# LONDON ARRAY OFFSHORE WIND FARM PHASE 1

# INTER-TIDAL GEOPHYSICAL DATA ASSESSMENT FOR CANTERBURY CITY COUNCIL JANUARY 2011

FEPA Licence 32945/09/2

CPA Consent 32945/06/0/CON

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LONDON ARRAY LIMITED

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**CONTROLLED DOCUMENT**

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| A | 16.12.2010 | HM | Updated report to include Canterbury City Council Planning Boundary Information | HM | PE |
| B | 28.1.2011 | HM | Updated report to include more background information on the geophysical techniques, and to address comments received from Richard Cross the Canterbury City Archaeologist | HM | PE |

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## INTER-TIDAL GEOPHYSICAL DATA ASSESSMENT FOR CANTERBURY CITY COUNCIL JANUARY 2011

**C O N T E N T S**

Page

## EXECUTIVE SUMMARY

London Array Limited (LAL), a consortium composed of three shareholders (E.ON, DONG Energy and Masdar) has planning consent to construct an offshore wind farm in the outer Thames Estuary more than 20km off the Kent and Essex coasts.

London Array Limited has appointed Helen Moore Senior Archaeological Consultant of Gifford as the Retained Archaeologist for both the onshore and offshore works, in collaboration with Dr Justin Dix and Dr Fraser Sturt of the University of Southampton.

A completely new geophysical survey has been taking place during 2010 and into early 2011 across the locations of the wind farm turbines, inter-array cables, the two off-shore substations, the export cable route and also the inter-tidal area where the cables will come onshore. The geophysical surveys are being undertaken in order to provide up to date detailed information for the LAL engineers, for Environmental Consent purposes, for archaeological purposes and also to acquire Unexploded Ordnance (UXO) information.

A study of the inter-tidal geophysical survey data received to date (December 2010) has been carried out by the Gifford Retained Archaeologists in order to identify features of archaeological significance in the area where the wind farm export cables will come ashore. Following careful analysis of all data sets, no targets of demonstrable archaeological importance were found that conflicted with the area of direct impact caused by installation works.

The Retained Archaeologists have identified two side scan sonar anomalies within the planning boundary of Canterbury City Council (CCC) which may have archaeological potential. One of these targets lies outside the buffered impact zones, whilst the other is small in nature and lies within the 10-20m buffer. It is therefore considered to lie beyond the immediate impact zone for the cable installation. This feature (GA 3) is also considered to be of low overall archaeological potential and is more likely to relate to bedforms in the area.

Despite the conclusion that the various anomalies have low archaeological potential, EMU Ltd has identified a large number of magnetic anomalies within the inter-tidal zone. Twenty one (21) of these anomalies lie within the CCC boundary. After review of the pinger, swath bathymetry and side scan sonar data, none were seen to have clear archaeological significance. However, it is possible that a number of these anomalies may prove on further investigation to be of archaeological interest. The most appropriate mitigation of potential disturbance of archaeological remains of this nature during installation is via a Finds Reporting Protocol often used within the marine zone where construction tends to be a 24 hour operation involving multiple vessels, and where conventional watching briefs are not cost effective. The reporting structure is set out in the original Wessex Archaeology (WA) Written Scheme of Investigation (WSI) in Section 8.6 *Finds Reporting Procedure,* and draft guidance and reporting forms and responsibility diagrams are set out in Appendix A.

## 1. INTRODUCTION

1.0.1 London Array Limited (LAL), a consortium composed of three shareholders (E.ON, DONG Energy and Masdar) has planning consent to construct an offshore wind farm in the outer Thames Estuary more than 20km off the Kent and Essex coasts. Once completed the wind farm will include up to 341 turbines generating 1000MW of electricity. The wind farm will be constructed in two phases, with Phase 1 incorporating 175 turbines over approximately 100km² with two associated offshore substations and an onshore substation at Cleve Hill in Kent (currently under construction).

1.0.2 This document reports on an assessment of the archaeological and geophysical data obtained from consents and engineering geophysical surveys during 2010 for the inter-tidal area where the export cables for the wind farm will come ashore (shown in figure 1). This assessment has been undertaken in order to review the data for its archaeological potential and any conflicts with the cable route and installation design which may occur within the boundaries of Canterbury City Council who have jurisdiction over a small zone of the inter-tidal area (see figure 1).

1.0.3 Helen Moore Senior Archaeological Consultant of Gifford is the retained Archaeologist for the London Array Ltd for both the onshore and offshore works, in collaboration with Dr Justin Dix and Dr Fraser Sturt of the University of Southampton. Gifford were appointed as the Retained Archaeologists for London Array Ltd in June 2009, and since their appointment have been undertaking a review of the existing geophysical information associated with Archaeological Exclusion Zones identified and created by Wessex Archaeology, and also the new geophysical 2010 survey data with regard to advising on the final design of the wind farm and the archaeological implications of this design.

## 2. PROJECT BACKGROUND AND PLANNING

2.0.1 An Environmental Statement was prepared by RPS Planning and Development in 2005, which included a chapter on the Historic Environment. This detailed the archaeological background to the development site for both the onshore and offshore works. Planning consent for the works was subsequently granted subject to a number of conditions for the offshore works under the Coastal Protection Act 1949 (CPA) and The Food and Environmental Protection Act 1985 (FEPA). The following consents are relevant for the offshore works:

- A Geotechnical Campaign
- Coastal Protection Act 1949

  *1. Prepare and agree Written Scheme of Investigation with English Heritage*

- FEPA Food and Environmental Protection Act 1985

  *1. Conform to the recommended procedures and consultation and co-operation between seabed developers and archaeologists as set out in the Joint Nautical Archaeological Committee's (JNAPC) Code of Practise for Seabed Developers*

  *2. Report any wreck material recovered to the Receiver of Wreck*

- Port of London Authority River Works License •

1. *Produce written scheme of investigation for approval by LPA*

2.0.2 Curatorial responsibility for the sub-tidal aspects of the project (outside of the jurisdiction of the local planning authority) resides with English Heritage. Kent County Council Heritage Conservation Group (KCCHCG) is responsible for curatorial advice for the inter-tidal and terrestrial zones of the project, and a small area of the inter-tidal zone is also under the jurisdiction of Canterbury City Council.

2.0.3 Planning Consent for cable laying within the inter-tidal area has been granted by Canterbury City Council subject to a number of conditions, of which Condition 3 pertains to the archaeology of the inter-tidal area:

*3 Before the commencement of the laying of cables hereby permitted an assessment of the archaeological resource within the inter-tidal area and sea bed affected; including any mitigation of safeguarding measures shall be submitted to and approved by the Local Planning Authority. Any such measure approved shall be implemented in full unless otherwise agreed in writing by the local planning authority. This condition acknowledges the initial investigation and walkover study undertaken in February 2009 and reporting in October 2009 by Wessex Archaeology (ref 67112.03) and submitted to the local planning authority under reference CA/09/0221/SOD.*

*Reason: To ensure the appropriate assessment of the archaeological implications of the development and the subsequent mitigation of adverse impacts.*

2.0.4 This document reports on the assessment of the archaeological resource within the inter-tidal area to be affected by the layjng of the export cables, and provides background information on the proposed mitigation for any unknown archaeological features and finds which may potentially be found during the cable laying operations. Further documents will be produced and submitted to Canterbury City Council following the production of this report detailing the protocols to be followed with regard to archaeological mitigation and finds reporting.

## 3. BASELINE ARCHAEOLOGICAL INFORMATION

3.0.1 Wessex Archaeology produced a Written Scheme of Investigation (WSI) for the London Array project in 2008. This document was written as part of the mitigation outlined within the Environmental Statement of June 2005. This was produced following collection of archaeological data within a defined study area in order to understand the archaeological implications of the development. The archaeological baseline information was presented within the London Array Offshore Wind Farm *Archaeological Assessment: Technical Report* (WA 2005). Data within or close to the inter-tidal study area is considered here (shown in figure 1 below). The following numbers of sites and areas of potential were identified:

- 19 sites and finds;
- 1 unidentified shipwreck
- 5 side scan sonar contacts
- Noted potential for the survival of submerged landscape evidence, palaeo-environmental evidence and prehistoric sites and finds within the wind farm and cable route study areas.

3.0.2 Based on the Wessex Archaeology data review an inter-tidal walkover survey was carried out by Wessex Archaeology on the 17th to 19th February 2009 (WA report 67112.04). The purpose of the walkover survey was to identify archaeological sites and features within the inter-tidal section of the cable route, and to record, classify and obtain fixed positions for all visible sites, monuments and stray archaeological finds within this area. Walkover survey is considered to be the best way of identifying surface archaeological features given the often cluttered nature of the inter-tidal zone. However, it is important to note that no archaeological features of significance were identified within the survey area, including three fish weirs or traps identified from historic aerial photographs and recorded on the Kent County Council Historic Environment Record (HER nos MWX18696-8 and Wessex Archaeology numbers 1007-9).

3.0.3 The HER co-ordinates for the fish weirs should not be viewed as exact location markers, but as indicators of broader regions within which these features may be found. Data gathering is further complicated in the inter-tidal zone by its rapid ability to change due to shifting sediments and material which has been exposed previously may not currently be visible on the surface. Similarly, ephemeral features such as post alignments etc may not resolve themselves well in geophysical data, such as sub-bottom profiling or side scan sonar data. As a consequence, there is still the potential for archaeological remains to be discovered during installation.

3.0.4 The potential for the survival of submerged landscape sequences within the inter-tidal zone was noted by Wessex Archaeology in the WSI (Report 67110.06). Geotechnical cores were not taken from the inter-tidal area due to the shallow impact depth of the cable laying, however cores were taken further out into the river Swale along the export cable route. Wessex Archaeology has undertaken assessment of a number of these cores. The phase two geo-archaeological recording of cores taken along the cable export route (WA report 67111.05) indicates the presence of organic material within the estuarine alluvium of vibrocore VC612 (coordinates 356952, 5691969 UTM Zone 31N). This location lies in the main channel of the river Swale, to the north of the study area considered here. Wessex Archaeology are currently undertaking palaeo-environmental analysis of a number of the borehole cores taken during previous geotechnical site investigations. A Stage 3 Assessment is being undertaken including assessment of pollen, Diatoms, Foraminifera, Ostracods and plant macro-fossils and dating may also be undertaken if possible.

3.0.5 There is no core data from the inter-tidal zone and therefore the exact sedimentary sequence remains unknown. Pinger data obtained by EMU in 2010 has been used as the best available source of subsurface data for this report. It remains possible that relict landscape surfaces and associated ephemeral archaeological remains may be encountered during installation.

## 4. 2010 GEOPHYSICAL SURVEY FOR ENVIRONMENTAL CONSENT AND ENGINEERING PURPOSES

4.0.1 A completely new geophysical survey has been taking place during 2010 and into early 2011 across the locations of the wind farm turbines, inter-array cables, the two off-shore substations, the export cable route and also the inter-tidal area where the cables will come onshore. The geophysical surveys are being undertaken in order to provide up to date detailed information for the LAL engineers, for Environmental Consent purposes, for archaeological purposes and also to acquire Unexploded Ordnance (UXO) information.

4.0.2 The geophysical survey areas for the engineering survey provide comprehensive coverage of the impact zones. For the inter-array cables and the export cable, the surveys will cover the cable corridor and 50 m on each side of the corridor. Each turbine foundation will be covered by a 200m sided square. The two substations are to be covered by 300m sided square. The Consent survey area will cover the remaining area outside the engineering survey within the outer corners of the turbines.

4.0.3 The survey equipment will be the same set-up for both the consent and engineering surveys and will comprise the following:

- Single beam echo sounder
- Multi beam echo sounder
- Sub bottom profiler (high resolution): pinger / chirp
- Side scan sonar
- Magnetic gradiometer

4.0.4 Gifford reviewed the London Array Geophysical Specification for its archaeological compatibility prior to the survey work being tendered out to specialist companies, and we are confident that the LAL survey requirements are more than adequate to provide high quality data for archaeological interpretation. The survey methodologies make use of the most accurate and up-to-date equipment, with acquisition of extremely high resolution data.

4.0.5 Dr Fraser Sturt of the University of Southampton Centre for Maritime Archaeology and one of the Retained archaeologists for London Array has undertaken the review of all of the processed geophysical data for the Inter-tidal area. All of the datasets have been assessed with regard to potential archaeological structures, features and findspots and the assessment of this data is presented in this report.

### 4.2Introduction to the Marine Geophysical Techniques and Types of Data

4.0.1 In order to acquire comprehensive data pertaining to the sea bed, it is necessary to undertake multiple instrument surveys to collect a wider range of information. The following paragraphs provide a short synopsis of the various geophysical techniques used during the London Array geophysical marine surveys (The text below has been modified from Dean, Dix and Quinn's chapter on marine geophysics in *Underwater Archaeology: The NAS Guide to Principles and Practice*, 2009. Ed. Bowen, A., published by John Wiley & Sons) :

#### Bathymetric surveys

4.0.2 An essential component of all investigations of submerged archaeological sites is the production of a detailed bathymetric (depth) chart which is essentially a map of the landscape of the seabed. This has been attained by the use of a Swath bathymetry system, an acoustic technique using the single and multibeam echo sounders to record depth measurements in a thin strip below and to the side of the boat. The ping of the echo sounders repeats at up to 50 times a second as the boat moves forward. In one pass, this provides considerably more depth information about the seabed than could be achieved with a single echo sounder. The data collected during swath surveys can normally be displayed in real time as a profile and as a colour contour plan, or as a complex 3-dimensional image.

4.0.3 Swath bathymetry is now a standard survey tool for both site-specific work and for coverage of the larger expanses of the seabed necessary for submerged landscape reconstruction.

**Sidescan Sonar**

4.0.4 Side scan sonar is a method of underwater imaging using a similar wide angle pulse as the swath bathymetry systems but rather than calculating depth information from the returning echo, the system displays the intensity of the sound scattered back from the seafloor sediments and from objects exposed on the seabed, to the sonar system in the tow-fish towed along the seafloor. Side-scan data can be processed to provide undistorted images of the seafloor in real time. Rock, gravel, wood and metals are better reflectors than finer grained sediments and will therefore be recorded as darker elements on the sonar record. Arguably the most important phenomenon on side-scan records for archaeological purposes are acoustic shadows which provide a 3-dimensional quality to what is essentially a 2-dimensional survey. Acoustic shadows occur alongside objects which stand proud of, or are partially buried in, the seafloor. In side-scan sonar data, shadows can often indicate more about the shape and nature of a target than the acoustic returns from the target itself.

4.0.5 The technique is exactly analogous to taking a low-angle (as opposed to overhead) photo of the sea floor using a flashbulb and black and white film. The difference is that side scan sonar illuminates the sea floor with a pulse of sound rather than light. Since it uses sound rather than light, side scan sonar works even in murky or black water.

**Sub-bottom profiling**

4.0.6 While side-scan sonar and swath bathymetry are the most effective techniques for finding and delineating archaeological objects exposed on the sea-bed, many archaeological sites coincide with areas of high sedimentation. This can result in the partial or complete burial of structures, features and artefacts. While wrecks with substantial iron content may be found using magnetic surveying the only technique suitable for detecting buried wooden artefacts is sub-bottom profiling. Marine archaeologists are increasingly interested in the identification of the environment or landscape in which they were deposited, and to understand this it is essential to look at both the surface and the sub-surface. Sub bottom profilers work on the same principle as simple echosounders, but use much lower frequency acoustic energy. Two principal types of systems exist, those that produce a single frequency pulse (e.g. pingers and boomers) and those that produce a swept frequency pulse (Chirp). The acoustic pulses penetrate below the seabed and into the sediment. Returning echoes from sub bottom features such as geological stratas or buried material create a 2D survey which can be captured ditigally or direct to a paper printer.

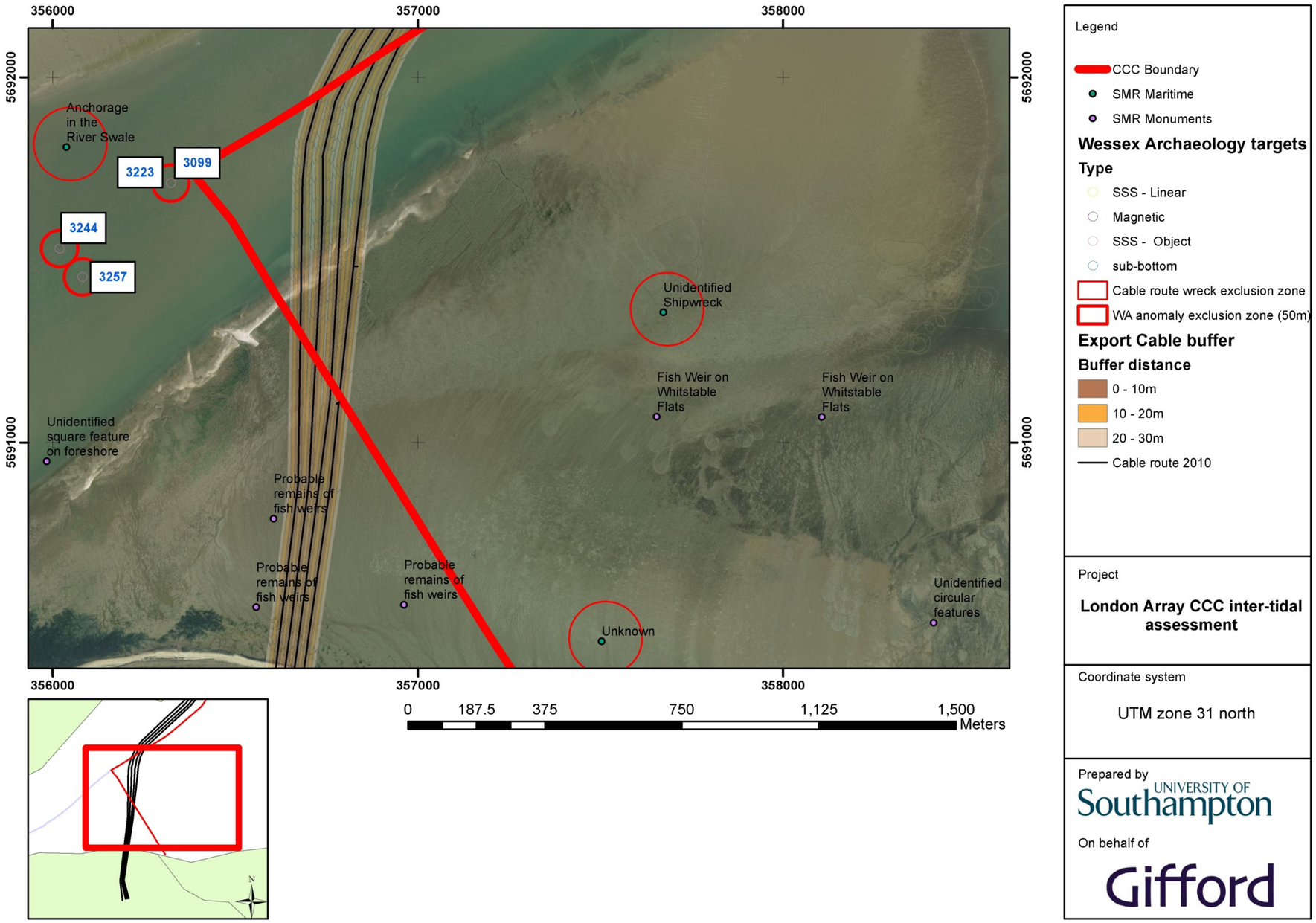
4.0.7 Chirp systems produce a pulse that can penetrate decametres into the sea-bed whilst still retaining decimetre resolution. Chirp profilers are towed as close to the seabed as safety will allow, typically 5-10m above the bottom, although if configured correctly they can operate in water depths as shallow as 2.5m. The frequency spectrum or bandwidth is wide for Chirp systems (typically between 6 and l0kHz) and this is important as it controls the vertical resolution, with a practical vertical resolution of 20- 30cm being obtainable at depths in excess of 30m.

**Magnetometry**

4.0.8 Marine magnetometers detect variations in the Earth's total magnetic field. These variations may be caused by the presence of ferrous material on or under the seabed, geological features or diurnal variations in the Earth's magnetic field due to solar activity. Marine magnetic surveying has become a standard technique for mapping the location of ferrous material on the seabed.

4.0.9 One problem with magnetic surveying in coastal waters is the amount of detritus on the seabed from port developments and people's use and abuse of the coastal zone. Non-archaeological magnetic anomalies are abundant within developed areas such as ports. Ferrous objects buried within the estuarine sediments produce a variation in the magnetic field which is recorded as a Grid value (see table 1 page 16). There are a large number of magnetic anomalies within the inter-tidal area where the export cables will come ashore. In order to define a target's archaeological potential the different types of geophysical data must be reviewed together to understand whether the magnetic target has any clear shape or form. If geophysical techniques such as the side scan sonar and pinger data do not provide a clear surface or sub-surface expression then it is unlikely that the anomaly is of high archaeological potential.

4.0.10 Magnetometers are usually towed behind the survey vessel at a sufficient distance to avoid any magnetic disturbance caused by the survey vessel itself.




Legend

CCC Boundary
SMR Maritime
SMR Monuments

**Wessex Archaeology targets**

**Type**

SSS - Linear
Magnetic
SSS - Object
sub-bottom
Cable route wreck exclusion zone
WA anomaly exclusion zone (50m)

**Export Cable buffer**

**Buffer distance**

0 - 10m
10 - 20m
20 - 30m
Cable route 2010

Project

**London Array CCC inter-tidal assessment**

Coordinate system

UTM zone 31 north

Prepared by

UNIVERSITY OF Southampton

On behalf of

Gifford

**FIGURE 1 CHART SHOWING THE EXTANT ARCHAEOLOGICAL DATA FOR THE INTER-TIDAL AREA IN RELATION TO THE PROPOSED CABLE ROUTE AND THE CCC BOUNDARY**

## 5. INSTALLATION METHODS

5.0.1 The export cables will be laid within the inter-tidal zone using the Sea-Stallion 4 plough, deployed from the C.L.V. Stemat Spirit. This plough has a 5.2m surface operating width and will lay the cable at depths of up to 2.5m. Prior to cable laying a pre-grapnel run will be undertaken clearing an area ± 5 m around each cable centreline. The cable trench itself will be 0.28m wide.

Pictures of the Sea Stallion 4 Cable Plough and an example of a Cable Burial Trench using this plough

5.0.2 Horizontal drilling will be undertaken at the landfall to enable the cables be installed underneath current sea defences. The Stemat Spirit will be grounded/anchored at the edge of the channel, potentially using a 6 point mooring system. The cables will then be floated off the barge and ploughed in up to the exit point of the horizontal drilling.

5.0.3 Current plans are for four export cables to be laid in the inter-tidal zone (see figure 1).

## 6. INSTALLATION BUFFER ZONES

6.0.1 Installation buffer zones for the export cables of 10-20-30 metres have been used by Gifford based on our knowledge of the installation vessels and impacts of the installation methods. Our review has also included a consideration of the impacts of the pre-grapnel run.

## 7. DATA SOURCES USED IN THIS ASSESSMENT

7.0.1 The following data sources were used to undertake this assessment:

**Archaeological**

Historic Environment Records (HER) Records from Kent County Council (OSGB)
National Monument Records (NMR) (OSGB)
Wessex Archaeology Exclusion zone data (OSGB)
UKHO Wreck Records (WGS 84)
Thames Regional Environmental Characterisation (REC) Archaeological Assessment
Wessex Archaeology Reports

**Geophysical (**WGS 84 UTM 31N)

EMU 2010 data

- Swath Bathymetry (0.5 m)
- Pinger data
- Magnetic Gradiometer Analytical Signal Grid and targets 23/09/2010
- Magnetic Gradiometer Analytical Signal Grid and targets 20/08/2010
- Side Scan Sonar Geotiffs (0.1m)

Engineering (WGS 84 UTM 31N)
LAL – August 2010

- Engineering Shapefiles
- Cable Corridor data
- Consent boundary data

**Channel Coastal Observatory**

- Aerial Photographs (0.1m)
- Lidar (0.5m)

7.0.2 Figures 2, 3, 4 and 5 below illustrate the extent of coverage of the main data sets examined as part of this assessment. There was 100% coverage of the export cable route by side scan sonar and magnetometer data, but only partial coverage of swath bathymetry. All data was of good quality, bar the closest inshore sections of the side scan sonar, where vessel turning manoeuvres caused disruption to data.

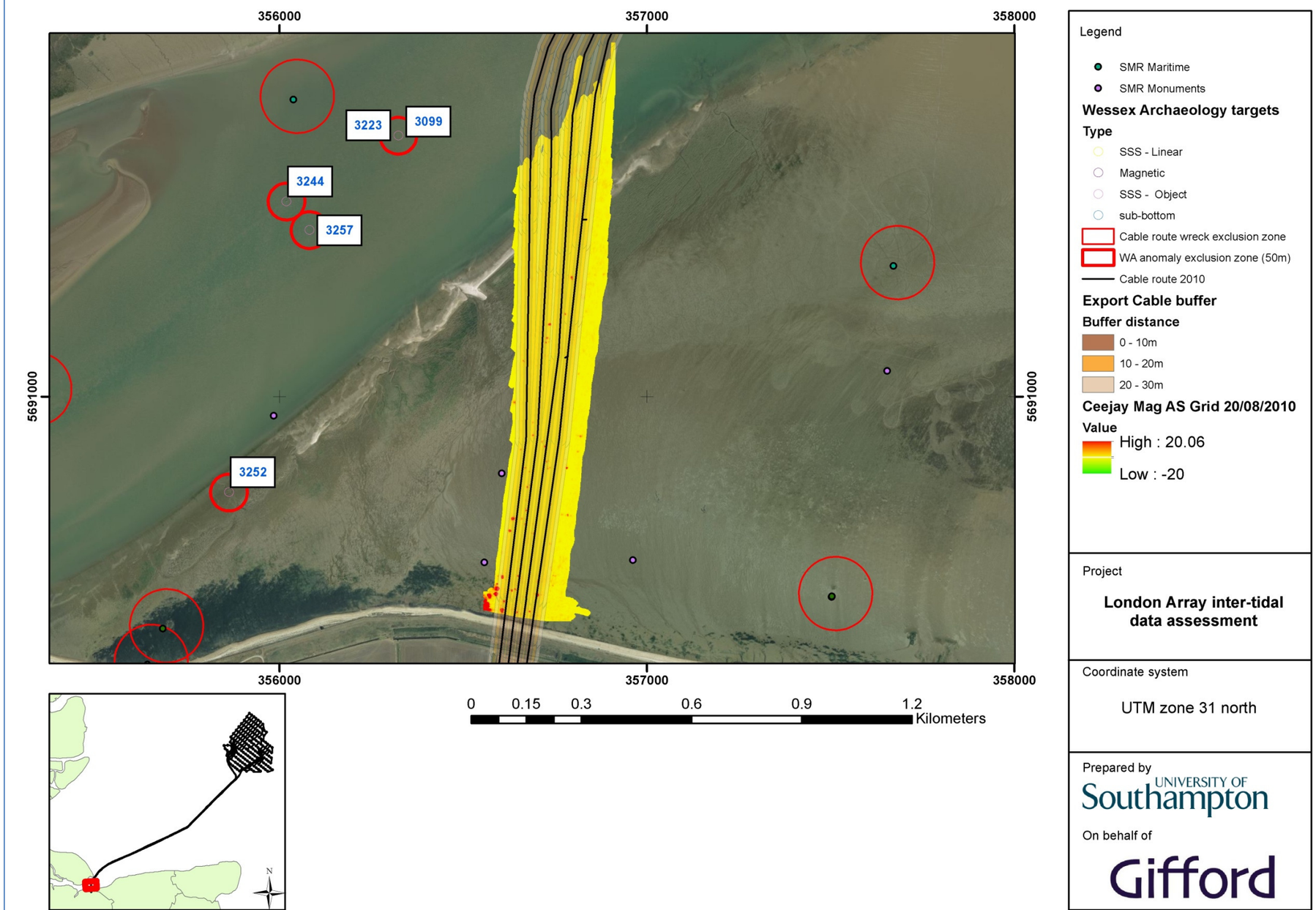



**FIGURE 2 CHART SHOWING THE EXTENT OF THE EMU 2010 (20/08/2010) CEEJAY MAGNETIC GRADIOMETER DATA SET. THE PROCESSED ANALYTICAL SIGNAL GRID WAS PRODUCED BY EMU LTD.**

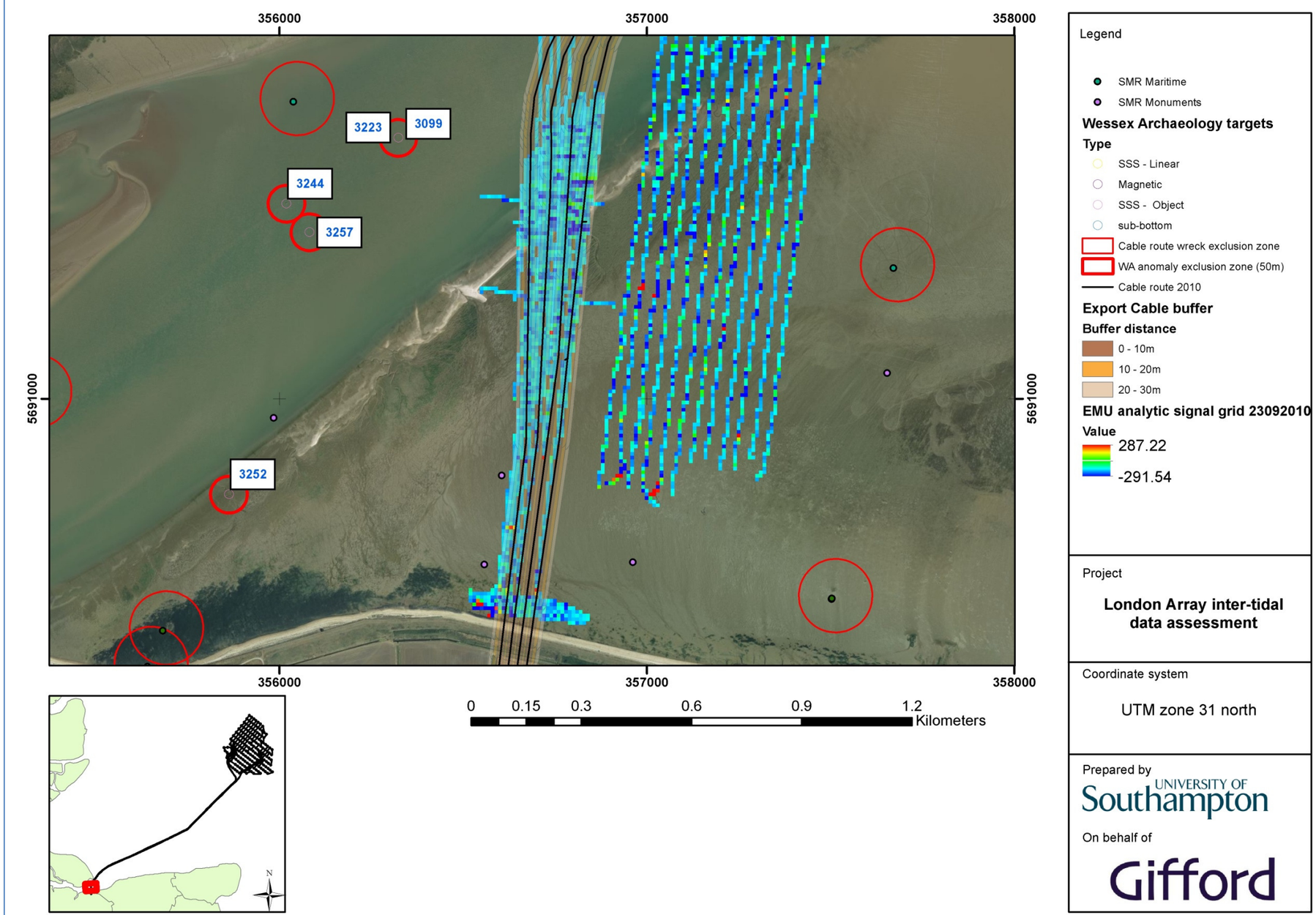



**FIGURE 3 CHART SHOWING THE EXTENT OF THE EMU 2010 CONSENTS GRADIOMETER SURVEY (23/09/2010). THE ANALYTICAL SIGNAL GRID WAS PRODUCED BY EMU LTD.**

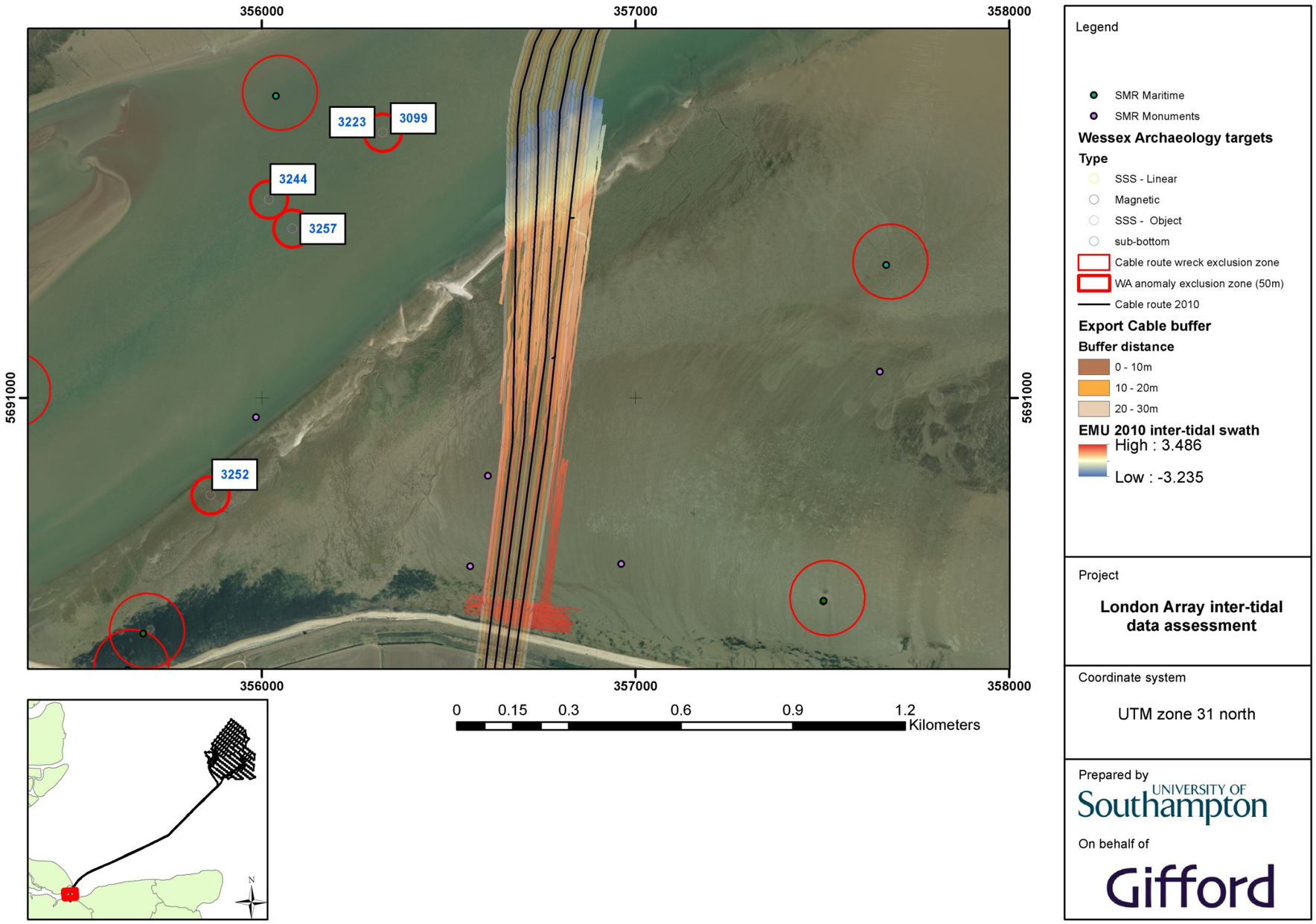



**FIGURE 4 CHART SHOWING THE EXTENT OF THE EMU 2010 INTER-TIDAL SWATH BATHYMETRY**

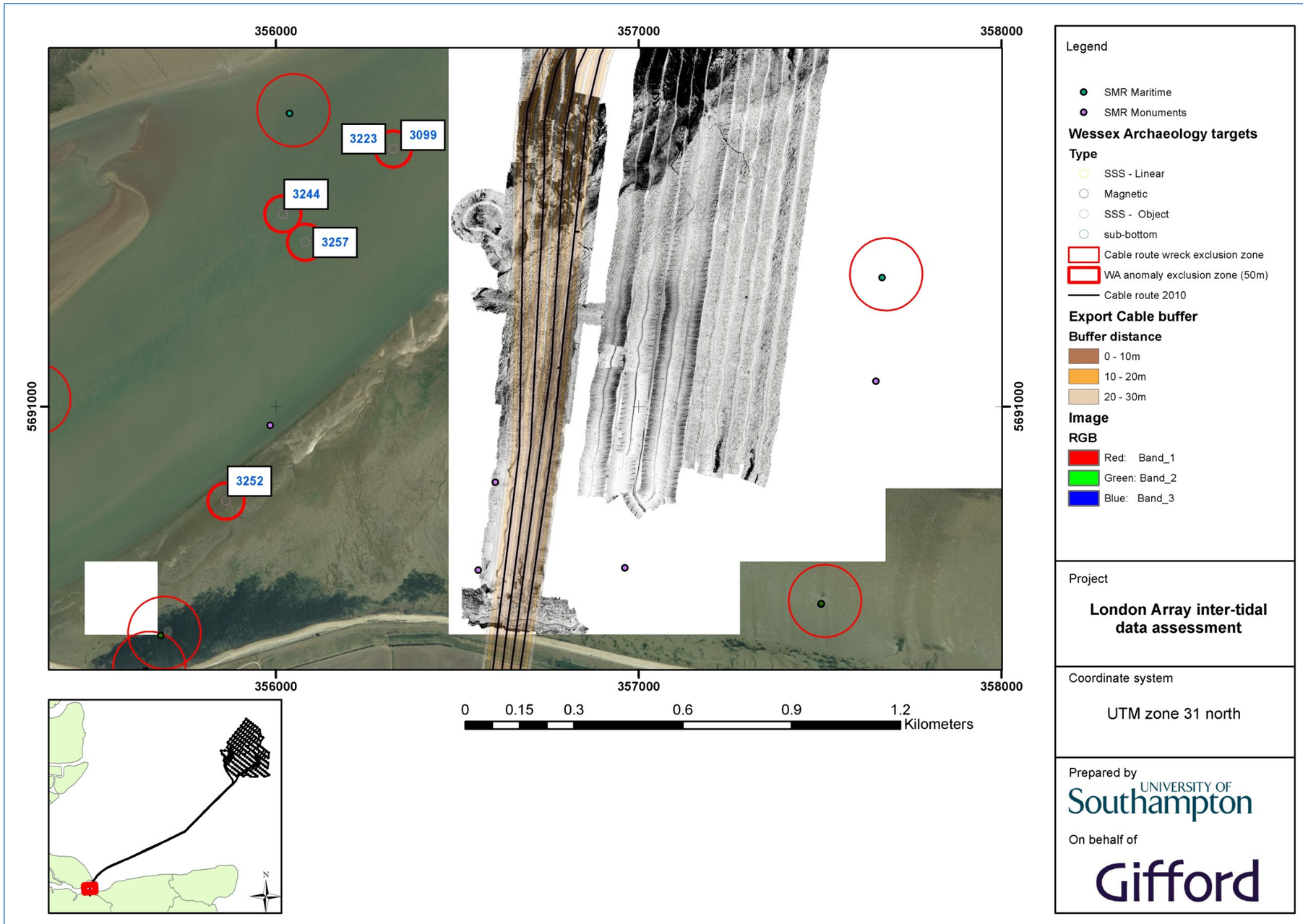



**FIGURE 5 CHART SHOWING THE EXTENT OF THE EMU 2010 SIDE SCAN SONAR SURVEY FOR THE INTER-TIDAL ZONE.**

## 8. DATA ASSESSMENT

8.0.1 This data assessment, in line with the walkover survey carried out by Wessex Archaeology, found no sites of demonstrable archaeological potential within the inter-tidal zone. However, as the charts in the following sections make clear, the area encompassed by this study includes a large number of magnetic anomalies, side scan sonar reflectors and two pinger anomalies. Overall, there is a continual low level of potential for some of these features to be of archaeological significance (buried ferrous material etc). In addition, as discussed in previous sections of this report, there are no vibrocore or borehole records for this inter-tidal stretch and, consequently the exact stratigraphy is unknown. This, with the reported presence of fish weirs in the vicinity of the cable route (but not identified in the walk over survey) suggests that there is the possibility that submerged land surfaces may be encountered during installation.

8.0.2 When attempting to ascertain the specific nature and archaeological potential of an anomaly, there is often a need for additional, more detailed, data to be collected. In some situations this will require professional archaeologists to dive on a site, or when this is not practical, use of a remotely operated vehicle (ROV). Data collected in this way allows for ground truthing of geophysical interpretations through direct archaeological observation. Within the area considered by this report such operations were not necessary. This was because the area exposed at low tide was sufficient to allow for walk over survey by professional archaeologists at an early stage in the project. This walkover survey provided important baseline information which has been used to inform the interpretation of the geophysical data.

### 8.1 MAGNETIC GRADIOMETRY TARGETS

8.1.1 EMU ltd identified seventeen magnetic anomalies from the Ceejay data set provided to Gifford on 20/08/2010. In addition, a further four anomalies were found within the Consents Magnetic Gradiometer data set uploaded on the 23/09/2010 within the CCC boundary. As none of these targets showed a clear surface expression of archaeological significance, or had any correspondence in the pinger data, their archaeological potential is seen as low. Consequently, the magnetic anomaly target data was queried against buffers of the cable route centreline (at 10, 20 and 30m distance from the cable centreline) to establish those most likely to be encountered during installation. This reduced the number of anomalies to a total of seventeen (17). The location and magnitude of these anomalies is presented in table one below and their locations are illustrated in charts 1 – 30.

**Table 1 The location and magnitude of anomalies that lie within the CCC boundary.**

| EMU Data set | EMU Target_ID | Easting | Northing | Grid value | FromBufDst | ToBufDist |
|---|---|---|---|---|---|---|
| **20/08/2010** | 120 | 356782 | 5691561 | 5.1 | 0 | 10 |
| **20/08/2010** | 121 | 356786 | 5691561 | 5.5 | 0 | 10 |
| **20/08/2010** | 122 | 356840 | 5691576 | 3 | 0 | 10 |
| **20/08/2010** | 124 | 356796 | 5691605 | 3.5 | 0 | 10 |
| **20/08/2010** | 125 | 356790 | 5691606 | 3.7 | 0 | 10 |
| **20/08/2010** | 113 | 356778 | 5691224 | 25.5 | 10 | 20 |
| **20/08/2010** | 118 | 356814 | 5691492 | 3.4 | 10 | 20 |
| **20/08/2010** | 123 | 356821 | 5691581 | 4.8 | 10 | 20 |
| **20/08/2010** | 126 | 356801 | 5691609 | 3.4 | 10 | 20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **20/08/2010** | 127 | 356807 | 5691614 | 3.4 | 10 | 20 |
| **20/08/2010** | 128 | 356824 | 5691614 | 3.6 | 10 | 20 |
| **20/08/2010** | 114 | 356830 | 5691269 | 3.6 | 20 | 30 |
| **20/08/2010** | 115 | 356795 | 5691324 | 86.9 | 20 | 30 |
| **20/08/2010** | 117 | 356810 | 5691492 | 4.1 | 20 | 30 |
| **20/08/2010** | 119 | 356810 | 5691534 | 3.3 | 20 | 30 |
| **20/08/2010** | 129 | 356863 | 5691646 | 3.4 | 20 | 30 |
| **23/09/2010** | 13 | 356802 | 5691338 | 9.65 | 20 | 30 |

### 8.2SUB_BOTTOM PROFILER PINGER TARGETS

8.2.1 EMU identified two separate pinger targets; TAR_SBP_001 and TAR_SBP_002, both of which were found within the CCC boundary.

8.2.2 TAR_SBP_001 (356782.58, 5691602.34 UTM 31N) is identified as relating to a potential boulder (13.1m long by 1.1m high). The pinger data over the anomaly is shown in figure six (below) and swath bathymetry over the feature in figure seven. Aerial photographic evidence above the anomaly shows that it is likely to be a boulder rather than an anthropogenic feature. This topographic 'high' represents a potential hazard for installation works.

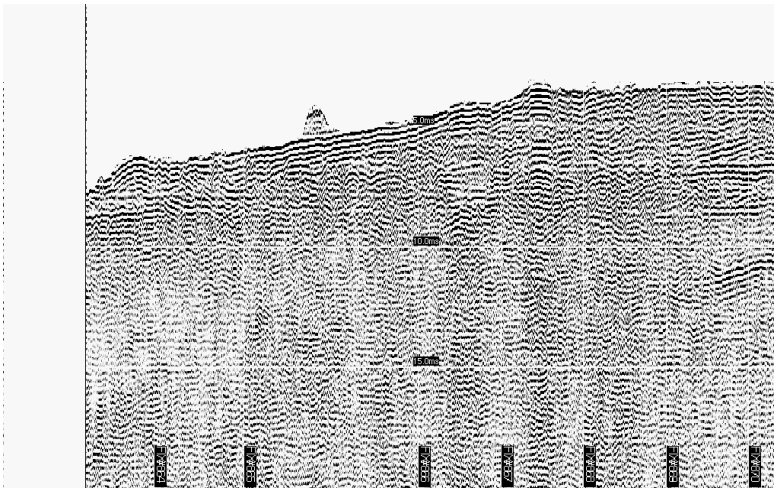


**FIGURE 6 PINGER DATA SHOWING TAR_SBP_001**

8.2.3 TAR_SBP_002 is identified by EMU as relating to a gravel ridge. This feature is clearly geological in origin and can be seen in the aerial photographs, side scan sonar and swath bathymetry data (see figure 8 below).

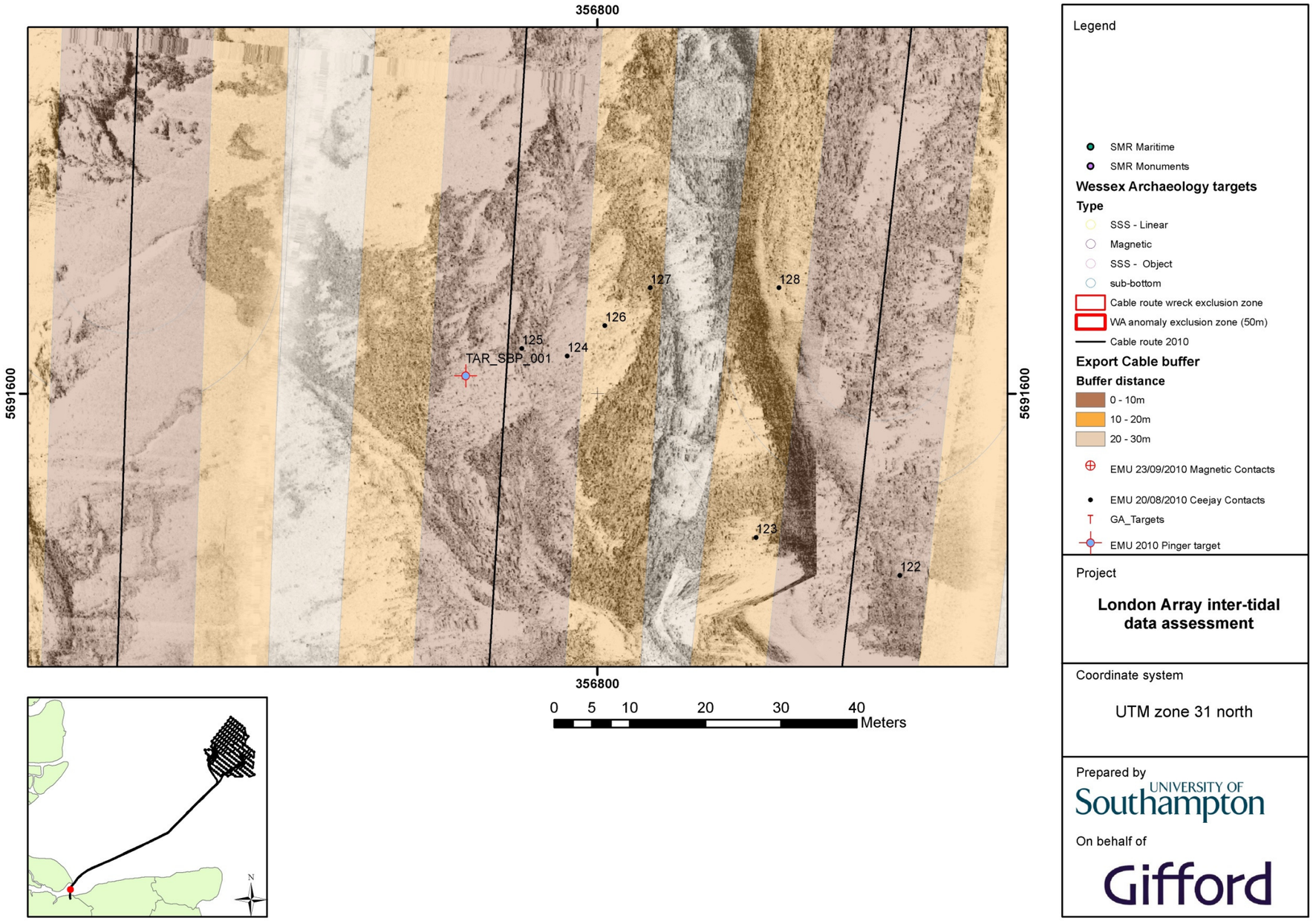



**FIGURE 7 CHART SHOWING SIDE SCAN SONAR OVER TAR_SBP_001.**

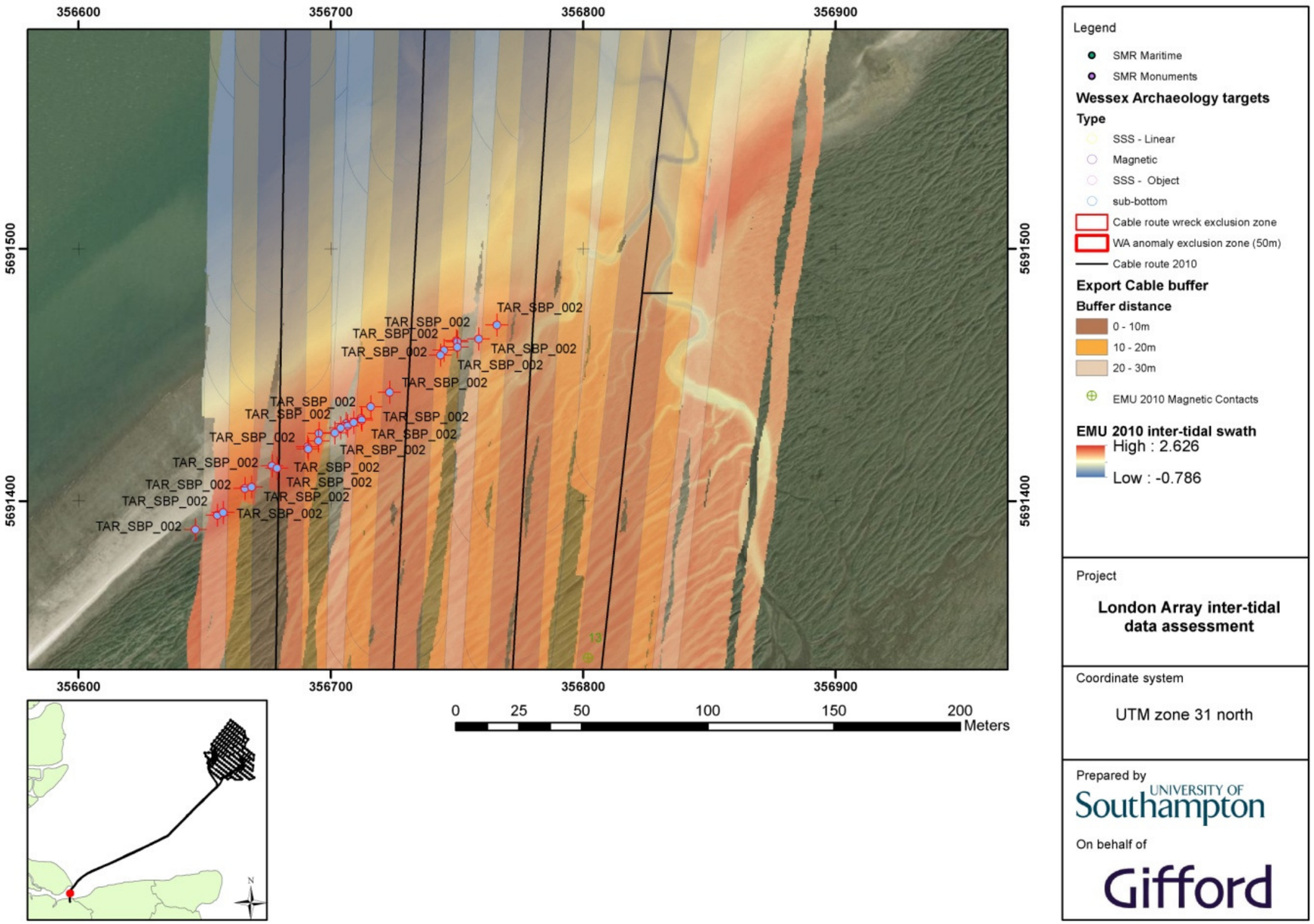



**FIGURE 8 CHART SHOWING THE LOCATION OF THE GRAVEL RIDGE (TAR_SBP_002)**

### 8.3Side Scan Sonar, Swath Bathymetry, Lidar and Aerial Photographic data

8.3.1 As discussed in section 3.1.2 (above) the walk over survey of the inter-tidal area carried out by WA provides a crucial first person assessment of this area. Their conclusion that there were no features of archaeological interest within the study area helps to resolve the ambiguous nature of side scan sonar reflectors and anomalous topographic features.

8.3.2 However, review of the side scan sonar, swath bathymetry, lidar and aerial photographs for the entire inter-tidal area revealed three anomalies not otherwise identified in the data received. These have been given Gifford Archaeology (GA) IDs 1, 2 and 3. Only two of these fell within the CCC boundary (GA 1 and GA 3). Each of the GA anomalies relates to a patch of dark reflectors. The locations of these anomalies are noted in table 2 and are shown in figures 9, 10, and 11 (below). Each anomaly is considered to have low archaeological potential due to their morphology and similarity to surrounding bed forms. Of the three targets, only GA 3 lies within the cable buffer zone. As this is a discrete anomaly and sits within the 10m buffer no direct conflict is apparent.

**Table 2 Details of the anomalies identified by Gifford Archaeology within the jurisdiction of Canterbury City Council.**

| GAID | Easting | Northing | Type | Length | Width | Archaeological Potential |
|---|---|---|---|---|---|---|
| 1 | 356849.096 | 5691277.466 | SSS | 9 | 2.6 | Low |
| 3 | 356670.781 | 5691756.315 | SSS | 3 | 3 | Low |

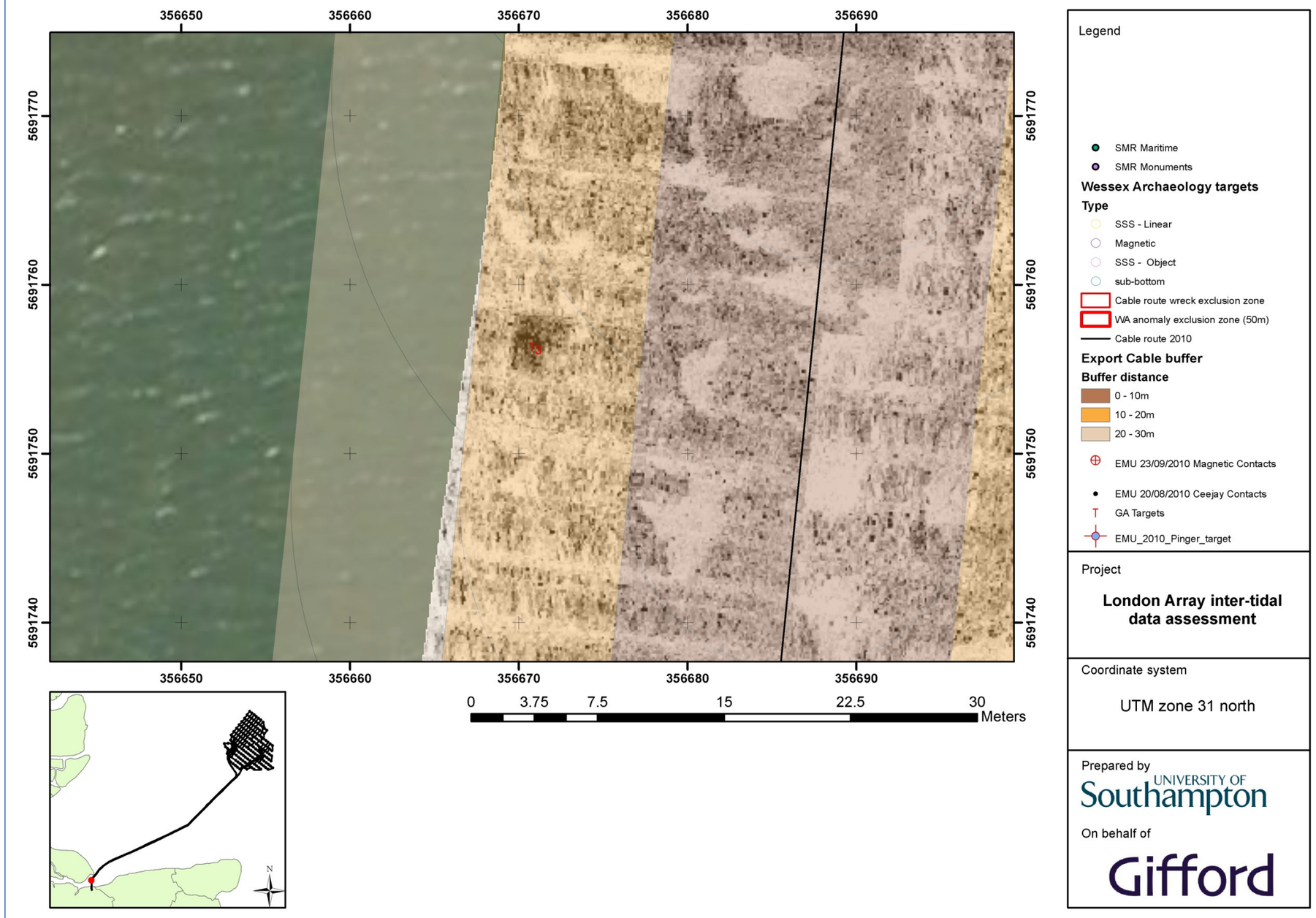



**FIGURE 9 MAP SHOWING THE LOCATION AND SIDE SCAN SONAR SIGNATURE OF GA 3 (A PATCH OF DARK REFLECTORS).**

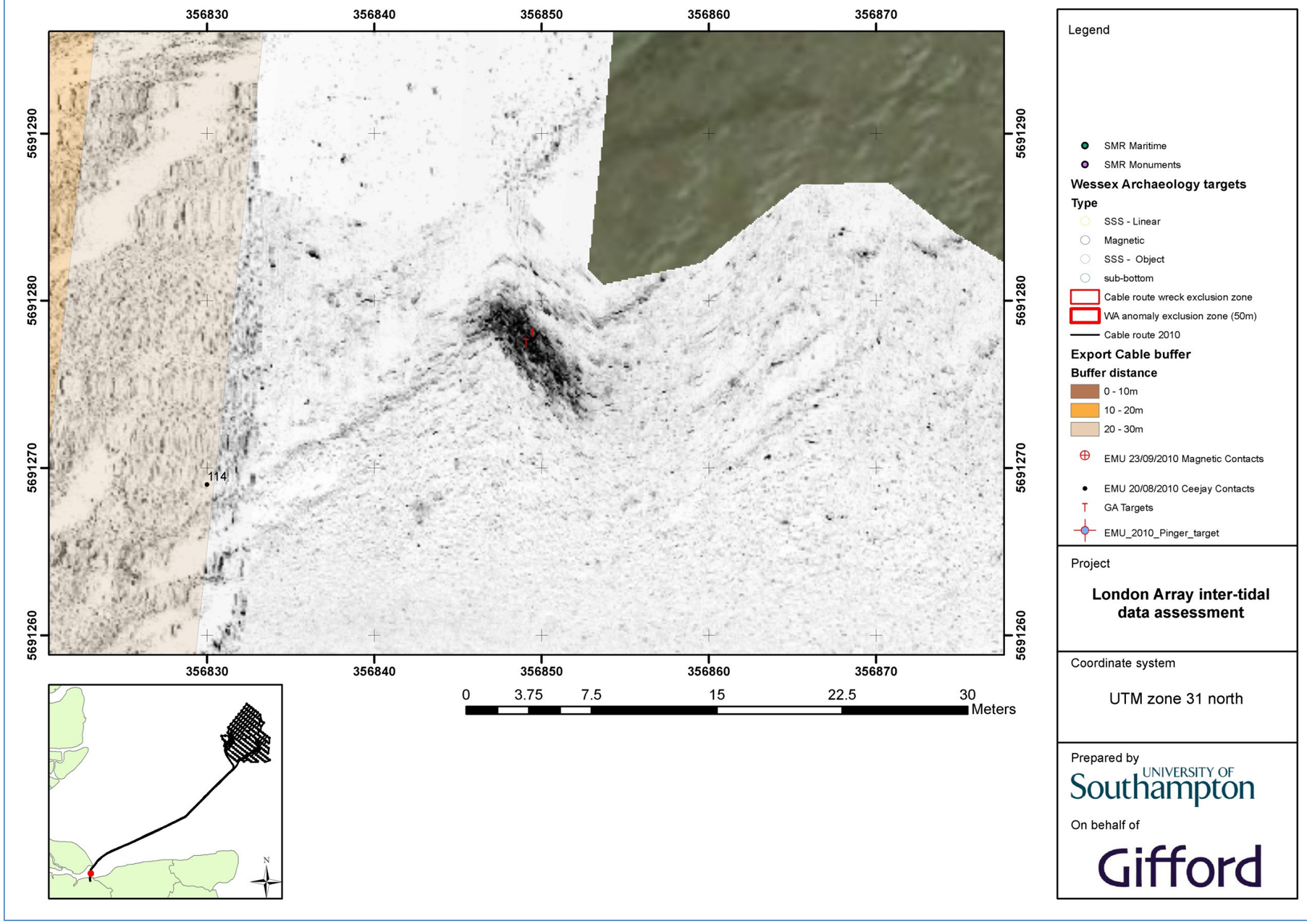



**FIGURE 10 MAP SHOWING THE LOCATION OF GA 1 AND ITS SIDE SCAN SONAR SIGNATURE (A PATCH OF DARK REFLECTORS).**

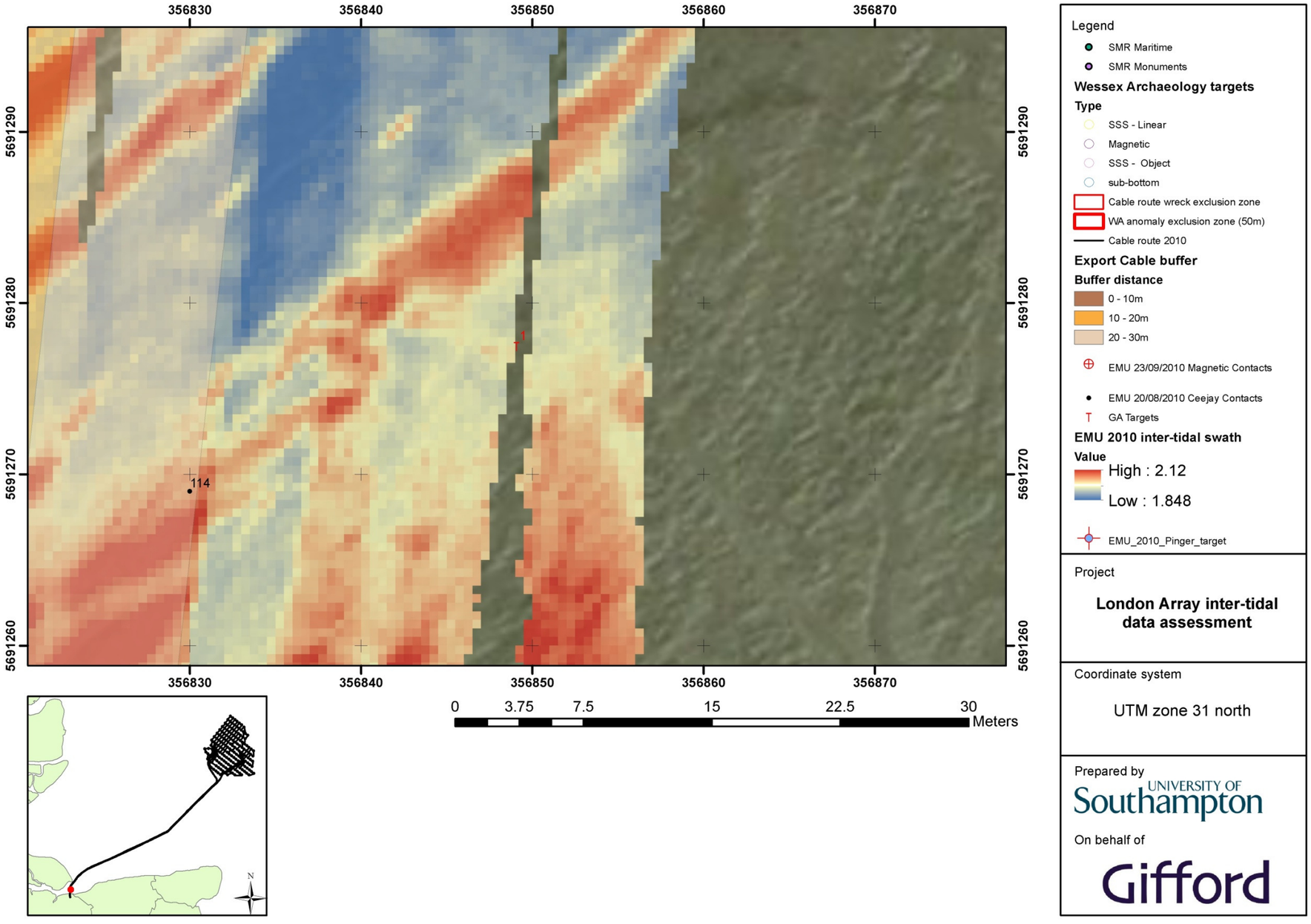



**FIGURE 11 MAP SHOWING THE LOCATION OF GA 1 AGAINST THE EMU 2010 SWATH BATHYMETRY. THERE IS LITTLE EVIDENCE FOR THIS BEING A SIGNIFICANT ANOMALY.**

## 9. DATA ASSESSMENT CHARTS

9.0.1 The following figures provide small scale charts of the inter-tidal cable route and associated magnetic, pinger and GA identified anomalies within CCC boundary.

9.0.2 As discussed in section 7 above, it is important to note that despite the relatively large number of anomalies present, none have been attributed as having recognisable archaeological significance.

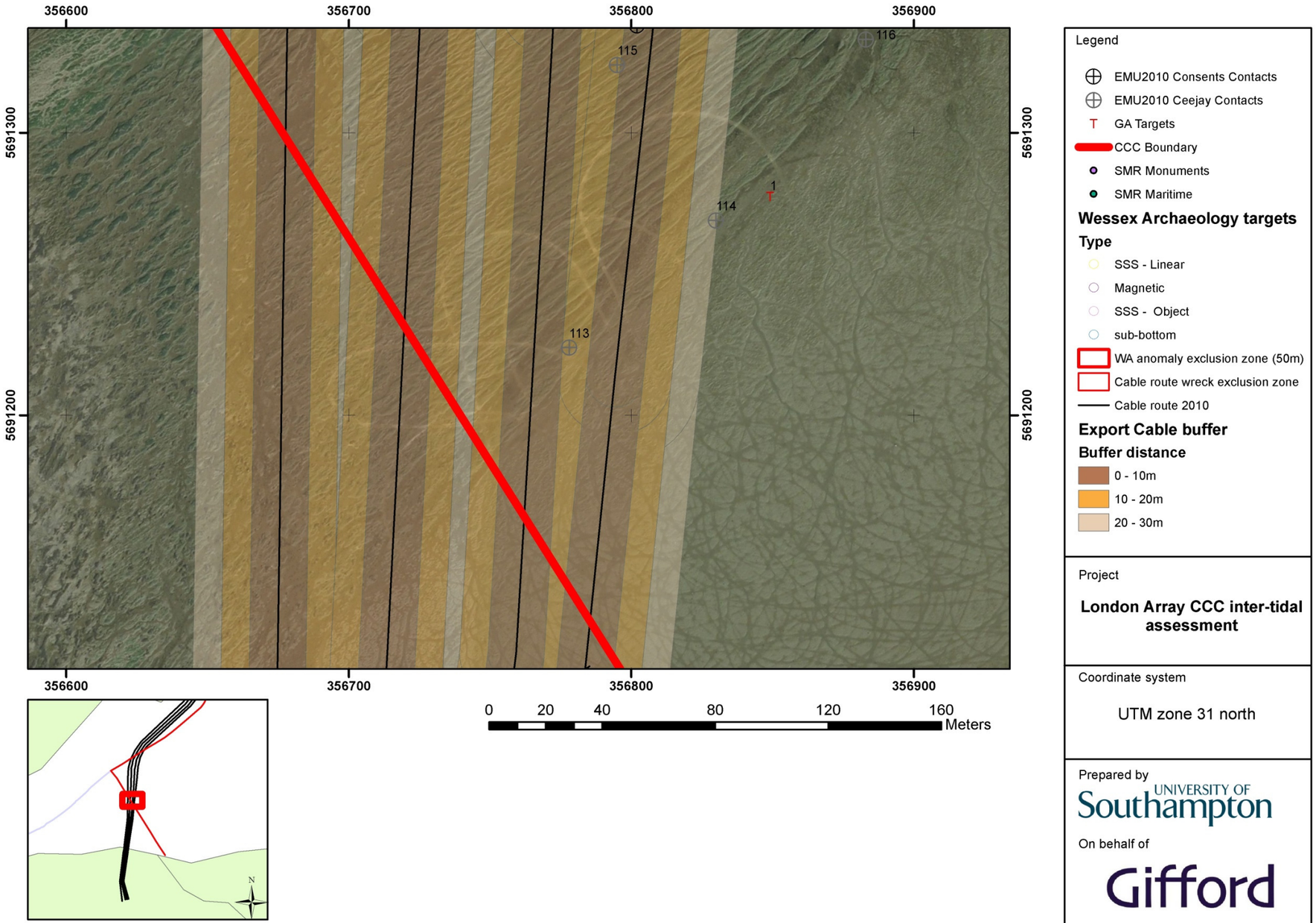



**FIGURE 12 CHART 1A SHOWING ANOMALIES ASSSOCIATED WITH THE SOUTHERN CCC BOUNDARY INTERSECTION WITH THE CABLE ROUTE.**

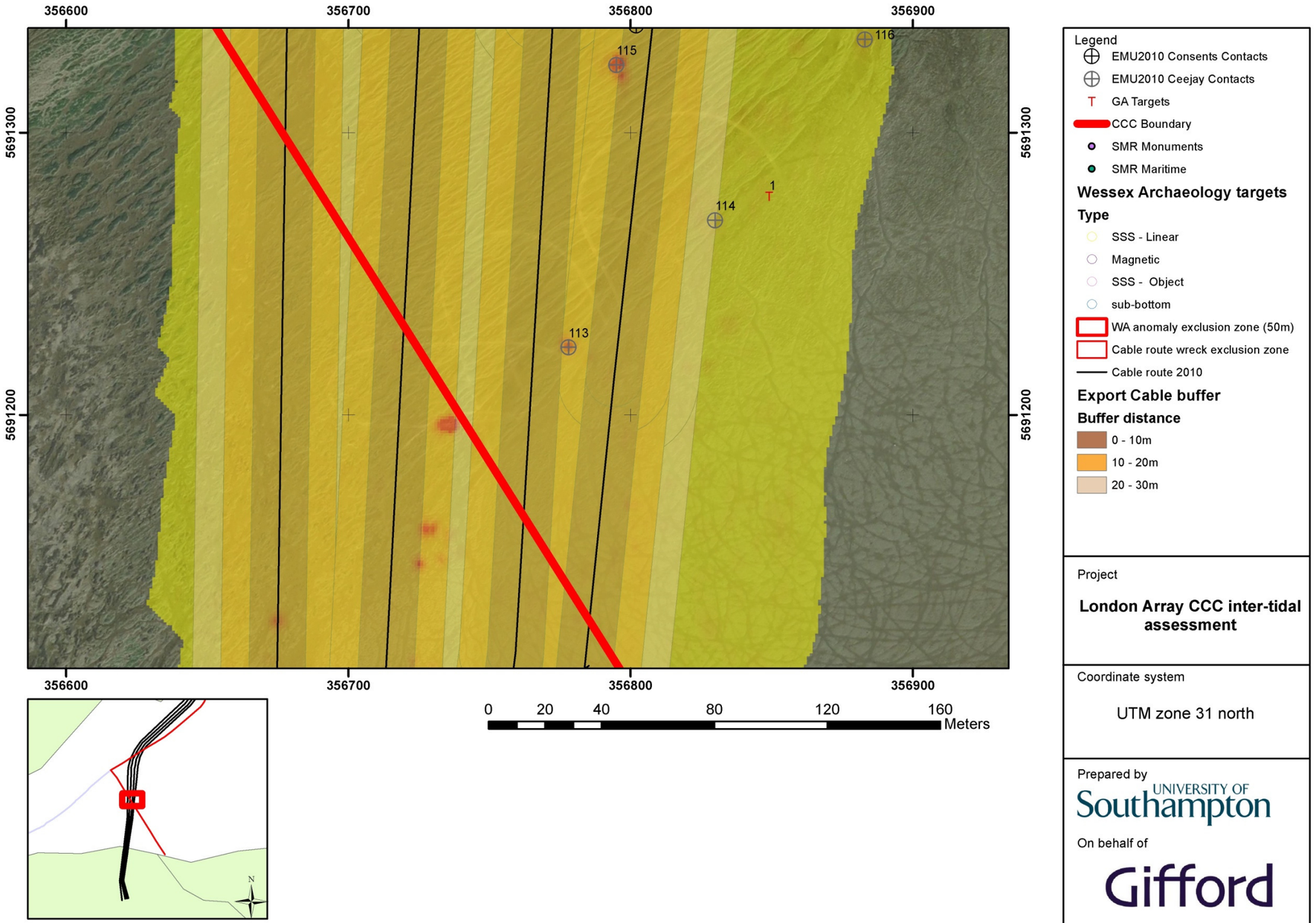



**FIGURE 14 CHART 1B SHOWING THE CEEJAY GRADIOMETER DATA AND ANOMALIES.**

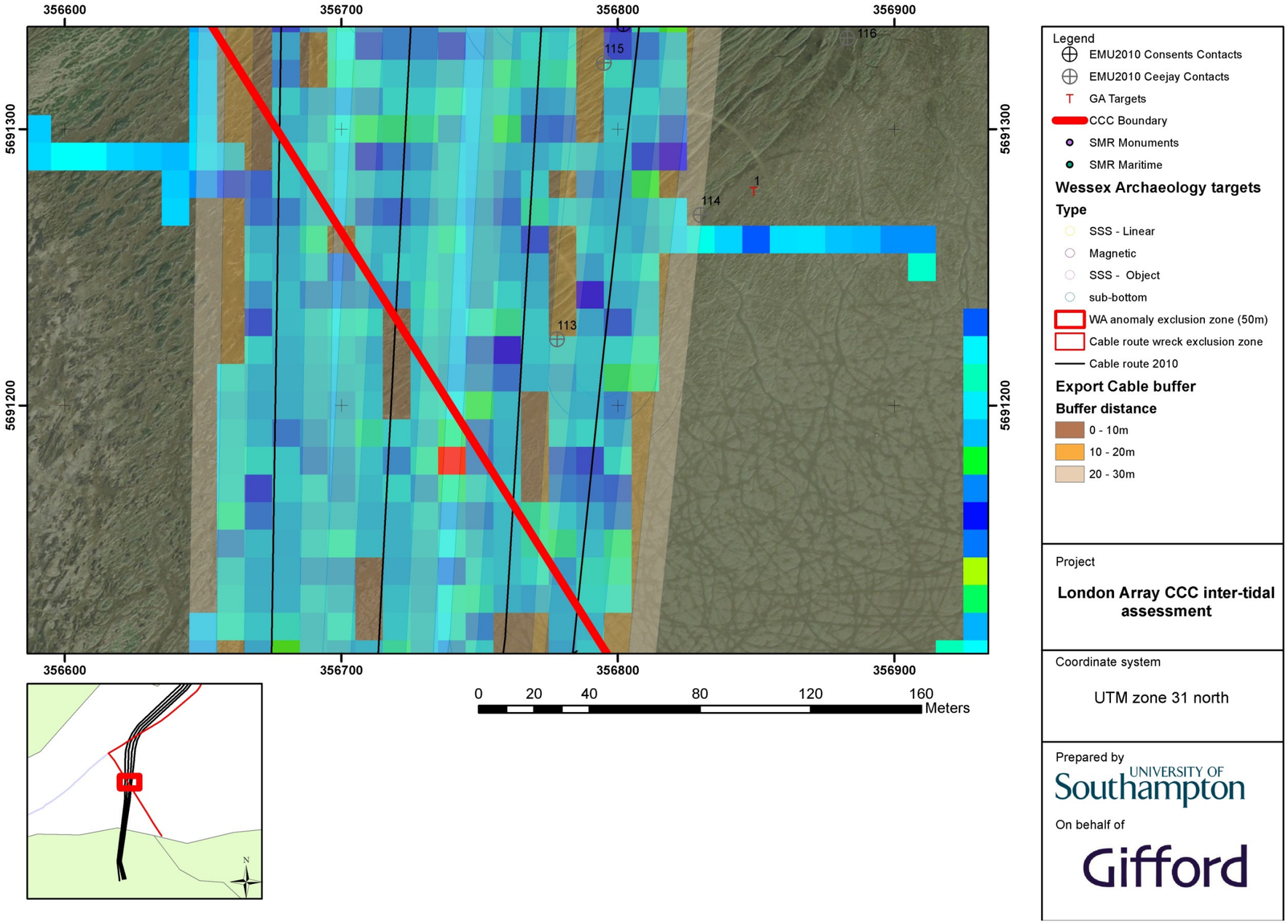



**FIGURE 15 CHART 1C SHOWING THE CONSENTS GRADIOMETER DATA AND ANOMALIES.**

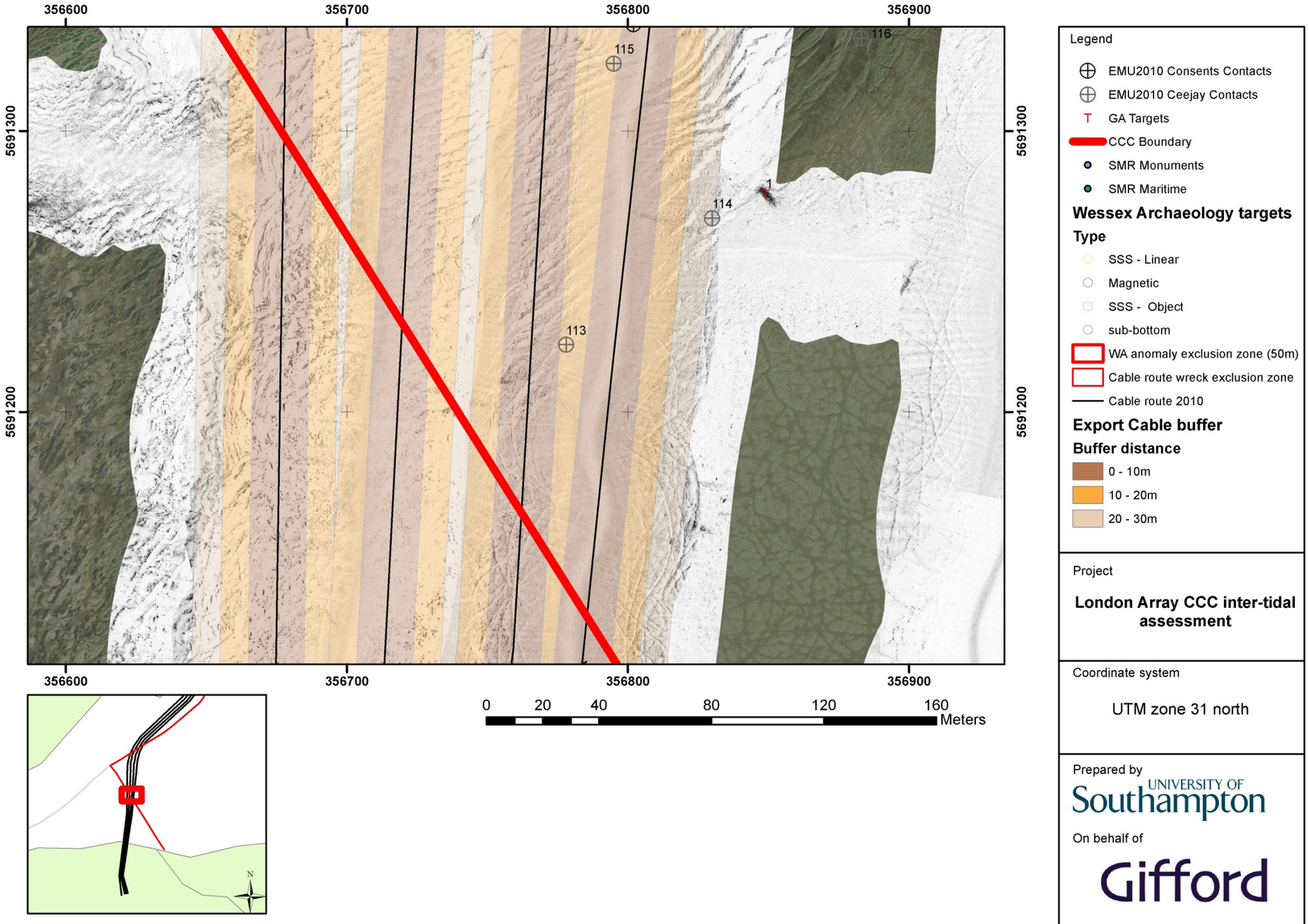



**FIGURE 16 CHART 1D SHOWING THE SIDE SCAN SONAR DATA AND ANOMALIES.**

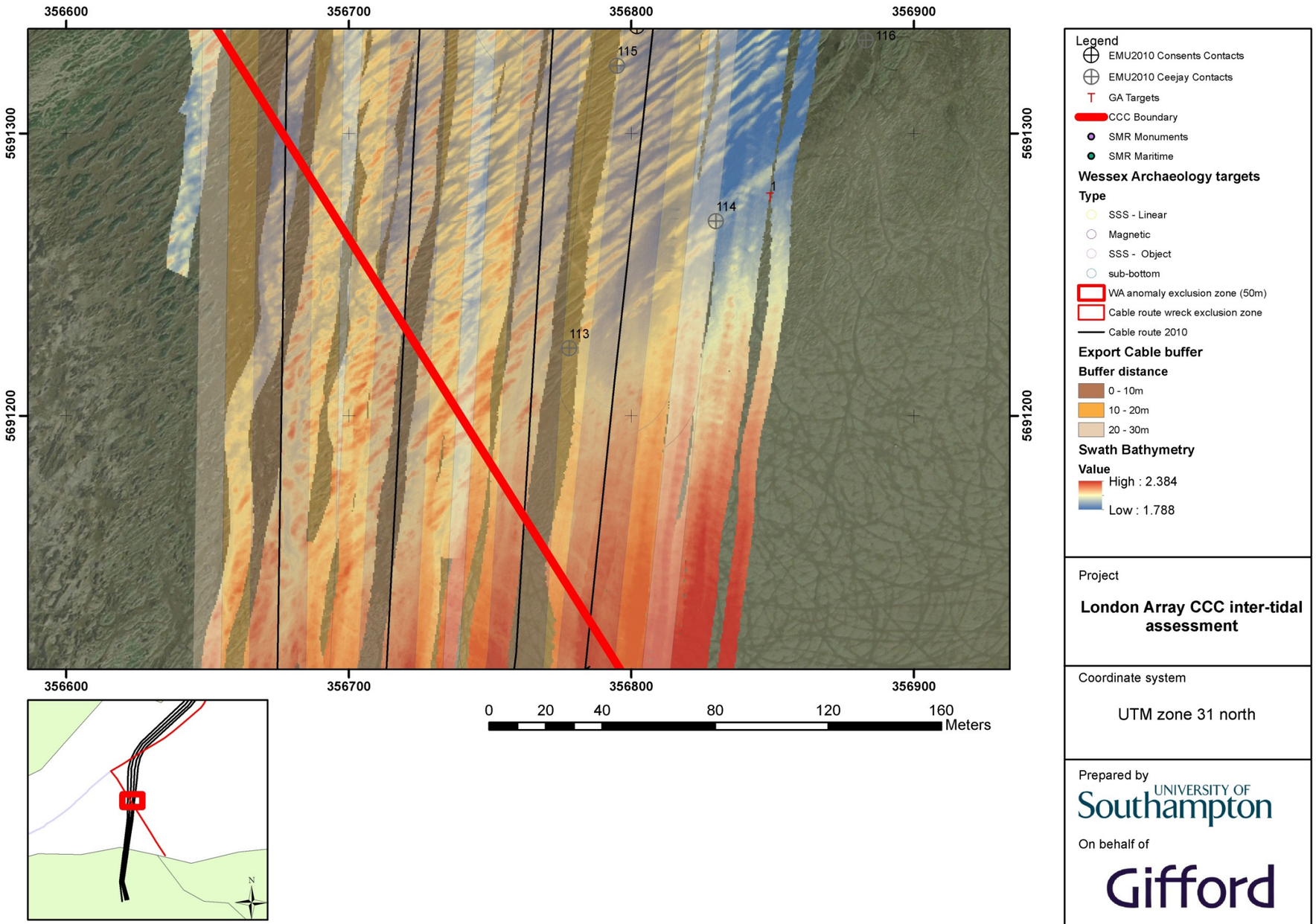



**FIGURE 17 CHART 1E SHOWING THE SWATH BATHYMETRY AND ANOMALIES.**

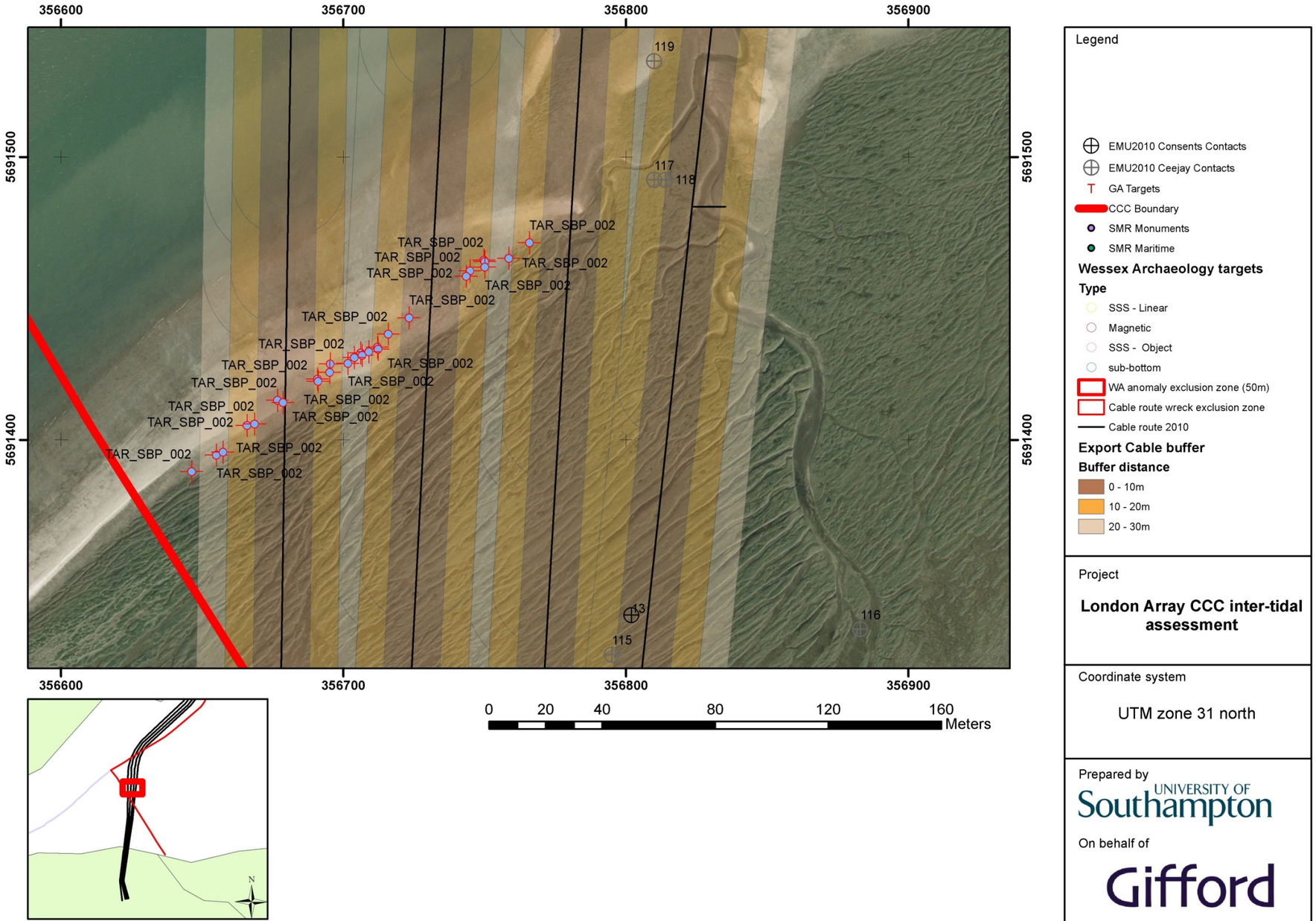



**FIGURE 18 CHART 2A SHOWING AERIAL PHOTOGRAPHIC DATA AND ANOMALIES.**

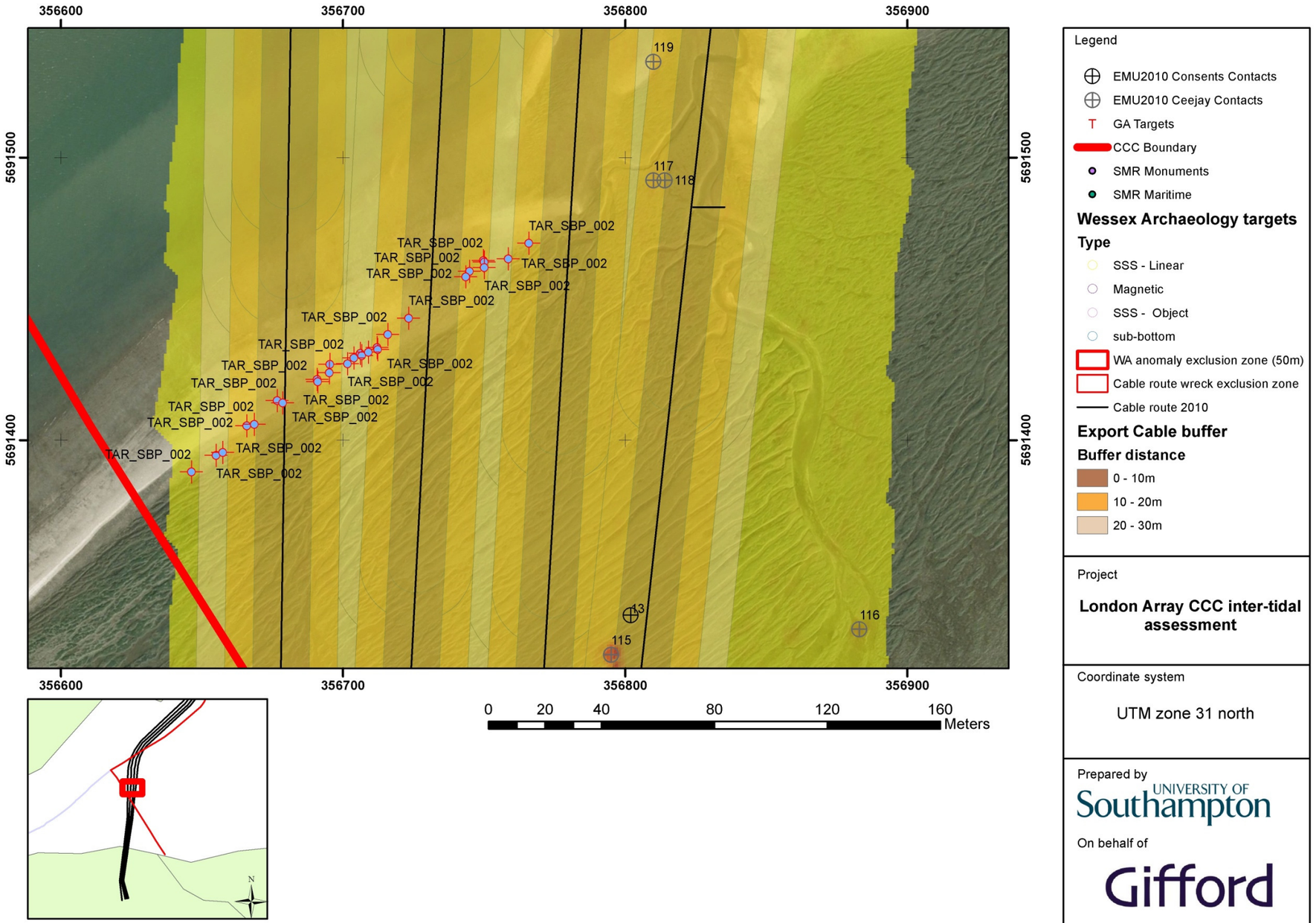



**FIGURE 19 CHART 2B SHOWING CEEJAY GRADIOMETER DATA AND ANOMALIES.**

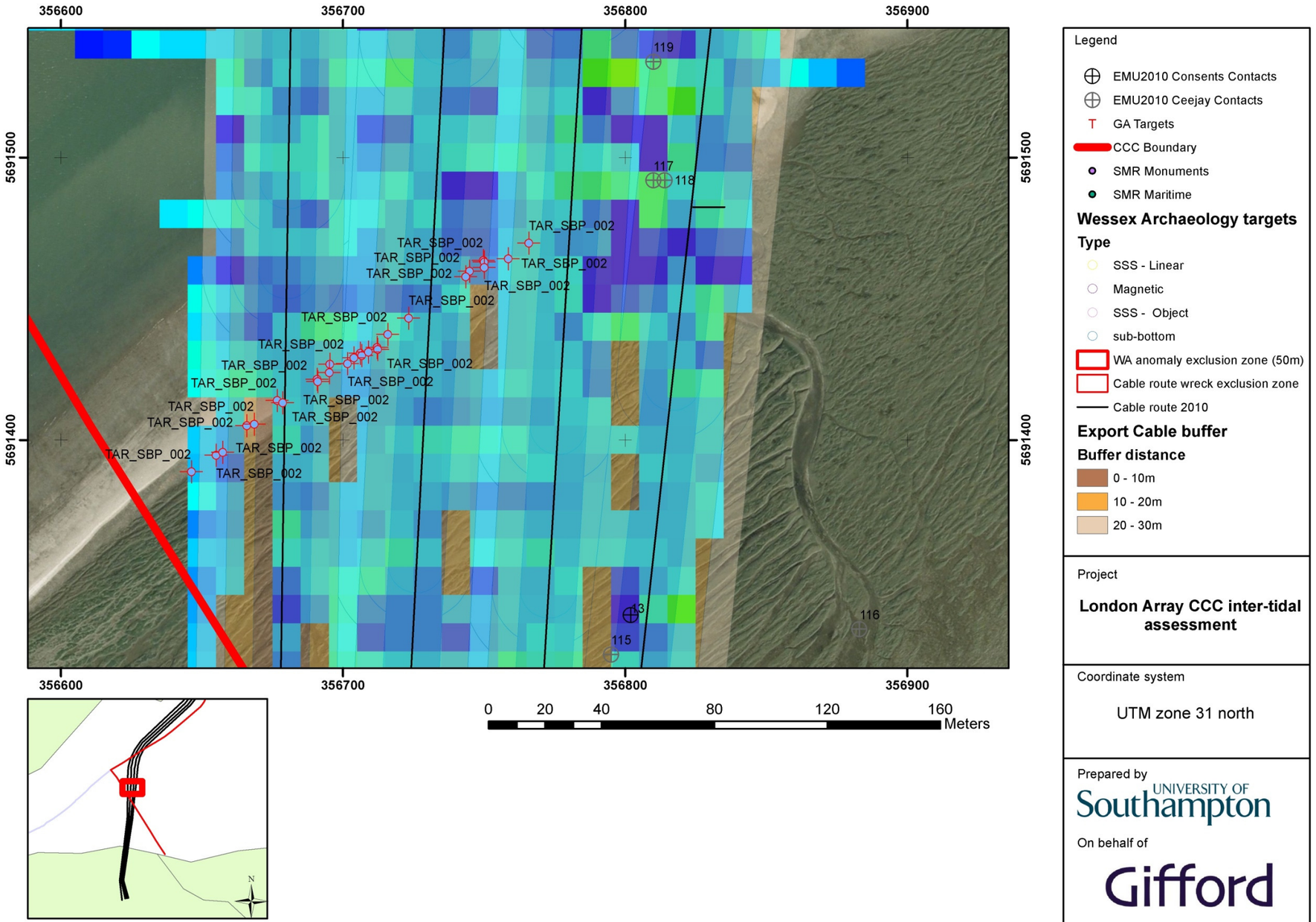



**FIGURE 20 CHART 2C SHOWING CONSENTS GRADIOMETER DATA AND ANOMALIES.**

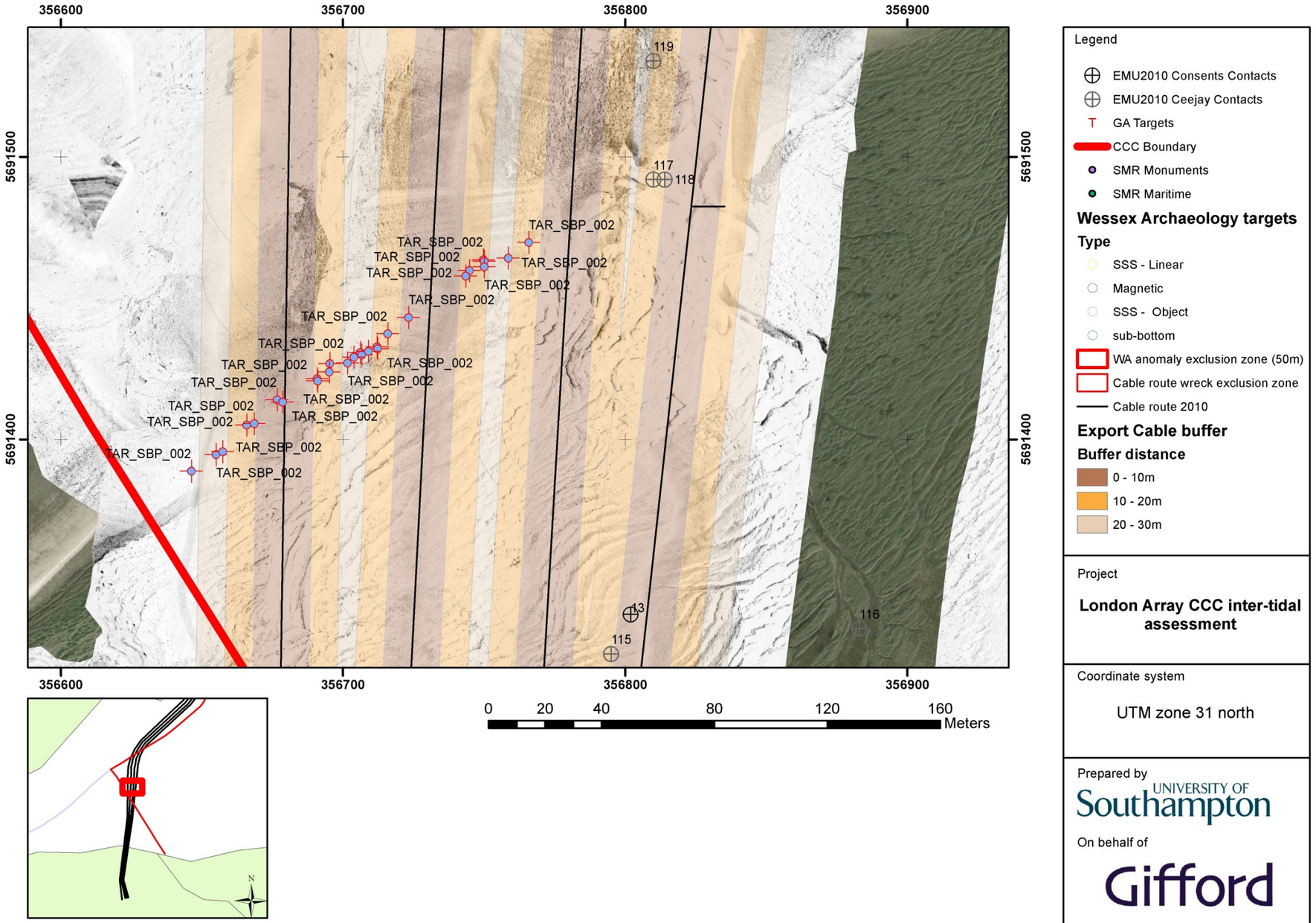



**FIGURE 21 CHART 2D SHOWING SIDE SCAN SONAR AND ASSOCIATED ANOMALIES.**

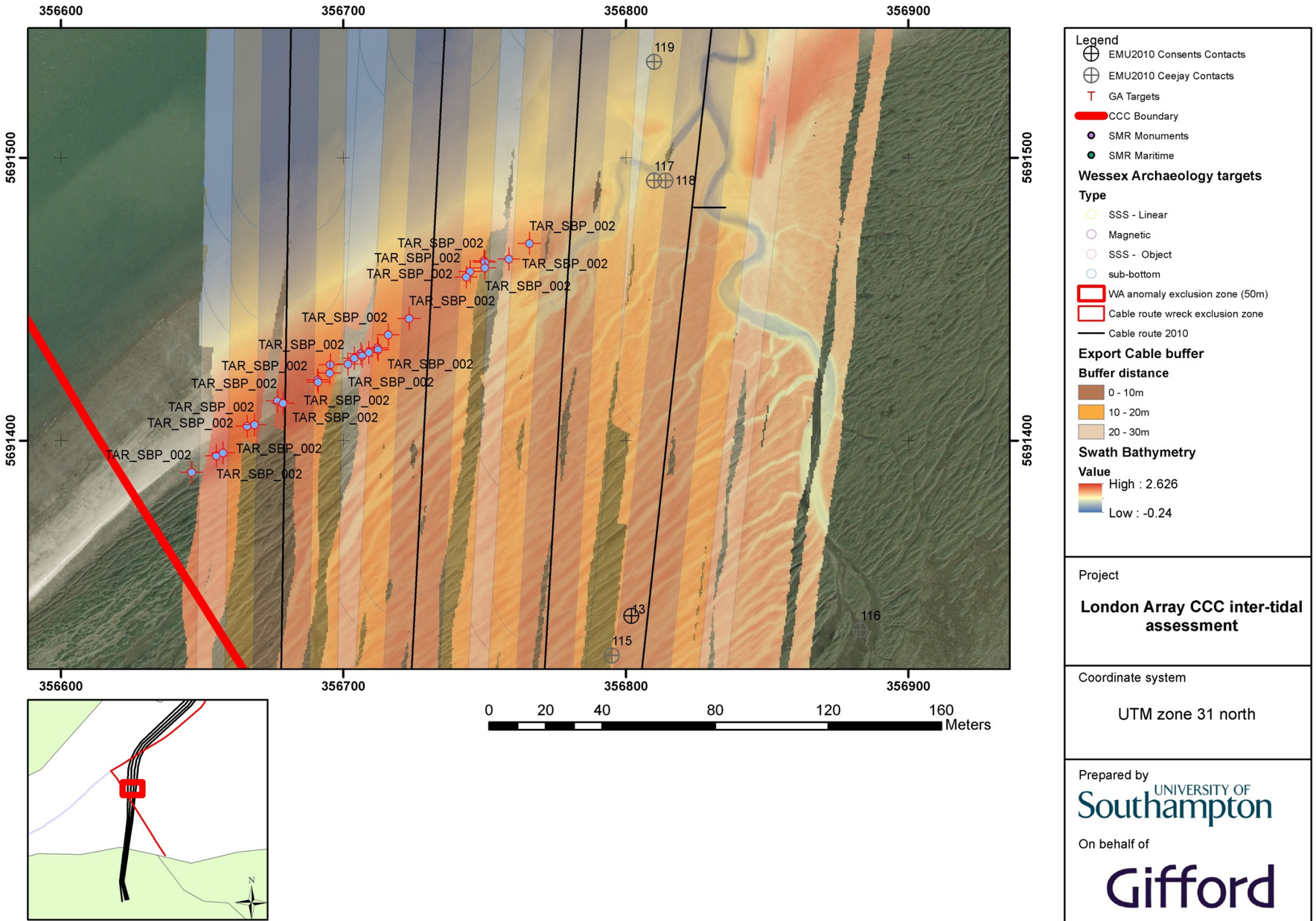
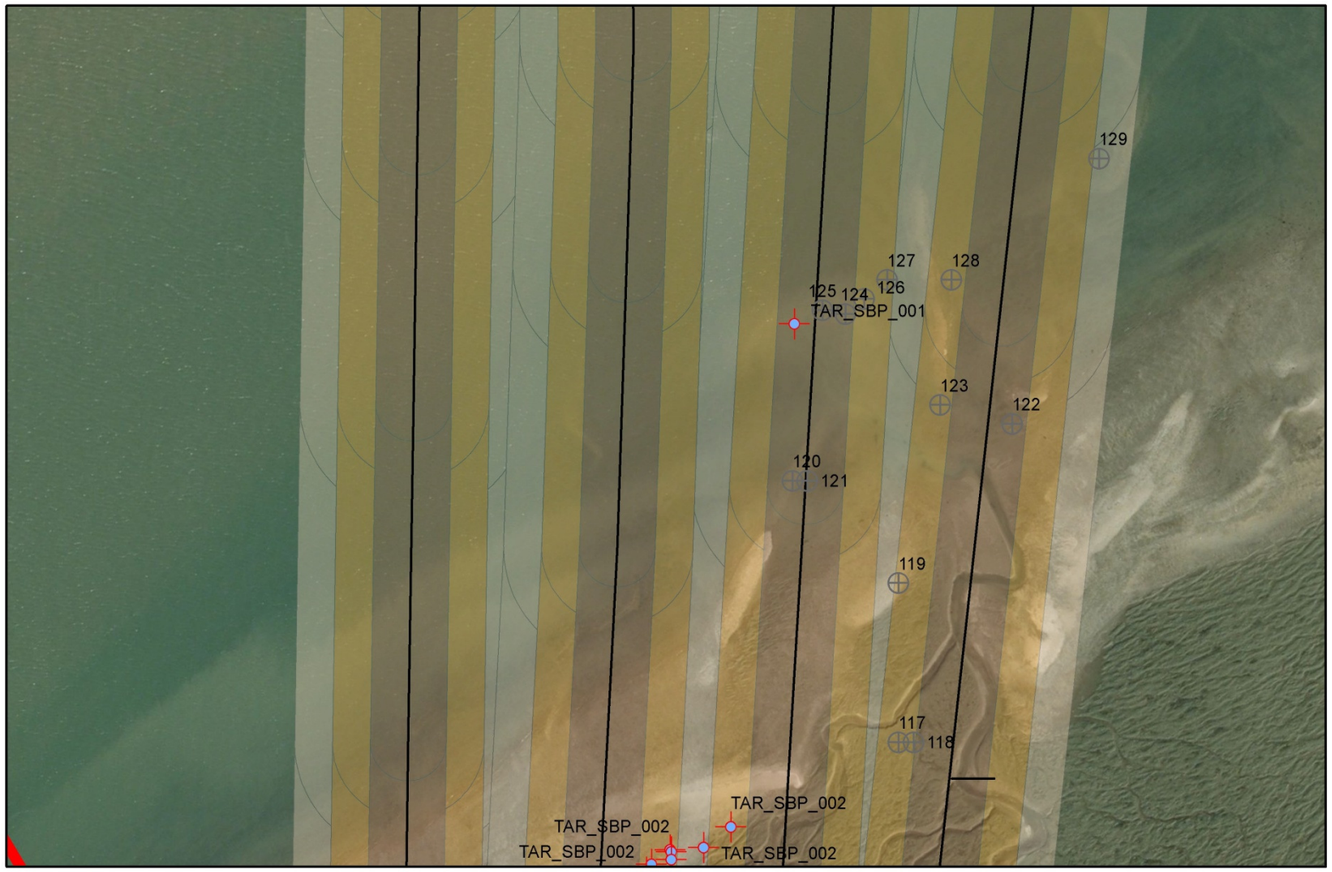
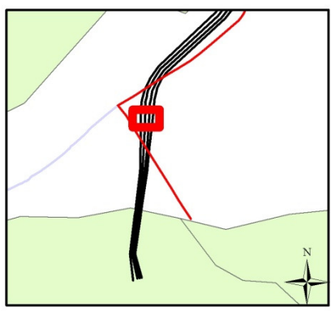



**FIGURE 22 CHART 2E SHOWING SWATH BATHYMETRY AND ASSOCIATED ANOMALIES.**




0 20 40 80 120 160 Meters

Legend

- EMU2010 Consents Contacts
- EMU2010 Ceejay Contacts
- GA Targets
- CCC Boundary
- SMR Monuments
- SMR Maritime

**Wessex Archaeology targets**

**Type**

- SSS - Linear
- Magnetic
- SSS - Object
- sub-bottom
- WA anomaly exclusion zone (50m)
- Cable route wreck exclusion zone
- Cable route 2010

**Export Cable buffer**

**Buffer distance**

- 0 - 10m
- 10 - 20m
- 20 - 30m

Project

**London Array CCC inter-tidal assessment**

Coordinate system

UTM zone 31 north

Prepared by

University of Southampton

On behalf of

Gifford

**FIGURE 23 CHART 3A SHOWING AERIAL PHOTOGRAPHIC DATA AND ANOMALIES.**

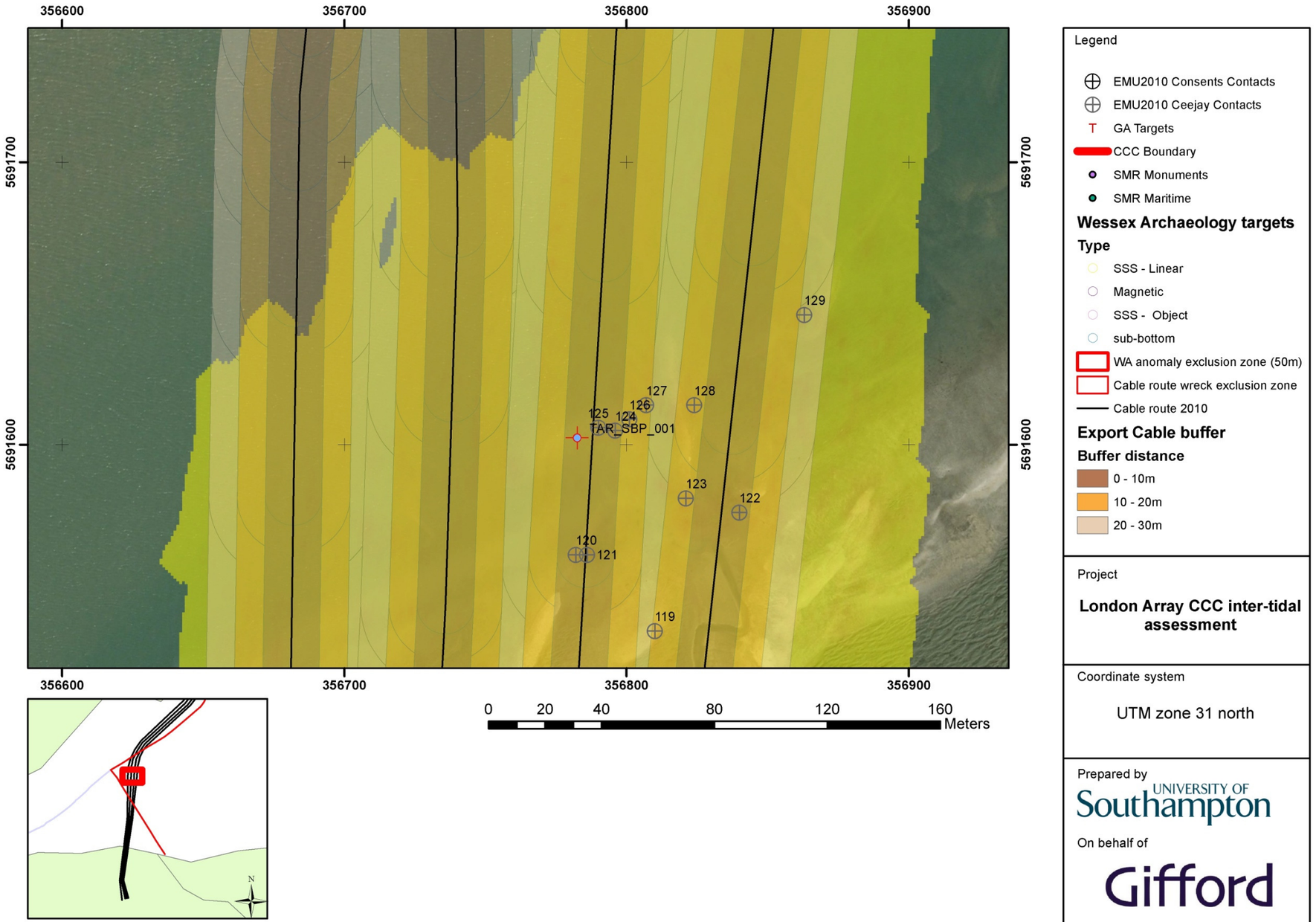



**FIGURE 24 CHART 3B SHOWING CEEJAY GRADIOMETER DATA AND ANOMALIES.**

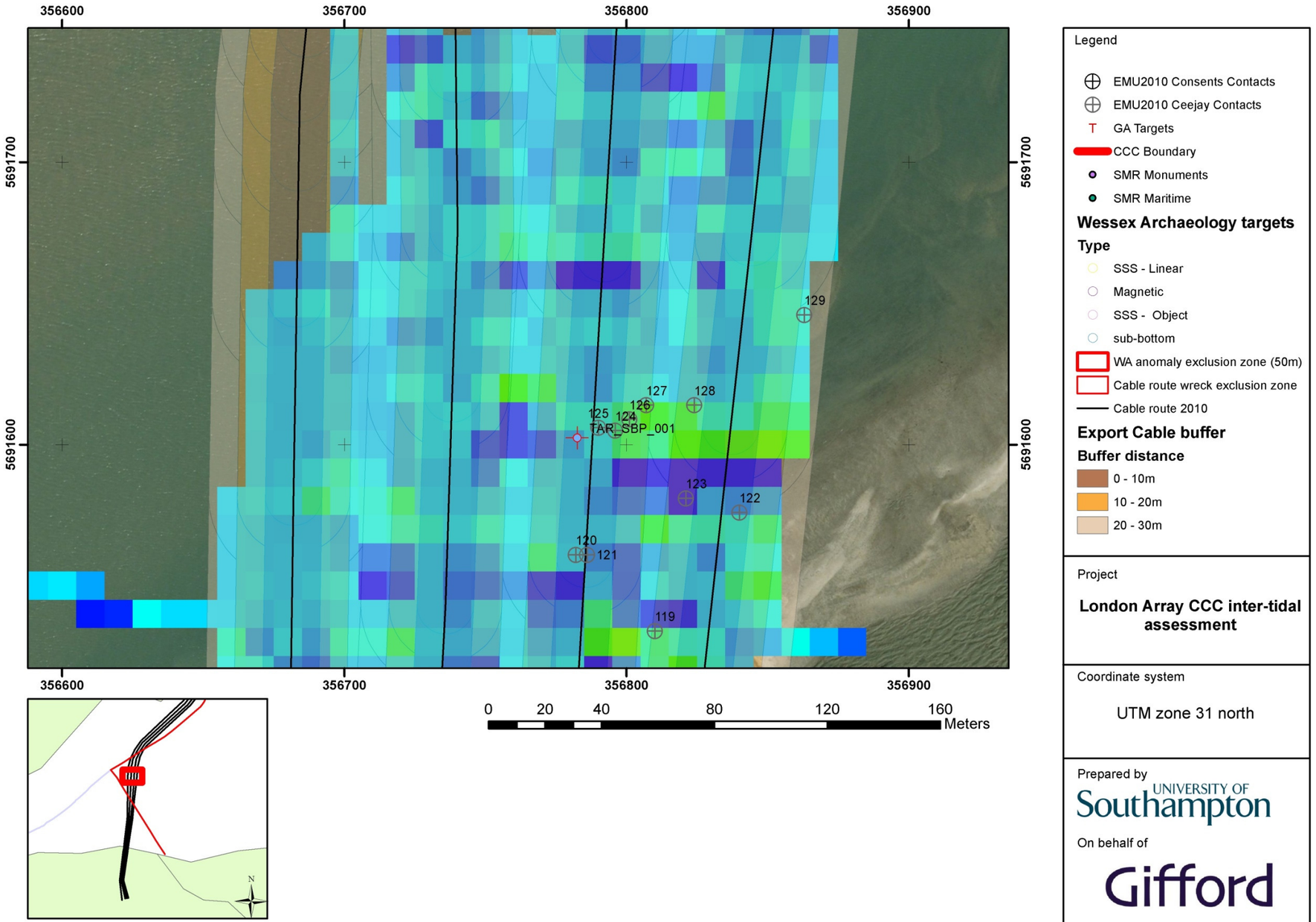
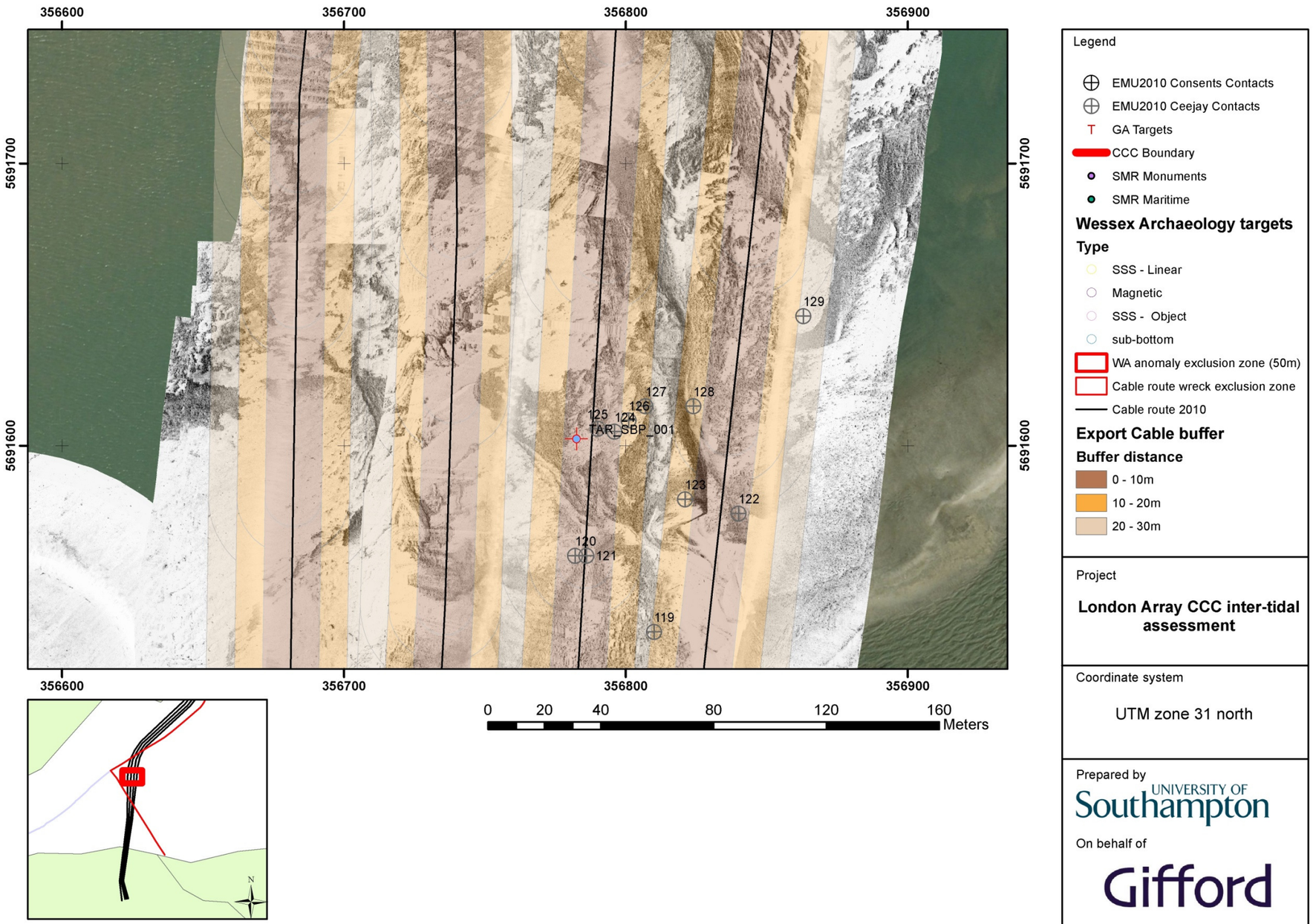



**FIGURE 25 CHART 3C SHOWING CONSENTS GRADIOMETER DATA AND ANOMALIES.**




Legend

- EMU2010 Consents Contacts
- EMU2010 Ceejay Contacts
- GA Targets
- CCC Boundary
- SMR Monuments
- SMR Maritime

**Wessex Archaeology targets**

**Type**

- SSS - Linear
- Magnetic
- SSS - Object
- sub-bottom
- WA anomaly exclusion zone (50m)
- Cable route wreck exclusion zone
- Cable route 2010

**Export Cable buffer**

**Buffer distance**

- 0 - 10m
- 10 - 20m
- 20 - 30m

Project

**London Array CCC inter-tidal assessment**

Coordinate system

UTM zone 31 north

Prepared by

UNIVERSITY OF Southampton

On behalf of

Gifford

**FIGURE 26 CHART 3D SHWOING SIDE SCAN SONAR DATA AND ANOMALIES**

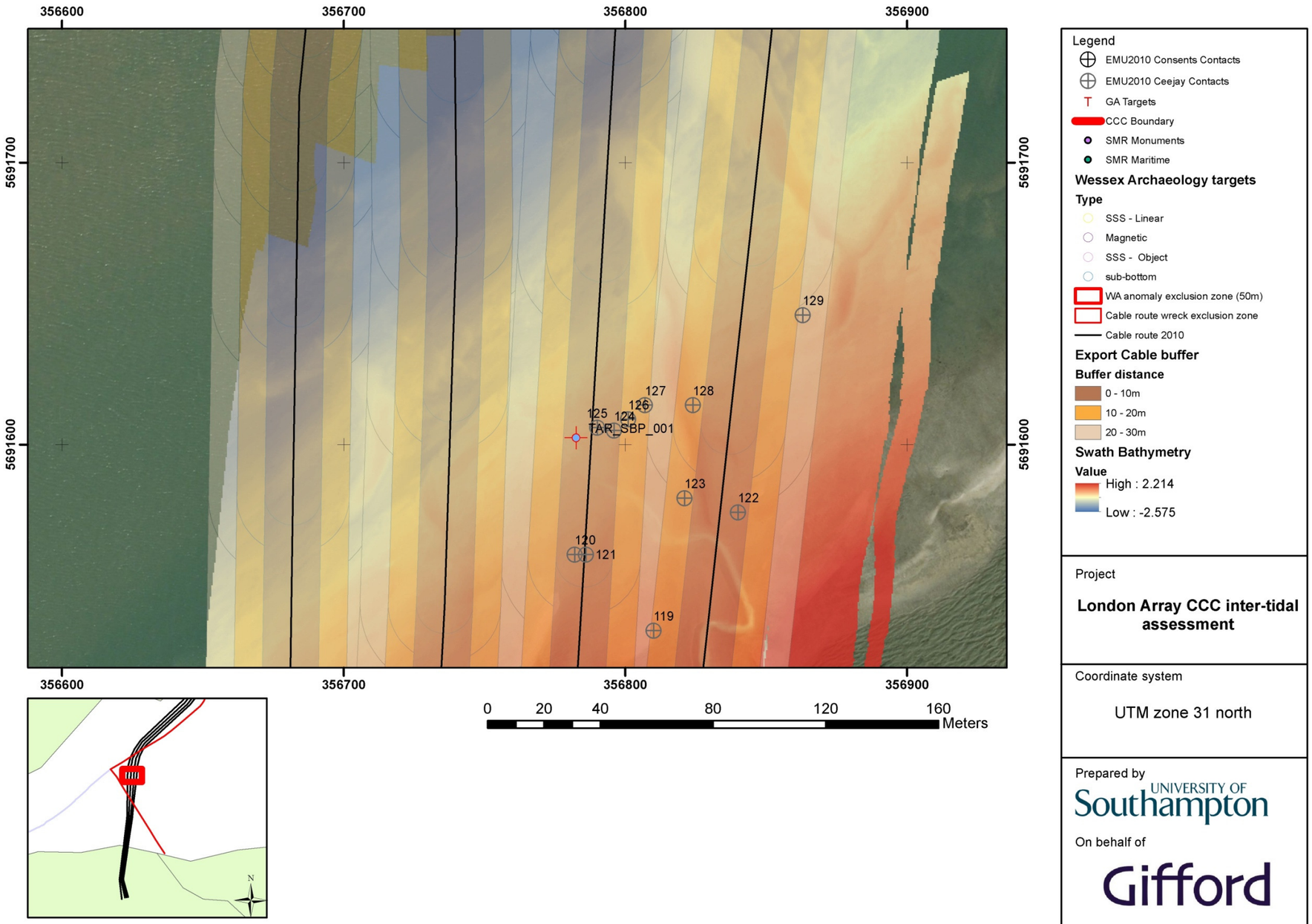
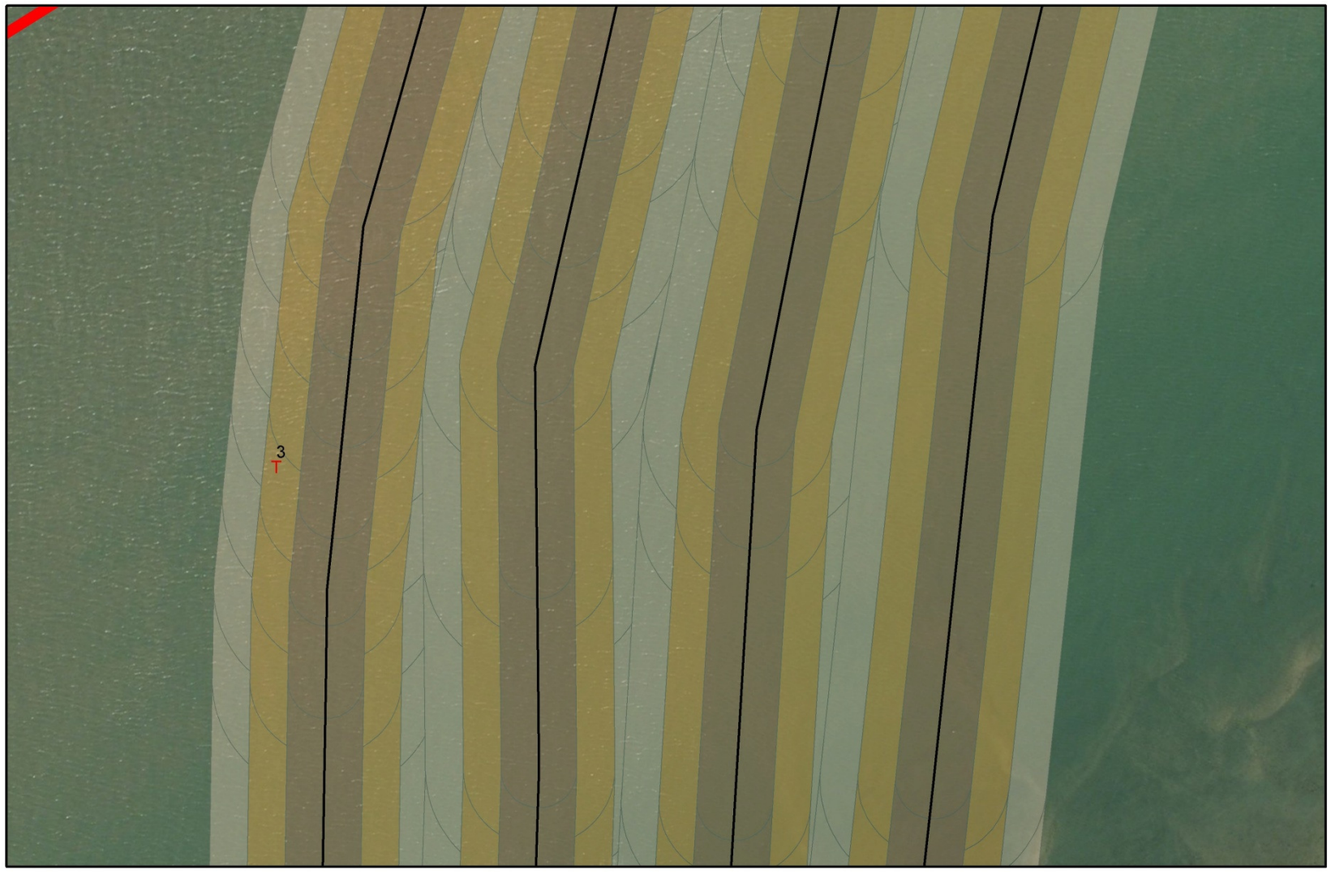
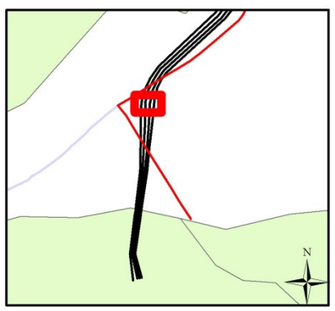



**FIGURE 27 CHART 3E SHOWING SWATH BATHYMETRY AND ANOMALIES.**




0 20 40 80 120 160
Meters

Legend

- EMU2010 Consents Contacts
- EMU2010 Ceejay Contacts
- GA Targets
- CCC Boundary
- SMR Monuments
- SMR Maritime

**Wessex Archaeology targets**

**Type**

- SSS - Linear
- Magnetic
- SSS - Object
- sub-bottom
- WA anomaly exclusion zone (50m)
- Cable route wreck exclusion zone
- Cable route 2010

**Export Cable buffer**

**Buffer distance**

- 0 - 10m
- 10 - 20m
- 20 - 30m

Project

**London Array CCC inter-tidal assessment**

Coordinate system

UTM zone 31 north

Prepared by

University of Southampton

On behalf of

Gifford

**FIGURE 28 CHART 4A SHOWING AERIAL PHOTOGRAPHIC DATA AND ANOMALIES.**

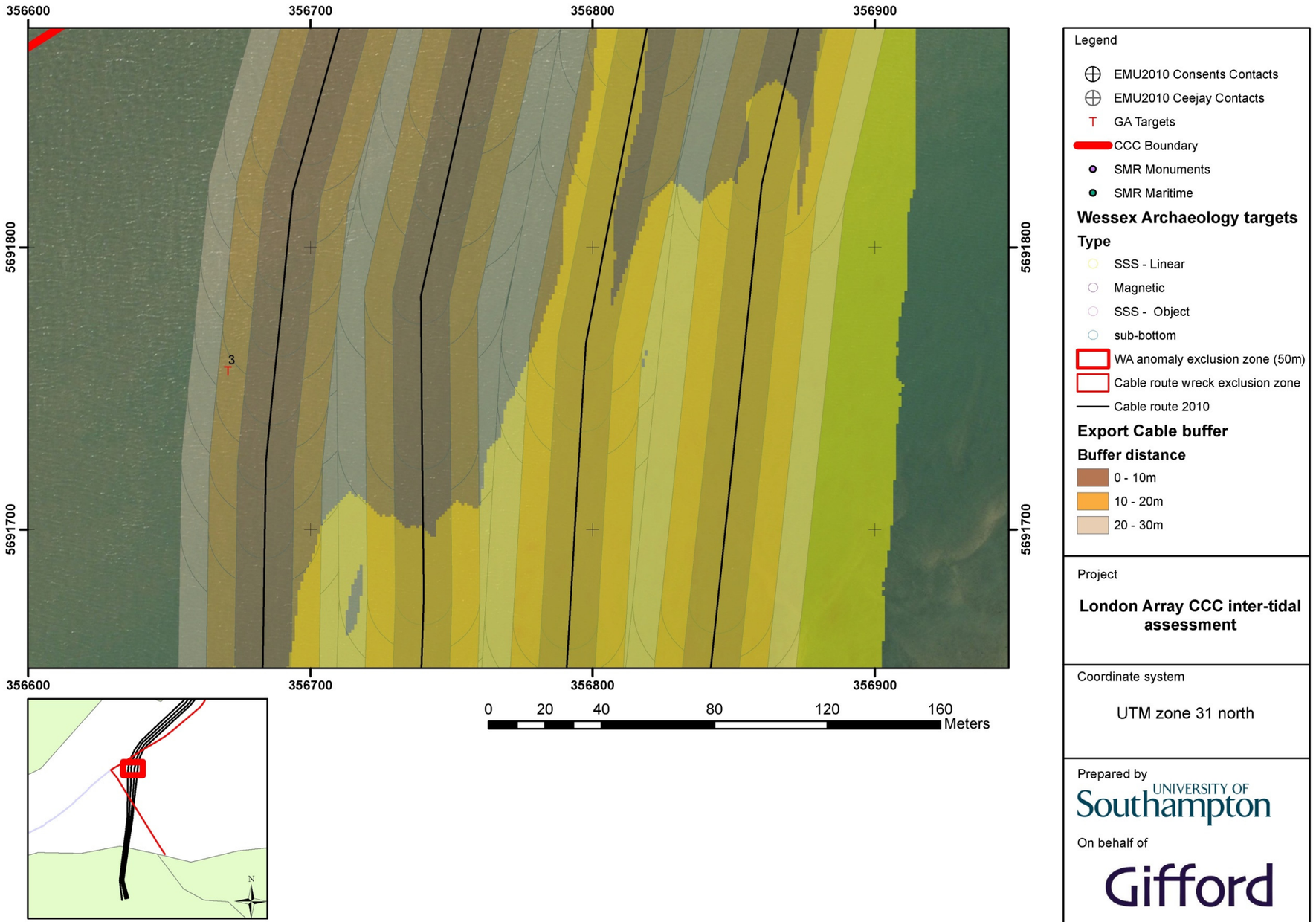



**FIGURE 29 CHART 4B SHOWING CEEJAY GRADIOMETER DATA AND ANOMALIES.**

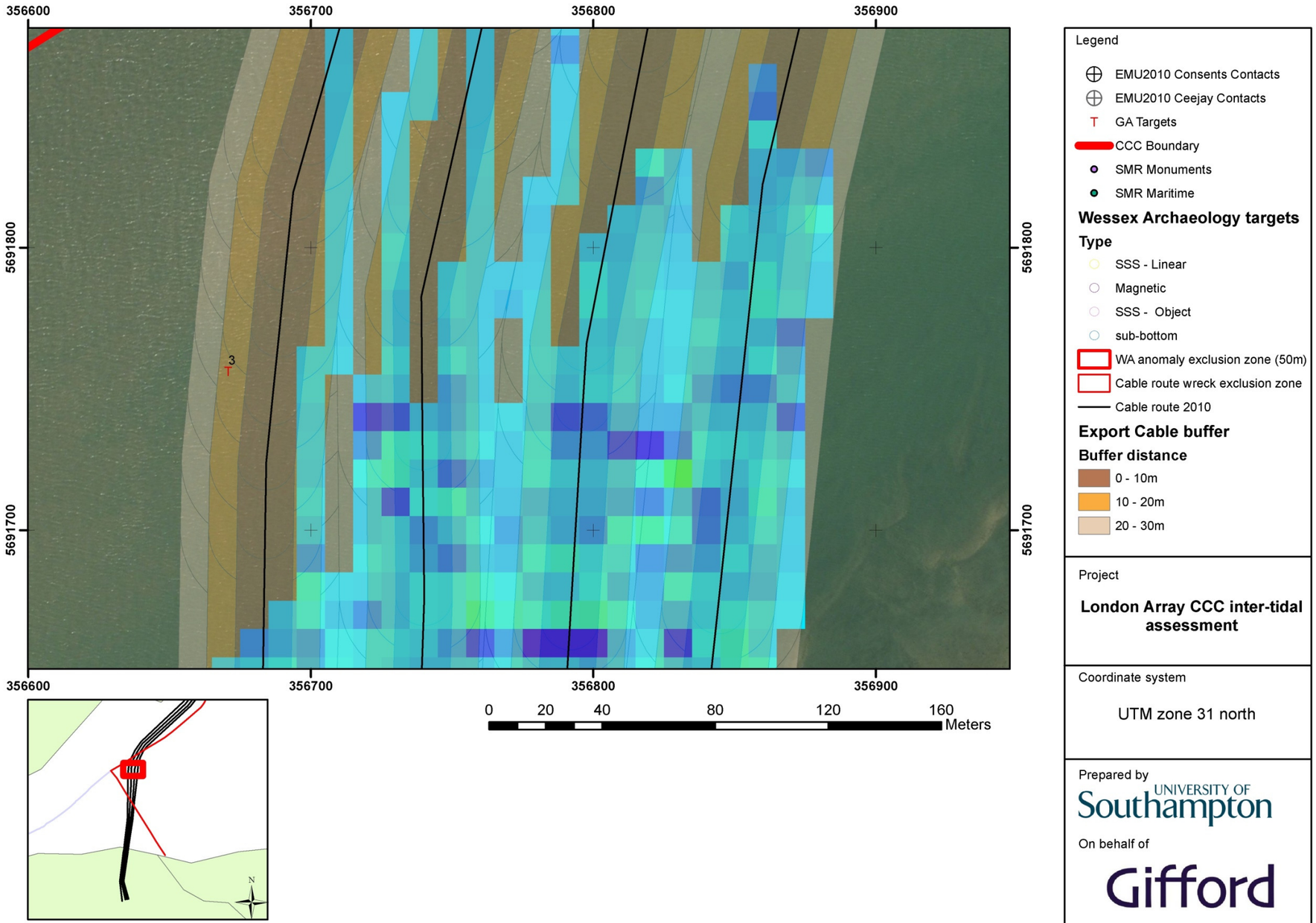



**FIGURE 30 CHART 4C SHOWING CONSENTS GRADIOMETER DATA AND ANOMALIES.**

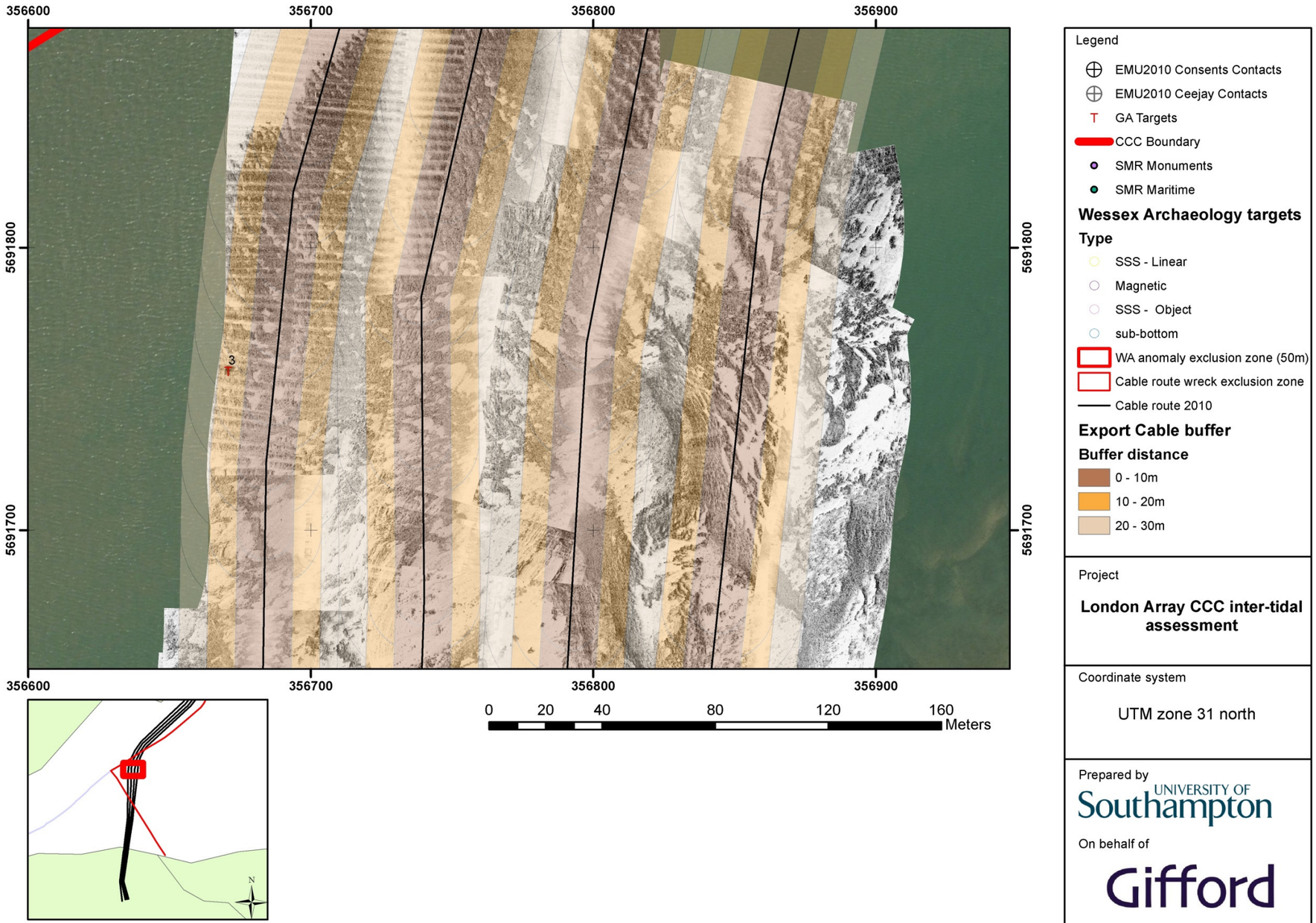



**FIGURE 31 CHART 4D SHOWING SIDE SCAN SONAR DATA AND ANOMALIES.**

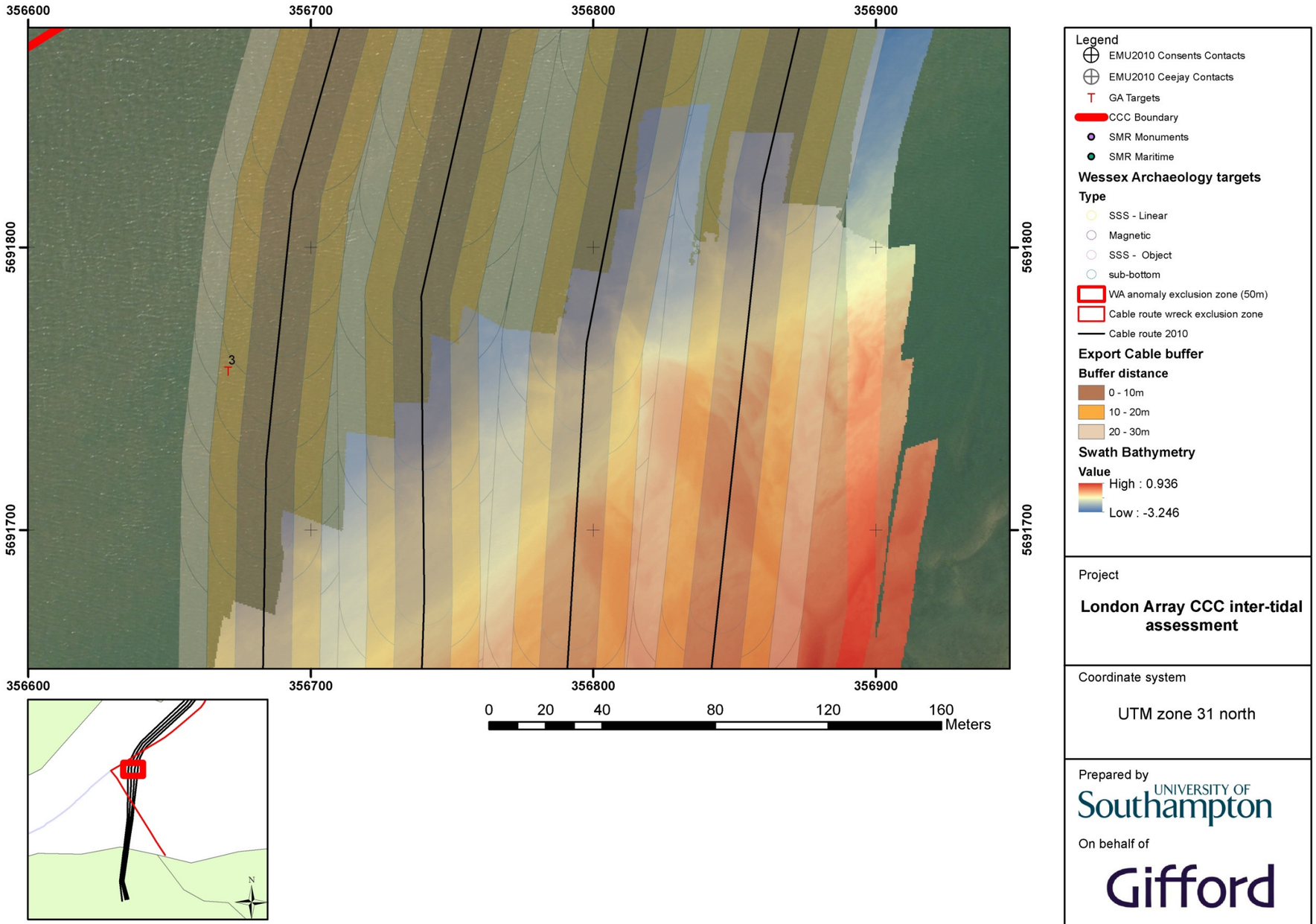



**FIGURE 32 CHART 4E SHOWING SWATH BATHYMETRY DATA AND ANOMALIES.**

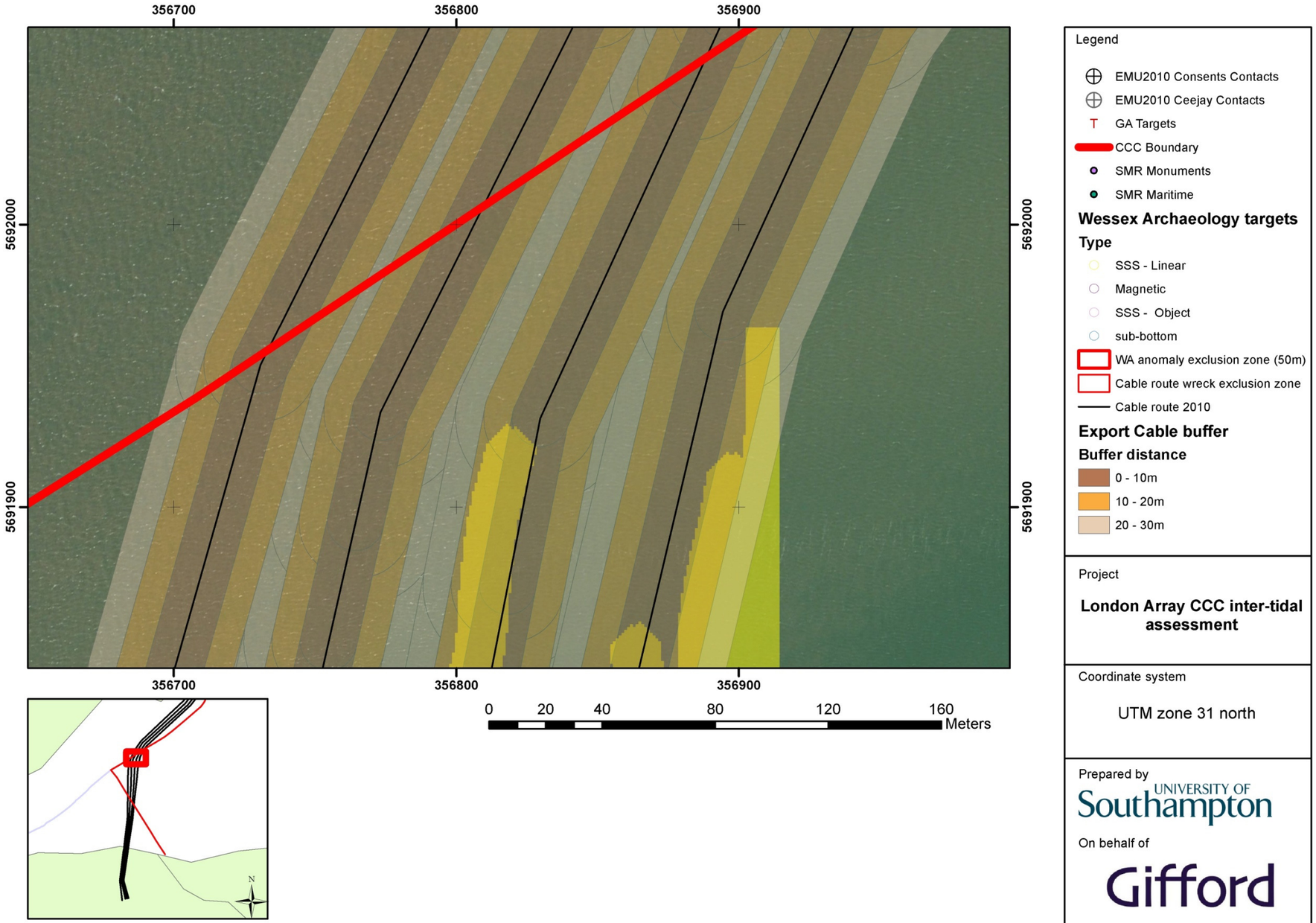



**FIGURE 33 CHART 5A SHOWING CEEJAY GRADIOMETER DATA AND ANOMALIES.**

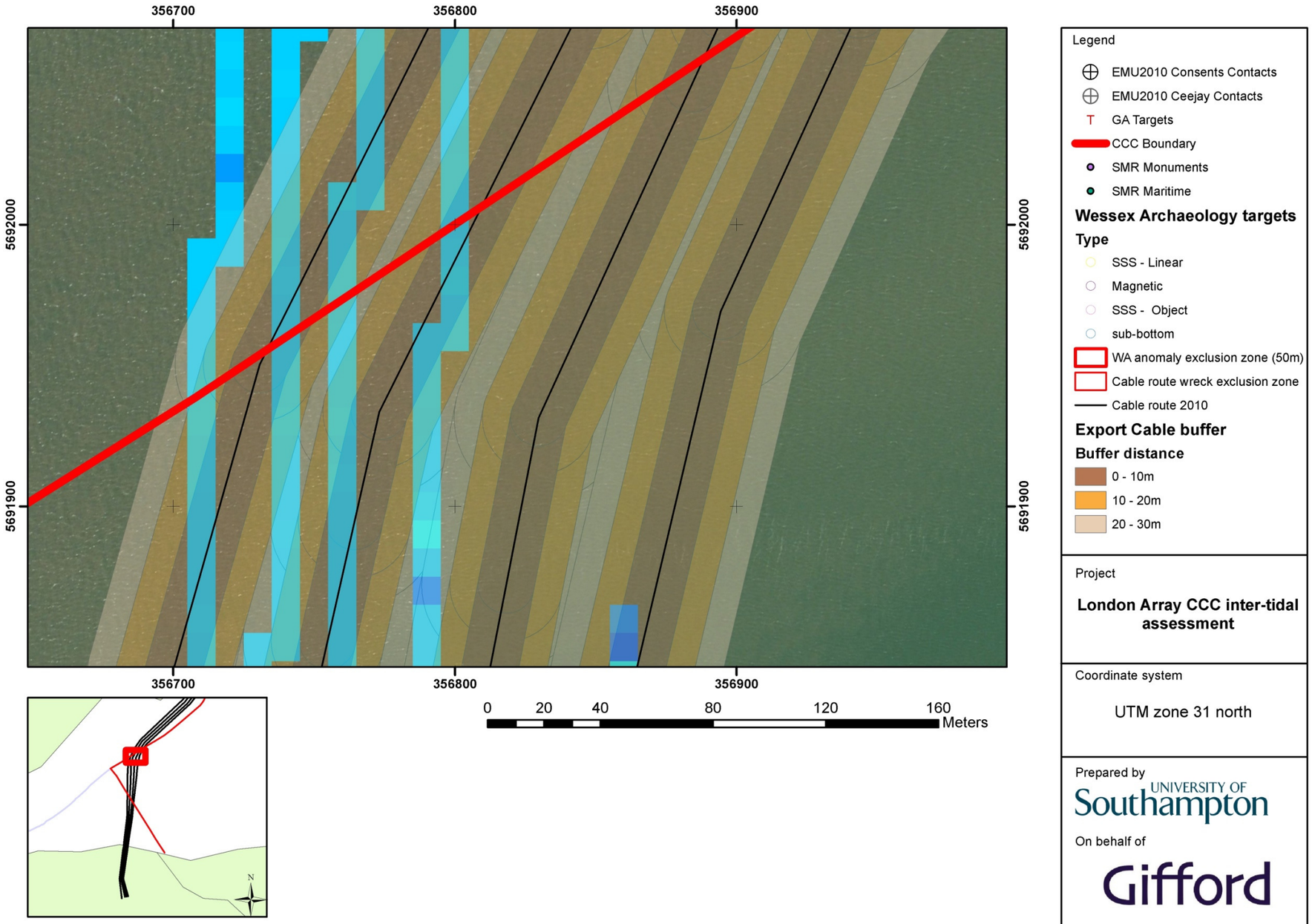



**FIGURE 34 CHART 5B SHOWING CONSENTS GRADIOMETER DATA AND ANOMALIES.**

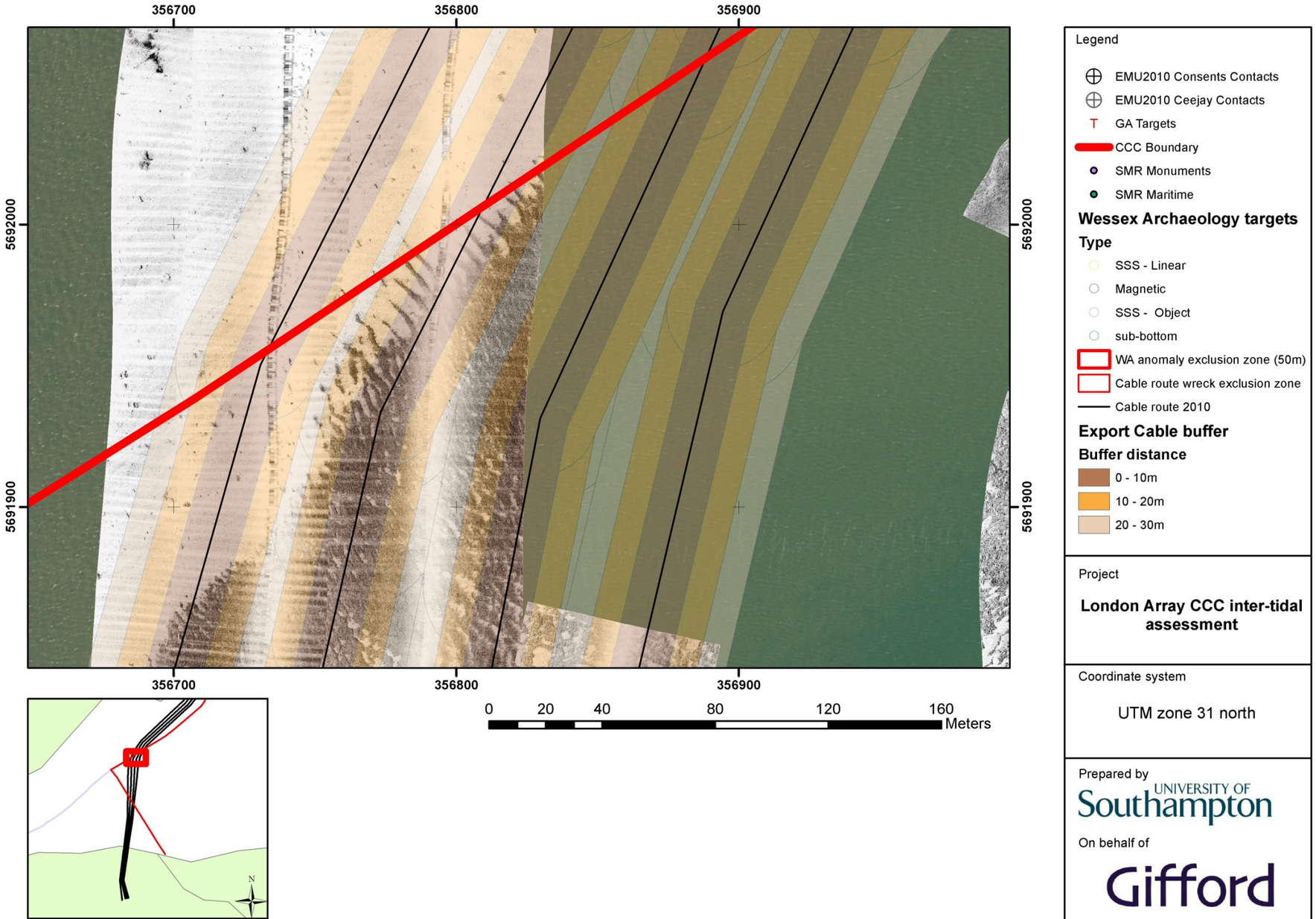



**FIGURE 35 CHART 5C SHOWING SIDE SCAN SONAR DATA AND ANOMALIES.**

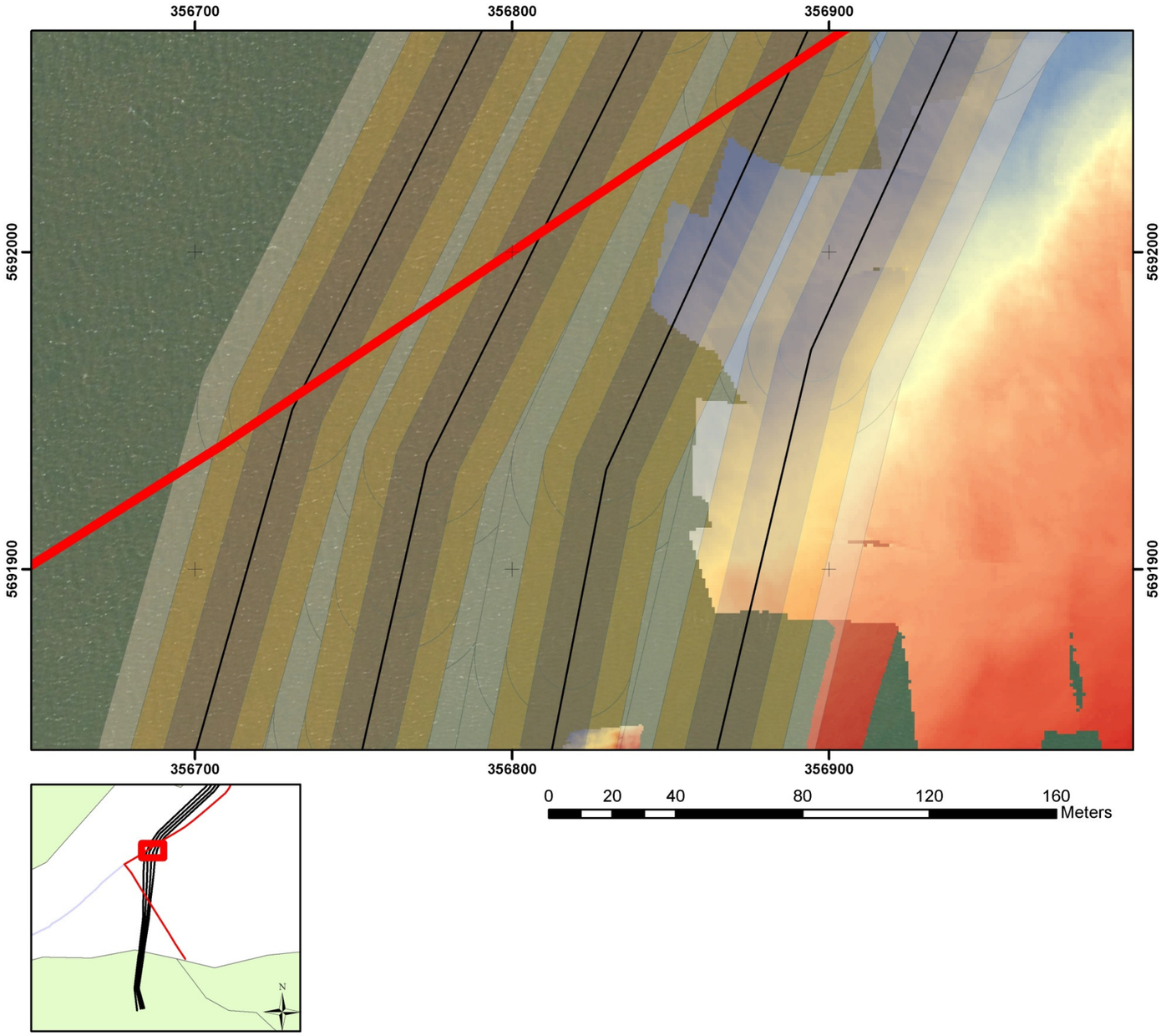



**FIGURE 36 CHART 5D SHOWING SWATH BATHYMETRY DATA AND ANOMALIES.**

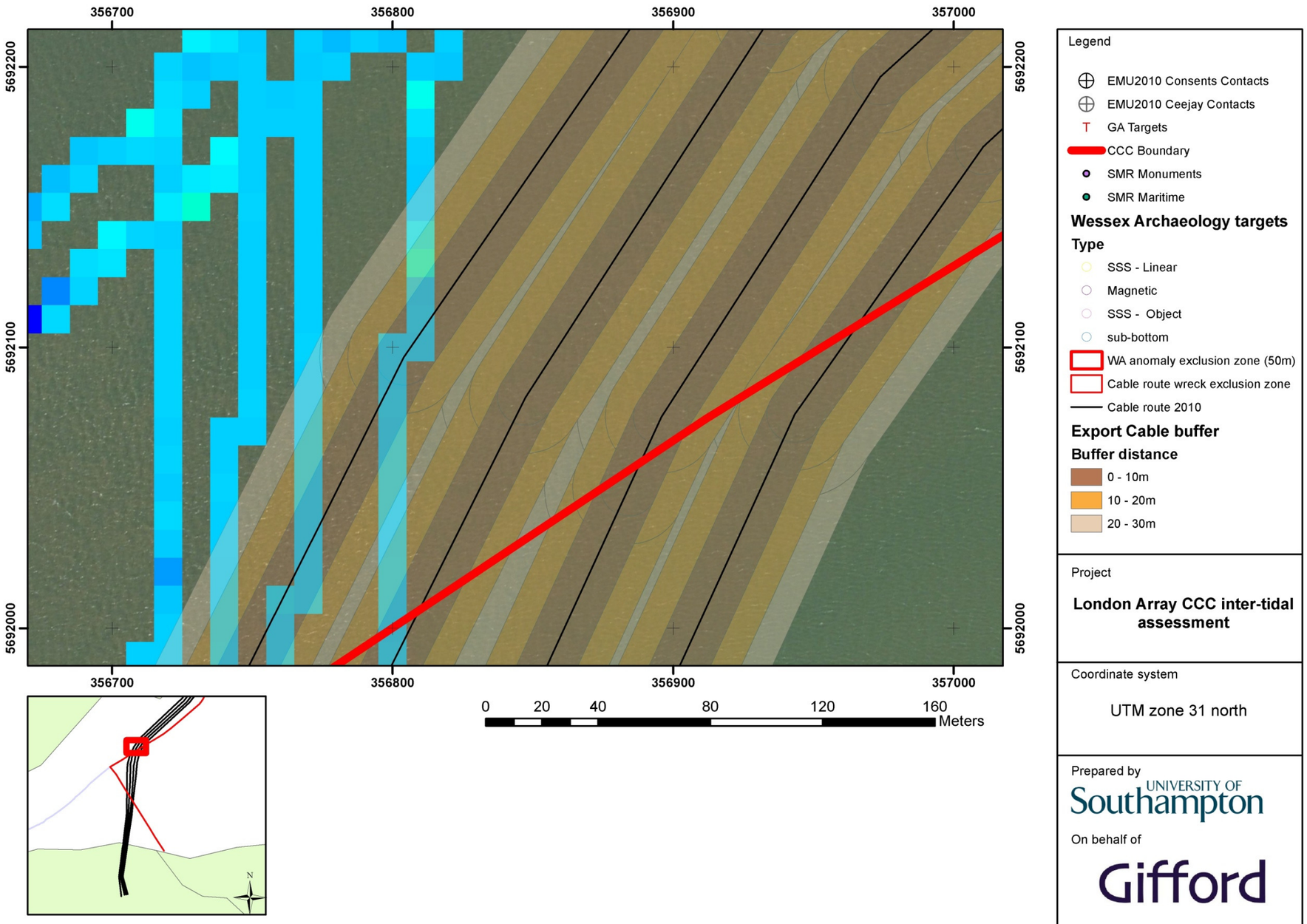



**FIGURE 37 CHART 6A SHOWING CONSENTS GRADIOMETER DATA AND ANOMALIES.**

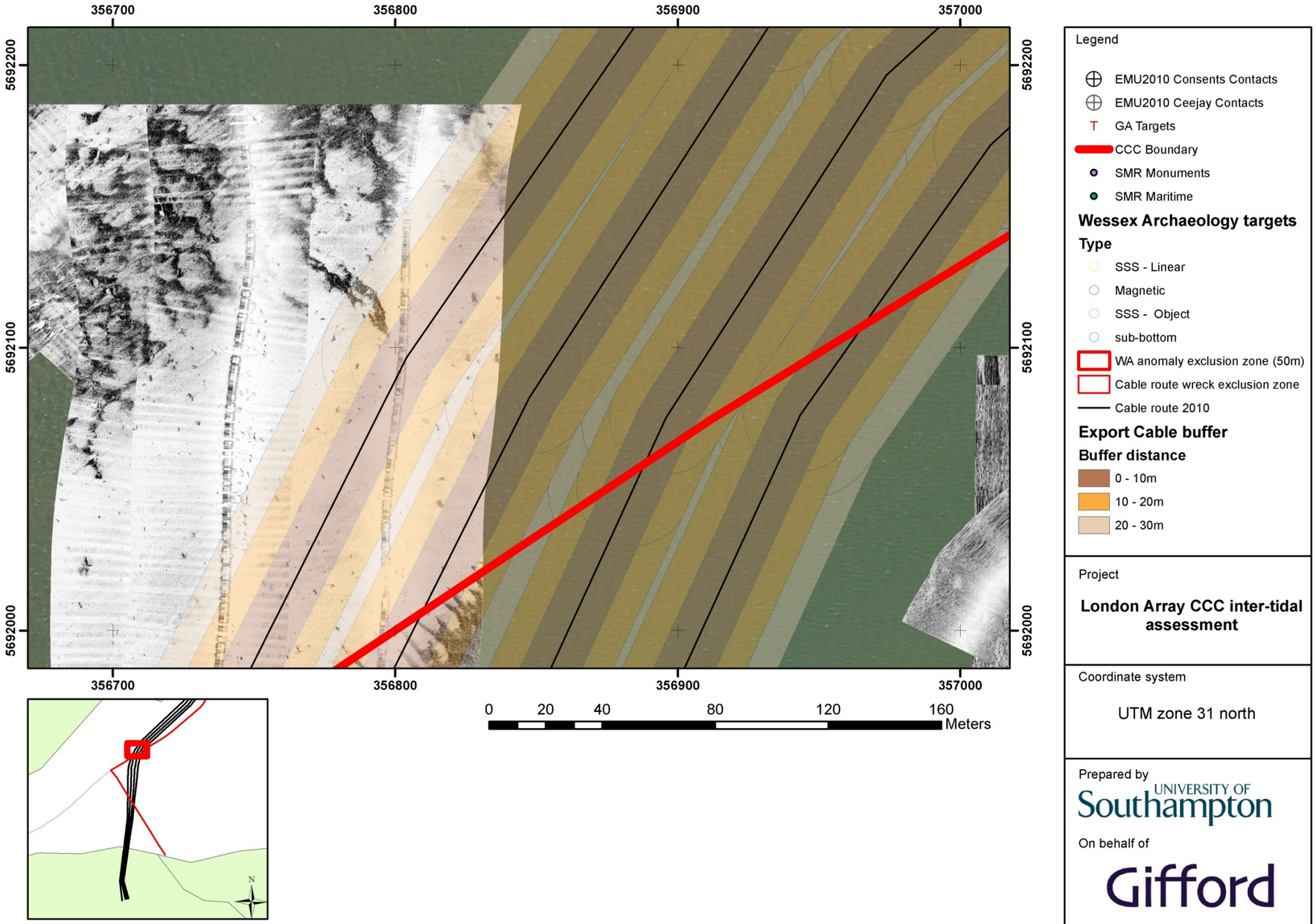



**FIGURE 38 CHART 6B SHOWING SIDE SCAN SONAR DATA AND ANOMALIES.**

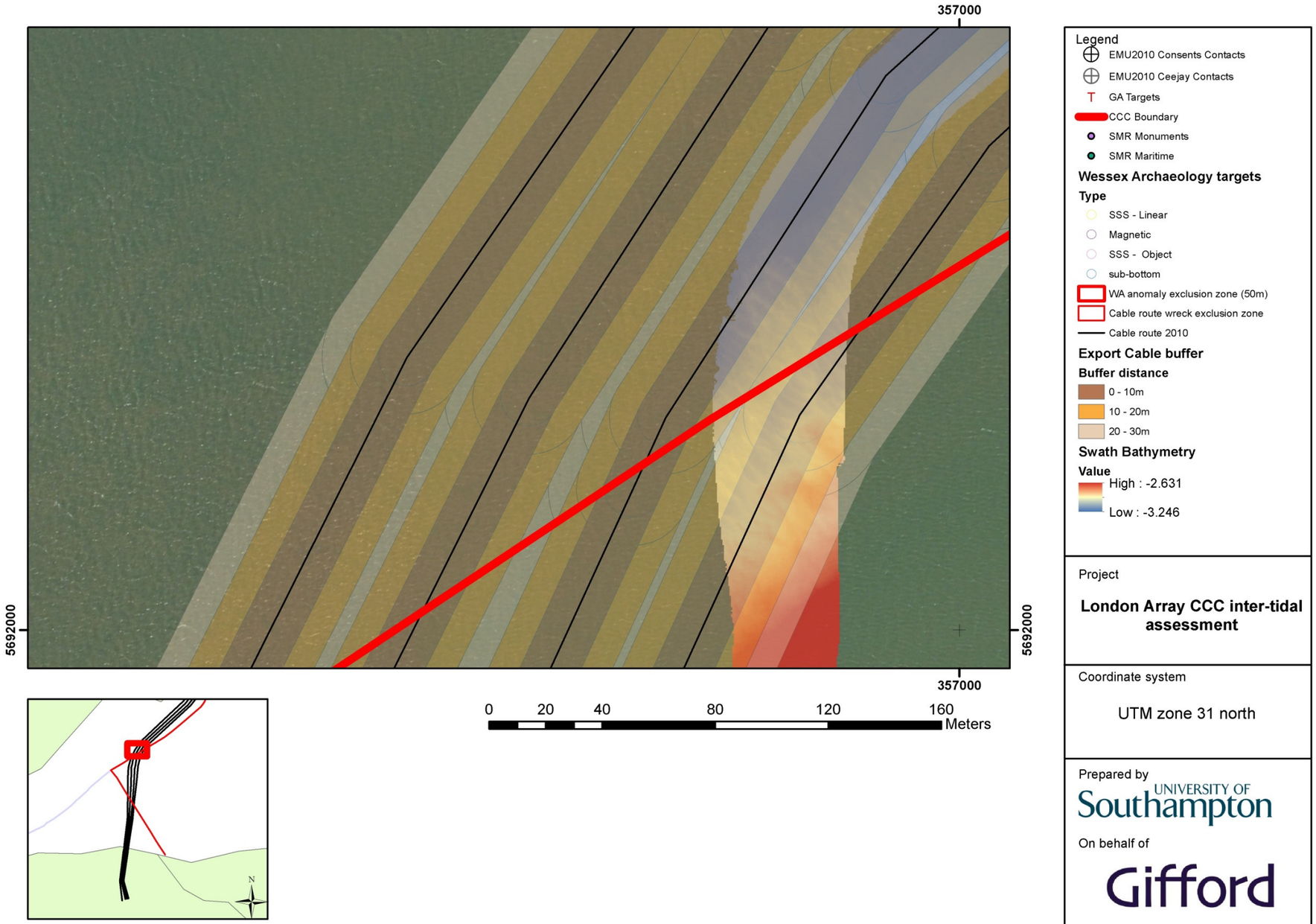



**FIGURE 39 CHART 6C SHOWING SWATH BATHYMETRY DATA AND ANOMALIES.**

## 10. CONCLUSIONS AND FURTHER MITIGATION REQUIREMENTS

10.0.1 After careful review of the datasets, no features of high archaeological potential or significance were identified within the cable route buffer zones in the CCC boundary. This concurs with the Wessex Archaeology conclusions from the walkover survey of the area.

10.0.2 However, the possibility remains that some of the magnetic anomalies may be features of archaeological interest, and may be disturbed during installation works. At present we have no way of predicting which (if any) these may be. Therefore it has been considered that rather than instating archaeological exclusion zones for each of these anomalies which cannot be demonstrated as having archaeological potential, the suggested mitigation strategy should involve implementing the reporting strategy laid out in the original Wessex Archaeology WSI during the pre-grapnel and installation phases. The draft Wessex Archaeology Finds Reporting Protocol is included in Appendix A.

10.0.3 Protocols for Archaeological Discoveries (PADs) are systems for monitoring for unexpected or incidental finds relating to the historic environment, and have come into use predominantly in the marine sphere where construction tends to be a 24 hour operation involving multiple vessels, where conventional watching briefs are not cost effective. They are recommended in Historic Environment Guidance for the Offshore Renewable Energy Sector (Cowrie 2007, 11.3, 45-6). Wessex Archaeology have produced guidance on the protocol for Archaeological discoveries for offshore renewables projects for the Crown Estate (December 2010) see Appendix A) and have also set up an Implementation Service funded by the Crown Estate where finds can be reported and documented.

10.0.4 As described below, if any of the targets listed in sections 6.1-6.3 of this report were to be revealed during installation as cultural material, the installation team would inform the Retained Archaeologists and a record would be made. Anomalies may be revealed by resistance encountered during cable laying or contact on forward-looking sonar (if used), which may indicate that an object or structure of archaeological interest has been encountered on the seabed. The draft Wessex Finds Reporting protocol is reproduced in full in Appendix A of this report.

10.0.5 Documentation for The Protocol for Archaeological Discoveries for the London Array project will be sent to Richard Cross the Canterbury City Archaeologist for approval in advance of export cable installation works. The documents in Appendix A are draft documents for information only at this stage. The London Array Retained Archaeologists will be the nominated contact for the initial reporting of finds with Lynsey Upsdell Consents Co-coordinator for the London Array. The Retained Archaeologists will ensure that all relevant reporting and any finds assessment and conservation work is undertaken in close collaboration with London Array, English Heritage and Canterbury City Council.

***FINDS REPORTING PROCEDURE*** (Taken from the Wessex WSI section 8.6)

***Scope***

*8.6.1. A Protocol for Reporting Finds of Archaeological Interest will address the reporting of finds of archaeological material, recovered from the inter-tidal and sub-tidal areas during the construction of the wind farm. A draft copy of the Protocol is included in* ***Appendix VI****; it will also be produced as a stand-alone document for use on-board the construction vessels.*

*8.6.2. The relevant staff on all construction vessels will be informed of the Protocol, details of the find types that may be of archaeological interest, and the potential importance of any archaeological material encountered.*

*8.6.3. Provision will be made by London Array Limited, in accordance with the Protocol, for the prompt reporting/recording of archaeological remains encountered, or suspected during works to English Heritage and KCCHCG. If the find recovered is 'wreck' within the meaning of the Merchant Shipping Act (1996) then a report will also be made to the Receiver of Wreck. If the find is 'treasure' within the meaning of the Treasure Act (1996) then a report will also be made to the Coroner.*
*8.6.4. The response to reported finds is set out in the Protocol. At the end of the construction phase a report will be prepared on the results of the Protocol.*

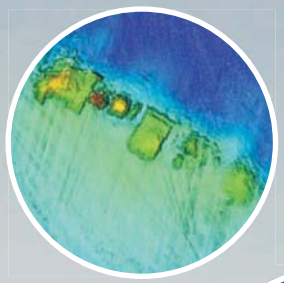
10.0.6 Given this recommendation it is appropriate that the installation team be made aware of the anomalies described in the sections above. These include magnetic targets identified by EMU Ltd, Pinger targets identified by EMU Ltd, and Side Scan Sonar and swath targets identified by the retained archaeologists (noted as GA targets).

10.0.7 Our review is based on geophysical data, HER and NMR records, aerial photographs and the Wessex reports only, and no surveys by diver or ROV have been undertaken to validate further the geophysical evidence. Our recommendations are based on a thorough review of the geophysical evidence where all of the datasets do not support the existence of a recognisable archaeological anomaly. Gifford can take no responsibility for unknown archaeological remains being discovered during the installation phase of the Wind farm.

## APPENDIX A
## WESSEX ARCHAEOLOGY DRAFT FINDS PROTOCOL

# Protocol for Archaeological Discoveries

## Offshore Renewables Projects



December 2010

Wessex Archaeology

THE CROWN ESTATE

# Protocol for Archaeological Discoveries

## Offshore Renewables Projects

Prepared on behalf of

THE CROWN ESTATE

16 New Burlington Place, London W1S 2HX

Wessex Archaeology

**Document ref. 73830.04**
**December 2010**

| | |
|---|---|
| **Title** | Protocol For Archaeological Discoveries: Offshore Renewables Projects |
| **Principal Author(s)** | Toby Gane (Wessex Archaeology) |
| **Managed by** | Dr Antony Firth (Wessex Archaeology) |
| **Origination date** | 11 May 2010 |
| **Date of last revision** | November 2010 |
| **Version** | 73830.04 |
| **Wessex Archaeology QA** | Dr Antony Firth |
| **Status** | Final |
| **Summary of changes** | Incorporating relevant changes as requested by consultees |
| **Associated reports** | 73340 |
| **Client Approval** | Chris Lloyd (The Crown Estate) |

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# CONTENTS

# 1 INTRODUCTION

## 1.1 Background

1.1.1 This document is a protocol that will satisfy anticipated conditions relating to the reporting of archaeological discoveries across the offshore renewable energy industry, if followed correctly.

1.1.2 Protocols for Archaeological Discoveries (PADs) are systems of monitoring for unexpected or incidental finds relating to the historic environment, and have come into use predominantly in the marine sphere where construction tends to be a 24 hour operation, involving multiple vessels, where conventional watching briefs (routinely used in the terrestrial sector) are not cost effective. They are recommended in *Historic Environment Guidance for the Offshore Renewable Energy Sector* (Cowrie 2007, 11.3, 45–6).

1.1.3 The character of the marine environment and lower baseline of archaeological knowledge at sea means that the level of unspecified risk of archaeological discoveries is generally higher at sea than on land, whilst the construction team's flexibility in the event that a significant site is discovered is generally less. Protocols may also prove useful on land to provide a safety-net when construction activities are diffuse or in areas of apparently low potential, especially given the legal requirements applicable to some archaeological discoveries. It is anticipated that the PAD will apply to all activities in the marine and inter-tidal zone and on land, if part of the offshore scheme.

1.1.4 This PAD is specific to archaeology, and it should be used at all stages of the development process where archaeological information may be obtained, including all pre-development surveys such as benthic sampling, obstruction surveys and other such operations.

1.1.5 It should be noted that this PAD is a 'safety-net' only. Anticipated scheme impacts on the historic environment will have been taken into account prior to consent and wherever possible dealt with either in advance or by conditions requiring the implementation of an archaeological Written Scheme of Investigation (WSI). This Protocol in no way detracts from the basic tenet; that impacts on the historic environment should be considered and addressed in the earliest stages of the development process.

1.1.6 PADs have been used very effectively in other industries – most notably Marine Aggregate Industry (MAI) Protocol used in the aggregate dredging sector. To date over 650 individual finds have been investigated as a result of over 200 reports, such as the important lithic tool assemblages found in Area 240. These discoveries are helping to directly inform the advice given to industry, by the Archaeological Curators. A number of previously unknown archaeological sites have been recognised due to assemblages and artefacts reported through the MAI Protocol. Details of the MAI Protocol and the important discoveries that have been made can be found at http://www.wessexarch.co.uk/projects/marine/bmapa/index.html.

1.1.7 The MAI Protocol has proved to be a cost effective mitigation measure with huge benefits for industry and the protection of our heritage. It has also contributed to continuing good relationships between archaeologists and those working offshore. A programme of awareness-raising visits, newsletters and an annual seminar has helped those working in the aggregate dredging industry to learn how reporting finds contributes to identifying potentially significant archaeological sites and, where appropriate, protecting them for future generations.

1.1.8 This Protocol is intended to satisfy any conditions that relate to reporting protocols included on consents administered by marine licensing authorities, including the Major Infrastructure Planning Unit (MIPU), the Marine Management Organisation (MMO) (or equivalent planning authority), Marine Scotland, the Welsh Assembly Government's Marine Consents Unit or the Department of Environment (Northern Ireland). Where implementation of this Protocol is a condition of consent, failure to follow the Protocol may give rise to a breach of condition.

1.1.9 *Our Seas – a Shared Resource*, the UKs Marine High Level Objectives envisions that "The use of the marine environment is spatially planned where appropriate and based on an ecosystems approach which takes account of climate change and recognises the protection and management needs of marine cultural heritage according to its significance" (DEFRA, 2009).

1.1.10 This theme is echoed and expanded in the UK-wide Draft Marine Policy Statement (MPS) (DEFRA, 2010). It intends to provide the high level policy context

within which Marine Plans will be developed, and set the direction for marine licensing and other relevant authorisation systems. The MPS is intended to "*facilitate, support and … ensure a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and our most important heritage assets*".

1.1.11 The Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) states that the Regulator "*… should be satisfied that offshore wind farms and associated infrastructure have been designed sensitively taking into account known archaeological features and their status*" (DECC 2009, p. 43). More specifically it goes on: "*It is likely to be necessary … to impose conditions requiring that … the following [is] undertaken: a Protocol for Unexpected Discoveries. This is a formal mechanism for intercepting and reporting accidental discoveries of unexpected marine archaeological material*".

1.1.12 COWRIE's *Historic Environment Guidance for the Offshore Renewable Energy Sector* (2007) document states: *"The aim of protocols for unexpected discoveries is to reduce any adverse effects of the development upon the marine historic environment by enabling people working on the project to report their discoveries or recovered material rapidly in a manner that is convenient and effective. The protocol will set out the respective responsibilities of the developer, main contractors, and archaeological contractors/consultants. The protocol therefore provides a mechanism to aid compliance with the Merchant Shipping Act 1995 in respect to recovery of 'wreck', as defined by the Act and reporting of military vessel and aircraft wrecks to the Ministry of Defence."*

1.1.13 This Protocol applies to things that are or may have been made, used or affected by people. This will include, for example, fossilised remains from periods of human inhabitation, but not fossils that are exclusively pre-human in origin. It will not include finds of geological, ecological, or other non-archaeological origin, unless a link to human activity can be assumed.

1.1.14 This Protocol takes into account, and is consistent with, existing statutory and non-statutory regimes for reporting discoveries, ownership of finds and other legal regimes in each of the home countries (England; Scotland; Wales; Northern Ireland), on land, within territorial waters and outside territorial waters.

1.1.15 For some classes of find there are specific legal requirements (e.g. treasure, wreck, human remains). These legal requirements will be met by following this Protocol. In such instances, failure to follow the Protocol may also give rise to a criminal offence.

1.1.16 Where **ordnance** is concerned, specific rules are likely to have been put in place by the Developer or their contractors. These rules are required for the safe conduct of construction and installation operations, and must take precedence over this Protocol. Historic ordnance may, however, also be of archaeological interest and can be reported under this Protocol once local rules for ordnance have been satisfied.

1.1.17 This Protocol is supported by an **Implementation Service** (IS) funded by The Crown Estate which will cover the administration of the reporting of discoveries and provide advice about immediate actions (including recording, handling and storage, and introduction of measures to prevent or reduce damage if the presence of a significant archaeological site is suspected).

1.1.18 The IS can help the Developer with any subsequent actions required, but such actions are expected to be the direct responsibility of the Developer, to be agreed case-by-case with the Regulator and their archaeological advisors (curators) with the assistance of the Developer's own Retained Archaeologist, where appointed.

1.1.19 The Protocol is accompanied by an **Awareness Programme** to provide awareness-raising in the workplace, taking into account differing workplace circumstances.

## 1.2 Outline

1.2.1 Archaeological finds made in the course of construction and installation activities are important because they can shed light on past human use of the landscape, sea and seabed. The information that such discoveries bring to light can help archaeologists better understand society and human endeavour in the past, and better protect significant aspects of our history on behalf of future generations.

1.2.2 The Protocol is intended to apply to development, construction and installation activities where an archaeologist is not present on site and therefore not immediately available. In cases where the Developer has made provision for an archaeologist to be on site, as part of a site investigation, watching brief or specific archaeological works, then the archaeological method statement relating to this provision will take precedence. Where no specific archaeological provision has been made, then this Protocol will apply.

1.2.3 This Protocol addresses finds of archaeological interest made on the seabed, onboard vessels, in the inter-tidal zone or on land. They may be identified as a result of geophysical survey, ROV or diver visual identification or through coming into contact with anchors, grapnels, jack-up legs or other seabed equipment. Alternatively they may be uncovered during groundworks on land or in the inter-tidal zone. These finds

or anomalies may indicate that an object or structure of archaeological interest has been encountered on the seabed, the inter-tidal zone or on land.

1.2.4 The definition of an archaeological "find" in this context is of an object or site with archaeological potential or significance. It does not refer just to items brought to the surface. An archaeological "site" is a group of features or objects that make up a relatively discrete collection of associated archaeological objects. This could be a shipwreck, structure, or other archaeological assemblage.

1.2.5 An "anomaly" is distinct from a find or site, and is a signature that could be visual or digital (e.g. geophysical) that indicates a possible find or site. Further investigation may reveal that it is not of human origin, or is too modern to be of archaeological interest – but until this takes place it must be considered as a source of *possible* archaeological interest.

1.2.6 The Protocol anticipates discoveries being made by Project Staff, who report to a Site Champion on their vessel or site (usually the senior person on site), who then reports to a person (the Nominated Contact) who has been nominated by the Developer to co-ordinate implementation of the Protocol. The Nominated Contact will in turn inform the Implementation Service (IS) and the Developer's Project Manager(s). The IS will in turn liaise with the Nominated Contact, Archaeological Curators and the Developer's Project Manager(s) as necessary.

1.2.7 It is recognised that, for the Protocol to be effective, participants (such as Site Champions or project staff) should receive appropriate training. This will take place through the Awareness Programme referred to above.

1.2.8 The response to reported finds will be implemented through the measures set out in the Protocol, such as further survey or the establishment of Temporary Exclusion Zones (TEZs), which may be converted into new Archaeological Exclusion Zones (AEZs), if warranted. Any action to implement new, or to amend agreed AEZs or TEZs will only be done in agreement with the appropriate national Archaeological Curators and the Regulator responsible for consenting the development.

1.2.9 It is recognised that this Protocol refers primarily to offshore schemes of development. However, with offshore renewable schemes it is usual to have associated infrastructure (such as export cables) that impact not only the offshore historic environment, but also inshore, inter-tidal, and in fully terrestrial localities. Therefore this Protocol has been designed to operate in all of these environments, where an archaeologist is not present.

## 1.3 Roles and Responsibilities

1.3.1 The Site Champion is the person formally appointed by the Developer to be directly responsible for reports arising from a particular activity location. The Site Champion could be a Vessel Master, a Construction Foreman or any other person in a position to control the immediate works.

1.3.2 The Developer's Nominated Contact is the formal point of contact for all matters relating to the PAD between the Developer, its subcontractors, the Site Champions, the IS, the Retained Archaeologist (where appointed), the Archaeological Curators and ultimately the Regulator. The Nominated Contact could be the scheme's Environmental Manager, Project Manager or any other coordinator that the Developer feels is appropriate and effective in acting in this role. It is critical that all parties hold the Nominated Contact's full contact details and that any changes to the Nominated Contact's details are circulated as soon as possible.

1.3.3 The Implementation Service (IS) is a service provided by an archaeological contractor appointed by The Crown Estate (TCE) to manage the day to day responses to reports through the PAD. The performance of the IS will be reviewed by TCE, and the annual report of the IS will be submitted to Regulators, Archaeological Curators and Developers.

1.3.4 The Developer may have appointed a Retained Archaeologist to provide archaeological advice and/or services to the development. In this case the IS will undertake its duties in liaison with the Retained Archaeologist, as well as the Nominated Contact for the Developer.

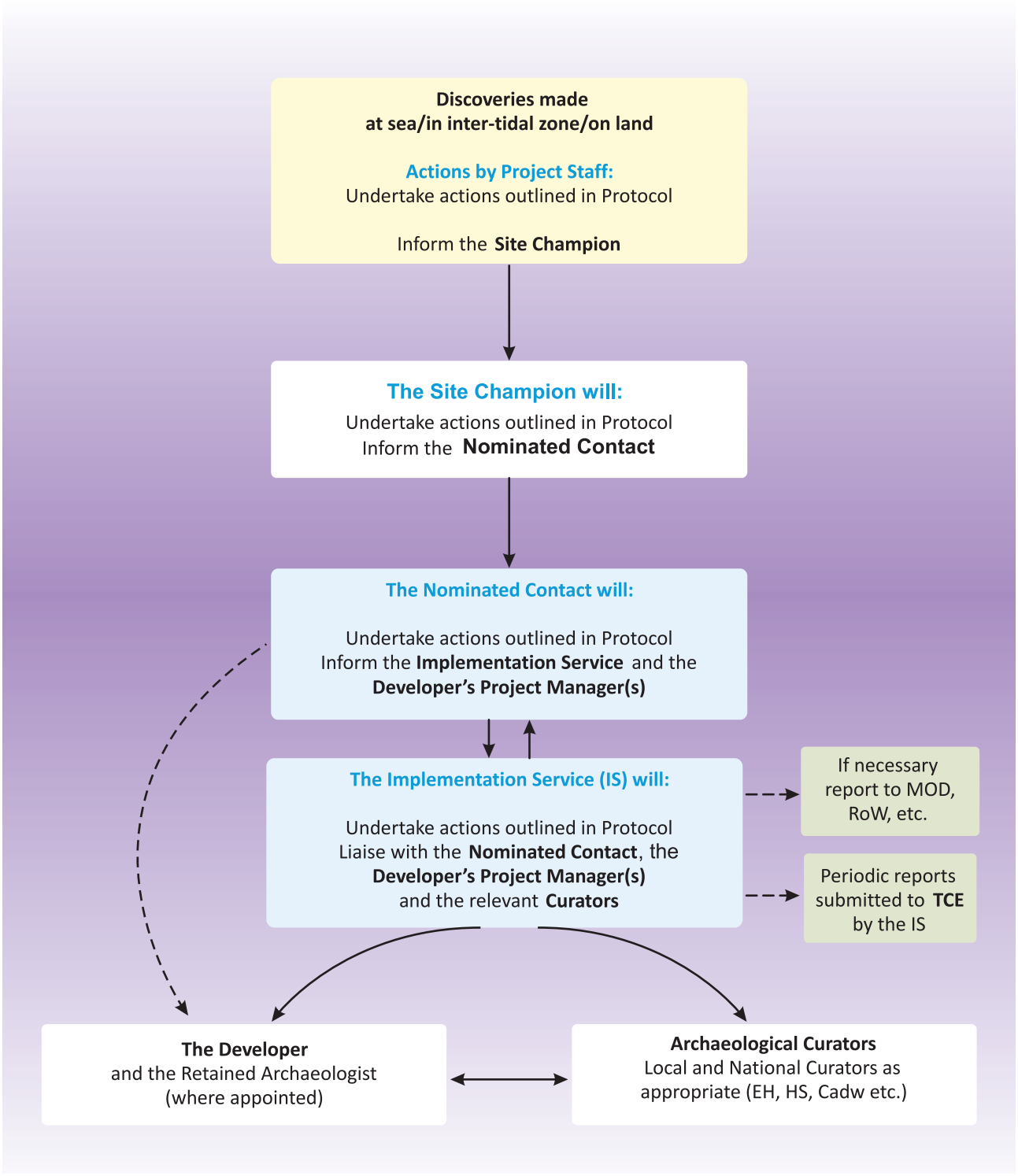
1.3.5 The level of service provision by the IS, including response times for time critical activities, will normally be as follows:

| Time Critical Category | Description | Response Time from receipt of report from Nominated Contact |
|---|---|---|
| *Urgent* | Very time-critical construction/installation activities | 1 hr |
| *Non-Urgent* | Pre consent/development survey activities and other non-time-critical construction/installation activities | 1–2 working days |

1.3.6 It should be noted that a detailed assessment of the potential of any discoveries may be dependant on the advice of, and information from, a range of external specialists, repositories and organisations. Therefore the IS can only provide a full response as that information becomes available.

1.3.7 Response times are for Initial Responses and are for information submitted to the IS web-site. Alternative communication may take the form of email correspondence and/or telephone conversations (where internet access is restricted).

## Basic Sequence of Reporting (when an archaeologist is not present)



# 2 ACTIONS BY PROJECT STAFF

## 2.1 In All Cases

2.1.1 If a find of archaeological interest is made, Project Staff will immediately inform the Site Champion (via their supervisor if appropriate).

2.1.2 If the discovery is ordnance, then Project Staff will abide by their operational procedures which are to take precedence; and then report via the Protocol once safe to do so.

2.1.3 Where items of archaeological interest are recovered, Project Staff (under direction of the Site Champion) will:

- Handle all material with care.
- Any rust, sediment, concretion or marine growth should not be removed and 'groups' of items or sediments should not be separated.
- If possible photograph the item in the condition in which it was recovered.
- Record the position at which the artefact/sediments were recovered.
- Provide a unique reference number for each artefact, which is to be included on all recording and storage mediums.

If the find is from a waterlogged or underwater environment, then Project Staff (under direction of the Site Champion) will arrange for the find to be immersed in seawater in a suitable clean container, which should be covered.

## 2.2 Discoveries On Board

2.2.1 If a find of archaeological interest is made on board a construction vessel (for instance, caught in a grapnel/anchor or trapped in a plough), Project Staff will immediately inform the Officer on Watch. The Officer on Watch will inform the Site Champion.

2.2.2 Where it is possible to identify the seabed position from which the find originated, the Officer on Watch will temporarily cease construction activities in the vicinity of the seabed location, or move to an alternate location, until the advice of the IS has been obtained. The advice of the IS will be provided within the timescales previously advised (1.3.5).

## Anomalies on the Seabed

2.3.1 Finds or sites of archaeological potential may be encountered via a number of methods including; geophysical survey, diver magnetometer, obstacle avoidance sonar, visual survey by ROV or divers, and interaction with ploughs, anchors, jack-up legs or seabed grapnels. Staff should be constantly aware of the possibility of archaeological discoveries.

2.3.2 If an anomaly is identified in advance of impact, such as on the forward-looking sonar of a cable plough, the route should – where possible – be deviated around the obstruction, in line with normal ploughing practise. The position of the anomaly will be reported to the Officer on Watch and thence to the Site Champion.

2.3.3 If an anomaly is identified after an impact has occurred, for example, as indicated by a change in the towing cable tensiometer, avoidance by deviation will be precluded. However, the change in tension should be immediately brought to the attention of the Officer on Watch and the Site Champion so that the anomaly can be reported, advice can be sought and any requirements for further investigation determined.

2.3.4 The Officer on Watch will arrange for the grapnel or plough to be recovered to the surface and examined as soon as possible, once recovered to surface, to see if any archaeological material is trapped within it, and will inform the Site Champion accordingly.

2.3.5 If an anomaly comes to light in the course of geophysical survey or drop-down video survey the Officer on Watch will ensure that the position of the anomaly is noted on navigational software and that the Site Champion is informed.

## 2.4 Discoveries on Land or in Inter-tidal Areas

2.4.1 Discoveries may be made in the course of groundworks, trenching or site investigations. They should be reported to the Site Champion and the finds handled in accordance with the general guidance above. Where archaeological investigations are already taking place, as part of a watching brief, evaluation trenching, strip map and sample or open area investigation, then

the method statement for those investigations will take precedence and discoveries need not be reported under this protocol.

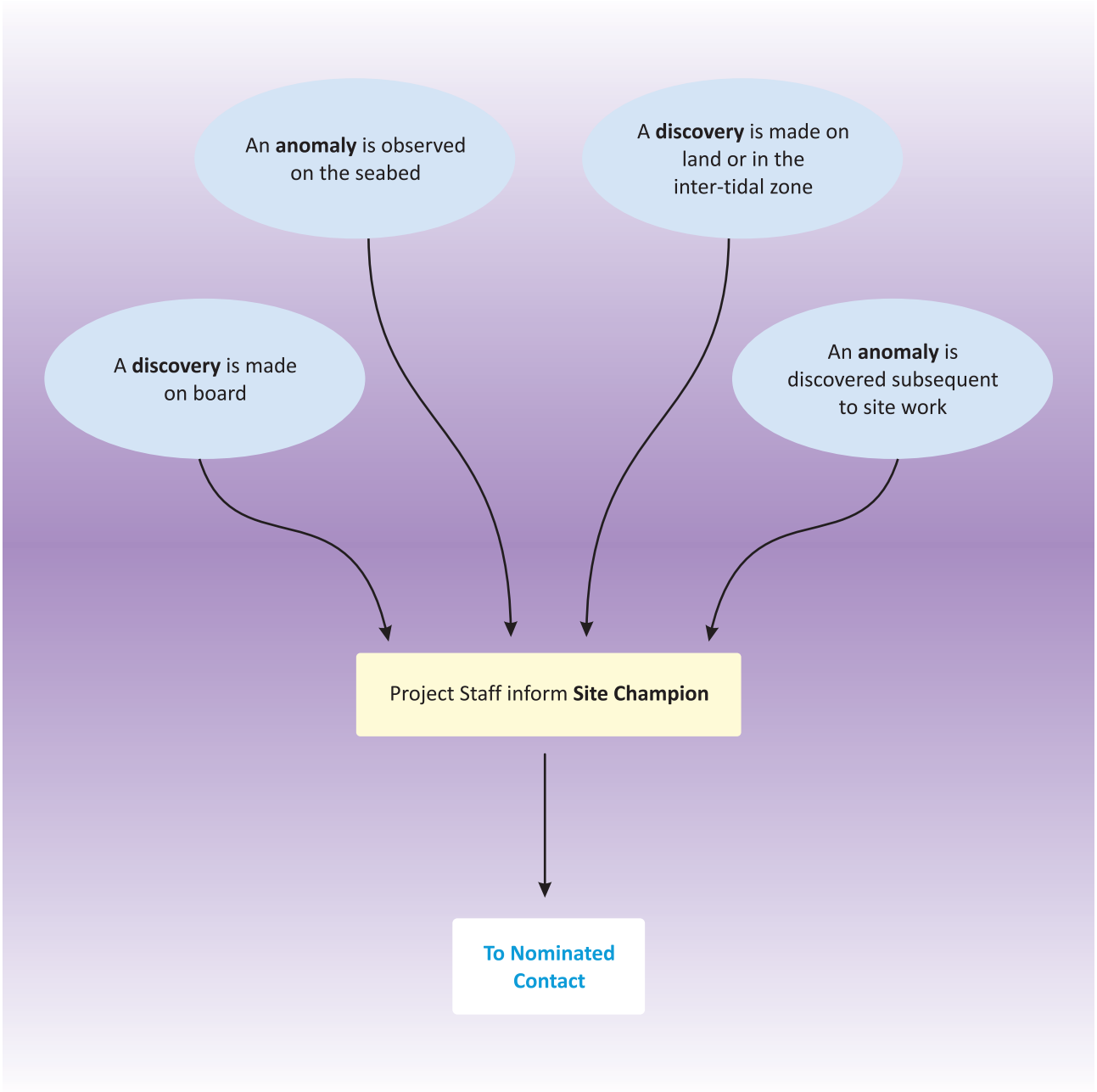
## 2.5 Discoveries Subsequent to Work on Site

2.5.1 There are a number of circumstances in which the presence of material of archaeological interest may be identified after work on site has occurred. For example, Project Staff reviewing geophysical data or video might observe an anomaly. Similarly, Project Staff involved in processing samples in the laboratory may make archaeological discoveries in their samples.

2.5.2 Staff examining sample material (e.g. core material; benthic samples) should consider the potential for archaeological and/or paleoenvironmental material being recovered within their samples. Where such discoveries are made Project Staff should inform the Site Champion and pass on details of the sample number and its position.

2.5.3 If an anomaly comes to light in the course of processing or interpreting geophysical survey data, video or other photographic data, Project Staff should inform the Site Champion and pass on details of the data files and navigational information relating to the positions where the data were obtained.

### Actions by Project Staff (when an archaeologist is not present)



# 3 ACTIONS BY SITE CHAMPION

3.1.1 Where it is possible to identify the position from which the discovery originated, the Site Champion will arrange for a Temporary Exclusion Zone (TEZ) in which construction activities will cease temporarily (in the vicinity of the location), or move to an alternate location, until the advice of the IS has been obtained. The advice of the IS will be provided within the timescales previously advised (1.3.5).

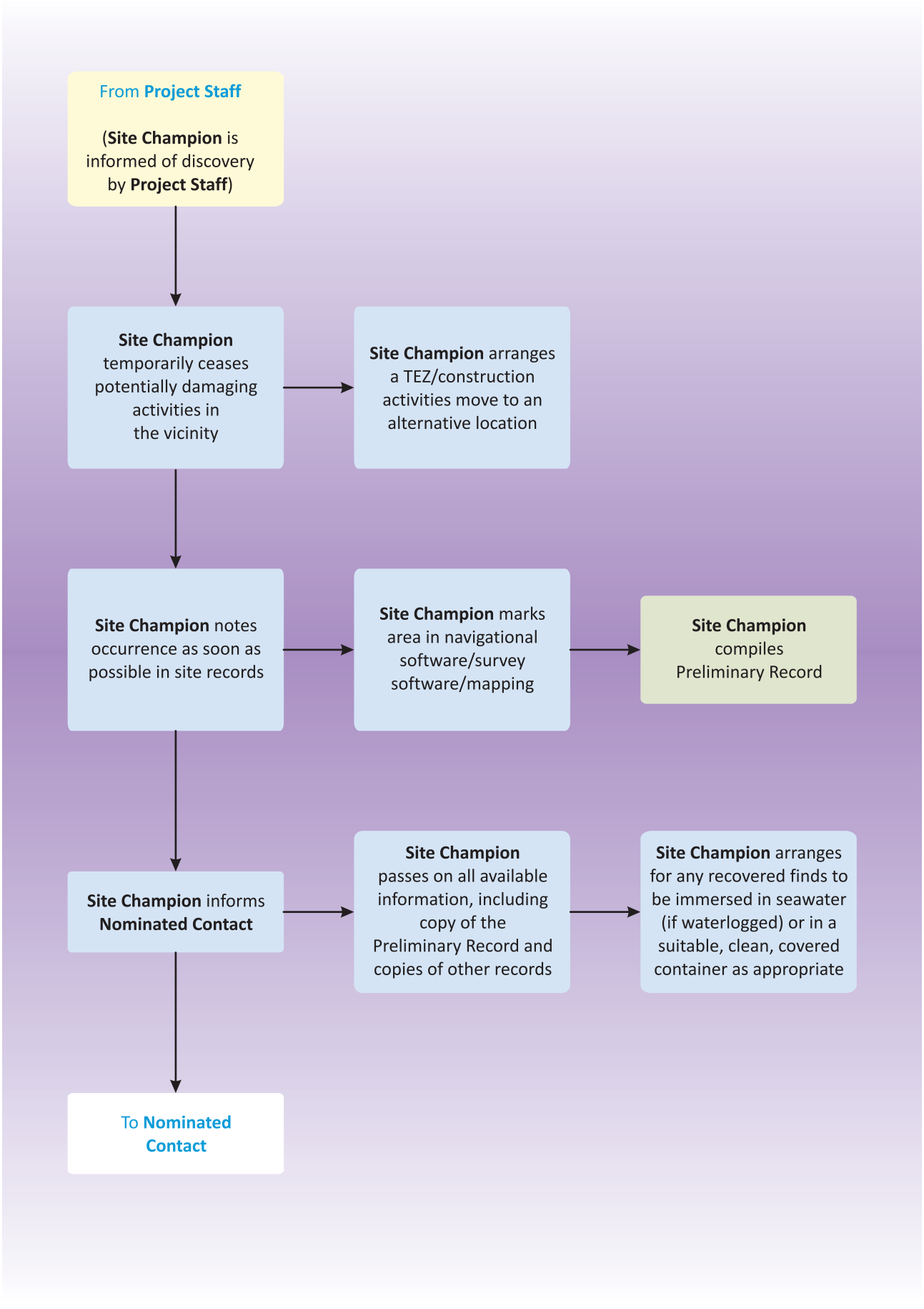
3.1.2 The Site Champion will note the occurrence as soon as possible in the site daybook or vessel log together with the time and exact position. The entry should include a close approximation of the original position of the find/anomaly. Additionally, the area should be marked on site drawings or surveys.

3.1.3 The Site Champion will compile a Preliminary Record (see Appendix I) of the occurrence. The Site Champion will inform the Developer's Nominated Contact of the occurrence as soon as possible and pass on all available information, including a copy of the Preliminary Record and copies of any photographs, drawings or other records that have been made.

3.1.4 The Site Champion will arrange for any finds (of archaeological material) to be carefully contained and protected;

- if waterlogged: immersed, bagged and placed in a protective container, or placed in seawater in a suitable clean container, which should be covered and stored in a cool, dark place;
- if dry: placed in a suitable container and stored in a cool, dark place;
- any dirt, rust, concretion or marine growth should not be removed.

## Actions by Site Champion



# 4 ACTIONS BY THE NOMINATED CONTACT

4.1.1 The Nominated Contact will confirm with the Site Champion that all the details set out in the Preliminary Record are comprehensive and correct.

4.1.2 Contact will be made with the Implementation Service at the earliest opportunity, preferably using the IS web service. The IS will provide advice on the appropriate immediate actions in addition to the recording, handling and storage of any items recovered. The advice of the IS will be provided within the timescales previously advised (1.3.5).

4.1.3 The Nominated Contact shall pass on to the Implementation Service all available information relating to the circumstances of the occurrence, including a copy of the Preliminary Record and copies of any other records that have been made.

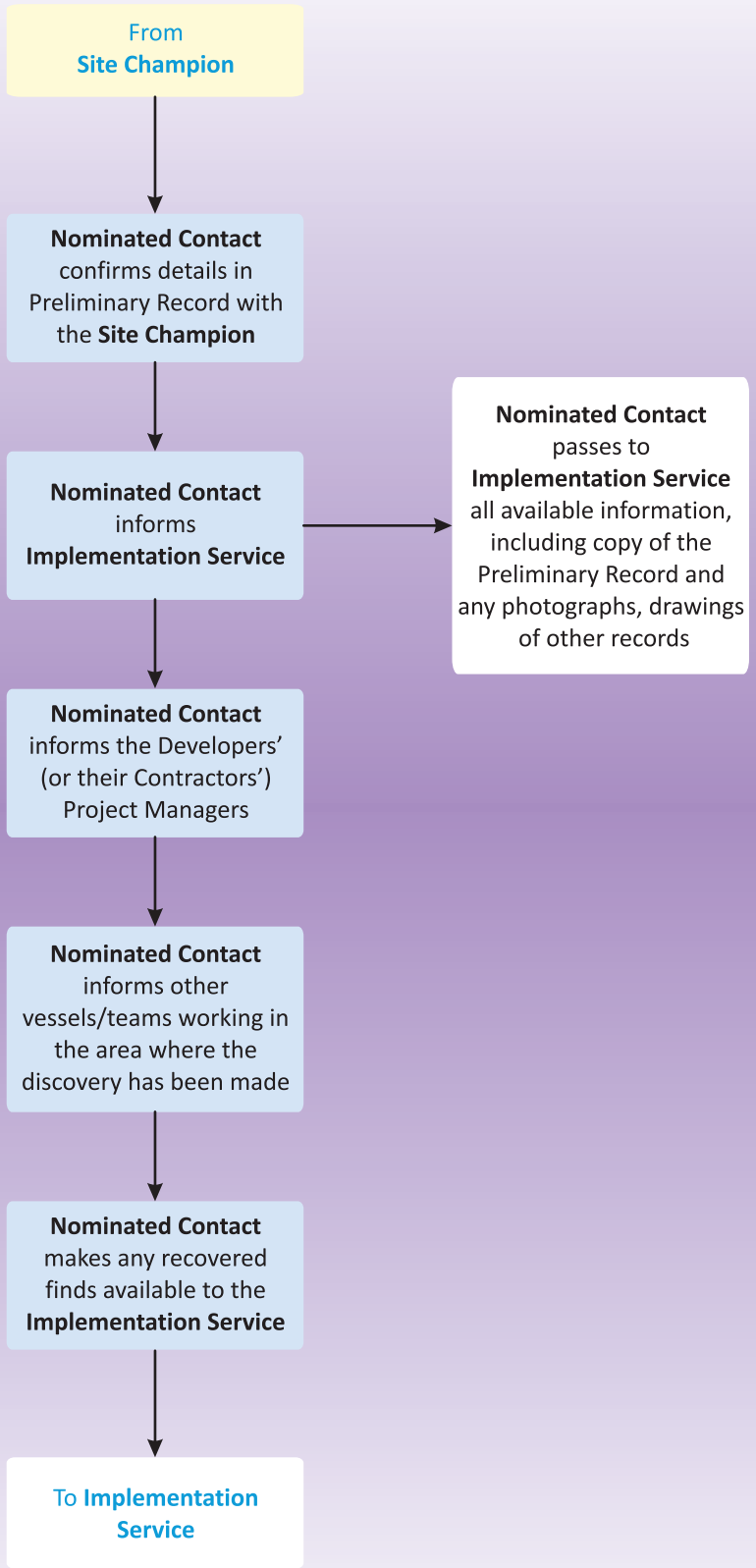
4.1.4 In addition any finds should be made available to the IS if required.

4.1.5 Once informed of a find by a Site Champion, the Nominated Contact will inform the Developer's (or their Contractors') Project Managers (as appropriate), in addition to the IS.

4.1.6 The Nominated Contact should inform other teams engaged in potentially damaging activities in the same area, to ensure that they are aware of the position of the discovery so that further possible damage to the historic environment can be avoided.

4.1.7 Should it be required by TCE or the Developer, IS archaeologists will travel to the site to inspect any finds or data made available.

## Actions by Nominated Contact



# 5 ACTIONS BY THE IMPLEMENTATION SERVICE

5.1.1 The Implementation Service will review the information about the discovery in conjunction with geophysical and/or desk-based information, where available. This review will normally be based on information uploaded to the IS web site. Additional communication may take the form of email correspondence and/or telephone conversations (where internet access is restricted).

5.1.2 The IS will send an Initial Response to the Nominated Contact to acknowledge the report.

## 5.2 Urgent Reports

5.2.1 Where the report is urgent, the Initial Response will include an assessment of archaeological potential and a decision on the continuation or removal of the Temporary Exclusion Zone (TEZ).

## 5.3 Assessment of Archaeological Potential

5.3.1 The assessment of archaeological potential will be based on the following guidance:

5.3.2 The following types of discovery are likely to be of **low** potential:

- reports of single, apparently isolated, finds that are not datable or are of modern (post-1800) or later date.

5.3.3 The following types of discovery are likely to be of **high** potential:

- reports of single finds that are of post-medieval or earlier date;
- reports of single finds that relate to military aircraft;
- reports of multiple finds from the same area;
- reports indicating the presence of a wreck or other structural remains;
- reports of peat or other fine-grained material apparently pre-dating Holocene marine conditions.

5.3.4 In the case of a discovery of **high** potential, construction will not recommence in the TEZ without the approval of the Archaeological Curators. The IS will confirm the extent of the area of the TEZ. The IS will notify the Archaeological Curators that a discovery of high potential has been reported, and will provide details of the further actions (see below) that have been advised.

5.3.5 In the case of discoveries of **low** potential, the Implementation Service will advise the Nominated Contact that the TEZ may be lifted and that construction activities in the vicinity of the discovery may recommence.

## Summary Record

5.4.1 The IS will send a Summary Record of the report to the Nominated Contact and to other relevant parties. The Summary Record will include:

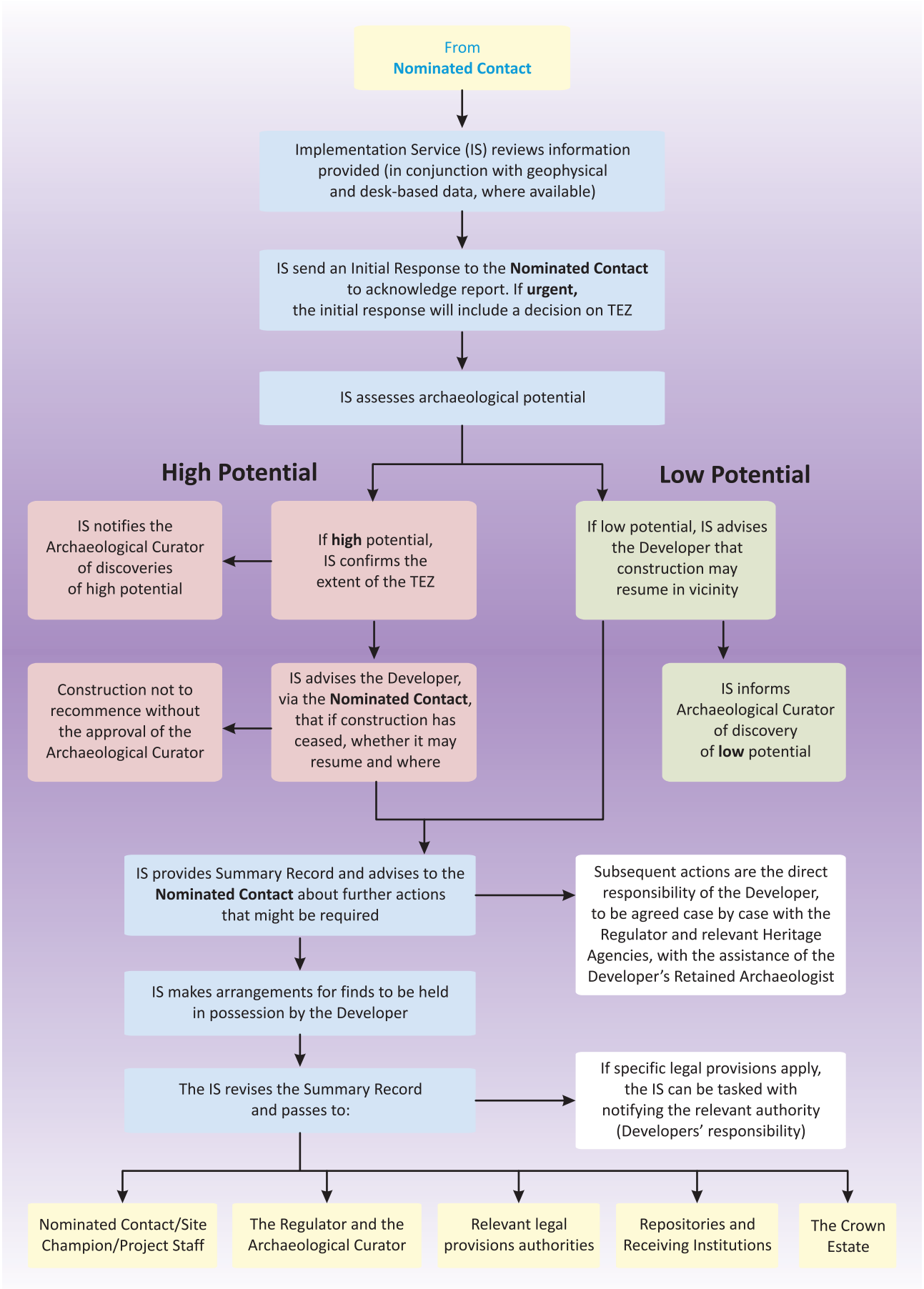
- advice on the identification of finds and the character of their seabed locations;
- an assessment of the archaeological potential of the report, including the rationale for the conclusion reached;
- advice on actions to be taken in respect of the discovery, including any recovered finds;
- a list of the parties to which the summary record and associated archaeological data are being sent.

## 5.5 Subsequent Actions

5.5.1 The Implementation Service will advise the Nominated Contact of the implications of the discovery and of further actions that might be required. Further actions may include call-out investigations, the conversion of a TEZ to an AEZ, and/or the institution of a watching brief. The rationale for conclusions reached will be provided to the Nominated Contact.

5.5.2 Any subsequent actions are expected to be the direct responsibility of the Developer, to be agreed case-by-case with the Regulator and relevant Heritage Agencies with the assistance of the Developer's own Retained Archaeologist, where appointed.

## Actions by Implementation Service flow chart



## 5.6 Further Requirements

5.6.1 If the discovery is something to which specific legal provisions apply (treasure, human remains, wreck etc.), it will remain the responsibility of the Developer to undertake such statutory reporting as is required. The Developer may, however, task the Implementation Service with making statutory reports alongside reporting under this Protocol if they so wish.

5.6.2 The Ministry of Justice (MoJ) states: "*It should be noted that an application to the Ministry of Justice for a licence to remove or disturb human remains will only be required where the remains are buried under ground on land and within the territorial waters of England and Wales. Moreover, licences cannot be granted once remains have been removed from the ground*".

## 5.7 Finds

5.7.1 The IS will make arrangements for the Developer to hold in possession any recovered finds, subject – in the case of wreck – to agreement with the Receiver of Wreck. The subsequent handling, retention or disposal of finds will be subject to applicable law and to arrangements between the Developer and the institution receiving the archaeological archive arising from the scheme.

## 5.8 Revised Summary Record

5.8.1 The Summary Record will be revised to take account of further information or actions that have taken place or are planned. The IS will pass on a copy of the revised Summary Record to:

- The Nominated Contact for circulation to the Site Champion and relevant Project Staff.
- The relevant Regulator and Archaeological Curator(s).
  - In England this would be is English Heritage and the Local Government Archaeological Curator. The IS will send a copy of the summary record to the NMR for incorporation in their records.
  - In the Scottish Offshore Region it is Historic Scotland and the Local Government Archaeological Curator. Finds of low potential are not required to be reported to the Archaeological Curators. However, the IS will send a copy of the summary record to the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) for incorporation in their records.
  - In the Welsh Offshore Region it is Cadw and the Local Government Archaeological Curator. The IS will send a copy of the summary record to the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) for incorporation their records.
  - In Northern Ireland it is the Northern Ireland Environment Agency (Built Heritage) and the Local Government Archaeological Curator. The IS will send a copy of the summary record to the NISMR.
- The relevant authority, where specific legal provisions apply (e.g. Receiver of Wreck, Coroner, MOD etc.).
- The relevant archaeological records repository, including the relevant NMR, HERs, PAS etc. The content of the summary record will be sent in a digital format consistent with the requirements of the relevant repository.
- The Crown Estate.

# 6 APPENDIX I: LEGAL TERMS AND RESPONSIBILITIES

## 6.1 Legal Terms & Responsibilities*

6.1.1 *Protection of Wrecks Act 1973*. Under the 1973 Act, shipwrecks and wreckage of historical, archaeological or artistic importance within UK territorial waters can be protected by way of designation. Once a wreck has been designated it is an offence to carry out certain activities on or around the site without a licence.

6.1.2 Administration of the Act and associated licences is the responsibility of English Heritage in England, Historic Scotland in Scotland, Cadw in Wales and the Northern Ireland Environment Agency (Built Heritage) in Northern Ireland.

6.1.3 Currently, designated wrecks in UK waters range in date from the middle Bronze Age to the 20th century. Where a wreck is located that it is considered warrants designation, the relevant Secretary of State is required to consult appropriate advisors prior to designation. However, Developers should be aware that it is also possible, for a wreck or wreck material to be designated in an emergency.

6.1.4 *Merchant Shipping Act 1995*. This Act is not a form of designation, but will affect offshore renewable energy schemes if, in the course of site investigations or construction, any material is recovered which falls within the definition of 'wreck'. All wreck has an owner, and the Merchant Shipping Act sets out the procedure for returning recovered wreck to the owner or their successor. The Receiver of Wreck has to be notified of all recovered wreck landed in the UK, and will seek to identify the original owner so that it can be claimed. Ownership of unclaimed wreck from within territorial waters vests in the Crown or in a person to whom rights of wreck have been granted. Unclaimed wreck from beyond territorial waters is returned to the finder.

6.1.5 The Receiver of Wreck has a duty to ensure that finders who report wreck receive an appropriate salvage payment. In the case of material considered to be of historic or archaeological importance, a suitable museum will be asked to purchase the material at the current market valuation. The finder will receive the net proceeds of the sale as a salvage payment. If the right to, or the amount of, salvage cannot be agreed, either between the owner and finder or between competing salvors, the Receiver of Wreck will hold the wreck until the matter is settled, either through amicable agreement or by court judgement.

6.1.6 Protection of Military Remains Act 1986. The primary purpose of The Protection of Military Remains Act is to protect the resting places of military personnel from unauthorised disturbance. It allows the Ministry of Defence (MOD) to protect vessels and aircraft that were in military service when they were lost or wrecked. The MOD can designate any such named vessel lost after 4 August 1914 as a 'protected place' even if the position of the wreck is not known. In addition the MOD can designate a 'controlled site' any such wreck whose position is known.

6.1.7 Access is not prohibited at a 'protected place', but it is an offence to tamper with, damage, move or remove items from such a wreck without a licence. However, access, salvage and excavation are all prohibited on 'controlled sites', except where a licence for restricted activities has been obtained from the MOD.

6.1.8 The remains of all aircraft that have been lost in military service are automatically classified as 'protected places' by the Act.

6.1.9 *Marine (Scotland) Act 2010*. This Act enables Scottish Ministers to designate Historic Marine Protected Areas (MPAs). This is restricted to Scottish Territorial Waters.

6.1.10 *Human Remains*. In 2008, the Ministry of Justice issued a statement on burial law and archaeology in relation to the Burial Act 1857. The main principle of the statement is:

> *Exhumation licence applications under the Burial Act 1857 will be considered wherever human remains are buried in sites to which the Disused Burial Grounds (Amendment) Act 1981 or other burial*

* Adapted from *Historic Environment Guidance for the Offshore Renewable Energy Sector*, COWRIE, 2007

*ground legislation does not apply. This is expected to apply to the majority of archaeological excavations. When licenses are issued, a time limit, normally of up to two years, will be set for re-interment of human remains; it will be possible to apply for an extension when circumstances justify this. It will be rare for the Burial Act 1857, or other burial legislation, to apply to human remains found in the marine environment.*

6.1.11 The responsibility for burials in Wales rests with the Welsh Assembly, and in Scotland the Scottish Government is responsible.

6.1.12 For sites in Scotland, the guidance offered in *Historic Scotland Policy Paper 5: The Treatment of Human Remains in Archaeology* should be adhered to.

6.1.13 *Treasure: The Treasure Act 1996*. The Act has effect in England, Wales and Northern Ireland and is supplemented by the Treasure (Designation) Order 2002. Finders of gold and silver objects (over 300 years old) and some base metal assemblages (prehistoric) as defined in the Act are required to report such finds by contacting the Coroner and delivering the items for hand over as per the coroners' instructions.

6.1.14 The Act and the Order apply to objects found anywhere in England, Wales and Northern Ireland, including in or on land, in buildings (whether currently occupied or ruined), in rivers and lakes and on the foreshore (that is the area between mean high water and mean low water on beaches and tidal river banks), provided that the object does not come from a wreck.

6.1.15 In Scotland, the Scots common law right relating to found archaeological and historic items in Scotland (and dealt with through the system of Treasure Trove) does not extend to the marine environment except to the foreshore.

6.1.16 *Bona Vacantia* (Scotland). The term *bona vacantia* means "ownerless goods". In Scotland, *bona vacantia* refers only to the assets of dissolved companies and lost property, which is administered under the Civic Government (Scotland) Act 1982. In Scottish law, ownerless goods fall to the Crown and the realised value of such assets are paid into the Scottish Consolidated Fund for use of the Scottish Government on behalf of the people of Scotland.

6.1.17 *Ancient Monuments and Archaeological Areas Act 1979*. Monuments that are of national importance within UK territorial waters can be protected by being added to the schedule of monuments protected under this Act. It is an offence to damage, or carry out a range of specified activities on such a 'scheduled monument', unless a licence for these activities has been obtained from the relevant authority, in the form of 'scheduled monument consent'.

6.1.18 Monument can mean, among other things, the site of any vehicle, vessel, aircraft or other structure. It also refers many types of archaeological site in the traditional sense.

6.1.19 In Scotland, the Act is devolved to Scottish Ministers and the Historic Environment (Amendment) (Scotland) Bill has recently been introduced to the Scottish Parliament.

6.1.20 *The Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995*. The Ancient Monuments Act 1979 does not apply in Northern Ireland. The relevant legislation is the Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995. It provides for the designation of scheduled monuments and the statutory reporting of archaeological objects found.

# 7 APPENDIX II: GUIDELINES FOR IDENTIFYING FINDS OF ARCHAEOLOGICAL INTEREST AND HANDLING ARTEFACTS

## 7.1 Materials Guidelines

7.1.1 *Rubber, Plastic etc.* In most cases, rubber, plastic, bakelite and similar modern materials are not of archaeological interest and can be disregarded. One exception is where such materials are found in the same area as aluminium objects and structures, which may indicate aircraft wreckage from World War Two. Such material should be reported.

7.1.2 *Iron and Steel.* The potential range and date of iron and steel objects is so wide that it is difficult to provide general guidance. In broad terms, iron and steel objects which are covered by a thick amorphous concrete-like coating ('concretion') are likely to be of archaeological interest and should be reported. Pieces of metal sheet and structure may indicate a wreck and should be reported. Specific operational measures are likely to apply in respect of ordnance (cannonballs, bullets, shells) which should take precedence over archaeological requirements. However, discoveries of ordnance may be of archaeological interest, and they should be reported.

7.1.3 *Other Metals.* Items made of thin, tinned or painted metal sheet are unlikely to be of archaeological interest. Aluminium objects may indicate aircraft wreckage from World War Two, especially if two or more pieces of aluminium are fixed together by rivets. All occurrences should be reported. Copper and copper alloy (bronze, brass) objects might indicate a wreck, or they may be very old. All occurrences should be reported. Precious metal objects and coins are definitely of archaeological interest because they are relatively easy to date. All occurrences should be reported.

7.1.4 *Bone*. Discoveries of animal bone, teeth and tusks are of archaeological interest because they may date to periods when the seabed formed dry land, and should be reported. Such bones, teeth, tusks etc. may have signs of damage, breaking or cutting that can be directly attributed to human activity. Large quantities of animal bone may indicate a wreck (the remains of cargo or provisions) and should be reported. Human bone is definitely of archaeological interest, and may, if buried and found within the territorial waters, be subject to the provisions of the Burial Act 1857. Any suspected human bone should be reported, and treated with discretion and respect. Objects made out of bone – such as combs, harpoon points or decorative items – can be very old and are definitely of archaeological interest. All occurrences should be reported.

7.1.5 *Wood*. Light coloured wood, or wood that floats easily, is probably modern and is unlikely to be of archaeological interest. 'Roundwood' with bark – such as branches – is unlikely to be of archaeological interest, although it may provide paleo-environmental evidence. However, roundwood that has clearly been shaped or made into a point should be reported. Pieces of wood that have been shaped or jointed may be of archaeological interest, especially if fixed with wooden pegs, bolts or nails – all occurrences should be reported. Objects made out of dark, waterlogged wood – such as bowls, handles, shafts and so on – can be very old and are definitely of archaeological interest. All occurrences should be reported.

7.1.6 *Stone*. Small to medium size stones that are shaped, polished and/or pierced may be prehistoric axes. All occurrences should be reported. Objects such as axe heads or knife blades made from flint are of prehistoric date and should be reported. Large blocks of stone that have been pierced or shaped may have been used as anchors or weights for fishing nets. All occurrences should be reported. The recovery of numerous stones may indicate the ballast mound of a wreck, or a navigational cairn. All occurrences should be reported.

7.1.7 *Pottery*. Any fragment of pottery is potentially of interest, especially if it is a large fragment. Items which look like modern crockery can be discarded, but if the item has an unusual shape, glaze or fabric it should be reported.

7.1.8 *Brick*. Bricks with modern proportions and v-shaped hollows ('frogs') are of no archaeological interest. Unfrogged, 'small', 'thin' or otherwise unusual bricks may date back to Medieval or even Roman times and should be reported.

7.1.9 *Peat and Clay*. Peat is black or brown fibrous soil that formed when sea level was so low that the seabed formed marshy land, for example on the banks of a river or estuary. The peat is made up of plant remains, and also contains microscopic remains that can provide information about the environment at the time it was formed. This information helps us to understand the kind of landscape that our predecessors inhabited, and about how their landscape changed. It can also provide information about rising sea-level and coastline change, which are important to understanding processes that are affecting us today. Prehistoric structures (such as wooden trackways) and artefacts are often found within or near peat, because our predecessors used the many resources that these marshy areas contained. As these areas were waterlogged, and have continued to be waterlogged because the sea has risen, 'organic' artefacts made of wood, leather, textile and so on often survive together with the stone and pottery which are found on 'dry' sites.

7.1.10 Fine-grained sediments such as silts and clays are often found at the same places as peat. These fine-grained sediments also contain the microscopic remains that can provide information about past environments and sea level change. Any discoveries of such material would be of archaeological interest, and their occurrence should be reported.

## 7.2 Artefact Storage Advice

7.2.1 It should be noted that 'time is of the essence' in terms of the recovery of waterlogged archaeological material. If waterlogged organic items are allowed to dry out this can cause irreparable damage. Care in handling items is paramount.

7.2.2 In the event of artefact recovery, the finds should be stored in the following manner:

7.2.3 If dry, finds should be placed in zip-lock bags and/or stored in a suitable protective container in a cool, dark area if possible.

7.2.4 If waterlogged, any artefacts should be kept damp, or preferably totally submerged (in sea water), in zip-lock bags which are then stored in ridged plastic boxes to prevent damage. Items should be kept wet, covered, and stored in a cool, dark area if possible, and protected from any damage to potentially delicate waterlogged material.

7.2.5 Any sediments of interest will be collected and double bagged into zip-lock bags.

7.2.6 If particularly delicate or significant items are recovered the IS should be contacted for further advice.

7.2.7 The Developer will supply suitable storage materials to its construction operations. The IS can advise on suitable materials for this purpose.

# Offshore Renewables Protocol for Archaeological Discoveries



## Preliminary Record Form: Discoveries on the Seabed/ on board / in intertidal zone / on land

| |
|---|
| Company Name: |
| Vessel/Team Name: |
| Site/sea area Name: |
| Date: |
| Time of compiling information: |
| Name of compiler (Site Champion): |
| Name of finder (if different to above): |

| |
|---|
| Time at which discovery was encountered: |
| Vessel position at time when anomaly was encountered: |
| a) Latitude |
| b) Longitude |
| c) Datum (if different from WGS84) |
| Original position of the anomaly on the seabed, if known: |
| Notes on likely accuracy of original position stated above: |
| a) How accurate is the position? |
| b) Is the position the original position or has the material been moved by operations? |
| c) Details of circumstances and activity that lead to the discovery |

THE CROWN ESTATE

# Offshore Renewables Protocol for Archaeological Discoveries



## Preliminary Record Form: Discoveries on the Seabed/ on board / in intertidal zone / on land

| |
|---|
| Description of the find/anomaly: |
| Apparent size/extent of the anomaly: |
| Details of any find(s) recovered: |
| Details of photographs, drawings or other records made of the find(s) (e.g. location figure): |
| Details of treatment or storage of find(s): |
| Date and time Nominated Contact informed: |
| General notes: |
| If discovered on the seabed: |
| a) Derived from: e.g. Obstacle Avoidance Sonar, Cable Tensiometer? |
| b) Apparent size/extent of anomaly (length, width, height above seabed) |
| c) Extent of deviation/route development |
| Signed: Date: |

THE CROWN ESTATE

# 8 APPENDIX III: GLOSSARY OF ACRONYMS

| | |
|---|---|
| AEZ | Archaeological Exclusion Zone |
| DCMS | Department of Culture, Media and Sport |
| DECC | Department of Energy and Climate Change |
| DEFRA | Department for Environment, Food and Rural Affairs |
| EH | English Heritage |
| EZ | Exclusion Zone |
| GIS | Geographic Information System |
| HER | Historic Environment Record |
| HS | Historic Scotland |
| IfA | Institute for Archaeologists |
| IPC | Infrastructure Planning Commission |
| IS | Implementation Service |
| JNAPC | Joint Nautical Archaeology Policy Committee |
| MOD | Ministry of Defence |
| MIPU | Major Infrastructure Planning Unit |
| MoJ | Ministry of Justice |
| NMR | National Monuments Record |
| OR | Offshore Renewable |
| OWF | Offshore Wind Farm |
| PAD | Protocol for Archaeological Discoveries |
| PAS | Portable Antiquities Scheme |
| ROV | Remote Operated Vehicle |
| RoW | Receiver of Wreck |
| TCE | The Crown Estate |
| TEZ | Temporary Exclusion Zone |

# 9 APPENDIX IV: LIST OF CONSULTEES

### List of Consultees for The Crown Estate, Offshore Renewable Energy and the Historic Environment Consultation

Advisory Committee for Historic Wreck Sites
Association of Local Government Archaeological Officers: Maritime Committee
Association of Local Government Archaeological Officers: Planning & Legislation Committee
Cadw
Centrica
Council for British Archaeology
Department for Culture, Media and Sport
Department for Environment, Food and Rural Affairs
Department of Energy and Climate Change
Department of Enterprise Trade and Investment
Department of the Environment, Northern Ireland
DONG Wind (UK) Ltd
East Anglia Offshore Wind (SP Renewables)
English Heritage: Marine Team
E.ON
Fluor
Forewind
Historic Scotland
Infrastructure Planning Committee
Institute for Archaeologists
Joint Nautical Archaeology Policy Committee
Manx National Heritage
Marine Management Organisation
Marine Scotland
Ministry of Defence
Ministry of Justice
Nautical Archaeology Society
Northern Ireland Environment Agency
Portable Antiquities Scheme
Receiver of Wreck (MCA)
Renewable UK
RES
Royal Commission on the Ancient and Historical Monuments of Scotland
Royal Commission on the Ancient and Historical Monuments of Wales
Scottish Government
Sea Energy Renewables
The Crown Estate
UHI Millenium Institute
Welsh Assembly Government: Energy Team
Welsh Assembly Government: Marine Policy Team

THE CROWN ESTATE

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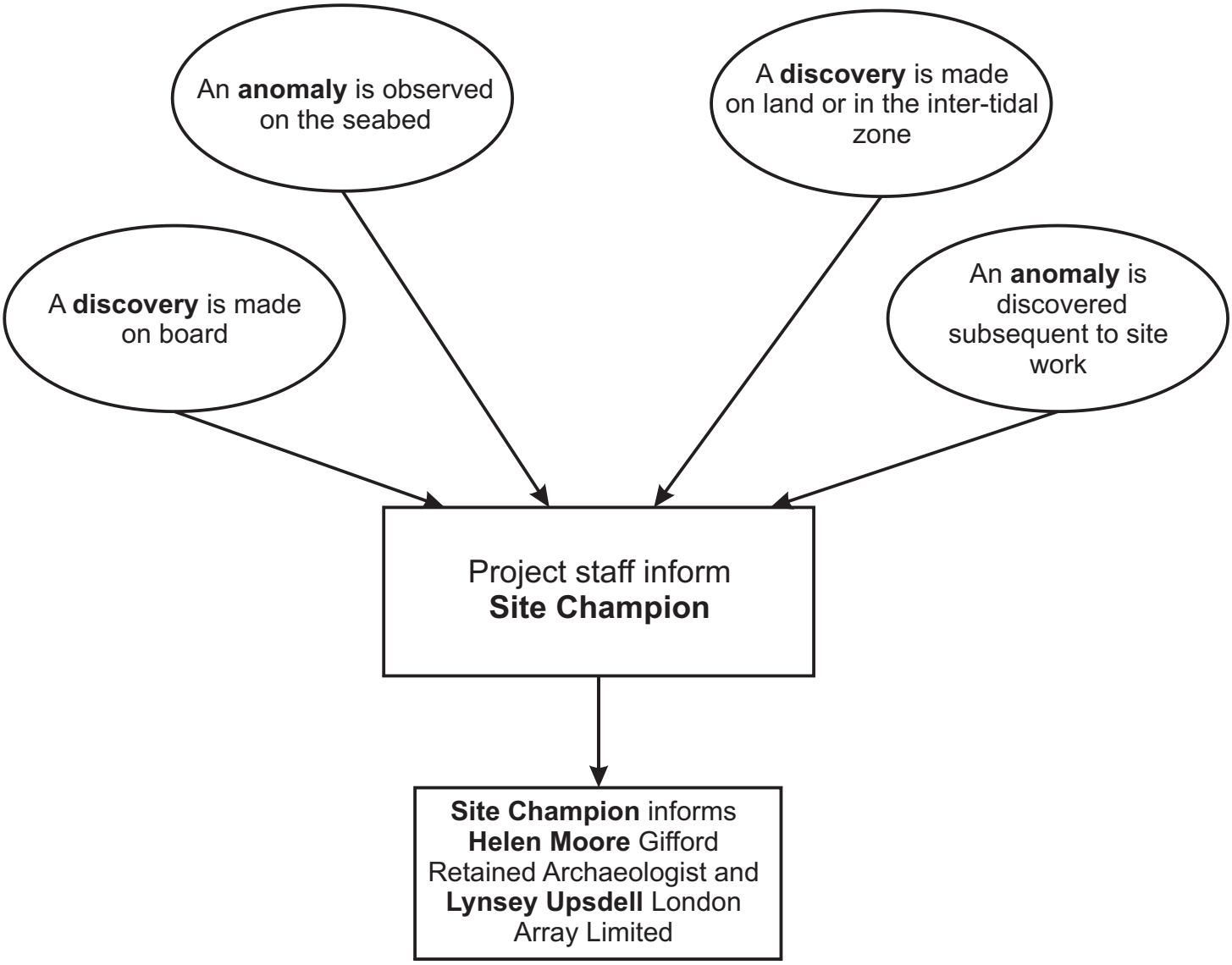
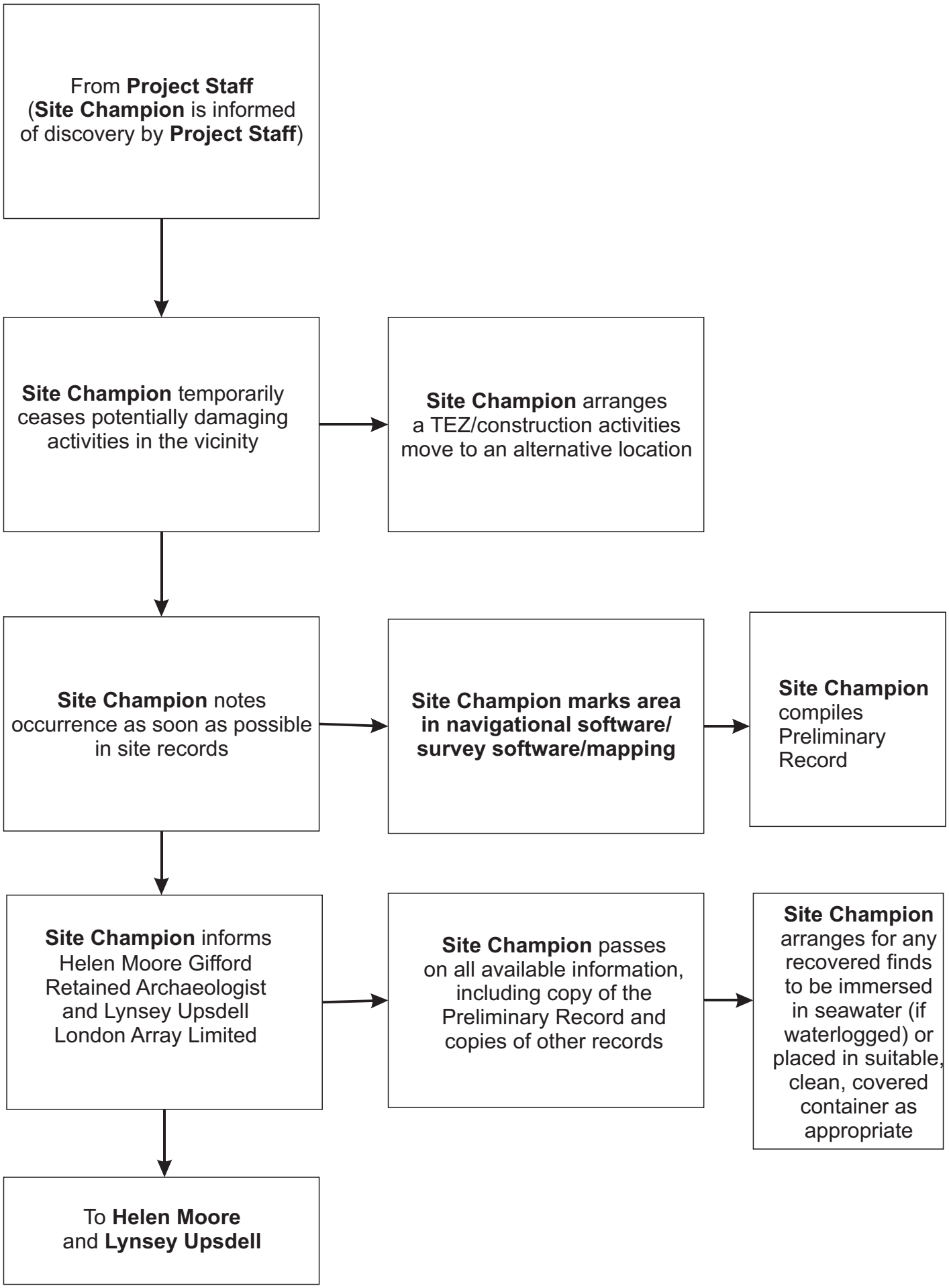
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk
Regional offices in **Edinburgh**, **Rochester** and **Sheffield**
For more information visit **www.wessexarch.co.uk**

REGISTERED ORGANISATION IfA

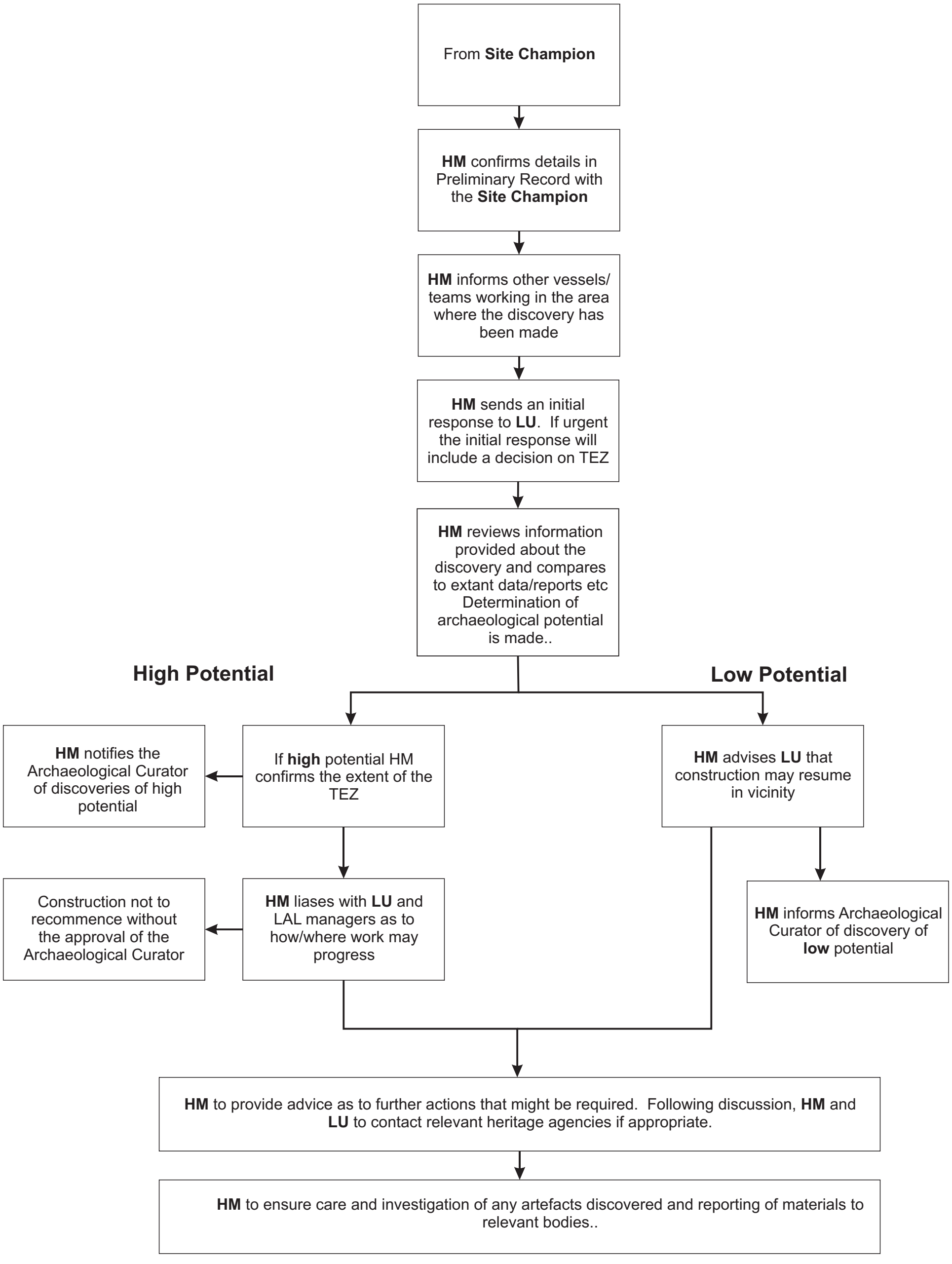
# Actions by Project Staff



# Actions by Site Champion



# Actions by Retained Archaeologist Helen Moore and Lynsey Upsdell of London Array Limited



# London Array Limited
# Offshore Renewables Protocol

for Archaeological Discoveries



**Preliminary Record Form: Discoveries on the Seabed / on board / in intertidal zone / on land**

| |
|---|
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| Vessel / Team Name: |
| Site / sea area Name: |
| Date: |
| Time of compiling information: |
| Name of compiler (Site Champion): |
| Name of finder (if different to above): |

| |
|---|
| Time at which discovery was encountered: |
| Vessel position at time when anomaly was encountered: |
| a) Latitude |
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