



**Royal
HaskoningDHV**
Enhancing Society Together

Managing Heritage Impacts

Digital Data and Dogger Bank

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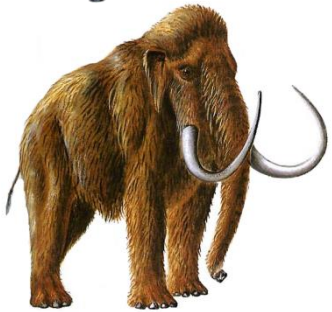
23 April 2015

Project Background

- Dogger Bank
 - Largest Round 3 offshore wind Zone
 - North Sea 8660 km²
 - Forewind (RWE, SSE, Statkraft and Statoil)
 - Royal HaskoningDHV, Wessex Archaeology

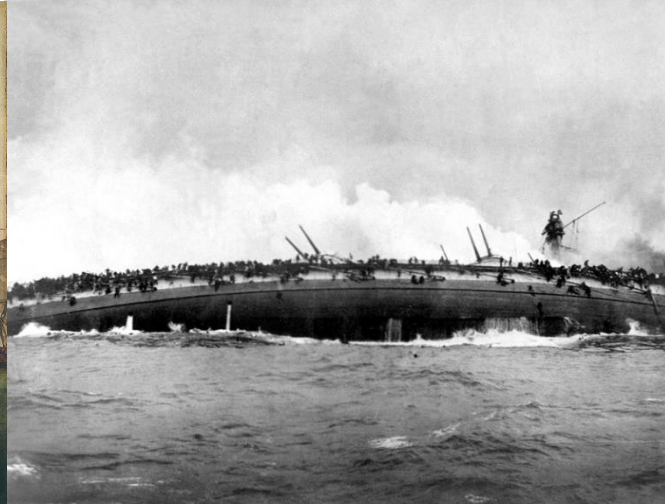


Prehistoric Dogger Bank



Coles, BJ (1998)
Doggerland: A speculative survey. Proceedings of Prehistoric Society vol 64

Wrecks and Aircraft



Impact Assessment... How Much Work? ..and When?

Shipwreck Investigation, Port of Pori Finland



Reducing Risk at Dogger Bank

- Zone Appraisal and Planning (ZAP)
 - early identification of potential impacts to heritage
- Embedded Mitigation
 - avoiding significant impacts through project design
- Staged Assessment
 - Increased resolution at each stage



High-level ZAP: Wrecks

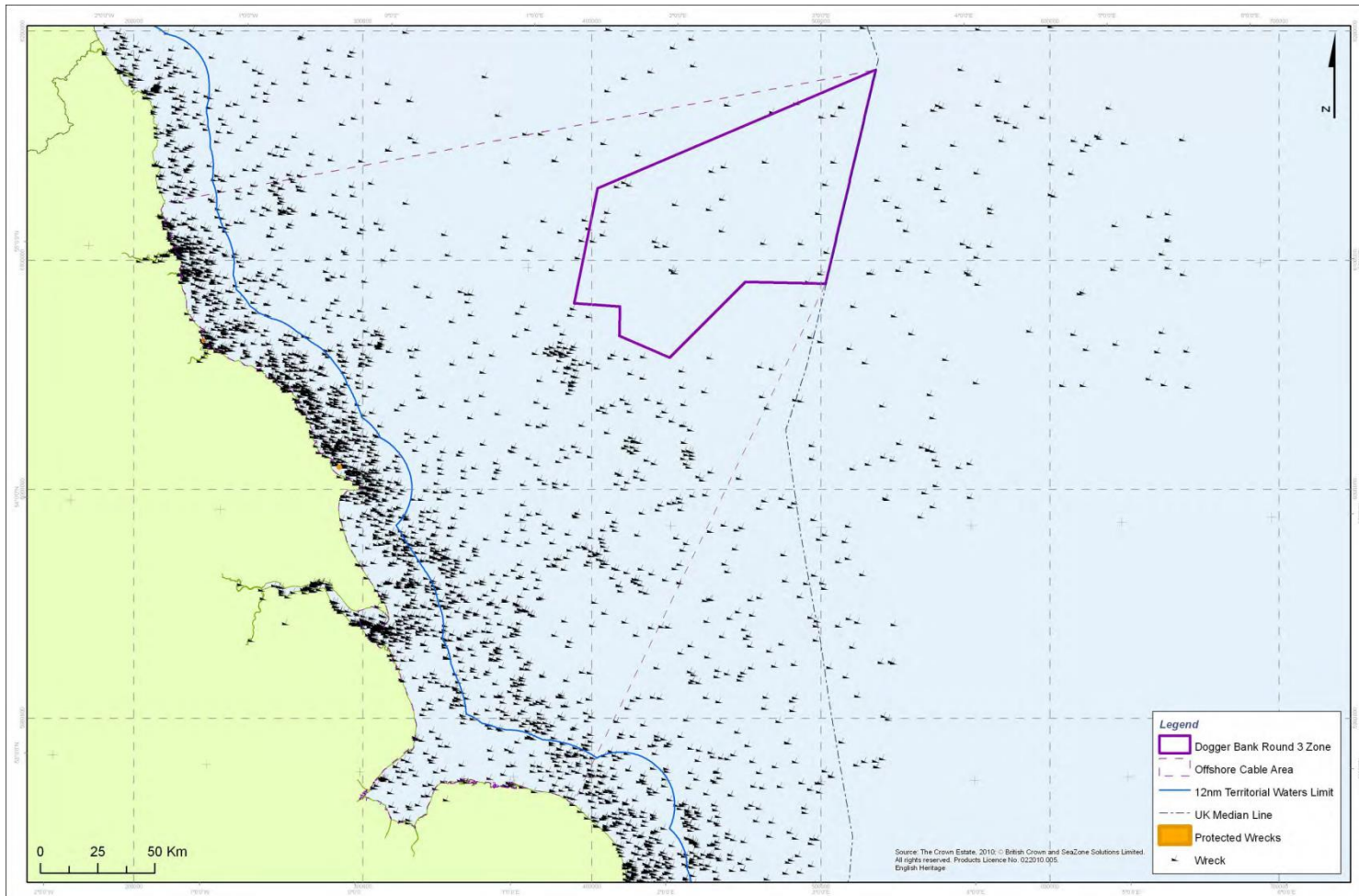


Image courtesy
of Forewind

High-level Zap: Palaeolandscapes

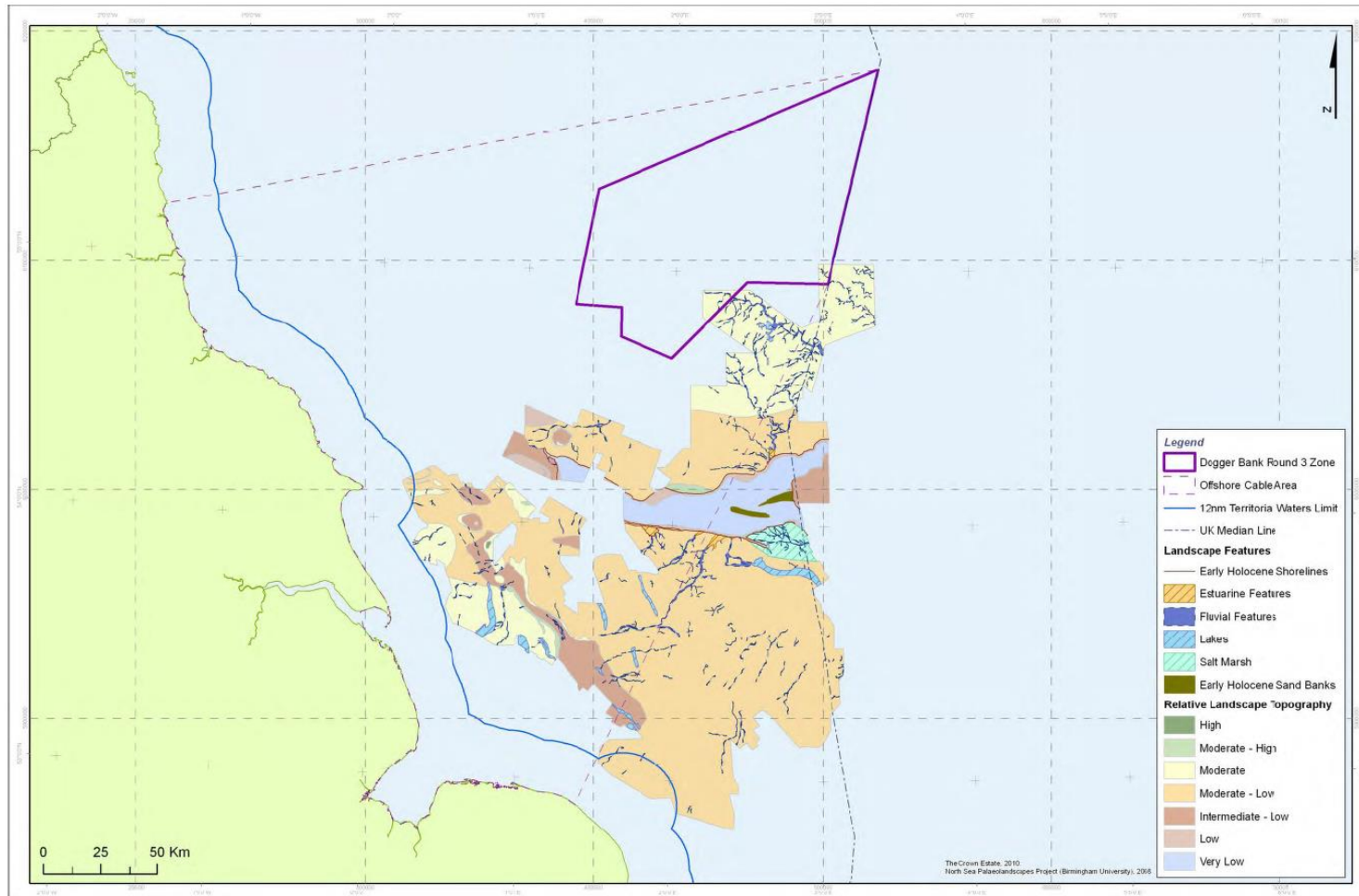
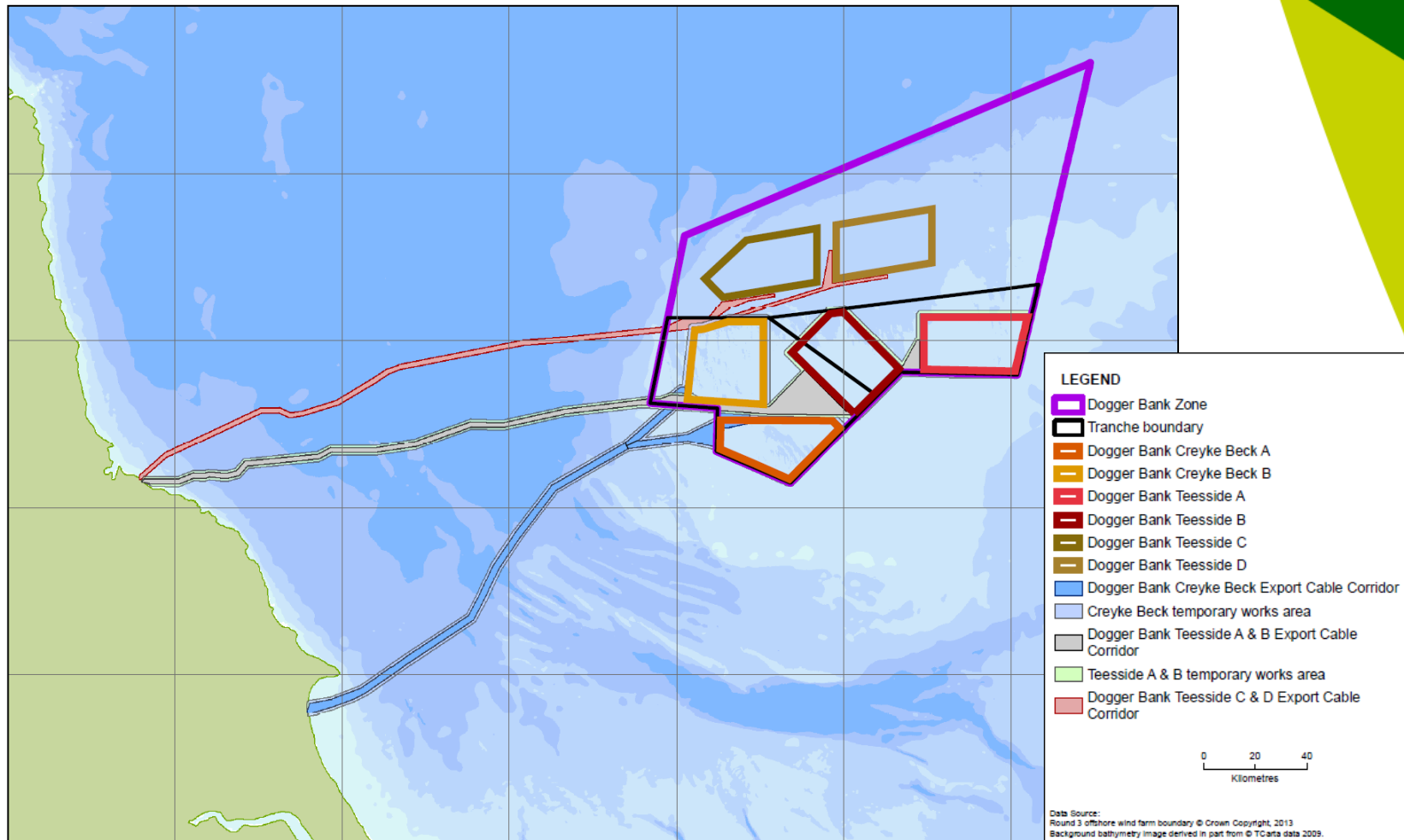


Image courtesy
of Forewind

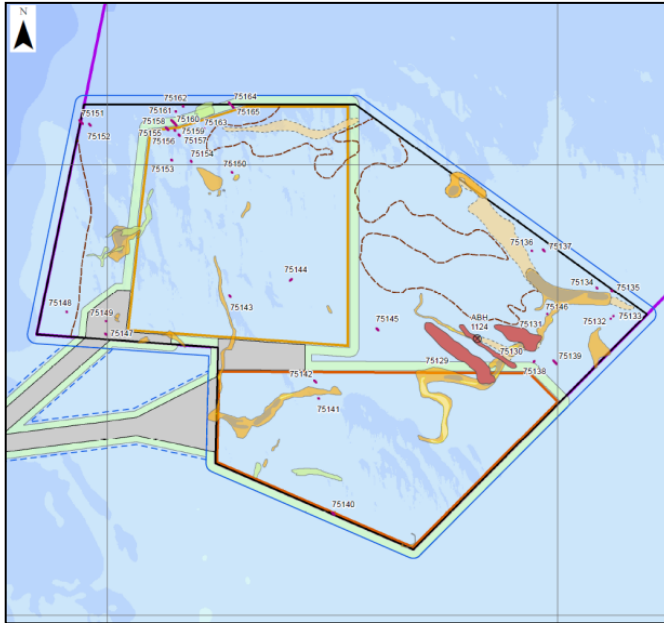
Projects for EIA



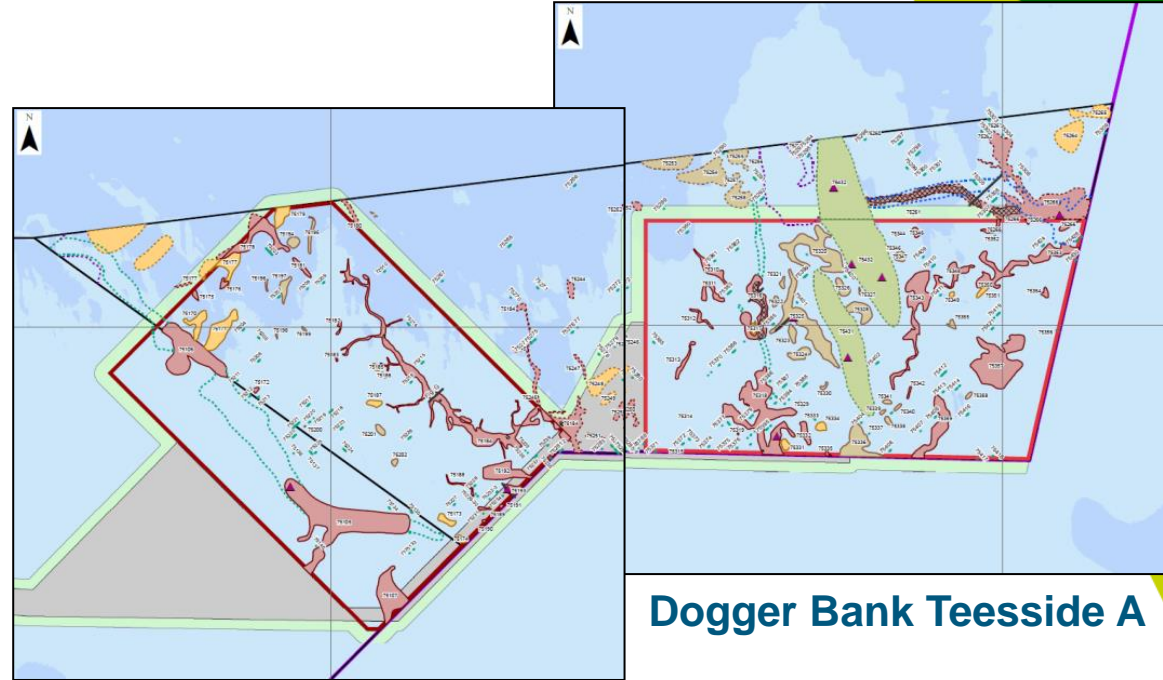
Geophysical Data

- Raw data processed by Wessex Archaeology
- Images optimised for archaeological assessment
- Representative sample of:
 - Sidescan Sonar and Multibeam Bathymetry
= Seabed Features
 - Sub-bottom Profiler
= Buried features (palaeolandscapes)
 - Magnetometer
= Ferrous buried/surface material
- Spatial comparison using ESRI ArcGIS

Palaeolandscapes



Dogger Bank Creyke Beck



Dogger Bank Teesside B

Dogger Bank Teesside A

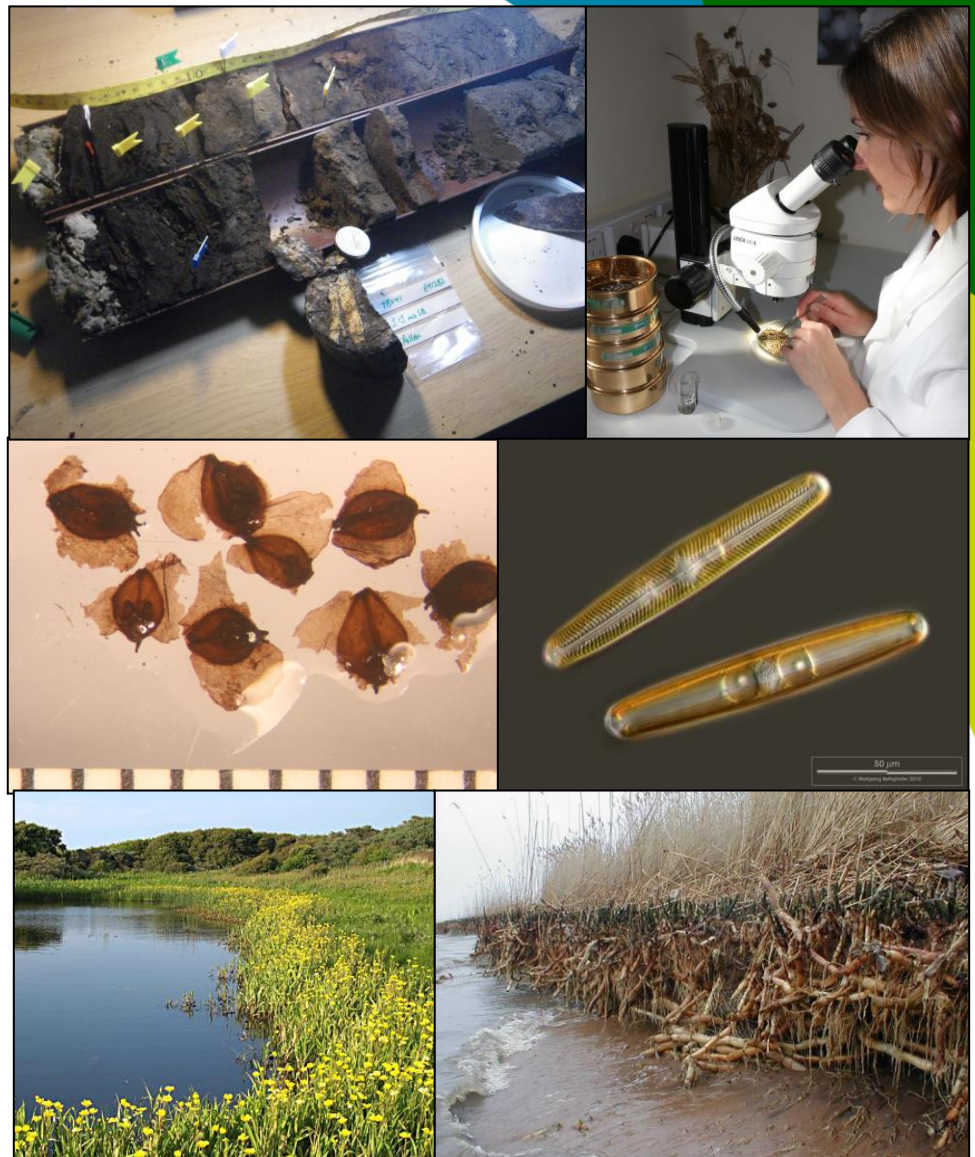
Images courtesy of
Wessex Archaeology

Palaeolandscapes



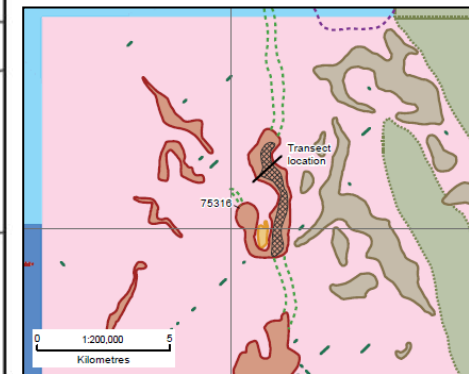
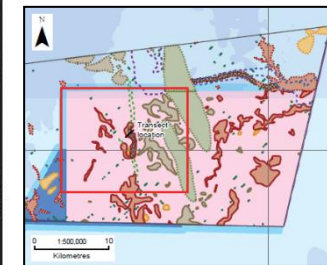
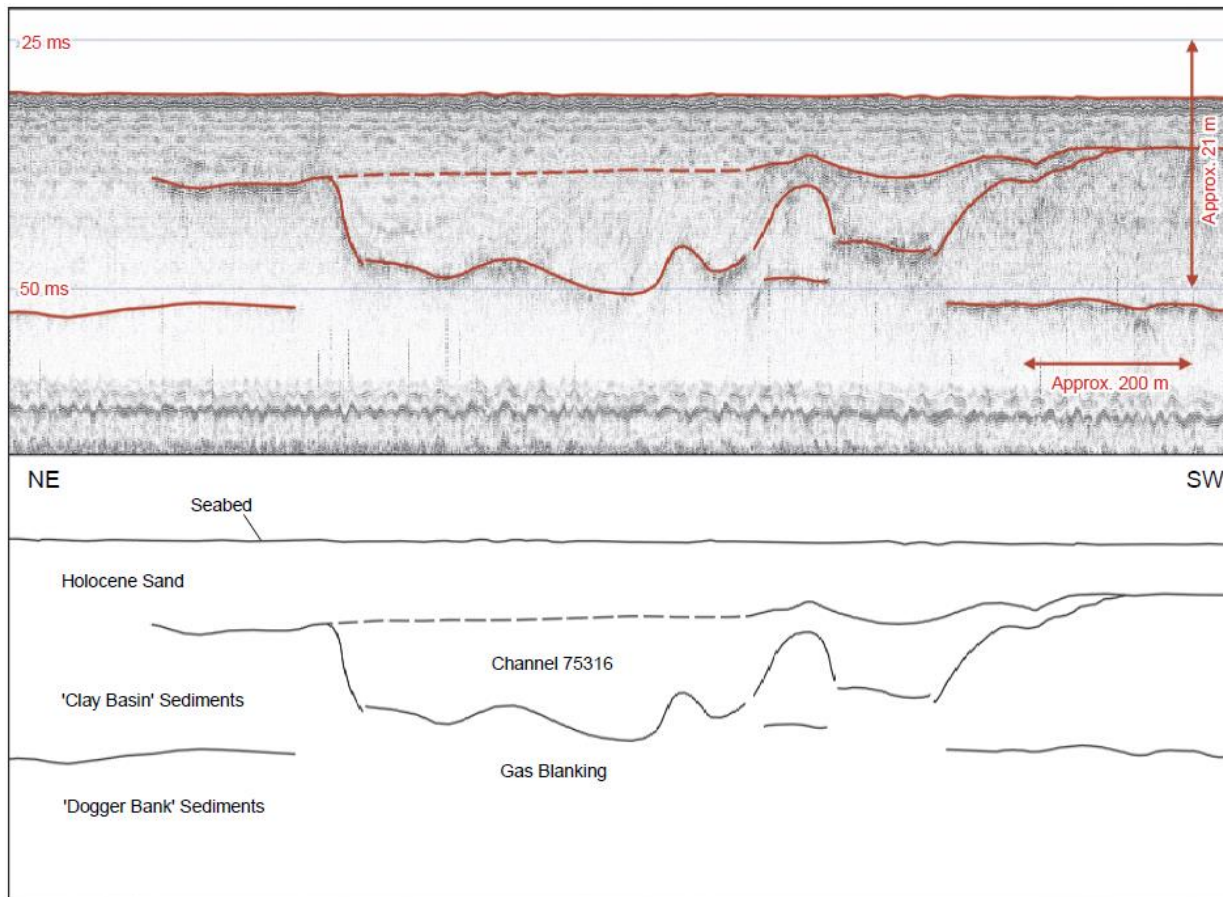
**View of the Mackenzie Delta,
Northern Canada**

Photograph by Sarah Bannon



Images courtesy of Wessex Archaeology

Palaeolandscapes: Data Example



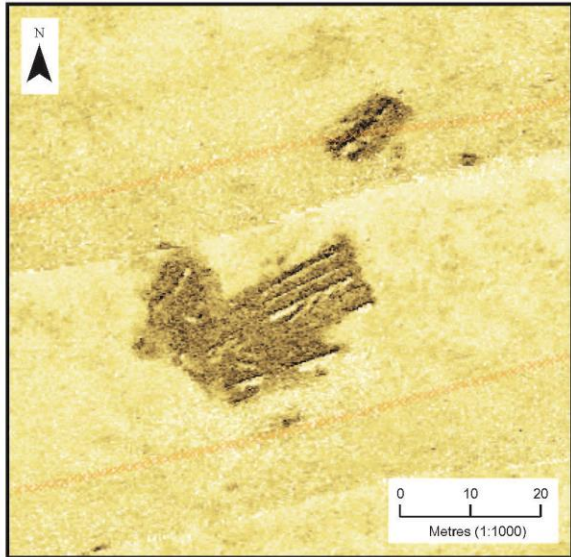
Channel Feature Dogger Bank Teesside A

Images courtesy of Wessex Archaeology

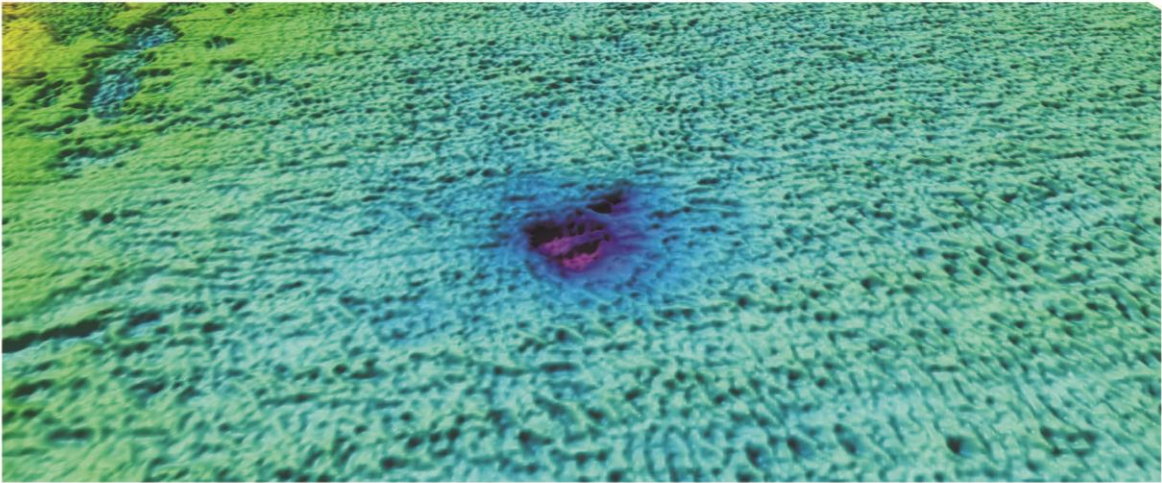
Seabed Features

- In project areas and export cable corridors:
 - United Kingdom Hydrographic Office
 - 99 wrecks and obstructions
 - National Record of the Historic Environment
 - 115 maritime records
 - Historic Environment Record
 - 63 maritime records
- Anomalies in geophysical data
 - corresponded to just 2 of the above

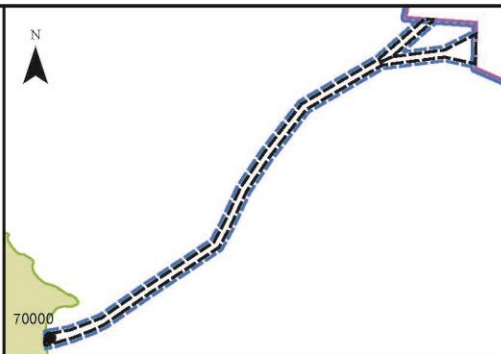
Location		290918 E, 5990495 N (UTM31N)	Route	Coincident
Archaeological Importance		High		
Geophysical survey dimensions and notes		Dimensions: 43.1m x 35.9m x 0.6m. Irregular seabed depression with an elongate central mound. Backscatter data shows a series of parallel linear features which make up the remains of the wreck; no actual recognisable vessel structure is visible. No magnetometer data available in this area.		
Build	Type	Steam Cargo Ship		
	Construction	Single boiler, compound expansion engine of 192HP, single drive shaft.		
	Dimensions	75.77m x 10.39m		
	Shipyard	Kish, Boulds & Co., Sunderland		
Loss	Cause	Torpedoed by UC-16 whilst on passage Gothenburg for London 25/17/1918, towed and attempted to beach but was lost close to shore.		
Extent of Survival		UKHO record this as being the aft section of the wreck, and that the vessel is very broken up and dispersed. Geophysical data seem to confirm this, as no coherent structure appears to remain. Debris is likely to be partially buried in the area, however, with feature 70001 nearby likely to be associated wreckage.		



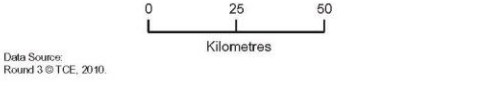
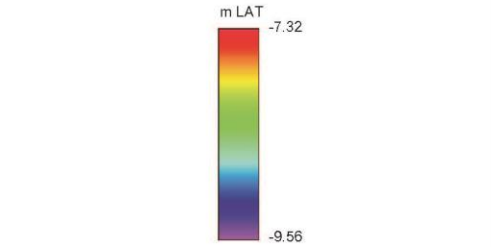
70000: Sidescan sonar



70000: Multibeam bathymetry (facing north, x10 vertical exaggeration)



- LEGEND**
- Tranche A Marine Study Area
 - Export Export Cable Corridor Marine Study Area
 - Tranche A
 - Export Cable Corridor
 - Dogger Bank Offshore Wind Farm



Data Source:
Round 3 © TCE, 2010.

PROJECT TITLE
DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE
**Sheet 8 – Wreck 70000
SS Sote (UKHO 5805)**

VER	DATE	REMARKS	Drawn	Checked
1	01/08/2012		KJF	VC

DRAWING NUMBER:
DataSheets_70000-WA-01

SCALE: 1:2,000,000 PLOT SIZE: A4 DATUM: WGS84 PROJECTION: UTM31N

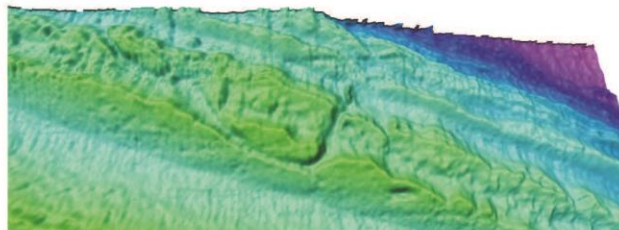
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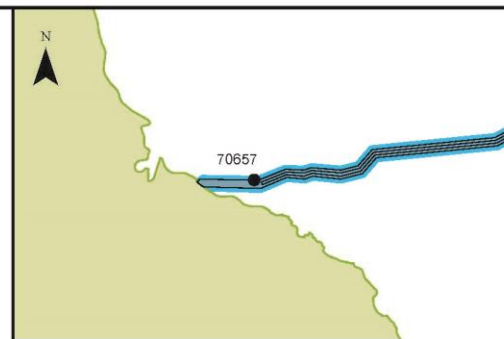
Location		249763 E 6058493 N (UTM31N)	Area	Teesside Cable Route
Archaeological Importance		High		
Geophysical survey dimensions and notes		18.5m x 6.2m x 0.9m. The wreck lies in quite shallow water, recorded at 28m water depth in the nearshore area of the cable corridor. The surrounding seabed is covered in a substantial rocky reef with large cobbles and boulders scattered across the area. In the backscatter geophysical dataset the wreck appears as a discreet large anomaly covered by sands and gravels. The skeleton of the vessel is subtly visible in the geophysical data with some structure of the hull or stern area present and somewhat intact. The wreck is a dark diffuse reflector with a thin and bright shadow visible. This wreck is to some extent visible in the multibeam bathymetry data; however it is not distinguishable as a wreck. There is no supporting magnetometer data available in this location, however according to the wreck records it is of a steel construction and as such will likely be highly magnetic. This is a Live wreck.		
Build	Type	Minesweeper - Previously ex-trawler, 275 tons		
	Construction	Steel		
	Dimensions	Original dimensions unknown		
	Shipyard	Smiths Dock Co. Ltd., Middlesbrough 1916		
Loss	Cause	Mine in 1917 - This vessel was sunk by a mine from the German submarine UC-50 (Rudolf Seuffer), off Skinningrove, nine people were lost as a result of this sinking.		
Extent of Survival		The wreck is in a poor state of preservation according to both geophysical datasets and written accounts. The vessel is recorded as being very broken up and abraded lying on the seabed; it looks to be in a poor state of preservation and is described in the UKHO database as being very decayed and damaged. Divers accounts have noted that this is an armed trawler lying on its port side. The ship's bell was found almost buried on the seabed some 20m off the port side of the vessel.		



70657: Sidescan sonar image of Wreck 70657 18.5m x 6.2m x 0.9m

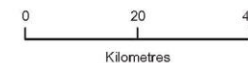
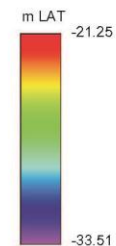


70657: Multibeam bathymetry image looking North x10 vertical exaggeration



LEGEND

- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas



Data Source:
Round 3 © TCE, 2010.

PROJECT TITLE
DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE
**Sheet 7 – HMS Ruthin Castle 70657
(UKHO 6058)**

VER	DATE	REMARKS	Drawn	Checked
1	04/07/2013		KJF	VC

DRAWING NUMBER:
Geophys_WreckSheet7_Teesside_WA-01

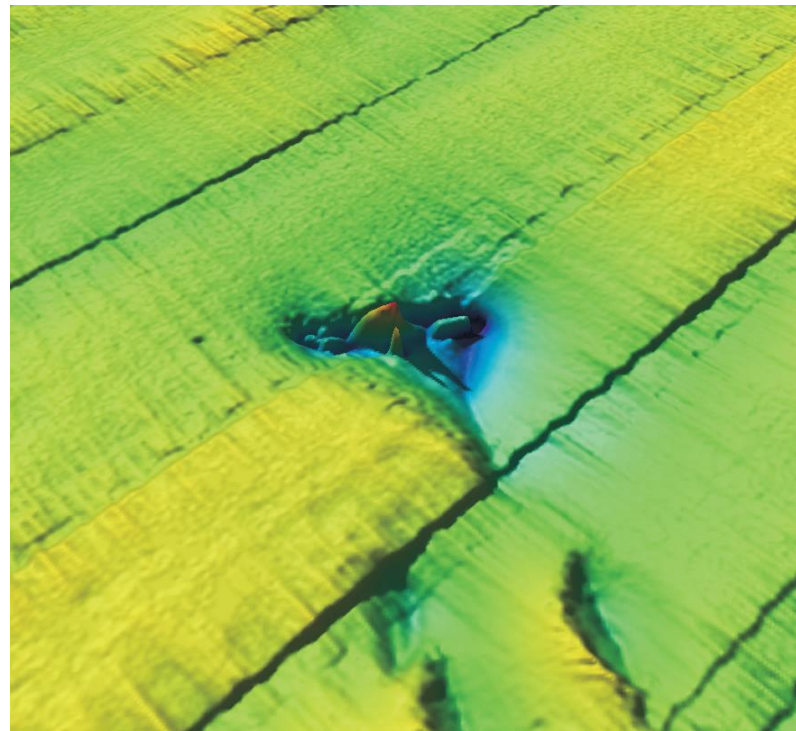
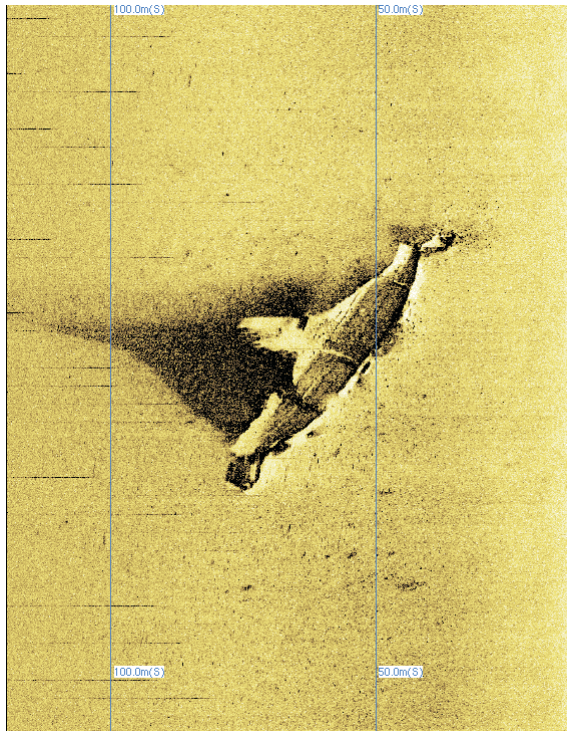
SCALE 1:1,250,000 PLOT SIZE A4 DATUM WGS84 PROJECTION UTM31N

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Seabed Features

- 16 new wrecks
- 484 features of potential anthropogenic origin



**Unidentified
wreck (70502)
Dogger Bank
Creyke Beck A**

Images courtesy of
Wessex Archaeology

Mitigation and next steps?

- Gazetteer mapped against design envelope
- Embedded Mitigation
 - AVOID impacts through design
 - = 58 Archaeological Exclusion Zones (100m)
 - = Micrositing
 - UNAVOIDABLE impacts through SITE SPECIFIC measures
 - = Pre-construction geophysical survey data
 - = Pre-construction geotechnical data
 - = Targeted geoarchaeological survey
 - = Ground truthing (Diver / ROV)
 - = Reporting Protocol (The Crown Estate ORPAD)



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Questions?

Acknowledgements

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Jack Russell

Royal HaskoningDHV Robert Staniland