1.7.3. Assess and record discrimination criteria for each Component

2.116. This task was not carried out due to pressure of time and because it was felt that monuments were better assessed in the field than on paper. This decision was accepted by KCC/EH.

Task 1.7.4. Enhance Event data with information from secondary and museum sources

2.117. In the course of enhancing new and existing monument records, each identifiable Event was recorded, or existing Events enhanced with available information.

Equally, new sources were added and existing sources enhanced as the exercise progressed.

Task 1.7.5. Check internal cross-referencing between Component, Event and Source datasets

2.118. Cross-referencing between record types was carried out periodically by the Project Officer and the Archaeological Systems Development Officer.

SECTION 1.8. PREPARE MODEL OF COASTAL CHANGE

Task	
1.8.1.	Digitise height and depth contours from current map and chart base
1.8.2.	Generate digital elevation model from height and depth contours
1.8.3.	Review available sea-level information for age/altitude/tendency data
1.8.4.	Superimpose sea-level data on digital elevation model to present model of coastal change
1.8.5.	Produce maps of coastal change by Stretch
1.8.6.	Consider scope for enhancing model of coastal change

Task 1.8.1. Digitise height and depth contours from current map and chart base

2.119. Height contours (1: 10 000 scale, MLW to +230 m at 5 m intervals) were provided digitally by KCC, levelled to Ordnance Datum (OD). Depth contours (various scales, 0 to -30 m) were digitised from a series of Admiralty Charts, levelled to Chart Datum (CD). As CD relative to OD varies not only from chart to chart but also within each chart, then depth contours were cut and levelled according to the nearest OD conversion, guided by the chartlets showing the extent of surveys upon which each chart is based. As a result, all contours were levelled to OD.

Task 1.8.2. Generate digital elevation model from height and depth contours

2.120. A digital elevation model (DEM) was generated from the height and depth contours using commercially available software (Surfer). Mean High Water and Mean Low Water were omitted from the DEM in an attempt to negate the effects of reclamation, which otherwise extends the high water mark seaward of its ‘natural’ position.

Task 1.8.3. Review available sea-level information for age/altitude/tendency data

2.121. Available sea-level information for North Kent has recently been reviewed (see Firth forthcoming). Despite acknowledged shortcomings, sea-level change information adapted from the Tilbury sequence of Devoy (1979) offers a broadly accepted framework.

Task 1.8.4. Superimpose sea-level data on digital elevation model to present model of coastal change

2.122. Sea-level heights based on the Tilbury framework have been applied to the DEM, including a nominal 5 m tidal range to indicate the possible extent of the intertidal zone through time. The resulting model indicates the extent of now-inundated land surfaces available for exploitation in the past, and also creates a landscape in which

areas of high probability of human exploitation and potential survival can be postulated.

2.123. The model is overlain with the extents of offshore sandbanks that are thought to have developed in tandem with sea-level rise during the Holocene, together with the depth of Holocene deposits indicated on available geological maps (BGS Sheet 51N 00 Thames Estuary, Sea Bed Sediments and Quaternary, 1:250 000) (see Figs. 4-8).

Task 1.8.5. Produce maps of coastal change by Stretch

2.124. The model of coastal change has been incorporated into the project GIS to form a background against which information relating to each stretch can be displayed.

2.125. The model has also been used as the background to the period maps upon which the project's interpretative overview is based (see below).

Task 1.8.6. Consider scope for enhancing model of coastal change

2.126. The model of coastal change would be enhanced by developing a deposit model for the North Kent Coast, which is proposed as a Phase II task (see 8.6. below). In particular, there is a need to better define the morphology of the pre-inundation surface underlying areas that have been buried by Holocene deposition and reclamation. Mapping of the pre-inundation landsurface must also address the palaeo-channels of the Medway, Swale and Thames, and the development of Holocene marine features such as sandbanks.

2.127. The results of various geo-archaeological investigations in North Kent that are currently underway are likely to lead to better local definition of the Tilbury framework, and to revision of the model developed during this project.

SECTION 1.9. OVERVIEW

Task	
1.9.1.	Query project database and mapping system by Component Type, Class and Period and by Stretch
1.9.2.	Relate query results to model of coastal change
1.9.3.	Prepare interpretative overview of the historical environment in context of existing research frameworks

Task 1.9.1. Query project database and mapping system by Component Type, Class and Period and by Stretch

2.128. The project database has been queried predominantly by 'top term' in the *Thesaurus of Monument Types* (which equates to Class) and by period. In instances where the top term is not suitable for extracting particular themes, then queries based on an aggregation of Monument Types have been used. The monuments within each stretch are summarised by period and by zone in the Stretch Database.

2.129. In addition to monument data, Areas of Archaeological Potential have been queried and displayed by period on the thematic maps upon which the interpretive overview is based.

Task 1.9.2. Relate query results to model of coastal change

2.130. As noted above, the results of thematic mapping of monuments from prehistoric periods was displayed using the model of coastal change as a background.

Task 1.9.3. Prepare interpretative overview of the historical environment in context of existing research frameworks

2.131. The document *An Archaeological Research Framework for the Greater Thames Estuary* (Williams, J. and Brown, N. 1999) has been taken as the appropriate existing research framework. The Framework Objectives set out in Chapter Three were used to structure the substance of the interpretative overview.

2.132. Preparation of the overview was impeded by a number of structural problems arising from the ExeGesIS database and dataset. These problems are discussed in the section on the validity of Phase I methodology, below.

STAGE 2: ASSESSMENT

2.133. The methodology for Stage 2 centred on a specially designed 'Stretch Database' that summarises data derived from ExeGesIS and other sources, and provides a mechanism for assessing potential, importance, threat and evaluation priority.

2.134. Looking ahead to Phase II, provision was also made to develop the Stretch Database for field appraisal of each stretch.

2.135. The content of the Stretch Database and the results of the assessment of potential, importance and threat are summarised in Appendix I of the Proposals for Field Evaluation (Wessex Archaeology August 2000).

SECTION 2.1. DISCERN POTENTIAL

Task	
2.1.1.	Discern potential for as yet unrecorded components in the Survey Area as a whole on the basis of the enhanced record, the model of coastal change and the interpretative overview
2.1.2.	Discern potential for as yet unrecorded components in each Stretch on the basis of the enhanced record, the model of coastal change and the interpretative overview

Task 2.1.1. Discern potential for as yet unrecorded components in the Survey Area as a whole on the basis of the enhanced record, the model of coastal change and the interpretative overview

Task 2.1.2. Discern potential for as yet unrecorded components in each Stretch on the basis of the enhanced record, the model of coastal change and the interpretative overview

2.136. The question of potential was addressed predominantly at the level of stretches, rather than for the Survey Areas as a whole. The Stretch Database summarised information upon which a qualitative assessment of potential could be made, and provided structured terms (not assessed; low; medium; high; uncertain) supported by additional notes.

2.137. The results of the assessment of potential are discussed in Section 4 below.

SECTION 2.2. ASSESS IMPORTANCE

Task	
2.2.1.	Query presence of and potential for Components in each Stretch
2.2.2.	Query aggregated discrimination criteria of Components known or thought to lie within each Stretch
2.2.3.	Assess importance of the historic environment in each Stretch with reference to above queries

Task 2.2.1. Query presence of and potential for Components in each Stretch

2.138. The Stretch Database summarised the monuments in each stretch by period and zone, and summarised other data relating to the historic environment such as the presence of Areas of Archaeological Potential and Conservation Areas, and Landscape Character.

Task 2.2.2. Query aggregated discrimination criteria of Components known or thought to lie within each Stretch

2.139. Task 2.2.2. was not carried out because it depended on Task 1.7.3. (Assess and record discrimination criteria for each Component) which, as agreed earlier in the project, was inappropriate to a predominantly desk-based study.

Task 2.2.3. Assess importance of the historic environment in each Stretch

2.140. The importance of the historic environment in each stretch was assessed qualitatively on the basis of the summarised information by reference to a series of standard terms (not assessed; low; medium; high; uncertain) supported by additional notes.

2.141. The results of the assessment of importance are discussed in Section 5 below.

SECTION 2.3. ASSESS THREAT

Task	
2.3.1.	Compare pattern of actual and forecast shoreline change with model of coastal change for each Stretch
2.3.2.	Assess threat to the historic environment of each Stretch with reference to shoreline change and other impacts

Task 2.3.1. Compare pattern of actual and forecast shoreline change with model of coastal change for each Stretch

2.142. Where available from the SMP, forecast shoreline change (including land at risk and distance to fallback line) is summarised in the Stretch Database. Actual shoreline change was also assessed by visual comparison of historic maps and charts with the present shoreline. On the basis of this information, notes on historic and forecast change were added to the Stretch Database.

Task 2.3.2. Assess threat to the historic environment of each Stretch with reference to shoreline change and other impacts

2.143. Notes were made in the Stretch Database of the level of development within each stretch, based on cartographic evidence. This information, together with the notes on historic and forecast change mentioned above, were used to assess qualitatively the threat to the historic environment in each stretch by reference to a series of standard terms (not assessed; low; medium; high; uncertain) supported by additional notes.

2.144. The results of the assessment of threat are discussed in Section 6 below.

SECTION 2.4. CLARIFY SCOPE OF FRAMEWORK OBJECTIVES

Task	
2.4.1.	Identify apparent lacunae in understanding and appreciating the historic environment of the North Kent Coast on the basis of the assessment of importance and threat
2.4.2.	Clarify scope of framework objectives set out in 'An Archaeological Research Framework for the Greater Thames' on the basis of the above identification of lacunae

Task 2.4.1. Identify apparent lacunae in understanding and appreciating the historic environment of the North Kent Coast on the basis of the assessment of importance and threat

Task 2.4.2. Clarify scope of framework objectives set out in 'An Archaeological Research Framework for the Greater Thames' on the basis of the above identification of lacunae

2.145. On the basis of the assessment of potential, importance and threat, and the interpretative overview, several lacunae were identified. These lacunae, and their implications for the framework objectives, are set out in the Review of Greater Thames Framework Objectives (Section 7 below).

SECTION 2.5. IDENTIFY COMPONENTS AND STRETCHES FOR FIELD EVALUATION

Task	
2.5.1.	Prioritise Components and Stretches for field evaluation on the basis of satisfaction with Component and Stretch records
2.5.2.	Prioritise Components and Stretches for field evaluation on the basis of the assessment of importance and threat
2.5.3.	Inspect a sample of prioritised Components and Stretches to check validity of overall methodology
2.5.4.	Appraise practical and logistical constraints on Survey Phase II on basis of inspection of sample Components and Stretches

Task 2.5.1. Prioritise Components and Stretches for field evaluation on the basis of satisfaction with Component and Stretch records

Task 2.5.2. Prioritise Components and Stretches for field evaluation on the basis of the assessment of importance and threat

2.146. Evaluation priorities for stretches were assigned on the basis of the assessment of potential, importance and threat, rather than satisfaction with records. The evaluation priority was classed by reference to standard terms (not assessed; low; medium; high;

uncertain), and supported by qualitative comments. The resulting priorities are discussed in Section 8 below.

2.147. Individual monuments were not subject to any form of discrimination in the course of this project as precedence was given to the assessment of stretches. Consequently, there is no systematic basis on which to offer priorities for the field evaluation of monuments. It is possible, however, to suggest a number of monuments for field evaluation on the basis of our necessarily subjective familiarity with the Survey Area. The monuments so identified are discussed in Section 8 below.

Task 2.5.3. Inspect a sample of prioritised Components and Stretches to check validity of overall methodology

2.148. Pressure on the project timetable precluded extensive inspection of monuments or stretches. Consequently, critical consideration of the overall methodology was based primarily on experience of handling desk-based information. The validity of the Phase I methodology is discussed below.

2.149. A small sample of stretches was inspected towards the end of the project. Impressions gathered from this inspection have contributed to the approach proposed for Phase II.

Task 2.5.4. Appraise practical and logistical constraints on Survey Phase II on basis of inspection of sample Components and Stretches

2.150. In the absence of extensive inspection, an appraisal of practical and logistical constraints was carried out by reference to mapped data regarding public access, which has been summarised in the Stretch Database. Consideration of logistical and practical matters has also been furthered by participation in a working group on methodologies for rapid coastal zone assessment surveys, and subsequent discussions.

VALIDITY OF PHASE I METHODOLOGY

Definition of Survey Area/Broader Study Area

2.151. The specification for Phase I required that the project review the appropriateness of the extents of the Survey Area in the final report.

2.152. The extents of the Survey Area and the Broader Study Area have proved both workable and appropriate to Phase I. The Broader Study Area provides a useful context while the Survey Area focuses effort directly on the coastal zones. In practice, the survey has been pragmatic in that some monuments outside the Survey Area have been recorded if relevant to the aims of the project.

2.153. It is worth noting that the marine zone beyond the Survey Area (i.e. below low water or the county boundary) has not been considered systematically within this project, except where relevant to the model of coastal change. Consequently, it may be appropriate to add a ‘marine module’ to the project to enhance the record of casualties and seabed obstructions, subject to clarification of EH/KCC remit in the marine zone.

2.154. Similarly, land above the 5 m contour was excluded from the Survey Area, even though some areas above 5 m (e.g. on cliffs) are very close to the sea and might be expected to include monuments used in a maritime context. It should be recalled, however, that use of a Broader Study Area ensured that *existing* monuments on cliff tops were included in the database and mapping system. It may be appropriate to assess the potential for new cliff top sites in North Kent in due course.

2.155. Finally, it will be recalled that cut lines were used to limit the Survey Area in places where the 5 m contour was deeply indented, notably in the Medway valley and the Wantsum. It may be appropriate to commission a 'Medway Survey' and a 'Wantsum Survey' to draw the results of this project for the lower reaches of these (former) waterways into a more comprehensive consideration of their archaeological potential and importance.

Software Installation and Operation

2.156. Wessex Archaeology encountered initial difficulties in the process of installing and optimising the software (ExeGesIS with ArcView), which are not well supported. Difficulties were compounded by ambiguity regarding Wessex Archaeology's status as a licensed user, inhibiting requests for additional support. As a result, the system was not fully operational on time.

2.157. The relationship between the SMR software and ArcView is fragile and poorly documented. The failings, and successes, of the system had to be discovered by trial and error. One particular weakness is that the system becomes unstable if more than one person tries to add or amend data within ArcView (though as WA turned out to have a single user license this failing had only a limited operational effect).

2.158. Wessex Archaeology complemented the ExeGesIS/ArcView system with a bespoke database for stretches, air photographs, bulk data entry, and querying the overall dataset. To some extent the need for a bespoke addition reflects weaknesses in ExeGesIS/ArcView for a project of this kind. The design and operation of the bespoke database was hindered by the fact that ExeGesIS is based on an outdated version of Access, though it is understood that a major revision is underway.

2.159. Both ExeGesIS and Arcview are new systems to Wessex Archaeology, so staff had to train themselves 'on the job'. Inevitably, recording became more effective and efficient as familiarity with the system increased. An initial formal training period could have improved the initial threshold of system use.

2.160. ExeGesIS was designed to permit considerable flexibility in recording practice, so it offers little protection against inconsistent data entry (see below). A manual for SMR operators – which should overcome some consistency issues – is currently in preparation, though Wessex Archaeology was not made aware of the draft until recording was well advanced.

2.161. With hindsight, it would have been better to have a distinct stage of software installation and familiarisation, to be completed before recording commenced.

Monument Recording

2.162. It became apparent in the course of preparing the interpretative overview that the dataset of monuments provided in ExeGesIS by KCC is problematic. This dataset was originally provided to KCC in 1989 by the RCHME, and many current problems may hark back to the original data and its migration from system to system. The net effect is that many of the monument records are ambiguously or inaccurately ascribed to the themes and periods upon which the overview is based. These problems appear to have arisen as a result of inconsistent recording practices, poor data transfer, and the structure of the recording system encapsulated within ExeGesIS. A full appreciation of these problems requires a detailed understanding of the structure of ExeGesIS and of the data standards (notably the RCHME *Thesaurus of Monument Types*) that it encapsulates, but the following paragraphs gives a flavour of some of the difficulties.

2.163. ExeGesIS allows for multiple Monument Types to be included within a single monument record. For example, record KE10116 refers to monument types 'aisled hall house', 'farmhouse' and 'house', the periods of which overlap. It is not clear whether this is one building that developed over time, or whether there are three monuments that succeeded each other, or three concurrent buildings on the same site (or any combination of the above). The net effect is that a query designed to draw out the characteristics of recorded monuments will generate spurious multiples. Moreover, it is often impossible to distinguish spurious multiples from genuine monument characteristics.

2.164. Each of the Monument Types can be ascribed to a separate period. For example record KE8996 comprises five Monument Types 'church', each dated to an overlapping period. It is not possible to infer whether there have been five separate monuments on this site, or one monument occupied and adapted through different phases (or any combination of the above). The Display Date field – which should provide sufficient clarification as it allows dates to be ascribed to specific Events within a monument's history (built, abandoned etc.) – has been misused (2360 of 4492 records repeat the Monument Type) or not used (2068 records).

2.165. Each Monument Type may be related to more than one 'Top Term' in the *Thesaurus of Monument Types*, and there may be multiple relationships between a Monument Type and even one Top Term. For example record KE8807 is monument type 'farmhouse', which falls under Top Terms 'Domestic' and 'Agriculture and Subsistence'. Moreover, 'farmhouse' falls under 'dwelling – house – farmhouse' and 'agricultural building – farm building – farmhouse' under Top Term 'Domestic'. The net effect is a count of three farmhouses. Again, it is not clear whether there are actually three farmhouses with distinguishable characteristics, or just one.

2.166. Period information has been recorded very poorly. Of 4493 Monument Type records, 2324 have no data entered in the period field, even though in the majority of cases the required information is recorded in the description, summary or name field. In particular, many of the recorded vessels have the date of loss in the name field, but no period. Another typical example is record KE8147 'a 4th century Roman coin', which has not been ascribed to a period and does not, therefore, appear in query results.

2.167. Similarly, there has been an apparent tendency to ascribe prehistoric finds to a very wide period range, i.e. 500000 BC to 409 AD.

2.168. A further difficulty arises where evidence from multiple periods is found in roughly the same location. For example, monument KE1055 is named as 'flint implements and settlement' and comprises the following monument types and periods: settlement (Medieval); trackway (Roman); hearth (Post-medieval); wall (Medieval). In addition, a Palaeolithic handaxe is recorded as a 'find'. This collection would have been more usefully recorded as four or five monuments than as one monument.

2.169. There are also examples of undisciplined recording. For example, one monument record ('South Bank of the Thames' – KE13653) refers to 26 individual sites (gas works, sewage works etc.), represented by 26 separate dots, strung along the shoreline. The 'monument' as a whole has been given the date range 1664-1994, so the whole string appears if any specific period within this range is selected. Moreover, the whole string appears if any one of the monument types (or top terms) included within the record is queried. For example, a query on the monument term 'almshouse' – one of which is included – will result in an apparent distribution of 26 almshouses along the south bank. It would have been better had these monuments been recorded as a series of separate monument records, which is how WA dealt with this particular record.

2.170. The Record Type field is also problematic. There is provision for 'findspot' and 'building' for example, but many findspots and buildings have been entered as 'monument'. Also, the options are poorly structured. 'Maritime' seems to mean 'vessel' as far as Record Type is concerned, but a wider class of monuments (such as docks, wharves etc.) when it is used as a Top Term. Equally, it is not clear why 'Listed Building' and Building' are distinct Record Types, when there is separate provision for Listed Building details under monument status.

2.171. Some of these discrepencies can be remedied by disciplined recording practices and by cleaning the existing records. Wessex Archaeology has adopted the policy of only recording one monument type per monument record in the Survey Area. Consequently, evidence from two discrete periods at the same location, or two discrete buildings in the same complex, are regarded as separate monuments.

Record Cleaning

2.172. As discussed above, many KE-prefix records contain information that is inadequately categorised within the records themselves. It was recognised that it was necessary to 'clean' the KE records prior to drawing conclusions from their apparent distribution, periodisation etc. The records that require cleaning fall into two groups: KE records within the Broader Study Area but outside the Survey Area; and KE records within the Survey Area. The first group requires cleaning in order to provide a general context for monuments within the Survey Area. The second group needs cleaning in order to contribute to the assessment of importance and potential of each Stretch.

2.173. It should be noted that estimates for cleaning are based on points rather than records, because of a tendency in the KE data to use one record to summarise several related

monuments identified by separate points. In the course of cleaning, each additional point is likely to require a new monument record.

2.174. As the first group – the Broader Study Area – comprises 1833 points it was agreed that these records would not be cleaned in the course of the current project.

2.175. The second group – the Survey Area – comprised 1821 points. These were prioritised according to zone (land, intertidal, marine) and new options added to the Validation Status field in ExeGesIS to record whether each record was 'Cleaned (WA)' or 'Requires Cleaning (WA)'. A trial run was conducted with the following results:

	Total of KE-prefix monument points	No. cleaned	Time taken
CO1 marine	208	86	1 day
CO2 intertidal	864	25	0.5 day
CO3 land	749	25	0.5 day
Total	1821	136	2 days

2.176. This information was used to estimate the amount of time required to complete the cleaning of KE-prefix records in the Survey Area, as follows:

Survey Area	Uncleaned KE-prefix monument points	Estimated time required
CO1 marine	122	1.5 day
CO2 intertidal	839	17 days
CO3 land	724	14.5 day
Total	1685	33 days

2.177. In view of the amount of time required to clean these records and the knock-on effect on the project programme it was decided not to pursue the task further. Although these records have not been cleaned, they have already been enhanced in the course of the project through cross-referencing to Event and source records.

2.178. The approximate daily rates of 50 records for terrestrial and 100 records for maritime monuments can also be used to indicate the time required to clean the records from the Broader Study Area:

Broader Study Area	Uncleaned KE-prefix monument points	Estimated time required
maritime	584	6 days
terrestrial	1249	25 days
Total	1833	31 days

2.179. The estimated time required to clean KE-prefix records for both the Survey Area and the Broader Study Area is, therefore, c. 64 days.

Monument Polygons

2.180. As well as providing for monument points, the ExeGesIS/ArcView system allows monuments to be recorded as lines and/or polygons. The KE-prefix monuments were recorded only as points. However, some polygon sources were also provided either as hard copy or digitally (e.g. national mapping programme results, post-1500

defence sites). Where available, these polygons have been linked to existing monuments, or to new monuments.

2.181. All of the new monuments identified by Wessex Archaeology have been recorded as points as a matter of course. Many of the sources – notably the cartographic and air photographic sources – are also capable of generating polygons, though this is necessarily more time-consuming than simply adding a point. An operational compromise was achieved whereby extensive new monuments were recorded as polygons as well as points, whereas confined sites were recorded only as points. The results is that the following numbers of monuments are recorded as points and as polygons:

	No. of monuments recorded with polygons
KE-prefix	132
WX-prefix	388

2.182. It should be noted that an early decision was made not to use the line facility of ExeGesIS/ArcView to record monuments, as monuments are better recorded as areas than as lengths. The line facility was used, however, in recording vertical air photographic sorties as Events.

2.183. It is also worth noting that points and polygons have different advantages and disadvantages as far as a project of this type is concerned. Polygons give a more accurate impression of the extent of a monument on the ground at medium and large scales, but at the small scale required to map the Survey Area as a whole they tend to disappear entirely. In contrast, points can be given a constant size irrespective of the scale of mapping so they are better at indicating overall distributions.

2.184. Notwithstanding the advantages of points given the scale of the project it may be considered appropriate to record more monuments as polygons, especially as it is our view that many of the confined monuments have identifiable boundaries. The time required to carry out this task is estimated as follows:

	No. of monuments recorded only as points	Estimated time required to create polygons
Survey Area WX-prefix	1376	5.5
Survey Area KE-prefix	1624	6.5
Broader Study Area	1874	7.5
Total	**4874**	**19.5**

2.185. Sea defences proved problematic as a type of extensive monument because it is difficult to separate sea defences into a series of discrete monuments from air photographic or cartographic evidence alone. At the start of the project the SMR for the Survey Area included only seven points for sea walls. A further seventy-seven sea defences were recorded by Wessex Archaeology before the problem of distinguishing between individual sea defences became overwhelming. Subsequently, sea defences were recorded only as polygons on a separate layer. This layer now comprises 928 polygons (see Fig. 11), though there is no way of establishing how many discrete monuments this figure represents without further detailed research.

2.186. Wessex Archaeology also digitised polygons for Areas of Archaeological Potential from hard copy provided by KCC. KCC decided that such areas should not be recorded as monuments, so the polygons are held as a separate layer.

Quality and Timetables

2.187. Inevitably, difficulties arising from data quality and in collating sources had an adverse impact on the timetable for recording monuments. In retrospect, it would have been better to have a distinct 'source audit' stage to clarify the quantity and quality of sources, to be completed before recording commenced. In particular, such an audit could have identified the need for 'cleaning', which should also have been carried out prior to recording.

Targeting

2.188. The majority of new monuments recorded during the project have been located from historic maps and from air photographs. These sources give little indication of the age or character of the features identified, so many of the new monuments are no more than 'anomalies' that require inspection in the field to confirm their actual status. Moreover, our experience on this project suggests that maps and air photographs tend to favour standing monuments of Post-medieval and Modern date. The anticipated biases in the eventual record might warrant explicit discussion in the course of the 'source audit' proposed above.

2.189. In future, it may also be prudent to review project objectives early in Phase I of any further survey projects, to take account of biases in the available sources. The results of the source audit suggested above might indicate that concentration on specific zones, stretches or monument types would be more cost-effective than the more general trawl adopted in this project.

Recording Speed

2.190. A key factor in project timetabling is anticipating the speed at which new records can be entered from sources. As discussed above, familiarity with the database and mapping system, a source audit and cleaner base data would all improve the speed of recording new monuments. Overall speed might also be improved by use of secretarial staff with specialised typing and data-entry skills. However, the strength of the system lies in the capacity to overlay various sources and arrive at a considered view of each monument, which can then be recorded. Hence recording has to be carried out by archaeologists rather than secretarial staff, but it is advantageous to use archaeologists with high level data-entry skills.

2.191. Overall efficiency increased markedly when project staff had a portable computer to take to external sources such as the UK Hydrographic Office, local record offices and museums. Prior to the portable, lists of sources had to be hand-written and then typed up, effectively doubling the time required. Efficiency increased yet further when Word documents were replaced with a database with specific data-entry forms, because recording became more structured and consistent. The database was designed in such a way as to permit bulk loading of data into ExeGesIS/ArcView.

Air Photographs

2.192. Air photographs were viewed against two layers of large-scale mapping, namely the current OS 1:10,000 series and the first edition 25' to the mile series. With hindsight (and given prompt delivery of the historic mapping), it would have preferable to have viewed the APs against all of the historic large scale mapping, or at least the first and third editions.

2.193. Monuments were recorded from the APs using a bespoke database with provision to bulk load the data to ExeGesIS/ArcView. Again with hindsight, it would have been advantageous to include additional fields in the bespoke database to raise the level of recording and further improve the transfer to ExeGesIS/ArcView.

2.194. The project targeted APs from the NMR on the basis of date, so that all frames from the 1940s were viewed. It may be appropriate in future to target the NMR APs even more narrowly on a) the 'S' series defence mapping from the early 1940s, b) a 1940s series offering complete coverage (e.g. 106G/1944), and c) the most complete series from the 1950s.

2.195. The APs were particularly useful for locating surviving monuments that were also shown on historic maps, though the maps were better for digitising the extents of monuments so identified. Consequently, there was less need to scan, geo-reference and digitise APs than originally anticipated.

2.196. Nonetheless, the scanned APs have considerable potential as a quasi-map base for field evaluation, both for assessing the stability of monuments and for positioning field staff relative to minor geomorphological features (sand waves, rivulets) not shown on OS maps. The advantage of scanning and geo-referencing complete AP coverage for the Survey Area as a precursor to fieldwork is discussed further below.

'Red Herrings'

2.197. The project addressed a couple of sources that might better have been set aside, pending the results of other work. For example, in the course of the project it became apparent that there are ongoing projects to incorporate Tithe Maps and Apportionments (Public Record Office) and Listed Buildings (Images of England, EH) into systems that are accessible digitally. The detail and timescale of these projects, especially as they relate to North Kent, are not known.

2.198. The disadvantage of disregarding these sources from the start would have been that their possible contribution to the overall assessment of the historic environment would have been overlooked. On balance, it may be better to rely on historic OS maps rather than Listed Building information to identify older buildings, with the LB information used only to record legal status. Turning to the Tithe Maps, in North Kent it seems that field and settlement patterns did not change substantially between the 1840s and the 1870s, so the first edition 25' to 1 mile mapping is a more accessible source. However, the Tithe Maps and Apportionments could be used profitably in a study of the overall pattern of land reclamation, as discussed further below (see 7.3. and 8.6.).

2.199. With hindsight, the opportunity to start a dialogue with local groups and the information gathered about practical aspects of fieldwork were probably more useful than the data that arose directly from the exercise. However, all of the data provided was very welcome and future dialogue promises to generate some very useful records.

Source Priorities

2.200. In the light of experience it is possible to propose source priorities more categorically than hitherto. Subject to the results of a 'source audit', prior cleaning of base data and the compilation of basic data, the following tiers are suggested for prioritising recording:

Tier	Order	Source
1	1	Large scale historic OS mapping
	2	NMR vertical Air Photographs
	3	Environment Agency Air Photographs
2	1	Historic charts and surveys
	1	Other historic mapping
	2	Published/unpublished documents
3	1	Museum accession records
	1	Receiver of Wreck records
	2	Local society/individual records
	3	NMR oblique Air Photographs
	3	Cambridge University vertical and oblique Air Photographs
4	1	Listed Buildings
	1	Conservation Areas
	1	Areas of Archaeological Potential
	1	Scheduled Monuments
	1	Protected Wrecks
	2	Parks and Gardens
	2	Battlefields

2.201. This prioritisation can be incorporated into an amended structure for the stages of Phase I, as follows (cf. project Specification, paragraph 6.1.1.):

Stage 1: Set up
System installation and familiarisation
Source Audit
Cleaning

Stage 2: Compilation
Collate current mapping (OS, Admiralty Charts, existing GIS layers)
Enter bulk sources (existing SMR, AP coversearches, bibliographies)
Collate historic mapping (OS, UKHO charts and surveys, other maps)

Stage 3: Enhancement
Record monuments from historic OS maps and vertical APs
Record monuments from other cartographic sources and published/unpublished documents
Record monuments from museums, local societies/individuals and other APs sources
Confirm legal status of recorded monuments from local and national curatorial sources

Assessment
(unchanged)

Delivery
(unchanged)

3. INTERPRETATIVE OVERVIEW OF THE HISTORIC ENVIRONMENT

3.1. INTRODUCTION

3.1.1. Although limited by difficulties with the database and dataset (see above) this overview does indicate the scope for developing overarching interpretations of patterns of human activity in the Survey Area through time. The overview also illustrates the importance of setting data for the Survey Area itself within the wider context of the Broader Study Area, though the variable quality of available data for the Broader Study Area undermines the exercise significantly.

3.1.2. Preparation of the overview also prompted a relatively early attempt at drawing useful data out of the recording system. The capabilities of the system in this respect seem relatively undeveloped, perhaps accounting for the continued presence of poor quality data.

3.1.3. The following section sets out this project's contribution to the Framework Objectives set out in *An Archaeological Research Framework for the Greater Thames Estuary* (Williams, J. and Brown, N. 1999).

3.2. PLEISTOCENE PALAEO-ENVIRONMENT AND ARCHAEOLOGY

Framework Objective

To increase understanding of the physical evolution of the Thames estuary during the Pleistocene and of the social and cultural strategies of early human populations in relation to changes in environment and climate

Overview

3.2.1. The Thames and Medway, and their tributaries, pre-date the most recent inundation of the region by several hundred thousand years. As sea-level has fluctuated, these river systems have repeatedly cut and deposited river-borne material such as sand and gravels, to which have been added other forms of deposits such as brickearth. Relics of these deposits survive in the drift geology of the region, both as terraces and as 'head' deposits. These deposits are contemporary with and post-date various episodes of human occupation, so they contain Palaeolithic material either *in situ* or re-deposited from other sites.

3.2.2. A relatively small number of sites within the Survey Area have yielded Palaeolithic remains (see Fig. 3), though it should be noted that some nationally important sites fall immediately outside the Survey Area (but within the Broader Study Area). The recorded Palaeolithic sites fall into two groups: first, those associated with the Thames terraces (particularly the Boyn Hill gravel/Terrace 2) near Gravesend; second, those associated with head deposits from the Medway eastwards.

3.2.3. There is an apparent correlation between Palaeolithic finds and coastal exposures of head deposits that warrants further investigation in the context of continuing coastal erosion. Additionally, attention ought to be directed to coastal exposures of head

deposits where Palaeolithic finds have yet to be recorded (on Sheppey, for example) to establish the potential of these deposits.

Project Contribution

3.2.4. Although the distribution of 'new' Palaeolithic sites generally reflects the pattern of existing sites, Phase I has at least added nine records to the previous total of 20 records.

3.2.5. Phase I has also sought to overlay the record of sites against the following geological and geo-archaeological background:

- the changing channel of the Thames/Medway (related to Oxygen Isotope Stages (OIS) from Wymer 1999);
- the depth of Quaternary sediments beneath the Thames Estuary (BGS Sheet 51N 00 Thames Estuary, Sea Bed Sediments and Quaternary, 1:250 000);
- terrace and head deposits (data provided by KCC)

The juxtaposition of these different forms of data should prompt more detailed consideration of their accuracy and correlation, and may form a basis for identifying important deposits. For example, recent fieldwork has shown that the accuracy of existing BGS mapping of Pleistocene gravels is open to question.

3.2.6. The historic maps and charts collected in Phase I provide an accurate cartographic base dating back to the late eighteenth century. This base can be used to identify areas of quarrying and other forms of land-use that may have influenced patterns of discovery over the past 200 years, thus facilitating the identification of key areas where important deposits might be exposed. Investigations in the Ebbsfleet valley, for example, have shown that detailed examination of historic maps in relation to antiquarian records may clarify the provenance of earlier finds.

3.2.7. A number of Palaeolithic sites identified by TERPS (as published in Wymer 1999) within the Broader Study Area but outside the Survey Area do not appear in the SMR. Given that the Palaeolithic dataset is somewhat limited, it may be appropriate to enter the additional sites in the Broader Study Area in the course of Phase II.

3.2.8. It seems likely that the current archaeological record under-represents the extent and character of the Palaeolithic resource in the Survey Area. Moreover, the principal methods adopted during Phase I (analysis of historic maps, air photographs and so on) are unlikely to add directly to the record of Palaeolithic sites. Rather, there is a need for intrusive investigation such as borehole survey and cleaning of exposures to clarify the extent and character of deposits. Consequently, Pleistocene Palaeo-environment and Archaeology is one of the lacunae identified by Phase I as warranting specific investigation (see Section 7 below).

3.2.9. Occasional discoveries of Palaeolithic artefacts in the course of fishing and dredging indicate that potentially important deposits exist below low water, and there are three or possibly four terraces under the Holocene deposits of the Thames Estuary. Any further research into the extent and character of Pleistocene deposits should make specific provision for Palaeolithic material in the marine zone.

3.3. HOLOCENE PALAEO-ENVIRONMENT

Framework Objective

To increase understanding of the physical evolution of the Thames estuary and associated climatic and environmental change and their relationship with human activity during the Holocene

Overview

3.3.1. Although some topographic variations may have been masked by marine processes in the course of Holocene sea-level rise, it appears that much of the region comprised a relatively flat coastal plain from the Early Mesolithic to the Bronze Age (see Figs 4-7). In this context, the higher ground of Hoo, Sheppey, Herne and Thanet may have been of particular strategic importance. With the possible exception of Thanet in the Bronze Age, however, such possible importance (emphasised recently by Neolithic and Bronze Age discoveries in Sheppey) is not borne out by the apparent distribution of sites.

3.3.2. Given the paucity of the existing dataset there is limited scope for addressing human exploitation and management of woodland and marshes. However, it is possible that data from sites identified from air photographs and validated by fieldwork during Phase II could provide insights to human-environment interactions in prehistoric North Kent.

Project Contribution

3.3.3. Phase I has added to the number of Mesolithic, Neolithic, Bronze Age and Iron Age points, as follows:

	KE-prefix*	WX-prefix
Mesolithic	12	7
Neolithic	20	9
Bronze Age	88	8
Iron Age	89	4

*NB: the KE-prefix points cover both the Survey Area and the Broader Study Area, whereas the WX-prefix points are predominantly from the Survey Area alone.

Although the numbers for Mesolithic and Neolithic additions are small, they represent an increase of c. 50%. The increases for the Bronze Age and Iron Age are closer to 10% and 5% respectively. Moreover, the 'new' sites broadly reflect the distribution of existing points.

3.3.4. As with the Palaeolithic, the methods employed in Phase I are unlikely to favour the identification of prehistoric sites, though it is possible that some of the undated anomalies identified from air photographs may prove to be prehistoric upon field evaluation.

3.3.5. However, Phase I has generated a model of coastal change that – despite its weaknesses – provides a preliminary palaeo-environmental context for addressing the prehistory of North Kent. Although it provides a useful starting point, the model

is not sufficiently detailed to attempt firm conclusions about the possible extent of surviving palaeo-environmental deposits and land surfaces. As the model improves, however, it is likely to prompt a substantial re-evaluation of the human history of the region, in terms both of the resources available and of the cultural landscapes populated by earlier inhabitants.

3.3.6. It is worth noting that Phase I has recorded a fair number of 'new' Roman sites: the record now comprises 86 WX-prefix points in addition to the 365 KE-prefix points, which represents an increase of c. 25% (see Fig. 8). As these 'new' sites are within low-lying areas, further investigation of such sites is likely to generate insights into Roman occupation and exploitation of the marshes. In turn, this may have implications for patterns of post-Roman activity that lead to reclamation and to the creation of landscapes that are familiar to us today.

3.4. MARITIME ARCHAEOLOGY

Framework Objective

To examine the role of the estuary in providing internal coherence through trading and other maritime contacts and as a major artery of communication between England and continental Europe

Overview

3.4.1. The dataset includes a relatively extensive sub-set of maritime sites, including vessels, casualties and sites such as wharves and docks. There is good coverage of the nineteenth and twentieth centuries, showing concentrations along particular stretches of coast that are likely to be 'real' patterning of past activity rather than biases in recording (see Fig. 9). There is also a fair distribution of eighteenth century and earlier sites in the Medway and Swale. However, the record as a whole is undermined by the very large number of undated records, though it appears that many of these records – notably the recorded losses or 'casualties – include dating information that can be drawn out by 'cleaning' the records (see 2.171. above).

3.4.2. Of the casualties, most can be expected to date to the late eighteenth and nineteenth centuries, as a result of an economic need for the reporting of shipping intelligence (including losses), which started with the publication of *Lloyds List* from c. 1740. Clearly, the North Kent Coast can be expected to include casualties and associated maritime features from earlier centuries, as indicated by the Anglo-Saxon 'Graveney Boat'. Moreover, Bronze Age plank-built craft such as the Ferriby boats have been found to survive in environments similar to those of the North Kent Coast.

3.4.3. In many cases the volume of shipping losses off the open coast is an accident of weather and topography and has little to do with human activity upon that coast as such. However, the Thames Estuary forms a maritime 'cul-de-sac' and hence a high proportion of shipping activity within the confines of the estuary will be connected to regional activity. The nature of shipping casualty records is such that details of cargo, voyage and ship type are known. It should be possible, therefore, to generate patterns of trade along the Thames Estuary on a regional and international basis, at least within the terms of the available data.

3.4.4. The dataset includes information on monuments and buildings that have a maritime use, such as wharves, docks and shipbuilding sites. The existing record is clearly biased towards, on the one hand, structures associated with the Royal Dockyards as the majority are located around Chatham and Sheerness and, on the other, the more permanent structures built during the nineteenth century that are still obvious features in the landscape.

3.4.5. Until the nineteenth century and the development of modern formal dock facilities it was common for coastal craft to load/unload over open beaches with little or no dock infrastructure, a practice that continued into the twentieth century. It is likely that older harbour facilities are hidden under later structures and reclamation, or are better detected by analysing place names or identifying suitable natural harbours near to settlements.

Project Contribution

3.4.6. The survey has identified a large number of maritime sites including vessels, hards, anchorages and boat/shipyards along with their associated infrastructure dating back to the seventeenth century and earlier. The breakdown in terms of points is as follows (see Fig. 9):

	KE-prefix*	WX-prefix
undated	1463	74
Pre-C18th	35	64
C18th	31	38
C19th	64	249
C20th	50	146

*NB: the KE-prefix points cover both the Survey Area and the Broader Study Area, whereas the WX-prefix points are predominantly from the Survey Area alone.

3.4.7. These figures represent a substantial increase in the number of dated maritime sites across recent centuries. If the many KE-prefix casualty records that are nominally 'undated' are cleaned the increase will be less marked, but it is worth noting that casualties are documented losses rather than located sites, whereas the sources examined in Phase I (APS, charts etc.) will indicate actual positions where material may survive.

3.4.8. The identification of often hitherto unrecorded landing points provides a basis for considering maritime traffic as an integral part of the landscape. The adoption of a 'landscape' perspective should help to identify the needs and produce of the hinterland served by these landing points, generating hypothesis about the character of cargoes and trading links that can be tested by reference to the vessels wrecked in the region.

3.4.9. The survey has generated firm evidence for shipbuilding sites from the middle of the nineteenth century onwards. The location of older sites may be inferred by their proximity to known landing places.

3.4.10. The survey has identified a large number of hulks abandoned in the intertidal zone. Aerial photographic evidence suggests that the majority were abandoned in the decades following WWII. Very few vessels have been detected that were hulked

before WWII, though the long working life of vessels may mean that some post-WWII hulks are older than they first appear. Known sites from the region included Saxon watercraft, so it can be assumed that at least some older vessels will have survived. Some of the relatively modern watercraft may warrant further investigation.

3.4.11. Evidence of *in situ* wreck sites (as opposed to hulks) within the survey area is limited to the sub-tidal remains of the Medway and Thames. One identified wreck has a provisional seventeenth century date but its position in a navigation channel has prevented investigation. The presence of an eighteenth century wreck in the intertidal zone off Whitstable is tentatively suggested by another source. Information on the remaining identified wreck sites suggests that they are relatively recent in date.

3.4.12. This lack of direct evidence for cargoes is offset to some extent by the increased knowledge of landing points above and also the identification of a number of anchorage sites and navigation features indicating commonly used channels and contemporary hazards. Field investigation of these features may provide direct evidence of sea-borne trade along the North Kent Coast.

3.5. INTERTIDAL AND RELATED ARCHAEOLOGY

Framework Objective

To develop a full appreciation of the range and context of remains within the intertidal zone as evidence of environmental change and the exploitation and management of the intertidal resource.

Overview

3.5.1. This interpretative theme (see Fig. 10) refers to sites that fall within the present intertidal zone (Mean Low Water to Mean High Water), which may include sites that were formerly on dry land. In particular, all of the presently intertidal sites from Palaeolithic to Iron Age, and possibly Roman times might be expected to have originated in contexts that were substantially drier than they are today. The lack of data from areas that are now submerged precludes meaningful comment on intertidal exploitation in prehistory.

3.5.2. However, the dataset does contain a considerable number of examples of Roman and Medieval saltworkings on low lying ground, much of which was probably intertidal prior to reclamation in the Early Medieval and Medieval periods.

3.5.3. The only recorded evidence for fishing in the dataset is limited to two areas of oyster pits located in tributaries of the Swale, and fishtraps off Whitstable. Whilst this is too small a sample upon which to base any comment, it does indicate one form of activity whose extent and character is likely to become increasingly well understood in Phase II.

Project Contribution

3.5.4. Phase I has identified the following numbers of points in the intertidal zone:

	KE-prefix*	WX-prefix
Palaeolithic	3	6
Mesolithic	3	6
Neolithic	3	6
Bronze Age	13	6
Iron Age	6	3
Roman	76	48
Saxon	2	3
Medieval	5	8
Post-medieval	33	100
Modern	5	8

*NB: the KE-prefix points cover both the Survey Area and the Broader Study Area, whereas the WX-prefix points are predominantly from the Survey Area alone.

3.5.5. The large numbers of Post-medieval and Roman sites in the intertidal zone may reflect a particular emphasis on exploiting the coast in those periods, though as the sources examined favour Post-medieval remains it is possible that the coastal emphasis was also true of the preceding Medieval period.

3.5.6. Whilst some of the intertidal sites can be identified by reference to historic maps or similar previously identified features, many sites are simply 'anomalies' that require field investigation. It should be noted that, on the basis of Phase I, a large number of intertidal sites seem likely to prove more recent than originally anticipated.

3.5.7. It appears that sites in the intertidal zone are at risk from coastal erosion as many of the features identified from historic maps are no longer visible.

3.6. SEA WALLS AND FLOOD DEFENCES

Framework Objective

To develop a holistic approach to the study of sea walls and flood defences in the estuary landscape as evidence of climatic change, and reclamation, management and exploitation of the marshland resource

Overview

3.6.1. Sea Walls and Flood Defences occur extensively throughout the Survey Area (see Fig. 11), often a considerable distance inland. These features are likely to be closely related to the overall history of reclamation and land-use in the region, which has been identified as a lacuna in our understanding of the North Kent Coast that warrants additional work (see Section 7 below).

3.6.2. As noted above, sea walls and flood defences are problematic because it is difficult to separate sea defences into a series of discrete monuments from air photographic or cartographic evidence alone. Although many 'new' sea walls were recorded during Phase I the problem of distinguishing between individual sea walls became overwhelming. Subsequently, sea walls were recorded only as polygons on a separate layer. This layer now comprises 928 polygons (see Fig. 11), though there is no way of establishing how many discrete monuments this figure represents without further detailed research.

Project Contribution

3.6.3. The survey has mapped the extent of the seawalls evident on historic maps/charts and air photographs, adding considerably to the overall record:

	KE-prefix	WX-prefix	Additional Polygons
Sea Walls and Flood Defence*	7	77	928

NB: comprises Monument Types 'Dyke(Defence)', 'Embankment', 'Land Reclamation', 'Revetment' and 'Sea Defences'.

3.6.4. Phase I also included a pilot study that demonstrated the use of Tithe Maps and Apportionments to provide insights into the relationship between land management and reclamation, using field names and uses.

3.7. SETTLEMENT PATTERNS

Framework Objective

To further understanding of the evolution of settlement, other land-use patterns and structural remains around the estuary in terms of their social, economic and political development

Overview

3.7.1. The pattern of settlement activity in the Broader Study Area has been accessed through sites recorded as domestic or agricultural, by period (see Fig. 12). The majority of sites fall outside the Survey Area. Given the shortcomings of the dataset for the Broader Study Area (discussed in 2.161. *et seq.* above), detailed consideration of apparent patterns of settlement through time is inadvisable. However, the enhanced dataset resulting from record cleaning may enable detailed analysis of the spatial development of settlement within some areas of the Survey Area in due course. In particular the south banks of the Thames between Greenhithe and Shorne and the Swale between Sittingbourne and Faversham appear to have a fair range of settlement sites over extended periods of time.

3.7.2. Given the evident importance of the North Kent Coast for various forms of agriculture through the centuries, it is possible that 'Agriculture' should be addressed as a specific theme with its own framework objective.

Project Contribution

3.7.3. The survey has brought together a considerable amount of historic cartographic material, which provides a particularly detailed view of terrestrial land-use since 1840. This information could provide a base for studies of settlement from this date onwards, covering the major periods of industrial urban growth.

3.7.4. Inferences about pre-industrial rural settlement might be drawn from the earlier historic mapping, and from the distribution of archaeological sites and areas of archaeological potential.

3.7.5. Many of the unidentified 'anomalies' located by the survey are likely to provide direct or indirect evidence of settlement and land-use that will contribute to the Framework Objective.

3.8. THE HISTORIC BUILT ENVIRONMENT

Framework Objective

To further the understanding of the evolution of the historic built environment along the estuary with special reference to structural form and function, the aspirations of the associated individuals and communities and the use of local building materials.

Overview

3.8.1. The majority of built-up areas fall outside the Survey Area, and many other buildings within the Broader Study Area are recorded as 'monuments' rather than 'buildings' so they are difficult to distinguish at a strategic level (see Fig. 13). Concentrations of Listed Buildings are, not surprisingly, associated with Conservation Areas at Gravesend, Sheerness, Faversham and Margate for example. It seems likely that standing buildings associated with marine and coastal activity (i.e. within the Survey Area) are under-represented by current listing. This may also be true of groups of maritime/coastal buildings with coherent settings in the Survey Area, which may warrant designation as Conservation Areas.

Project Contribution

3.8.2. The majority of the survey area is unsuitable for large-scale building. It is only in places such as Sheerness and Gravesend (because of water related industry) and Margate (because of leisure activities) that building has been concentrated.

3.8.3. Nonetheless, Phase I has added to the record of Listed Buildings, as follows:

	KE-prefix*	WX-prefix
Listed Buildings	148	85
	3	6

*NB: the KE-prefix points cover both the Survey Area and the Broader Study Area, whereas the WX-prefix points are predominantly from the Survey Area alone. Phase I did not seek to record all Listed buildings within Conservation Areas in the Survey Area.

3.8.4. The enhanced dataset arising from Phase I provides a basis for reviewing the current degree of recognition and protection of the coastal built environment.

3.8.5. Other than the sea-front and riverside developments, only a few hamlets, buildings or industrial sites have been located. Many of these sites were abandoned in the twentieth century and there are few visible remains in recent air photographs. Cartographic evidence suggests that such sites are of relatively recent date, possibly no earlier than the nineteenth century. Much of the building is a result of transient industrial use such as brickworking.

3.9. HISTORIC DEFENCES AND OTHER MILITARY INSTALLATIONS

Framework Objective

To develop an understanding of defensive systems around the estuary and their role in relation to the estuary, London and south-east England

Overview

3.9.1. The dataset appears to present reasonable coverage of defence and military sites on the North Kent Coast, particularly for the Post-medieval and Modern periods (Fig. 14).

3.9.2. The Post-medieval and Modern defences are sited to face a threat of attack from the Thames Estuary itself, be it from the sea or from the air. It appears that the defences have been laid out to defend the upper reaches of the Thames and the two Royal Dockyards, suggesting interplay between two strategic approaches to national defence. First, the traditional strategic approach of investing the defence of the nation in the Royal Navy, to be executed away from mainland UK but requiring local defence of the infrastructure that supported the fleet, i.e. the Dockyards. Second, defence of London as a political, economic and social centre – especially against airborne attack during the Twentieth Century. Further detailed consideration of the enhanced dataset may enable the identification of sequences of development in defence policy, strategy and tactics, though such analysis should extend beyond the Survey Area and even the Broader Study Area to encompass defence installations on both sides of the Thames Estuary.

3.9.3. Prior to the sixteenth century there is no immediately obvious system of defence, with the exception of Reculver Roman Fort representing the 'Saxon Shore'. Pre-sixteenth century defences such as motte and bailey and later castles appear to be distributed randomly with respect to the coast, and seem more likely to have been built to meet the needs of local defence than any thought of regional or 'national' defence.

3.9.4. The traditional view of England defended in the air and on the beaches only represents one side of the military history of the North Kent Coast, as the sea has served frequently as a conduit for assault and conquest by the English abroad. The evidence for historic offence in North Kent does not appear to have been addressed to the same degree as the history of defence, so it is likely that the current record under-represents this element.

Project Contribution

3.9.5. The contribution of Phase I to the overall number of defence and military sites is as follows:

	KE-prefix*	WX-prefix
Roman	3	
Saxon	2	
Medieval	14	
Post-medieval	54	8
Modern	176	61
Undated	1	6

*NB: the KE-prefix points cover both the Survey Area and the Broader Study Area, whereas the WX-prefix points are predominantly from the Survey Area alone.

3.9.6. Although the additional numbers are quite low, it should be noted that defence sites have received a great deal of interest in recent years and been subject to previous enhancement projects, including the *Survey of Kent post-1500 defence sites*. Consequently, the addition of 61 Modern sites is notable, particularly in enhancing the record east of the Swale.

3.10. INDUSTRY AND TRANSPORT

Framework Objective

To develop an understanding of the estuary's industrial archaeology remains and their relationship to the history of industrialisation in the estuary

Overview

3.10.1. The dataset comprises predominantly Post-medieval industrial and transport sites (see Fig. 15) whose remains are still obvious features in the landscape. However, there is also a fair record of Roman industrial sites especially in the Medway (which has been enhanced by Phase I) and in the vicinity of Shorne, comprising the remains of pottery production and salt-making concentrated in former low lying and marsh land adjacent to sources of raw material. The record of Roman transport is limited to Watling Street and its various spurs. Medieval industry on the marshes of Sheppey is also well represented.

3.10.2. Post-medieval industrial sites can be divided into three groups

- Extraction and processing in the vicinity of local raw materials, which forms the biggest group. The industries include, in order of number of sites, bricks, cement, salt, lime and copperas.
- Processing of produce brought from outside the region but situated here because of access to a supply of water for processing, power and/or shipping. The industries include breweries, maltings, chemical works, boatbuilding and corn.
- Industries situated in the region because of military commitments, such as the Royal Dockyards and explosives factories. The latter may have been located preferentially in the region because of the availability of relative isolated sites.

3.10.3. Post-medieval transport sites comprise dock installation, canals and railways/tramways that serviced the region’s industries and settlements.

3.10.4. Modern industry is represented by a relatively small number of sites largely located because of their need for access to water and/or water transport. These include power stations, aircraft works, explosive factories and boat yards. There is an apparent trend in the dataset of Modern industrial sites away from extraction, though this trend may be attributable to a bias in recording.

3.10.5. The present dataset is reasonably extensive and has been improved by Phase I. As a result, it should be possible to present a relatively detailed overview of specific coastal industries in future.

Project Contribution

3.10.6. Phase I has added substantially to the number of points, especially transport sites in the Post-medieval and Modern periods:

		KE-prefix*	WX-prefix
Roman	- industrial	84	19
	- transport	17	3
Saxon	- industrial	1	
	- transport		
Medieval	- industrial	46	2
	- transport	3	1
Post-medieval	- industrial	218	44
	- transport	91	144
Modern	- industrial	40	37
	- transport	23	166
Undated	- industrial	20	34
	- transport	17	3

*NB: the KE-prefix points cover both the Survey Area and the Broader Study Area, whereas the WX-prefix points are predominantly from the Survey Area alone.

3.10.7. The dating of the sites identified by Phase I reflects the sources used, notably the historic OS maps from the 1870s and later. Earlier sites are very limited and have been identified largely as a result of archaeological fieldwork intercepted through examination of secondary sources. Air photographs indicate extensive salt working areas, but the dating of these areas cannot be determined from APs alone.

4. POTENTIAL OF THE SURVEY AREA

4.1. As noted above, the question of potential was addressed through the Stretch Database, which summarised information upon which a qualitative assessment of potential could be made, and provided structured terms (not assessed; low; medium; high; uncertain) supported by additional notes.

4.2. The results of the assessment of potential are as follows (see Fig. 1 for extent of each Stretch):

Stretch		Potential	Notes
60000	Darent	medium	Stretch is partly undeveloped. Intertidal zone may be well preserved. Marine zone has been dredged.
60001	Greenhithe	low	Above HW zone comprises largely modern development. Intertidal zone very small. Marine zone has relatively high number of components, though potential reduced by dredging.
60002	Greys	high	Much of stretch is undeveloped. Intertidal zone appears to be subject to erosion, possible revealing previously buried components. Marine zone appears to be heavily dredged.
60003	Gravesend	medium	Stretch has been heavy developed for several hundred years. Potential for Post-medieval monuments within development is high. The intertidal zone was probably used to a much greater extent in the past, but is now under modern reclamation. Marine zone has been dredged.
60004	Higham	medium	Much of area is undeveloped. Brickworks show potential for buried components. Intertidal contains debris. Marine zone has been dredged.
60006	Cliffe	medium	Above HW zone largely undeveloped. Parts of it are reclaimed. Intertidal zone is subject to erosion - possibly revealing previously buried monuments. Riverbed is accreting in marine zone so the potential for undisturbed monuments is high.
60007	Halstow	high	Above HW zone includes areas of reclaim. Low number of monuments probably reflects low level of land use. Intertidal and marine zones appear to be accreting. High potential for buried deposits.
60008	Grain	medium	Relatively high number of components above HW probably reflects level of development, which now covers large percentage of stretch. Intertidal zone appears to be eroding but contains large mudflats with high potential for monuments. Marine zone heavily dredged except for main channel.
60009	Hoo	high	Stretch largely comprises Post-medieval reclaim. Potential for buried monuments beneath the reclaim is high. Intertidal zone is eroding and appears to be uncovering 'features'. Marine zone is accreting and has high potential for undisturbed monuments.
60010	Chatham	medium	Much of the stretch is heavily developed but contains many buildings of potential historic interest. Areas that are undeveloped largely comprise reclaim. Intertidal zone comprises eroding marshland with some potential. Marine zone comprises accreting riverbed, with high potential for undisturbed monuments.

60011	Nor	high	Above HW zone largely unchanged and undeveloped. Relatively high number of intertidal monuments. The intertidal zone is known to have supported a high level of use in the past. The marine zone is accreting and has high potential for undisturbed monuments.
60012	Queenborough /Upchurch	high	Most of the stretch is intertidal and is subject to heavy erosion that is exposing monuments in areas of known past activity. The stretch has highest number of monuments in marine and intertidal zones, and in the overall total.
60013	Sheerness	medium	Most of known monuments are Post-medieval standing buildings. Area of undeveloped land does not seem to have produced many monuments. Intertidal zone has been subject to erosion and recent reclamation.
60014	Minster	medium	Most of stretch comprises intertidal zone at the base of cliffs. Historic mapping indicates high level of erosion of cliff and intertidal zone. High potential for previous terrestrial components in intertidal zone.
60015	Elmley	medium	Stretch is largely undeveloped and has not been subject to heavy land use. Potential for remains in both intertidal and above HW zones is high.
60016	South Swale	high	Stretch is largely undeveloped and consists of large areas of mudflats. Potential for buried monuments is good, as is preservation.
60017	Harty	medium	Stretch is largely undeveloped and partly reclaimed. Level of landuse is probably high.
60018	Whitstable	high	Large areas of exposed intertidal mudflats and reclaimed land. Land use probably relatively high.
60019	Wantsum	high	Stretch is an area of known historic activity. Much of the land has been reclaimed and has potential for buried monuments. Intertidal zone very narrow but may contain material from eroded land sites.
60020	Thanet	medium	Stretch consists mainly of intertidal at the base of cliffs with occasional 'inlets' onto low lying land. Highest potential is for material that has eroded from cliffs.

4.3. The only stretch considered to be of low potential was Greenhithe, as the zone above high water largely comprises modern development, the intertidal zone is narrow and there has been dredging of the marine zone. It should be noted, however, that in the light of the high level of threat, this stretch is suggested as a pilot for Phase II (see below).

5. THE IMPORTANCE OF THE NORTH KENT COAST HISTORIC ENVIRONMENT

5.1. As noted above, the importance of the historic environment in each stretch was assessed qualitatively on the basis of summarised information about monuments and other archaeological interests by reference to a series of standard terms (not assessed; low; medium; high; uncertain) supported by additional notes.

5.2. The results of the assessment of importance are as follows:

Stretch		Importance	Notes
60000	Darent	medium	Relatively high number of monuments, mainly built heritage. Land-use probably high.
60001	Greenhithe	low	Much of land is modern development. Intertidal zone probably eroded by reclamation. Dredging has probably reduced potential in marine zone.
60002	Greys	medium	Small number of components, possible because of low level of land use (stretch is also relatively small).
60003	Gravesend	medium	Importance of area probably rests with its built heritage.
60004	Higham	medium	Above HW zone has potential. Intertidal may be covered with reclaim in some areas, otherwise has some potential.
60006	Cliffe	high	Potential balanced against low number of known monuments given land-use. Intertidal and marine zones have a very high potential for undisturbed monuments. Erosion will possibly reveal these in the intertidal zone.
60007	Halstow	high	All zones are probably under explored. Intertidal and marine zones have a high potential.
60008	Grain	medium	Stretch comprises a large outcrop of gravel in otherwise alluvial zone and may have a long history of settlement. Small section of deep undisturbed channel with high level of historic activity.
60009	Hoo	high	Eroding land surface is probably Post-medieval. Underneath the surface there is a potentially undisturbed channel.
60010	Chatham	medium	Post-medieval standing remains form the majority of monuments within this stretch and provide its main importance.
60011	Nor	high	Known use of intertidal zone in the past. High potential for undisturbed monuments.
60012	Queenborough /Upchurch	high	High volume of finds and known level of exploitation of intertidal zone.
60013	Sheerness	medium	Importance of stretch lies in HM dockyard, which has been heavy redeveloped.
60014	Minster	medium	Foreshore material is shingle - potential for preservation is not good.
60015	Elmley	high	Stretch is undeveloped and adjacent to a large waterway with good conditions for preservation.
60016	South Swale	high	Potential of additional monuments is good.
60017	Harty	high	Areas of gravel in alluvium suggest possible foci for settlement in the past. Intertidal zone contains large mudflats and has good potential for survival.
60018	Whitstable	high	Stretch known for its production of finds from intertidal zone, though this may be as sign that in situ deposits have already eroded away. Above HW zone know for large unusual buried monuments (i.e. Graveney boat).

60019	Wantsum	high	Stretch comprises a former waterway that has high potential for undisturbed monuments.
60020	Thanet	medium	Stretch forms a small element of an archaeologically important area.

5.3. As above, Greenhithe was the only stretch that was considered to be of low importance.

6. THREATS TO THE NORTH KENT COAST HISTORIC ENVIRONMENT

6.1. As noted above, the threat to the historic environment was assessed qualitatively on the basis of the level of development and notes on historic and forecast shoreline change. Threat was assessed by reference to a series of standard terms (not assessed; low; medium; high; uncertain) supported by additional notes.

6.2. The results of the assessment of importance are as follows:

	Stretch	Threat	Notes
60000	Darent	high	Based on the potential of the area for development.
60001	Greenhithe	high	Small amount of land left undeveloped, which is potentially under threat from further development.
60002	Greys	medium	Possible threat from development above HW, and in intertidal zone from erosion.
60003	Gravesend	medium	Much of area already developed or dredged.
60004	Higham	medium	Stretch is probably not under immediate pressure of development or erosion.
60006	Cliffe	medium	Immediate development unlikely. Intertidal zone most at risk from erosion.
60007	Halstow	low	No immediate risk of development or erosion.
60008	Grain	medium	Southern part of stretch is already developed, northern half variably developed. Probably not under threat from development. Biggest threat is erosion of intertidal zone.
60009	Hoo	high	Threat of erosion to intertidal zone is high.
60010	Chatham	low	Some threat to eroding intertidal zone. Little scope for increased development.
60011	Nor	low	No noticeable erosion. Most of area is intertidal hence there is very little risk from development.
60012	Queenborough /Upchurch	high	All of the stretch is eroding.
60013	Sheerness	medium	Threat to undeveloped land from extension of developed area. Threat to intertidal zone.
60014	Minster	high	Stretch subject to heavy erosion. Parts of the stretch are not going to be defended.
60015	Elmley	low	Stretch does not appear to be under threat from development or erosion.
60016	South Swale	low	No apparent threats from development or erosion.
60017	Harty	low	No apparent threats from development or erosion.
60018	Whitstable	medium	Stretch is currently well defended. Heavy erosion has occurred in the past and the situation may change in future.
60019	Wantsum	medium	Most of the stretch is well defended, though this may not continue to be the case. One management unit is to be allowed to retreat.
60020	Thanet	medium	Very little direct threat, though material in cliffs subject to erosion.

6.3. Of the five stretches where the threat is ‘high’, three (Hoo, Queenborough/Upchurch and Minster) are particularly effected by coastal erosion and two (Darent and Greenhithe) and subject to development pressure. Development and coastal erosion are notable threats in many of the stretches where the threat is ‘medium’. Dredging is a notable threat in some stretches (e.g. Gravesend).

7. REVIEW OF GREATER THAMES FRAMEWORK OBJECTIVES

7.1. There are four lacunae in understanding and appreciating the historic environment of the North Kent Coast that are immediately evident from Phase I.

7.2. First, the majority of new monuments have been located on the basis of historic maps and air photographs, which favour Post-medieval and Modern standing remains. Consequently, the record seems likely to under-represent the character and extent of prehistoric activity, and the survival of sites. Field evaluation, together with further collaboration with selected local societies, can be expected to ameliorate this lacuna.

7.3. Second, the limited assessment of Tithe Maps and Apportionments, and the digitising of sea defences, indicate considerable scope for understanding the process of land reclamation. However, detailed consideration of individual maps and defences – together with documentary research – would be required to develop a satisfactory account. This level of work falls outside the terms of the current project and could be addressed as a project in its own right (see 8.6. below).

7.4. Third, although a coarse model of coastal change has been developed, it is not sufficiently detailed to attempt firm conclusions about the possible extent of surviving palaeo-environmental deposits and land surfaces. In particular, the model – derived as it is from bathymetric data – indicates extensive areas of former 'land' corresponding to sandbanks that are relatively recent in date. Further work is required (see 8.6. below) to determine whether these sandbanks may conceal former landsurfaces, or whether they have simply accreted at the same rate as sea-level rise.

7.5 Finally, further work is required (see below) on the Pleistocene geo-archaeology of the Thames Estuary, to clarify the extent, correlation and age of terraces and deposits on the North Kent Coast. Information about the presence, character and extent of submerged terraces also appears to be limited. It is also worth noting that available terrestrial and marine geological maps do not fit together, leaving a blank strip along the coast.

8. PROPOSALS FOR PHASE II

8.1. AIM

8.1.1. As in Phase I, the aim of the Rapid Coastal Zone Assessment Survey is to enhance the Kent Sites and Monuments Record (and thereby the National Monuments Record) in order to permit an improved curatorial response to strategic coastal planning and management initiatives, and to individual development or works proposals. Phase II will also further develop methodologies for coastal survey to a common national data standard, compatible with the data requirements of other coastal managers and researchers.

8.2. APPROACH

8.2.1. Unlike Phase I, Phase II does not break down easily into a sequence of individually-resourced tasks following one after the other. Moreover, this project has identified some remedial tasks that are more properly considered as part of Phase I than as Phase II. Although it is desirable to 'pilot' the field survey methodology, the degree of preparatory work required before any pilot can proceed outweighs the likely scope of the pilot. Equally, there are a number of tasks that can proceed in parallel with the field survey. The approach to Phase II set out below envisages relatively discrete and not-necessarily sequential stages, each of which could be resourced independently if required.

8.3. REMEDIAL TASKS

Clean Records from Survey Area

8.3.1. As discussed above, the SMR data supplied at the start of the project contains many inconsistencies and requires 'cleaning' if enhancement is to be worthwhile. It is essential that this work is carried out before taking the overall dataset for the Survey Area into the field.

Digitise Monument Polygons

8.3.2. The project has highlighted the scope for substantially increasing the proportion of monuments represented by polygons as well as by points. Again, it would be sensible to carry out this work before taking the dataset into the field.

Clean Records from Broader Study Area

8.3.3. As discussed above, there is a need to clean existing SMR data for the Broader Study Area. This exercise does not have to be carried out before fieldwork commences, but the results should be available as fieldwork ends so that they can inform overall interpretations of the coastal region.

8.4. PREPARATORY TASKS

Develop Recording System

8.4.1. A recording system is required that, in effect, takes ExeGesIS/ArcView into the field. Monument data that is currently held in the system has to be made available in the field so that it can be verified and enhanced, and provision has to be made for information about new monuments to be entered. The recording system should also make stretch data and historic maps and air photographs available to fieldworkers. New data, including polygons mapped using GPS, will have to be incorporated into the recording system in such a way that it can be bulk loaded into the SMR. The whole package will have to be reliable and sufficiently robust to withstand the inhospitable environment; although machine-based, the recording system will have to be supported with conventional hard copy for use in wet and muddy areas.

8.4.2. The remote data-entry system designed by Wessex Archaeology for recording Air Photographs may offer a model for development of the recording system.

Generate AP Base

8.4.3. Air photographs – particularly the Environment Agency APs – offer considerable potential as a 'map base' to guide archaeologists in the field. It should also be noted that KCC, in conjunction with English Nature, carried out flights during the equinoctial low tides of autumn 2000. Subject to copyright and licensing, it may be feasible to scan and geo-reference complete current coverage for the Survey Area from either of these sources. It may also be appropriate to scan and geo-reference historic coverage of areas where monuments were once visible but have since 'disappeared'.

Liaise with Local Groups

8.4.4. In the interests of furthering collaboration with local societies and individuals, it may be advantageous to circulate summary details of existing and new sites. Such an exercise should help to overcome suspicions about the contractor's role, as well as encouraging information about the validity of monument records and about additional sites.

8.4.5. The exercise could also be used to initiate discussions about access to additional information held by local societies and individuals, notably the Gravesend Historical Society's 'Historical Resource Database' and detailed records held by Upchurch Archaeological Research Group and Kent Oyster Coast Environmental Survey.

8.5. PILOT TASKS

Recording System

8.5.1. Following preliminary design work, it will be necessary to pilot the recording system to assess its practicality and to ensure that data migration will be successful. The pilot project would also provide an opportunity to manage the practical and logistical aspects of Phase II on a small scale, as well as providing feedback on the quantity

and character of monuments likely to be encountered. The pilot stage should include provision for amending the recording system as appropriate.

8.5.2. The choice of stretches for piloting Phase II is based on the evaluation priority of each stretch, summarised below. It should be noted that the evaluation priority was established by professional judgement using the assessment of potential, importance and threat for guidance only. The assessment terms were not scored, and there is no mechanical link between assessment and priority. Hence it can be seen that similar assessments under each heading do not necessarily result in similar evaluation priorities:

Stretch		Potential	Importance	Threat	Evaluation priority
60000	Darent	medium	medium	high	high
60001	Greenhithe	low	low	high	high *
60002	Greys	high	medium	medium	low
60003	Gravesend	medium	medium	medium	medium
60004	Higham	medium	medium	medium	low
60006	Cliffe	medium	high	medium	high
60007	Halstow	high	high	low	medium
60008	Grain	medium	medium	medium	high *
60009	Hoo	high	high	high	high
60010	Chatham	medium	medium	low	low
60011	Nor	high	high	low	medium
60012	Queenborough/ Upchurch	high	high	high	high
60013	Sheerness	medium	medium	medium	low
60014	Minster	medium	medium	high	high
60015	Elmley	medium	high	low	high *
60016	South Swale	high	high	low	medium
60017	Harty	medium	high	low	medium
60018	Whitstable	high	high	medium	high *
60019	Wantsum	high	high	medium	high
60020	Thanet	medium	medium	medium	medium

8.5.3. Following discussion with KCC, it is proposed that the asterisked (*) stretches (Greenhithe, Grain, Elmley and Whitstable) are used to pilot Phase II. It should, however, be borne in mind that every stretch requires a degree of field evaluation in the main body of Phase II to test, at the very least, the assessment offered by Phase I.

8.5.4. Evaluation priorities were also required for individual monuments, though the method used to identify these monuments was based on a general, subjective familiarity with the historic environment of the North Kent Coast rather than the more systematic approach used to prioritise stretches. The monuments in the following list comprise both typical and apparently unusual sites belonging to a variety of periods, types and themes. Field evaluation of the monuments below would provide a flavour of the character and survival of archaeological remains on the North Kent Coast. Consequently, it would be appropriate to pilot the recording system on a substantial proportion of the monuments listed below.

No.	Parish	Site	Justification
KE14888	Cliffe	schooner *Hans Egede*	Only non-barge sailing hulk located by this survey.
KE2609	Cliffe	Lower Hope Battery	Seventeenth century battery.

KE3516	Swale	Castle Rough	Moated site.
KE6484	Chislet	Reculver	Area of many multi-period finds in eroding cliffs.
WX17257	Leysdown	Shorts	Site of world's first production aircraft factory.
WX17520	Birchington	St Mildreds Bay	Area of many multi-period finds.
WX17540	Cliffe	Lower Hope explosive works	Twentieth century explosive works.
WX17600	Faversham	Harty Ferry	Site of pre-eighteenth century ferry crossing.
WX17636	Cooling	Whalebone Marshes	Interesting placename.
WX17706	Whitstable	Tankerton Beach	Site of many Mesolithic finds.
WX17739	Cliffe	Cliffe Fort Brennan Torpedo Slips	Nineteenth century coastal defence system, unusual survival.
WX17757	Hoo St. Werburgh	Buttercrock Wharf	Numerous examples of maritime related debris and boat remains.
WX17806	Sheerness	Thames WWII Anti-Submarine Netting	WWII defence feature and pre-1946 barges.
WX17858	Whitstable	Salt Mounds	Typical feature.
WX17932	High Halstow		Possible salt works.
WX17962	Stoke	Hulk	Pre 1946
WX18031	Hoo St. Werburgh	Ford Marsh	Possible former salt work, also joined by hardway and only ford marked in area.
WX18714	Leysdown	Possible fish weir	Observed in Environment Agency Air Photographs.
WX17618	Higham	Higham Common	Causeway across marsh to river that appears on mapping since 17th century. Associated with intertidal Roman material and supposedly the point at which Claudius crossed the Thames.
	St. Mary Hoo	Egypt Bay Seawalls	Typical multiple series of seawalls and reclaimed land.
WX18997	Chestfield	Tankerton Gardens	Site of heavy recent coastal erosion.
WX19139	Hoo St. Werburgh	Circular embankment	Unexplained marsh/reclaim feature.

Project Booklet

8.5.5. Phase I has already generated sufficient information to prepare and publish a short (16-20 page) booklet on the overall aims and implementation of the survey. Such a publication should further ease relations with local societies and individuals and assist in discussions regarding foreshore access with landowners and operators. The booklet would also feed back the preliminary results to the public and raise awareness generally about the importance of the historic environment of the North Kent Coast. It is conceivable that the public might report information about new sites as a result.

Project Website

8.5.6. Further to the proposed booklet above, it would be relatively inexpensive to set up and maintain a project website to disseminate results as they occur. A website will raise awareness and, more importantly, help to engage the public in the process of conservation.

Mapping of Ownership/Other Interests

8.5.7. During the project, preliminary discussions were held with the agents of the Crown Estate regarding their mapping of ownership and other proprietorial interests in the Survey Area. Subject to copyright and licensing, it would be feasible to digitise and annotate the available mapping. As well as facilitating discussions about access – and, potentially, management agreements to protect sensitive sites – the exercise may highlight patterns of ownership, tenure and landuse that are of historical significance.

8.5.8. It may also be appropriate at this stage to clarify the availability of other mappable datasets for the North Kent Coast held by organisations such as the Environment Agency, English Nature, the Countryside Commission and the RSPB. In particular, it may be necessary to obtain permission or licenses to enter designated areas.

8.6. FIELD SURVEY

Extensive Survey

8.6.1. Extensive survey of the coastal zone would form the most substantial element of Phase II, and is expected to comprise a walkover that addresses the whole of zone CO2 (intertidal) totalling over 9000 hectares. Particular attention would be paid to the Mean High Water mark (>340 km), where monuments formerly protected by burial are likely to become exposed due to sea-level rise and storm action. Provision will also be required to survey selected areas of zone CO3 (above high water), which totals over 21,000 hectares.

8.6.2. Zone CO1 (marine), totalling c. 5500 hectares, will not be addressed in Phase II. However, the potential and importance of this zone – and the threat to the historic environment within it – requires further consideration.

8.6.3. Although it is anticipated that the whole of zone CO2 will be subject to extensive survey, the exercise should take account of the assessment of potential, importance and threat, and the prioritisation of Stretches (see 8.4.2. above).

Intensive Survey

8.6.4. It is anticipated that a limited amount of intensive survey will be required to further characterise monuments that are of outstanding importance, represent poorly understood types, or are under immediate threat. Although intensive surveys will be predominantly non-intrusive, it is conceivable that a degree of cleaning, sampling and test excavation may be warranted.

Geo-archaeological Survey

8.6.5. Some provision may be required for geo-archaeological survey to further develop the model of coastal change. For example, auger transects at selected locations could provide a general characterisation of the sediment sequence and provide samples suitable for palaeo-environmental assessment and dating.

8.6.6. The scope for using marine geophysical techniques to locate and map palaeo-channels in the intertidal zone, for example, should also be explored.

Repeat Survey

8.6.7. In areas where rapid erosion is occurring either continuously or periodically, there will be a need to carry out repeat surveys to clarify the rate of attrition to the historic environment, and to provide a record of monuments that are being damaged.

Monitoring Survey

8.6.8. Where the presence and character of archaeological material has been established by extensive and intensive survey, there will be a need to carry out monitoring surveys periodically to provide information about monument condition in an environment that is inherently dynamic environment. Where monument condition is deteriorating rapidly as a result of erosion, then monitoring may prompt repeat survey (see 8.5.7. above).

8.6.9. There is also a need to carry out monitoring surveys on areas of coast where there are currently few recorded monuments but the potential is high, so that any monuments revealed by fresh exposures can be reported. Reports of new material may prompt renewed extensive or intensive survey, as appropriate.

8.6.10. It is anticipated that local archaeologists, both individually and in societies, will play a central role in systematic monitoring surveys of the North Kent Coast.

8.7. PARALLEL TASKS

History of Reclamation

8.7.1. The history of reclamation could be addressed as a parallel project drawing on Tithe Maps and Apportionments, other historic maps and air photographs, and documentary sources. If carried out in parallel, provision should be made for the findings of extensive and intensive observation of sea defences to be fed back to the history of reclamation project.

Deposit Model

8.7.2. Further consideration of quaternary sources and the results of geo-archaeological survey could enable the development of the model of coastal change into a deposit model. A deposit model could be expected to have a degree of predictive capability, as well as generating clearer insights into human-environment interactions in the course of sea-level rise.

Pleistocene Geo-archaeology

8.7.3. As noted above, there is a need to pull together geological and archaeological data relating to the extent, correlation and age of terraces east of the Hoo peninsula, and offshore. Such an exercise should clarify the potential for discoveries of both derived and *in situ* deposits of Lower and Middle Palaeolithic date. The historic map base collated during Phase I could also be used to identify former quarries containing significant exposures.

Thames-wide Thematic Mapping

8.7.4. In view of the level of coastal surveys being carried out in Kent, on the Thames foreshore and in Essex, it is proposed that some preliminary efforts be made to correlate results. The objective would be to develop thematic maps corresponding to the framework objectives for the Greater Thames. At the very least, the exercise should highlight the difficulties likely to be encountered in attempting regional-scale interpretations.

Coast-wide Thematic mapping

8.7.5. Further to the point above, it is suggested that preliminary efforts be made to correlate the results of the North Kent Coast survey with the comparable survey of Norfolk and Suffolk, and with other surveys across the Southern North Sea Basin. In this case, the objectives would be to seek conclusions about overall patterns of coastal exploitation through time, and to highlight problems of supra-regional interpretation.

8.8. DELIVERY

Enhanced SMR

8.8.1. The primary deliverable will be a revised SMR dataset in ExeGesIS/ArcView format.

Project Report(s)

8.8.2. It is anticipated that the end of Phase II will be marked by submission of one or more reports setting out the methodology, results and conclusions of the project.

Project Archive(s)

8.8.3. The paper and material archive arising from Phase II will be deposited at a suitable repository at the end of the project.

Interpretative Publication

8.8.4. It is suggested that the end of Phase II is also marked by the publication of an interpretative overview of the historic environment of the North Kent Coast. A well-illustrated, authoritative and readable narrative of 80-100 pages prepared for an informed general audience would serve as suitable dissemination.

8.8.5. It may be appropriate to revise and republish the Project Booklet proposed above. Arrangements could also be made to maintain the Project Website beyond the timescale of Phase II.

Mitigatory and/or Research Proposals

8.8.6. It is anticipated that proposals would be submitted on designation, fieldwork or other actions that might be required to improve the conservation, understanding and appreciation of the historic environment of the North Kent Coast.

9. CONCLUSIONS: THE IMPLICATIONS OF THE PROJECT

9.1. THE ARCHAEOLOGY OF KENT AND THE SOUTHERN NORTH SEA BASIN

9.1.1. The project was set up within both English Heritage's developing framework for Rapid Coastal Zone Assessment Surveys and the Interreg IIC funded Planarch project, with partners in Essex, Belgium, France and the Netherlands. It is appropriate therefore to examine the implications of the project in terms of the objectives of these separate but complimentary programmes. In terms of the Rapid Coastal Zone Assessment Survey, the emphasis was on developing the knowledge base of the Survey Area whilst developing and refining methodologies that might have more widespread application around the coast of England. For Planarch however, the principal concern was to take forward, within the Planarch project area, best practice relating to the integration of archaeology within the spatial planning process.

9.1.2. Phase I has made a substantial contribution to our knowledge of archaeological sites on one shore of the Southern North Sea Basin, together with its geoarchaeological context. Inevitably, the dataset enhanced by this project will be further augmented in the future. Nonetheless, the project has sought to describe the known distribution of Palaeolithic material on the Kent side of the Thames by developing a framework that can, in principle, be extended to the whole Thames-Rhine-Meuse-Scheldt confluence. A framework has also been developed for considering the distribution of Mesolithic to Iron Age sites relative to a coarse model for Holocene shoreline change. The evident weaknesses of this model are useful because they highlight questions that have to be resolved by further investigation. Refinement of the model should stimulate the development of hypotheses regarding prehistoric occupation of coastal areas, both as resources to be exploited and as landscapes that had cultural meaning.

9.1.3. The overall number of sites recorded from the Roman period onwards is substantial and it becomes meaningful to distinguish patterns of, for example, settlement, agriculture, industry, transport, defence and maritime activity. Given the role of North Kent as a point of entry for people, goods and ideas, it is particularly apt to address the Roman/Early Medieval/Medieval transition in the context of the Southern North Sea Basin. Again, Phase I has refined and enlarged the dataset within a framework that allows spatial, chronological and thematic examination of such matters.

9.1.4. The tendency of the primary sources of data consulted in Phase I to favour Post-medieval and Modern sites has been noted. The range and density of sites from these periods present an opportunity to analyse the complex pattern of human inhabitation and exploitation of the coastal environment, from primary production through processing to transport and trade in mariculture, agriculture and industry. There is scope to link waterfronts both to their hinterlands and to the vessels that served them, and thence to the overall pattern of imports and exports within the Thames and throughout the Southern North Sea. While production and trade might generally characterise North Kent and its maritime neighbours in these later centuries, Phase I has also added to the record of military sites that bear witness to warfare – and armed peace – in the region.

9.2. METHODOLOGY

Phase I Surveys

9.2.1. The methodological implications of the Phase I Survey of the North Kent Coast for other Phase I surveys have been discussed at length above (see Section 2). Historic maps, charts, air photographs and secondary sources are of paramount importance, but it is essential to avoid sources that are distracting, time-consuming and unproductive. One overriding recommendation, therefore, is to audit existing data, systems and sources before finalising the project design. Additionally, as each source is most useful when combined and compared with other sources, it is important that all sources are fully available from the start so that the anticipated sequence of analysis is not disrupted.

Planarch

9.2.2. The results of this project are of direct relevance to Planarch, notably general objectives a to c (see paragraph 1.1.3. above). The integration of high quality monument data – supported by defined areas of archaeological potential and the historical sources such as maps, charts and air photographs – within the KCC GIS means that the historic environment can be taken more fully into account at all levels of development planning and development control. This framework has wider potential application.

9.2.3. The project has also shown how the KCC GIS can be used to correlate land use and planning data with the presence of archaeological monuments to identify threats to the historic environment, including threats caused by natural processes. The methodology developed by the project, which provides an assessment of the archaeological potential and possible threat to each stretch of the North Kent Coast, provides a framework that can be used throughout the County as well as in the Planarch area as a whole.

9.2.4. This project has made a substantial contribution to the broad area survey of the Kent side of the Thames, including the littoral, the intertidal zone and the immediate hinterland of the coast. The survey is an essential stage in developing a model of the historic environment that can be used to inform decision-making. Given this advance it is important to validate and build on the results, and the survey provides a firm basis for identifying priorities and targeting fieldwork in Phase II. It should also be noted that many of the lessons learned in refining the process of data enhancement and mapping have been as valuable as the data itself.

9.2.5. While Phase I has produced a more comprehensive record of the surface archaeological landscape (objective 1 of the Thames area-wide project, see paragraph 1.1.4. (1) above), the need for further information relating to buried archaeological landscapes has been reinforced. Firstly, a project is proposed to develop a deposit model for the North Kent Coast, addressing the possible extent of surviving palaeo-environmental deposits and land surfaces. Secondly, a project is proposed to clarify the extent, correlation and age of Pleistocene terraces and deposits on the North Kent Coast. Thirdly, a project is proposed on the history of coastal land use and reclamation. In all three cases, Planarch will provide an essential forum for sourcing

data and discussing approaches, as the processes and deposits evident on the North Kent Coast are part of a sequence extending throughout the Planarch area. Accordingly, all three projects would add considerably to the scope for predictive modelling of archaeological potential throughout the Southern North Sea Basin, and thus be of direct assistance to spatial planning in all the partner bodies. The experience of Continental colleagues in alluvial/estuarine environments will also make a positive contribution to the Thames area. Such potential benefits make it important generally to develop links between other projects relating to the natural and historic environment of the Southern North Sea Basin.

9.2.6. This project has addressed the second objective of the Thames area-wide project – which is to understand the impact of erosion and other natural pressures (see paragraph 1.1.4.(2) above) – through the systematic assessment of each stretch of the North Kent Coast in terms of apparent historic shoreline change, shoreline management, and erosion. As noted above the system developed in the course of this project provides a basic framework that can be considered by other Planarch partners.

9.2.7. Phase I has helped to address the third objective of the Thames area-wide project (see paragraph 1.1.4.(3) above) by developing, and addressing critically, desk-based methodologies for rapid and accurate identification of the archaeological resource. Further work is necessary to integrate these methodologies with field surveys.

9.2.8. A key part of the Planarch project is the exchange of best practice between the partners, who have a rich variety of experience and expertise. A presentation on on the Thames area-wide project was made to the partners at a Planarch Seminar in November 2000 in Mons, and it is hoped that there will be further dialogue as work on the Thames is taken forward.

9.2.9. Finally, the project has again demonstrated how GIS can be used to generate thematic maps of the distribution of archaeological material across the whole Survey Area. This capability is important to archaeological research, to predictive modelling, and to the overall integration of the historic environment through spatial planning and more generally. The project has provided critical feedback on the quality and structure of archaeological data required, and on how the data is best manipulated and displayed.

9.2.10. The Planarch framework presents the opportunity, building on the datasets of the various partners, to extend such spatial analysis to the entire Southern North Sea Basin. In particular, the Planarch partners very much wish to address, for example, the maritime cultural landscapes that have bound the region together through the millennia. Planarch provides a forum that is unique in overcoming administrative divisions, enabling archaeologists and planners to regard the Southern North Sea as a bond, not a barrier.

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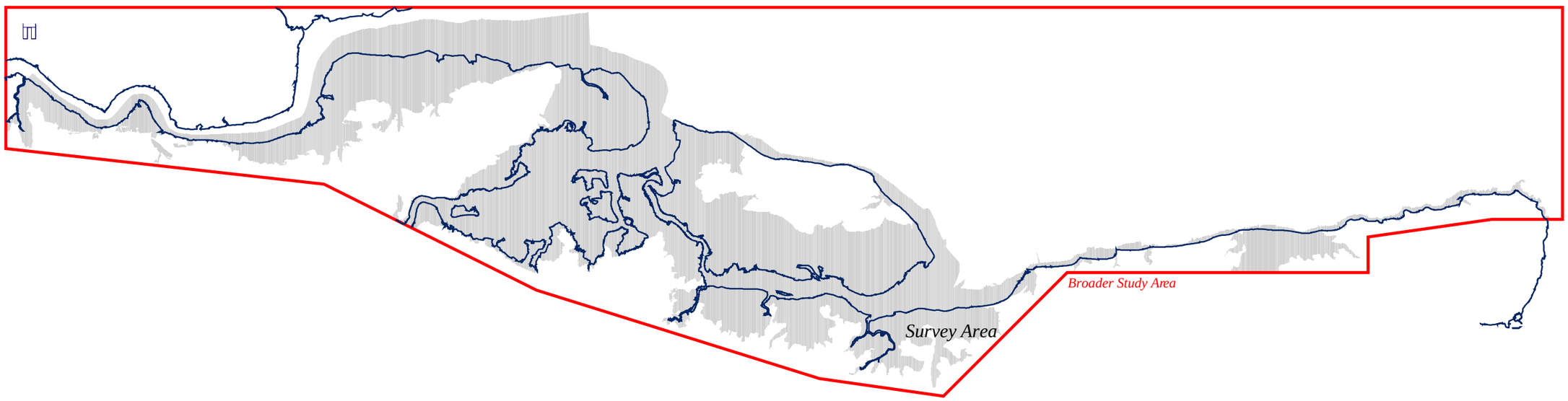
Study and Survey Areas



Stretches

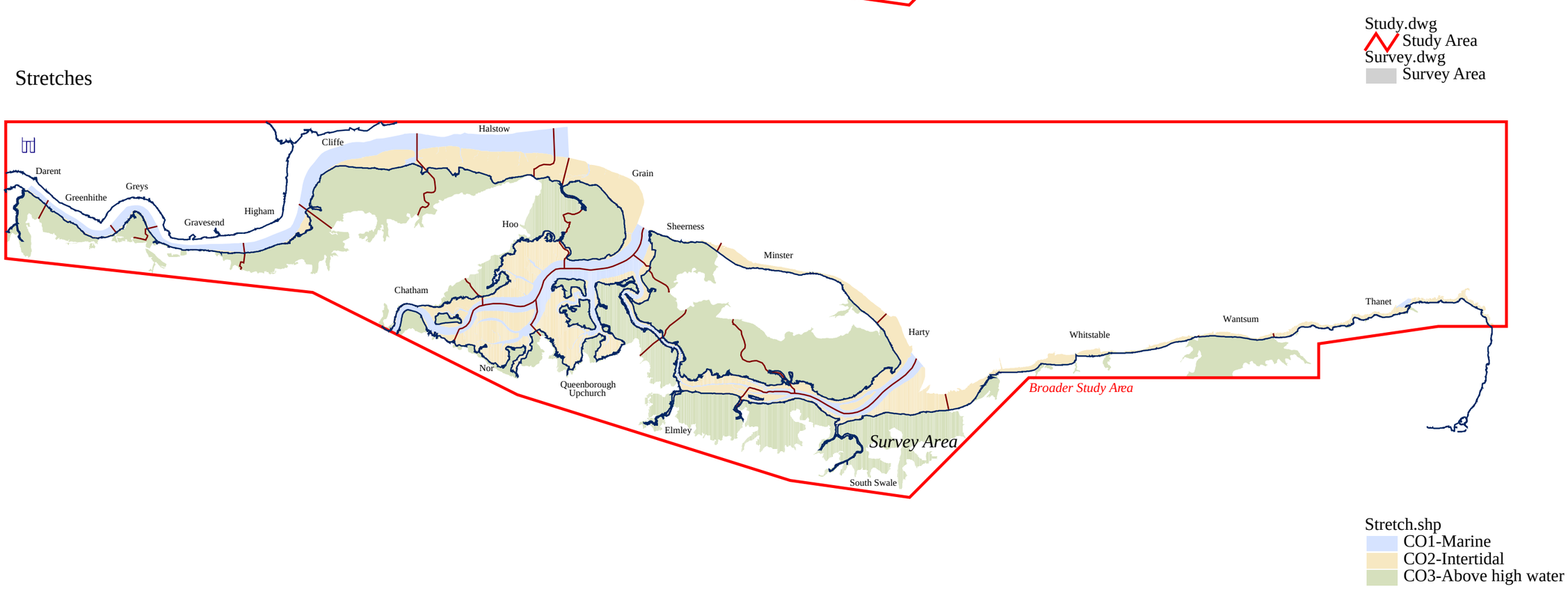
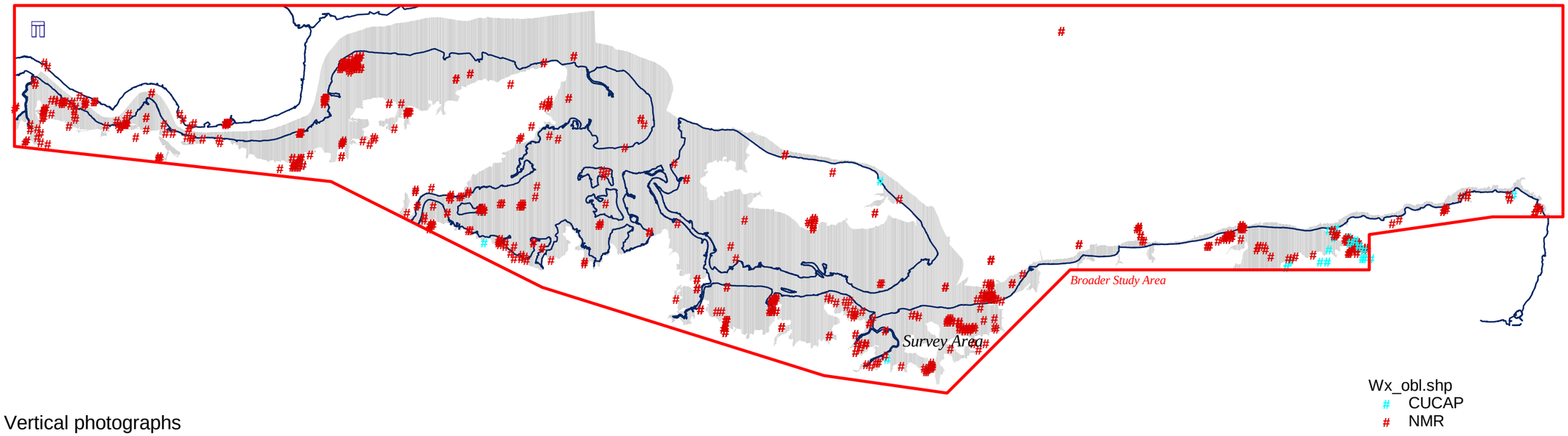


Figure 1

Oblique photographs



Vertical photographs

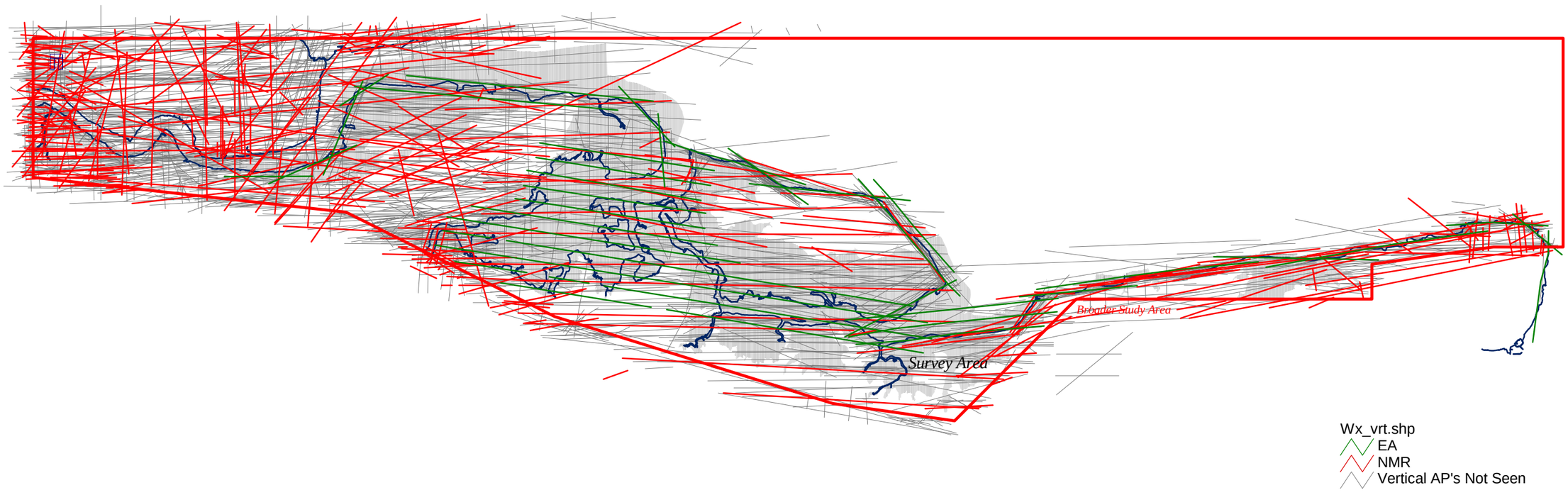


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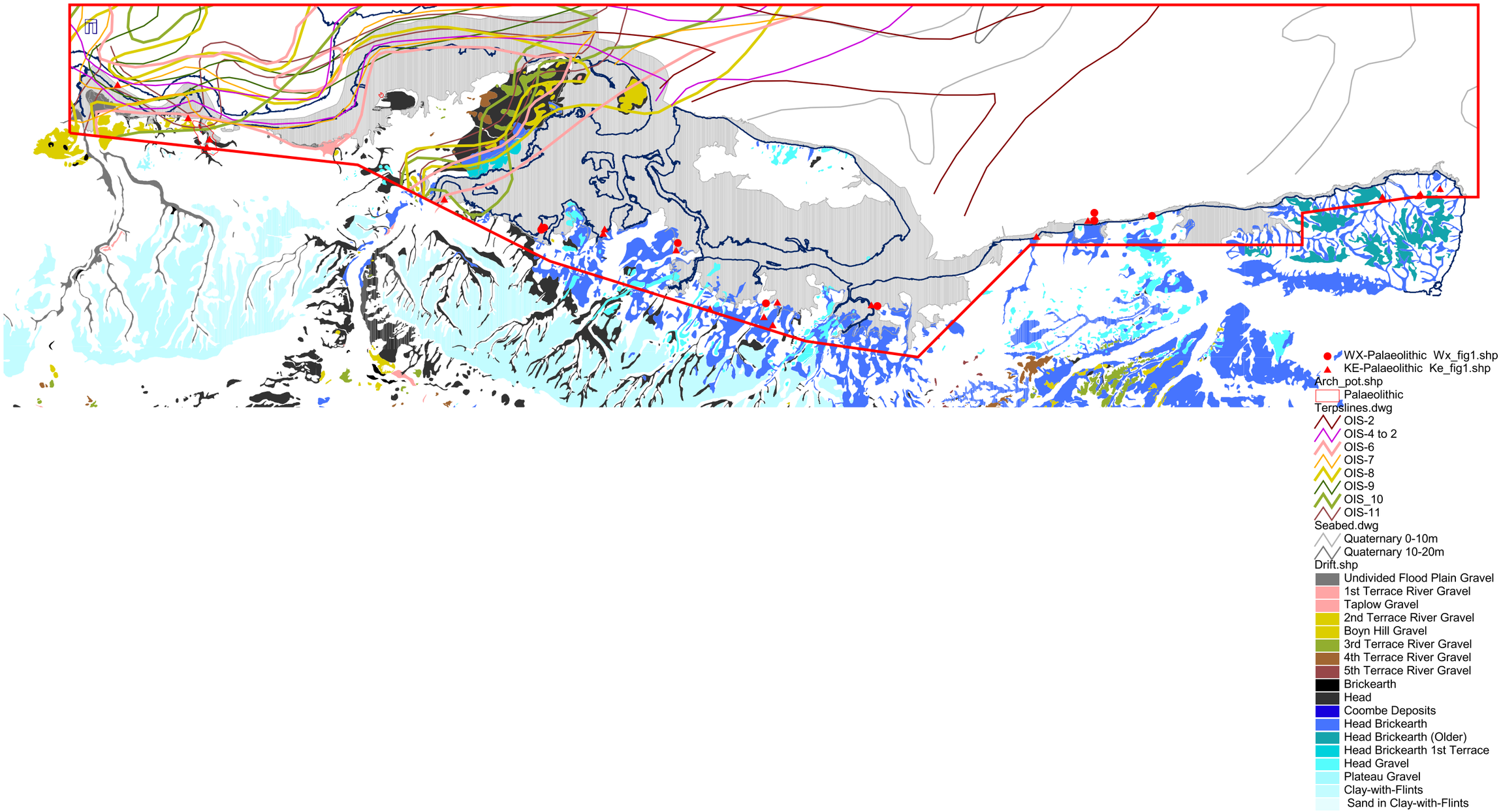
Figure 2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KE-Palaeolithic Ke_fig1.shp
Arch_pot.shp
Palaeolithic
Terpslines.dwg
OIS-2
OIS-4 to 2
OIS-6
OIS-7
OIS-8
OIS-9
OIS_10
OIS-11
Seabed.dwg
Quaternary 0-10m
Quaternary 10-20m
Drift.shp
Undivided Flood Plain Gravel
1st Terrace River Gravel
Taplow Gravel
2nd Terrace River Gravel
Boyn Hill Gravel
3rd Terrace River Gravel
4th Terrace River Gravel
5th Terrace River Gravel
Brickearth
Head
Coombe Deposits
Head Brickearth
Head Brickearth (Older)
Head Brickearth 1st Terrace
Head Gravel
Plateau Gravel
Clay-with-Flints
Sand in Clay-with-Flints
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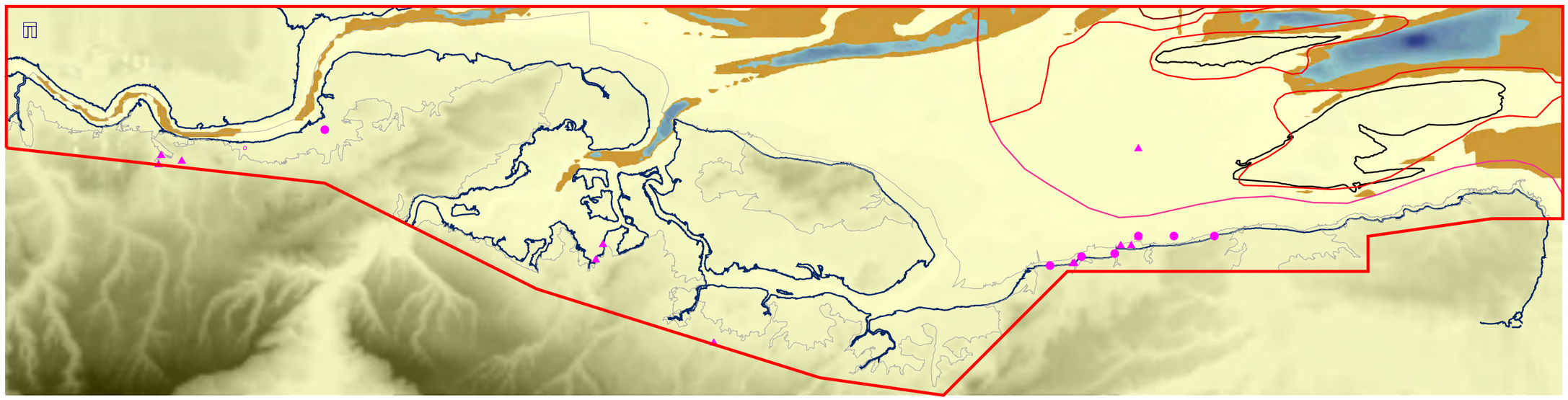
Figure 3

Holocene Palaeo-environment: Early Mesolithic (Tilbury I)



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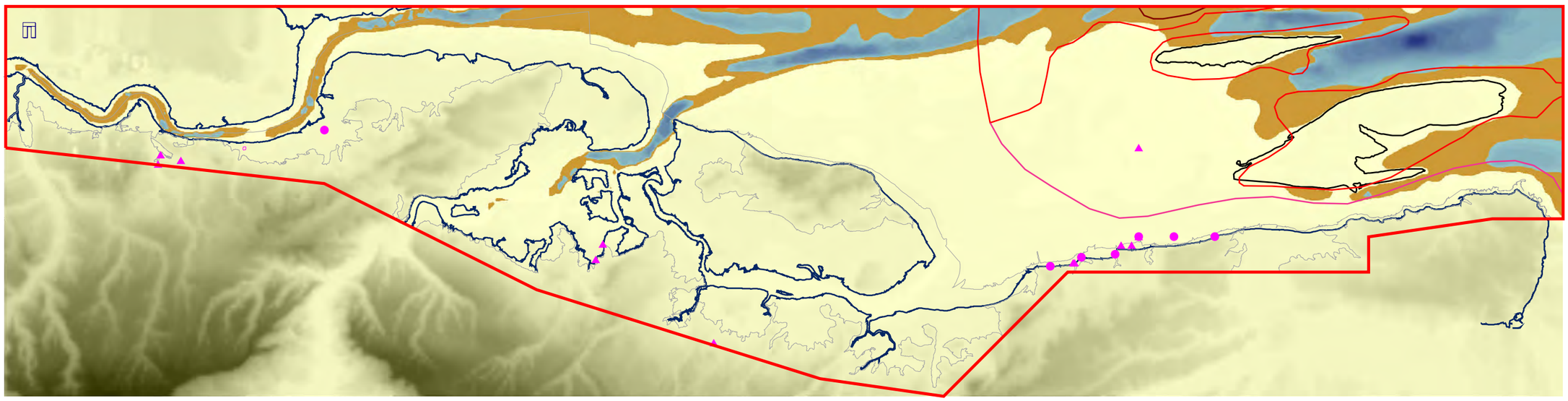
KE-Mesolithic Kefig2&3.shp
Arch_pot.shp
Mesolithic
Seabed.dwg
Holocene 0-1m
Holocene 1-10m
Holocene 10-20m
Sandbanks.dwg
Sandbanks

0 5 10 Kilometres

Figure 4

Holocene Palaeo-environment: Late Mesolithic (Tilbury II)



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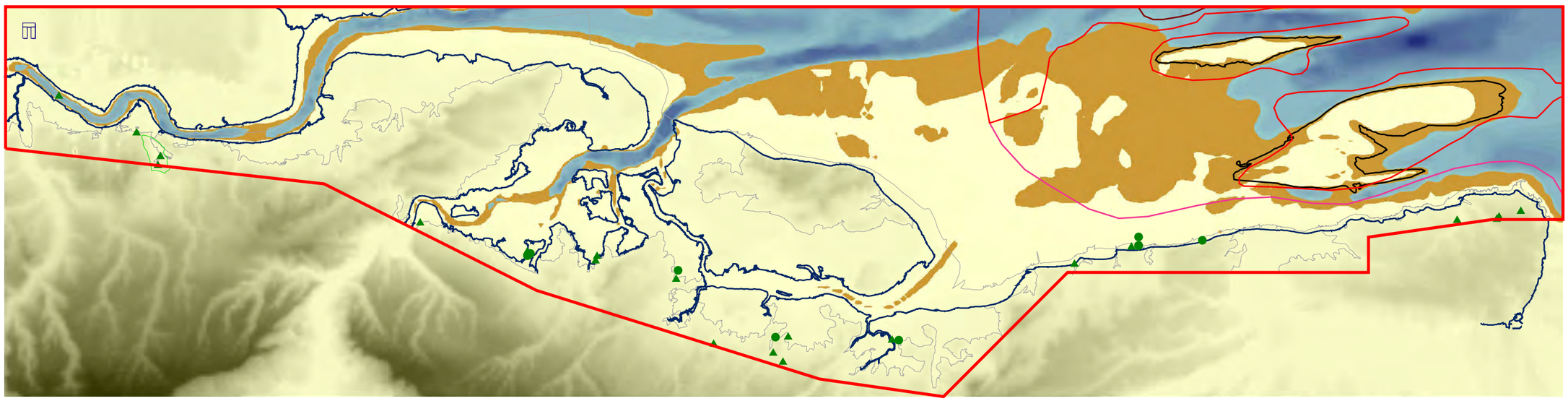
KE-Mesolithic Kefig2&3.shp
Arch_pot.shp
Mesolithic
Seabed.dwg
Holocene 0-1m
Holocene 1-10m
Holocene 10-20m
Sandbanks.dwg
Sandbanks

0 5 10 Kilometres

Figure 5

Holocene Palaeo-environement: Neolithic (Tilbury III)



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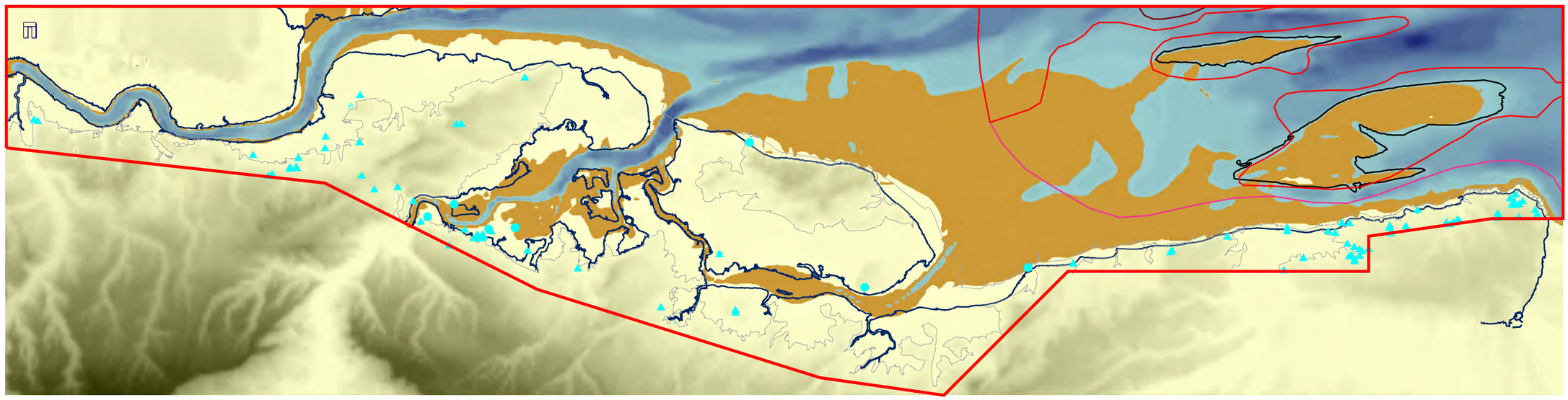
KE-Neolithic Ke_fig4.shp
Arch_pot.shp
Neolithic
Seabed.dwg
Holocene 0-1m
Holocene 1-10m
Holocene 10-20m
Sandbanks.dwg
Sandbanks

0 5 10 Kilometres

Figure 6

Holocene Palaeo-environmental: Bronze Age (Tilbury IV)



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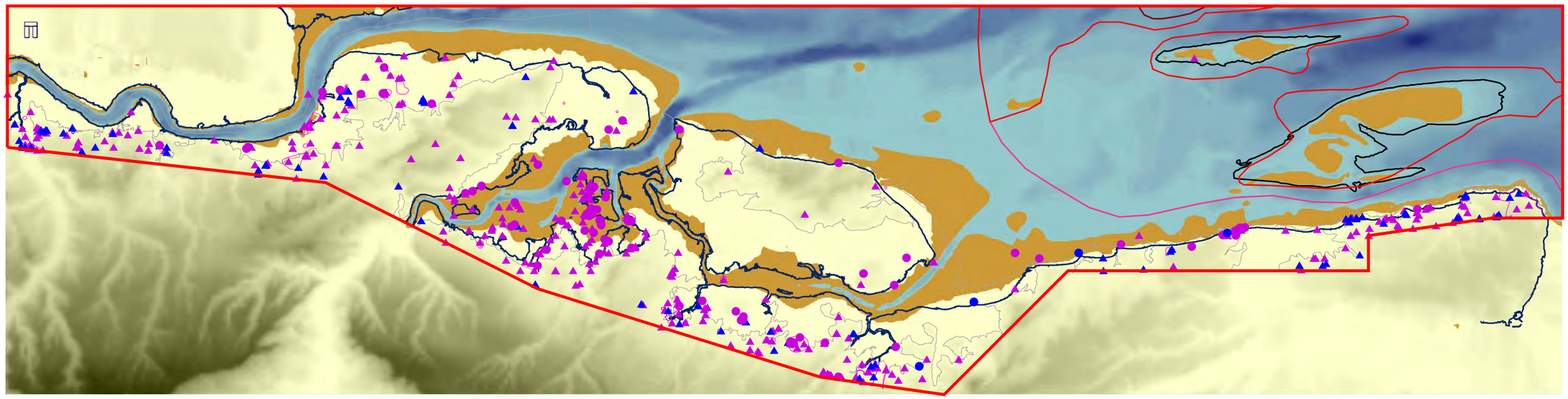
KE-Bronze Age Ke_fig5.shp
Arch_pot.shp
Bronze Age
Seabed.dwg
Holocene 0-1m
Holocene 1-10m
Holocene 10-20m
Sandbanks.dwg
Sandbanks

0 5 10 Kilometres

Figure 7

Holocene Palaeo-environmental: Iron Age/Roman (Tilbury V)



WX-Iron Age Wfig6ia.shp
WX-Roman Wfig6r.shp
KE-Iron Age Kfig6ia.shp
KE-Roman Kfig6r.shp
Arch_pot.shp
Iron Age
Roman
Seabed.dwg
Holocene 0-1m
Holocene 1-10m
Holocene 10-20m
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Sandbanks

0 5 10 Kilometres

Figure 8

Maritime Archaeology

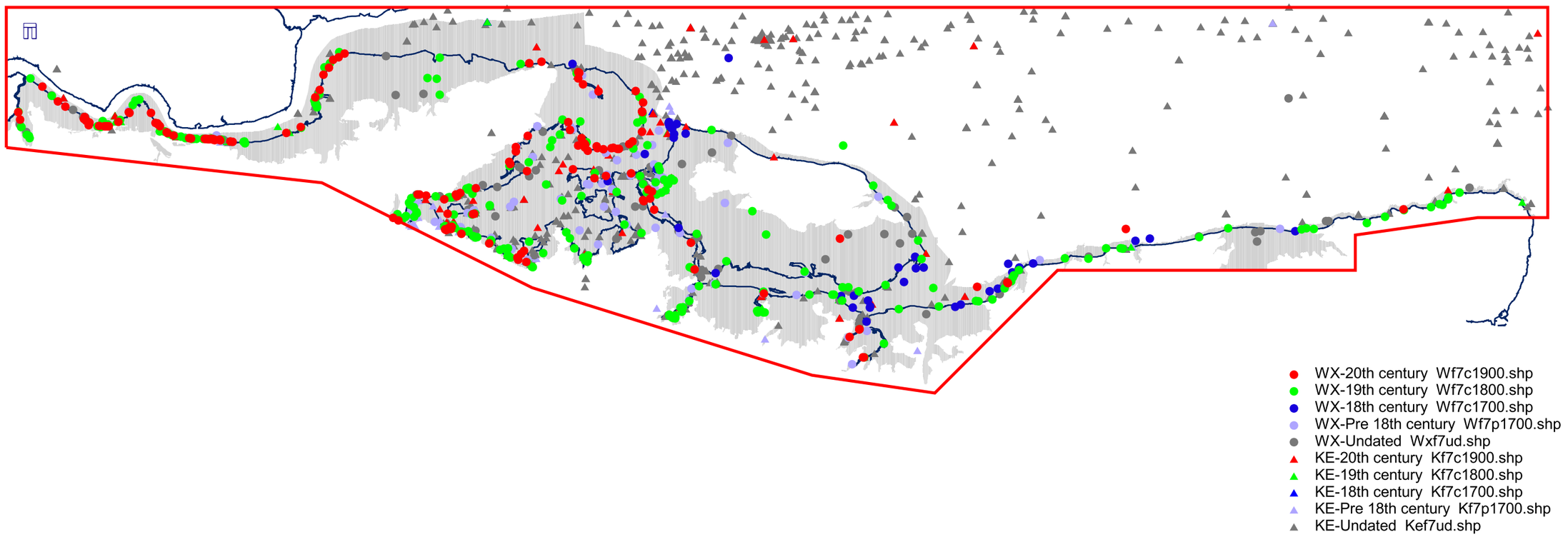

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Figure 9

Intertidal and Related Archaeology

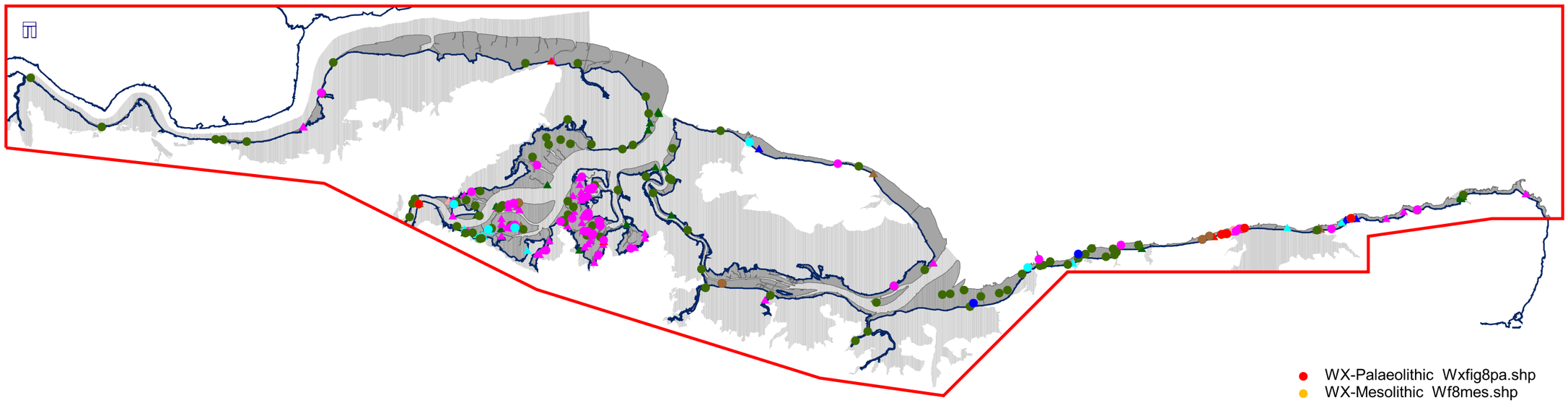

Figure 10

Sea Wall and Flood Defences

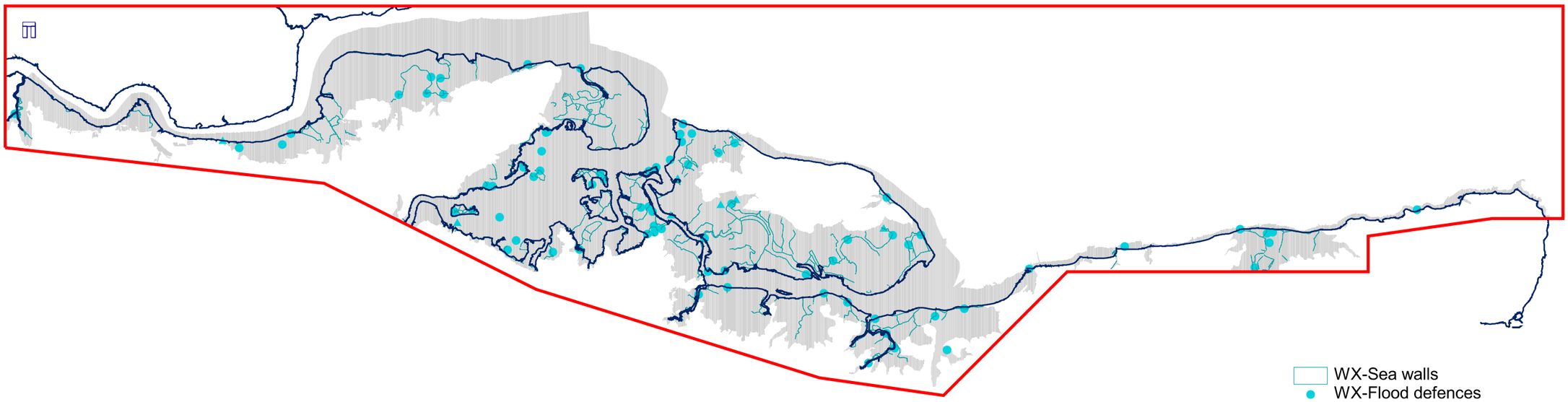

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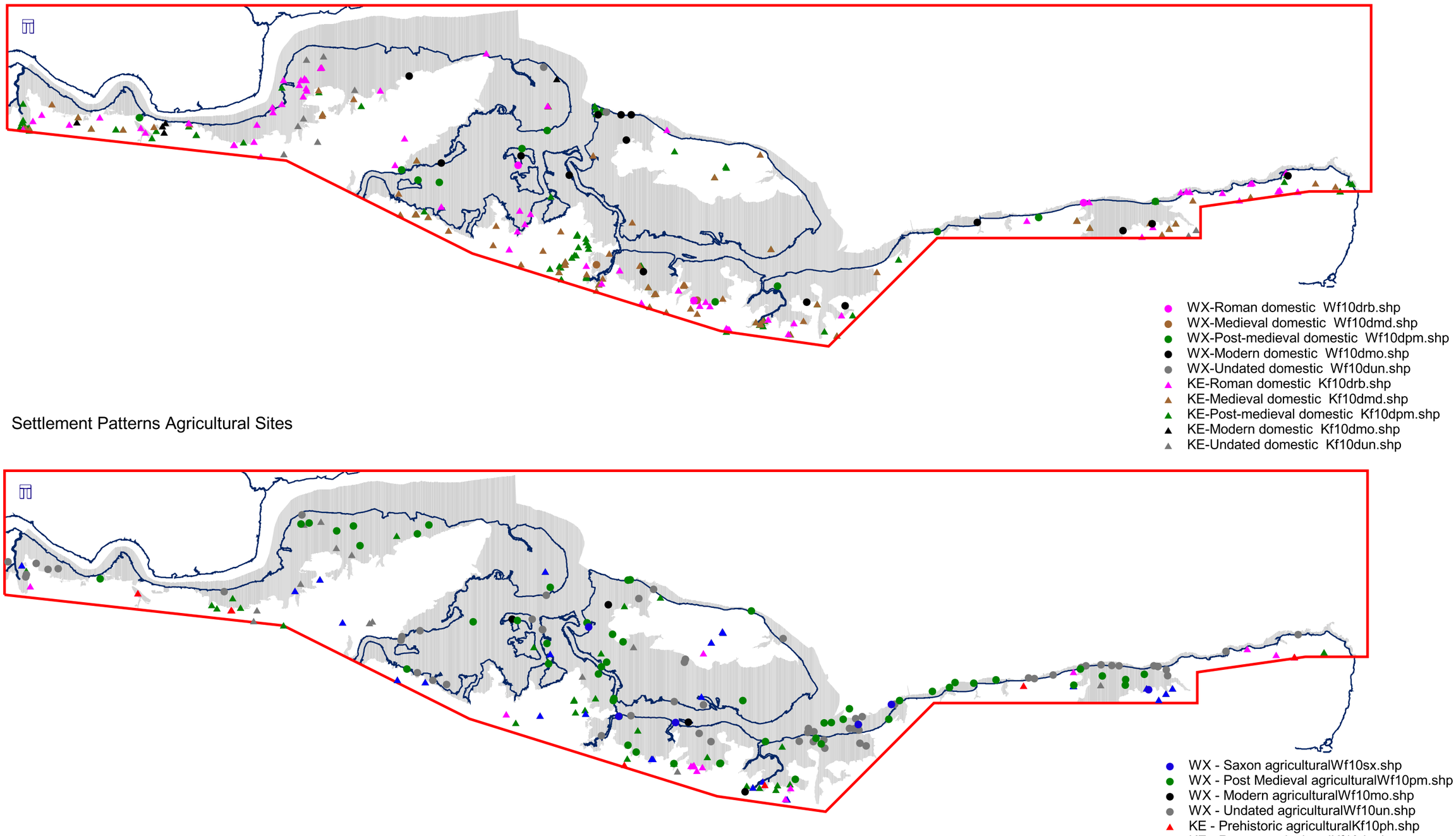
Figure 11

Settlement Patterns Domestic Sites



Settlement Patterns Agricultural Sites

Figure 12

Historic Built Environment

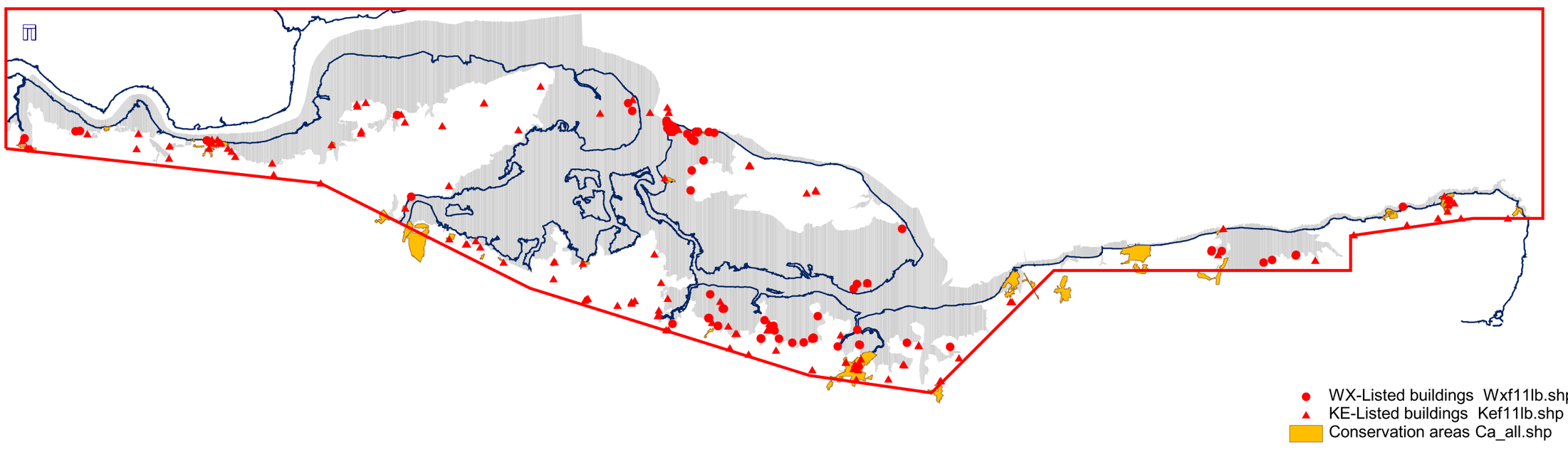


Figure 13

Historic Defences and Other Military Installations

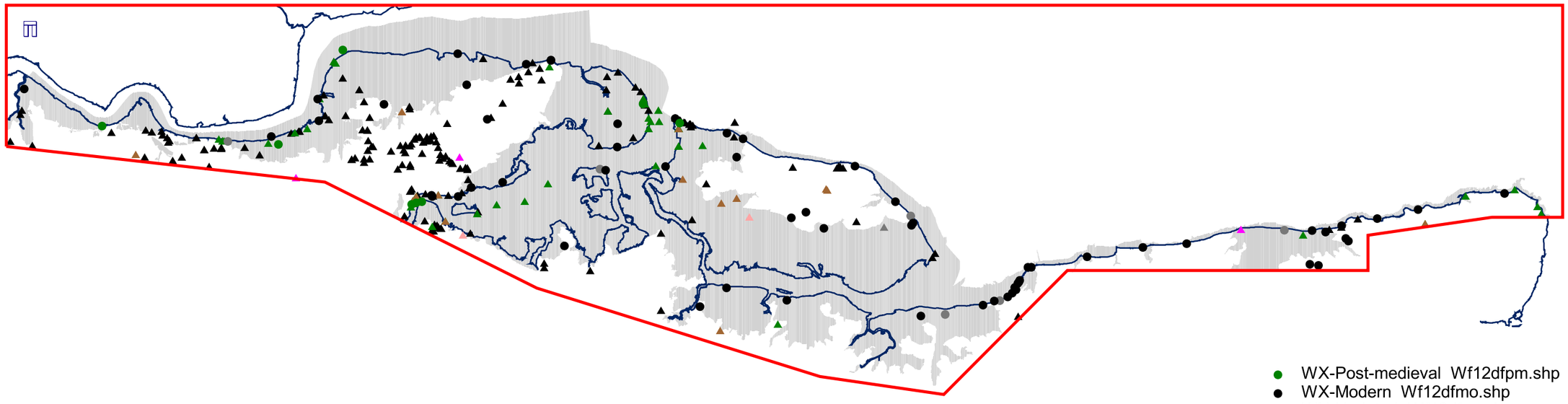


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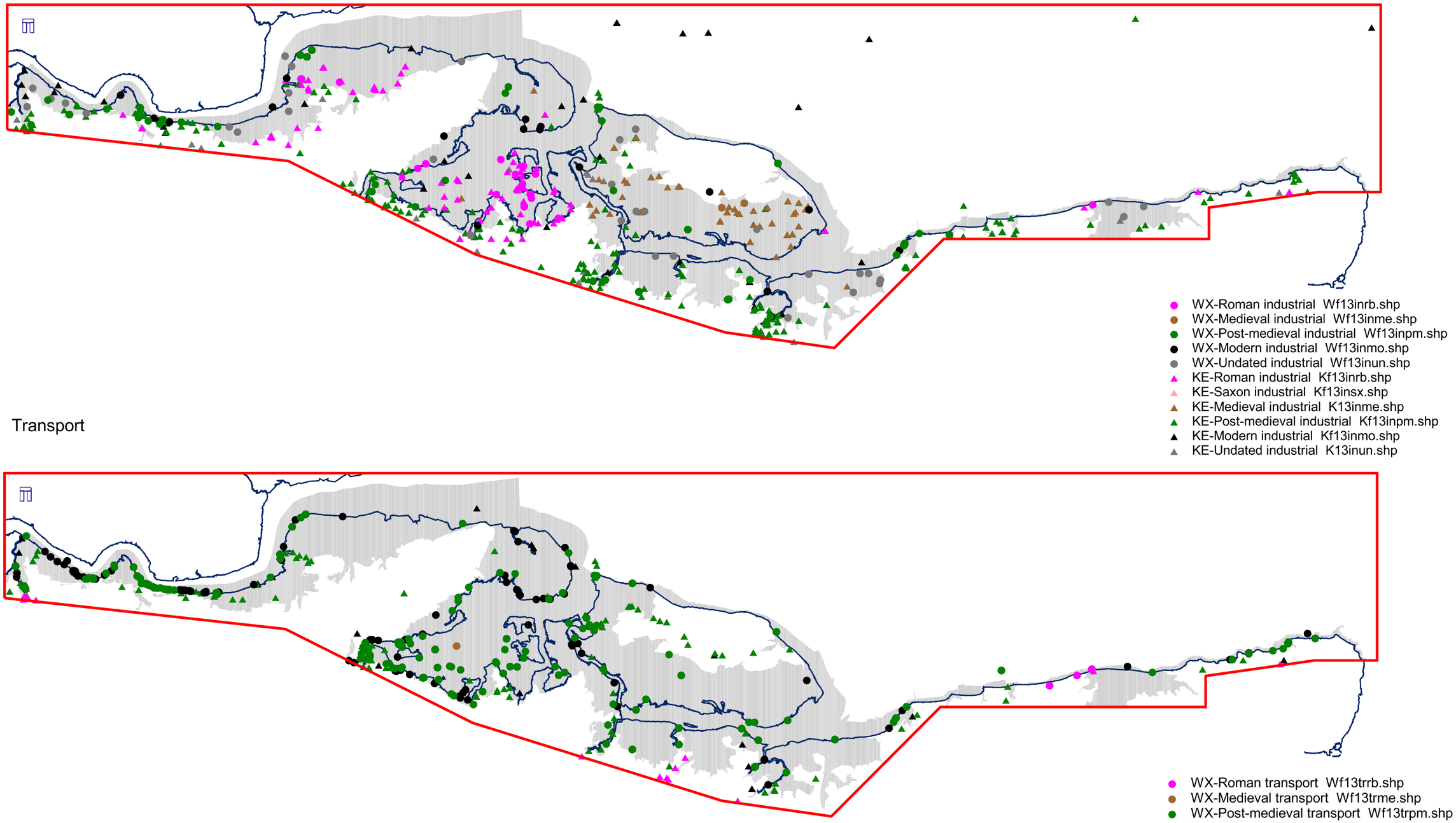
Figure 14

Industrial Sites



Transport

0 5 10 Kilometres

Figure 15

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