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Appendix 26.2
Stage 1 Geoarchaeological Review of 2024 Offshore Geotechnical Data

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Summary

Wessex Archaeology (WA) have been commissioned by Collaborative Environmental Advisers (CEA) (the 'Client'), on behalf of National Grid Lion Link Limited (NGLLL) ('the Applicant'), to undertake a Stage 1 geoarchaeological review of geotechnical logs. The vibrocores were acquired during a geotechnical survey undertaken in 2024 from within the Proposed Offshore Scheme, defined as the part of the LionLink Project (hereafter referred to as the 'Project') within the British jurisdiction. The Proposed Offshore Scheme will route from the proposed Landfall across the southern North Sea to the boundary between the UK and Netherlands Exclusive Economic Zone (EEZ).

A total of 224 vibrocore logs were reviewed as part of the Stage 1 works, with the aim of identifying deposits of potential geoarchaeological interest with recommendations made for further geoarchaeological work (i.e. Stage 2 geoarchaeological recording) if necessary.

The results from the geotechnical vibrocores acquired across the Proposed Offshore Scheme illustrate a Quaternary sequence broadly consistent with the geological history of the southern North Sea as mapped by the British Geological Survey. These deposits collectively comprise a sequence of Pleistocene sediments characteristic of the Yarmouth Roads Formation, the Eem Formation, and the Lower and Upper Brown Bank Formations, overlain by units not assigned to any known geological formation, including fluvial sands and gravels and alluvial sands, peat, organic interbedded sands and head. The Quaternary sequence is generally capped by modern seabed sediments.

Unit 4a (the Upper Brown Bank Formation), Unit 7 (Head) and Unit 8 (Seabed Sediments) were considered to have low archaeological and/or geoarchaeological potential and were collectively assigned a low priority status.

The oldest sediments recovered in vibrocores (Unit 1) comprise silty, occasionally gravelly sands with thin beds of stiff clay, interpreted as Lower to Middle Pleistocene deposits of the Yarmouth Roads Formation (>MIS 13). The frequency of shell in most of these deposits suggests that deposition occurred in a marine environment. However, in the nearshore area off the proposed Landfall possible fluvial to alluvial shell-free sediments were recorded. Most importantly, the grey sands in VC_006 contain beds of reworked peat. These deposits are lithologically similar to, and may be broadly contemporary with, an archaeologically significant Early Middle Pleistocene sequence of the Cromer Forest-bed Formation (CF-bF) beneath Anglian (MIS 13) Till at Happisburgh. The shelly sands typically associated with the Yarmouth Roads Formation are assigned a low priority status. However, the well-sorted fine sands in the nearshore may represent channel fill deposits and are assigned a medium priority status.

A number of vibrocores located toward the offshore extent of the Proposed Offshore Scheme containing shelly brown dense sands have been interpreted as the Eem Formation (Unit 2), reflecting deposition in a fully marine environment during the Ipswichian interglacial (MIS 5e); these are assigned a low priority status. Overlying these dense sands is a blanket deposit of organic silts and sands which may immediately post-date MIS 5e, representing the initial fall and stabilisation of the landscape following marine regression. Alternatively, these deposits could be contemporary with the Upper Brown Bank Formation and represent the margin of the associated lagoonal/shallow water feature.

Unit 3 comprises greenish grey fine to coarse occasionally gravelly sands with faint laminations and represents the Lower Brown Bank dating to MIS 5e-3. This unit corresponds to marine regression following the last interglacial highstand with deposits representing deposition in either an intertidal or shallow marine environment. The archaeological and/or geoarchaeological potential of these

deposits is unclear but may reflect intertidal conditions, and thus has been assigned a medium priority status.

Unit 4b is recorded as stratigraphically overlying the clays and silts of the Upper Brown Bank Formation (Unit 4a) and is interpreted as estuarine to intertidal sediments characterised as slightly gravelly fine to coarse sands with shell fragments and laminae to thin beds of silt and clay. In VC_056, thinly interbedded organic shelly sands were recorded overlying Upper Brown Bank deposits, which could mark a possible margin of the shallow lagoon/embayment with organic bedding suggesting that stable conditions enabled the development of a vegetated landscape. The archaeological and/or geoarchaeological potential of Unit 4b remains unclear, however has been assigned a medium priority status.

Unit 5 comprises strong orange-brown gravelly sands and sandy gravels, and often laminated fine to coarse sands, interpreted as high-energy fluvial to low-energy alluvial deposition, respectively. The age of these fluvially-derived sediments is unclear; however, they typically overlay grey sands of the Yarmouth Roads Formation, which predate the Anglian Glaciation (MIS 12). Correlation to river terrace deposits onshore is not currently possible, however these fluvial sediments offshore may be related to the offshore continuation of the palaeo-Bytham. This unit is assigned a medium priority status.

Unit 6a is characterised as dark brown peat and was identified in two vibrocores located in the nearshore (VC_005 and VC_128). The absolute age of these peats is uncertain; however, equivalent organic deposits have been recovered in the nearshore area off Walberswick which are suggested to compare to the peat deposits at Southwold town marshes, radiocarbon dated to between 6755–6510 BP and 4575–4300 BP (Late Mesolithic-Early Bronze Age).

Peat in the nearshore is overlain by very organic interbedded sands, likely indicative of deposition in an estuarine, intertidal or shallow marine environment (Unit 6b). Due to the high organic and bedded nature of the nearshore deposits, they have also been assigned a high priority status. Shell fragments are occasional to frequent in these deposits and the upper surface diffusely grades to modern seabed sediments, which indicates these deposits represent the progressive inundation of the North Sea during the early Holocene. As the organic content is considerably lower than the equivalent nearshore deposits, they have been assigned a medium priority status.

Based on the results of the Stage 1 marine geoarchaeological assessment, recommendations are made for Stage 2 geoarchaeological recording and deposit modelling. A selection of vibrocores containing deposits defined as the Yarmouth Roads Formation (Unit 1), Eem Formation (Unit 2), Unit 4b (?Upper Brown Bank), Fluvial Sands and Gravels/Alluvial Sands (Unit 5), Peat (Unit 6a) and Organic Interbedded (Unit 6b), were recommended for Stage 2 recording to ground-truth interpretations and determine the suitability of deposits for Stage 3 palaeoenvironmental assessment.

Acknowledgements

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The Stage 1 review and report writing was undertaken by Hayley Hawkins. The marine geoarchaeological assessment was managed by Dr Beccy Scott. The figures were produced by Amy Wright. The project was managed on behalf of Wessex Archaeology by Andrea Hamel.

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Stage 1 Geoarchaeological Review of 2024 Offshore Geotechnical Data

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology (WA) have been commissioned by Collaborative Environmental Advisers (CEA) (the 'Client'), on behalf of National Grid Lion Link Limited (NGLLL) ('the Applicant'), to undertake a Stage 1 geoarchaeological review of geotechnical logs. The vibrocores were acquired during an initial geotechnical survey undertaken in 2024 from within the Proposed Offshore Scheme, defined as the marine elements of the LionLink Project (hereafter referred to as the 'Project') within the British jurisdiction. The Proposed Offshore Scheme will route from the proposed Landfall across the southern North Sea to the boundary between the UK and Netherlands Exclusive Economic Zone (EEZ) (**Figure 1**).

1.1.2 The Project is a proposed electricity interconnector between Great Britain and the Netherlands that will supply up to 2 gigawatts (GW) of electricity and will connect to Dutch offshore wind via an offshore converter platform in Dutch waters. The Project will play an important role in reducing the UK's reliance on fossil fuels and supporting the UK government's objectives to create a secure, reliable, and affordable energy supply for UK households.

1.1.3 The Proposed Scheme would involve the construction of a converter station and the installation of offshore and onshore underground high voltage direct current cables (HVDC) to the onshore converter station and underground high voltage alternating current cables (HVAC) between the converter station and the proposed Friston substation.

1.1.4 This Stage 1 report will focus on the area defined as the Proposed Offshore Scheme, covering from Mean High Water Springs (MHWS) to the GB/NL EEZ boundary.

1.2 Scope of works

1.2.1 To help frame geoarchaeological investigations of this nature, WA has developed a five-stage approach, encompassing different levels of investigation appropriate to the results obtained, accompanied by formal reporting of the results. This staged approach has been developed following Historic England's guidance document 'Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (Historic England 2015). The stages are summarised below (**Table 1**).

1.2.2 This report outlines the results of a Stage 1 review of geotechnical logs acquired during a survey undertaken in 2024. Previous geoarchaeological assessments undertaken in the study area offshore (Norfolk Vanguard and Norfolk Boreas Offshore Wind Farms; WA 2019a; 2019b) highlighted the potential for deposits of archaeological interest to be present within the Proposed Offshore Scheme. To further understand the spatial distribution of these deposits, and to assess if any other deposits of archaeological interest were present within the offshore and nearshore areas, a Stage 1 review was undertaken, as detailed in

Table 1, with recommendations made for further geoarchaeological work if deemed necessary.

Table 1 Staged approach to geoarchaeological investigations

Stage	Description
Stage 1: Geoarchaeological review	Desk-based review of geotechnical and geological data. Establish likely presence/ absence/ distribution of archaeologically relevant deposits. Identify deposits or samples for Stage 2 works.
Stage 2: Geoarchaeological recording/monitoring	Target deposits or samples identified in Stage 1. Describe the sequences recovered and undertake deposit modelling (if suitable). Interpret depositional environment (if possible). Identify if suitable deposits are present for Stage 3 works.
Stage 3: Palaeoenvironmental assessment	Sub-sample deposits of archaeological interest for paleoenvironmental assessment (e.g. pollen, plant macrofossils, foraminifera, ostracod and diatoms) and associated scientific dating. Provide an outline interpretation of the archaeological and palaeoenvironmental context. Any recommendations for Stage 4 works will depend on the potential for further analysis and the project research objectives.
Stage 4: Palaeoenvironmental analysis	Full analysis of samples and additional scientific dating as specified in Stage 3, together with a detailed synthesis of the results, in their local, regional or wider archaeological and palaeoenvironmental context. Publication would usually follow from a Stage 4 report.
Stage 5: Publication	Publication of the results of Stage 1-4 works for submission in a peer reviewed journal, book or monograph, depending on the archaeological significance of the work. The scope and location of the final publication will be agreed in consultation with the client and regulatory bodies where appropriate.

2 GEOARCHAEOLOGICAL BACKGROUND

2.1 Introduction

2.1.1 Geoarchaeological assessments are typically undertaken with reference to geological periods (e.g. Quaternary), epochs (e.g. Pleistocene) and sub-epochs (e.g. Devensian) that reflect major climate sea-level and/or environmental changes. Here we adopt British nomenclature correlated to the Marine Isotope Stage (MIS) record to distinguish between different climatic periods, with dates given in Kya (thousands of years before present). Marine Isotope Stages are deduced from marine palaeoclimatic records and reflect alternating warm (interglacial) and cold (glacial) periods throughout the Quaternary. Some Marine Isotope Stages can be subdivided into sub-stages reflecting relatively warmer (interstadial) or Cool (stadial) periods within a single stage.

2.2 Geological baseline

2.2.1 The Proposed Offshore Scheme is located in an area characterised by Pleistocene and Holocene sediments (Cameron et al. 1992), comprising clays, silts, sands and gravels with

occasional organic-rich deposits (peats), overlain by recent, unconsolidated marine shelly sands.

2.2.2 The Pleistocene geological history of the North Sea basin is dominated by repeated glacial/interglacial cycles, resulting in rising and falling sea levels (**Figure 2**) and deposition of terrestrial, marine and glacially-derived sediments. The Project area, and the southern North Sea in general, is known to contain an important sedimentary archive including material dating from the earliest occupation of northwestern Europe (Parfitt et al. 2010) up to more recent post-glacial reoccupation of Britain (Waddington 2015).

2.2.3 Only one glacial episode is thought to have directly affected the area. This was during the Anglian period (MIS 12, 480–423 Kya) when ice extended into the southernmost North Sea. During subsequent glacial episodes, ice sheets terminated further north so did not directly affect the region. However, indirect affects resulting from changing sea levels and cold periglacial conditions will have influenced landscape evolution in the region. The exact southern extent of the Anglian glaciation is debatable. However, bathymetric data suggests part of the Anglian ice sheet may have extended as far south as offshore from Felixstowe (Emu 2009), and Dix and Sturt (2011) argue for an Anglian glacial origin for over-deepened valleys (tunnel valleys) identified within the Outer Thames estuary.

2.2.4 East Anglia and Suffolk, and areas immediately offshore, are currently thought to have experienced only one glacial advance during the Pleistocene. Palaeolandscape features from periods of low relative sea level are therefore more likely to be preserved here than further north (approximately north of the north Norfolk coast), where they have been impacted on during the subsequent Saalian (MIS 10-6) and Devensian (MIS 5d-2) glacial advances. Some surviving Pleistocene deposits may have been reworked or redeposited to a certain extent during subsequent marine transgressions (Cameron et al. 1992), but there is potential for them to survive on the seabed.

2.2.5 The oldest deposits likely to be encountered across the Proposed Offshore Scheme belong to the Westkapelle Ground Formation, which are located near to the present-day Norfolk coast and have been mapped extending up to 20 km offshore. The Westkapelle Formation is Praetiglian and Tiglian in age (2.3–1.6 Ma) and therefore predates the earliest known occupation of Britain. This formation represents deposition in a pro-delta setting (Cameron et al. 1992).

2.2.6 The earliest deposits of archaeological interest belong to the Yarmouth Roads Formation which are non-marine sands with clay beds laid down in a fluvial to intertidal (deltaic) setting during the early Pleistocene prior to the Anglian glaciation (MIS 12). Yarmouth Roads Formation is thought to contain units that are broadly contemporary with terrestrial deposits belonging to the CF-bF recorded on the foreshore at Pakefield, approximately 14.08 km north north-east of the proposed Landfall at Walberswick, Suffolk. The CF-bF deposits are associated with internationally significant Lower Palaeolithic archaeology dated to around 700 Kya, and palaeoenvironmental evidence (Parfitt et al. 2005, Parfitt 2008).

2.2.7 Based on British Geological Survey (BGS) mapping, the Proposed Offshore Scheme transects a large area associated with a geological formation defined as the Brown Bank Formation. The Brown Bank Formation includes deposits of silty sand, sandy silt and sandy silty clay, which is in places up to 20 m thick. The sandy silty clay deposits are here termed the Upper Brown Bank, to distinguish them from the underlying deposits of shelly silty sand and sandy silt that characterise both the Lower Brown Bank (Early Devensian) and underlying Eem Formation (Ipswichian Interglacial) (Limpenny et al. 2011; Bicket and

Tizzard 2015). However, geotechnical and geophysical data has highlighted the presence of additional phases of deposition associated with the Brown Bank Formation (Waajen et al. 2024).

2.2.8 The Brown Bank Formation is present as a blanket deposit and has traditionally been interpreted to represent a shallow lagoon environment, comprising clayey silty sands (Cameron et al.1992; Limpenny et al. 2011) although more recently studies have shown that the upper sequence largely comprises clayey silt (Eaton et al. 2020; Wessex Archaeology 2018a) with channel-like features present to the west (Bicket and Tizzard 2015; Limpenny et al. 2011).

2.2.9 The Brown Bank Formation has been previously dated using optically stimulated luminescence (OSL) dating (Limpenny et al. 2011; Tizzard et al. 2014; 2015; WA 2019a; 2019b) and ages fell into two broad ranges: MIS 3 and MIS 5d-5c. Based on this evidence, it is not clear if Brown Bank Formation was deposited over the duration of the early Devensian, or if deposition was more episodic punctuated by periods of hiatus and subaerial exposure (Tizzard et al. 2015). The date of the Brown Bank Formation therefore has significant implications both for our understanding of the palaeogeographic development of the North Sea, when connections would have allowed access to Britain, as well as the nature and significance of any archaeology, if preserved. As the Proposed Offshore Scheme transects the mapped extent of the Brown Bank, it presents an opportunity to identify possible margins of this extensive shallow water feature which may have been hotspots for human occupation.

2.2.10 In places across the southern North Sea, sequences of early Holocene deposits are mapped overlying Pleistocene sediments. The Holocene sediments include organic-rich peats along with more minerogenic fluvial and alluvial sediments, most often infilling channels (Limpenny et al. 2011; Tappin et al. 2011; Tizzard et al. 2015; Gearey et al. 2017; Brown et al. 2018), but also preserved on the Brown Bank Formation or overlying periglacial aeolian sediment. The peats are of high geoarchaeological potential, preserving a range of palaeoenvironmental remains and material suitable for radiocarbon dating.

2.2.11 Pleistocene and early Holocene sediments are capped by post-transgression marine sands. The progressive inundation of the North Sea occurred over an extended time scale, with particularly rapid sea-level rise during the early Holocene (11.5-7 Kya), and with fully marine conditions occurring by around 6 Kya (Sturt et al. 2013). However, limitations in the availability of reliable sea-level index-points (Hazell 2008), combined with uncertainty around the glacio-isostatic response of the southern North Sea, make it difficult to accurately reconstruct sea-level history and the timing of inundation across the Proposed Offshore Scheme.

2.3 Archaeological baseline

2.3.1 The southern North Sea off the east coast of East Anglia and Suffolk is known to contain well preserved palaeolandscape features such as fluvial channels that formed during periods of lower sea level when the southern North Sea was free of ice. The archaeological remains of these terrestrial landscapes are frequently recovered by dredging and fishing activities in numerous areas around the southern North Sea, generally in the form of the remains of extinct megafauna (e.g. woolly mammoths, woolly rhinoceros, bison, horse, lion and hyena).

2.3.2 The discovery of actual human artefacts, such as stone tools and worked bone is a rarer occurrence, but artefacts have been recovered (e.g. Hublin et al. 2009). Reported finds from offshore activity has, to date, produced a range of lithic artefacts indicating early prehistoric activity in submerged palaeolandscapes from Lower, Middle, and Upper Palaeolithic periods (Tizzard et al. 2015).

2.3.3 The earliest records of Lower Palaeolithic archaeology from northern Europe are associated with terrestrial deposits on the margins of the North Sea basin in East Anglia and Suffolk, most notably from Pakefield (Parfitt et al. 2005) and Happisburgh Site 3 (Parfitt et al. 2010). Whilst the archaeology at Pakefield was created during a fully interglacial, more Mediterranean climate, at around MIS 17 (**Figure 2**), the remains at Happisburgh Site 3 are older (MIS 21 or MIS 25) and the environmental evidence is indicative of cool conditions at the edge of the boreal zone (Candy et al. 2011) which implies that these early hominins were capable of surviving in northern Europe in periods not associated with fully interglacial environments (Parfitt et al. 2010). The importance of these sites is international, as they are currently unique at this latitude for this early date.

2.3.4 Cohen et al. (2012) highlighted the North Sea basin as a key region for understanding Pleistocene hominins within a northerly, coastal environment. The east of England, particularly East Anglia, but also the southeast of England, are important regions for later Middle Pleistocene, Lower Palaeolithic archaeology (MIS 13-MIS 9). During this timeframe British archaeology reflects repeated episodes of hominin occupation during temperate interglacial and cool conditions, separated by phases of hominin absence during fully glacial periods.

2.3.5 Archaeological evidence is particularly abundant onshore in Britain during MIS 13 and MIS 11 (**Figure 2**) (Wymer 1999; Pettitt and White 2012), and includes the key Lower Palaeolithic assemblage dating to c. 500 Kya (MIS 13) at Happisburgh 1 (Lewis et al. 2019). During this period, warmer climate conditions meant Britain was again available to be recolonised by hominin communities, after a period of absence during the preceding Anglian glaciation (MIS 12). Lower Palaeolithic archaeological assemblages of this date tend to be characterised by handaxes, although during the earlier part of MIS 11, collections lacking handaxes (termed Clactonian) have been recognised. The foreshore, cliffs and hinterland at Clacton-on Sea (Essex) comprise an important Lower Palaeolithic site which is a designated geological Site of Special Scientific Interest (SSSI). Channel sediments from the area are also an important site for the Lower Palaeolithic Clactonian flint industry and have yielded the earliest wooden tool in the world, a spear, alongside lithic artefacts and bone tools (Parfitt et al. 2022). This archaeology dates from the Hoxnian interglacial period (MIS 11, c. 423 – 380 Kya, **Figure 2**) (Sumbler 1996; Bridgland et al. 1999), and the type site for the Hoxnian (the Hoxne Brick Pit) is located a relatively short distance inland outside of Diss, Suffolk (Ashton et al. 2008).

2.3.6 During the MIS 10 glaciation (**Figure 2**) there appears to have been a hiatus in hominin activity in Britain (Pettitt and White 2012). The post-MIS 10 occupation of Britain is associated with the emergence of the Neanderthals and their associated archaeology and patterns of behaviour. From the later part of MIS 9 the archaeological record attests to the development of Levallois core working strategies (White and Ashton 2003). This is also seen to mark the end of the Lower Palaeolithic and the beginning of the Middle Palaeolithic. The Levallois technique comes to dominate the British archaeological record during the early Middle Palaeolithic (late MIS 8 and MIS 7), with handaxe production occurring infrequently (Scott 2011, Scott and Ashton 2011).

2.3.7 The potential for early Middle Palaeolithic archaeology to be preserved in contexts beneath the North Sea is indicated by the recovery of likely early Middle Palaeolithic lithic artefacts during marine aggregate dredging from licence Area 240 in the Palaeo-Yare catchment. Over 120 artefacts have now been recovered from this locale, some of which are identifiable as Levallois, likely dating to the late Middle Palaeolithic, with many recovered from in situ or minimally disturbed contexts (Tizzard et al. 2014; 2015; Shaw et al. 2024).

2.3.8 Palaeogeographically, Area 240 is one of the most northerly Neanderthal sites in northwest Europe and of primary archaeological importance for defining Middle Palaeolithic potential and the contemporary palaeogeography across the southern North Sea basin (Tizzard et al. 2014). Area 240 is located approximately 16 km north of the Proposed Offshore Scheme and highlights the archaeological potential of preserved Pleistocene fluvial deposits within the southern North Sea.

2.3.9 Currently there is very limited evidence of hominin presence in Britain during the Ipswichian (MIS 5e) or the early Devensian (MIS 5d-a; Wenban-Smith et al. 2010). Within the context of early prehistory and submerged palaeogeography, however, substantial areas of the southern North Sea basin would have been dry land during the warming and cooling limbs of the various sub-stages (MIS 5d to 5a, **Figure 2**) and archaeological sites of this age are relatively abundant in northern France (Locht et al. 2015). Therefore, the potential exists for human activity to have occurred sporadically both within Britain and in any sub-aerially exposed parts of the southern North Sea basin, during the early Devensian.

2.3.10 From late MIS 4 to MIS 3 there is evidence onshore in Britain and offshore in the British and Dutch sectors of the North Sea (Hublin et al. 2009; Shaw et al. 2023) for Neanderthal recolonization. This late Middle Palaeolithic archaeological record is associated with morphologically and technologically distinctive handaxes (White and Jacobi 2002). A key site belonging to this period is Lynford Quarry, Norfolk where a palaeochannel containing mammoth remains and associated late Middle Palaeolithic stone tools and debitage have been recovered (Boismier et al. 2012).

2.3.11 Climatically, MIS 3 was significantly colder than now but did not attain the glacial conditions of later or earlier glacial periods (e.g. MIS 6 or 2, **Figure 2**) (Pettitt and White 2012). For the Neanderthals that may have occupied the region at this time, surviving in the area that is now the southern North Sea during this period may have been subject to a variety of technological and cultural adaptations (White 2006).

2.3.12 In the early Upper Palaeolithic, at the end of the Late Pleistocene, Neanderthals were replaced in northern Europe by modern humans who, occupying and moving through what is now the southern North Sea, were present in Britain from around 34 Kya (Jacobi and Higham 2011; Bicket and Tizzard 2015). Archaeological evidence for this period consists of blade point/leaf point assemblages, thought to be associated with the final Neanderthal occupation of Britain, and a small number of findspots associated with Evolved Aurignacian and Gravettian lithic artefacts which were produced by modern humans (Jacobi and Higham 2011).

2.3.13 During the last glacial period, the Proposed Offshore Scheme will have been close to the maximum Devensian ice margin. At the maximum of the last glacial period, the environment within the southern North Sea was relatively poor for human colonisation, with humans absent from Britain during these peak cold conditions. However, there was increasing human exploitation after ~15 Kya. Humans at this time were hunting game, such as

mammoth and deer, and evidence of these animals has been reported through marine aggregate dredging, and the associated reporting requirements (Bicket and Tizzard 2015).

2.3.14 The onshore archaeological record of later Upper Palaeolithic activity is marked by Creswellian/Final Magdalenian stone tool assemblages associated with the later Upper Palaeolithic recolonization of Britain by modern humans (Higham and Jacobi 2011), and offshore locations may provide unique and important context for coastal and lowland human activity during this period.

2.3.15 The Mesolithic period began in the early Holocene and at around 10 Kya sea levels were approximately 35 m below current levels (Shennan et al. 2018), sub-aerially exposing large parts of the southern North Sea and English Channel making them suitable for human occupation. Archaeological and palaeoenvironmental material from this period has been reported from North Sea contexts for over a century (Godwin and Godwin 1933). For example, a Maglemosian harpoon artefact was trawled in the early 20th century and was later radiocarbon dated to around 12,000 Kya (Housley 1991).

2.3.16 Between 8 and 5 Kya, much of the landscape was inundated by eustatically driven sea level change, and by 6 Kya sea level was only approximately 7 m below the present level (Shennan et al. 2018). Around this time, Britain became an island again (Coles 1998). Settlements at the time were often transitory and seasonal, and therefore leave little trace in the archaeological record. It is possible that the now-submerged environment within the Norfolk Vanguard and Norfolk Boreas sites, located 600 m west (Norfolk Vanguard West) and 400 m south-east (Norfolk Boreas) of the Proposed Offshore Scheme, was occupied up until the final marine transgression thought to have occurred around 8,000 Kya.

2.3.17 It is clear from numerous research and development-led investigations that postglacial marine transgression has not destroyed Pleistocene and Holocene palaeogeography by default. Areas of preserved palaeogeographic features do remain, and detailed reconstructions of palaeoenvironments and palaeogeography can be achieved for large parts of the North Sea basin (Tappin et al. 2011; Limpenny et al. 2011; Dix and Sturt, 2011).

2.3.18 Considerable attention has been paid to Mesolithic landscapes of the southern North Sea (Gaffney et al. 2007; Tappin et al. 2011, Geary et al. 2017) as the now-submerged palaeolandscapes provide key contextual evidence for recovered artefacts and a background landscape within which to place these human communities. Increasingly, a maritime perspective has developed for understanding the early prehistoric archaeological record, where coasts, estuaries and wetlands are key landscape elements (Ransley et al. 2013).

3 AIMS AND OBJECTIVES

3.1.1 The principal aim of the Stage 1 geoarchaeological assessment is to assess the archaeological and geoarchaeological potential of deposits recovered in vibrocores acquired within the Proposed Offshore Scheme of the Project.

3.1.2 This will be achieved by addressing the following objectives;

- Review geotechnical vibrocore logs to identify deposits of potential archaeological and geoarchaeological interest, assigning high, medium and low priority status, and;

- Make recommendations for Stage 2 geoarchaeological recording and deposit modelling, where necessary.

4 METHODOLOGY

4.1 Coordinate system

4.1.1 All location information and figures are presented as projected coordinates in ETRS 1989 UTM 31N Eastings and Northings.

4.1.2 The vertical reference level is given as metres below sea floor (mbsf) which assumes the top of the vibrocore is equal to the level of the sea floor. Water depths are given as metres below Lowest Astronomical Tide (m LAT).

4.2 Geotechnical drilling and coring strategy

4.2.1 A total of 224 vibrocores were acquired during a geotechnical survey undertaken in September 2024. The location of the vibrocores recovered from the Proposed Offshore Scheme are presented in **Figure 3** and **Appendix 1**.

4.2.2 Vibrocores were acquired using a high-performance corer along the Proposed Offshore Scheme. Target depth of engineering vibrocores was 6.30 mbsf. Vibrocores were acquired in clear liners, split into 1.00 m sections offshore and transported to the laboratory of Next Geosolutions in Norwich where they were split open lengthways, photographed and described in detail. Geotechnical logs and core photographs were provided to Wessex Archaeology for review and geoarchaeological assessment.

4.3 Review of geotechnical logs

4.3.1 A preliminary assessment stage was undertaken, based on the vibrocore logs that were drafted on the vessel by describing the deposits through the liner, and inspecting the top and base of each 1.00 m cut section. These preliminary logs were sent to Wessex Archaeology direct from the vessel and allowed some high priority deposits to be identified prior to core splitting (e.g. organic material and peat). A selection of vibrocores identified as containing deposits of high potential or archaeological interest (e.g. terrestrial deposits of unknown depositional history, such as alluvial sands) were highlighted to Next Geosolutions as vibrocores to be retained for archaeological purposes. A full list of vibrocores recommended for geoarchaeological recording is given in **Appendix 3**.

4.3.2 However, a series of core samples identified as containing deposits of archaeological interest and selected to be retained for geoarchaeological recording were discarded during geotechnical testing. As such, an additional geotechnical survey was undertaken to reacquire vibrocores with archaeological potential. A complete list of core samples retargeted during this later survey campaign is presented in **Appendix 4**. The additional vibrocores recollected for archaeological purpose remaining unsplit, with core samples delivered directly to Wessex Archaeology for Stage 2 geoarchaeological recording.

4.3.3 All remaining vibrocores were split open by the geotechnical contractor, after which a second stage of review was undertaken by a geoarchaeologist using the final versions of the vibrocore logs and core photographs. Some of the cores highlighted in the preliminary pass were also split and more detailed logs provided.

4.3.4 Each of the final 224 geotechnical vibrocore logs were reviewed by a trained geoarchaeologist in order to determine their potential for further geoarchaeological works.

Vibrocores were assigned either a high, medium or low priority status based on their perceived geoarchaeological significance as itemised in **Appendix 2** and shown on **Figure 3**. Those vibrocores identified as high or medium priority status were recommended for Stage 2 geoarchaeological recording.

5 RESULTS

5.1.1 A total of 224 vibrocore logs were reviewed as part of the Stage 1 works, with the aim of identifying deposits of potential geoarchaeological interest with recommendations made for further geoarchaeological work (i.e. Stage 2 geoarchaeological recording) if necessary. Outline descriptions based on geotechnical logs are presented in **Appendix 2**, accompanied by an initial interpretation of the deposits.

5.1.2 The lowermost unit of light greenish grey fine to medium, occasionally slightly gravelly silty sand and clayey sand with thin beds of stiff clay was recovered in 66 vibrocores (Unit 1). These deposits, collectively defined as 'grey sands' are recorded at a depth of between seabed (VC_44 and VC_46) and 5.70 mbsf (VC_08 and VC_09) and are occasionally interbedded with beds of firm clays. Organic material is occasionally recorded, typically as plant fragments, however reworked beds of peats were observed in VC_06 and may represent short periods of stabilisation during deposition. These sands are characterised by frequent shell fragments, suggesting deposition in an estuarine to shallow marine setting. However, sands absent of shell are also recorded and may suggest deposition in a low-energy fluvial setting. This variation in lithology is indicative of a fluvio-deltaic environment.

5.1.3 In 54 vibrocores located within the offshore extent of the Proposed Offshore Scheme to the far northeast, dense dark greyish brown sands with frequent shell fragments and occasional thin beds of stiff brown clay were observed (Unit 2). Given the frequency of shell, these deposits are collectively interpreted as representing deposition in a shallow to fully marine environment. In 45 of these vibrocores, these deposits show a gradual transition to slightly and very organic silts and sands. Between VC_167 and VC_200, these organic deposits are homogenous and are recorded between seabed and c. 1.00 mbsf. However, in VC_166 these organics become bedded within brown sands, indicating an increasingly fluctuating water-lain environment.

5.1.4 In 10 vibrocores (VC_028, VC_033_B, VC_084, VC_086, VC_127, VC_128, VC_132, VC_134, VC_135 and VC_136) greenish grey fine to coarse, occasionally gravelly sand with occasional faint laminae was recorded typically underlying stiff grey clay (Unit 3) at depths of between 0.10 mbsf (VC_135) and 5.30 mbsf (VC_086). A diagnostic characteristic of this unit is the abundance of shell fragments and rhythmic structure which suggests deposition in a fully marine or intertidal environment.

5.1.5 In 88 vibrocores, Unit 3 is overlain by high strength greenish grey sandy silty clay and clayey silt with thin beds of fine sand (Unit 4a). These deposits range in thickness from 5.63 m (VC_080) to 0.25 m (VC_059) and in some locations are interbedded with silty sands possibly representing intertidal conditions. Within this deposit, thin clay laminations and shell fragments have been recorded throughout and coupled with greenish fine-grained sediments, may represent a low-energy shallow water environment influenced by marine processes.

5.1.6 These high strength clays are stratigraphically overlain in 43 vibrocores by occasionally gravelly fine to coarse sands with shell fragments and thin beds and laminae of silts and clays. This variation in lithology, combined with the presence of shell fragments, suggests

deposition occurred in a fluctuating, likely intertidal or marginal, environment. The grey colour and clear lower boundary suggest these deposits may be related to the stratigraphically underlying high strength clays. These deposits are thus collectively assigned as Unit 4b.

5.1.7 In the nearshore, gravelly sands and sandy gravels were identified in 10 vibrocores (VC_002, VC_002_A, VC_010, VC_011, VC_012, VC_013, VC_178, VC_180, VC_181, and VC_202). These coarse deposits are either overlain or underlain by fine to coarse orangish brown sands with frequent thin to medium laminae in five vibrocores. However, these sands are also recorded in an additional eight vibrocores (VC_003, VC_004, VC_007, VC_008, VC_009, VC_009_A, VC_177 and VC_201) where the coarse component is absent. The coarse sands and gravels are interpreted as representing high-energy fluvial deposition, with the sands representing lower-energy alluvial deposition. These deposits are collectively assigned as Unit 5.

5.1.8 In two vibrocores (VC_005 and VC_128) very dark brown peat was recorded as either representing the basal deposit (VC_005) or overlying high strength clays of Unit 4a (VC_128). In VC_128, the peat was described as clayey and fibrous, showing the development and preservation of plant material. This peat also overlies the Upper Brown Bank Formation and likely represents the formation of a semi-terrestrial environment following the decline of the lagoonal feature. These peats were deposited in a semi-terrestrial landscape, possibly a freshwater wetland situated at the margin of a palaeochannel, prior to final marine transgression in the North Sea (Unit 6a).

5.1.9 Overlying peat, light olive to reddish brown silty sand with occasional shell fragments and beds of black organic silt and clay was recorded in 85 vibrocores in the offshore and nearshore areas of the Proposed Offshore Scheme (Unit 6b). The organic content in this unit is variable, with both *in situ* bedded and reworked organics recorded as widespread offshore, and thick sequences (4.30 m in VC_005) of *in situ* organics recorded within the nearshore. These deposits are likely indicative of increasing depositional energy associated with marine transgression, with the organic beds punctuated by coarse shelly sands.

5.1.10 In two vibrocores located in the nearshore (VC_003 and VC_179), these organic interbedded sands are overlain by soft to firm slightly sandy and gravelly clay with shell fragments (Unit 7). These deposits are thin (0.10 m and 0.15 m in VC_003 and VC_179, respectively) and are recorded at seabed, with an erosive lower boundary overlying Unit 6b. This unit is structureless and contains some gravel clasts which suggests a degree of reworking. Therefore, this unit is tentatively interpreted as representing Head.

5.1.11 The uppermost deposits recovered in 81 vibrocores comprise fine to coarse sand with varying amounts of shell fragments. These deposits are interpreted to represent modern seabed sediments (Unit 8).

6 DISCUSSION

6.1 Introduction

6.1.1 The results from the geotechnical vibrocores acquired across the Proposed Offshore Scheme illustrate a Quaternary sequence broadly consistent with the geological history of the southern North Sea as mapped by the British Geological Survey (BGS) (**Table 2**; **Appendix 2**). These deposits collectively comprise a sequence of Pleistocene sediments characteristic of the Yarmouth Roads Formation, the Eem Formation, and the Lower and

Upper Brown Bank Formations, overlain by units not assigned to any known geological formation, including fluvial sands and gravels and alluvial sands, peat, organic interbedded sands and head. The Quaternary sequence is generally capped by modern seabed sediments.

Table 2 Shallow stratigraphy of deposits within the Proposed Offshore Scheme

Unit	WA Unit Name	Description	Formation	Epoch
8	Seabed sediment	Fine to coarse sand with shell fragments	Seabed sediment	Modern/Late Holocene
7	Head	Soft to firm slightly sandy and gravelly clay	n/a	?Early to mid-Holocene
6b	Organic interbedded	Olive to reddish brown silty sand with beds of organic silt and clay	n/a	Early Holocene (pre-transgression)
6a	Peat	Dark brown peat	n/a	
5	Fluvial sands and gravels/ alluvial sands	Orangish brown gravelly sands and sandy gravels (fluvial) and laminated sands (alluvial)	n/a	?Early Holocene to Cromerian (MIS >13-1)
4b	Estuarine to intertidal sands	Gravelly fine to coarse sands with shell fragments and thin beds and laminae of silts and clays	?Upper Brown Bank Formation	Early to Mid-Devensian (MIS 5d-3)
4a	Estuarine alluvium	High strength greenish grey sandy silty clay and clayey silt	Upper Brown Bank Formation	
3	Intertidal to shallow marine	Greenish grey fine to coarse occasionally gravelly sand with occasional faint laminae	Lower Brown Bank Formation	Early Devensian (MIS 5e-5d)
2	Marine to shallow marine	Dense brown sands with frequent shell fragments. Frequently overlain by organic silt/sand	Eem Formation	Ipswichian Interglacial (MIS 5e)
1	Grey sands	Light greenish grey fine to medium silty sand and clayey sand with thin beds of stiff clay	Yarmouth Roads Formation	Cromerian (>MIS 13)

6.2 Yarmouth Roads

6.2.1 The oldest sediments recovered in vibrocores (Unit 1) comprise silty, occasionally gravelly sands with thin beds of stiff clay, pockets of organic material and various amounts of fragmented shells. These sediments are interpreted as forming part of a deltaic complex, corresponding to the Lower to Middle Pleistocene deposits of the Yarmouth Roads Formation (>MIS 13).

6.2.2 The frequency of shell within deposits of the Yarmouth Roads Formation suggests that these sediments represent the more distal part of the deltaic complex in shallow water, which would not have been suitable for inhabitation with low archaeological and geoarchaeological priority. However, in the nearshore area, these deposits are characterised as shell-free, well-sorted and fine-grained, which indicates that deposition may have occurred in a low-energy fluvial or alluvial environment. Most importantly, the grey sands in VC_006 contain beds of reworked peat. This sequence in the nearshore is lithologically similar to the Early Middle Pleistocene sequence of the Cromer Forest-bed Formation (CF-bF) at Happisburgh 1, comprising upper grey channel sands and organic

clays of the Low Lighthouse Member, from which internationally significant Lower Palaeolithic archaeology and palaeoenvironmental evidence has previously been recovered (Lewis et al. 2021). The relationship between the Yarmouth Roads Formation and the Cf-bF onshore is poorly resolved at present and requires further investigation.

6.2.3 At Happisburgh, the CF-bF sits within the upper part of the Yarmouth Roads formation and is contemporary with their deposition. The preservation potential of contemporary channel sequences has recently been further evidenced in the nearshore off Happisburgh (WA 2024) and suggests that deposits of similar age and archaeological potential may be preserved elsewhere in the nearshore areas off the Norfolk and Suffolk coastlines.

6.2.4 The shelly sands typically associated with the Yarmouth Roads Formation are assigned a low priority status. However, the well-sorted fine sands in the nearshore which may represent channel fill deposits are assigned a medium priority status.

6.3 Eem Formation

6.3.1 Based on BGS mapping of geological formations, a number of vibrocores located toward the offshore extent of the cable route containing shelly brown dense sands have been interpreted as the Eem Formation (Unit 2). The Eem Formation as defined by the BGS (Stoker et al. 2011) represents deposition in fully marine conditions during the Ipswichian interglacial (MIS 5e). The palaeolandscape of the southern North Sea during this period would have been dominated by fully marine or shallow marine conditions and therefore sediments have low preservation potential for palaeoenvironmental and/or archaeological material and are assigned low priority status.

6.3.2 Interestingly, these dense marine sands of the Eem Formation are frequently overlain by organic silts and sands which are typically recorded between seabed and 1.00 mbsf. Organic deposits dating to the Late Glacial to early Holocene and associated with palaeochannel features are widely recorded across the study area (WA 2019a; 2019b), however these sequences are unique in that they diffusely grade to the upper organic sediments. This suggests that these organic silts and sands may immediately post-date MIS 5e, representing the initial fall and stabilisation of the landscape following marine regression. Assuming an age of MIS 5e-d, it is possible these deposits are broadly contemporaneous with estuarine and fluvial sediments identified in Area 240 (Unit 4; Tizzard, et al. 2014) from which late Middle Palaeolithic handaxes may have been recovered (Shaw et al. 2023).

6.3.3 Moreover, it is possible that the upper organic deposits could be contemporary with the Upper Brown Bank Formation, representing the margin of the lagoon which covered an extensive area during MIS 5d-3 (see 6.5.1). These upper organic deposits are therefore assigned a medium priority status.

6.4 Lower Brown Bank Formation

6.4.1 Unit 3 comprises greenish grey fine to coarse occasionally gravelly sands with faint laminations and represents the Lower Brown Bank dating to MIS 5e-3. This units corresponds to marine regression following the last interglacial highstand with deposits representing deposition in either an intertidal or shallow marine environment (Limpenny et al. 2011).

6.4.2 Distinguishing these deposits between the Eem Formation and the Lower Brown Bank Formation is difficult given the lithology of both geological units is broadly homogenous.

However, there appears to be a greater variation in lithology in deposits defined as the Lower Brown Bank, with gravelly units and faint laminations indicative of a fluctuating shallow water environment.

6.4.3 The Lower Brown Bank is typically identified through chronostratigraphy and the identification of the overlying high strength clays of the Upper Brown Bank. However, in three locations (VC_134, VC_135 and VC_136) no such clays were recorded. These deposits are therefore tentatively interpreted as the Lower Brown Bank. Moreover, it is possible these deposits could represent intertidal conditions on the margins of the embayment/lagoon which existing from MIS 5d-3. The archaeological and/or geoarchaeological potential of these deposits is unclear but may represent intertidal conditions and thus have been assigned a medium priority status.

6.5 Upper Brown Bank Formation

6.5.1 Unit 4a comprises high strength greenish grey sandy silty clay and clayey silt with shell fragments and laminae of sand and represents the Upper Brown Bank, dating to the Early/Middle Devensian (MIS 5d-3; Limpenny et al. 2011; WA 2018a; 2018b). The Upper Brown Bank is interpreted as a shallow lagoon/embayed environment, however the fine-grained nature of the sediments, coupled with occasional thin laminations, beds and pockets of organics and shell inclusions, suggests a variable and complex depositional history (e.g. influence by tidal regime or other currents). This is reinforced by recent investigations of the Brown Bank in the Dutch sector of the southern North Sea, with optically stimulated luminescence (OSL) dates placing the initial formation of this lagoon feature at early MIS 4 (ca. 70 Kya; Waajen et al. 2024), which significantly post-dates deposits dated in Norfolk Vanguard (82.4 ± 8.5 Kya; WA 2018).

6.5.2 The identification of these deposits across the Proposed Offshore Scheme extends the known distribution of the Brown Bank Formation and suggests that periodic expansion of the lagoon/embayment may have occurred throughout the Early-Middle Devensian and extending as far as the outer nearshore area (e.g. VC_018).

6.5.3 Although the Upper Brown Bank is of potential archaeological significance with low-lying shores presenting opportunities for occupation and exploitation, the deposits recovered have been assigned a low priority status as previous microfaunal assessments undertaken on these clay-rich sediments in the Norfolk Vanguard and Norfolk Boreas sites (WA 2019a; 2019b) suggest deposition occurred in a shallow embayment which would have been unsuitable for occupation.

6.5.4 Unit 4b is recorded as stratigraphically overlying the clays and silts of the Upper Brown Bank Formation (Unit 4a) and is interpreted as estuarine to intertidal sediments, characterised by slightly gravelly fine to coarse sands with shell fragments and laminae to thin beds of silt and clay. The unit is lithologically similar to the Lower Brown Bank deposits but contains less shell. This, combined with the stratigraphic position and diffuse lower boundary of these sands suggests that Unit 4b could represent increasing depositional energy in response to the regression of the lagoonal feature. The archaeological and/or geoarchaeological potential of Unit 4b is unclear, however has been assigned a medium priority status.

6.5.5 In VC_056, thinly interbedded organic shelly sands were recorded overlying Upper Brown Bank deposits. Interestingly, grey sands of the Yarmouth Roads are dominant to the southwest, whereas to the northeast of this location vibrocores largely comprise thick

sequences of high strength clays typically associated with the Upper Brown Bank. Palaeogeographically, this area marks a possible margin of the extensive shallow water feature, with organic bedding indicating that stable conditions prevailed to facilitate the development of a vegetated landscape. Coarse sands are however recorded and indicate that this was a marginal environment, punctuated by rhythmic high-energy conditions characteristic of an intertidal or estuarine setting. This is reinforced by the BGS mapping which show that VC_056 is located on the margin of a south trending tributary channel feature of the Brown Bank (Bicket and Tizzard 2015).

6.6 Fluvial sands and gravels/alluvial sands

6.6.1 Unit 5 comprises strong orangish brown gravelly sands and sandy gravels, and often laminated fine to coarse sands, interpreted as high-energy fluvial to low-energy alluvial deposition, respectively. The age of these fluvially-derived sediments is unclear, however they typically overly grey sands of the Yarmouth Roads and may, therefore, post-date them. However, the nature of their relationship to the Yarmouth Roads is unresolved at present. Correlation to river terrace deposits onshore is not currently possible given interpreted SBP data is not yet available for the Proposed Offshore Scheme. However, it should be noted that even with available geophysical datasets, correlation to onshore features is complex and not always possible.. Despite this, based on modern geography, it is possible these fluvial sediments offshore may be related to the offshore continuation of the palaeo-Blythe. Alternatively, these deposits may form part of an unidentified channel in the nearshore area of the Project. This unit is assigned a medium priority status.

6.7 Peat

6.7.1 Unit 6a is characterised as dark brown peat and was identified in two vibrocores located in the nearshore (VC_005 and VC_128). The absolute age of these peats is uncertain, however equivalent organic deposits have been recovered in the nearshore area off Walberswick which are suggested to compare to the peat deposits at Southwold town marshes, radiocarbon dated to between 6755–6510 BP and 4575–4300 BP (Late Mesolithic-Early Bronze Age).

6.7.2 The peat deposits have the highest potential for preserving material for radiocarbon dating, along with a range of palaeoenvironmental remains (e.g. pollen and plant macrofossils) suitable for reconstructing past landscape and environmental change, and investigating evidence for human activity during the Mesolithic, or possibly the Palaeolithic.

6.8 Organic interbedded

6.8.1 Peat in the nearshore is overlain by very organic interbedded sands, likely indicative of deposition in an estuarine, intertidal or shallow marine environment (Unit 6b). Due to the high organic and bedded nature of the nearshore deposits, they have also been assigned a high priority status.

6.8.2 Organic interbedded deposits are also widely recorded typically overlying Units 4a/4b of Brown Bank. Shell fragments are occasional to frequent in these deposits and the upper surface diffusely grades to modern seabed sediments, which indicates these deposits represent the progressive inundation of the North Sea during the early Holocene. This indicates that these deposits are equivalent to the intertidal to shallow marine deposits identified within the Norfolk Vanguard and Boreas offshore windfarms (WA 2019a; 2019b) located immediately adjacent to the Proposed Offshore Scheme. The organic content and structure of these deposits is variable, with both reworked and in situ beds of fine-grained

material recorded. As the organic content is considerably lower than the equivalent nearshore deposits, they have been assigned a medium priority status.

6.9 Head

6.9.1 Unit 7 comprises soft brown slightly gravelly and sandy clays. This lithologically variable deposit suggests that a degree of reworking has been undertaken. The lower boundary in both vibrocores is sharp and erosive in nature, which is more characteristic of Head as opposed to alluvium which has been reworked by later marine processes. Although the depositional history of this deposit is unclear, based on the reworked nature it has been assigned a low priority status.

6.10 Seabed sediments

6.10.1 Unit 8 is predominantly characterised by shelly sands, although may be gravelly in places. These seabed sediments are present across the Proposed Offshore Scheme and mark the final submergence of the formerly terrestrial North Sea landscape and the prevalence of fully marine conditions.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

7.1.1 A Stage 1 geoarchaeological review of 224 vibrocores acquired during a geotechnical survey undertaken in 2024 in support of the Proposed Offshore Scheme of the Project, has identified a Quaternary sequence comprising Pleistocene sediments characteristic of the Yarmouth Roads Formation, the Eem Formation, and the Lower and Upper Brown Bank Formations, overlain by units not correlated to any known geological formation, including fluvial sands and gravels and alluvial sands, peat, organic interbedded sands and head. The Quaternary sequence is generally capped by modern seabed sediments.

7.1.2 Based on the results of the Stage 1 marine geoarchaeological assessment, recommendations are made for Stage 2 geoarchaeological recording and deposit modelling (**Appendix 3 and 4**), as outlined below, and taking into account the regional research agendas (NSPRF 2023).

7.1.3 All core samples recommended for Stage 2 geoarchaeological recording are illustrated in **Figure 4**. The figure outlines the vibrocores retained for geoarchaeological recording during the preliminary review stage and targeted archaeological vibrocores recollected during a later geotechnical survey.

7.2 Stage 2 geoarchaeological recording

Yarmouth Roads Formation

7.2.1 The majority of deposits recovered in vibrocores correlated to the Yarmouth Roads Formation generally represent the most distal extent of a fluvial-deltaic system present across the southern North Sea during the Cromerian (>MIS 13), defined by grey shelly sands. However, in the nearshore area off the proposed Landfall in Walberswick, fine sands absent of shell are present and may represent low-energy fluvial sediments equivalent to the archaeologically significant CF-bF deposits at Pakefield and Happisburgh. It is thus recommended that a selection of samples in the nearshore, including VC_006 which comprises reworked peat, are recorded by a geoarchaeologist to ground-truth the interpretations based on geotechnical logs and core photographs and to assess the potential for palaeoenvironmental assessment.

Eem Formation

7.2.2 The Eem Formation deposits are characterised by dense brown shelly sands. These sediments were deposited in a fully marine environment during the Ipswichian interglacial (MIS 5e) and therefore have low archaeological and geoarchaeological potential. Organic silts and sands are however recorded overlying these marine sands and may represent falling sea levels and the development of a sub-aerial landscape directly following the Ipswichian highstand. A selection of vibrocores containing these upper organic deposits have therefore been recommended for Stage 2 geoarchaeological recording, to visually corroborate the presence of organic material and assess the potential for palaeoenvironmental assessment.

Upper Brown Bank Formation

7.2.3 No geoarchaeological recording was recommended for Unit 4a of the Upper Brown Bank Formation. However, Unit 4b is interpreted as estuarine to intertidal deposits which tentatively correlate to the Upper Brown Bank, possibly representing the regression of this shallow lagoon feature. These deposits are typically minerogenic and contain beds of gravels indicative of high-energy fluctuating conditions and are not considered as geoarchaeologically significant. However, few vibrocores on the margin of the Brown Bank, as mapped by BGS, have been identified as comprising frequent thin beds of organics indicative of stable conditions. Therefore, a selection of these vibrocores with organic bedding have been selected for Stage 2 geoarchaeological recording, to ground-truth interpretations and determine the suitability of the organic beds for Stage 3 palaeoenvironmental assessment.

Fluvial sands and gravels/alluvial sands

7.2.4 A series of deposits characterised by orangish brown frequently laminated, well-sorted sands were identified in vibrocores recovered in the nearshore area of the landfall at Walberswick. It is recommended that a selection of vibrocores containing these alluvial sands are recorded by a trained geoarchaeologist to determine the suitability of these deposits for Stage 3 palaeoenvironmental assessment. The fluvial sands and gravels will also be recorded within the selected vibrocores, however are expected to have lower potential for paleoenvironmental assessment.

Peat

7.2.5 Peat (Unit 6a) was recovered in two vibrocores (VC_005 and VC_128) which are both located within the nearshore area off the proposed Landfall. Peat was assigned a high priority status as it has high potential to preserve material for both palaeoenvironmental assessment and scientific dating. It is recommended that both samples containing peat are recorded by a geoarchaeologist to determine their suitability for further assessment considering sample condition and quality.

Organic interbedded

7.2.6 Deposits defined as ‘organic interbedded’ (Unit 6b) were recovered across the nearshore and offshore extent of the Proposed Offshore Scheme. Deposits assigned to this unit were largely assigned a medium priority status. However, nearshore deposits characterised by organic-rich and structured (i.e. well-bedded) sediments were assigned a high priority status, with high potential to contain material suitable for palaeoenvironmental assessment and scientific dating. It is therefore recommended that a selection of core samples are geoarchaeologically recorded to determine the suitability of deposits of further assessment.

7.3 Deposit modelling

7.3.1 A series of two-dimensional transects showing the distribution, extent and thickness of deposits is also recommended as part of the Stage 2 works. The geotechnical data from the Proposed Offshore Scheme which encompasses the nearshore and offshore extent of the Project, will provide an opportunity to create a seamless deposit model across the coastal zone showing the nature, extent and survival of deposits not formerly mapped by BGS.

7.3.2 The results from the Stage 2 geoarchaeological recording and deposit modelling recommended above will then be considered alongside regional and development-specific research questions to determine if further palaeoenvironmental assessment is required.

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APPENDICES

Appendix 1 – Vibrocore locations

VC id	Easting	Northing	Elevation	Ending Depth
VC_001	412601	5798276	-17.61	2.10
VC_001_A	412606	5798283	-13.19	3.90
VC_002	413691	5798603	-13.24	2.20
VC_002_A	413690	5798598	-13.69	2.40
VC_003	414312	5798932	-16.59	2.80
VC_004	415168	5799389	-17.22	4.20
VC_005	415720	5799682	-20.02	4.60
VC_006	416751	5800232	-20.02	3.70
VC_007	417516	5800853	-22.25	5.37
VC_008	418120	5801751	-22.77	5.70
VC_009	418707	5802617	-22.75	5.70
VC_009_A	418713	5802617	-23.15	3.80
VC_010	419481	5803339	-24.21	4.10
VC_011	420338	5803463	-25.23	3.20
VC_012	421384	5803500	-26.48	2.40
VC_013	422198	5803526	-25.93	3.80
VC_014	423607	5803510	-33.01	3.40
VC_015	424248	5803493	-31.95	4.10
VC_016	425351	5803461	-30.57	4.00
VC_017	426383	5803435	-33.19	4.60
VC_017_A	426376	5803433	-33.70	2.70
VC_018	426890	5803422	-30.68	2.30
VC_018_A	426894	5803424	-30.64	2.40
VC_019	428380	5803397	-32.75	2.50
VC_020	429365	5803528	-33.78	3.10
VC_021	430422	5803714	-32.60	2.80
VC_022	430958	5803754	-33.63	3.30
VC_022_A	430958	5803754	-33.63	3.30
VC_023	432421	5803856	-34.00	2.20
VC_024	433524	5803958	-34.35	2.80
VC_025	434683	5804059	-36.18	2.50

VC id	Easting	Northing	Elevation	Ending Depth
VC_026	435540	5804115	-37.69	3.80
VC_027	436328	5804168	-36.73	0.70
VC_027_A	436322	5804167	-36.55	1.80
VC_027_B	436334	5804170	-36.49	2.80
VC_028	437216	5804227	-34.91	3.10
VC_029	438306	5804408	-39.61	4.20
VC_030	438756	5805229	-41.83	1.90
VC_030_A	438757	5805236	-41.90	2.10
VC_031	439054	5806209	-44.11	5.20
VC_031_A	439047	5806206	-43.28	3.00
VC_032	439940	5806544	-44.63	2.70
VC_033_B	441014	5806803	-46.36	2.50
VC_034	442033	5807048	-44.64	1.60
VC_034_A	442027	5807051	-44.21	1.60
VC_034_B	442028	5807043	-44.18	3.60
VC_035	442860	5807244	-39.75	3.40
VC_036	443829	5807482	-38.70	1.50
VC_036_A	443833	5807479	-38.89	1.90
VC_036_B	443827	5807486	-38.66	3.40
VC_037	444640	5807674	-39.01	2.10
VC_038	445772	5807950	-38.41	2.80
VC_039	446743	5808464	-37.66	4.70
VC_040	447533	5808899	-43.24	2.30
VC_041	448603	5809496	-38.88	2.20
VC_042	449229	5809714	-39.97	2.20
VC_043	450635	5810154	-41.65	3.00
VC_044	451512	5810245	-44.50	4.00
VC_045	452228	5810435	-45.92	4.00
VC_046	452503	5811138	-46.47	4.80
VC_047	452542	5812639	-42.28	2.80
VC_048	452561	5813338	-44.14	3.20
VC_049	452590	5814338	-45.50	3.90
VC_050	452615	5815283	-45.95	4.00
VC_051	452669	5817217	-42.49	3.80

VC id	Easting	Northing	Elevation	Ending Depth
VC_052	452674	5817332	-42.82	3.50
VC_053	452698	5818335	-42.22	3.60
VC_054	452969	5819104	-45.66	3.00
VC_055	453714	5820009	-41.53	3.60
VC_056	454344	5820775	-46.58	4.80
VC_057	455073	5821657	-45.76	3.70
VC_058	455739	5822457	-49.74	4.70
VC_059	456436	5823309	-47.42	2.90
VC_060	456898	5823861	-48.33	4.30
VC_061	457508	5824606	-48.22	4.80
VC_062	458161	5825384	-46.41	3.80
VC_063	458807	5826168	-50.82	5.00
VC_064_A	459571	5827099	-50.20	2.60
VC_065	460072	5827703	-50.64	3.58
VC_066	460599	5828332	-49.67	4.80
VC_067	461357	5829254	-50.13	4.80
VC_068	461991	5830023	-49.86	4.50
VC_069	462671	5830836	-50.46	5.20
VC_070_A	463332	5831647	-49.67	3.30
VC_071	463808	5832208	-46.91	5.00
VC_072	464453	5832990	-46.65	5.20
VC_073	465417	5834162	-45.47	4.70
VC_074	465822	5834655	-46.54	3.70
VC_075	466479	5835397	-49.24	5.60
VC_076	467142	5836146	-46.88	5.10
VC_077	467717	5836792	-43.69	4.90
VC_078	468465	5837642	-40.39	5.50
VC_079	469136	5838397	-42.24	5.70
VC_080	469801	5839139	-41.75	5.95
VC_081	470420	5839834	-42.16	4.30
VC_082	471175	5840696	-44.40	5.40
VC_083	471724	5841317	-44.80	5.70
VC_084	472420	5842156	-45.90	4.20
VC_085	472493	5843368	-45.00	5.00

VC id	Easting	Northing	Elevation	Ending Depth
VC_086	472477	5844033	-45.00	5.30
VC_087	472446	5845137	-44.00	5.30
VC_088	472420	5846137	-41.00	5.95
VC_089	472424	5847137	-40.00	5.75
VC_090	472442	5848140	-39.00	5.75
VC_091	472456	5849141	-38.00	5.60
VC_092	472466	5850133	-36.58	2.70
VC_093	472447	5852038	-35.85	2.40
VC_094_A	472447	5852038	-36.18	3.00
VC_095	472437	5853142	-38.24	5.80
VC_096	472418	5854648	-36.36	4.30
VC_097	472403	5855135	-37.06	5.10
VC_098	472306	5856131	-36.71	5.30
VC_099	472216	5857126	-37.52	5.30
VC_100	472111	5858130	-38.11	4.80
VC_101	-	-	-	-
VC_102	471914	5860110	-36.28	1.70
VC_102_A	471920	5860104	-36.66	3.90
VC_103	-	-	-	-
VC_104	471688	5862094	-36.57	4.70
VC_105	471612	5863102	-36.89	3.30
VC_106	471569	5864069	-36.55	3.80
VC_107	471714	5865068	-37.33	4.00
VC_108	472973	5865777	-36.60	3.80
VC_109	473133	5866281	-36.17	4.10
VC_110	473123	5867279	-35.42	4.00
VC_111	473110	5868273	-35.00	3.30
VC_112	473102	5869277	-34.33	3.80
VC_113	473092	5870273	-34.07	3.80
VC_114	473080	5871274	-34.83	3.30
VC_115	473071	5872270	-34.35	3.70
VC_116	473050	5873276	-34.17	3.70
VC_116_A	473050	5873276	-34.17	3.70
VC_117	473118	5874276	-35.20	3.50

VC id	Easting	Northing	Elevation	Ending Depth
VC_118	473233	5875263	-33.20	4.30
VC_119	473387	5876247	-34.98	4.50
VC_120	474361	5877455	-33.16	5.00
VC_121	474714	5877683	-34.20	4.00
VC_121_A	474720	5877682	-33.68	3.70
VC_122	-	-	-	-
VC_123	476532	5878522	-34.73	2.70
VC_124	477443	5878930	-34.06	3.00
VC_125	478357	5879340	-34.68	3.70
VC_126	479272	5879748	-33.31	4.40
VC_127	480180	5880158	-35.29	3.90
VC_128	481090	5880573	-33.44	2.80
VC_129	482005	5880976	-33.82	3.50
VC_130	482914	5881386	-31.12	4.70
VC_131	483829	5881794	-32.92	2.50
VC_132	484492	5882453	-33.00	4.30
VC_133	484491	5883088	-34.01	4.00
VC_134	484225	5884417	-33.30	2.20
VC_135	484736	5885253	-33.96	4.10
VC_136	485420	5885982	-32.89	4.80
VC_137	486065	5886736	-30.44	4.90
VC_138	486078	5887702	-28.87	5.00
VC_139	487837	5889823	-29.38	4.60
VC_140	486466	5888920	-28.50	5.10
VC_141	486235	5888650	-29.45	4.60
VC_142	488690	5890339	-28.65	5.10
VC_143	489551	5890852	-32.33	4.50
VC_144	490411	5891368	-30.81	4.80
VC_145	491263	5891887	-30.68	4.20
VC_146	492081	5892458	-29.55	4.60
VC_147	492712	5893223	-29.90	4.40
VC_148	493012	5893940	-31.55	4.80
VC_149	493365	5895106	-31.19	3.30
VC_150	493646	5896073	-30.71	4.60

VC id	Easting	Northing	Elevation	Ending Depth
VC_151	493921	5897028	-30.67	4.60
VC_152	494197	5897984	-28.55	4.90
VC_153	494477	5898948	-29.94	5.10
VC_154	494754	5899907	-27.72	4.70
VC_155	495033	5900868	-28.84	3.70
VC_156	495310	5901832	-27.60	4.90
VC_157	495587	5902791	-28.76	5.00
VC_158	495867	5903752	-27.52	4.70
VC_159	496143	5904712	-28.23	4.40
VC_160	496398	5905589	-28.93	4.70
VC_161	496701	5906637	-27.60	5.00
VC_162	496937	5907386	-28.87	5.00
VC_163	497299	5908697	-28.35	3.40
VC_164	497534	5909515	-29.15	4.00
VC_165	497813	5910476	-28.95	3.70
VC_166	498090	5911436	-30.92	4.40
VC_167	498368	5912396	-30.51	4.00
VC_168	498646	5913357	-30.71	4.40
VC_169	498924	5914318	-30.24	4.40
VC_170	499202	5915279	-30.35	3.80
VC_171	499479	5916239	-30.43	4.30
VC_172	499758	5917200	-29.79	4.60
VC_173	500036	5918160	-30.85	4.50
VC_174	500314	5919121	-30.30	4.60
VC_175	500694	5920033	-31.15	4.50
VC_176	501524	5920541	-30.56	4.60
VC_177	410682	5796100	-9.90	3.90
VC_178	411534	5796443	-11.41	4.30
VC_179	413023	5797043	-12.49	3.20
VC_180	414455	5797743	-18.01	3.00
VC_181	415394	5798854	-19.16	4.40
VC_182	501571	5920556	-30.60	4.60
VC_183	502520	5920548	-32.20	4.25
VC_184	-	-	-	-

VC id	Easting	Northing	Elevation	Ending Depth
VC_185	504452	5920039	-31.60	4.30
VC_186	-	-	-	-
VC_187	506368	5919470	-31.50	4.20
VC_188	507728	5919067	-31.30	4.30
VC_189	-	-	-	-
VC_190	509533	5918529	-31.10	4.30
VC_191	-	-	-	-
VC_192	511453	5917973	-30.60	3.00
VC_193	512335	5917786	-30.80	1.70
VC_193_A	512339	5917786	-31.00	1.10
VC_193_B	512341	5917786	-31.00	4.50
VC_194	-	-	-	-
VC_195	514883	5917241	-30.00	4.30
VC_196	-	-	-	-
VC_197	515316	5918944	-30.00	4.80
VC_198	515577	5920220	-30.00	4.60
VC_199	-	-	-	-
VC_200	515886	5921752	-30.00	4.30
VC_201	411708	5798614	-10.52	3.10
VC_202	410143	5795908	-8.72	4.00
VC_203	453543	5817237	-45.62	1.20
VC_203_A	453542	5817247	-45.37	2.70
VC_203_B	453550	5817249	-45.46	2.00
VC_203_C	453549	5817242	-47.10	5.00
VC_204	454150	5817593	-46.47	2.80
VC_204_B	454141	5817583	-46.36	4.20
VC_205	455129	5818828	-45.11	5.10
VC_206	455584	5819197	-45.00	5.40
VC_206_A	455583	5819197	-45.00	3.40
VC_207	455983	5820122	-51.00	5.85
VC_208	456069	5821043	-52.60	2.70
VC_209	456159	5822064	-51.80	5.80
VC_210	456270	5822633	-47.60	2.00

Appendix 2 – Stage 1 log review

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_001	0.00	0.30	Dark greyish brown silty gravelly SAND with soft black silty sandy organic clay laminae	Organic interbedded	-	Medium
VC_001	0.30	1.95	Greyish brown silty very gravelly SAND with silty sandy organic clay laminae	Grey sands	Yarmouth Roads	Low
VC_001	1.95	2.10	Thinly to thickly interlaminated stiff grey CLAY and SAND	Grey sands	Yarmouth Roads	Low
VC_001A	0.00	0.60	Very thinly interbedded dark greyish brown silty SAND and soft black organic CLAY	Organic interbedded	-	Medium
VC_001A	0.60	2.20	Greyish brown silty very gravelly SAND. Gravel is shell fragments and mixed lithologies	Grey sands	Yarmouth Roads	Low
VC_001A	2.20	3.90	Thinly to thickly laminated stiff grey CLAY and silty SAND	Grey sands	Yarmouth Roads	Low
VC_002	0.00	0.20	Orangish brown gravelly sand	Fluvial sands and gravels	-	Medium
VC_002	0.20	1.50	Light olive brown silty fine to medium SAND with occasional shell fragments and organic matter	Alluvial sands	-	Medium
VC_002	1.50	2.20	Very dark grey very silty SAND with very thin beds of sand, frequent organic matter and occasional shell fragments	Grey sands	Yarmouth Roads	Medium
VC_002_A	0.00	0.20	Dark yellowish brown very sandy GRAVEL	?Fluvial sands and gravels	-	Medium
VC_002_A	0.20	1.65	Light yellowish brown to olive brown silty SAND with thin beds of stiff clay and silt	Alluvial sands	-	Medium
VC_002_A	1.65	3.00	Dark grey thinly interbedded silty SAND	Grey sands	Yarmouth Roads	Medium
VC_003	0.00	0.10	Soft brown slightly sandy slightly gravelly CLAY with occasional angular shell fragments	Head	-	Low
VC_003	0.10	1.80	Black very low strength silty CLAY with very thin beds of sand and silt, frequent organic matter and occasional shell fragments	Organic interbedded	-	High
VC_003	1.80	2.80	Greyish brown silty fine to medium SAND with frequent shell fragments and organic matter	Alluvial sands	-	Medium
VC_004	0.00	0.60	Brown low strength silty CLAY with frequent organic matter and rare shell fragments	Organic interbedded	-	High
VC_004	0.60	2.80	Black low strength silty CLAY with frequent organic matter and rare shell fragments	Organic interbedded	-	High
VC_004	2.80	3.60	Black sandy SILT with thin beds of sand and clay	Organic interbedded	-	High
VC_004	3.60	4.20	Grey silty SAND with rare shell fragments	Alluvial sands	-	Medium
VC_005	0.00	1.00	Very soft greenish grey to black silty CLAY with occasional shell fragments	Organic interbedded	-	Medium
VC_005	0.40	4.30	Greenish grey occasionally brown silty SAND with occasional shell fragments and beds of black staining	Organic interbedded	-	High
VC_005	4.30	4.60	Very dark brown firm PEAT	Peat	-	High

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_006	0.00	0.50	Reddish brown slightly silty gravelly SAND with frequent shell fragments	Seabed sediments	-	Low
VC_006	0.50	2.60	Light greenish grey silty SAND with rare shell fragments	Grey sands	Yarmouth Roads	Medium
VC_006	2.60	3.10	Firm greenish grey slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Yarmouth Roads	Low
VC_006	3.10	3.70	Very dark brown slightly silty gravelly SAND with occasional shell fragments and pockets of clayey peat between 3.20-3.50m	Grey sands	Yarmouth Roads	Medium
VC_007	0.00	0.15	Blackish brown organic sand	Organic interbedded	-	Medium
VC_007	0.15	5.37	Yellowish brown fine to medium SAND with occasional shell fragments and organic matter	Alluvial sands	-	Medium
VC_008	0.00	3.00	Brownish yellow fine SAND with rare gravel, organic matter and abundant shell fragments	Alluvial sands	-	Medium
VC_008	3.00	5.70	Greenish grey slightly sandy SILT with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_009	0.00	2.50	Light olive brown slightly silty fine to medium SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_009	2.50	3.75	Light olive brown slightly silty fine to medium SAND with occasional shell fragments	Alluvial sands	-	Medium
VC_009	3.75	5.70	Greenish grey slightly silty fine to medium SAND with occasional shell fragments and rare organic matter	Grey sands	Yarmouth Roads	Medium
VC_009_A	0.00	3.00	Light olive brown to very dark grey silty fine SAND with frequent shell fragments and organic matter	Organic interbedded	-	Medium
VC_009_A	3.00	3.80	Greenish grey silty fine SAND with occasional shell fragments, rare organic matter and very rare clay pocket	Alluvial sands	-	Medium
VC_010	0.00	1.30	Light olive brown to dark grey silty fine SAND with frequent shell fragments and organic matter	Alluvial sands	-	Medium
VC_010	1.30	2.60	Light olive brown silty fine to medium SAND with frequent fine gravel, shell fragments and organic matter. Gravel is subangular to angular	Fluvial sands and gravels	-	Medium
VC_010	2.60	4.10	Greyish brown silty fine SAND with rare shell fragments and rare organic matter	Alluvial sands	-	Medium
VC_011	0.00	2.20	Light olive brown silty fine to medium SAND with occasional shell fragments and organic matter	Organic interbedded	-	Medium
VC_011	2.20	3.20	Greyish brown silty medium to coarse SAND with frequent subangular to angular cobbles.	Fluvial sands and gravels	-	Medium
VC_012	0.00	0.60	Brown silty becoming slightly gravelly SAND with shell fragments	Seabed sediments	-	Low
VC_012	0.60	1.60	Dark grey silty gravelly organic fine to medium SAND	Organic interbedded	-	Medium
VC_012	1.00	2.40	Orangish brown slightly silty sandy fine to coarse angular to rounded GRAVEL	Fluvial sands and gravels	-	Medium
VC_013	0.00	0.25	Brown slightly silty sandy fine to coarse rounded GRAVEL with shell fragments	Seabed sediments	-	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_013	0.25	0.55	Firm dark grey very thinly bedded slightly sandy CLAY with thin silty sand laminae	Organic interbedded	-	Medium
VC_013	0.55	1.25	Dark grey to dark yellowish brown silty very sandy fine to coarse angular to rounded GRAVEL	Fluvial sands and gravels	-	Medium
VC_013	1.25	2.70	Stiff olive brown to greenish grey thinly to thickly laminated slightly sandy CLAY and silty SAND	Alluvial sands	-	Medium
VC_013	2.70	3.80	Greenish grey silty fine to medium SAND	Grey sands	Yarmouth Roads	Medium
VC_014	0.00	0.20	Dark greyish brown slightly silty slightly gravelly SAND with shell fragments	Seabed sediments	-	Low
VC_014	0.20	3.40	Dark grey silty fine to medium SAND with occasional shell fragments and weak siltstone	Grey sands	Yarmouth Roads	Medium
VC_015	0.00	0.30	Olive brown to organish brown silty gravelly fine to coarse SAND with shell fragments	Seabed sediments	-	Low
VC_015	0.30	4.10	Light grey silty fine to medium SAND with occasional shell fragment and organic matter	Grey sands	Yarmouth Roads	Medium
VC_016	0.00	0.25	Dark greyish brown silty gravelly SAND with very closely spaced interlaminated soft black organic clay and sand	Organic interbedded	-	Medium
VC_016	0.25	2.15	Dark grey clayey silty SAND with rare becoming frequent and coarse shell fragments	Grey sands	Yarmouth Roads	Low
VC_016	2.15	4.00	Dark greyish brown slightly silty slightly gravelly SAND with frequent shell fragments	Grey sands	Yarmouth Roads	Low
VC_017	0.00	3.80	Light olive brown to grey silty fine to medium SAND with occasional shell fragments and organic matter	Seabed sediments	-	Low
VC_017	3.80	4.60	Dark greenish grey clayey fine SILT with occasional shell fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_017_A	0.00	0.40	Yellowish to orangish brown slightly shelly fine to medium SAND	Seabed sediments	-	Low
VC_017_A	0.00	2.70	Light olive brown to grey silty fine to medium SAND with occasional shell fragments and faint laminae	Grey sands	Yarmouth Roa2ds	Low
VC_018	0.00	2.40	Stiff bluish grey sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_018_A	0.00	2.40	Stiff bluish grey sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_019	0.00	0.20	Reddish brown slightly gravelly silty SAND with occasional shell fragments	Seabed sediments	-	Low
VC_019	0.60	2.50	Black high strength silty CLAY with rare silt and sand pockets, rare shell fragments and organic matter	Estuarine alluvium	Upper Brown Bank	Low
VC_020	0.00	1.30	Very dark grey silty fine SAND with frequent clay and silt pockets, shells fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_020	1.30	3.10	Grey silty fine SAND with frequent shell fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_021	0.00	0.40	Reddish brown slightly gravelly SAND with occasional shell fragments	Seabed sediments	-	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_021	0.40	2.80	Greenish grey slightly silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_022_A	0.00	1.00	Reddish brown silty gravelly SAND with frequent shell fragments	Seabed sediments	-	Low
VC_022_A	1.00	3.30	Greenish grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_023	0.00	1.60	Dark grey to grey silty fine to medium SAND with occasional organic matter and shell fragments	Grey sands	Yarmouth Roads	Low
VC_023	1.60	2.20	Light grey silty fine to medium SAND with rare shell fragments	Grey sands	Yarmouth Roads	Low
VC_024	0.00	0.20	Reddish brown slightly silty gravelly SAND with frequent shell fragments	Seabed sediments	-	Low
VC_024	0.20	2.80	Light greenish grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_025	0.00	0.20	Brown silty fine to medium SAND with frequent shell fragments and organic matter, fine to medium angular to subangular gravel top 0.20 m	Seabed sediments	-	Low
VC_025	0.20	1.60	Dark grey very low strength silty sandy CLAY with very thin beds of sand and silt, frequent shell fragments and organic matter	Estuarine alluvium	Upper Brown Bank	Low
VC_025	1.60	2.50	Grey silty fine SAND	Grey sands	Yarmouth Roads	Low
VC_026	0.00	3.80	Yellowish brown to very dark grey silty fine to medium SAND with frequent shell fragments and organic matter	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_027	0.00	0.70	Greyish brown silty fine to medium SAND with frequent shell fragments and organic matter	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_027_A	0.00	1.80	Greyish brown to yellowish brown silty fine to medium SAND with frequent shell fragments and organic matter	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_027_B	0.00	2.10	Dark greyish brown to yellowish brown silty fine to medium SAND with frequent shell fragments and organic matter	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_027_B	2.10	2.80	Grey silty fine SAND with frequent organic matter and occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_028	0.00	0.15	Reddish brown slightly gravelly SAND with frequent shell fragments	Seabed sediments	-	Low
VC_028	0.15	1.00	Light bluish grey sandy SILT with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_028	1.00	2.60	Soft to stiff light bluish grey slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_028	2.60	3.10	Light bluish grey gravelly SAND with occasional shell fragments	Intertidal to shallow marine	Lower Brown Bank	Medium
VC_029	0.00	4.20	Grey to dark grey silty fine to medium SAND with occasional shell fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_030	0.00	0.95	Orangish brown slightly gravelly shelly fine to coarse SAND	Seabed sediments	-	Low
VC_030	0.95	1.90	Light olive brown to grey silty fine to medium SAND with occasional shell fragments and organic matter	Grey sands	Yarmouth Roads	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_030_A	0.00	0.70	Light olive brown to grey silty fine to medium SAND with occasional shell fragments and organic matter	Seabed sediments	-	Low
VC_030_A	0.70	2.10	Extremely low strength grey clayey SILT with occasional shell fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_031	0.00	0.30	Dark greyish green fine SAND with rare fine gravel, organic matter and abundant shell fragments	Seabed sediments	-	Low
VC_031	0.30	5.00	Light greenish grey fine to medium SAND with occasional shell fragments and organic matter	Organic interbedded	-	Medium
VC_031	5.00	5.20	Low strength dark greenish grey silty CLAY with rare shell fragments	Grey sands	Yarmouth Roads	Low
VC_031_A	0.00	3.00	Light olive brown to grey silty fine to medium SAND with occasional shell fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_032	0.00	0.80	Dark grey silty fine to medium SAND with occasional shell fragments and organic matter	Organic interbedded	-	Medium
VC_032	0.80	2.70	Low strength grey sandy SILT with occasional shell fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_033_B	0.00	0.30	Greenish black silty fine SAND with frequent shell fragments, organic matter and rare clay and silt	Organic interbedded	-	Medium
VC_033_B	0.30	1.30	Extremely low strength dark greenish grey silty CLAY with frequent shell fragments and rare silt and sand	Estuarine alluvium	Upper Brown Bank	Low
VC_033_B	1.30	2.50	Greenish grey silty fine SAND with many shell fragments and rare organic matter	Intertidal to shallow marine	Lower Brown Bank	Medium
VC_034	0.00	1.00	Stiff greenish grey slightly sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_034	1.00	1.60	Dark greyish brown slightly silty gravelly SAND with frequent shell fragments	Grey sands	Yarmouth Roads	Low
VC_034_A	0.00	1.00	Stiff greenish grey slightly sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_034_A	1.00	1.60	Dark greyish brown slightly silty slightly gravelly SAND	Grey sands	Yarmouth Roads	Low
VC_034_B	0.00	0.50	Firm greenish grey slightly sandy CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_034_B	0.50	3.60	Greyish brown to grey silty fine to medium SAND with occasional shell fragment and organic matter	Grey sands	Yarmouth Roads	Low
VC_035	0.00	0.20	Yellowish brown silty medium to coarse SAND with frequent shell fragments and organic matter	Seabed sediments	-	Low
VC_035	0.20	1.80	Bluish grey slightly gravelly clayey SAND with occasional shell fragments	Reworked alluvium	?Upper Brown Bank	Medium
VC_035	1.80	3.40	Bluish grey very stiff slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_036	0.00	0.50	Yellowish to orangish brown silty medium to coarse SAND with frequent shell fragments and organic matter	Seabed sediments	-	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_036	0.70	1.50	Greenish grey silty fine to medium SAND with frequent shell fragments and occasional organic matter	Grey sands	Yarmouth Roads	Low
VC_036_A	0.00	1.20	Yellowish brown silty medium to coarse SAND with occasional shell fragments	Seabed sediments	-	Low
VC_036_A	1.20	1.90	Greenish grey silty fine to medium SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_036_B	0.00	0.70	Yellowish brown silty medium to coarse SAND with frequent shell fragments and organic matter	Seabed sediments	-	Low
VC_036_B	0.70	2.80	Greenish grey silty fine to medium SAND with frequent shell fragments and occasional organic matter	Grey sands	Yarmouth Roads	Low
VC_036_B	2.80	3.40	Dark grey medium to high strength silty CLAY with interbedded sand and silt, frequent shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_037	0.00	0.40	Yellowish brown silty fine to medium SAND with frequent shell fragments and organic matter	Seabed sediments	-	Low
VC_037	0.40	2.10	Grey silty fine SAND with frequent shell fragments and occasional organic matter	Grey sands	Yarmouth Roads	Low
VC_038	0.00	0.20	Reddish brown slightly silty gravelly fine to coarse SAND	Seabed sediments	-	Low
VC_038	0.20	2.80	Light greenish grey silty fine to medium SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_039	0.00	0.10	Soft yellowish brown gravelly CLAY with coarse shell fragments	Seabed sediments	-	Low
VC_039	0.10	1.30	Greenish grey clayey fine to coarse SAND with beds of silt	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_039	1.30	4.70	Soft becoming firm dark greenish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_040	0.00	0.30	Reddish brown slightly silty slightly gravelly fine to coarse SAND with occasional shell fragments	Seabed sediments	-	Low
VC_040	0.30	2.30	Light greenish grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_041	0.00	0.90	Olive brown silty fine to medium SAND with occasional shell fragments, organic matter and fine gravel	Seabed sediments	-	Low
VC_041	0.90	2.20	Stiff bluish grey sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_042	0.00	0.30	Reddish brown slightly silty gravelly SAND with frequent shell fragments	Seabed sediments	-	Low
VC_042	0.40	2.20	Greenish grey silty fine SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_043	0.00	0.60	Reddish brown silty fine to coarse SAND with occasional shell fragments	Seabed sediments	-	Low
VC_043	0.60	3.00	Dark grey fine to coarse SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_044	0.00	4.00	Light greenish grey occasionally light reddish brown silty SAND	Grey sands	Yarmouth Roads	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_045	0.00	0.10	Greyish brown silty fine to medium SAND with occasional shell fragments, organic matter and fine gravel	Seabed sediments	-	Low
VC_045	0.10	4.00	Grey silty fine to medium SAND with occasional shell fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_046	0.00	4.80	Greenish grey occasionally brown silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_047	0.00	0.30	Reddish brown slightly silty gravelly SAND with occasional shell fragments	Seabed sediments	-	Low
VC_047	0.30	2.80	Light greenish grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_048	0.00	2.40	Light greenish grey silty SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_048	2.40	3.20	Stiff bluish grey slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_049	0.00	0.30	Reddish brown slightly silty gravelly SAND with occasional shell fragments	Seabed sediments	-	Low
VC_049	0.30	3.90	Greenish grey occasionally light greenish grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_050	0.00	0.40	Reddish brown gravelly SAND with occasional shell fragments	Seabed sediments	-	Low
VC_050	0.40	4.00	Greenish grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_051	0.00	1.10	Reddish brown occasionally greenish grey slightly silty gravelly SAND with occasional shell fragments	Seabed sediments	-	Low
VC_051	1.10	3.20	Light greenish grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_051	3.20	3.80	Greenish grey slightly silty gravelly SAND with frequent shell fragments	Grey sands	Yarmouth Roads	Low
VC_052	0.00	0.30	Yellowish brown silty fine to medium SAND with gravel, frequent shell fragments and organic matter. Gravel is medium to coarse angular to subangular	Seabed sediments	-	Low
VC_052	0.30	3.50	Grey silty fine to medium SAND with frequent organic matter and occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_053	0.00	0.30	Yellowish brown silty fine to medium SAND with frequent gravel, shell fragments and organic matter. Gravel is fine to medium angular to subangular.	Seabed sediments	-	Low
VC_053	0.30	3.60	Grey silty fine to medium SAND with frequent organic matter and occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_054	0.00	0.30	Yellowish brown silty fine to medium SAND with occasional fine gravel, frequent shell fragments and organic matter	Seabed sediments	-	Low
VC_054	0.30	3.00	Grey silty fine to medium SAND with frequent organic matter and occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_055	0.00	3.60	Yellowish brown silty fine to medium SAND with frequent gravel, shell fragments and organic matter. Gravel is fine to medium angular to subangular.	Estuarine to intertidal sands	?Upper Brown Bank	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_056	0.00	4.30	Yellowish brown to very dark greyish brown silty fine to medium SAND with frequent shell fragments and organic matter	Organic interbedded	-	Medium
VC_056	4.30	4.80	Very dark grey sandy SILT with very thin beds of sand and clay, frequent organic matter and occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_057	0.00	0.50	Yellowish brown silty fine to medium SAND with occasional gravel, frequent shell fragments and organic matter	Seabed sediments	-	Low
VC_057	1.20	3.70	Brown to very dark greyish brown silty fine to medium SAND with frequent shell fragments and organic matter	Organic interbedded	-	Medium
VC_058	0.00	0.50	Dark greyish brown silty fine to medium SAND with frequent shell fragments and organic matter	Organic interbedded	-	Medium
VC_058	0.50	1.80	Dark greenish grey medium to high strength silty CLAY with very thin beds of silt, frequent shell fragments and organic matter	Estuarine alluvium	Upper Brown Bank	Low
VC_058	1.80	3.80	Greenish grey silty fine to medium SAND with frequent shell fragments and organic matter	Intertidal sands	Upper Brown Bank	Low
VC_058	3.80	4.70	Dark greenish grey high strength silty CLAY with very thin beds of silt and sand, frequent shell fragments and organic matter	Estuarine alluvium	Upper Brown Bank	Low
VC_059	0.00	0.25	Yellow to orangish brown silty fine to coarse SAND with frequent shell fragments	Organic interbedded	-	Medium
VC_059	0.25	0.50	Dark greenish grey medium to high strength silty CLAY with very thin beds of silt, occasional shell fragments and organic matter	Estuarine alluvium	Upper Brown Bank	Low
VC_059	0.50	2.90	Greenish grey silty fine to medium SAND with frequent shell fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_060	0.00	0.55	Dark brown silty fine to coarse SAND with black staining and beds of organics with shell fragments	Organic interbedded	-	Medium
VC_060	0.55	1.55	Firm grey CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_060	1.55	4.30	Dark brown mottled black slightly gravelly SAND	Grey sands	Yarmouth Roads	Low
VC_061	0.00	1.10	Olive brown to dark greyish brown silty SAND with thin beds of soft organic clay	Organic interbedded	-	Medium
VC_061	1.10	1.85	Dark grey thinly laminated firm CLAY and silty SAND	Estuarine alluvium	Upper Brown Bank	Low
VC_061	1.85	4.80	Dark greenish grey silty SAND with thin laminae	Grey sands	Yarmouth Roads	Low
VC_062	0.00	3.80	Pale yellow to olive grey silty fine to medium SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_063	0.00	3.75	Greenish black to greenish grey silty fine to medium SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_063	3.75	5.00	Greenish grey very silty fine SAND	Grey san ds	Yarmouth Roads	Low
VC_064_A	0.00	2.70	Black very silty fine SAND with occasional shell fragments	Organic interbedded	-	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_065	0.00	0.75	Dark greyish brown silty SAND with thin beds of black organic clay and silty sand	Organic interbedded	-	Medium
VC_065	0.75	3.80	Dark greenish grey SAND with thin beds of very stiff laminated clay and occasional siltstone	Grey sands	Yarmouth Roads	Low
VC_066	0.00	3.70	Dark yellowish brown silty SAND with rare shell fragments and slightly gravelly thick laminae of organic clay	Organic interbedded	-	Medium
VC_066	3.70	4.80	Dark greenish grey silty SAND with very stiff clay laminae	Grey sands	Yarmouth Roads	Low
VC_067	0.00	0.60	Reddish brown silty SAND with occasional shell fragments	Seabed sediments	-	Low
VC_067	0.60	3.45	Light brown slightly gravelly silty SAND with occasional shell fragments and faint bedding	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_067	3.45	4.80	Firm bluish grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_068	0.00	0.30	Reddish brown occasional dark greenish grey silty SAND	Seabed sediments	-	Low
VC_068	0.30	2.80	Firm brown slightly sandy CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_068	2.80	4.50	Greenish grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_069	0.00	0.40	Reddish brown occasional greenish black silty SAND with occasional shell fragments and thin beds of organic clay	Organic interbedded	-	Medium
VC_069	0.40	2.40	Bluish grey silty SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_069	2.40	5.20	Firm bluish slightly sandy clayey SILT with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_070_A	0.00	0.20	Reddish brown gravelly SAND with occasional shell fragments	Seabed sediments	-	Low
VC_070_A	0.20	3.30	Greenish grey very silty fine SAND with occasional shell fragments and organic matter	Grey sands	Yarmouth Roads	Low
VC_071	0.00	0.15	Reddish brown gravelly SAND with occasional shell fragments	Seabed sediments	-	Low
VC_071	0.15	5.00	Firm dark greenish grey slightly sandy clayey SILT with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_072	0.00	0.50	Yellowish brown clayey very gravelly SAND with shell fragments	Seabed sediments	-	Low
VC_072	0.50	0.70	Light greenish grey silty SAND	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_072	0.70	2.35	Dark greenish grey silty SAND	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_072	2.35	3.00	Dark grey sandy SILT	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_072	3.00	4.00	Firm dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_072	4.00	5.20	Grey silty fine to coarse SAND	Grey sands	Yarmouth Roads	Low
VC_073	0.00	0.30	Light olive brown silty medium to coarse SAND with frequent shell fragments	Seabed sediments	-	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_073	0.30	0.90	Greenish grey silty medium SAND with occasional organic matter and shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_073	0.90	1.40	Dark greenish grey medium strength sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_073	1.40	4.70	Light greenish grey silty SAND with pockets of plant remains	Grey sands	Yarmouth Roads	Low
VC_074	0.00	0.90	Light olive brown to olive silty medium to coarse SAND with very frequent shell fragments	Seabed sediments	-	Low
VC_074	0.90	1.90	Greenish grey silty medium SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_074	1.90	2.30	Dark greenish grey CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_074	2.30	3.70	Dark greenish grey silty fine SAND with occasional shell fragments and organic matter	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_075	0.00	0.60	Soft dark greenish grey slightly sandy slightly gravelly CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_075	0.60	5.60	Greenish grey silty fine SAND with frequent beds of clay	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_076	0.00	3.00	Dark olive grey clayey silty SAND with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_076	3.00	5.10	Dark greenish grey slightly silty SAND	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_077	0.00	0.30	Reddish brown slightly silty SAND with frequent shell fragments	Seabed sediments	-	Low
VC_077	0.30	3.10	Soft bluish grey slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_077	3.10	4.90	Soft light greenish grey slightly sandy clayey SILT with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_078	0.00	0.70	Yellowish brown gravelly fine to coarse SAND	Seabed sediments	-	Low
VC_078	0.70	1.25	Greyish brown silty fine to coarse SAND	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_078	1.25	5.30	Soft grey silty CLAY becoming slightly sandy	Estuarine alluvium	Upper Brown Bank	Low
VC_079	0.00	0.80	Brownish yellow slightly gravelly medium to coarse SAND with coarse shells	Seabed sediments	-	Low
VC_079	0.80	1.60	Black to brown interbedded fine to medium SAND	Organic interbedded	-	Medium
VC_079	1.60	3.50	Very soft dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_079	3.50	5.70	Firm to stiff dark greenish grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_080	0.00	0.25	Brownish yellow gravelly fine to coarse SAND with shell fragments	Seabed sediments	-	Low
VC_080	0.25	0.32	Black fine to coarse SAND	Organic interbedded	-	Medium
VC_080	0.32	4.00	Very soft dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_080	4.00	5.95	Very soft mottled black dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_081	0.00	0.15	Reddish brown slightly silty SAND with frequent shell fragments	Seabed sediments	-	Low
VC_081	0.15	4.30	Soft bluish grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_082	0.00	0.95	Light yellowish brown slightly gravelly fine to coarse SAND with shell fragments	Organic interbedded	-	Medium
VC_082	0.95	5.40	Very soft dark greenish grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_083	0.00	0.15	Brownish yellow slightly gravelly fine to coarse SAND with shell fragments	Seabed sediments	-	Low
VC_083	0.15	5.70	Very soft dark greenish grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_084	0.00	0.05	Reddish brown silty fine to coarse SAND with occasional shell fragments	Seabed sediments	-	Low
VC_084	0.05	2.90	Firm bluish grey slightly sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_084	2.90	4.20	Light bluish grey to light brown slightly silty slightly gravelly SAND with occasional shell fragments	Intertidal to shallow marine	Lower Brown Bank	Medium
VC_085	0.00	0.75	Very soft dark grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_085	0.75	4.20	Soft dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_086	0.00	3.70	Soft bluish grey slightly sandy CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_086	3.70	5.30	Light greenish grey silty fine SAND	Intertidal to shallow marine	Lower Brown Bank	Medium
VC_087	0.00	0.80	Very soft dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_087	0.80	5.30	Very soft silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_088	0.00	0.95	Light yellowish brown slightly gravelly fine to coarse SAND with shell fragments	Organic interbedded	-	Medium
VC_088	0.95	1.30	Dark greenish grey silty SAND	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_088	1.30	5.95	Very soft silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_089	0.00	1.30	Reddish brown occasionally greenish grey silty SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_089	1.30	5.75	Soft bluish grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_090	0.00	2.10	Reddish brown silty SAND with occasional pockets of black sand	Organic interbedded	-	Medium
VC_090	2.10	5.75	Firm bluish grey CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_091	0.00	2.70	Reddish brown occasionally black silty organic SAND	Organic interbedded	-	Medium
VC_091	2.70	5.60	Very soft bluish grey CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_092	0.00	2.70	Light olive brown slightly gravelly SAND with shell fragments	Organic interbedded	-	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_093	0.00	2.40	Reddish brown silty SAND with organic material and shell fragments	Organic interbedded	-	Medium
VC_094_A	0.00	3.00	Light olive brown to very dark grey silty fine to medium SAND with frequent shell fragments and organic matter	Organic interbedded	-	Medium
VC_095	0.00	1.45	Dark grey silty fine to medium SAND with frequent shell fragments and organic matter	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_095	1.45	5.80	Very soft to soft dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_096	0.00	2.50	Reddish brown occasionally greenish black silty SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_096	2.50	4.30	Soft dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_097	0.00	1.25	Reddish brown slightly silty fine to coarse SAND with shell fragments	Organic interbedded	-	Medium
VC_097	1.25	1.70	Dark greyish brown silty fine to coarse SAND with rare shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_097	1.70	5.00	Soft bluish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_098	0.00	1.50	Dark yellowish brown mottled black slightly gravelly SAND	Organic interbedded	-	Medium
VC_098	1.50	2.50	Greenish grey silty SAND with rare shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_098	2.50	5.30	Soft dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_099	0.00	0.80	Light olive brown slightly gravelly fine to coarse SAND	Organic interbedded	-	Medium
VC_099	0.80	5.30	Firm dark grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_100	0.00	0.70	Greenish grey occasionally stained greenish black silty fine to coarse SAND with frequent shell fragments	Organic interbedded	-	Medium
VC_100	0.70	4.80	Soft dark bluish grey CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_102	0.00	0.50	Reddish brown fine to coarse SAND with occasional shell fragments	Seabed sediments	-	Low
VC_102	0.50	1.70	Greenish brown occasionally black silty fine to coarse SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_102_A	0.00	1.40	Reddish brown occasionally greenish black silty SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_102_A	1.40	3.90	Firm bluish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_103	0.00	0.20	Reddish brown slightly gravelly SAND with shell fragments	Seabed sediments	-	Low
VC_103	0.20	0.70	Black to dark grey silty fine to coarse organic SAND with rare shell fragments	Organic interbedded	-	Medium
VC_103	0.70	3.00	Firm bluish grey slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_104	0.00	0.70	Reddish brown occasionally greenish black silty SAND with occasional shell fragments	Organic interbedded	-	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_104	0.70	3.90	Light greenish grey slightly silty fine to medium SAND with occasional shell fragments and laminae	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_104	3.90	4.70	Firm bluish grey slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_105	0.00	0.50	Reddish brown occasionally greenish black silty SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_105	0.50	1.80	Dark grey silty fine to coarse SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_105	1.80	3.30	Grey silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_106	0.00	1.20	Greenish black occasionally reddish brown silty fine to coarse SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_106	1.20	2.10	Greenish grey silty fine SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_106	2.10	3.80	Firm greenish grey slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_107	0.00	0.50	Greenish black silty SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_107	0.50	1.50	Light grey fine to medium SAND with few thin beds	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_107	1.50	4.00	Firm bluish grey slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_108	0.00	1.15	Dark greyish brown slightly gravelly SAND with black staining	Organic interbedded	-	Medium
VC_108	1.15	2.40	Dark grey silty fine to medium SAND	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_108	2.40	3.80	Firm dark grey clay thinly laminated organic CLAY with black staining	Estuarine alluvium	Upper Brown Bank	Low
VC_109	0.00	1.05	Dark greyish brown mottled black gravelly SAND	Organic interbedded	-	Medium
VC_109	1.05	2.00	Dark brownish grey slightly silty fine to medium SAND with thick bed of black silt	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_109	2.95	4.10	Firm to stiff bluish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_110	0.00	1.30	Dark greyish brown staining black gravelly silty SAND with thin beds of organic clay	Organic interbedded	-	Medium
VC_110	1.30	2.80	Dark brownish grey slightly silty fine to medium SAND with rare fine shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_110	2.80	4.00	Firm to stiff bluish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_111	0.00	1.60	Dark greyish brown to black slightly gravelly silty fine to coarse SAND with thick bed of organics between 1.40-1.60m	Organic interbedded	-	Medium
VC_111	1.60	1.90	Dark brownish grey silty fine to medium SAND	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_111	1.65	3.30	Firm to stiff bluish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_112	0.00	1.90	Dark greyish brown SAND with black beds of organic clay and silt	Organic interbedded	-	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_112	1.90	3.80	Firm dark grey thinly laminated slightly organic CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_113	0.00	1.30	Dark greyish brown mottled black gravelly SAND with shell fragments	Organic interbedded	-	Medium
VC_113	1.30	1.70	Dark brownish grey silty fine to medium SAND	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_113	1.70	3.80	Firm to stiff bluish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_114	0.00	0.90	Dark greyish brown slightly gravelly silty SAND with thick beds of organic silt	Organic interbedded	-	Medium
VC_114	0.90	3.30	Firm to stiff bluish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_115	0.00	1.60	Dark greyish brown slightly gravelly silty SAND with thick beds of organic silt	Organic interbedded	-	Medium
VC_115	1.60	3.70	Firm to stiff bluish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_116_A	0.00	0.30	Orangish brown slightly gravelly shelly fine to coarse SAND	Seabed sediments	-	Low
VC_116_A	0.30	2.00	Greenish grey mottled red silty fine to coarse SAND	Organic interbedded	-	Medium
VC_116_A	2.00	3.70	Stiff bluish grey silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_117	0.00	1.80	Greenish grey silty SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_117	1.80	3.50	Stiff bluish grey slightly sandy silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_118	0.00	2.50	Dark greyish brown silty fine to medium SAND with frequent beds of organic sand and shell fragments	Organic interbedded	-	Medium
VC_118	2.50	4.30	Firm grey CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_119	0.00	2.10	Dark greyish brown fine to medium SAND with occasional shell fragments and organic matter	Organic interbedded	-	Medium
VC_119	2.10	3.50	Greyish olive slightly silty fine SAND with rare organic and abundant shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_119	3.50	4.50	Medium strength dark greyish olive silty CLAY with rare organic matter, many shell fragments and frequent sand pockets	Estuarine alluvium	Upper Brown Bank	Low
VC_120	0.00	2.00	Dark grey silty fine to coarse SAND with frequent shell fragments	Organic interbedded	-	Medium
VC_120	2.00	3.10	Dark brownish grey silty fine to coarse SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_120	3.00	5.00	Firm grey CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_121	0.00	3.00	Brown to dark greyish brown silty fine SAND with frequent shell fragments and organic matter	Organic interbedded	-	Medium
VC_121	3.00	4.00	Medium to high strength dark greenish grey silty CLAY with rare organic matter, rare shell fragments and frequent sand pockets	Estuarine alluvium	Upper Brown Bank	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_121_A	0.00	1.00	Dark black to brown silty fine to coarse SAND	Organic interbedded	-	Medium
VC_121_A	1.00	2.80	Dark grey sandy SILT with many shell fragments and organic matter and rare clay and silt pockets	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_121_A	2.80	3.70	Medium to high strength greenish grey silty CLAY with rare sand and silt pockets	Estuarine alluvium	Upper Brown Bank	Low
VC_122	0.00	1.00	Dark brown to black sandy SILT and silty SAND with shell fragments	Organic interbedded	-	Medium
VC_122	1.00	1.70	Dark brownish grey silty fine to coarse SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_122	1.70	3.00	Dark brown SILT/CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_123	0.00	1.20	Very dark greyish brown silty fine SAND with many shell fragments and organic matter and rare clay and silt	Organic interbedded	-	Medium
VC_123	1.20	2.70	Greenish grey medium to high strength silty CLAY with rare sand and silt pockets, shell fragments and organic matter	Estuarine alluvium	Upper Brown Bank	Low
VC_124	0.00	1.30	Greenish grey to black silty SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_124	1.30	3.00	Stiff light greenish grey slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_125	0.00	1.20	Reddish brown occasionally stained greenish black silty SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_125	1.20	3.00	Light brownish grey silty fine to coarse SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_125	3.00	3.70	Stiff bluish grey slightly sandy CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_126	0.00	2.40	Dark brown slightly silty SAND wtih occasional shell fragments and black staining	Organic interbedded	-	Medium
VC_126	2.40	4.30	Stiff greenish grey slightly sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_127	0.00	0.70	Very dark greyish brown occasionally stained black silty fine to coarse SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_127	0.70	0.80	Light greenish grey silty fine to medium SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_127	0.80	1.90	Firm bluish grey silty CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_127	1.90	3.90	Brown silty fine to coarse SAND with occasional becoming frequent shell fragments	Intertidal to shallow marine	Lower Brown Bank	Medium
VC_128	0.00	0.30	Light orangish brown slightly gravelly SAND with occasional shell fragments	Seabed sediments	-	Low
VC_128	0.30	1.10	Dark brown to black silty SAND with black staining and occasional shell fragments	Organic interbedded	-	Medium
VC_128	1.10	1.30	Fibrous very dark greyish brown clayey PEAT	Peat	-	High
VC_128	1.30	1.90	Soft light greenish grey CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_128	1.90	2.80	Greenish grey slightly silty SAND with occasional shell fragments	Intertidal to shallow marine	Lower Brown Bank	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_129	0.00	1.70	Dark brown occasionally greenish grey silty fine to coarse SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_129	1.70	3.10	Reddish brown silty SAND with occasional pockets of greenish grey sandy clay and occasional shell fragments and pockets of clay	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_129	3.10	3.50	Firm greenish grey sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_130	0.00	4.20	Greenish grey mottled black slightly silty SAND with shell fragments	Organic interbedded	-	Medium
VC_130	4.20	4.70	Stiff slightly sandy CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_131	0.00	1.00	Greenish grey mottled black slightly silty SAND with shell fragments	Organic interbedded	-	Medium
VC_131	1.00	2.50	Light greenish grey silty SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_132	0.00	2.00	Greenish grey slightly silty SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_132	2.00	2.60	Firm bluish grey slightly sandy CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_132	2.60	3.00	Dark brown clayey fine to coarse SAND with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_132	3.00	3.90	Stiff bluish grey slightly sandy CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_132	3.90	4.30	Dark brown fine to coarse SAND with occasional shell fragments	Intertidal to shallow marine	Lower Brown Bank	Medium
VC_133	0.00	0.30	Very dark greyish brown occasionally stained black silty fine to coarse SAND with occasional shell fragments	Organic interbedded	-	Medium
VC_133	0.30	2.20	Dark greyish brown occasionally greenish grey silty fine to coarse SAND with occasional shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_133	2.20	4.00	Firm bluish grey sandy CLAY with occasional shell fragments	Estuarine alluvium	Upper Brown Bank	Low
VC_134	0.00	0.30	Reddish brown fine to coarse SAND with occasional shell fragments	Seabed sediments	-	Low
VC_134	0.30	2.00	Greenish grey silty fine to coarse SAND becoming clayey with shell fragments	Intertidal to shallow marine	?Lower Brown Bank	Medium
VC_135	0.00	0.10	Reddish brown SAND with shell fragments	Seabed sediments	-	Low
VC_135	0.10	1.90	Greenish grey very silty SAND with occasional shell fragments and black possibly organic bed between 2.30-2.50m	Intertidal to shallow marine	?Lower Brown Bank	Medium
VC_135	1.90	4.10	Greyish brown silty SAND becoming slightly gravelly with occasional shell fragments	Intertidal to shallow marine	?Lower Brown Bank	Medium
VC_136	0.00	0.20	Reddish brown slightly gravelly silty SAND with occasional shell fragments	Seabed sediments	-	Low
VC_136	0.20	4.00	Light greenish grey slightly gravelly silty SAND with shell fragments	Intertidal to shallow marine	?Lower Brown Bank	Medium
VC_136	4.00	4.80	Greyish brown slightly silty SAND with frequent shell fragments	Intertidal to shallow marine	?Lower Brown Bank	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_137	0.00	0.20	Reddish brown silty fine to coarse SAND with occasional shell fragments	Seabed sediments	-	Low
VC_137	0.20	4.90	Light greenish grey silty fine to coarse SAND with beds of stiff clay and occasional shell fragments and organic bands between 0.25-0.50m	Marine to shallow marine	Eem Formation	Medium
VC_138	0.00	0.50	Reddish brown silty SAND with occasional shell fragments	Seabed sediments	-	Low
VC_138	0.50	2.30	Dark brownish grey silty SAND with occasional shell fragments and beds of organic silt	Marine to shallow marine	Eem Formation	Medium
VC_138	2.30	5.00	Dark greenish grey silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_139	0.00	4.60	Greenish grey occasionally black silty SAND with occasional shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_140	0.00	0.50	Yellow fine to coarse SAND with shell fragments	Seabed sediments	-	Low
VC_140	0.50	5.10	Dark greyish brown to dark grey silty SAND with beds of shell fragments and pockets and beds of black organic sand between 1.20-3.00m	Marine to shallow marine	Eem Formation	Medium
VC_141	0.00	4.60	Greenish grey occasionally greenish black silty SAND with occasional shell fragments with occasional bands of dark brown silt	Marine to shallow marine	Eem Formation	Medium
VC_142	0.00	0.30	Brownish yellow fine to coarse SAND	Seabed sediments	-	Low
VC_142	0.30	3.00	Dark grey mottled black silty SAND with occasional shell fragments and frequent beds of black organic sand	Marine to shallow marine	Eem Formation	Medium
VC_142	3.00	5.10	Dark greyish brown silty SAND with occasional shell fragments and thin beds of stiff brown clay	Marine to shallow marine	Eem Formation	Low
VC_143	0.00	4.50	Greenish grey silty SAND with occasional shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_144	0.00	0.20	Yellowish brown gravelly SAND with frequent shell fragments	Seabed sediments	-	Low
VC_144	0.20	3.00	Dark greyish brown silty SAND with frequent beds of shell fragments and stiff clay	Marine to shallow marine	Eem Formation	Low
VC_144	3.00	4.80	Dark to light grey slightly gravelly silty SAND with rare shell fragments	Grey sands	Yarmouth Roads	Low
VC_145	0.00	4.20	Greenish grey occasionally reddish brown silty SAND with occasional shell fragments	Marine to shallow marine	Eem Formation	Low
VC_146	0.00	0.20	Yellow mottled black slightly gravelly SAND with occasional shell fragments	Seabed sediments	-	Low
VC_146	0.20	4.60	Greenish grey slightly gravelly silty SAND with frequent shell fragments and pockets and beds of organic sand between 0.30-1.50m	Marine to shallow marine	Eem Formation	Medium
VC_147	0.00	4.40	Greenish grey occasionally greenish black silty SAND with shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_148	0.00	0.20	Dark grey mottled dark yellowish brown slightly gravelly SAND with shell fragments	Seabed sediments	-	Low
VC_148	0.20	3.60	Dark greyish brown silty SAND with occasional shell fragments and rare beds of	Marine to shallow marine	Eem Formation	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
			clay and reworked organics between 0.20-0.40m			
VC_148	3.60	4.80	Light grey silty fine to medium SAND	Grey sands	Yarmouth Roads	Low
VC_149	0.00	3.30	Greenish grey silty fine to medium SAND with occasional shell fragments	Marine to shallow marine	Eem Formation	Low
VC_150	0.00	0.25	Yellowish brown mottled black silty fine to coarse SAND with shell fragments and reworked organics	Seabed sediments	-	Low
VC_150	0.25	4.60	Dark greenish grey silty fine to coarse SAND with occasional becoming rare shell fragments	Marine to shallow marine	Eem Formation	Low
VC_151	0.00	4.60	Greenish grey occasionally reddish brown silty SAND with occasional shell fragments and black lenses of silt between 0.40-0.70m	Marine to shallow marine	Eem Formation	Medium
VC_152	0.00	0.20	Light olive brown slightly gravelly SAND with shell fragments	Seabed sediments	-	Low
VC_152	0.20	1.00	Dark greenish grey gravelly silty SAND with frequent shell fragments and beds of black possibly organic silty clay	Marine to shallow marine	Eem Formation	Medium
VC_152	1.00	4.90	Greenish grey slightly gravelly SAND with shell fragments and thin beds of stiff brown clay	Marine to shallow marine	Eem Formation	Low
VC_153	0.00	5.10	Dark greyish brown silty SAND with occasional shell fragments and beds of black organic silt between 0.30-1.20m	Marine to shallow marine	Eem Formation	Medium
VC_154	0.00	0.15	Reddish brown silty SAND with shell fragments	Seabed sediments	-	Low
VC_154	0.15	1.80	Dark brown silty SAND with frequent to occasional shell fragments and thin beds of organic sand	Marine to shallow marine	Eem Formation	Medium
VC_154	1.80	4.70	Greenish grey silty SAND with thinly spaced beds of stiff clay and occasional shell fragments	Marine to shallow marine	Eem Formation	Low
VC_155	0.00	3.70	Brown to greyish brown to grey silty fine SAND with frequent organic matter and shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_156	0.00	0.30	Yellow fine to coarse SAND with shell fragments	Seabed sediments	-	Low
VC_156	0.30	1.00	Brownish grey slightly gravelly silty fine to coarse SAND with occasional shell fragments and beds of organic sand	Marine to shallow marine	Eem Formation	Medium
VC_156	3.00	4.90	Brownish grey very silty fine to coarse SAND with shell fragments	Marine to shallow marine	Eem Formation	Low
VC_157	0.00	0.20	Light brownish grey silty fine SAND with frequent shell fragments	Seabed sediments	-	Low
VC_157	0.20	1.00	Dark grey silty fine SAND with frequent shell fragments and beds of organic sand	Marine to shallow marine	Eem Formation	Medium
VC_157	1.00	5.00	Grey silty fine SAND with occasional organic matter and shell fragments	Marine to shallow marine	Eem Formation	Low
VC_158	0.00	0.50	Light yellowish brown slightly gravelly SAND with occasional shell fragments and thin beds of organic sand	Marine to shallow marine	-	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_158	0.50	5.00	Olive brown silty SAND with occasional shell fragments and thin beds of stiff clay	Marine to shallow marine	Eem Formation	Low
VC_159	0.00	0.20	Yellow fine to coarse SAND with shell fragments	Seabed sediments	-	Low
VC_159	0.20	4.40	Very dark greenish grey silty SAND with occasional few thin beds of possibly organic silt to 1.30m	Marine to shallow marine	Eem Formation	Medium
VC_160	0.00	0.10	Dark brown silty fine to coarse SAND with shell fragments	Seabed sediments	-	Low
VC_160	0.10	1.60	Dark grey silty fine to coarse SAND with frequent shell fragments and thin beds of organic sand between 0.45-1.50m	Marine to shallow marine	Eem Formation	Medium
VC_160	1.60	3.90	Dark grey silty SAND with thin beds of soft clay and silt	Marine to shallow marine	Eem Formation	Low
VC_160	3.90	4.70	Dark grey clayey silty fine to medium SAND	Marine to shallow marine	Eem Formation	Low
VC_161	0.00	0.20	Reddish brown silty fine to medium SAND with occasional shell fragments	Seabed sediments	-	Low
VC_161	0.20	3.00	Very dark grey to black slightly organic silty SAND with occasional shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_161	3.00	5.00	Greyish brown fine to medium SAND with occasional shell fragments	Marine to shallow marine	Eem Formation	Low
VC_162	0.00	2.30	Dark greyish brown slightly silty SAND with frequent shell fragments and beds of organic sand	Marine to shallow marine	Eem Formation	Medium
VC_162	2.30	5.00	Dark grey silty SAND with occasional thin beds of stiff clay and frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_163	0.00	0.55	Yellowish brown to brown silty SAND with frequent shell fragments	Seabed sediments	-	Low
VC_163	0.55	2.00	Dark grey silty SAND with occasional shell fragments and very closely to closely spaced thin black organic beds	Marine to shallow marine	Eem Formation	Medium
VC_163	2.00	3.40	Dark grey to brown silty SAND with occasional shell fragments	Marine to shallow marine	Eem Formation	Low
VC_164	0.00	1.30	Dark greyish brown to dark grey silty SAND with occasional shell fragments and closely spaced black beds of organic sandy silt	Marine to shallow marine	Eem Formation	Medium
VC_164	1.30	3.20	Dark greyish brown silty SAND with frequent shell fragments and closely spaced slightly organic lenses	Marine to shallow marine	Eem Formation	Medium
VC_164	3.20	4.00	Dark greyish brown silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_165	0.00	1.00	Black silty fine to medium SAND with occasional shell fragments and organic matter	Marine to shallow marine	Eem Formation	Medium
VC_165	1.00	3.70	Grey silty fine to medium SAND with occasional shell fragments	Marine to shallow marine	Eem Formation	Low
VC_166	0.00	2.50	Dark greyish brown silty SAND with frequent shell fragments and beds of organic sand between 0-1.50m	Marine to shallow marine	Eem Formation	Medium
VC_166	2.50	4.05	Dark grey clayey silty SAND with occasional shell fragments	Marine to shallow marine	Eem Formation	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_166	4.05	4.40	Dark greyish brown thinly to thickly laminated silty SAND and soft CLAY	Marine to shallow marine	Eem Formation	Low
VC_167	0.00	3.40	Light olive brown to greyish brown silty fine to medium SAND with frequent shell fragments and organic sand between 0-0.60m	Marine to shallow marine	Eem Formation	Medium
VC_167	3.40	4.00	Extremely low strength greyish brown silty CLAY with occasional shell fragments and rare sand pockets	Marine to shallow marine	Eem Formation	Low
VC_168	0.00	2.90	Dark greyish brown silty SAND with frequent shell fragments with organic sand between 0-0.60m	Marine to shallow marine	Eem Formation	Medium
VC_168	2.90	3.60	Dark greyish brown clayey silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_168	3.60	4.40	Dark greyish brown thinly to thickly laminated silty SAND and soft CLAY	Marine to shallow marine	Eem Formation	Low
VC_169	0.00	3.40	Dark greyish brown silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_169	3.40	4.15	Dark greyish brown clayey silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_169	4.15	4.40	Dark greyish brown silty sandy CLAY with frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_170	0.00	3.10	Dark greyish brown silty SAND with frequent shell fragments and organic sand between 0-0.70m	Marine to shallow marine	Eem Formation	Medium
VC_170	3.10	3.80	Dark greyish brown thinly to thickly laminated silty SAND and soft CLAY	Marine to shallow marine	Eem Formation	Low
VC_171	0.00	3.40	Dark grey slightly gravelly silty SAND with frequent shell fragments and slightly organic silt between 0-0.80m	Marine to shallow marine	Eem Formation	Medium
VC_171	3.40	4.30	Dark greyish brown clayey silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_172	0.00	4.40	Dark olive brown slightly gravelly silty SAND with frequent shell fragments and possible organics between 0-0.80m	Marine to shallow marine	Eem Formation	Medium
VC_173	0.00	3.90	Dark brown slightly gravelly silty SAND with frequent shell fragments and organic silt between 0-0.75m	Marine to shallow marine	Eem Formation	Medium
VC_173	3.90	4.50	Dark greyish brown clayey silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_174	0.00	4.60	Dark olive brown silty SAND with frequent shell fragments and organic silt between 0-0.60m	Marine to shallow marine	Eem Formation	Medium
VC_175	0.00	4.50	Dark olive brown silty SAND with frequent shell fragments and organic silt between 0-0.70m	Marine to shallow marine	Eem Formation	Medium
VC_176	0.00	4.60	Dark greyish brown silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Low
VC_177	0.00	0.70	Soft dark grey to black thinly to thickly laminated CLAY with silty sand laminae	Organic interbedded	-	High
VC_177	0.70	1.95	Reddish brown to light yellowish brown silty SAND with thin laminae of stiff clay	Alluvial sands	-	Medium
VC_177	1.95	3.90	Dark grey to grey silty SAND with thin laminae of stiff clay	Grey sands	Yarmouth Roads	Low

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_178	0.00	0.15	Soft dark grey to black thinly to thickly laminated CLAY with silty sand laminae	Organic interbedded	-	Medium
VC_178	0.15	0.70	Light yellowish brown slightly gravelly silty SAND with shell fragments	Fluvial sands and gravels	-	Medium
VC_178	0.70	4.30	Light yellowish brown to olive brown silty SAND with occasional stiff clay pockets	Alluvial sands	-	Medium
VC_179	0.00	0.15	Soft dark greyish brown slightly sandy slightly gravelly CLAY with rare angular fine shell fragments	Head	-	Low
VC_179	0.15	1.90	Dark grey clayey sandy organic SILT	Organic interbedded	-	High
VC_179	1.90	3.20	Grey slightly silty SAND with rare shell fragments	Grey sands	Yarmouth Roads	Low
VC_180	0.00	1.90	Soft dark grey thinly laminated organic CLAY with occasional shell fragments	Organic interbedded	-	High
VC_180	1.90	2.30	Yellowish to orangish brown slightly silty sandy GRAVEL	Fluvial sands and gravels	-	Medium
VC_180	2.30	3.00	Grey silty SAND with occasional pockets of stiff clay and shell fragments	Grey sands	Yarmouth Roads	Low
VC_181	0.00	1.00	Very soft dark grey slightly sandy silty CLAY	Organic interbedded	-	High
VC_181	1.00	3.00	Very soft black slightly sandy silty organic CLAY with beds of sand	Organic interbedded	-	High
VC_181	3.00	4.00	Olive yellow gravelly fine to coarse SAND with shell fragments	?Fluvial sands and gravels	-	Medium
VC_181	4.00	4.40	Dark grey silty SAND with shell fragments and pockets of clay	Grey sands	Yarmouth Roads	Low
VC_182	0.00	4.60	Dark greenish grey slightly clayey SAND with frequent shell fragments and organic silt between 0-0.50m	Marine to shallow marine	Eem Formation	Medium
VC_183	0.00	4.25	Dark greenish grey silty SAND with frequent shell fragments and organic silt between 0-0.50m	Marine to shallow marine	Eem Formation	Medium
VC_185	0.00	4.30	Dark greenish grey silty SAND with frequent shell fragments and organic silt between 0-0.40m	Marine to shallow marine	Eem Formation	Medium
VC_187	0.00	4.20	Very dark brown occasionally greenish grey silty SAND with possible organics between 0-0.30m	Marine to shallow marine	Eem Formation	Medium
VC_188	0.00	4.30	Greenish grey silty SAND with many shell fragments and organic silt between 0-0.40m	Marine to shallow marine	Eem Formation	Medium
VC_190	0.00	4.30	Dark greyish brown occasionally dark brown silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_192	0.00	3.00	Greenish grey silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_193	0.00	1.70	Dark greenish grey occasionally reddish brown SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_193_A	0.00	1.10	Dark greenish grey occasionally reddish brown SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_193_B	0.00	4.50	Dark greenish grey occasionally reddish brown SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_195	0.00	4.30	Greenish grey silty SAND with frequent shell fragments with possible organics between 0-0.30m	Marine to shallow marine	Eem Formation	Medium
VC_197	0.00	4.80	Very dark grey silty SAND with frequent shell fragments and organic silt between 0-0.50m	Marine to shallow marine	Eem Formation	Medium
VC_198	0.00	4.60	Greenish grey silty SAND with many shell fragments and organic silt between 0-0.50m	Marine to shallow marine	Eem Formation	Medium
VC_200	0.00	4.30	Brown occasional greenish grey silty SAND with frequent shell fragments	Marine to shallow marine	Eem Formation	Medium
VC_201	0.00	0.20	Soft dark grey to black slightly sandy organic CLAY	Organic interbedded	-	High
VC_201	0.20	1.40	Dark orangish brown slightly silty SAND with frequent fine to medium laminae	Alluvial sands	-	Medium
VC_201	1.40	2.65	Grey slightly silty very shelly SAND	Grey sands	Yarmouth Roads	Low
VC_201	2.65	3.10	Dark grey slightly shelly silty SAND with occasional pockets of stiff clay	Grey sands	Yarmouth Roads	Low
VC_202	0.00	1.60	Thinly interbedded organic CLAY and SILT with shell fragments	Organic interbedded	-	High
VC_202	1.60	4.00	Black to slightly orangish brown organic gravelly SAND becoming sandy GRAVEL with depth	Fluvial sands and gravels	-	Medium
VC_203	0.00	0.85	Dark greyish brown slightly silty gravelly SAND with many shell fragments	Seabed sediments	-	Low
VC_203	0.85	1.20	Dark greyish brown slightly silty sandy GRAVEL with many shell fragments	Seabed sediments	-	Low
VC_203_A	0.00	1.35	Light olive brown slightly silty SAND with frequent shell fragments	Seabed sediments	-	Low
VC_203_A	1.35	2.45	Dark grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_203_A	2.45	2.90	Light olive brown slightly silty SAND	Grey sands	Yarmouth Roads	Low
VC_203_B	0.00	0.85	Dark greyish brown silty SAND with occasioal shell fragments	Seabed sediments	-	Low
VC_203_B	0.85	2.00	Dark grey slightly gravelly silty SAND with shell fragments	Grey sands	Yarmouth Roads	Low
VC_203_C	0.00	5.00	Light greenish grey silty SAND with occasional shell fragments	Grey sands	Yarmouth Roads	Low
VC_204	0.00	0.15	Dark greyish brown silty sandy GRAVEL with shell fragments	Seabed sediments	-	Low
VC_204	0.15	2.80	Dark greyish brown thinly to thickly laminated silty SAND and soft CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_204_B	0.00	0.15	Reddish brown slightly gravelly SAND with occasional shell fragments	Seabed sediments	-	Low
VC_204_B	0.15	4.20	Soft to firm very dark brown slightly sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_205	0.00	4.25	Brownish yellow slightly gravelly silty SAND with black silt bands	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_205	4.25	5.10	Grey clayey SILT	Estuarine alluvium	Upper Brown Bank	Low
VC_206	0.00	1.60	Brownish yellow slightly gravelly SAND with shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium

VC id	Depth from (m)	Depth to (m)	Description	Interpretation	Formation	Priority
VC_206	1.60	5.40	Brown slightly gravelly SAND with whole and fragmented shells	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_206_A	0.00	2.10	Yellowish brown slightly silty SAND with shell fragments and silty clay laminae	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_206_A	2.10	3.40	Dark greyish brown slightly silty slightly gravelly SAND with thin black organic silty sand laminae	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_207	0.00	3.00	Very soft dark greenish grey very sandy silty CLAY	Estuarine alluvium	Upper Brown Bank	Low
VC_207	3.00	5.85	Dark greenish grey silty SAND	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_208	0.00	0.85	Yellowish brown slightly silty SAND with rare shell fragments	Seabed sediments	-	Low
VC_208	0.85	1.50	Dark grey slightly silty slightly gravelly SAND with shell fragments	Estuarine to intertidal sands	?Upper Brown Bank	Medium
VC_208	1.50	2.70	Firm dark grey thinly to thickly laminated firm CLAY and sandy SILT	Estuarine alluvium	Upper Brown Bank	Low
VC_209	0.00	0.40	Light yellowish brown slightly gravelly SAND becoming mottled black	Seabed sediments	-	Low
VC_209	0.40	0.65	Greenish grey to black very gravelly silty CLAY with shell fragments	Reworked alluvium	-	Low
VC_209	0.65	5.80	Greenish grey sandy clayey SILT	Estuarine alluvium	Upper Brown Bank	Low
VC_210	0.00	1.55	Light olive brown slightly silty SAND with sub-horizontal black beds of silt	Organic interbedded	-	Medium
VC_210	1.55	2.00	Dark greenish grey silty fine to medium SAND	Estuarine alluvium	Upper Brown Bank	Low

Appendix 3 –Vibrocores recommended for Stage 2 geoarchaeological recording.

VC id	Easting	Northing	Interpretation
VC_001_A	412605.83	5798282.67	Organic interbedded (Unit 6b)
VC_002_A	413689.56	5798597.81	Fluvial sands and gravels/alluvial sands (Unit 5)
VC_003	414312.41	5798931.81	Organic interbedded (Unit 6b) and Fluvial sands and gravels/alluvial sands (Unit 5)
VC_005	415720.41	5799682.26	Organic interbedded (Unit 6b) and Peat (Unit 6a)
VC_056	454343.64	5820774.89	Organic interbedded (Unit 6b)
VC_073	465417.42	5834161.53	?Upper Brown Bank (Unit 4b)
VC_075	466478.85	5835397.39	?Upper Brown Bank (Unit 4b)
VC_088	472419.56	5846137.05	Organic interbedded (Unit 6b)
VC_095	472436.68	5853141.97	?Upper Brown Bank (Unit 4b)
VC_114	473080.25	5871274.44	Organic interbedded (Unit 6b)
VC_120	474361.43	5877454.81	Organic interbedded (Unit 6b)
VC_154	494754.42	5899906.81	Eem Formation - bedded organics (Unit 2)
VC_166	498089.63	5911436.19	Eem Formation - bedded organics (Unit 2)
VC_167	498367.71	5912396.45	Eem Formation - bedded organics (Unit 2)
VC_168	498645.9	5913357.03	Eem Formation - bedded organics (Unit 2)
VC_169	498923.6	5914317.8	?Eem Formation - bedded organics (Unit 2)
VC_170	499202.14	5915279.23	?Eem Formation - bedded organics (Unit 2)
VC_172	499757.58	5917199.89	Eem Formation - bedded organics (Unit 2)
VC_173	500036.37	5918160.41	Eem Formation - bedded organics (Unit 2)
VC_181	415393.83	5798854.31	Organic interbedded (Unit 6b) and Fluvial sands and gravels/alluvial sands (Unit 5)
VC_209	456159.13	5822064.14	?Upper Brown Bank (Unit 4b)

Appendix 4 –Vibrocores recommended for reacquisition for Stage 2 geoarchaeological recording.

VC id	Easting	Northing	Interpretation
VC_006	416750.97	5800231.84	Yarmouth Roads (Unit 1) - with possible peats
VC_007	417515.7	5800853.22	Organic interbedded (Unit 6b) and Fluvial sands and gravels/alluvial sands (Unit 5)
VC_009	418707.31	5802617.29	Organic interbedded (Unit 6b), Fluvial sands and gravels/alluvial sands (Unit 5) and Yarmouth Roads (Unit 1 - ?fluvial)
VC_011	420338.39	5803463.26	Organic interbedded (Unit 6b) and Fluvial sands and gravels/alluvial sands (Unit 5)
VC_013	422198.44	5803525.94	Organic interbedded (Unit 6b), Fluvial sands and gravels/alluvial sands (Unit 5) and Yarmouth Roads (Unit 1 - ?fluvial)
VC_016	425351.48	5803461.41	Organic interbedded (Unit 6b)
VC_017	426383.09	5803435.45	Yarmouth Roads (Unit 1 - ?fluvial)
VC_031	439054.16	5806209.14	Organic interbedded (Unit 6b)
VC_060	456897.73	5823860.53	Organic interbedded (Unit 6b)
VC_063	458806.54	5826167.81	Organic interbedded (Unit 6b)
VC_101	472018.06	5859122.89	Organic interbedded (Unit 6b)
VC_102	471914.2	5860109.83	Organic interbedded (Unit 6b)
VC_103	471805.65	5861070.54	Organic interbedded (Unit 6b)
VC_106	471569.02	5864069.44	Organic interbedded (Unit 6b) and ?Upper Brown Bank (Unit 4b)
VC_109	473132.66	5866280.59	Organic interbedded (Unit 6b) and ?Upper Brown Bank (Unit 4b)
VC_111	473109.58	5868272.98	Organic interbedded (Unit 6b) and ?Upper Brown Bank (Unit 4b)
VC_118	473233	5875262.82	Organic interbedded (Unit 6b)
VC_121_A	474720.27	5877682.08	Organic interbedded (Unit 6b) and ?Upper Brown Bank (Unit 4b)
VC_128	481090.48	5880573.25	Organic interbedded (Unit 6b) and Peat (Unit 6a)
VC_130	482914.38	5881385.99	Organic interbedded (Unit 6b)
VC_138	486077.64	5887701.64	Eem Formation - bedded organics (Unit 2)
VC_140	486466.06	5888919.61	Eem Formation - bedded organics (Unit 2)
VC_152	494196.79	5897984.12	Eem Formation - bedded organics (Unit 2)
VC_177	410682.37	5796099.68	Organic interbedded (Unit 6b), Fluvial sands and gravels/alluvial sands (Unit 5) and Yarmouth Roads (Unit 1 - ?fluvial)
VC_178	411533.65	5796442.74	Organic interbedded (Unit 6b) and Fluvial sands and gravels/alluvial sands (Unit 5)
VC_180	414455.29	5797743.02	Organic interbedded (Unit 6b) and Fluvial sands and gravels/alluvial sands (Unit 5)
VC_202	410143.09	5795907.78	Organic interbedded (Unit 6b) and Fluvial sands and gravels/alluvial sands (Unit 5)

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Outer Dowsing

Cromer

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Dereham

Norwich

Great Yarmouth

Lowestoft

Thetford

Woodbridge

Ipswich

Harwich

Netherland

Amsterdam

ardiff

London

Brussels

Belgium

Luxer

Survey corridor

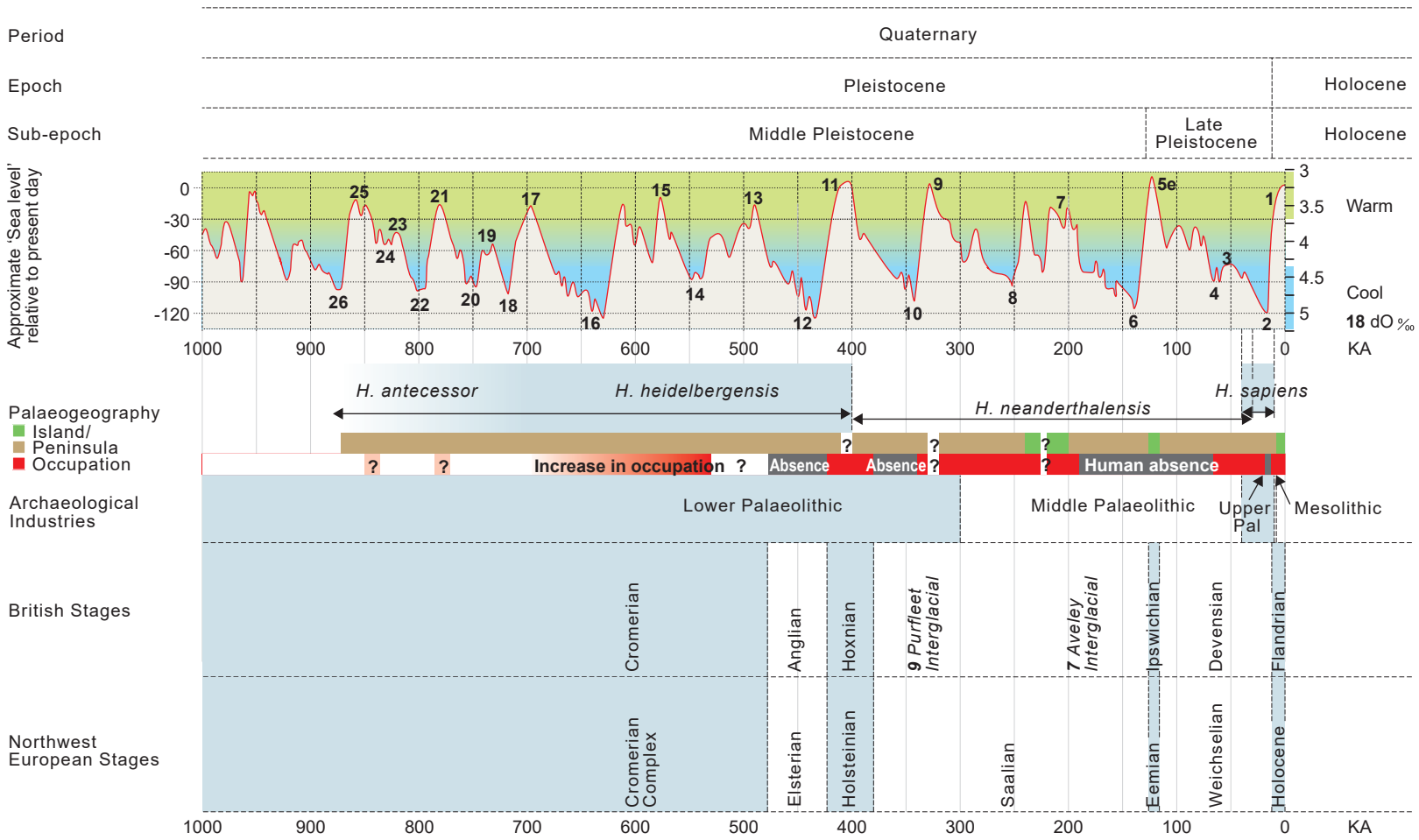
0 25 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue, Esri, TomTom, Garmin, Foursquare, FAO, METI/NASA, USGS.

Date: 17/12/2024	Created by: AW
Scale: 1:750,000 at A3	Revision: 0

Figure 1: Location of LionLink



The figure presents information derived from several references: the global sea-level curve is from Lisiecki and Raymo (2005) and Jelgersma (1979). Details on the geology and archaeology were provided by Dix and Westley (2004); Funnel (1995); Gibbard and van Kolfschoten (2004); Kukla et al. (2002); Lee et al. (2006); Lowe and Walker (1997) and Wymer (1999).

Date:	17/12/2024	Revision Number:	0
Scale:	NTS at A4	Illustrator:	KJF, AW
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Chronostratigraphic timeline for the last 1 million years

Figure 2

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Benacre
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Cove Bottom
Reydon Smear
Reydon
Southwold
Walberswick

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VC_013
VC_009_A
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VC_006
VC_005
VC_004
VC_003
VC_181
VC_201
VC_002
VC_002_A
VC_001_A
VC_001
VC_180
VC_179
VC_178
VC_177
VC_202

Norwich
Great Yarmouth

Survey corridor
Vibrocore priority
High
Medium

0
2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, Garmin, NaturalVue.

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Figure 3a: Geoarchaeological Priority Status

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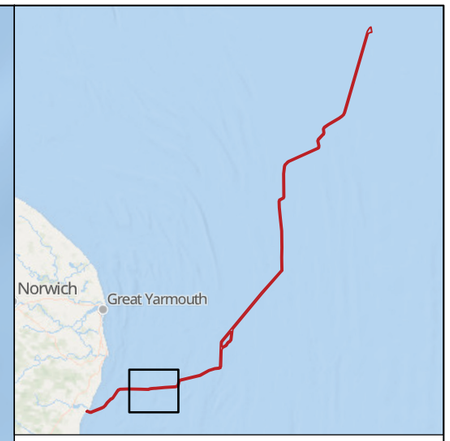


Survey corridor

Vibrocore priority

- Medium
- Low

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

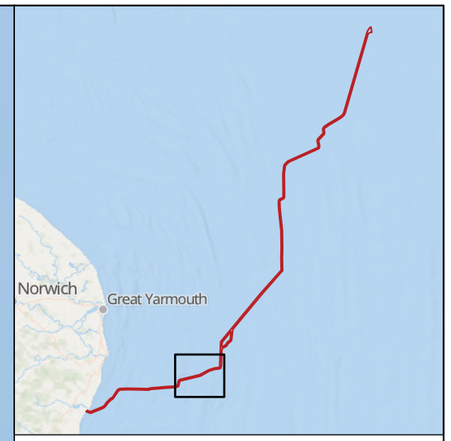
World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, Garmin, NaturalVue.

Date: 17/12/2024	Created by: AW
Scale: 1:50,000 at A3	Revision: 0

Figure 3b: Geoarchaeological Priority Status

440000
445000
450000
5810000
5805000

VC_049
VC_048
VC_047
VC_046
VC_045
VC_044
VC_043
VC_042
VC_041
VC_040
VC_039
VC_038
VC_037
VC_036_B
VC_036
VC_035
VC_036_A
VC_034_A
VC_034
VC_034_B
VC_033_B
VC_032
VC_031_A
VC_031
VC_030_A
VC_030
VC_029



Survey corridor
Vibrocore priority
Medium
Low

0 2 km

Date: 17/12/2024 | Created by: AW

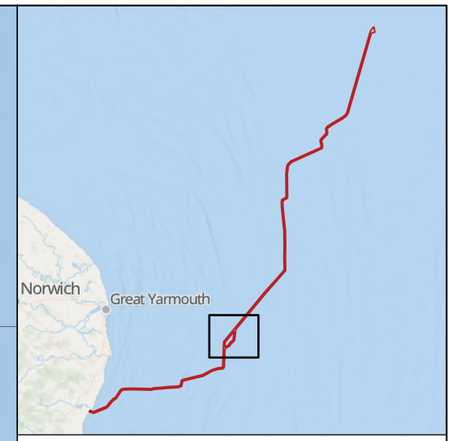
Scale: 1:50,000 at A3 | Revision: 0

Figure 3c: Geoarchaeological Priority Status

C:\Users\a.wright\OneDrive - Wessex Archaeology\Documents - Studio Temporary Projects\Temporary Reporting Graphics\271321_LionLink\Graphics_Office\Rep figs\Marine_Geoarch\2024_12_17\271321_ArcPro\271321_ArcPro.aprx

450000
455000
460000
5825000
5820000
5815000

VC_0[illegible]A
VC_063
VC_062
VC_061
VC_060
VC_059
VC_210
VC_058
VC_209
VC_057
VC_208
VC_056
VC_207
VC_055
VC_206_A
VC_206
VC_205
VC_054
VC_053
VC_204_B
VC_204
VC_052
VC_203_A
VC_203_C
VC_051
VC_203
VC_050
VC_049



Survey corridor
Vibrocore priority
Medium
Low

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

Date: 17/12/2024	Created by: AW
Scale: 1:50,000 at A3	Revision: 0

Figure 3d: Geoarchaeological Priority Status

C:\Users\a.wright\OneDrive - Wessex Archaeology\Documents - Studio Temporary Projects\Temporary Reporting Graphics\271321_LionLink\Graphics_Office\Rep figs\Marine_Geoarch\2024_12_17\271321_ArcPro\271321_ArcPro.aprx

460000

465000

470000

5840000

5835000

5830000

VC_081

VC_080

VC_079

VC_078

VC_077

VC_076

VC_075

VC_074

VC_073

VC_072

VC_071

VC_070_A

VC_069

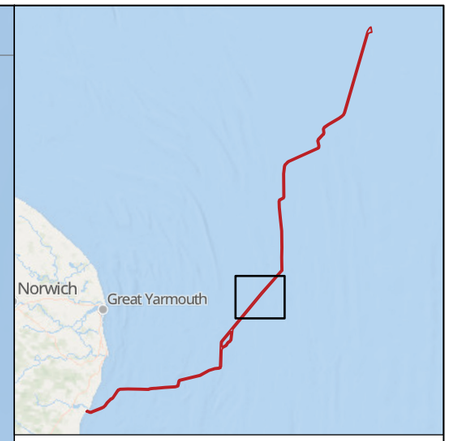
VC_068

VC_067

VC_066

VC_065

VC_064_A



Survey corridor

Vibrocore priority

- Medium
- Low

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

Date: 17/12/2024	Created by: AW
Scale: 1:50,000 at A3	Revision: 0

Figure 3e: Geoarchaeological Priority Status

C:\Users\a.wright\OneDrive - Wessex Archaeology\Documents - Studio Temporary Projects\Temporary Reporting Graphics\271321_LionLink\Graphics_Office\Rep figs\Marine_Geoarch\2024_12_17\271321_ArcPro\271321_ArcPro.aprx

465000

470000

475000

5850000

5845000

5840000

VC_095

VC_094_A

VC_093

VC_092

VC_091

VC_090

VC_089

VC_088

VC_087

VC_086

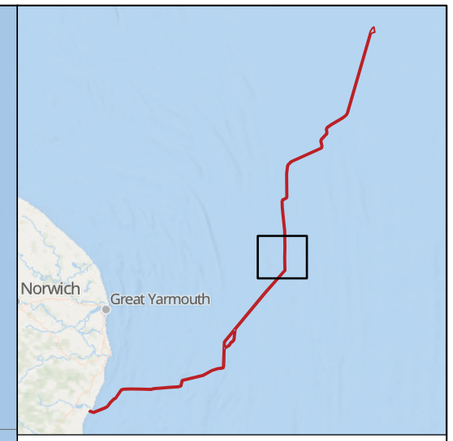
VC_085

VC_084

VC_083

VC_082

VC_081



Survey corridor

Vibrocore priority

- Medium
- Low

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

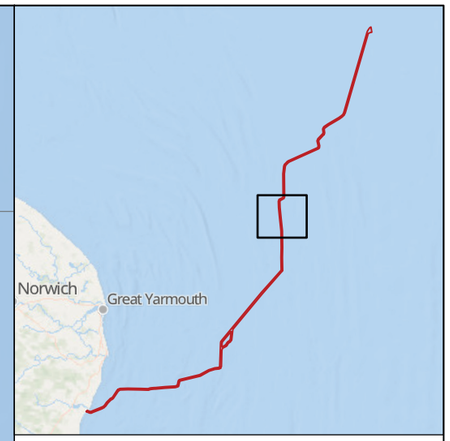
Date: 17/12/2024	Created by: AW
Scale: 1:50,000 at A3	Revision: 0

Figure 3f: Geoarchaeological Priority Status

C:\Users\a.wright\OneDrive - Wessex Archaeology\Documents - Studio Temporary Projects\Temporary Reporting Graphics\271321_LionLink\Graphics_Office\Rep figs\Marine_Geoarch\2024_12_17\271321_ArcPro\271321_ArcPro.aprx

465000
470000
475000
480000
5865000
5860000
5855000

VC_109
VC_108
VC_107
VC_106
VC_105
VC_104
VC_102
VC_102_A
VC_100
VC_098
VC_097
VC_096
VC_095



Survey corridor
Vibrocore priority
Medium

0
2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

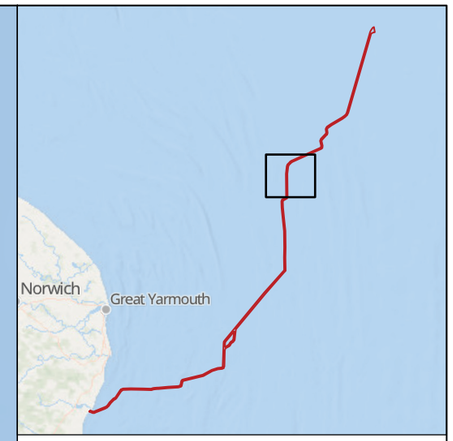
Date: 17/12/2024	Created by: AW
Scale: 1:50,000 at A3	Revision: 0

Figure 3g: Geoarchaeological Priority Status

C:\Users\a.wright\OneDrive - Wessex Archaeology\Documents - Studio Temporary Projects\Temporary Reporting Graphics\271321_LionLink\Graphics_Office\Rep figs\Marine_Geoarch\2024_12_17\271321_ArcPro\271321_ArcPro.aprx

470000
475000
480000
5875000
5870000

VC_126
VC_125
VC_124
VC_123
VC_121
VC_121_A
VC_120
VC_119
VC_118
VC_117
VC_116_A
VC_116
VC_115
VC_114
VC_113
VC_112
VC_111
VC_110
VC_109



Survey corridor
Vibrocore priority
Medium

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

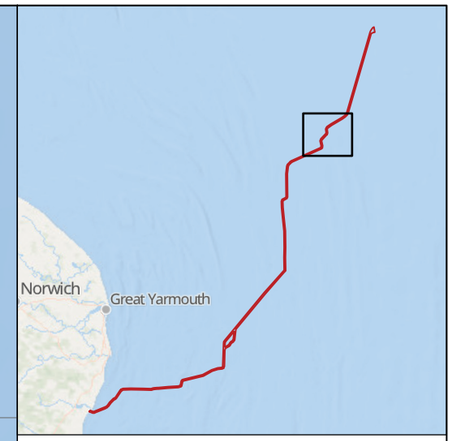
Date: 17/12/2024	Created by: AW
Scale: 1:50,000 at A3	Revision: 0

Figure 3h: Geoarchaeological Priority Status

C:\Users\a.wright\OneDrive - Wessex Archaeology\Documents - Studio Temporary Projects\Temporary Reporting Graphics\271321_LionLink\Graphics_Office\Rep figs\Marine_Geoarch\2024_12_17\271321_ArcPro\271321_ArcPro.aprx

480000
485000
490000
5890000
5885000
5880000

VC_147
VC_146
VC_145
VC_144
VC_143
VC_142
VC_139
VC_140
VC_141
VC_138
VC_137
VC_136
VC_135
VC_134
VC_133
VC_132
VC_131
VC_130
VC_129
VC_128
VC_127
VC_126



Survey corridor
Vibrocore priority
- High
- Medium
- Low

0 2 km

Date: 17/12/2024 | Created by: AW

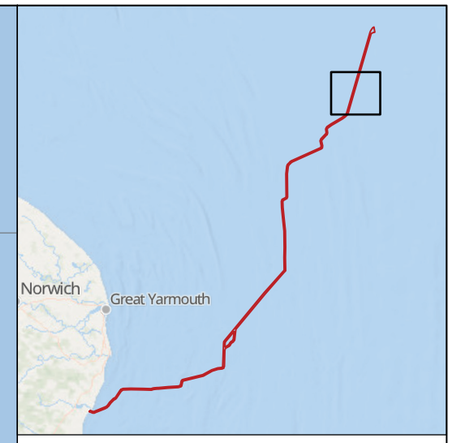
Scale: 1:50,000 at A3 | Revision: 0

Figure 3i: Geoarchaeological Priority Status

490000
495000
500000
5905000
5900000
5895000

32

VC_161
VC_160
VC_159
VC_158
VC_157
VC_156
VC_155
VC_154
VC_153
VC_152
VC_151
VC_150
VC_149
VC_148
VC_147



Survey corridor
Vibrocore priority
Medium
Low

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

Date: 17/12/2024 | Created by: AW

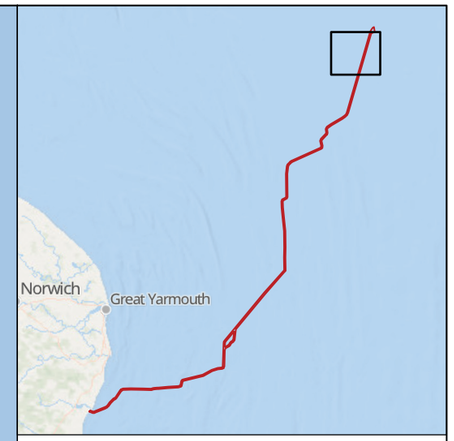
Scale: 1:50,000 at A3 | Revision: 0

Figure 3j: Geoarchaeological Priority Status

C:\Users\a.wright\OneDrive - Wessex Archaeology\Documents - Studio Temporary Projects\Temporary Reporting Graphics\271321_LionLink\Graphics_Office\Rep figs\Marine_Geoarch\2024_12_17\271321_ArcPro\271321_ArcPro.aprx

490000
495000
500000
5915000
5910000

VC_174
VC_173
VC_172
VC_171
VC_170
VC_169
VC_168
VC_167
VC_166
VC_165
VC_164
VC_163
VC_162
VC_161



Survey corridor
Vibrocore priority
Medium
Low

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

Date: 17/12/2024	Created by: AW
Scale: 1:50,000 at A3	Revision: 0

Figure 3k: Geoarchaeological Priority Status

C:\Users\a.wright\OneDrive - Wessex Archaeology\Documents - Studio Temporary Projects\Temporary Reporting Graphics\271321_LionLink\Graphics_Office\Rep figs\Marine_Geoarch\2024_12_17\271321_ArcPro\271321_ArcPro.aprx

505000

510000

515000

5920000

5915000

VC_174

VC_175

VC_176

VC_182

VC_183

VC_185

VC_187

VC_188

VC_190

VC_192

VC_193_B

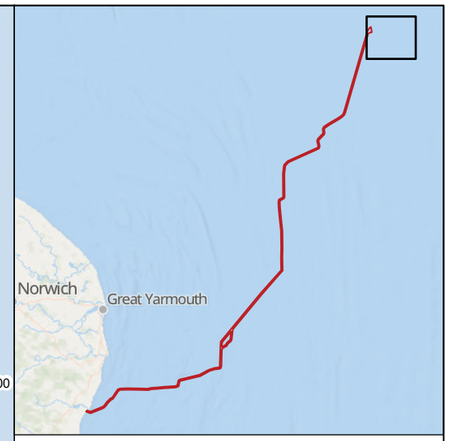
VC_193

VC_195

VC_197

VC_198

VC_200



Survey corridor

Vibrocore priority

- Medium
- Low

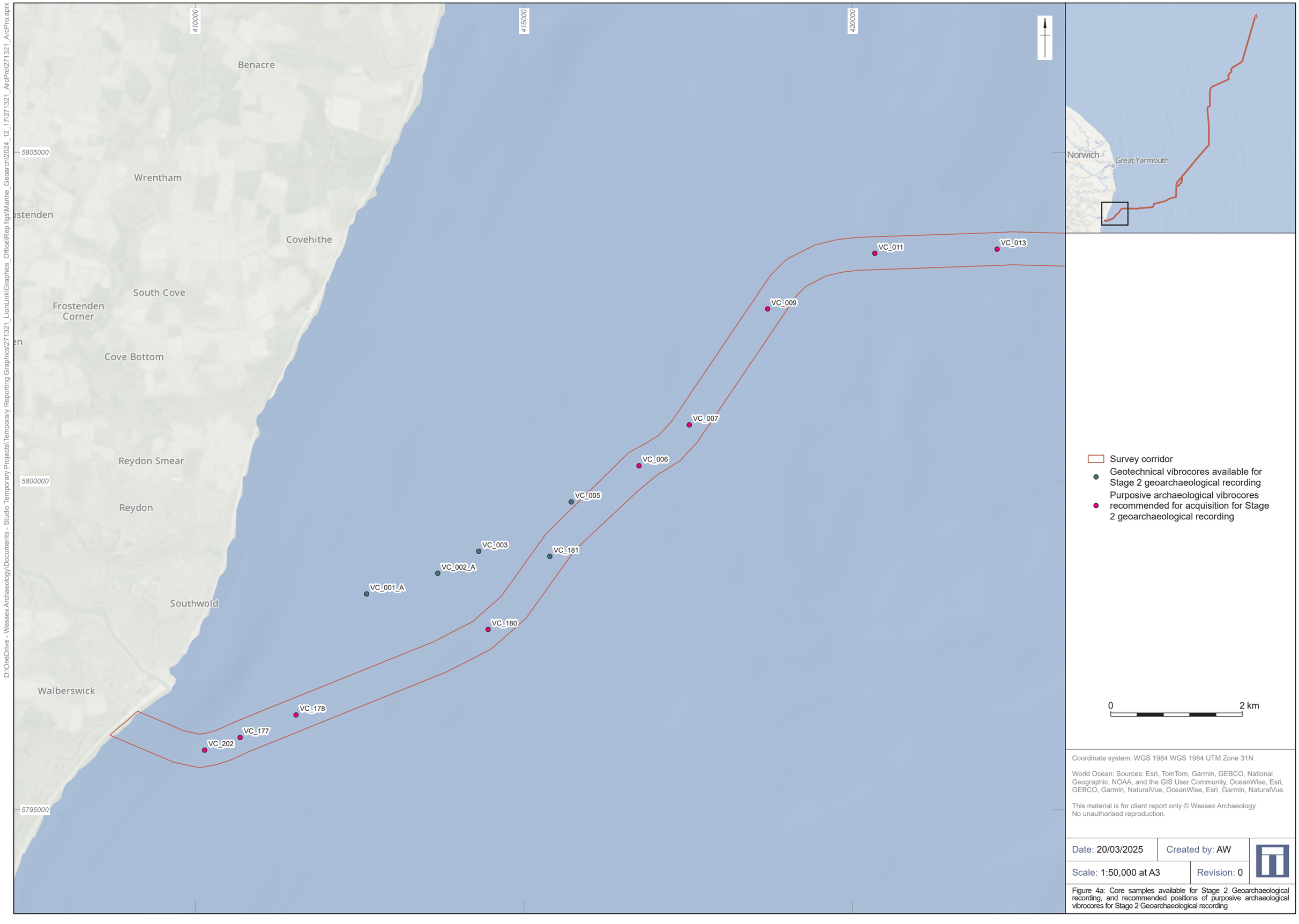
0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Esri, Garmin, NaturalVue, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, OceanWise, Esri, GEBCO, Garmin, NaturalVue.

Date: 17/12/2024	Created by: AW
Scale: 1:50,000 at A3	Revision: 0

Figure 3l: Geoarchaeological Priority Status



D:\OneDrive - Wessex Archaeology\Documents - Studio Temporary Projects\Temporary Reporting Graphics\271321_LionLink\Graphics_Office\Rep figs\Marine_Geoarch\2024_12_17\271321_ArcPro\271321_ArcPro.aprx

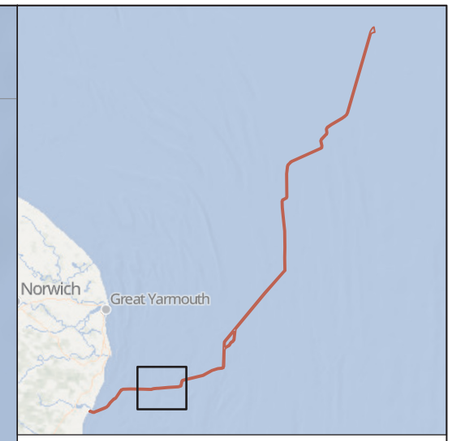
Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

Date: 20/03/2025	Created by: AW	
Scale: 1:50,000 at A3	Revision: 0	

Figure 4a: Core samples available for Stage 2 Geoarchaeological recording, and recommended positions of purposive archaeological vibrocores for Stage 2 Geoarchaeological recording

425000
430000
435000
5810000
5805000
5800000

VC_016
VC_017
VC_031



Survey corridor

Purposive archaeological vibrocores recommended for acquisition for Stage 2 geoarchaeological recording

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

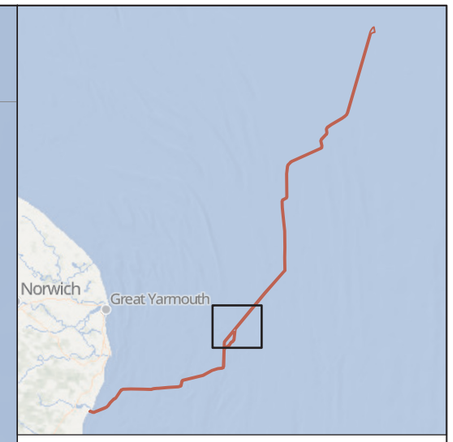
Date: 20/03/2025 | Created by: AW

Scale: 1:50,000 at A3 | Revision: 0

Figure 4b: Core samples available for Stage 2 Geoarchaeological recording, and recommended positions of purposive archaeological vibrocores for Stage 2 Geoarchaeological recording

450000
455000
460000
5830000
5825000
5820000

VC_063
VC_060
VC_209
VC_056



Survey corridor
Geotechnical vibrocores available for Stage 2 geoarchaeological recording
Purposive archaeological vibrocores recommended for acquisition for Stage 2 geoarchaeological recording

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

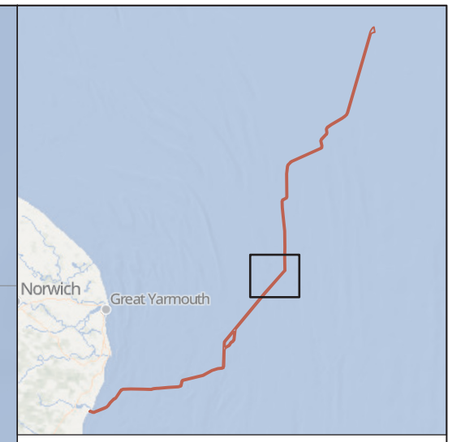
World Ocean: Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

Date: 20/03/2025 | Created by: AW
Scale: 1:50,000 at A3 | Revision: 0

Figure 4c: Core samples available for Stage 2 Geoarchaeological recording, and recommended positions of purposive archaeological vibrocores for Stage 2 Geoarchaeological recording

465000
470000
475000
5845000
5840000
5835000

VC_088
VC_075
VC_073



Survey corridor
Geotechnical vibrocores available for Stage 2 geoarchaeological recording

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

Date: 20/03/2025 | Created by: AW

Scale: 1:50,000 at A3 | Revision: 0

Figure 4d: Core samples available for Stage 2 Geoarchaeological recording, and recommended positions of purposive archaeological vibrocores for Stage 2 Geoarchaeological recording

465000

470000

475000

5860000

5855000

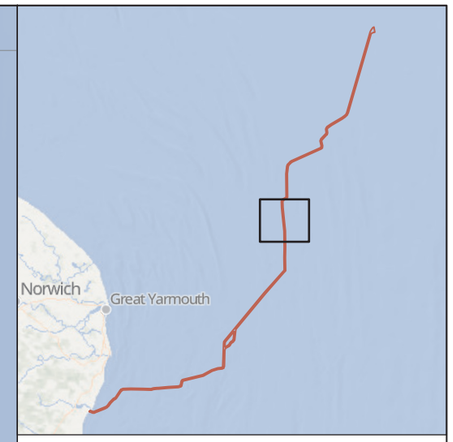
VC_106

VC_103

VC_102

VC_101

VC_095



Survey corridor

Geotechnical vibrocores available for Stage 2 geoarchaeological recording

Purposive archaeological vibrocores recommended for acquisition for Stage 2 geoarchaeological recording

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

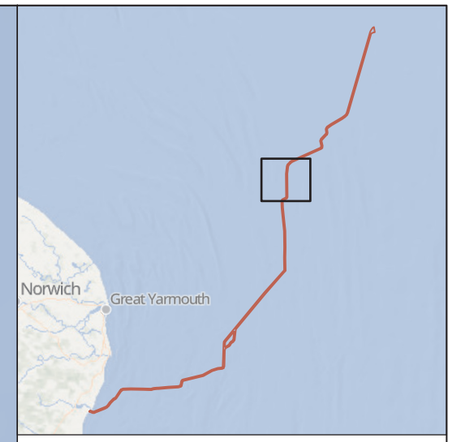
Date: 20/03/2025 | Created by: AW

Scale: 1:50,000 at A3 | Revision: 0

Figure 4e: Core samples available for Stage 2 Geoarchaeological recording, and recommended positions of purposive archaeological vibrocores for Stage 2 Geoarchaeological recording

470000
475000
480000
5875000
5870000
5865000

VC_121_A
VC_120
VC_118
VC_114
VC_111
VC_109



Survey corridor
Geotechnical vibrocores available for Stage 2 geoarchaeological recording
Purposive archaeological vibrocores recommended for acquisition for Stage 2 geoarchaeological recording

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

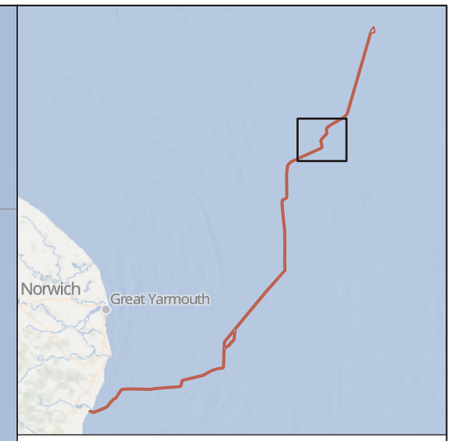
Date: 20/03/2025 | Created by: AW

Scale: 1:50,000 at A3 | Revision: 0

Figure 4f: Core samples available for Stage 2 Geoarchaeological recording, and recommended positions of purposive archaeological vibrocores for Stage 2 Geoarchaeological recording

480000
485000
490000
5890000
5885000
5880000

VC_140
VC_138
VC_130
VC_128



Survey corridor

Purposive archaeological vibrocores recommended for acquisition for Stage 2 geoarchaeological recording

0 2 km

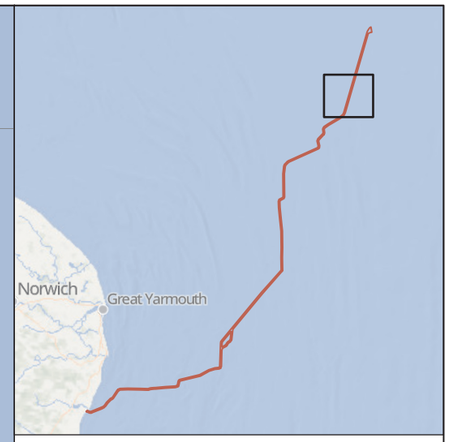
Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

Date: 20/03/2025 | Created by: AW

Scale: 1:50,000 at A3 | Revision: 0

Figure 4g: Core samples available for Stage 2 Geoarchaeological recording, and recommended positions of purposive archaeological vibrocores for Stage 2 Geoarchaeological recording



Survey corridor

Geotechnical vibrocores available for Stage 2 geoarchaeological recording

Purposive archaeological vibrocores recommended for acquisition for Stage 2 geoarchaeological recording

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

Date: 20/03/2025 | Created by: AW

Scale: 1:50,000 at A3 | Revision: 0

Figure 4h: Core samples available for Stage 2 Geoarchaeological recording, and recommended positions of purposive archaeological vibrocores for Stage 2 Geoarchaeological recording

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495000

500000

505000

5920000

5915000

5910000

VC_173

VC_172

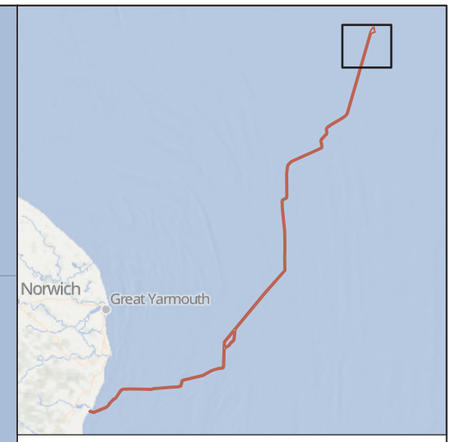
VC_170

VC_169

VC_168

VC_167

VC_166



Survey corridor

Geotechnical vibrocores available for Stage 2 geoarchaeological recording

0 2 km

Coordinate system: WGS 1984 WGS 1984 UTM Zone 31N

World Ocean: Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue.

Date: 20/03/2025 | Created by: AW

Scale: 1:50,000 at A3 | Revision: 0

Figure 4i: Core samples available for Stage 2 Geoarchaeological recording, and recommended positions of purposive archaeological vibrocores for Stage 2 Geoarchaeological recording

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