Britned Interconnector
Stage 2 Geotechnical Assessment

Recording of Core 120

Ref: 64491.01
Date: March 2007

BRITNED INTERCONNECTOR

STAGE 2 GEOTECHNICAL ASSESSMENT
RECORDING OF CORE 120

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SUMMARY

Wessex Archaeology was commissioned by Metoc plc., on behalf of BritNed Developments Limited, to archaeologically assess Borehole Core 120. The core was collected by Fugro Engineering Services Limited as part of a geotechnical sampling programme associated with ground investigation works as the BritNed Interconnector UK landfall site on the Isle of Grain, Kent.

The study was undertaken at Wessex Archaeology's offices and comprised the recording and archaeological description of the core in order to determine the archaeological potential of deposits within the area to be impacted by the Interconnector.

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

- The upper part of the sequence is disturbed by industrial activity;
- Holocene age estuarine alluvium extends to a depth of at least 30m below ground level within the site;
- Further analysis is required to establish the archaeological and environmental potential of the alluvium.

On the basis of the Stage 2 recording it is recommended that the core be sampled, and that these samples are subject to Stage 3 analysis, which would include an assessment of the pollen, diatoms, ostracods and foraminifera within the sedimentary sequence of the core section. In addition, samples of peat collected by WA during the ground investigations from below the core section are recommended for radiocarbon dating.

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STAGE 2 GEOTECHNICAL ASSESSMENT
INTERPRETATION OF CORE 120

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ACKNOWLEDGEMENTS

Wessex Archaeology is grateful to Metoc plc. and BritNed Developments Limited for commissioning the watching brief. Wessex Archaeology is also grateful to Daniel Laver of Parsons Brinckerhof and Emma Wightman of Fugro for their assistance during the Stage 2 work.

The project was managed for Wessex Archaeology by John Gribble. The assessment was carried out by Jack Russell and Margaret Christie who also compiled the report. Cathy Chisholm acted as wood specialist. John Gribble managed the project and edited the report and Steve Webster provided quality assurance.

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1. INTRODUCTION

1.1. PROJECT BACKGROUND

1.1.1. Wessex Archaeology (WA) was commissioned by Metoc plc. to undertake a Stage 2 archaeological recording of a section of Core 120 in order to assess the archaeological potential of deposits within the area to be impacted by the Interconnector. This work forms the first of a staged series of mitigation proposals made in the Archaeological Watching Brief report (WA 2006).

1.1.2. A programme of geotechnical investigations on the site, located at the eastern extremity of the Isle of Grain, Kent, was undertaken by Parsons Brinkerhoff in December 2006. Fugro Engineering Services Limited collected the cores.

1.1.3. The Stage 2 recording of the core section was undertaken at Wessex Archaeology's offices.

1.2. CHARACTERISTICS OF THE AREA

1.2.1. The terrestrial topography of the Isle of Grain is generally low-lying, with a maximum height of approximately 10m above sea level. The base geology of the area is London Clay laid down during the Eocene (54,8 – 33,7 million years BP). In places this is overlain by Pleistocene sediments (1,808,000 - 11,550 BP) including river gravels (IGS 1977). This may be an indication that the Isle of Grain once formed part of the River Medway, which now runs to the south of the island.

1.2.2. The London Clay and Pleistocene sediments are in turn overlain by alluvial deposits of silt and clay, with lenses and beds of peat and seams of sand and gravel. Borehole data examined by Metoc prior to the commencement of the geotechnical investigations suggested that the depth of alluvium varied across the site, from as little as 0.5m below ground level to 30m below ground level (mgbl) (WA 2006).

2. AIMS AND OBJECTIVES

2.1.1. The aim of this study is to provide a Stage 2 geo-archaeological interpretation of a single core section collected as part of the geotechnical ground investigation for the proposed scheme.

2.1.2. The objectives of the study are:

- to describe the sediments contained within the core in terms of their structure and form, and the depth and thickness of the horizons;
- to identify sediments within the core with archaeological potential;
- to comment on the archaeological character and importance of identified sediments; and
- to comment on the requirements for further analysis.

3. METHODOLOGY

3.1.1. Borehole 120 was drilled by Fugro and the sediments encountered were described on a standard borehole log form.

3.1.2. The co-ordinates of the borehole are:

Borehole	NGR Easting	NGR Northing
120	588821	174888

3.1.3. A 0.46m section of the borehole core, from 28m to 28.46mbgl, was recorded and assessed by WA. In the absence of surveyed heights, WA has continued to use 'metres below ground level' to describe the depth of sediments within the core (see WA 2006).

3.1.4. The core was split longitudinally and the basic sedimentary characteristics of one half were recorded, including depositional structure, texture, colour and stoniness (cf. Hodgson 1976). A depth below ground level was assigned to each sediment horizon and the character, structure and form of the sediment described.

4. RESULTS

4.1. SEDIMENTARY UNITS

4.1.1. WA examined the log produced by Fugro Engineering Services Limited for borehole 120. Three sedimentary units within the core were identified from the log. The 0.46m section of the core assessed by WA during the Stage 2 assessment formed part of Unit 3. Units 1 and 2 are described from the borehole log alone (see **Appendix 1**).

Unit 1: Made ground (0 to 0.8mbgl)

4.1.2. Unit 1 is a surface level of made ground, comprising brick and concrete rubble.

Unit 2: Sandy-clay (0.8 to 2.5mbgl)

4.1.3. Unit 2 is a grey to occasionally brown sandy-clay, with some sandy and clay laminations and some gravel and shell inclusions.

Unit 3: Alluvium (2.5 to a depth >30.6mbgl)

4.1.4. Unit 3 is the deepest of the three and is a described in the borehole logs as a grey sandy-clay or soft clay with some shell inclusions. The core section examined by WA for this report can be described as a green-black compact clayey-silt. Charcoal

pieces, plant remains, snails (including *Theodoxus fluviatilis*, *Bithynia* sp. and *Hydrobia ventrosa*) and occasional microlaminae and moderate molluscs (gastropods and bivalves) were identified. At 28.5mbgl peat with twigs was recorded in the borehole logs and a sample of this was collected by WA on site during the ground investigations.

4.2. OVERVIEW OF SEDIMENTARY SEQUENCE

4.2.1. The three principal phases of deposition can be summarised as follows:

Unit 1	Brick and concrete	Made ground
Unit 2	Sandy-clay	Possible Holocene alluvium
Unit 3	Silty-clay	Possible Holocene alluvium

4.2.2. The sedimentary sequence recovered from the core reflects the known geology of the area. However, Unit 3 extends to at least 28mbgl and probably as far as 30mbgl, which for Holocene alluvial deposits represents an exceptional thickness.

4.2.3. The 0.46m section of core assessed by WA from within Unit 3 contains *in situ* plant material and snail species that are from fresh and brackish water environments. This suggests that this part of Unit 3 was deposited when sea-level was lower and the development area was intertidal and part of an estuarine environment. This is further supported by the presence of peat, referred to in 4.1.2.

4.2.4. Assuming that Unit 3 is a Holocene deposit, and using Jelgersma's (1979: 240) sea-level curve model, an Early Mesolithic (8,500BC – 5,500 BC) date of c.7,500 BC can be postulated for the organic material found within the core section. This date is approximate, and a more accurate date may be obtained from the analysis of any pollen preserved in the alluvium, or from radiocarbon dating of the organic material.

4.2.5. Pieces of charcoal as large as 10mm in diameter were identified at a depth of 28.09mbgl within the core section. This may suggest human activity at this time within the development area. However, the charcoal has preliminarily been identified as oak, which does not correlate with the date of 7,500 BC since oak was not present in the UK during the Early Mesolithic.

5. DISCUSSION AND RECOMMENDATIONS

5.1.1. A palaeo land surface that may have supported a level of human activity in the area has been suggested by the organic material identified within the core section assessed for this report.

5.1.2. However, it is not possible to obtain an accurate date for the landscape at this stage. It is recommended, therefore, that Stage 3 sampling of the core section be

undertaken, to allow the assessment for pollen, diatom, foraminifera and ostracods. It is also recommended that carbon dating be carried out in order to date Unit 3.

5.1.3. This would provide chronological and environmental evidence about the formation of the alluvium in this area, and would be an important addition to the current archaeological knowledge of the history of the Thames Estuary.

6. REFERENCES

Hodgson, J.M., 1976, Soil Survey Field Handbook, Harpenden, Soil Survey Technical Monograph No. 5.

Institute of Geological Sciences (IGS), 1977, *Chatham, Sheet 272*, IGS

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APPENDIX I: SEDIMENT DESCRIPTIONS

Core 120 (0mbgl to >30.6mbgl)

Depth	Description	Unit
0-0.8mbgl	Made ground, brick and concrete rubble	1
0.8-2.5mbgl	Grey to occasionally brown sandy-clay with some sandy and clay laminations. Some gravel and shell inclusions.	2
2.5 to a depth >30.6mbgl	Grey sandy-clay or soft clay with some shell inclusions.	3
	28 to 28.2mbgl green black compact clayey-silt. Charcoal pieces <10mm diameter at 28.09 to 29.10mbgl. Occasional charcoal flecks and rare organic material in the form of plant stems from 28.07 to 28.19mbgl. Occasional microlaminae and moderate molluscs (gastropods and bivalves). Occasional snails including *Theodoxus fluviatilis*, *Bithynia* sp. and *Hydrobia ventrosa*	
	28.2 to 28.46mbgl: As above but with a concentration of organic material in the form of plant roots from 28.24 to 28.4mbgl and frequent molluscs from 28.32 to 28.40mbgl.	

Taken from borehole log sheets produced by Fugro Engineering Services Limited in 2006