

# RACE BANK OFFSHORE WIND FARM

## ADDITIONAL 2006 DATA ASSESSMENT

Ref: 62558.03

19/12/2012

### 1. INTRODUCTION

- 1.1.1. The latest version of the Race Bank Offshore Wind Farm Cable Route (RB\_Export\_Routes\_PSR0) was provided to Wessex Archaeology (WA) by Centrica on the 28<sup>th</sup> August 2012 in advance of a proposed programme of geotechnical investigations (**Figure 1**). On review, it was determined that the latest cable route, in places, is situated in areas not previously assessed for archaeological potential. WA undertook a data audit of the 2006 and 2009 data acquired for Race Bank Wind Farm, Docking Shoal Wind Farm and The Wash Cable Route in order to ascertain the volume of existing data requiring archaeological assessment (WA 2012a).
- 1.1.2. Conforming to the original methodology a 500m buffer was placed around the cable route to define the geophysical data assessment area. It should be noted that where the latest cable route is situated towards the edge of the geophysical survey area, full 1km coverage is not possible in four areas along the route (**Figure 2**).
- 1.1.3. Three areas requiring geophysical assessment were identified (**Figures 1 and 2**) and approximately 135 line km of data acquired in 2006 were identified for review. These three study areas were titled Centre, Northeast and Northwest Area for ease of reference. In the Centre Area there was approximately 5km of cable route requiring review. With a 500m buffer this amounted to 58 line km of geophysical data to be assessed. In the Northeast Area 5.6 km of cable route needed to be reviewed amounting to 43 line km of geophysical data. In the Northwest Area 11.6 km cable route requires assessment. Of this, the northern 7.1 km is covered by geophysical data amounting to 34 line km. The southern 4.5km is situated outside the limits of the acquired (2006) geophysical data and as such could not be reviewed (**Figure 2**).
- 1.1.4. Additionally, there are two areas in the centre of the cable route, 500m and 100m respectively, and one to the south where there is a short 300m section of the eastern cable route with no geophysics coverage.

### 2. DATA ASSESSMENT

- 2.1.1. All 2006 sidescan sonar, magnetometer and multibeam bathymetry data within the three study areas were assessed as these areas are outside of those used during the Race Bank Offshore Wind Farm and Wash Cable Route Corridor geophysical assessments (WA 2008 and WA 2007) For the sub-bottom profiler data every fifth line was assessed unless features of interest were seen which could be traced to an adjacent line. In this case further adjacent lines were evaluated until the feature was no longer evident.
- 2.1.2. Although the current three study areas are outside those used during the earlier Race Bank and Wash geophysical assessments they do adjoin them and hence some geophysical anomalies had been identified here during those earlier

assessments. As these features were outside the Race Bank and Wash study areas they were not fully interpreted or included in the geophysical assessments (WA 2008 and 2007). These features were subject to full interpretation and included in the current data assessment where appropriate.

- 2.1.3. The data acquired in 2009 had been fully assessed for the Wash Cable Route Additional Areas (WA 2010) so no further assessment was required. Sites of potential archaeological interest identified during this assessment that lie within the Centre study area were added to the gazetteer and shapefile for this assessment. There is no overlap between any of the Wash Additional Areas and the current Northwest and Northeast study areas (**Figure 1**).

### 3. RESULTS

- 3.1.1. A total of 13 geophysical anomalies and one recorded wreck were identified across the three study areas. These are summarised in **Table 1** and shown on **Figures 2 and 3**. All geophysical anomalies and known wrecks are listed in full in a gazetteer in **Appendix I**.

Feature type	Centre	Northwest	Northeast
Debris	1	0	1
Seafloor disturbance	0	0	1
Wreck	1	0	0
Magnetic	0	1	6
Channel	0	2	0
UKHO record	1	0	0
<b>Total</b>	<b>3</b>	<b>3</b>	<b>8</b>

**Table 1: Summary of geophysical anomalies and known wrecks**

- 3.1.2. As this assessment brings together anomalies from several different assessments the ID numbers for the wrecks and anomalies are not included as a continuous sequence. All the features except **7010** were identified during the various assessments of the 2006 dataset. Feature **7010** was interpreted from the 2009 dataset as part of the Wash Cable Route Additional Areas (62556.04).

### 3.2. CENTRE AREA

- 3.2.1. Three features of known or potential archaeological interest were interpreted within the Centre Area (inset **Figure 2**).
- 3.2.2. It should be noted that there are some navigational or positioning issues within the Wash geophysical data that covers this study area. Site **6319** is an uncharted wreck that was detected in the geophysical data. It was identified in both the sidescan sonar and bathymetry data but the anomalies lie with their centres approximately 40m apart.
- 3.2.3. The site is a broken up wreck measuring 38.6 x 16.9 x 0.8m in the sidescan sonar data and 48 x 14 x 1.2m in the bathymetry data. There is no magnetic anomaly associated with it so it is likely to be a wooden wreck.
- 3.2.4. There is one known wreck within this study area. Site **6916** is the wreck of the *Mirabel*. The UKHO records this as a small motor fishing vessel that sank in 1993. It was not detected in the geophysical data.

- 3.2.5. The third and final feature in the Centre Area, **7010**, contains two linear items of debris lying 6m apart. The larger item measures 8.5 x 2.8m and the smaller measures 7.2 x 2.7m.

### 3.3. NORTHWEST AREA

- 3.3.1. Three features of potential archaeological interest were interpreted within the Northwest Area (**Figure 3**).
- 3.3.2. A single small magnetic anomaly, **6906**, is located within this area. It is a small dipole with an amplitude of 7.6nT and is likely to be caused by a small piece of buried ferrous debris. It is not possible to tell whether the debris is modern or archaeological in nature.
- 3.3.3. At the northern end of the Northwest Area are located two buried channels, **6908** and **7172**. The larger of the two, **7172**, extends into the Northwest Area from the Race Bank study area to the north. In the Race Bank area it appeared as a broad, shallow channel filled with fine-grained stratified sediments. In the current investigation the southwestern extension of this channel appears shallower and more discontinuous. The nature of the fill also appears less clear with some sections containing stratified sediments and others appearing to contain a less structured fill.
- 3.3.4. The smaller channel, **6908**, may be a further extension or remnant of **7172** but is not seen directly to the south of **7172** (**Figure 3**).
- 3.3.5. Both channels have the potential to contain post-Devensian archaeological and palaeoenvironmental material.

### 3.4. NORTHEAST AREA

- 3.4.1. A total of eight features are located within the Northeast Area. Of these features, six (**6912-15** and **7300-01**) are isolated magnetic anomalies which range in amplitude between 6.7nT and 99.7nT. They are likely to represent buried ferrous debris.
- 3.4.2. Of the remaining two features **7302** is a seafloor disturbance and **7303** is an item of debris. Site **7302** measures 25.3 x 9.4m in the sidescan sonar data, where it appears as an indistinct area of dark reflectors. It is also visible in the bathymetry data as a low mound measuring 34 x 12 x 0.7m.
- 3.4.3. Site **7303** consists of a single linear item of debris measuring 14.1 x 4.7 x 0.7m. Although likely to be of anthropogenic origin it is not possible to tell whether the object is modern or archaeological in nature.

## 4. CONCLUSIONS

- 4.1.1. All three study areas contain low numbers of sites of archaeological potential. The Centre Area in the Wash is the only study area to contain a wreck and contains both an uncharted wreck seen in the geophysical data and the UKHO record for a second wreck for which no evidence was seen.
- 4.1.2. None of the seabed features interpreted are located at a proposed borehole location and there is therefore no requirement for any of these locations to be moved. A single proposed borehole lies within an interpreted palaeochannel (**7172**). This borehole does not need to be moved to avoid the feature and indeed may provide valuable information about the nature of the feature should the geotechnical

samples be made available for archaeological assessment. Further details on this are included in Mitigation section below.

- 4.1.3. The study areas contain mobile seabed sediments with large sandwaves in some areas. In the Northwest Area these were seen to be up to 13m or more in height. Such mobile sediments, particularly the large sandwaves, have implications for the survival and condition of archaeological sites as well as the identification of their presence. The presence of sandwaves indicates that the environment is mobile, with archaeological sites possibly subject to cycles of exposure and burial which will make them vulnerable to deterioration. Additionally, sandwaves may be extensive enough to cover archaeological sites making their detection problematic. It is therefore likely that the study areas contain further sites of archaeological potential that have not been detected.
- 4.1.4. The offset between the anomalies identified in the sidescan sonar and multibeam bathymetry datasets for the wreck site **6319** leads to concerns that there are inaccuracies in the positioning of one or more of the geophysical datasets in the Centre Area. The datasets acquired in 2006 were not collected specifically for archaeological purposes. The interpretation of future datasets acquired with higher resolution and that are more suitable for archaeological assessment will be beneficial for increasing confidence in the archaeological interpretation of the area.

## 5. MITIGATION

- 5.1.1. Archaeological Exclusion Zones (AEZs) will be the principle means to preserve *in situ* the sites, features or deposits of potential or known archaeological interest discussed above.
- 5.1.2. The majority of features (12 of 14) are not clearly of archaeological interest and require further investigation to determine whether they are anthropogenic in origin. They will not be subject to AEZs. However, where practical these anomalies should be avoided. In areas where these anomalies are densely concentrated and avoidance is not possible the sites subject to impact by the cable route and construction within the wind farm area should be assessed on a case by case basis during the initial design construction phase. This will result in either excluding those anomalies of archaeological significance or disregarding those comprising modern debris. These proposed exclusion zones and required mitigation will be outlined in the annex to the existing WSI once the development scheme has been established and further information on the anomalies has been obtained via routine construction surveys (Pre-lay Grapnel Run).
- 5.1.3. Implementation of AEZs is recommended for the two wrecks, **6916** and **6319**. The former is the position of the wreck of a fishing vessel recorded by the UKHO. Although unlikely to be of archaeological interest an exclusion zone is recommended to prevent damage occurring during development activities that may occur through contact with the site. Although the UKHO record this site as a live wreck no evidence has been seen for it in the geophysical data and an exclusion zone of 100m radius around the recorded position is therefore proposed.
- 5.1.4. Site **6319** is an uncharted wreck, likely to be of wooden construction. An exclusion zone of 50m buffered around the extent of the wreck as seen in the geophysical data is recommended. As the site appears in positions 40m apart in the multibeam bathymetry and sidescan sonar datasets the extent of the site has been determined as the sum of the areas covered in each dataset. This was then buffered by 50m to produce the AEZ.

- 5.1.5. The sites for which AEZs are recommended are indicated in **Figures 2 and 3**.
- 5.1.6. In terms of the palaeolandsurfaces indicated by the channels in the Northwest Area, provision should be made, where practicable, for the complete recovery of cores containing pre-inundation prehistoric material and/or organic deposits, and for the archaeological analysis of a suitable number of core samples. WA employ a five stage geotechnical assessment process which would be applicable to any planned geotechnical works within the study areas. Provision for such works is included in the revised Written Scheme of Investigation for Race Bank (WA 2012b)
- 5.1.7. At present a single proposed core location, RB\_ER\_DDVCPT-VC\_159, is situated near the southern edge of the larger part of feature **7172 (Figure 3)**. It may be appropriate for additional cores to be acquired within the main body of the feature and made available specifically for archaeological analysis and interpretation.

## 6. BIBLIOGRAPHY

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- Wessex Archaeology 2008, *Race Bank Offshore Wind Farm, Archaeological Assessment*, ref 62554.04, unpublished client report
- Wessex Archaeology 2010, *Race Bank and Docking Shoal Offshore Wind Farms, Additional Areas in the Wash: Assessment of Geophysical Data and Archaeological Impact Assessment*, ref 62556.04, unpublished client report
- Wessex Archaeology 2012a, *Race Bank Offshore Wind Farm, Data Audit of 2006 and 2009 Data*, ref 62558.01, unpublished client report
- Wessex Archaeology 2012b, *Race Bank Offshore Wind Farm, Archaeological Monitoring and Mitigation: Written Scheme of Investigation Revised*, 62555.05, unpublished client report

**7. APPENDIX I: KNOWN WRECKS AND GEOPHYSICAL ANOMALIES**

WA ID	Name / Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External References	62558 Area	Dataset	Exclusion Zone
6319	Wreck	334532	5888162	A1	48	16.9	1.2		Uncharted, broken up wreck. Appears in the sidescan sonar data as a discrete area containing debris, including several long linear features. There is no magnetic anomaly so it is likely to be wooden. A mound is visible in the bathymetry data 40m to the southwest of the sidescan position. It is in an area of uneven seafloor at the junction of 2 lines suffering from edge effects.		Centre	2006	50m buffer
6916	<i>Mirabel</i>	334775	5887206	A3	9.8				Wreck of a British fishing boat that sank on 17/12/1993. Classified as live. Not seen in the geophysical data.	UKHO 9176	Centre	2006	100m radius
7010	Debris	334820	5888232	A2	8.5	2.8	0		Two pieces of elongated debris measuring 7.2m x 2.7m and 8.5m x 2.8m lie approximately 6m apart. A third anomaly lies 30 north of these two objects. The third one measures 6.1m x 1.2m.		Centre	2009	
6906	Magnetic	348921	5906635	A2				7.6	Small dipole		NW	2006	

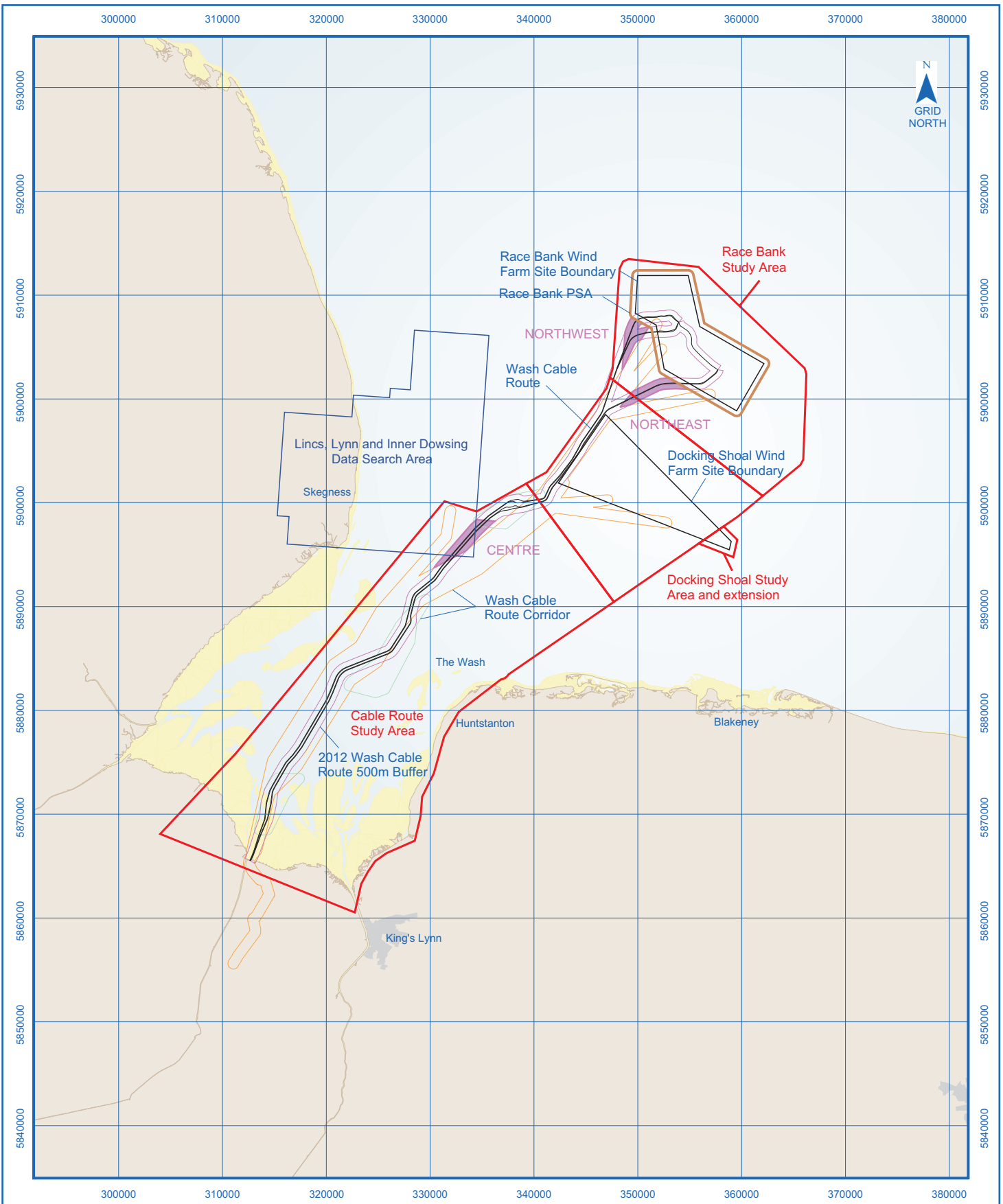
WA ID	Name / Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External References	62558 Area	Dataset	Exclusion Zone
6908	Channel	349792	5906819	A2	N/A	380			Channel feature observed in a single line of data. It may be a continuation/remnant of the larger 6910 to the north and west. It is a shallow feature with an approximate depth of 1.5m below the base of the overlying sandwaves. Depth below seabed of 9.3 - 13.7m.		NW	2006	
7172	Channel	350800	5907407	A2	3750	1400			Intermittent channel feature observed on 16 lines of data. In the NE it appears as a broad, shallow channel that becomes discontinuous to the SW. Depth below seabed 1.5 - 21.2m. Sediment fill is observed as stratified sediments in the NE. In the SW the fill is less distinct.		NW	2006	
6912	Magnetic	350205	5900516	A2				99.7	Medium negative anomaly, possibly resulting from buried ferrous material.		NE	2006	
6913	Magnetic	351142	5900359	A2				6.7	Small dipole. Possibly indicates a small item of buried ferrous material.		NE	2006	
6914	Magnetic	351720	5900970	A2				18.3	Small dipole. Possibly indicates a small item of buried ferrous material.		NE	2006	

WA ID	Name / Classification	Easting	Northing	Archaeological Discrimination	Length (m)	Width (m)	Height (m)	Magnetic Amplitude (nT)	Description	External References	62558 Area	Dataset	Exclusion Zone
6915	Magnetic	351700	5901720	A2				18.9	Small positive anomaly possibly indicative of buried ferrous material. Lies approx 40m NW of 3012 and 30m NW of 5000.		NE	2006	
7300	Magnetic	353190	5901650	A2				22.2	Anomaly with magnetic amplitude of 22.2nT		NE	2006	
7301	Magnetic	350765	5901285	A2				9.7	Anomaly with magnetic amplitude of 9.7nT		NE	2006	
7302	Seafloor disturbance	351723	5901699	A2	34	15.3	0.7		Indistinct area of raised seabed which is seen in the sidescan data to contain dark reflectors on a sandy seabed. A low mound is seen in the bathymetry data.		NE	2006	
7303	Debris	350399	5901161	A2	14.1	4.7	0.6		Linear object with height. On flat area of seabed but with ripples nearby.		NE	2006	

### Notes

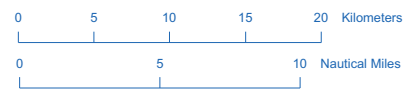
- All coordinates are given in WGS84 UTM Zone 31 North
- Positions and dimensions are given as a guide only
- This gazetteer is illustrated in **Figures 2 and 3**





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**RACE BANK OFFSHORE WIND FARMS**

DRAWING TITLE:  
**Race Bank OWF, Wash Cable Route & Adjacent Wind Farm Areas**

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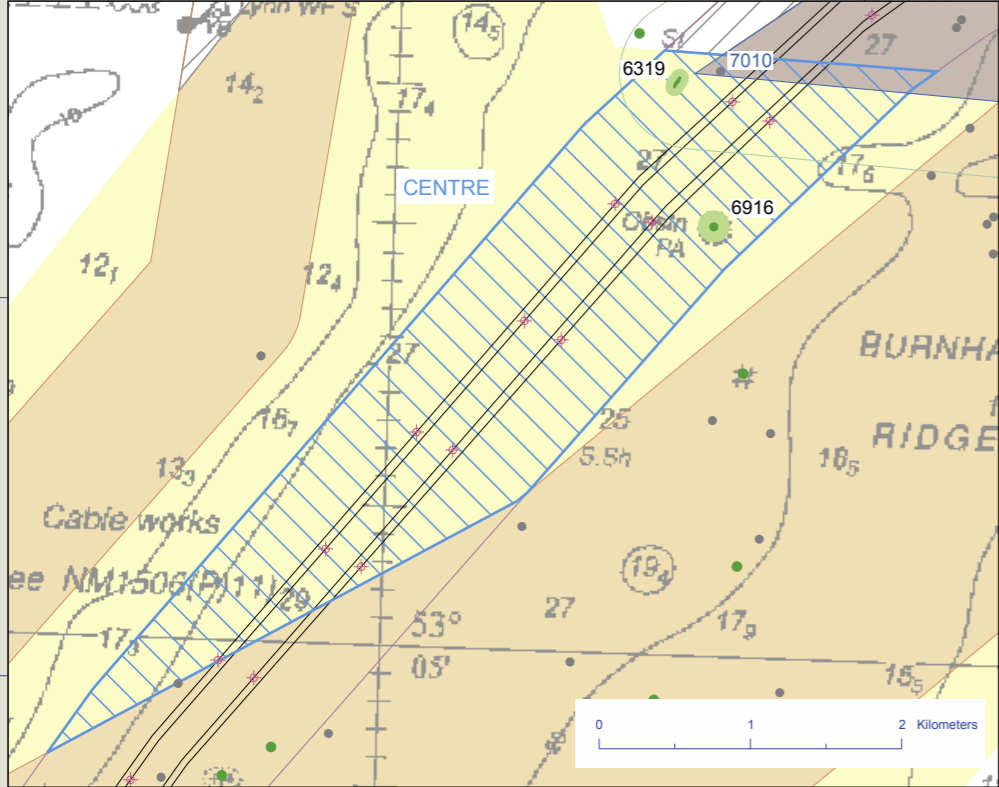
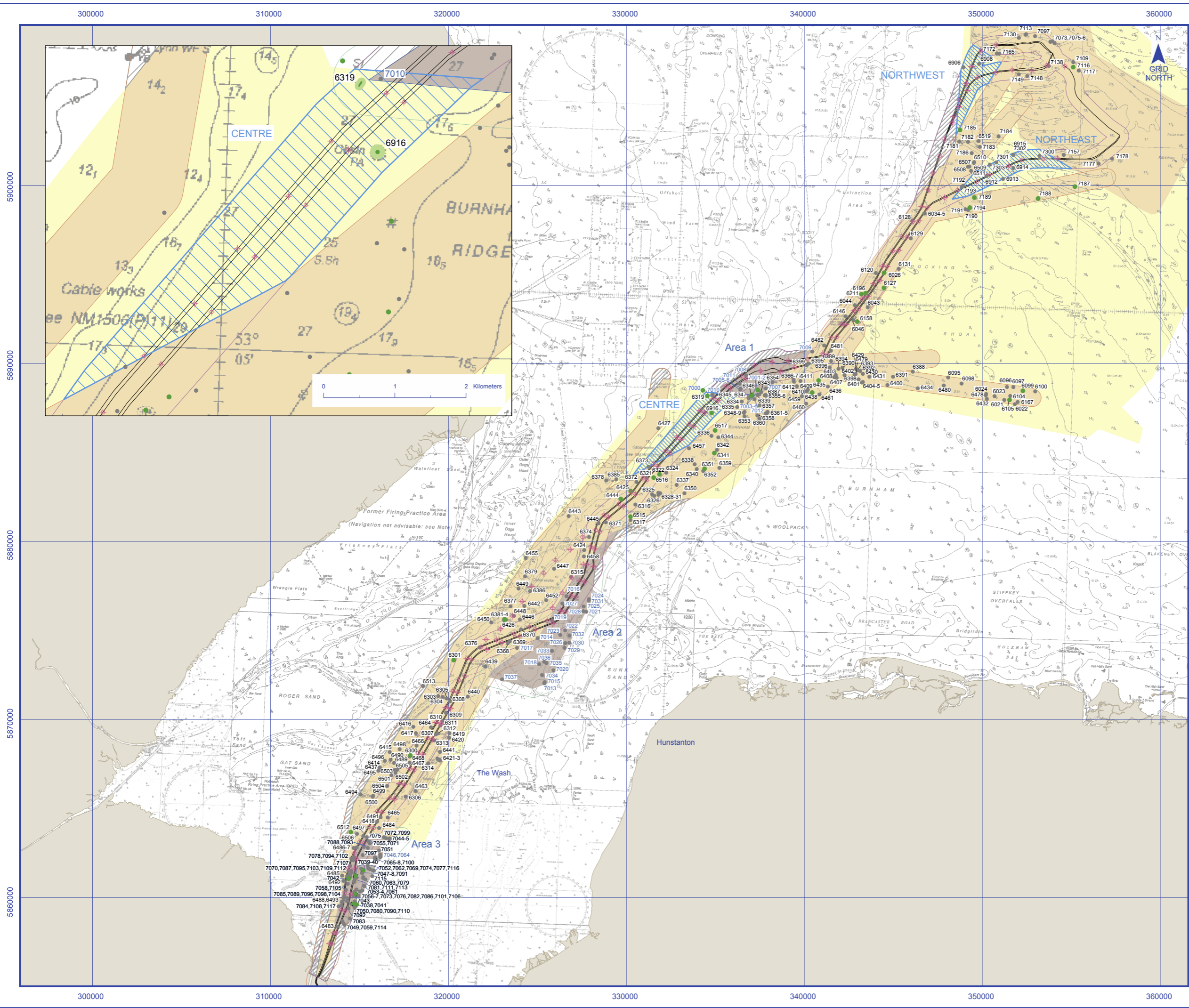
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- Sites Subject to Exclusion Zones
- Archaeological Exclusion Zones
- Anomalies requiring further investigation
- Updated Cable Routes
- Wash Cable Route Corridor
- 2012 Wash Cable Route 500m Buffer
- ▨ Cable Route Corridor additional areas - 2006 data (500m buffer)
- ▨ Cable Route Corridor additional areas - 2009 data (500m buffer)
- 2009 geophysical data assessed
- 2006 geophysical data assessed
- 2006 geophysical survey data coverage
- ▨ Areas not covered by geophysical survey data
- 6000 Data from Wessex Archaeology Assessment of 2006 Geophysics (ref. 62550, 62551 & 62554)
- 7000 Data from Wessex Archaeology Assessment of 2009 Geophysics (ref. 62556)
- ⊕ Proposed Geotechnical Sample Locations



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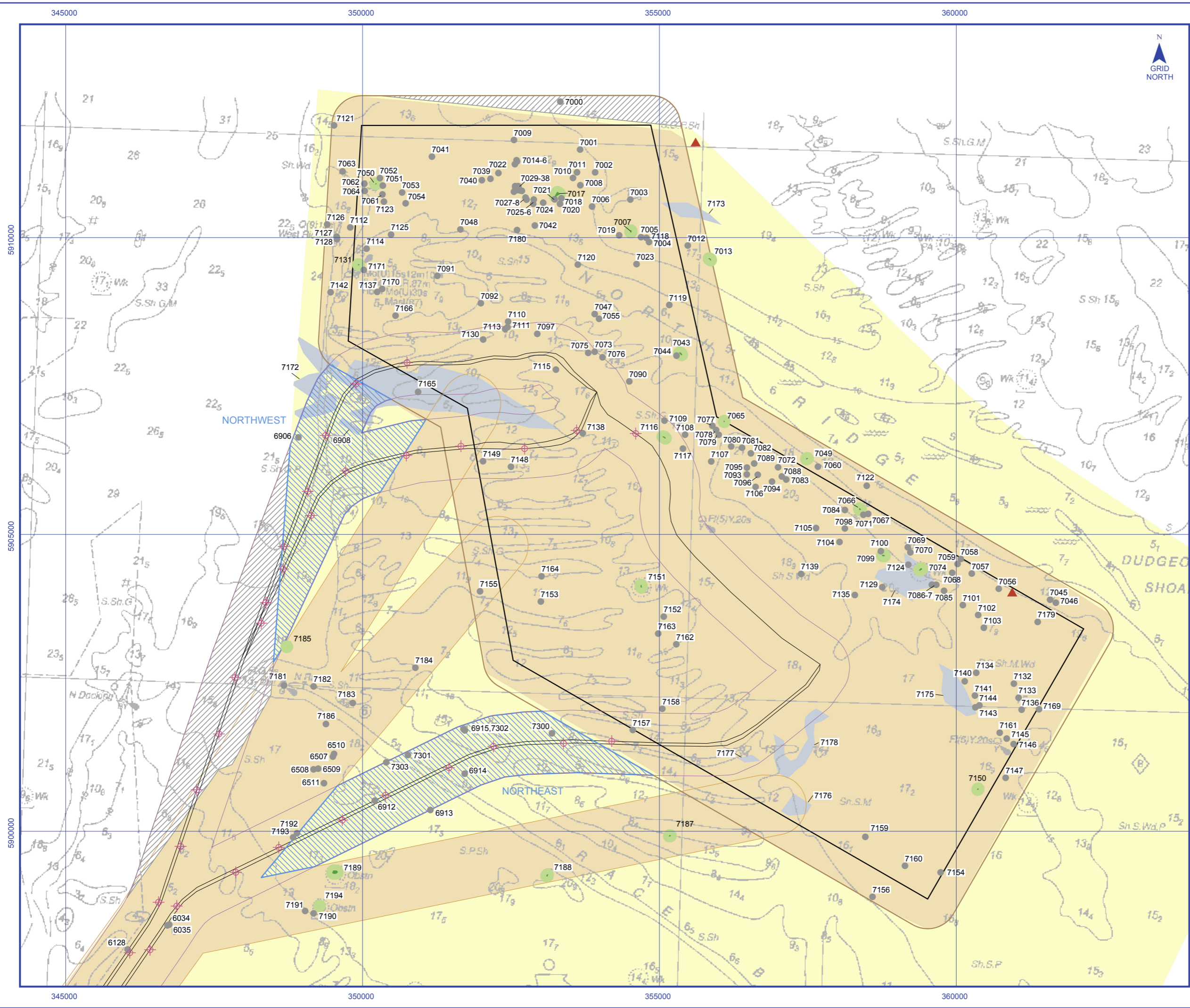
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DRAWING TITLE: **Geophysical Anomalies and Known Wrecks in the Cable Route Corridor**

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- Palaeochannels
- Sites Subject to Exclusion Zones
- Archaeological Exclusion Zones
- Anomalies Requiring Further Investigation
- Named Location
- Race Bank Wind Farm Site Boundary
- Principal Study Area
- Updated Cable Routes
- Wash Cable Route Corridor
- 2012 Wash Cable Route 500m Buffer
- Cable Route Corridor additional areas - 2006 data (500m buffer)
- 2009 geophysical data assessed
- 2006 geophysical data assessed
- 2006 geophysical survey data coverage
- Areas not covered by geophysical survey data
- Proposed Geotechnical Sample Locations



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