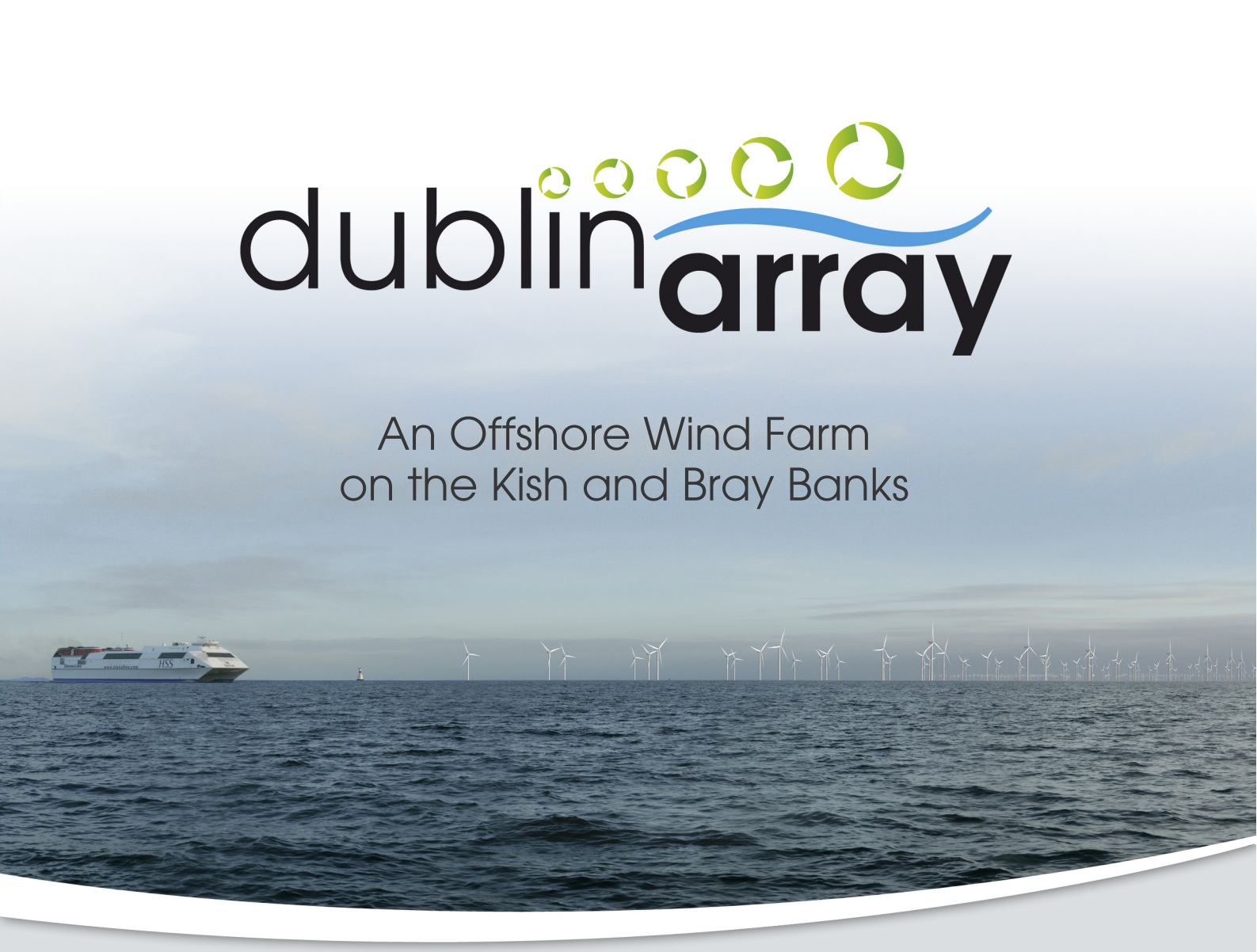
dublin array

An Offshore Wind Farm
on the Kish and Bray Banks



Environmental Impact Statement

January 2012 - Revision 1

Reviewed and Updated by

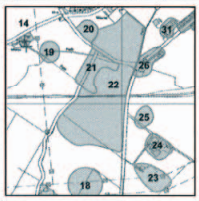
MRG consulting engineers

MRG CONSULTING ENGINEERS LIMITED

Prepared by

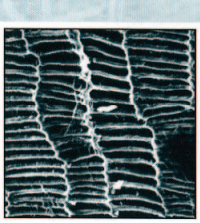
SAORGUS | ENERGY LTD

Volume 3 of 5 - Appendix D
Archaeological Impact Assessment










Archaeological Assessment for the Kish and Bray Banks Offshore Windfarm Development, Co. Dublin and Co. Wicklow

Project code: KBHS08
Client: Hydrographic Surveys Ltd.
Date: January 2009
By: Maura O Malley with contributions from Dan Atkinson, Scott Harrison, Hydrographic Surveys Ltd. and Jean Price

HEADLAND ARCHAEOLOGY Ltd

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Summary

This report outlines the results of an archaeological impact assessment which was carried out by Headland Archaeology Ltd in response to a request by Hydrographic Survey Ltd. The Kish and Bray banks have been selected for the development of an Offshore Windfarm. The proposed development will consist of 145 wind turbines erected on the banks with a cable route extending to two landfall points north of Bray, Co. Wicklow. The survey area (the banks) is approximately 18 km long by 3 km wide. The banks are located off the east coast: the north end is 12 km due east from Dunlaoghaire, the south end is 10 km due east from Greystones.

All relevant, readily available, literary and cartographic sources were consulted.

Evidence for archaeological remains was uncovered in close proximity to the two landfall points 326353/221319 and 326750/219407 and is documented within the report. There is potential for underwater archaeology being encountered during the course of the development. As the proposals for ground works are yet unclear, it is difficult to ascertain how much further archaeological involvement would be necessary. However, dredging, piling or other works could have a negative impact on any archaeological remains within the development site if the works occur in close proximity to such remains.

In order to mitigate this potential impact on archaeological remains, it is recommended that all groundwork associated with the development, including dredging and/or piling should be monitored by a suitably qualified archaeologist. These recommendations are subject to the approval of the Department of the Environment, Heritage and Local Government.

There are a considerable number of shipwrecks off the Irish coast. Wrecks over 100 years old and archaeological objects found underwater are protected under the National Monuments (Amendment) Acts 1987 and 1994. Significant wrecks less than 100 years old can be designated by Underwater Heritage Order on account of their historical, archaeological or artistic importance.

1. INTRODUCTION

An archaeological assessment was undertaken by Headland Archaeology Ltd on areas of proposed development on and off the south Dublin and north Wicklow coast. The work was undertaken in response to a request by Hydrographic Surveys Ltd for further information in support of a proposed windfarm development on the Kish and Bray banks. This assessment includes a review of readily available literary and cartographic sources, a site visit and an outline of recommended further archaeological work. Side Scan Sonar and Magnetometer surveys were undertaken for both the location of the turbines (Appendix 9) and the proposed cable route (Appendix 10). Additional interpretation was provided by Dan Atkinson (Appendix 11), while a metal detection survey was undertaken at the two landfall sites (Appendix 12).

2. METHODOLOGY

An archaeological desk-based study of existing archaeological records, shipwreck data and other potentially relevant literary sources was undertaken. A list of all sources consulted is provided in bibliographic form. Following this study the potential impact of the proposed project was assessed and an appropriate mitigation strategy has been outlined.

3. DESK-BASED STUDY

3.1 Site location and description

The proposed development has both on-shore and off-shore components. The main development is located offshore with 145 turbines to be erected on the Kish and Bray banks (Figures 1-3). The north end of the development is 12 km due east from Dun Laoghaire, the south end is 10 km due east from Greystones. As part of the proposed development a cable will then extend from the Kish Bank to one of two possible landfall points north of Bray, Co. Wicklow. This desk-based assessment examined the archaeological potential of the Kish and Bray banks, the area through which the cable would pass en route to the mainland and the two proposed landfall sites.

Both the onshore and offshore development areas have potential archaeological significance. There is evidence for a large number of shipwrecks in this area and the landfall sites occur close to sites of archaeological interest. Two possible landfall sites were investigated to aid in the selection of a single optimal landfall route.

3.2 Sites & Monuments Record and Record of Monuments & Places

The Sites & Monuments Record (SMR) consists of Ordnance Survey 6-inch maps with annotated known and suspected archaeological sites that generally pre-date AD 1700. The SMR was collated from documentary sources; various editions of Ordnance Survey maps,

aerial photography, historical and archaeological literature, the seventeenth century Down Survey and Civil Survey maps, eighteenth century estate maps and folklore/oral traditions. The National Monuments Act (1994) made provision for a Record of Monuments & Places (RMP). The RMP is a revised set of SMR maps, on which newly-discovered sites have been added and locations which proved not to be of antiquity have been de-listed by the National Monuments Service.

There are no recorded monuments corresponding with the grid references provided for the proposed landfall sites. However there are a number of monuments within a 500 m radius of each of the landfall sites (Figure 3). They are listed in the RMP as follows:

Landfall A:

Monument no.	*Grid ref*	*Townland*	*Description*
DU026-055001	326354/221792	Shanganagh	Martello tower
DU026-055002	326354/221795	Shanganagh	Defensive redoubt site

Landfall B:

Monument no.	*Grid ref*	*Townland*	*Description*
DU026-124	326638/219461	Bray Golf Links	Possible linear earthwork
DU026-070	326715/219835	Bray Golf Links	Martello tower
DU026-068001	326181/219568	Cork Abbey	Abbey
DU026-068002	326181/219572	Cork Abbey	Graveyard
DU026-069	326179/219480	Cork Abbey	Holy Well

Additional monuments have been recorded within 1 km of each of the landfall sites including a castle (DU 026-120), a *fulacht fiadh* (DU 026-116), and a series of ecclesiastical monuments; a church (DU 026-054001) and graveyard (DU 026-054002), a cross (DU 026-054003), and an additional building (DU 026-054005).

3.3 Literary and oral sources

Various literary and documentary sources were consulted, a full list of which is provided in the bibliography. Ireland is heavily influenced by the Atlantic weather system and experiences severe storms resulting in a considerable number of shipwrecks off the Irish coast. There are several literary sources relating to shipwrecks but these are often restricted to specific areas, time periods or types of vessel. Often the information does not include more than approximate details of where the vessel sank. From the eighteenth century the Lloyd's List has recorded shipwrecks around the coast of Ireland regularly including smaller vessels which were not previously recorded (Breen and Forsythe, 2004). The Underwater Archaeology Unit (UAU) is currently preparing an inventory of recorded shipwrecks in Irish waters. The Shipwreck Inventory of Ireland includes all known wrecks for the years up to

and including 1945 and approximately 10,000 records have been compiled and integrated into the shipwreck database so far. The Shipwreck Inventory is primarily a desktop survey with information collected from a broad range of cartographic, archaeological and historical sources, both documentary and pictorial.

The shipwreck resource can be better assessed with an understanding of Ireland's varied 6,331 km coastline. Most wreck sites in these waters will quickly disintegrate through the processes of erosion and chemical and biological breakdown. Ships in high-energy marine environments, for example on a rocky bed below an exposed western cliff, would have a rapid pace of deterioration. Low energy environments, for example within a sheltered muddy bay, will slow deterioration and may even have a preservative effect on buried components. Large sand flats dominate the shallow southern half of Dublin Bay and this is paralleled offshore where the bottom type in this area is predominantly sand. The coast from Dublin south to Wicklow is sheltered with strong tides, sand banks and deposits of gravel lying offshore (Breen and Forsythe, 2004).

Ireland has a rich underwater material cultural heritage which includes such well known discoveries as the Spanish Armada shipwrecks dating from 1588 off the north and west coasts, the H.M.S Vanguard, an ironclad battleship sank off Bray head, and the Santa Cruz which may have sunk on the Kish Bank in 1875 with a cargo of 200 chests of gold. Wrecks over 100 years old and archaeological objects found underwater are protected under the National Monuments (Amendment) Acts 1987 and 1994. Significant wrecks less than 100 years old can be designated by Underwater Heritage Order on account of their historical, archaeological or artistic importance as is the case with the wreck of the Lusitania located off Kinsale Head. Underwater Heritage Orders can also be used to designate areas of seabed or land covered by water to more clearly define and protect wreck sites and archaeological objects. Under the legislation all diving on known protected wreck sites or the intention of searching for archaeological underwater material is subject to licensing requirements.

The Archaeological Inventory is an inventory of all known archaeological sites in a county, based on an examination of all available paper sources in addition to local information and traditions collected in the course of fieldwork. However, an inventory for Co. Dublin has not yet been published, and so for the purpose of this report other resources were consulted.

The proposed location of Landfall A is in the townland of Shanganagh, in the parish of Rathmichael, Co. Dublin. In Lewis' Topographical Dictionary (Lewis 1837) he refers to the parish of Rathmichael as a place that 'attained a considerable degree of importance in the early period' with the vicars choral of St. Patrick's, Dublin claiming as their ancient inheritance the town of Shanganagh. Two sites, a Martello tower (DU 026-05501) and a defensive redoubt site (DU 026-05502), were identified within a 500 m radius of Landfall A. Further sites were identified within 1 km of Landfall A including a castle site (DU 026-120), a *fulacht fiadh* (DU 026-116), a church (DU 026-054001) and graveyard (DU 026-054002), a cross (DU 026-054003) and an additional building (DU 026-054005). The wealth of archaeological remains within the parish was commented upon by Lewis in 1837;

'The remains of a line of castles and entrenchments may be traced, commencing on the lands of Shanganagh…and continued over the mountain beyond Rathmichael to Ballyman; in such as yet exist, the vaults appear to have been centered with wickerwork. There are also several Druidical relics in the neighbourhood; also the ruins of Pucks Castle and that of Shankill, said to have been besieged by Cromwell and near which have been frequently found human skeletons and coins of the reigns of Chas. I and Jas. I.'

The proposed location of Landfall B is in the townland of Ravenswell in the parish of Bray, Co. Wicklow. Five sites of archaeological interest have been noted within a 500 m radius of Landfall B. These included a possible linear earthwork (DU 026-124), a Martello tower (DU 026-070), an abbey (DU 026-06801), a graveyard (DU 026-06802) and a holy well (DU 026-069). Landfall B is located approximately 70 m southeast of the zone of potential of one of these sites; the possible linear earthwork. It is recorded in the SMR as part of the Pale boundary, SMR 26:124, however other evidence suggests a connection with the nearby Corke Abbey to the north or Ravenswell House to the south.

The Martello tower, DU 026-070, is mentioned in the Ordnance Survey Namebooks for Co. Dublin as is the site of Corke Abbey DU 026-06801 'In East of townland of Great Cork. A very fine looking house situate[d] on rising ground which is covered with ornamental trees. The seat of Col. Wingfield.'

The Ordnance Survey letters also mention the site of Corke Abbey and its graveyard, DU 026-06802.

'A little distance on the road to Dublin you turn to the right into Cork Abbey, the residence of Col. Wingfield. They say that the house is built on the site of the old Abbey the ruins of which were pulled down for that purpose some forty years ago, and they shew the site of the old burial place a little south and west of the house. Head stones and bones have been often dug up here.' Eugene Curry.

A site of architectural heritage is also known in the area however it is almost 500 m west of the proposed landfall point and should not be impacted upon by the proposed development. Ravenswell House (WI-56-0-263192) is represented on the first and second edition OS maps, however a recent architectural survey has shown that not even a footprint of the building survives. A golf course, houses and a factory have since been constructed on the site.

3.4 Record of shipwrecks

There are a considerable number of shipwrecks recorded in the general area of the Kish and Bray banks. There may also potentially be many wrecks in the area through which the cable will pass en route to the proposed landfall points. Many of the wrecks listed in the various surveys (Bourke 1998; Bourke 1994; National Wreck Register, etc.) have relatively vague details as to their exact location with many being listed as being 'near Dublin' or 'off Bray'. It is possible that some of these wrecks may be in the vicinity of the proposed development area. However, many entries do refer directly to the Kish Bank and these are listed below. The other shipwrecks which may be in the vicinity of the development areas are listed in the

appendices at the end of this report (Appendices 1-7). Several ships are listed as wrecked on the Wicklow Bank. However this is not visible on the Admiralty charts. The term 'Wicklow Bank' is no longer in use (pers. comm. Captain J. Barlow, 2008). We can assume that it is an old name for one of the banks off the Wicklow coast, however it is difficult to say which bank it refers to. Details of shipwrecks on this bank have been added to the appendices (Appendix 8), as they may potentially be impacted upon by the proposed development.

• *Charlemont;* 1790; in the vicinity of the Kish Bank.
This was a mail packet vessel with both mail and passengers on board.
(Stokes and Dowling 2000)

• *Count Belligioso (or Belgiosa Imperial);* 1783; at middle of Kish Bank
This timber built Liverpool East Indiaman was bound for Lisbon and China, under Wignall. It was carrying a cargo of lead ingots and silver coins to the value of £130,000. Ginseng and rum were salvaged from the wreck; however no silver was ever recovered. Saunders Newsletter stated that the foremast and topmast of an East India ship were brought to Dublin.
(Stokes and Dowling 2000)

• *Clymene*; 3rd August 1859; Kish Bank
This 745 ton vessel sailed from Liverpool under Lister Harrison on the 3-8-1859 after undertaking repairs on a broken jib. Her Official No. was 10,562. She became stranded after the cast lead was not taken.
(CSP 1860, Vol. LX, 57)

• *Crown*; February 1832; Kish Bank
In a heavy gale of wind this ship from Liverpool, laden with salt from Charlestown, South Carolina struck the bank. Eleven people were drowned.
(Freemans Journal, Fri. 10th Feb. 1832, Column Shipwreck and loss of life)

• *Dublin Packet*; 22nd November 1820; Kish Bank
This American ship was en route from New York to Dublin, under Capt. Coles, when she was wrecked.
(Bourke 1998, 54)

• *Eleanor*; 7th March 1855; Kish Bank
This brig from Whitehaven, carrying coals, struck the bank and foundered.
(Bourke 1998, 53; LL no. 4269, 11th Feb 1806)

• *Elizabeth*; 1751; Kish Bank
This was a Glasgow sail vessel with a cargo of tobacco and pottery. It was stranded and wrecked on the bank.
(Stokes and Dowling 2000; Bourke 2000)

• *Esmeralda*; February 1907; 10 miles south by west of Kish Light (Dublin)?
This vessel sank after striking sunken wreckage. It was reported to the Dublin receiver on February 25th 1907.
(Board of Trade Harbour Dept., Obstructions to Navigation, National Archives, Ireland, Box 4/654, H 2582 & H 2639)

• *Esther & Sophia*; 21st April 1853; Kish Bank
This 125/175 ton vessel of Hamburgh was en route from Liverpool to St. Thomas with twelve crew and a cargo of coals. She encountered a SSW force 7 wind with thick conditions. She struck the bank during the night, filled with water and sank. The crew took to the boat and was saved by the *Hope* of Chester. The only person lost was the Master.
(Bourke 1998, 39; CSP 1854, Vol. LII, 43; CSP 1857-1858, Vol. LII, 43; CSP 1861, Vol. LVII, 'Wrecks and Casualties', 36)

• *Eumaeus;* 11th December 1939; near Kish buoy no. 4
This Liverpool steamer was attacked while in a convoy. She ran aground near the buoy.
(Bourke 1994, 40)

• *Firth of Soloway*; 19th April 1896; off Kish lightship near Bray Head
This barque was built in 1885 by W.B. Thompson and was owned by J. Spencer & Co. She weighed 1,313 tons and measured 228.4 by 36.5 by 21 feet. She was en route from the Clyde to Dunedin when she collided with the 919 ton steam ship *Marsden* and sank. The Captain and eight men were rescued by the *Marsden* but the Captain's wife, child and 13 men were lost. The *Marsden* was from Newcastle on Tyne and was en route from London to Greenock.
(Bourke 1994, 35; Hocking 1989, 243)

• *France et Brezil (Brazil)*; 4th January 1858; Kish Bank
This 600 ton ship of Harve was en route from Liverpool to Rio de Janeiro with a cargo of coals. She became stranded and was a total loss in a south-southeast force 9 wind. Eight of the eighteen men aboard were lost.
(Bourke 1998, 42)

• *Hamburg*; 21st October 1925; Kish Bank
This fully rigged barque of Germany was carrying a cargo of wheat; she anchored off Falmouth, awaiting orders and was told to go to Cork. She encountered a gale and was driven up the Irish Sea. She tried to get shelter in Dublin Bay but was grounded and became a wreck within 6 weeks. Gunther Prien was among the crew.
(Bourke 1998, 61)

• *Innisfallen*; 23rd May 1918; between Skerries and Kish L.S.
This twin funneled steam vessel of Cork / Britain was built in Newcastle in 1896 by Wingham Richardson. She weighed 598 / 1405 tons and measured 272 by 35.7 by 16.9 feet. She was en route from Liverpool to Cork, under Albert Cole with a general cargo. She was torpedoed abreast of the boilers and engine room and sank within a few minutes. Eleven lives were lost but the captain and twenty-three others were saved.

(Bourke 1994, 219)

• *Jenny and Nancy*; 1787; Kish Bank
This was a timber built Sail Vessel, cargo unknown.
(Stokes and Dowling 2000)

• *John Hawkes/Hawes*; 4th March 1852; Kish Bank
This 170 ton brig of Swansea was ten years old and owned by W. & J. Richards of Swansea. She was en route from Liverpool to Waterford with a cargo of rock salt. She had seven men aboard, including the master, George Winnacote. She encountered a south-southeast wind with fog and sleet when she hit the bank. The crew abandoned the vessel leaving her drifting. She was boarded by the pilot boat *Alert* and made for Kingstown but sank at 4-30. Two pilots were lost / four people were lost.
(Bourke 1998, 38; CSP 1852-53, Vol. LXI, 48-49; CSP 1852-53, Vol. XCVIII, 6; CSP 1857-1858, Vol. LII, 43; CSP 1861, Vol. LXIII, 36)

• *Kate*; 11 February 1891; 4 miles E by S of Kish Lighthouse
This 35-year old wooden schooner weighed 77 tons. The master was G McDowell and the owner was A Goldie from Plann, Kilmarnock. She was en route from Liverpool to Milford Haven with four crew and a cargo of coal when she collided with a brigantine.
(CSP 1892, Vol. LXXI, 146)

• *Lily*; 10 January 1872; north end of Kish Bank
This Wexford vessel was en route from Barrow to Cardiff with 180 tons of pig iron. The compass was disturbed by the cargo and she struck in thick weather. The master, James Scallan, and the six crew took to the boat.
(Bourke 1994, 33-34)

• *Lizzie*; 14th November 1894; 3 miles NE of Kish light
This 22-year old wooden cutter of Dublin weighed 50 tons. The master was W. Blackmore and the owner was Mrs. S. Blackmore of Ringsend, Dublin. The vessel was in Dublin fishing, with four crew when she was lost.
(CSP 1896, Vol. LXXV, 109)

• *Maggie*; 1891; Kish Bank
The Board of Trade reported that the *Maggie* and the *Inishtrahul* collided. The *Maggie* was abandoned.
(CSP 1894, Vol. LXXVI, 'Floating Derilicts', 86)

• *Maggie;* 24th March 1898; near Kish Lightship
This fishing vessel from Howth sank while out in a choppy sea. The crew of four was lost.
(Bourke 1994)

• *Nancy*; 8th January 1821; Kish
This vessel was lost.
(Irish Shipwreck Register)

• *Nile*; 19th January 1835; Kish Bank
This vessel was en route from Liverpool to Dublin when she foundered. Four lives were lost.
(CSP 1836, Vol. XVII, 315)

• *Olinka*; 25th January 1878; 2 miles S of Kish Lightship
This 9-year old wooden Austrian brig weighed 415 tons. The owner was M.V Battagliarini, Fiume and the master was Locovich. She was en route from Philadelphia to Dublin with twelve crew, a pilot and a cargo of maize. She was stranded and totally wrecked in a west to northwest force 9 gale. The pilot was lost.
(CSP 1878-79, Vol. LXIV, 'Strandings', 100)

• *Ophelia;* 1826; Kish Bank
This vessel was a Boston full rigger weighing 311 tons. It set sail from Liverpool bound for Savannah.
(Stokes and Dowling 2000)

• *Santa Cruz;* 11 January 1679; location unknown, may be on the Kish Bank.
She carried 200 chests of gold.
(Bourke 1998)

• *Sir Charles Napier*; 17th/19th November 1857; Kish Bank
This 16-year old ship of London weighed 620 tons. She was en route from Liverpool to Sierra Leone, under Samuel Bisset, with a general cargo. She was wrecked at 5 am due to heavy seas. An enquiry was ordered before F.I. Porter Esq., S.M. Dublin, and Captain Harris, H.C.S., Nautical Assessor. The loss of the ship was caused by the effect the large quantity of iron aboard had on the compass. These included 6000 iron pots and hoop iron faggots. Captain Bisset's Certificate was returned but he was severely reprimanded. One of the nineteen aboard was lost. The estimated loss on the vessel was 3,000*l.* and 4,000*l.* on the cargo.
(Bourke 1998, 42; CSP 1857-58, Vol. LII, 'List of Marine Casualties', 43; CSP 1859, Vol. XXV, 37; CSP 1861, Vol. LXIII, 36)

• *Success;* before June 1783; Kish Bank
This East Indiaman was lost. Salvage work was carried out on the wreck, which lies in 7 fathoms. Two divers were killed on the site, Spalding and his nephew Watson.
(Bourke 1998, 62)

• *Success;* 1790; on Kish Bank tail; Oporto for Dublin
This was a sail vessel with unknown cargo.
(Irish Shipwreck Register)

• *Success;* 26th April 1800; Kish Bank
This brig of Liverpool was wrecked.
(Bourke 1998, 66)

• *Vang Vard*; 1875; Kish Bank
(National Museum of Ireland)

• *Vigilant;* 1839; near Kish Light Vessel
This sloop set sail from Aberystwyth; details of its cargo are unknown.
(Stokes and Dowling 2000)

• *Wallington*; 7th March 1855; Kish Bank
This brig from Whitehaven was carrying coals when it struck the bank and foundered.
(Bourke 1998, 41; CSP 1857-1858, Vol. LII, 43)

• *unknown*; 1600; Kish Bank
Sail vessel with a cargo of passengers.
(Stokes and Dowling 2000)

• *unknown*; 1782; Kish Bank
Two vessels laden with bark were lost on the Kish Bank. Two boys and one man clinging to the masts were saved by a sloop.
(Bourke 1998)

• *unknown*; c.22nd November 1820; Kish Bank
Several colliers were wrecked.
(Bourke 1998, 54)

• *unknown*; 2nd August 1823; south end of Kish Bank
The *Mary* reported the loss of this large ship on the Kish during bad weather. She was feared wrecked.
(L.L. no. 5826, 5 August 1823)

• *unknown;* 1823; Kish Bank
This ship was wrecked while trying to pass through the Kish Bank.
(Stokes and Dowling 2000)

• *unknown;* 27th November 1849; On the Kish
This schooner was seen to founder.
(CSP 1852-3, Vol. XCVII, 3)

• *unknown;* 1849; On the Kish Bank
A large vessel was lost in this area.
(CSP 1852-3, Vol. XCVIII, 3)

• *unknown;* 1892; Kish Bank
This sunken wreck was noted by the master of the Codling Bank Lightship. The wreckage was searched for without success.
(CSP 1894, Vol. LXXVI, 86)

• *unknown;* 14th June 1902; Off Kish Light Ship
This steam trawler foundered. The crew were rescued by the mail boat and brought to Kingstown.
(Report on the Sea and Inland Fisheries of Ireland for 1902, xix)

• *unknown;* date unknown; Kish Bank
This is the stern of a ship.
(Bourke 1998, 63)

• *unknown;* date unknown; No. 2 Kish Buoy
A number of dredger buckets, *c.* 6 feet in diameter and 4 feet deep, lie in this area. A number of boxes, bottles and jars are also present. There may also be a cannon at the site.
(Bourke 1998, 63)

3.5 Cartographic sources

Cartographic sources are important in tracing land use patterns within a proposed development site as well as providing important information on the topography and archaeological potential of an area. A number of maps were consulted for information about the proposed development site:

1st edition Ordnance Survey map, 1829-41, 6": 1 Mile

Landfall A
The Martello tower (DU 026-055001) is listed on this edition of the map in Shanganagh townland. The defensive redoubt site (DU 026-055002) is not listed however a line on the map to the west of the Martello tower running parallel with the shoreline may suggest its presence.

The nearby Shanganagh Castle (DU 026-120) is listed on this edition of the map in Shanganagh townland. Kiltuck church (DU 026-054001) is listed as being 'in ruins', its graveyard cross and associated ecclesiastical remains are not identified.

Landfall B
The possible linear earthwork (DU 026-124) is not listed on this edition of the map. The map shows that the feature was part of a network of footpaths leading west from the adjacent former Ravenswell House to the sea, and indicated as 'footpath on top of bank'. In addition, part of the feature marks the line of the present county boundary between Dublin and Wicklow. Ravenswell House is also listed on this map.

The Martello tower (DU 026-070) is listed on this edition of the map in the townland of Cork Great. Corke Abbey (DU 026-06801) and the nearby holy well (DU 026-069) were also listed on this edition of the map.

2nd edition Ordnance Survey map, 1887-1913, 25": 1 Mile

Landfall A
The Martello tower (DU 026-055001) is listed on this edition of the map in Shanganagh townland. Again the defensive redoubt site (DU 026-055002) is not listed nor is it represented by any markings on the map.

The nearby Shanganagh Castle (DU 026-120) is listed on this edition of the map in Shanganagh townland. Kiltuck church (DU 026-054001) is listed as being 'in ruins', the crosses (DU 026-054003) are also listed in this edition of the map. The graveyard and associated ecclesiastical remains are not identified.

Landfall B
The possible linear earthwork (DU 026-124) is not listed on this edition of the map, nor is the Martello tower (DU 026-070). Corke Abbey is listed as 'on site of Abbey' and the holy well (DU 026-069) to the south of the ecclesiastical remains is listed as a 'well'.

The buildings of Ravenswell House are present on this edition of the map, though they are identified as Ravenswell convent and Ravenswell School.

Record of Monuments and Places map

Landfall A
All of the aforementioned sites of archaeological interest ((DU 026-055001), (DU 026-055002), (DU 026-120), (DU 026-116), and (DU 026-054)) are listed on this map.

Landfall B
All of the aforementioned sites of archaeological interest ((DU 026-124), (DU 026-070), (DU 026-068) and (DU 026-069)) are listed on this map.

Though buildings are present in the area previously occupied by Ravenswell house on this map, they are not identified as Ravenswell House.

Discovery Maps # 50 and # 56
Landfall A
Only the Martello tower (DU 026-055001) is listed on this map.

Landfall B
None of the aforementioned sites of archaeological or architectural interest are listed on this map.

Admiralty Chart # 1468

The Admiralty chart details the Kish and Bray banks and identifies one wreck off the northeast side of the Kish Bank. The erection of turbines at the location of this wreck would have a negative impact on both the known archaeological remains, as well as any previously unrecorded remains that may exist (see also Section 8 regarding potential negative impacts and their mitigation).

3.6 Previous archaeological investigations

The Archaeological Excavations Bulletin is an annual fieldwork gazetteer for Irish Archaeology; it was checked for a record of any licensed archaeological investigations carried out within the townlands surrounding the proposed landfall sites, between 1970 and 2004. Two excavations have been carried out in the vicinity of the proposed landfall sites. The following is a summary of those excavations:

Wicklow
2002:1960
Corke Abbey, Bray
Urban medieval
32657 21942
02E1717
One test-trench was opened in November 2002 on the grounds of Bray Golf Club, north of Bray town. The area under investigation is recorded in the SMR as part of the Pale boundary, SMR 26:124, although this identification is not supported by the historical evidence, which points to a possible association with Corke Abbey and to lands outside the Pale and held by the Crown that were leased in the 15th and 16th centuries to the Harrolde and Walshe families. The leveled boundary runs from the railway line north-eastward across part of the golf-course. The remains consist of a linear, flat-topped, tree-lined bank with shallow depressions on either side. The south-western end is the best-preserved section of this feature; the north-eastern end is barely detectable on the ground and is almost level. The test-trench was 14.2 m long, 1 m wide and 0.8–1 m in maximum depth. The cross-sections exposed the leveled and reworked remains of the boundary bank but no evidence of well-defined ditch cuts on either side of the leveled bank. There is a possibility, therefore, that the remains of a ditch or ditches exist below the level excavated. All of the material exposed either was sterile or had modern inclusions as a consequence of golf-course development.
Source: Margaret Gowen, Margaret Gowen and Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

Dublin
2004:0491
Possible linear earthwork
32657 21942
SMR 26:124
04E0354

Testing was undertaken across the line of a possible linear earthwork which runs through the lands of the present Bray Golf Links. The feature consists of a low bank (max. dimensions c. 3.5 m wide by c. 0.3 m high), which is barely discernible in places and is more readily identified by a line of relatively mature trees which grow along its length. The Ordnance Survey 6-inch map of 1840 indicates that the feature was part of a network of footpaths leading west from the adjacent former Ravenswell House (now the Sisters of Charity Convent) to the sea, and indicated as 'footpath on top of bank'. In addition, part of the feature marks the line of the present county boundary between Dublin and Wicklow. Two trenches were excavated across the feature. No evidence for a fosse or construction material, other than topsoil, associated with the bank was revealed. Pottery sherds and a fragment of glass, of late 18th- or 19th-century date, were recovered from the interface between topsoil and subsoil.

Given the cartographic evidence, coupled with the results of the testing, it is suggested that the feature is of late 18th- or early 19th-century date and is a landscape feature associated with the former Ravenswell House. Furthermore, it is also likely that the feature was much higher and narrower and may have originally served as a field boundary, which was subsequently almost fully leveled. This would explain why it is located along the line of a townland boundary, which was subsequently used as a county boundary. Source: Martin E. Byrne, Byrne Mullins and Associates, 7 Cnoc na Greine Square, Kilcullen, Co. Kildare.

3.7 Legislative protection for sites of archaeological, architectural and industrial heritage

Archaeological, architectural and industrial heritage sites are protected under the National Monuments and National Monuments (Amendment) Acts 1930-94, the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 and the Local Government Planning and Development Act 2000.

Archaeological sites

The term 'historic monument' was defined in the National Monument (Amendment) Act 1987 as 'a prehistoric monument and any monument associated with the commercial, cultural, economic, industrial, military, religious or social history of the place and is situated or of the country, which predates AD 1700, or such later date as the minister may appoint by regulations'. Section 3 of the 1987 National Monuments Act (amendment) provides that 'shipwreck' means '*a vessel, or part of a vessel, lying wrecked on, or in the sea bed or on or in land covered by water, and any objects contained in or on the vessel and any objects that were formerly contained in or on a vessel and are lying on, in or under the sea bed or land covered by water*'. Any wreck over 100 years old cannot be interfered with except in accordance with a licence issued by the Department of the Environment, Heritage and Local Government.

There are some recorded monuments in the vicinity of the proposed landfall sites (see 3.2 and 3.3 above). There are also records of several shipwrecks on the Kish Bank (see 3.4 above) and

due to the lack of accuracy of the records there is the potential to encounter many more along the cable route between the bank and the landfall sites (see Appendices).

Architectural heritage sites

In 1997 Ireland ratified the Granada Convention on architectural heritage. This provided the basis for a national commitment to the protection of the architectural heritage throughout the country. The Local Government (planning and development) Act 2000, and the Architectural Heritage (national inventory) and Historic monuments (miscellaneous provisions) Act 1999 made the legislative changes necessary to provide for a strengthening of the protection of architectural heritage.

While there are some architecturally significant buildings in the townlands surrounding the landfalls none of these are close to the proposed development sites. One property has been identified in Ravenswell townland, approximately 500 m west of Landfall B. However, a recent architectural survey has shown that not even a footprint of Ravenswell House remains. A golf course, houses and a factory have now been constructed on the site.
(www.buildingsofireland.ie)

Industrial Archaeological sites

Industrial archaeology concerns itself with the development of the landscape since the industrial revolution (*c.* 1700 AD). There are four main areas of study within industrial archaeology: primary or extractive industries, secondary or manufacturing industries, transports and communications and public utilities. In the 1987 amendments to the National Monuments Acts the OPW were empowered to use its discretion where post-1700 sites of national importance were involved. Under the new provision the proprietors of important industrial archaeological sites required planning permission either to alter or demolish such structures. In 1994 a further amendment to the National Monuments Acts enabled industrial archaeological sites to be added to the national record of monuments, and thus be afforded a measure of statutory protection.

No industrial archaeological sites were identified within the borders of the proposed development site.

3.8 Toponomy

A townland name may preserve information relating to its archaeology, history, folklore, ownership, topography or land use. Most place names were anglicized by the time the Ordnance Survey began in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of place names are generally recognizable.

Place name	Irish origin	English translation	Possible origin
Corke Abbey	Corcaigh	It is the dative singular of the noun *corach* meaning swamp.	Referring to the type of land associated with the area.

4. RECEIVING ENVIRONMENT

The proposed landfall sites are both located on the coast north of Bray, Co. Wicklow. This is a sheltered coast with strong tides, sand banks and deposits of gravel lying offshore (Breen and Forsythe 2004).

5. SITE INSPECTION

The area of the landfalls was visited in early May 2008. Both landfalls lie to the north of the town of Bray, Co. Wicklow. The coast can be described as low cliffs with a narrow beach and generally unremarkable character.

Inland from the low cliffs, at a short distance, runs the DART line connecting Bray to Dublin. Most of the adjoining land is occupied by golf links.

Landfall A is adjacent to the Woodbrook golf course (Plate 1).

Landfall B runs to the south of the Dargle View golf course and is plotted as landing at the industrial buildings known locally as Tynan's (Plates 2 and 3). The area was previously a town dump, and the low cliffs are surrounded by refuse.

A conversation with the groundskeeper at the Dargle View golf course revealed that the site has been sold and is the subject of a planning review for a proposed shopping mall. The RMP on the links (DU026-124) is not part of the proposed development.

6. DISCUSSION

Literary and cartographic sources associated with both the offshore and landfall sites would suggest that the area north of Bray had a long settlement history and that the potential for archaeological remains in the area is high, especially remains related to the maritime heritage of the banks.

A *fulacht fiadh,* a mound composed of heat shattered stone typically dating to the Bronze Age, is located in the townland of Shanganagh, just over 800 m southwest of Landfall A. There is also evidence for human activity right through to medieval times with several ecclesiastical remains in the townlands associated with Landfall A and Landfall B. The Martello towers identified in both Shanganagh and Cork Great/Bray Golf Links show continuity of use of the landscape through to the 19th century. The concentration of archaeological activity is not surprising as the rich marine resources in the area would have proved a major attraction to settlers.

A large number of shipwrecks are associated with the Kish and Bray banks and the lack of location detail in the literary sources means there could potentially be many more in the area between the banks and the proposed landfall sites. The sheltered nature of the coast in the proposed development area would increase the potential for archaeological remains however

the strong tides in the area would counter these benefits and would ultimately be detrimental to the preservation of archaeological remains.

7. CHARACTER OF THE PROPOSED DEVELOPMENT

The proposed windfarm development consists of the erection of 145 wind turbines on the Kish and Bray banks off the coast of south Co. Dublin and north Co. Wicklow. The development will also involve connecting the turbines on the banks via a cable to one of two possible landfall points on the mainland north of Bray. Two landfall routes were investigated in order to aid the selection of a single optimal landfall route.

8. RECOMMENDATIONS

Following an assessment of the relevant and readily available literary and cartographic sources it is concluded that the area of the development is of moderate archaeological potential.

- There are several recorded monuments within 500 m of Landfall A and Landfall B, the majority of which will not be impacted upon by the development. Landfall B is located approximately 70 m southeast of the zone of archaeological potential of the possible linear earthwork, DU 026-124 and so should not have a negative impact on the monument.

- If the monument will be impacted upon by the development, then it is proposed that a suitably qualified archaeologist carry out all monitoring works, and any archaeology uncovered be preserved by record.

- There are a number of ships known to have been lost on the Kish Bank and there are many more recorded as being lost in the general area of the development though their exact locations are unknown. These vessels or parts of them as well as items associated with them could potentially be lying on the seabed in the proposed development area. The erection of turbines in the area could have a negative impact on any such remains. Once the extent of the negative impact has been determined it will be assessed and an appropriate mitigation strategy will be established in conjunction with the County Council which may involve any of the following, singly or in combination: avoidance, redesign, preservation *in situ* or excavation (preservation by record).

The following mitigation measures are proposed. These recommendations are subject to approval by the Department of the Environment, Heritage and Local Government.

Due to the potential existence of sub-surface archaeology, it is proposed that a suitably qualified archaeologist carry out monitoring of all ground works and dredging works

undertaken at the site. Development in areas where archaeology is identified should be halted until an appropriate level of excavation and recording can be undertaken. The results of archaeological monitoring should be submitted in a report to the Heritage and Planning Division, Department of the Environment, Heritage and Local Government and the National Museum of Ireland.

It is also recommended that a visual dive survey be carried out on the anomalies identified within the development area during the side scan sonar survey, prior to the commencement of any works.

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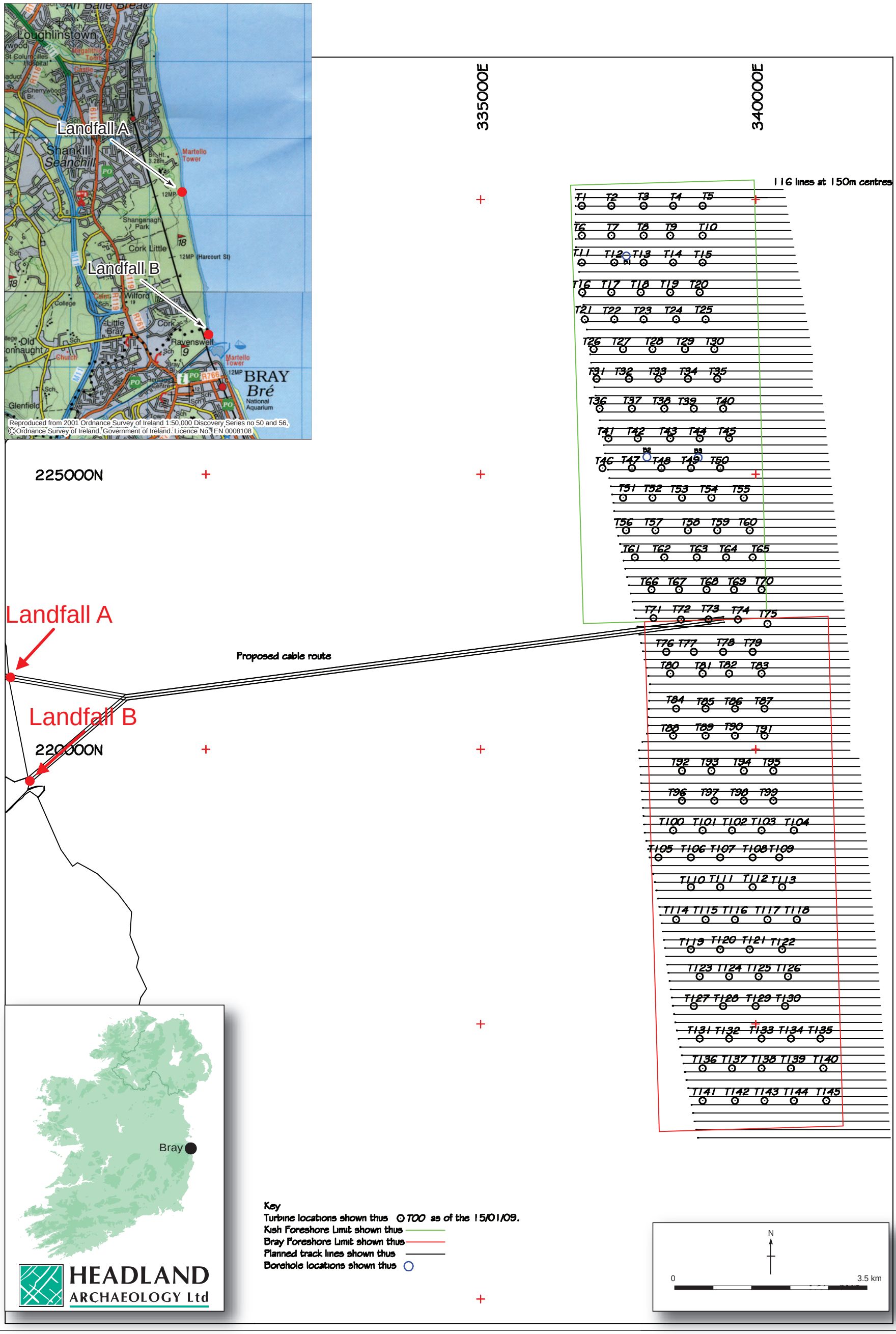

Figure 1 - The Kish and Bray Banks, Co. Dublin and Co. Wicklow: Map showing development area and location of proposed landfall sites.

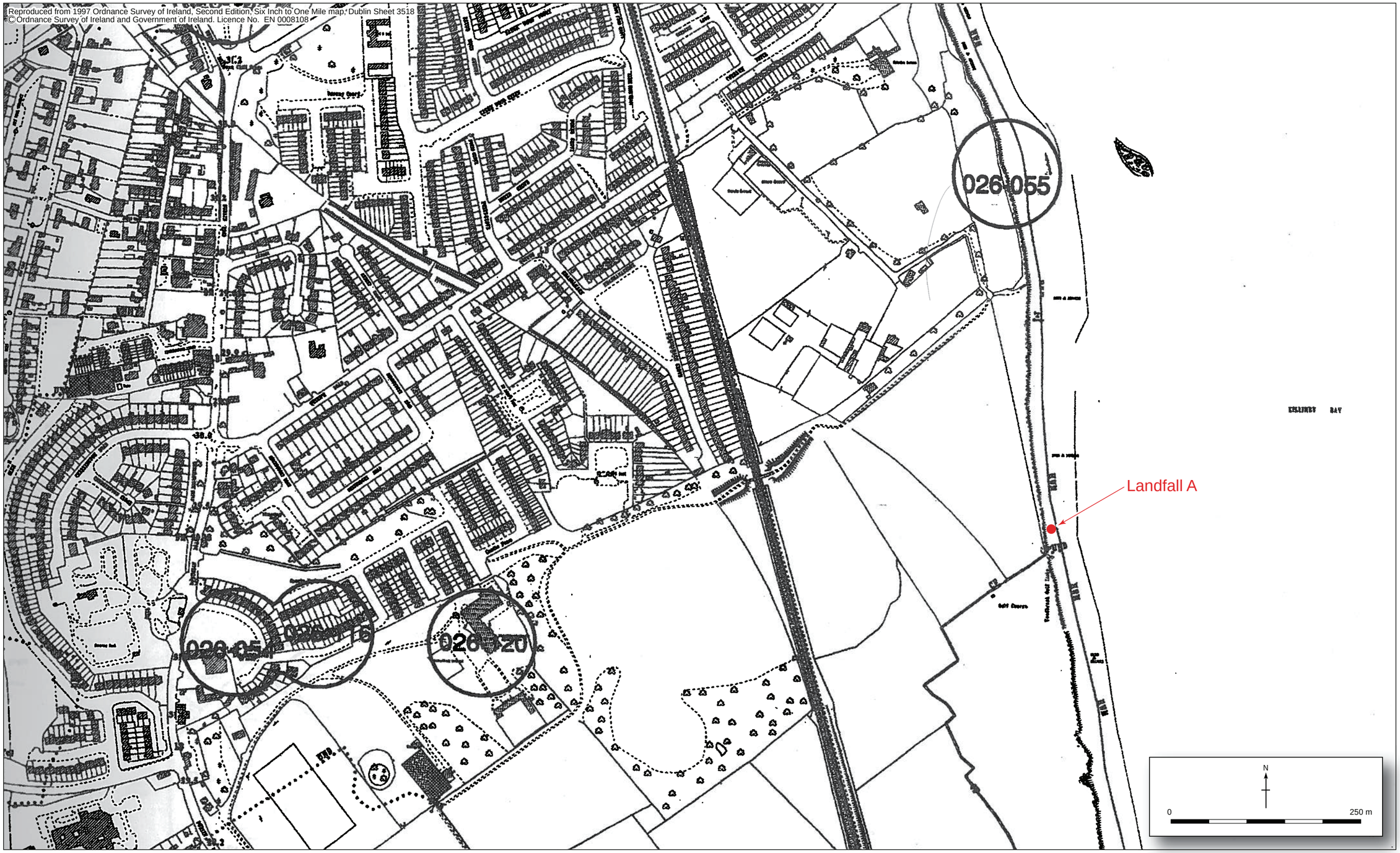

Figure 2 - The Kish and Bray Banks, Co. Dublin and Co. Wicklow: RMP map showing location of landfall site A

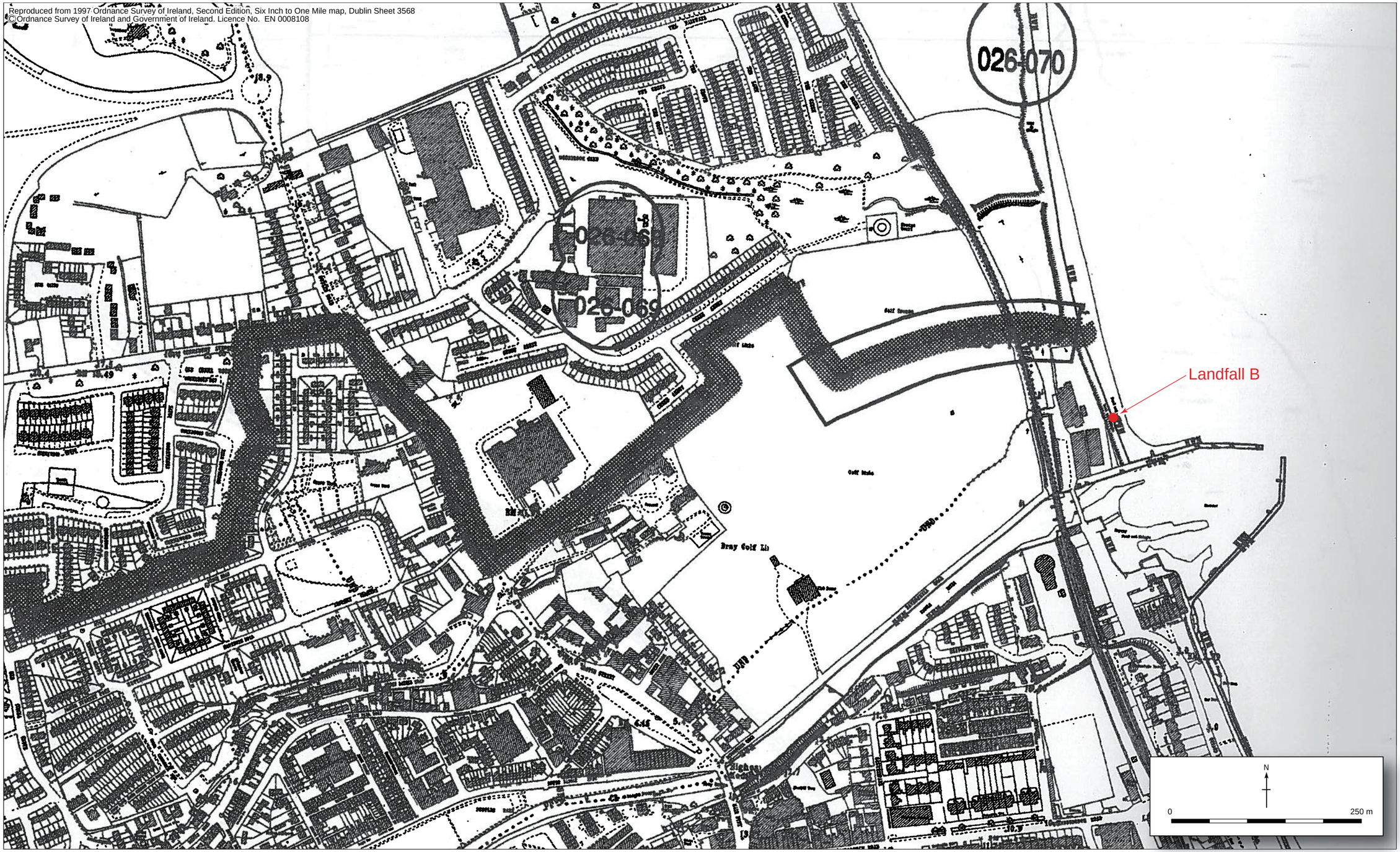

Figure 3 - The Kish and Bray Banks, Co. Dublin and Co. Wicklow: RMP map showing location of landfall site B

Plate 1 - Landfall A, Facing North

Plate 2 - Landafall B, Facing North

Plate 3 - Landfall B, Facing South

Appendix 1: Shipwrecks Bray / off Bray

Vessel	Date / Year	Comment	Cargo	Source
Betsy	1852	Maryport brig lost north of Bray Head during great storm of 1852	Coal	www.irishwrecksonline.net
Endeavour	1861	Drogheda brig	Coal	www.irishwrecksonline.net
Francis	1774	Sail vessel	-	www.irishwrecksonline.net
Francis	1824	Sail vessel	Beans and wheat	www.irishwrecksonline.net
Friends	25 Apr 1819	Sail vessel	-	Bourke, 1998
Friendship	1784	Sail vessel	Oil and port wine	www.irishwrecksonline.net
Friends of Bray	25 Apr 1819	-	-	Bourke 1998
Jean a Stat	1838	Dutch galliot	-	www.irishwrecksonline.net
Joseph	14 Feb 1888	Wooden yawl	Fish	CSP 1889, Vol. LXIX
Lady Harriet	12 Nov 1852	Chester sail vessel	Coal	Bourke, 1994
Leonie	30 Sept 1876	Near mouth of the Bray river, vessel hit the shore NE of a Martello tower and capsized	-	Bourke 1994
Marie Celine	31 Jan 1926	-	Rocket equipment	Bourke 1994
Newry	10 Apr 1818	-	-	CSP 1836, Vol. XVII
Pensiero	1873	Genoa barque wrecked north of Bray river	Wheat	www.irishwrecksonline.net
Pimorrero	1873	Italian barque	Grain	www.irishwrecksonline.net
Prudence	1819	Portuguese schooner	-	www.irishwrecksonline.net
Young Valliant	13 Nov 1852	-	-	CSP 1852-3, Vol. LXI
unknown	17 Jan 1774	Sloop	-	Bourke 1998
unknown	1766	Large sail vessel lost between Bray and Dalkey	-	www.irishwrecksonline.net
unknown	1767	Smack	-	www.irishwrecksonline.net
unknown	1773	Sail vessel	-	www.irishwrecksonline.net
unknown	1774	French sloop lost off Bray	-	www.irishwrecksonline.net
unknown	1774	Sail vessel	-	www.irishwrecksonline.net

				www.irishwrecksonline.net
unknown	30 Jan 1781	Coaster	-	Bourke 1998
unknown	30 Jan 1781	Coaster	-	Bourke 1998
unknown	1784	Sail vessel	-	www.irishwrecksonline.net
unknown	1784	Sail vessel	-	www.irishwrecksonline.net
unknown	8 Sept 1786	Sail vessel lost off Bray Head	Wine worth £80,000	www.irishwrecksonline.net
unknown	1790	4 sailing coasters lost between Bray and Dalkey	-	www.irishwrecksonline.net
unknown	27 Nov 1838	Brig	-	Bourke 1998
unknown	16 Mar 1844	Sloop	Coal	Bourke 1998
unknown	9 Feb 1861	135 vessels posted missing following a huge storm	-	Gilligan1980
unknown	1873	2 sail vessels lost	-	www.irishwrecksonline.net

Appendix 2: Shipwrecks Dublin / off Dublin

Vessel	Date/ Year	Comment	Cargo	Source
Adventure	26 Jan 1802	Sail vessel	-	Bourke 1998, 56
Amphitrite	1796	Brig	-	www.irishwrecksonline.net
Ann	10 Nov 1801	Sail vessel	-	National Wreck Register
Anna Maria	27 Dec 1803	Sail vessel	-	Bourke 1998
Ariadne	20 June 1795	Sail vessel	-	National Wreck Register
Aurora	6 Apr 1784	Sail vessel	-	Bourke 1998
Betty	25 June 1818	Sail vessel	-	CSP 1836, Vol. XVII, 294
Blazer	18 April 1783	Yacht	-	CSP 1852-3, Vol. XCVIII, 3
Cheefman	15 Mar 1762	Sail vessel	-	Bourke 1998, 59
Damao	1918	Portuguese steamer torpedoed by U-boat off Dublin	-	www.irishwrecksonline.net
Diana	1808	Sail vessel	-	www.irishwrecksonline.net
Dove	10 Feb 1808			National Wreck Register
Dream	18 Apr 1849	Yacht	-	CSP 1852-3, Vol. XCVIII, 3
Duke of Cumberland	16 Aug 1751	-	-	Bourke 1998
Elizabeth	1804	Sail vessel	-	www.irishwrecksonline.net
Elizabeth	4 / 11 Feb 1806	-	Coal	Bourke 1998
Endeavour	11 Dec 1792	-	-	National Wreck Register
Eva	1853	Full rigger	Passengers	www.irishwrecksonline.net
Experiment	12 Apr 1799	Sail vessel	Coal	Bourke 1998, 49
Globe	Nov 1842	Sail vessel	-	CSP 1843, Vol. IX, 42
Goodwill	17 April 1804	Sail vessel	Coal	Bourke 1998, 50
Hanover	8 Jan 1783	Sail vessel	Cheese and sheet copper	Bourke 1998, 64
H5	1918	British submarine sunk in collision	-	www.irishwrecksonline.net
Hope	1757	Sail vessel	Wheat	www.irishwrecksonline.net
Industry	27 Feb 1753	Sail vessel	-	Bourke 1998, 58
James	1829	Sail vessel	-	Bourke 1998
James Mc	8 Mar 1807	Sail vessel	-	Bourke 1998

Pherson				
Johns & William	1804	Sail vessel	-	www.irishwrecksonline.net
Leopard	Mar 1813	Schooner	Potatoes	Bourke 1998
Liffey	15 Mar 1897	Wooden smack	-	CSP, 1898, Vol. LXXXIII
Lime / Line / Lune	27 Dec 1803	Sail vessel	-	Bourke 1998
London	11 Nov 1825	Sail vessel	-	Bourke 1998
Maja	1945	Steamer torpedoed off Dublin	-	www.irishwrecksonline.net
Malaga	14 Jan 1747	Sail vessel	Fruit	Bourke 1994
Mary Ann	1807	Sail vessel	-	www.irishwrecksonline.net
Mary Elizabeth	5 Feb 1811	-	-	National Wreck Register
Nelson	1823	Harrington sail vessel	-	www.irishwrecksonline.net
Nancy	8 Jan 1821	-	-	National Wreck Register
Neptune	11 Mar 1763	-	-	National Wreck Register
New Ceres	20 Nov 1794	Sail vessel	-	Bourke 1998
Patrick	1833	Sail vessel	-	Bourke 1998
Pioneer	24 May 1855	Sail vessel	Sugar	Bourke 1998
Polly	11 Mar 1763	-	-	Bourke 1998
Prince Paquet	1807	-	-	Irish National Archive OP/241/15
Providence	21 Jan 1803	Sail vessel	-	Bourke 1998
Publica Fides	1 Jan 1785	Sail vessel	-	Bourke 1998
Quarantine	14 Jan 1785	Schooner	-	Bourke 1994
Rebecca	21 Aug 1795	Sail vessel	-	National Wreck Register
Robert	8 Nov 1758	-	-	Bourke 1994
Salaminia	1918	Greek steamer torpedoed 13 miles SSE of Dublin	-	www.irishwrecksonline.net
Shark	1833	Sail vessel	-	Bourke 1998
Spring Vale	12 Apr 1799	-	-	National Wreck Register
St. Michael	2 Dec 1802	-	-	Bourke 1998
St. Patrick	3 May 1847	Sail vessel	-	CSP 1851, Vol. LII
St. Pedro	14 Jan 1747	-	-	Bourke 1994
Speculation	25 Dec 1802	-	-	National Wreck Register
Spring Vale	1799	Sail vessel	-	www.irishwrecksonline.net
Subsanna	11 Mar 1763	-	-	National Wreck Register

Superb	1 Jan 1799	-	-	National Wreck Register
Swallow	10 Dec 1790	-	-	Bourke 1998
True Love	27 Feb 1811	-	-	National Wreck Register
Volunteer	14 Jan 1757	-	-	National Wreck Register
Wilderspool	1806	Liverpool galliot	-	www.irishwrecksonline.net
William	4 Feb 1777	-	-	Bourke 1998
Wilson	14 Jan 1747	-	-	Bourke 1994
York	1801	Sail vessel	-	www.irishwrecksonline.net
unknown	1582	Seven sail vessels wrecked offshore	Provisions	www.irishwrecksonline.net
unknown	Sept 1600	-	-	National Wreck Register
unknown	Aug 1639	-	Bark	Appleby 1992
unknown	Early 1675	Packet boat	-	Bourke 1994
unknown	14 Jan 1747	Herring boat	-	Bourke 1994
unknown	14 Jan 1747	Herring boat	-	Bourke 1994
unknown	1757	Sail vessel	Fruit	www.irishwrecksonline.net
unknown	14 Jan 1757	Herring boat	-	National Wreck Register
unknown	14 Jan 1757	Herring boat	-	National Wreck Register
unknown	26 Oct 1762	Sail vessel	Brandy	Bourke 1998
unknown	10 / 25 Feb 1773	Lighter	-	Bourke 1998
unknown	1787	Norwegian yawl swamped off Dublin	-	National Wreck Register
unknown	1788	Brig foundered 12 leagues off Dublin	-	www.irishwrecksonline.net
unknown	2 Feb 1799	-	-	Bourke 1998
unknown	2 Feb 1799	-	-	Bourke 1998
unknown	19 Nov 1780	Sail vessel	Provisions	Bourke 1998
unknown	1917	Dutch steamer mined off Dublin	-	www.irishwrecksonline.net

Appendix 3: Shipwrecks off Dun Laoghaire / Kingstown

Vessel	Date / Year	Comment	Cargo	Source
Africa	16 Sept 1915	Sail vessel	-	Bourke 1994, 217
Friends	26 Nov 1809	Sail vessel	-	Bourke 1998, 49
Friendship	7 Oct 1849	Sail vessel	-	CSP 1852-3, Vol. XCVIII, 3
Friends of Irvine	26 Nov 1809	-	-	National Wreck Register
Industry	9 Feb 1861	Schooner / brig	Coal	CSP 1862, Vol. LIV 1866
Kitty	3 Mar 1820	Sail vessel	-	National Wreck Register
Nelly	28 Apr 1809	-	-	National Wreck Register
Neptune	19 Oct 1765	-	-	National Wreck Register
Octavius	12 Nov 1901	Wooden schooner	Burnt ore	CSP 1902, Vol. LXIII, 125
Pilot	9 Nov 1863	Schooner		Bourke 1994
Willoughby	31 Oct 1752	-	-	National Wreck Register
York	13 Feb 1801			National Wreck Register
unknown	8 Jan 1783	Sail vessel	200 tones of lead	Bourke 1998
unknown	13 Aug 1829	Brig	coal	Freemans Journal 1829
unknown	24 Dec 1895	Sail vessel		National Wreck Register
unknown	8 Jan 1783	-	-	National Wreck Register
unknown	8 Jan 1783	Sloop	-	Bourke 1998
unknown	21 Sept 1787	-	-	National Wreck Register
unknown	1 Jan 1801	Collier	-	Freemans Journal 1801
unknown	13 Aug 1828	Steamboat	-	Freemans Journal 1828

Appendix 4: Shipwrecks Greystones / off Greystones

Vessel	Date / Year	Comment	Cargo	Source
Annie	12 Mar 1855	-	-	Bourke 1998
Eglinton	12 Mar 1855	-	-	Bourke 1998
Flint Castle	12 Mar 1855	-	-	Bourke 1998
Mary	9 / 11 Feb 1861	Schooner	Coal	Bourke 1994
Prince of Prussia	1840 - 1850	Lost north of Greystones	-	Bourke 1998
Rival	15 Apr 1854	Brig	Alcohol and tobacco	Bourke 1998
Sarah Jane	23 Oct 1886	Wooden Schooner	Coal	Bourke 1994
Wanderer	7 Dec 1849	-	-	Bourke 1994
unknown	19 Dec 1853	-	-	Bourke 1994
unknown	1853	Steamer wrecked in storm of 1853	Passengers	www.irishwrecksonline.net
unknown	1853	Sail vessel wrecked in storm of 1853	-	www.irishwrecksonline.net

Appendix 5: Shipwrecks Irish Sea / Irish Coast / Irish Channel

Vessel	Date / Year	Comment	Cargo	Source
Brier Rose	1941	Steamer lost in Irish Sea	Ballast	www.irishwrecksonline.net
Drake	1694	6th rate 24 gunship	-	www.irishwrecksonline.net
Lakemoor	1918	American cargo ship torpedoed in Irish Sea	-	www.irishwrecksonline.net
Longy	1917	French steamer torpedoed in Irish Channel	-	www.irishwrecksonline.net
Mikelis	1917	Greek steamer torpedoed in Irish Channel	-	www.irishwrecksonline.net
Nadejda	1918	Russian steamer torpedoed in Irish Channel		National Wreck Register
Nor	1917	Norwegian steamer torpedoed in Irish Channel		National Wreck Register
Olivine	1941	Steamer lost in Irish Sea	-	www.irishwrecksonline.net
Orior	c.4 Mar 1908	-	-	National Wreck Register
Redbreast	1917	Steamer	-	www.irishwrecksonline.net
Sarpfos	1918	Norwegian steamer torpedoed in Irish Channel	-	www.irishwrecksonline.net
Stephen Furness	1917	Armed steamer torpedoed in Irish Channel	-	www.irishwrecksonline.net
Ulabrand	1918	Norwegian steamer torpedoed in Irish Channel	-	www.irishwrecksonline.net
Wavelite	c.4 Mar 1908	-	-	National Wreck Register

Appendix 6: Shipwrecks Killiney

Vessel	Date / Year	Comment	Cargo	Source
Anna Maria Ann	1 Apr 1788	Sail vessel	-	Bourke 1998
Mary & Elizabeth	1804	Sail vessel	-	www.irishwrecksonline.net
unknown	21 Sep 1787	Unknown	Deer skins hogsheads washed up on bay suggest American ship sank somewhere off the coast	Dublin Chronicle, 22-25 Sept 1787

Appendix 7: Shipwrecks Wicklow / off Wicklow

Vessel	Date / Year	Comment	Cargo	Source
Amicitea	1846	Sail vessel	-	www.irishwrecksonline.net
Ann	17 Mar 1807	-	-	Bourke 1998
Betsy	1852	Sail vessel	-	www.irishwrecksonline.net
Brigand	30 April 1858	Sunk between Wicklow & Kish Bank	General cargo	CSP 1859, Vol. XXV
Carl Wilhelm	24 Nov 1815	Sail vessel	-	National Wreck Register
Choice	1808	Sail vessel		National Wreck Register
Dan	6 Oct 1755	Struck a bank	-	Bourke 1998
Dublin	1797	Brig	-	www.irishwrecksonline.net
Duncan	17 Mar 1807	-	-	Bourke 1998
Eagle	20 Dec 1776	-	-	Bourke 1998
Eliza	24 Dec 1803	Sail vessel	Copper ore	Bourke 1998
Francis	24 Nov 1824	Sail vessel	Beans	Bourke 1998
Friends	20 Nov 1820	-	-	Bourke 1998
Glenalvon	1846	Sail vessel	-	www.irishwrecksonline.net
Higson	7 Mar 1821	-	-	Bourke 1998
Janet	27 Nov 1787	-	Porter	National Wreck Register
Lynburn	1917	Steamer struck by a mine laid by UC-75	Pitwood	www.irishwrecksonline.net
Oporto Packet	17 Dec 1793	-	-	National Wreck Register
Mersey	1787	3 masted sail vessel	-	www.irishwrecksonline.net
Perseverance	5 Dec 1784	-	-	Bourke 1998
Robert Seamour	11 Feb 1861	-	-	Bourke 1998
Sally	26 Apr 1768	-	-	National Wreck Register
Shamrock	1867	Arklow smack	-	www.irishwrecksonline.net
Stag	16 Feb 1766	-	-	Bourke 1998
Susanna	24 Dec 1784	-	-	National Wreck Register
Watson	1838	Brig	-	www.irishwrecksonline.net
unknown	11 Dec 1784	Coaster	-	Bourke 1998
unknown	11 Dec 1784	Coaster	-	Bourke 1998
unknown	16 June 1826	Schooner capsized off Wicklow	-	Bourke 1998
unknown	9 Feb 1861	135 vessels	-	Gilligan 1980

		posted missing following a huge storm		
unknown	1873	Sail vessel	-	www.irishwrecksonline.net
unknown	1883	Barque	-	www.irishwrecksonline.net

Appendix 8: Shipwrecks Wicklow Bank

Vessel	Date / Year	Comment	Cargo	Source
Alexander	25 Jan 1847	Sail vessel	-	CSP 1851, Vol. LII, 5
Ann	8 Sept 1786	Sail vessel	-	National Wreck Register
Bellona	22 Dec 1795	Sail vessel		National Wreck Register
Ceres	1820	Sail vessel	-	www.irishwrecksonline.net
Demerera	1804	Lancaster full rigged	-	www.irishwrecksonline.net
Hope	1824	Brig	-	www.irishwrecksonline.net
Liberty	12 Mar 1784	-	-	Bourke 1998
Little Sisters	8 Apr 1805	-	-	Bourke 1998
Lord Ludgate	1799	Sloop	-	www.irishwrecksonline.net
Lord Musgrave	10 Apr 1799	Naval sloop	-	Bourke 1994
Mersey	14 Feb 1788	-	-	National Wreck Register
Minerva	20 Feb 1789	-	-	Bourke 1998
Polly	21 Mar 1786	-	-	National Wreck Register
Princess of Wales	16 Oct 1804	West Indiaman	Rum	Bourke 1998
Providence	10 Nov 1771	-	-	Bourke 1998
Reserve	15 Dec 1785	-	-	Bourke 1998
St. George	1 Dec 1790	-	-	National Wreck Register
Snowdon	Aug 1840	-	-	CSP 1843, Vol. IX
Trusty	1782	Sloop	Coal and copper	www.irishwrecksonline.net
William	29 Dec 1775	-	-	National Wreck Register
unknown	1 Dec 1790	-	-	National Wreck Register

Appendix 9: Archaeological Assessment Study Volume 1: Side Scan Sonar and Magnetometer Survey

PN 18/08

Licence Number: 08R113

Prepared For:
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Enterprise House
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Prepared By:
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Contents

Appendices

1. Introduction

Hydrographic Surveys Ltd were instructed by Saorgus Energy Ltd to undertake an archaeological assessment of the Kish and Bray Banks for the purposes of determining positions of proposed turbines with respect to a planned wind farm.

The application for use of detection devices was made to the DOEHLG on the 9th April 2008. The licence was granted to Hydrographic Surveys Ltd on the 9th June 2008.

Survey work commenced on the 13th June 2008 and was completed by the 19th September 2008.

Figure 4 illustrates the proposed positions of turbines within the limits of the survey area (Appendix 9.4).

2. Methodology

A full list of equipment used is listed in Appendix 9.1.

Horizontal Control and Grid

Horizontal control was provided by Trimble Ag DGPS 132 unit using satellite broadcast corrections. The DGPS position was interfaced into the sidescan unit and into the magnetometer unit and also logged to the Hypack Survey software to provide real-time line guidance and a record of position. On-line transformation of WGS'84 Latitude and Longitude to Irish National Grid (ING) took place within the survey programme. The trackplots, and magnetometer charts were produced from this survey programme.

Side Scan Sonar Survey

The CMax CM2 dual frequency sidescan sonar was used to survey the area of interest. The sidescan sonar has a full complement of display, recording, editing, annotation, measurement, remote data entry and instant access replay facilities.

It has automatic microprocessor control of the gain profile. All records have been recorded digitally. Processing of the side scan records and production of mosaics were carried out using the Hypack Survey Software.

The towfish was deployed astern off the starboard side. The layback from the Antenna position was recorded for all survey lines and applied during processing of data. Survey lines were run in an east-west direction with range settings of at 150 m centres (Figure 4). A range setting of 150 per channel was employed during survey. This allows for a maximum total swath of 300 m.

Magnetometer Survey

The Marine Magnetics SeaSpy magnetometer was used to record the magnetic signature data within the survey area. The SeaSpy systems are proton magnetometers that are enhanced by a unique quantum principle known as the Overhauser effect. The advantage over conventional proton magnetometers is that the SeaSpy can measure the magnetic field while polarizing, retain maximum sensitivity at sampling up to 1 Hz and deliver one or two orders of magnitude better precision. The SeaSpy does not produce heading error or have a dead zone.

The sidescan towfish was towed astern off the starboard side. The layback from the antenna position was recorded for all survey lines and applied during the processing and final presentation of data.

The magnetometer was towed off the stern of the boat off the port side. The layback from the antenna position has been accounted for in the final interpretation of results. This was run in conjunction with the side scan sonar survey.

3. Results

Side Scan Sonar Results

The side scan data is presented as a series of mosaics on the following charts:

HS: 59A-1/08 to HS:59A-5/08 (Figures 5-9).

A brief background on this area as extracted from the Anglesey Sheet 1:250,000 series produced jointly by the British Geological Survey and the Geological Survey of Ireland describes the Kish and Bray banks as the largest sand bank located off the East Coast of Ireland. The area is approximately 18 km long and is characterised by a strongly asymmetrical cross-section with a steep east facing slope.

The seabed sediments comprising this bank are broadly classified as sand of medium to low acoustic reflectivity.

The following characteristics have been observed from the side scan records collected by HSL during the course of this survey.

At the northern limit of the survey area the top of the bank is found towards the western side of the area limits. Progressing southwards the top of the bank appears to migrate towards the east.

The most obvious and dominant features found are the sandwaves. Wavelengths and heights of these vary. For example up in the north, wavelengths can be between 100 to 175 m apart with heights ranging from 1–4 m.

Distances between sandwaves increase moving down the bank and heights average around 1–1.5 m.

Descriptive notes have been appended onto the side scan interpretation charts to give indications of the average wavelengths and heights observed

The bathymetric contours have also been included on this chart to illustrate the asymmetrical nature of the bank.

Magnetometer Results

The results of the magnetometer survey are presented in charts **HS: 59B-1/08** to **HS: 59B-5/08** (Figures 10-14) and are represented by colour coded numerical values. These values represent the total field measurement in nT (nanoTeslas). Paucity of data in some areas was due to adverse weather conditions during survey work.

In brief the average values would appear to range from 48800 nT to 48900 nT over the entire 18 km length of the bank.

One area towards the northern part of the Bray foreshore limit has readings that average between 48750 nT to 48800 nT. This is most likely caused by natural differences in the geomorphologic make-up of the bank.

There were a total of 23 targets identified that would be of potential archaeological significance. These targets are annotated onto both the side scan and magnetometer interpretation charts.

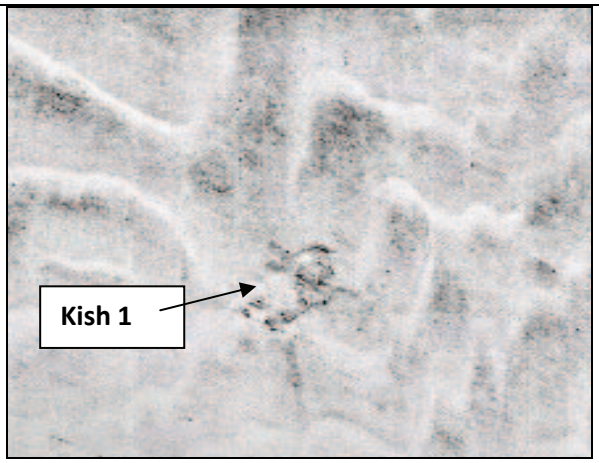
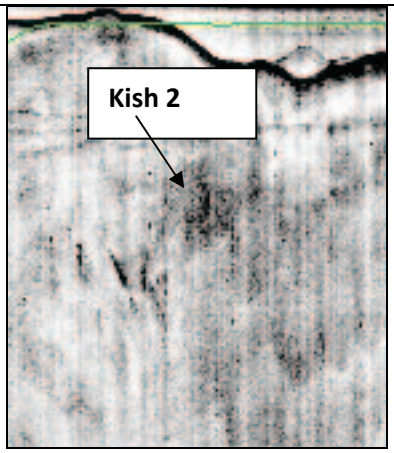
Table 1 lists these targets and gives information including grid position, image, and other descriptive information.

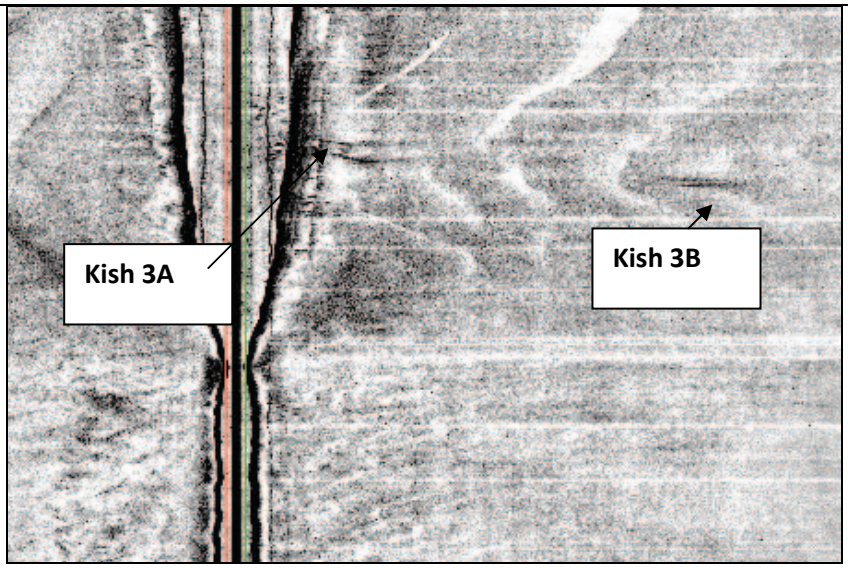
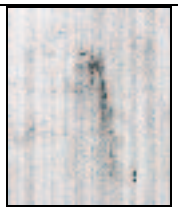
Appendix 9.2 contains a full list of these targets including the ING position, the WGS '84 latitudes and longitudes and Airy modified latitudes and longitudes.

The survey track-lines are presented on charts **HS: 59C-1/08** to **HS: 59C-5/08** (Figures 15-19).

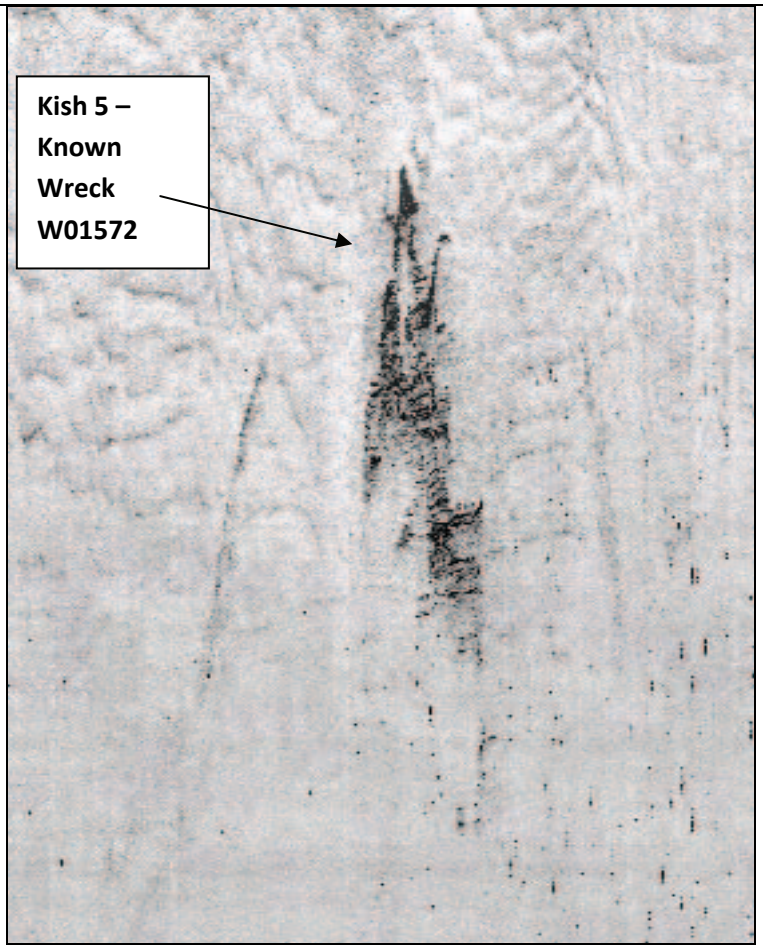
All the raw side scan and magnetometer data has been forwarded to Dan Atkinson of Headland Archaeology Ltd in accordance with the requirements of DOEHLG (Appendix 11).

Table 1: Targets of Interest

Target Name	Description All water depths quoted are in Chart Datum.
Kish 1	 **Grid Position:** 338800E 229960N This target lies in approximately 21 m water depth on a seabed characterised by sandwaves. The magnetometer values remain unchanged around this target. This target does not have any potential impact on the proposed positions of turbines.
Kish 2	 **Grid Position:** 337320E 229875N This target lies in approximately 3.5 m water depth. There is no change in the magnetometer readings around this target. It plots 50 m west of the planned position for T2 and so this turbine may have to be moved.

Kish 3	 **Grid Position: Kish 3A** 337320E 228970N **Kish 3B** 337820E 228920N These two targets lie in approximately 8.4 m water depth. There appears to be a slight change in magnetometer readings. These plot approximately 150–170 m north-west of the proposed position of T13. The general exclusion zone is in the region of 100 m.
Kish 4	 **Grid Position:** 338315E 227705N Lies in approximately 7 m water depth. There is no change in the magnetic signature. It is possible that it may be debris of some kind, possibly from lobster fishing.

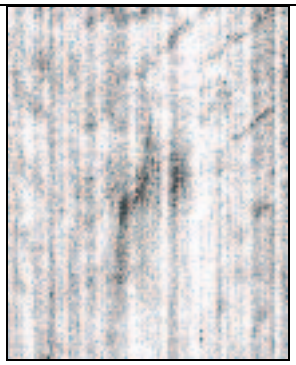
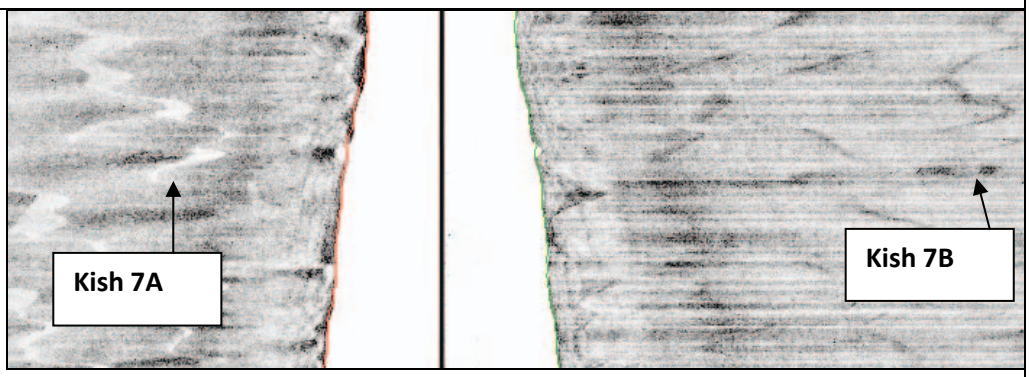
Kish5

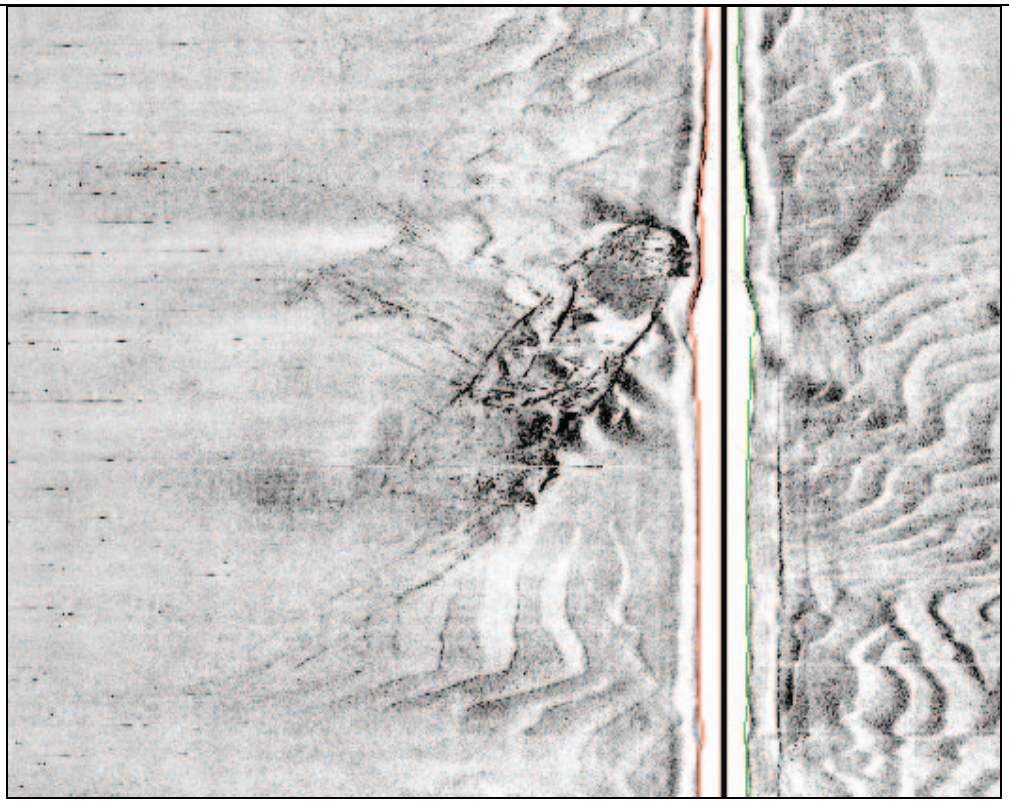


Grid Position: 337930E 227565N

This corresponds with a Known Wreck (W01572) from the DOEHLG files. It appears to be lying in 5 m water depth. This wreck is called the *Glenorchy* and dates back to 01/01/1869. According to the DOEHLG records it became a wreck on its maiden voyage from Greenock to Bombay. Its cargo was coal and railway sleepers. There is a noticeable reaction from the magnetometer.

An exclusion zone has been annotated around this target on the interpretation chart. There does not appear to be any impact to any planned turbines.

Kish 6	 **Grid Position:** 338490E 226810N. This target lies in approximately 5 m water depth. There was no change in the magnetic signature. However it plots approximately 160 m to the south-west of a Known Wreck (W01594). Based on this an exclusion zone has been annotated around these targets. T33 plots approximately 100 m west of the bottom left of this exclusion zone and T34 plots approximately 20 m west of bottom right hand corner. These should pose no potential impact. W01594 Vesper 13/01/1876. 10 year old iron screw steamer. Became stranded on the Kish bank. Vessel broke up.
Kish 7	 **Grid Position: Kish 7A** 339000E 226515N **Kish 7B** 339005E 226385N No change in the magnetic signature. These targets lie in 18–19 m water depth. There does not appear to be any impact on any planned turbines.

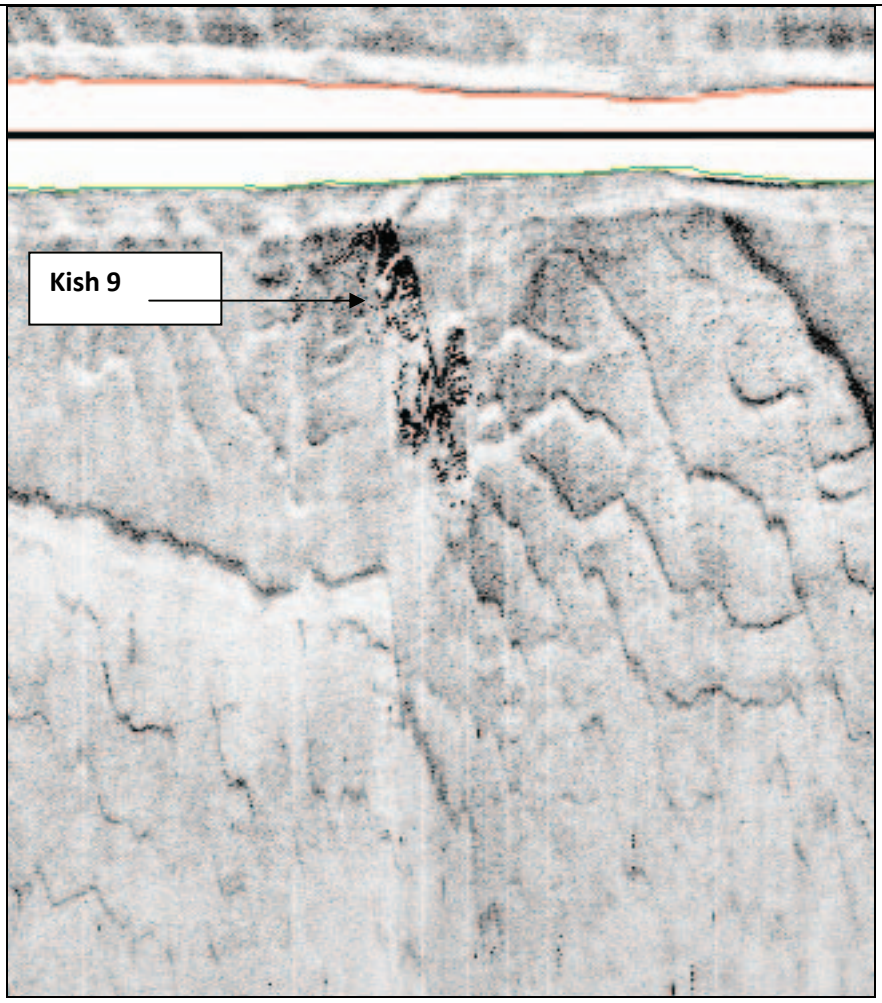
Kish 8	
	Grid Position: Middle of Wreck 338440E 226120N. Lies in approximately 7.7 m water depth.

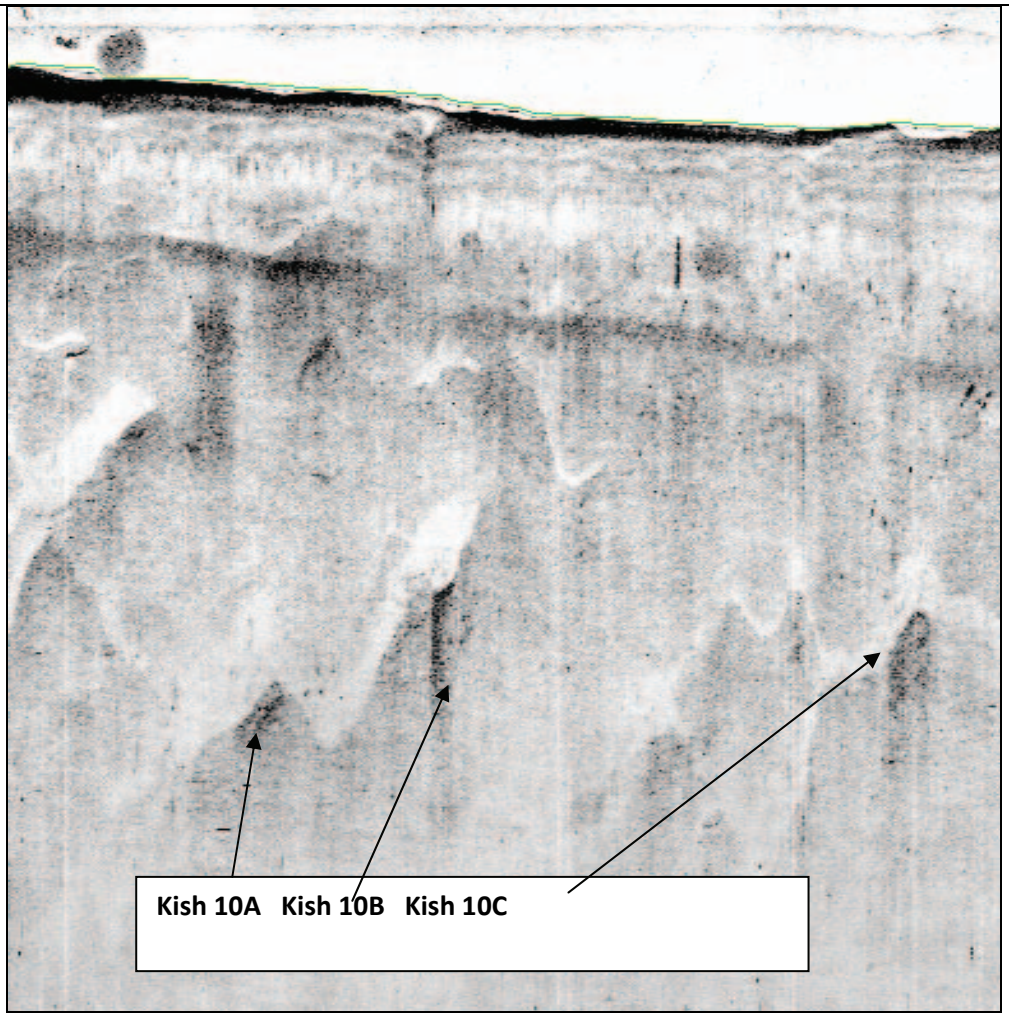
View of wreck from the adjacent survey line.

There also appears to be a number of smaller targets that plot in the vicinity of this wreck. These have all been annotated on the interpretation charts. An exclusion zone has also been annotated on the charts to encompass all of these targets.

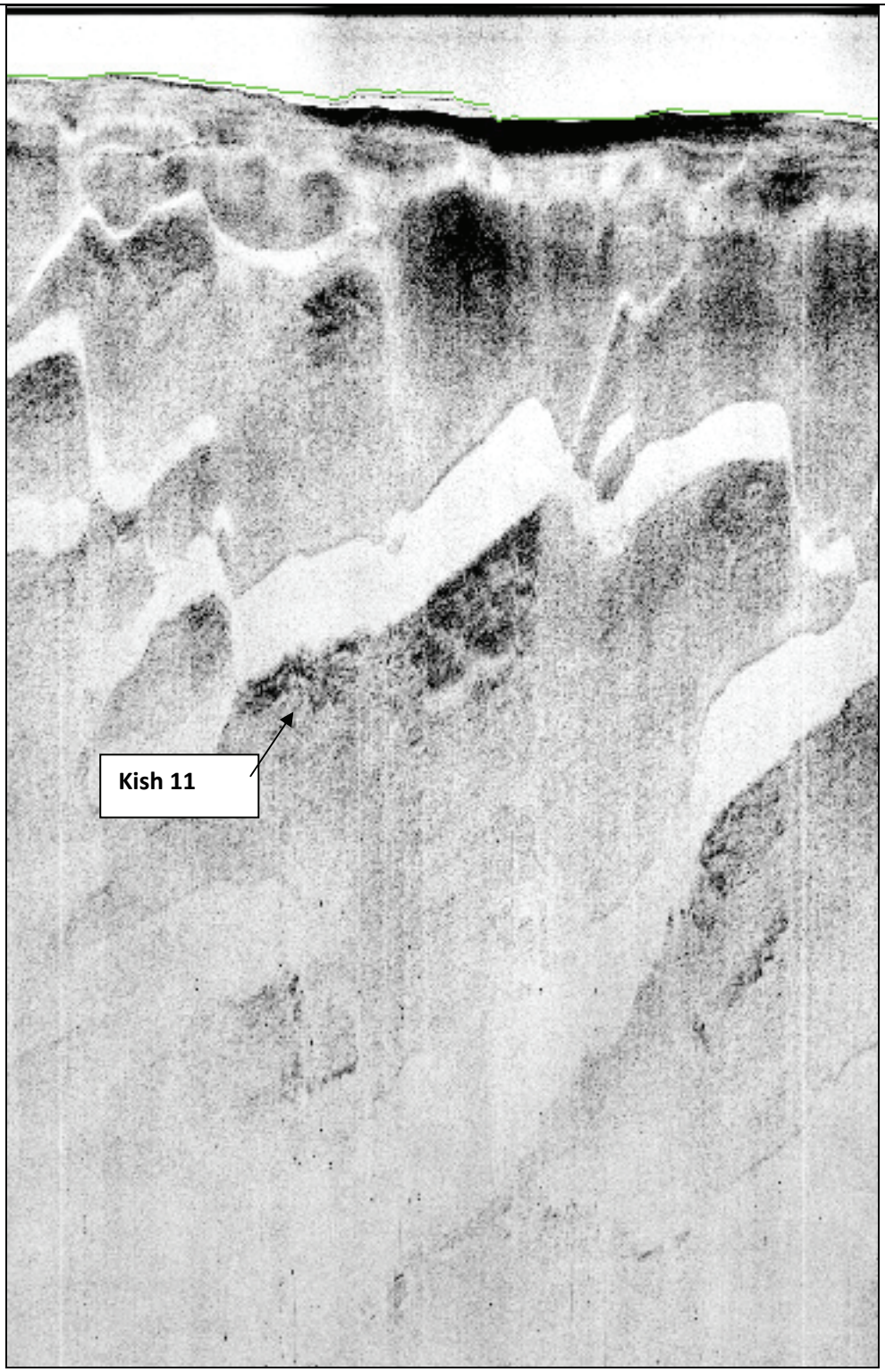
There is also a significant response from the magnetometer.

It would appear more than likely that these are all related to the Known Wreck W01630. The name of this is unknown and it dates around the mid-19th century. It is described as a wooden wreck discovered in 2003. The wreck is upside down. The hull is copper sheeted, and so would cause a significant response from the

	magnetometer. There is pottery strewn around this which is probably what all the little targets are and why there is no change in magnetic signature at these points. This suggests that the recorded position of this wreck may need to be adjusted. Based on the exclusion zone and targets the proposed location for T38 needs to be changed.
Kish 9	 **Grid Position:** 338490E 225519N. This target plots on the position given for Known Wreck W01629. It lies in 7.8 m water depth. An exclusion zone has been annotated around this target. The nearest turbine, T43 plots approximately 25 m to the north of the edge of this zone, so should pose no potential impact. W01629, unknown name remains of a 300–400 ton wooden vessel. Pottery, clay pipes, iron pots, anchors, a capstan and winch were recorded on the wreck site. *May*

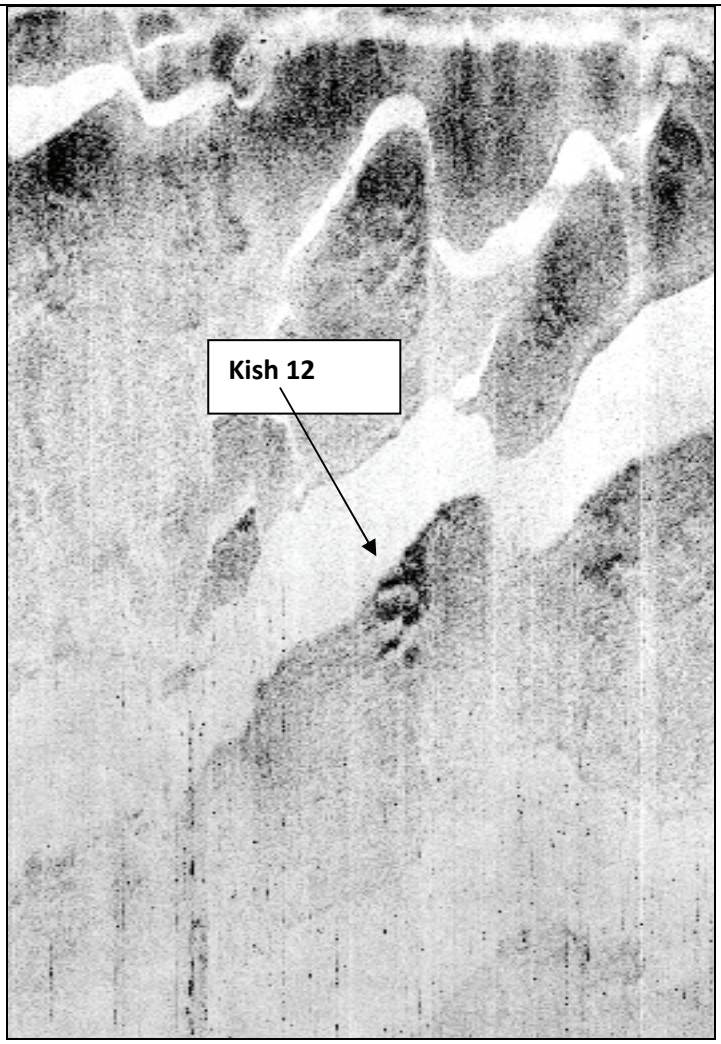
	be Sir Charles Napier. There was no noticeable reaction from the magnetometer in the vicinity of this target.
Kish 10	 **Grid Positions: Kish 10A** 339400E 225170N Kish 10B 339434E 225145N Kish 10C 339575E 225150N An exclusion zone has been put around these targets. They lie in water depths ranging from 18–25 m. There may be a possible impact on the positioning of T50.

Kish 11

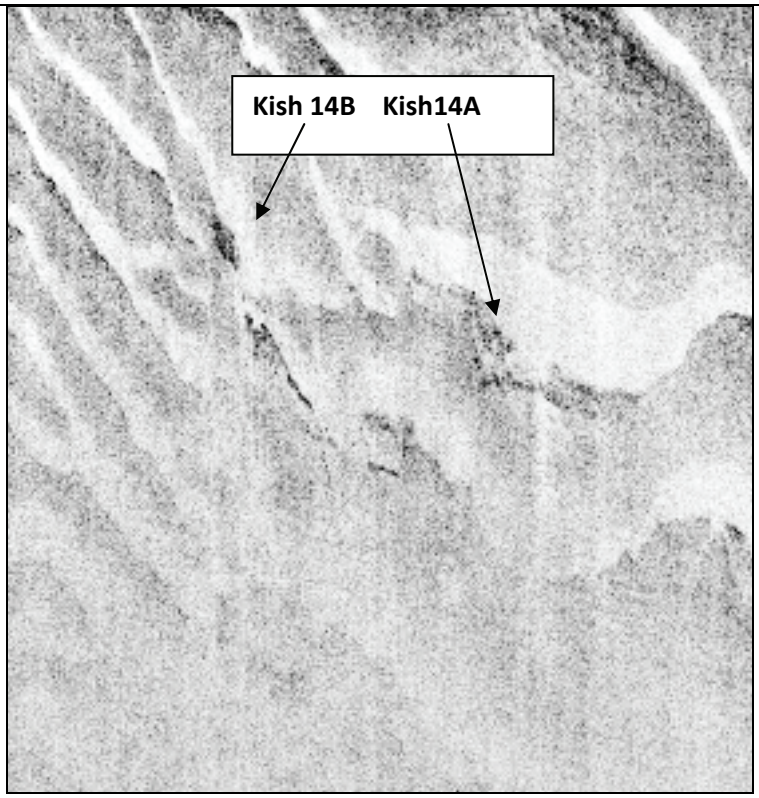


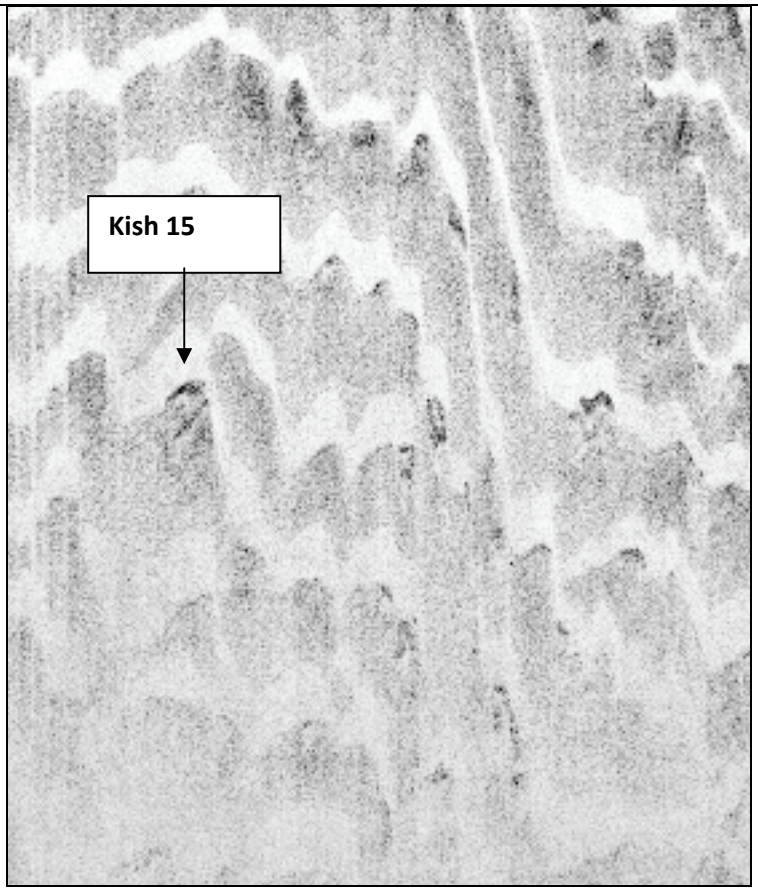
Grid Position: 337671E 224527N

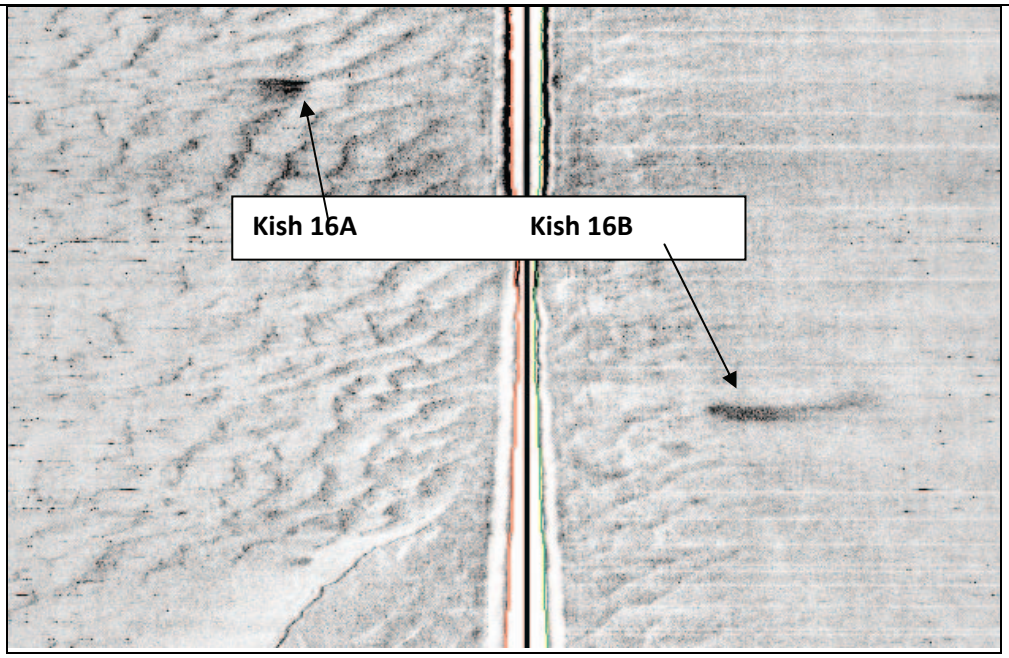
No reaction from the magnetometer. Lying in approximately 19 m of water. The proposed position of T51 is 100 m to the north-east of this target.

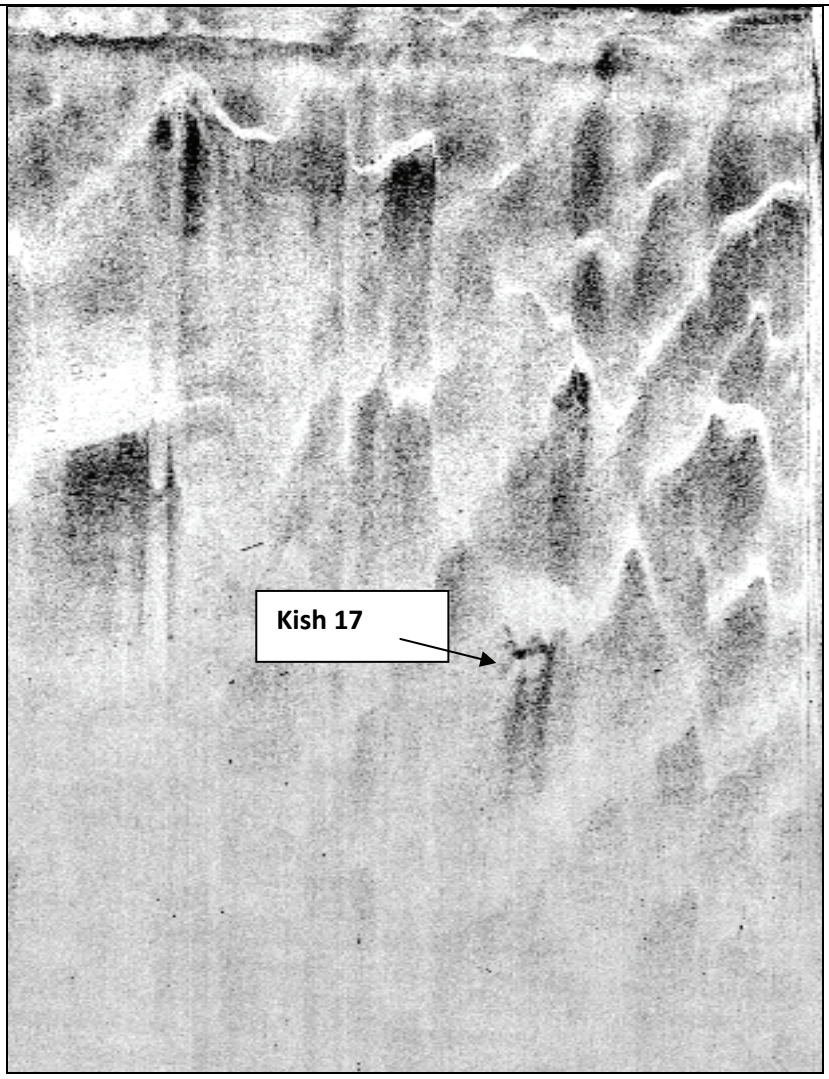
Kish 12	 **Grid Position:** 337724E 224260N. Lies in 20 m water depth. There was no reaction from the magnetometer. There are no turbines planned in this location.

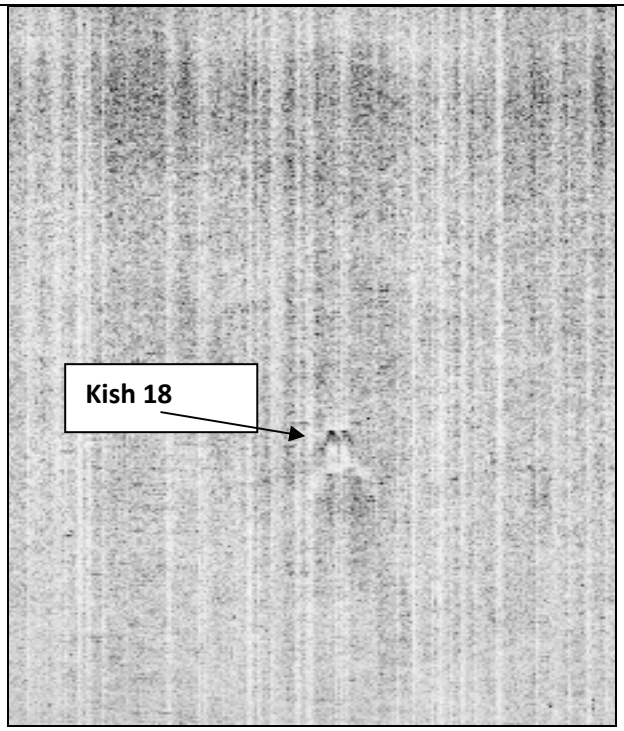
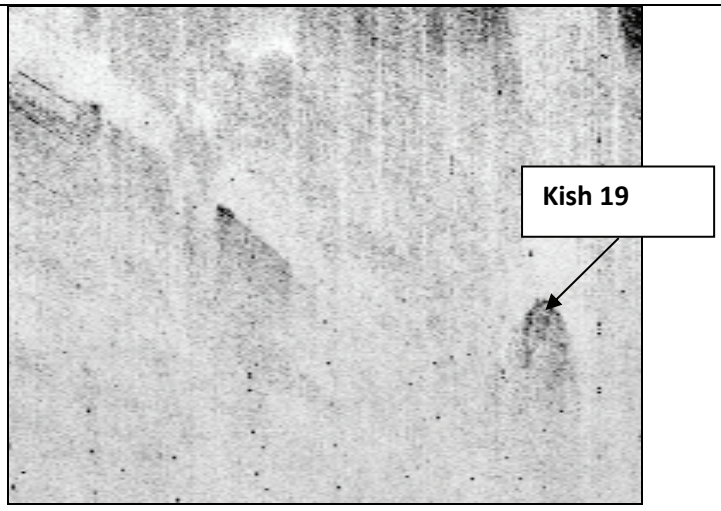
Kish 13	 **Grid Position:** 337605E 223985N Water depth 21 m, no reaction from the magnetometer. The planned location of T56 is approximately 35 m east of this target and so has a potential to impact and needs to be adjusted.

Kish 14	 **Grid Positions: Kish 14A** 338850E 222745N **Kish 14B** 338886E 222730N No reaction from magnetometer. Lying in 13.8 m water depth. No impact on any planned turbines.

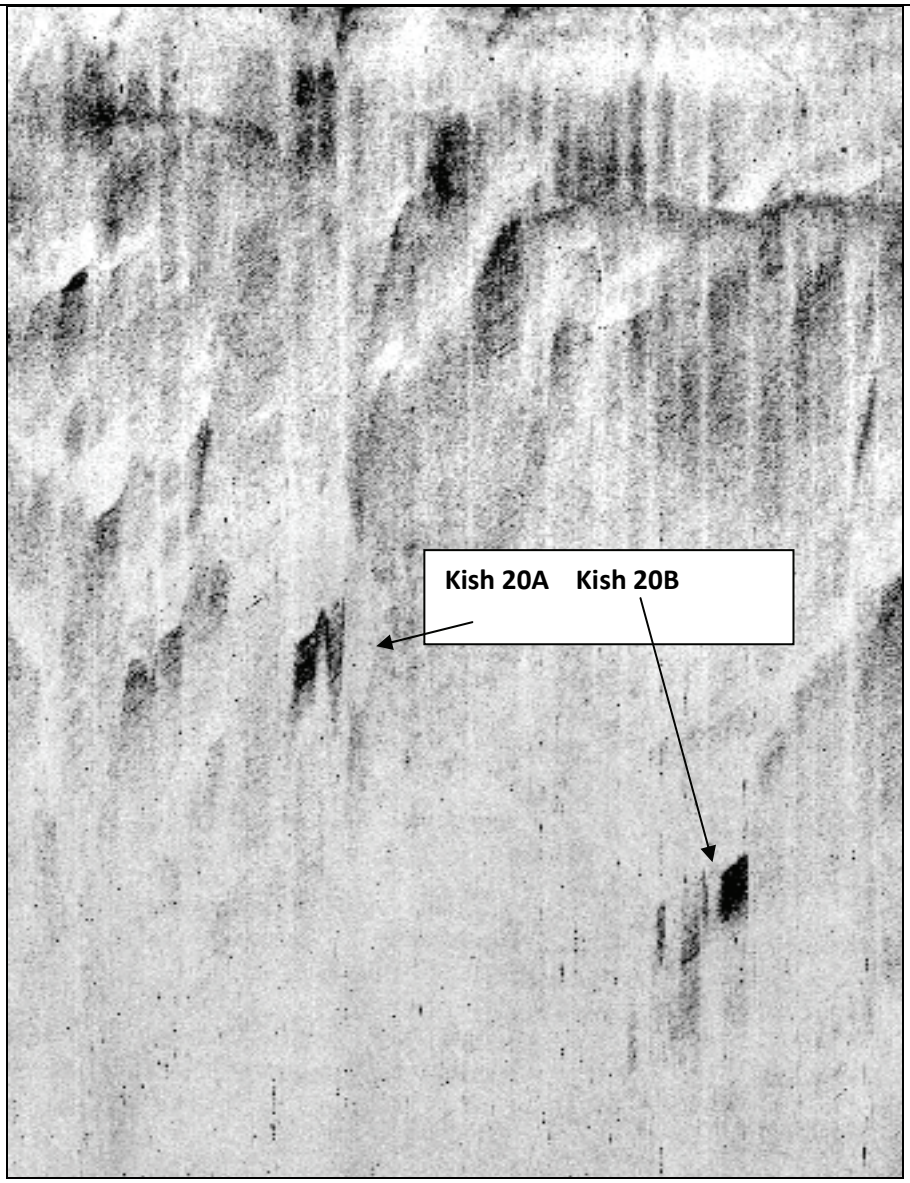
Kish 15	 **Grid Position:** 339155E 221560N Lying in approximately 14.5 m water depth. There appears to be a slight change in magnetometer readings. However there are no turbines planned for this area.

Kish 16	 **Grid Positions: Kish 16A** 339864E 220700N **Kish 16B** 340005E 220764N Lying in water depths between 4.0–5.1 m. There appears to be no reaction from the magnetometer in this region. Nearest planned turbine is approx 160 m to the north-west

Kish 17	 **Grid Position:** 340365E 218395N No change in magnetometer readings and no turbines are planned near it. Lying in 22.5–23 m.

Kish 18	 **Grid position:** 341243E 218096N A height of this target has been measured based on calculations performed within the processing program. This object is estimated to have a height of 2.7 m. It is lying in 33 m water depth. There was no reaction observed from the magnetometer. There are no planned turbines anywhere near this target.
Kish 19	 **Grid Position:** 340315E 217045N In 15.6 m water depth. No change in magnetometer readings. No planned turbines anywhere near this target.

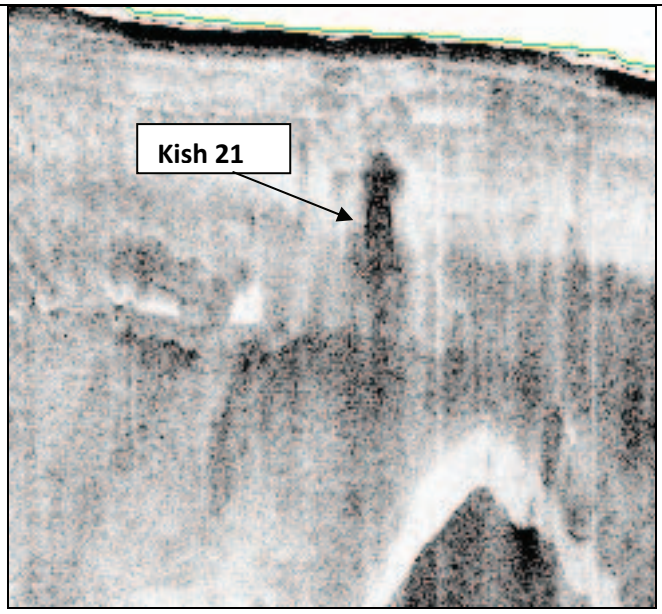
Kish 20

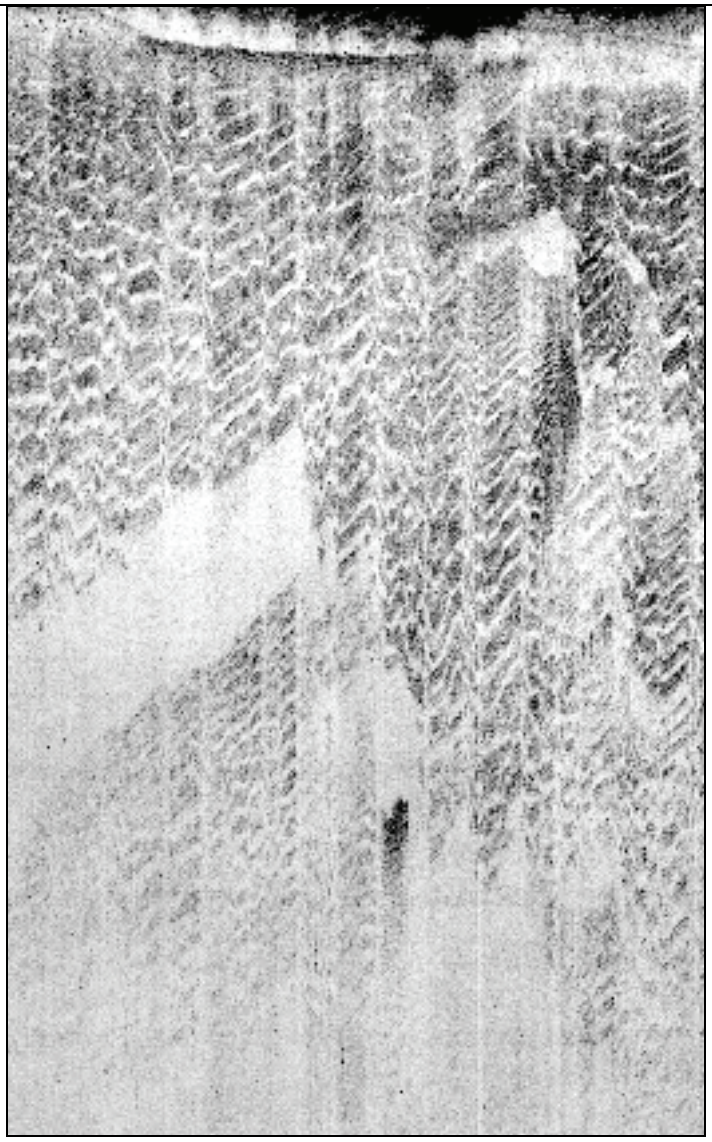


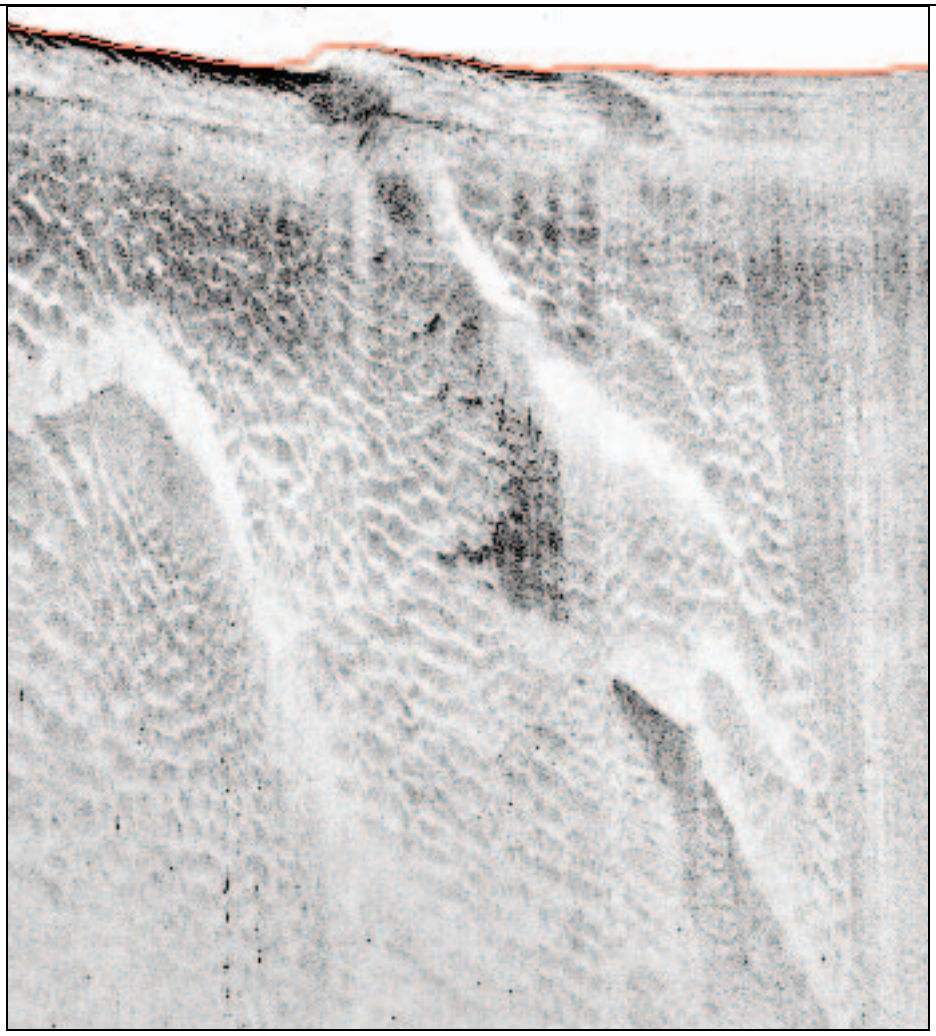
Grid Positions: Kish 20A 340400E 216889N

Kish 20B 340400E 216917N

Lying in 19.8–23 m water depth. The nearest planned turbine is T117 which plots approximately 180 m west of this target. This would be further than the nominal 100 m exclusion zone.

Kish 21	 **Grid Position:** 340495E 215765N Lying in 23 m water depth there was no reaction from the magnetometer. The nearest planned turbine is 140 m north-east of this target.

Kish 22	 **Grid Position:** 339590E 214227N Lying in 16.5 m water depth. There was no change in the magnetic signature around this target. It plots 40 m north-east of T137. It is possible that this turbine location will have to change.

Kish 23	 **Grid Position:** 339566E 213877N In 19.0 m water depth. No change in the magnetic signature. There are no planned turbines in the vicinity of this target and so should not be impacted upon.

Appendix 9.1: Equipment List

Equipment List and Technical Specifications

Side Scan Sonar The CMax CM2 dual frequency side scan sonar has a full complement of display, recording, editing, marking, annotation, measurement, remote data entry and instant access replay facilities.

It has automatic, microprocessor control of the gain profile.

All data is recorded digitally and can be processed through the CM2 Maxview programme and Hypack Hyscan Software.

The range setting for this project was set at 150 m per channel.

The towfish was deployed astern of the boat. Layback was accounted for in the presentation of data.

Magnetometer Marine Magnetics SeaSpy Magnetometer.

Magnetometer data processed through the Hypack Edit programme.

The magnetometer was towed astern. Layback was accounted for in the presentation of data.

Navigation Trimble AgDGPS 132. This unit provides sub-meter differential position accuracy.

The L-band satellite receiver uses a Trimble developed, sensitive design to provide coverage across the entire satellite footprint.

All charts are produced in Autocad Format.

Appendix 9.2: List of Target Positions in Irish National Grid, WGS'84 and Airy Modified Latitude and Longitude

Name	Easting	Northing	Lat-WGS84	Lon-WGS84	Lat-Airy Modified	Lon-Airy Modified
Kish1	338800	229960	53 18 7.1595 N	005 55 7.38 W	53 18 6.2798 N	005 55 3.7726 W
Kish2	337320	229875	53 18 5.7987 N	005 56 27.3763 W	53 18 4.9192 N	005 56 23.779 W
Kish3A	337835	228970	53 17 36.0635 N	005 56 0.999 W	53 17 35.1802 N	005 55 57.3988 W
Kish3B	337820	228920	53 17 34.4613 N	005 56 1.8863 W	53 17 33.5778 N	005 55 58.2863 W
Kish4	338315	227705	53 16 54.7226 N	005 55 37.0833 W	53 16 53.834 N	005 55 33.4807 W
Kish5	337930	227565	53 16 50.5577 N	005 55 58.0674 W	53 16 49.6687 N	005 55 54.4675 W
Kish6	338490	226810	53 16 25.6273 N	005 55 29.0467 W	53 16 24.7351 N	005 55 25.4435 W
Kish7A	339000	226515	53 16 15.6117 N	005 55 2 W	53 16 14.7181 N	005 54 58.4018 W
Kish7B	339005	226385	53 16 11.4047 N	005 55 1.9431 W	53 16 10.5106 N	005 54 58.3366 W
Kish8A	338490	226385	53 16 11.8891 N	005 55 29.7125 W	53 16 10.9952 N	005 55 26.1095 W
Kish8B	338300	226390	53 16 12.229 N	005 55 39.9497 W	53 16 11.3352 N	005 55 36.348 W
Kish8C	338565	226265	53 16 7.9397 N	005 55 25.8564 W	53 16 7.0453 N	005 55 22.253 W
Kish8D	338565	226220	53 16 6.4851 N	005 55 25.9269 W	53 16 5.5905 N	005 55 22.3235 W
Kish8E	338198	226200	53 16 6.1829 N	005 55 45.7466 W	53 16 5.2883 N	005 55 42.1458 W
Kish8F	338423	226130	53 16 3.7091 N	005 55 33.7243 W	53 16 2.8142 N	005 55 30.122 W
Kish8G	338440	226120	53 16 3.37 N	005 55 32.8233 W	53 16 2.475 N	005 55 29.2209 W
Kish8H	338430	226090	53 16 2.4096 N	005 55 33.4095 W	53 16 1.5145 N	005 55 29.8072 W
Kish9	338490	225519	53 15 43.8956 N	005 55 31.0684 W	53 15 42.9982 N	005 55 27.466 W
Kish10A	339400	225170	53 15 31.7573 N	005 54 42.5591 W	53 15 30.8581 N	005 54 38.9507 W
Kish10B	339434	225145	53 15 30.917 N	005 54 40.7656 W	53 15 30.0177 N	005 54 37.157 W
Kish10C	339575	225150	53 15 30.9453 N	005 54 33.1569 W	53 15 30.046 N	005 54 29.5474 W
Kish10D	339496	225155	53 15 31.1817 N	005 54 37.4076 W	53 15 30.2824 N	005 54 33.7986 W
Kish11	337671	224527	53 15 12.5952 N	005 56 16.7655 W	53 15 11.6941 N	005 56 13.1694 W

Kish12	337724	224260	53 15 3.9149 N	005 56 14.3242 W	53 15 3.0127 N	005 56 10.7279 W
Kish13	337605	223985	53 14 55.1363 N	005 56 21.1655 W	53 14 54.2331 N	005 56 17.5702 W
Kish14A	338850	222745	53 14 13.8873 N	005 55 16.0107 W	53 14 12.9786 N	005 55 12.4077 W
Kish14B	338886	222730	53 14 13.3685 N	005 55 14.0945 W	53 14 12.4598 N	005 55 10.4913 W
Kish15	339155	221560	53 13 35.2948 N	005 55 1.4379 W	53 13 34.3813 N	005 54 57.8336 W
Kish16A	339864	220700	53 13 6.8258 N	005 54 24.6032 W	53 13 5.9085 N	005 54 20.9946 W
Kish16B	340005	220764	53 13 8.7611 N	005 54 16.9085 W	53 13 7.844 N	005 54 13.2989 W
Kish17	340365	218395	53 11 51.8417 N	005 54 1.2666 W	53 11 50.915 N	005 53 57.6562 W
Kish18	341243	218096	53 11 41.3407 N	005 53 14.4798 W	53 11 40.4125 N	005 53 10.8636 W
Kish19	340315	217045	53 11 8.2503 N	005 54 6.0902 W	53 11 7.3182 N	005 54 2.481 W
Kish20A	340400	216889	53 11 3.1269 N	005 54 1.7625 W	53 11 2.1942 N	005 53 58.1528 W
Kish20B	340400	216917	53 11 4.032 N	005 54 1.7182 W	53 11 3.0994 N	005 53 58.1085 W
Kish20C	340437	216895	53 11 3.2857 N	005 53 59.7618 W	53 11 2.353 N	005 53 56.1519 W
Kish21	340495	215765	53 10 26.7033 N	005 53 58.4264 W	53 10 25.766 N	005 53 54.8168 W
Kish22	339590	214227	53 09 37.843 N	005 54 49.5289 W	53 09 36.8999 N	005 54 45.9265 W
Kish23	339566	213877	53 09 26.5517 N	005 54 51.3685 W	53 09 25.6072 N	005 54 47.7665 W

All latitudes and longitudes are given in degrees, minutes and seconds.

Appendix 9.3: Details of Known Wrecks as provided by DOEHLG

Kish Bank Wrecks with Locations

W01572 ZONE 011

Glenorchy 01/01/1869

KISH BANK, 53 16 50.10N, 005 55 57W

1,285-ton vessel of Glasgow, official no. was 60,391. Master was Thomas Meiklejohn. En route from Greenock to Bombay (maiden voyage), cargo of coal, railway sleepers. Struck the Kish Bank, became a wreck. Crew saved. Four tugs saved materials off the wreck.

LL 17,074, 4th January 1869; LL 17,076, 6th January

1869; PP 1870, LX, 98; PP 1871, LXI, 38

W01594 ZONE 011

Vesper 13/01/1876

KISH BANK, 53 16 30N, 05 55 24W

UKHO wreck no. 009101809. 380-ton, 10-year-old iron screw steamer of Hartlepool. Built at Dundee, official number was 52,569. Classed by Lloyd's as AB1. Owned by B.R. Huntley of Hartlepool, master was Jacob Tolsen. En route from Glasgow to Dunkirk, sixteen crew, 600 tonnes of coal and sugar. Struck the Kish Bank. Became stranded, attempted to get off several times but failed. Vessel began to break up. Captain, crew took to a lifeboat, landed at Killiney.

Bourke 1994, 33; LL 19,259, 14th January 1876; LL

19,260, 15th January 1876; LL 19,261, 17th January

1876; LL 19,262, 18th January 1876; PP 1876,

LXVII, 45, 219, 395; UKHO Wreck Data 1996

W01629 ZONE 011

Unknown mid-19th century

KISH BANK, 53 15 44.34N, 05 55 30W

Remains of a 300–400-ton wooden vessel (approx.) discovered by Marlin Sub Aqua Club in 2003. The vessel is partially exposed on the seabed in 8–10 m of water. Pottery, clay pipes, iron pots, a number of anchors, a capstan and a winch were recorded on the wreck site. May be the wreck of the *Sir Charles Napier*.

W01630 ZONE 011

Unknown mid-19th century

KISH BANK, 53 16 1.980N, 05 55 57W

Wooden wreck discovered by Marlin Sub Aqua Club in 2003. The wreck is partially exposed on the seabed in 8–10m of water. The wreck is upside-down. Hull is copper-sheeted. The wreck rises approximately 1m in height off the seabed, with pottery strewn around it.

Bolivar ***Post 1945***
On Admiralty Charts.

Appendix 9.4: Table of Turbine Locations

Turbine ID	Easting	Northing	Latitude (Modified Airy)	Longitude (Modified Airy)
T1	336839.3	229934.4	53 18 7.287 N	005 56 49.6296 W
T2	337375	229885.3	53 18 5.2009 N	005 56 20.7947 W
T3	337964.3	229885.3	53 18 4.65 N	005 55 48.9911 W
T4	338500	229885.3	53 18 4.1472 N	005 55 20.0805 W
T5	339035.7	229885.3	53 18 3.6424 N	005 54 51.1701 W
T6	336839.3	229344.3	53 17 48.2093 N	005 56 50.5449 W
T7	337375	229344.3	53 17 47.7108 N	005 56 21.6369 W
T8	337964.3	229344.3	53 17 47.16 N	005 55 49.837 W
T9	338446.4	229344.3	53 17 46.7076 N	005 55 23.822 W
T10	339035.7	229344.3	53 17 46.1525 N	005 54 52.0225 W
T11	336839.3	228852.5	53 17 32.3096 N	005 56 51.3073 W
T12	337437.5	228861.6	53 17 31.3651 N	005 55 56.6381 W
T13	337964.3	228852.5	53 17 31.2605 N	005 55 50.6014 W
T14	338500	228852.5	53 17 30.7578 N	005 55 21.7013 W
T15	339035.7	228852.5	53 17 30.2532 N	005 54 52.7972 W
T16	336785.7	228311.5	53 17 14.8692 N	005 56 55.0376 W
T17	337375	228311.5	53 17 14.3209 N	005 56 23.2442 W
T18	337910.8	228311.5	53 17 13.8204 N	005 55 54.3375 W
T19	338446.4	228360.7	53 17 14.9087 N	005 55 25.3646 W
T20	338982.2	228311.5	53 17 12.8138 N	005 54 56.5354 W
T21	336892.9	227819.7	53 16 58.87 N	005 56 50.0164 W
T22	337428.6	227819.7	53 16 58.3714 N	005 56 21.1179 W
T23	337964.3	227819.7	53 16 57.8709 N	005 55 52.2195 W

Turbine ID	Easting	Northing	Latitude (Modified Airy)	Longitude (Modified Airy)
T24	338553.6	227819.7	53 16 57.3179 N	005 55 20.4299 W
T25	339089.3	227819.7	53 16 56.8134 N	005 54 51.532 W
T26	337053.6	227278.7	53 16 41.2303 N	005 56 42.1868 W
T27	337589.3	227278.7	53 16 40.7312 N	005 56 13.2915 W
T28	338125	227278.7	53 16 40.2302 N	005 55 44.3965 W
T29	338714.3	227278.7	53 16 39.6769 N	005 55 12.6055 W
T30	339250	227278.7	53 16 39.1718 N	005 54 43.7161 W
T31	337107.2	226737.7	53 16 23.6902 N	005 56 40.1351 W
T32	337696.4	226737.7	53 16 23.141 N	005 56 8.3577 W
T33	338232.2	226737.7	53 16 22.6396 N	005 55 39.4606 W
T34	338767.9	226737.7	53 16 22.1364 N	005 55 10.5691 W
T35	339303.6	226737.7	53 16 21.6312 N	005 54 41.6779 W
T36	337160.7	226196.7	53 16 6.1501 N	005 56 38.0892 W
T37	337750	226196.7	53 16 5.6008 N	005 56 6.31 W
T38	338339.3	226196.7	53 16 5.049 N	005 55 34.5312 W
T39	338875	226196.7	53 16 4.5456 N	005 55 5.643 W
T40	339410.7	226196.7	53 16 4.0399 N	005 54 36.7551 W
T41	337231.4	225655.7	53 15 48.5941 N	005 56 35.1162 W
T42	337857.1	225655.7	53 15 48.0105 N	005 56 1.378 W
T43	338446.4	225655.7	53 15 47.4585 N	005 55 29.6026 W
T44	338982.1	225655.7	53 15 46.9547 N	005 55 0.7181 W
T45	339517.9	225655.7	53 15 46.4487 N	005 54 31.828 W
T46	337214.3	225114.8	53 15 31.1229 N	005 56 36.8775 W
T47	337750	225114.8	53 15 30.6236 N	005 56 7.9954 W

Turbine ID	Easting	Northing	Latitude (Modified Airy)	Longitude (Modified Airy)
T48	338285.7	225114.8	53 15 30.1224 N	005 55 39.1136 W
T49	338821.4	225114.8	53 15 29.6192 N	005 55 10.2319 W
T50	339357.1	225114.8	53 15 29.114 N	005 54 41.3506 W
T51	337589.3	224573.8	53 15 13.2833 N	005 56 17.5009 W
T52	338125	224573.8	53 15 12.7828 N	005 55 48.6223 W
T53	338660.7	224573.8	53 15 12.2801 N	005 55 19.7439 W
T54	339196.4	224573.8	53 15 11.7757 N	005 54 50.8656 W
T55	339785.7	224573.8	53 15 11.2185 N	005 54 19.0982 W
T56	337642.9	224032.8	53 14 55.7431 N	005 56 15.453 W
T57	338178.6	224032.8	53 14 55.2423 N	005 55 46.5776 W
T58	338767.9	223983.6	53 14 53.0987 N	005 55 14.8905 W
T59	339303.6	223983.6	53 14 52.594 N	005 54 46.0159 W
T60	339892.9	223983.6	53 14 52.0364 N	005 54 14.2525 W
T61	337803.6	223491.8	53 14 38.1028 N	005 56 7.6331 W
T62	338339.3	223491.8	53 14 37.6015 N	005 55 38.761 W
T63	338928.6	223491.8	53 14 37.0479 N	005 55 7 W
T64	339464.3	223491.8	53 14 36.5427 N	005 54 38.1289 W
T65	339946.4	223491.8	53 14 36.0863 N	005 54 12.1464 W
T66	338107	222902	53 14 18.7513 N	005 55 52.2011 W
T67	338607	222902	53 14 18.2826 N	005 55 25.2565 W
T68	339107	222902	53 14 17.8123 N	005 54 58.3122 W
T69	339607	222902	53 14 17.3403 N	005 54 31.3681 W
T70	340107.1	222852.5	53 14 15.2661 N	005 54 4.4972 W
T71	338143	222386	53 14 02.0356 N	005 55 51.0659 W

Turbine ID	Easting	Northing	Latitude (Modified Airy)	Longitude (Modified Airy)
T72	338642	222360	53 14 00.7273 N	005 55 24.2188 W
T73	339142.9	222360.7	53 14 0.2787 N	005 54 57.228 W
T74	339678.6	222360.7	53 13 59.7727 N	005 54 28.3633 W
T75	340214.3	222360.7	53 13 59.265 N	005 53 59.499 W
T76	338375	221770	53 13 41.9034 N	005 55 39.5271 W
T77	338875	221819.7	53 13 43.0407 N	005 55 39.5271 W
T78	339410.7	221770.5	53 13 40.9453 N	005 54 43.727 W
T79	339946.4	221770.5	53 13 40.4386 N	005 54 14.8661 W
T80	338446.4	221377.1	53 13 29.1341 N	005 55 36.2941 W
T81	339035.7	221327.9	53 13 26.99 N	005 55 4.6248 W
T82	339517.9	221377.1	53 13 28.1258 N	005 54 38.5709 W
T83	340107.1	221377.1	53 13 27.5681 N	005 54 6.8303 W
T84	338553.6	220737.7	53 13 8.3622 N	005 55 31.5185 W
T85	339089.3	220737.7	53 13 7.8587 N	005 55 2.6633 W
T86	339625	220737.7	53 13 7.3533 N	005 54 33.8085 W
T87	340160.7	220737.7	53 13 6.8461 N	005 54 4.9539 W
T88	338500	220245.9	53 12 52.5128 N	005 55 35.1737 W
T89	339089.3	220196.7	53 12 50.3686 N	005 55 3.512 W
T90	339624.9	220196.7	53 12 49.8634 N	005 54 34.6657 W
T91	340160.7	220245.9	53 12 50.9467 N	005 54 5.7312 W
T92	338660.7	219606.6	53 12 31.6939 N	005 55 27.5181 W
T93	339196.4	219606.6	53 12 31.1902 N	005 54 58.6698 W
T94	339785.7	219606.6	53 12 30.6339 N	005 54 26.9354 W
T95	340321.4	219606.6	53 12 30.1262 N	005 53 58.0877 W

Turbine ID	Easting	Northing	Latitude (Modified Airy)	Longitude (Modified Airy)
T96	338660.7	219065.6	53 12 14.2036 N	005 55 28.3635 W
T97	339250	219065.6	53 12 13.6495 N	005 54 56.6324 W
T98	339785.7	219065.6	53 12 13.1438 N	005 54 27.7878 W
T99	340321.4	219065.6	53 12 12.6361 N	005 53 58.9433 W
T100	338500	218475.4	53 11 55.2734 N	005 55 37.9375 W
T101	339035.7	218524.6	53 11 56.3611 N	005 55 9.0189 W
T102	339571.4	218524.6	53 11 55.8563 N	005 54 40.1775 W
T103	340107.1	218524.6	53 11 55.3495 N	005 54 11.3361 W
T104	340696.4	218524.6	53 11 54.7897 N	005 53 39.6093 W
T105	338232.1	218032.8	53 11 41.2149 N	005 55 53.0502 W
T106	338821.4	218032.8	53 11 40.6628 N	005 55 21.3258 W
T107	339357.1	218032.8	53 11 40.1589 N	005 54 52.4871 W
T108	339946.4	218032.8	53 11 39.6022 N	005 54 20.7632 W
T109	340428.6	218032.8	53 11 39.145 N	005 53 54.8051 W
T110	338821.4	217491.8	53 11 23.1725 N	005 55 22.1715 W
T111	339357.1	217491.8	53 11 22.6687 N	005 54 53.3361 W
T112	339946.4	217442.6	53 11 20.5215 N	005 54 21.6933 W
T113	340482.1	217491.8	53 11 21.6042 N	005 53 52.7809 W
T114	338553.6	216901.7	53 11 4.3459 N	005 55 37.5071 W
T115	339089.3	216901.7	53 11 3.843 N	005 55 8.6751 W
T116	339625	216901.7	53 11 3.3383 N	005 54 39.8433 W
T117	340214.3	216901.7	53 11 2.781 N	005 54 8.1271 W
T118	340750	216901.7	53 11 2.272 N	005 53 39.2958 W
T119	338821.4	216360.7	53 10 46.6046 N	005 55 23.9389 W

Turbine ID	Easting	Northing	Latitude (Modified Airy)	Longitude (Modified Airy)
T120	339357.1	216409.8	53 10 47.6882 N	005 54 55.0333 W
T121	339892.9	216409.8	53 10 47.1825 N	005 54 26.1993 W
T122	340482.1	216360.7	53 10 45.0367 N	005 53 54.5694 W
T123	338982.1	215868.9	53 10 30.5538 N	005 55 16.06 W
T124	339517.9	215868.9	53 10 30.0495 N	005 54 47.2289 W
T125	340053.6	215868.9	53 10 29.5434 N	005 54 18.4036 W
T126	340589.3	215868.9	53 10 29.0354 N	005 53 49.5784 W
T127	338875	215327.9	53 10 13.1641 N	005 55 22.668 W
T128	339410.7	215327.9	53 10 12.6604 N	005 54 53.8457 W
T129	340000	215327.9	53 10 12.1041 N	005 54 22.1397 W
T130	340535.7	215327.9	53 10 11.5963 N	005 53 53.3177 W
T131	338982.1	214737.7	53 09 53.9826 N	005 55 17.8281 W
T132	339517.9	214737.7	53 09 53.4785 N	005 54 49 W
T133	340107.1	214737.7	53 09 52.922 N	005 54 17.3072 W
T134	340642.9	214737.7	53 09 52.4138 N	005 53 48.4835 W
T135	341178.6	214737.7	53 09 51.9037 N	005 53 19.6655 W
T136	339035.7	214196.7	53 09 36.4419 N	005 55 15.7901 W
T137	339571.4	214196.7	53 09 35.9377 N	005 54 46.9745 W
T138	340107.1	214196.7	53 09 35.4317 N	005 54 18.1593 W
T139	340642.9	214196.7	53 09 34.9237 N	005 53 49.3389 W
T140	341232.1	214196.7	53 09 34.3628 N	005 53 17.6464 W
T141	339035.7	213606.6	53 09 17.3641 N	005 55 16.7121 W
T142	339625	213606.6	53 09 16.8096 N	005 54 45.0174 W
T143	340160.7	213606.6	53 09 16.3035 N	005 54 16.2056 W

Turbine ID	Easting	Northing	Latitude (Modified Airy)	Longitude (Modified Airy)
T144	340696.4	213606.6	53 09 15.7954 N	005 53 47.3942 W
T145	341285.7	213606.6	53 09 15.2342 N	005 53 15.7002 W

Survey Personnel

Project Manager:	Mike Haberlin
Field Surveyors:	Colin Johnston Joanna Andrewsksa
Geophysicist:	Claire McCarthy
Marine Archaeologist:	Dan Atkinson
Autocad Technician:	Gary Curtin

Appendix 10: Archaeological Assessment Study Volume 2: Cable Route Side Scan Sonar and Magnetometer Survey

PN 18/08

Licence Number: 08R113

Prepared For:
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Enterprise House
Kerry Technology Park
Listowel Road
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Prepared By:
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Contents

Appendices

1. Introduction

Hydrographic Surveys Ltd were instructed by Saorgus Ltd to undertake an archaeological assessment of the Kish and Bray banks for the purposes of determining positions of proposed turbines with respect to a planned windfarm. The results for the Kish and Bray Banks were dealt with in a separate Report Volume titled: Kish and Bray Banks Archaeological Assessment Study, Side Scan Sonar and Magnetometer Survey (see Appendix 9 above for this report).

The proposed cable route from shore to the Kish and Bray banks is the subject of this report (Figure 20).

The application for use of detection devices was made to the DOEHLG on the 9th April 2008. The licence was granted to Hydrographic Surveys Ltd on the 9th June 2008.

Survey work for the cable route commenced on the 13th June 2008 and was completed by the 15th September 2008 (Appendix 10.2).

Figure 20 illustrates the proposed location of the cable route.

2. Methodology

A full list of equipment used is listed in Appendix 10.1.

Horizontal Control and Grid

Horizontal control was provided by Trimble Ag DGPS 132 unit using satellite broadcast corrections. The DGPS position was interfaced into the sidescan unit and into the magnetometer unit and also logged to the Hypack Survey software to provide real-time line guidance and a record of position. On-line transformation of WGS'84 Latitude and Longitude to Irish National Grid (ING) took place within the survey programme.

Side Scan Sonar Survey

The CMax CM2 dual frequency sidescan sonar was used to survey the area of interest. The sidescan sonar has a full complement of display, recording, editing, annotation, measurement, remote data entry and instant access replay facilities.

It has automatic microprocessor control of the gain profile. All records have been recorded digitally. Processing of the side scan records and production of mosaics were carried out using the Hypack Survey Software. Side scan survey line Kish2_june13 was processed in CMax Maxview software and position fixing for this line was taken from the survey track line acquired in Hypack 2008 format.

The towfish was deployed astern off the starboard side. The layback from the Antenna position was recorded for all survey lines and applied during processing of data. Survey lines were run in an East-West direction with range settings of 75 m, 100 m or 150 m per channel. Some crosslines were run in a north-west/south-east direction near the shoreline to facilitate data acquisition in the shallower water near the shore.

Magnetometer Survey

The Marine Magnetics SeaSpy magnetometer was used to record the magnetic signature data within the survey area. The SeaSpy systems are proton magnetometers that are enhanced by a unique quantum principle known as the Overhauser effect. The advantage over conventional proton magnetometers is that the SeaSpy can measure the magnetic field while polarizing, retain maximum sensitivity at sampling up to 1 Hz and deliver one or two orders of magnitude better precision. The SeaSpy does not produce heading error or have a dead zone.

The magnetometer was towed astern off the port side of the boat. The layback from the antenna position has been accounted for in the final interpretation of results. This was run in conjunction with the side scan sonar survey.

3. Results

The archaeological desktop study has been undertaken by Headland Archaeology Ltd. and all raw side scan and magnetometer data has been made available to Headland Archaeology Ltd for their assessment in accordance with the requirements of DOEHLG.

Side Scan Sonar Results

The side scan data is presented as a series of mosaics on the following charts:

HS: 59A-6/08 to HS:59A-7/08 (Figures 21-22).

A brief background on this area, as extracted from the Anglesey Sheet 1:250,000 series produced jointly by the British Geological Survey and the Geological Survey of Ireland, describes the Kish and Bray banks as the largest sand bank located off the East Coast of Ireland. It is approximately 18 km long and is characterised by a strongly asymmetrical cross-section with a steep east facing slope.

The seabed sediments comprising this bank are broadly classified as sand of medium to low acoustic reflectivity.

The following characteristics have been observed from the side scan records along the cable route collected by HSL during the course of this survey.

The proposed landfall locations were designated as Landfall A and Landfall B by Saorgus Energy Ltd. Landfall A is located at NGR 326353/221319 in the townland of Shanganagh, Co. Dublin and Landfall B is located at 326750/219407, in the townland of Ravanswell, Co. Wicklow north of Bray Harbour (Figure 4). The seabed east of Landfall A is characterised by coarse deposits with rock outcrops and boulders present close to the shore. The interpreted boundary between these coarse deposits and a relatively smooth seabed dominated by finer deposits has been marked on HS:59A-6/08 (Figure 21). The seabed closest to the shoreline near Landfall B appears smooth with some rock outcrops or potential targets. Coarse deposits are noted to the north-east.

The seabed appears relatively smooth and featureless where the proposed route divides with sandwaves occurring east of the divide. Wavelengths and heights of these vary ranging from 50-150 m long and 1–3 m high. Descriptive notes have been appended onto the side scan interpretation charts to give indications of the average heights observed.

Moving east towards the bank, the sandwaves decrease in size and the seabed in HS:59A-7/08 (Figure 22) is dominated by ripples in the northern section with smoother and more featureless seabed towards the south of the side scan records.

The bathymetric contours have also been included on these charts. The 5 m contours are 50–450 m apart indicating the seabed is generally gently sloping.

Magnetometer Results

The results of the magnetometer survey are presented in charts **HS: 59B-6/08** to **HS: 59B-7/08** (Figures 23-24) and are represented by colour coded numerical values. These values represent the total field measurement in nT (nanoTeslas). The paucity of data in some areas was due to adverse weather conditions during survey work.

In brief the values would appear to range from 48751 nT to 48895 nT over the entire cable route. There are some variations in the data collected in June and September 2008 due to varying magnetic signature at different times of year.

Towards the coastline, a range of >80 nT in the magnetometer readings can be found over short distances across the area. The change in magnetic signatures is likely to reflect the natural geology of the area.

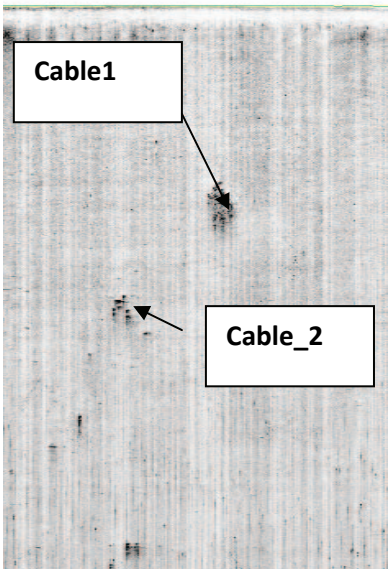
There were a total of 11 targets identified along the cable route that could be of potential archaeological significance. These targets are annotated onto both the side scan and magnetometer interpretation charts.

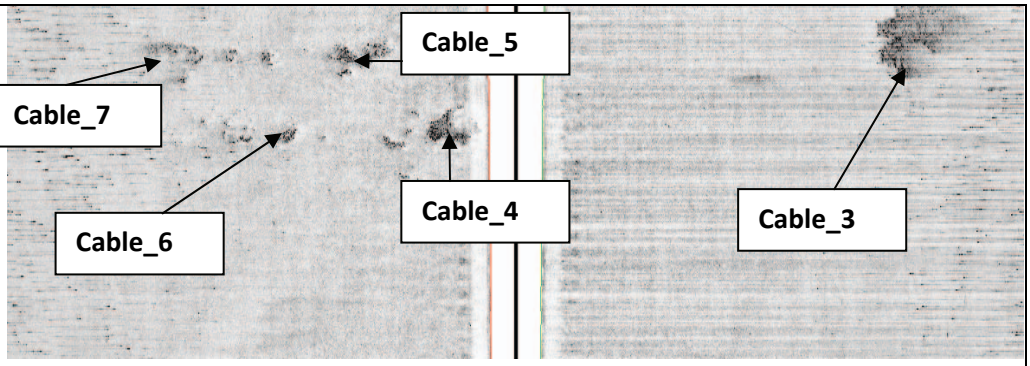
Table 1 lists these targets and gives information including grid position, image, and other descriptive information. It should be noted that no significant targets were identified on a section approximately 8.3 km long leading from the bank in a westwards direction.

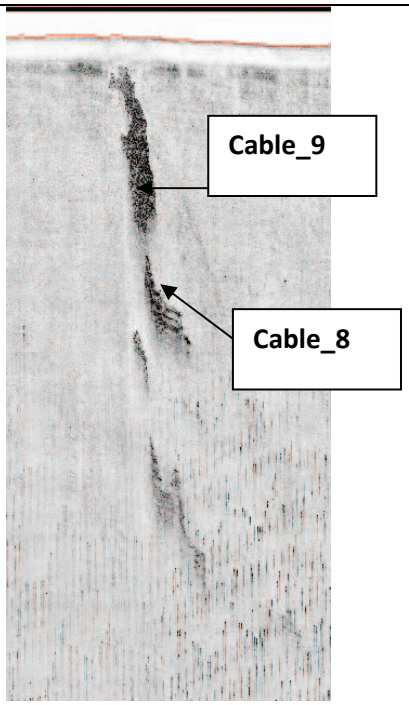
Appendix 10.2 contains a full list of these targets including the ING position, the WGS '84 latitudes and longitudes and Airy modified latitudes and longitudes.

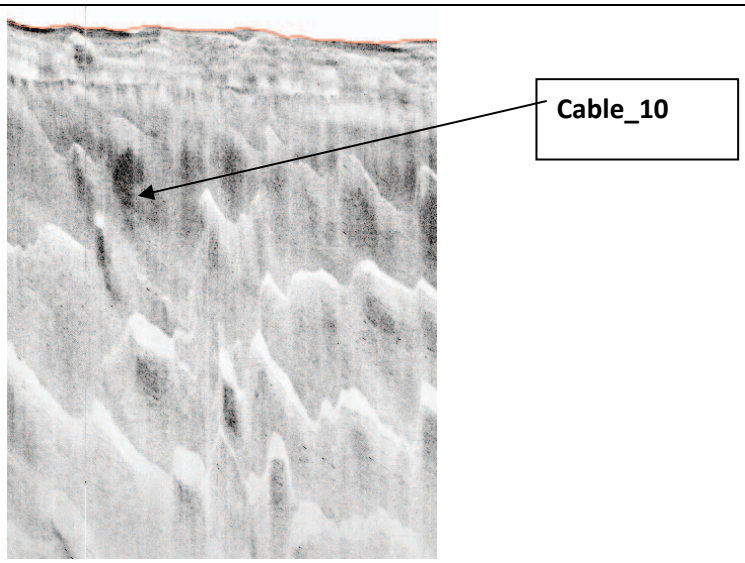
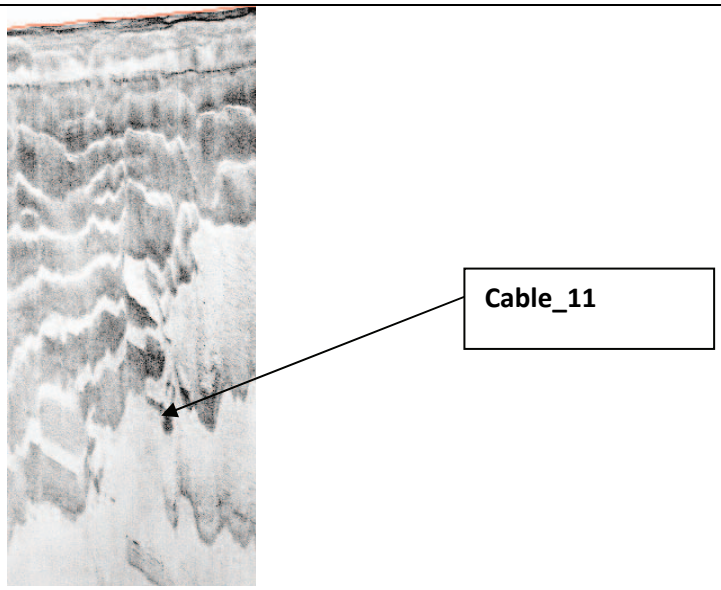
The survey track-lines are presented on charts **HS: 59C-6/08** to **HS: 59C-7/08** (Figures 25-26).

Table 1: Targets of Interest

Target Name	Description All water depths quoted are in Chart Datum.
Cable_1 Cable_2	 **Grid Position: Cable_1** 326983E 219774N **Cable_2** 326954E 219801N These two targets lie in approximately 2.1 m water depth. They are outside the range of the magnetometer survey. They lie on a featureless seabed and are over 120 m away from the proposed cable route.

Cable_3 **Cable_4** **Cable_5** **Cable_6** **Cable_7**	 **Cable_3 Grid Position:** 327128E 219526N **Cable_4 Grid Position:** 327167E 219605N **Cable_5 Grid Position:** 327200E 219595N **Cable_6 Grid Position:** 327188E 219633N **Cable_7 Grid Position:** 327225E 219613N **Cable_3** Dark area surrounded by otherwise light and smooth seabed. Magnetometer values at this location are not significant and are likely to reflect the characteristics of the natural geology in the area. **Cable_4 – Cable_7** This comprises of a cluster of small targets. These may represent natural rock outcrops. Water depths are 3.6–4.4 m C.D. in the vicinity. There are no significant changes in magnetometer readings in the vicinity.

Cable_8 **Cable_9**	 **Grid Position: Cable_8** 327140E 219488N **Cable_9** 327125E 219515N The water depths in the vicinity of Cable_8 and Cable_9 are 2.8–3.0 m. Cable_8 and Cable_9 are approximately 20 m and 28 m long respectively. They may represent a man made target or a natural features such as rock outcrops. There are no significant changes in magnetometer readings in the vicinity.

Cable_10	 **Grid Position:** 329765E 221145N Dark area located on a sandwave within 23.4–23.9 m C.D. water depths. Corresponding target located on 2 survey lines. There are no significant changes in magnetometer readings in vicinity.
Cable_11	 **Grid Position:** 331176E 221339N This target lies in approximately 18.2–19.8 m water depths surrounded by sandwaves. It is composed of a series of small targets that may be natural or represent discrete objects or debris. There are no significant changes in magnetometer readings in the vicinity.

Appendix 10.1: Equipment List

Equipment List and Technical Specifications

Side Scan Sonar The CMax CM2 dual frequency side scan sonar has a full complement of display, recording, editing, marking, annotation, measurement, remote data entry and instant access replay facilities.

It has automatic, microprocessor control of the gain profile.

All data is recorded digitally and can be processed through the CM2 Maxview programme and Hypack Hyscan Software.

The range setting for this project was set at 75 m, 100 m or 150 m per channel.

The towfish was deployed astern of the boat. Layback was accounted for in the presentation of data.

Magnetometer Marine Magnetics SeaSpy Magnetometer.

Magnetometer data processed through the Hypack Edit programme.

The magnetometer was towed astern. Layback was accounted for in the presentation of data.

Navigation Trimble AgDGPS 132. This unit provides sub-metre differential position accuracy.

The L-band satellite receiver uses a Trimble developed, sensitive design to provide coverage across the entire satellite footprint.

All charts are produced in Autocad Format.

Appendix 10.2: List of Target Positions in Irish National Grid, WGS'84 and Airy Modified Latitude and Longitude

Name	X	Y	Lat-WGS84	Lon-WGS84	Lat-Airy Modified	Lon-Airy Modified
Cable_1	326983	219774	53 12 48.5195 N	006 05 59.7179 W	53 12 47.6035 N	006 05 56.1978 W
Cable_2	326954	219801	53 12 49.4173 N	006 06 01.2411 W	53 12 48.5014 N	006 05 57.7212 W
Cable_3	327128	219526	53 12 40.3773 N	006 05 52.2641 W	53 12 39.4602 N	006 05 48.7432 W
Cable_4	327167	219605	53 12 42.8977 N	006 05 50.0506 W	53 12 41.9810 N	006 05 46.5293 W
Cable_5	327200	219595	53 12 42.5461 N	006 05 48.2877 W	53 12 41.6292 N	006 05 44.7663 W
Cable_6	327188	219633	53 12 43.7849 N	006 05 48.8795 W	53 12 42.8682 N	006 05 45.3581 W
Cable_7	327225	219613	53 12 43.1065 N	006 05 46.9156 W	53 12 42.1897 N	006 05 43.3939 W
Cable_8	327140	219488	53 12 39.1385 N	006 05 51.6723 W	53 12 38.2213 N	006 05 48.1513 W
Cable_9	327125	219515	53 12 40.0243 N	006 05 52.4414 W	53 12 39.1072 N	006 05 48.9205 W
Cable_10	329765	221145	53 13 30.4251 N	006 03 27.8874 W	53 13 29.5135 N	006 03 24.3474 W
Cable_11	331176	221339	53 13 35.4506 N	006 02 11.5914 W	53 13 34.5393 N	006 02 08.0417 W

All latitudes and longitudes are given in degrees, minutes and seconds

Survey Personnel

Project Manager:	Mike Haberlin
Field Surveyors:	Colin Johnston Joanna Andrewsksa
Geophysicists:	Claire McCarthy Rose Buckley
Marine Archaeologist:	Dan Atkinson
Autocad Technician:	Gary Curtin

Appendix 11: Archaeological Review of Side-Scan Sonar and Magnetometer Data to Identify Possible Targets of Cultural Heritage Interest

Dan Atkinson, Headland Archaeology (UK) Ltd

1. INTRODUCTION

This document presents the results of a review of side-scan sonar and magnetometer data provided by Hydrographic Surveys Ltd (HSL) on behalf of Saorgus Energy Ltd. in advance of a proposed offshore windfarm on the Kish and Bray banks in outer Dublin Bay. The survey data was produced in the first instance by HSL on behalf of Seorgus Energy Ltd. The details of the survey area, methodology and results are specified in the report produced by HSL (PN 18/08 Volume 1 and 2; Appendices 9 and 10 above).

The purpose of the data review is to identify any targets that may be deemed of cultural heritage interest within the survey area for the proposed wind farm; including the route of the cable connecting with the onshore sub-station facilities. Sites and features of Cultural Heritage interest are those that represent activities, features or objects that indicate human activity or the remains of such that survive within the archaeological record. This might include relict prehistoric landscapes and evidence of past human occupation and activity, or features, objects or artefacts that relate to past historic activity; for example all forms of maritime losses and their artefacts such as vessels and aircraft and the remains of maritime installations (eg. docks, harbours, breakwaters, piers and jetties).

Location of survey areas

The extent of the survey area within the proposed development is indicated in the Archaeological Assessment (O'Malley 2008; main report above) and the HSL report (PN 18/08; Appendices 9 and 10).

2. METHODOLOGY

The side-scan survey and magnetometer data was reviewed using C-Max and AQLog Edit Pro viewing software respectively. This data was cross-referenced with the findings of the Cultural Heritage Assessment (O'Malley 2008 above) and plans of the survey area illustrated in the report prepared by HSL (PN 18/08; Appendices 9 and 10 above). Targets identified as part of this review are prefixed with a **KB** for the survey of the banks and KC for the survey of the cable route. The targets are numbered following the last target number identified in the HSL reports (eg. **Kish 23** and **Cable_11**). For the purposes of this review those targets identified within a 100 m buffer around the survey area limits have also been included in the review.

3. RESULTS

The following presents the results of the review and analysis of the side-scan and magnetometer data.

Sea-bed type and conditions

The nature of the seabed within the proposed development comprises a mixture of sand and gravel, with sand pre-dominant on the Kish Bank in the north of the assessment area and gravels pre-dominant on the Bray Bank in the south of the assessment area. The shallow crest of the Kish and Bray Banks reveal evidence of systems of large sand waves (Wheeler *et al* 2001). The nature of the seabed along the route of the cable comprises sand and gravel with boulders and bedrock outcropping towards the in-shore section of the route.

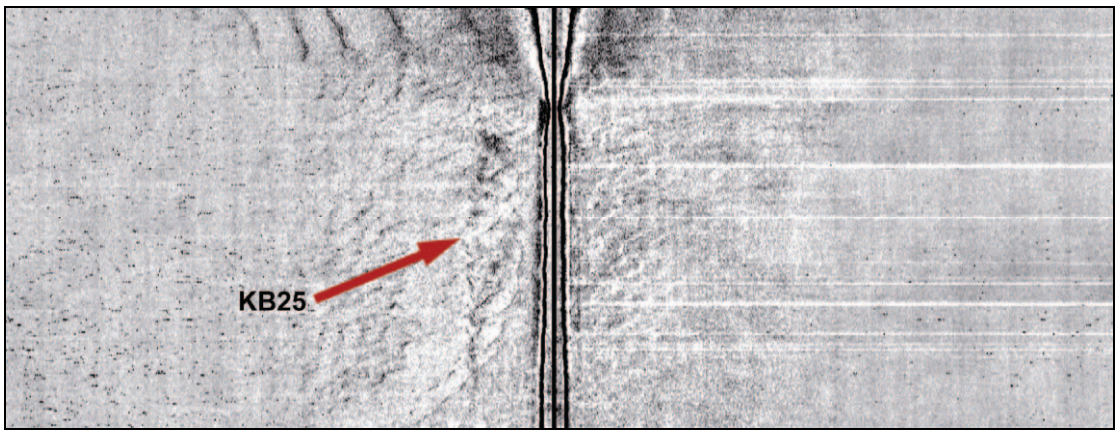
Targets identified within the main survey area

A total of 23 targets have been identified within the main survey area by HSL. These have been identified as **Kish1** and so on (see HSL report above). In addition, a further 9 possible targets were identified as part of this review, the results of which are presented in the table below.

Target ID	*Easting*	*Northing*	*Description*
KB24	336535	230140	Target is 100 m outside the survey area
KB25	337835 (position of	228970 Kish 3A)	Large linear spread
KB26	-	-	Target possibly associated with Kish 8 (known wreck WO1630)
KB27	-	-	Target possibly associated with Kish 8 (known wreck WO1630)
KB28	338375	226840	Possible object
KB29	337844	223465	Potential target
KB30			Possible objects
KB31	339852	224890	Potential objects (possible debris)
KB32	337551	224866	Potential targets x 2

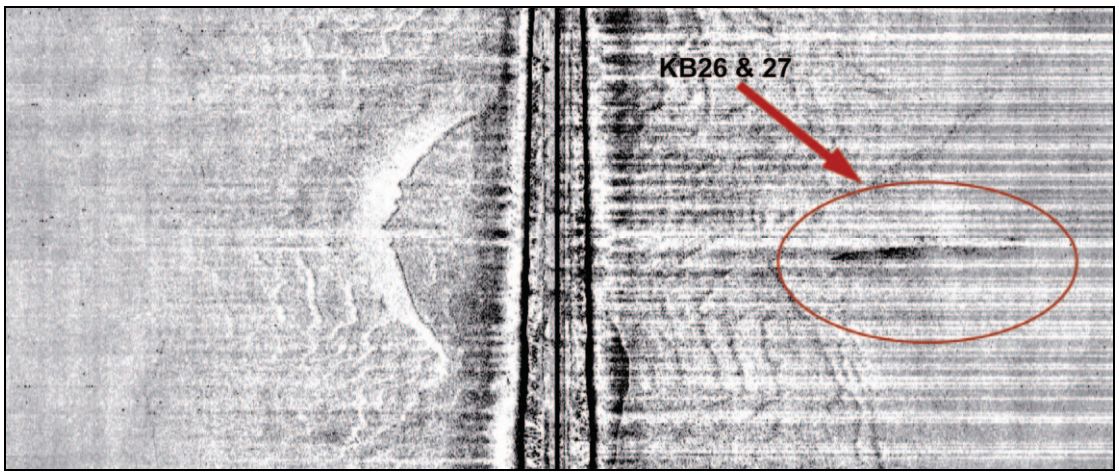
KB 25

This potential target represents a linear spread approximately 50 m long by 10 m wide with a possible linear extension roughly 25 m in length. The target is included within the 100 m exclusion zone in association with Kish 3A and Kish 3B as identified by HSL.



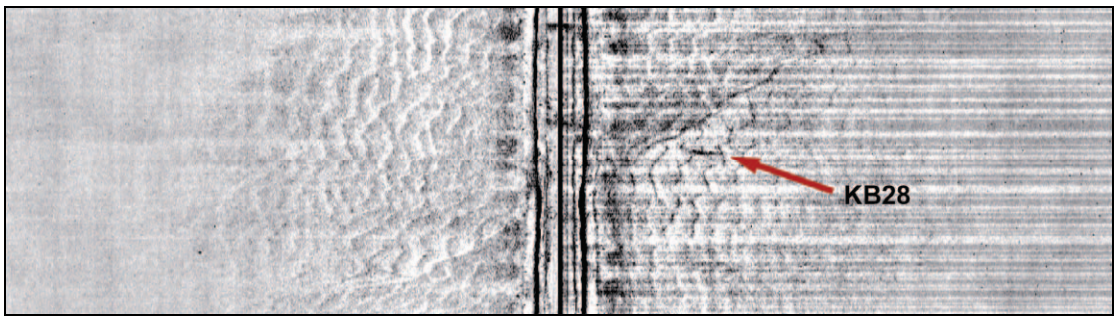
KB 26 & 27

These potential targets appear to represent objects that are possibly associated with Kish 8 as identified by HSL. KB 26 represents a linear spread approximately 40 m long by 5–10 m wide. KB 27 represents a possible object several meters long by no more than one meter wide. Kish 8 represents the known wreck WO1630. The targets are included within an exclusion zone established by HSL.



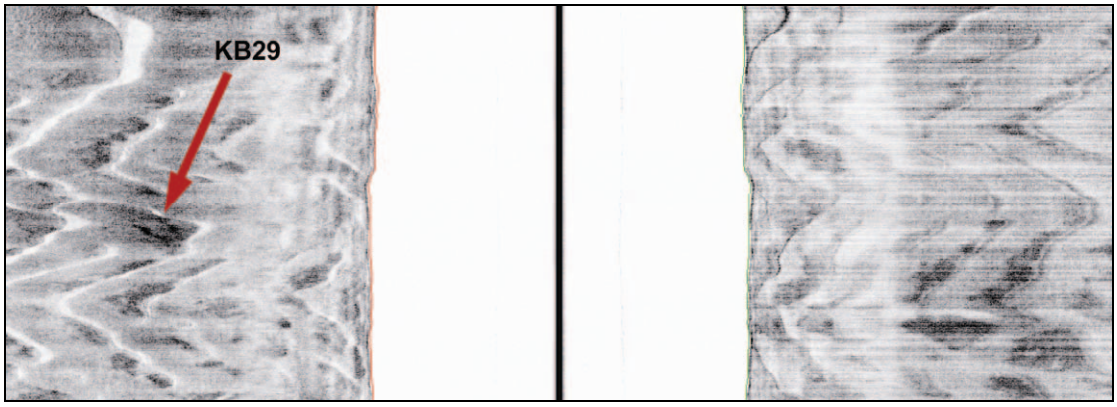
KB 28

This potential target represents a possible object approximately 10 m long by 1–2 m in width. This object is in close proximity to Kish 6 identified by HSL and the known wreck WO1594. This target falls within an exclusion zone established by HSL.



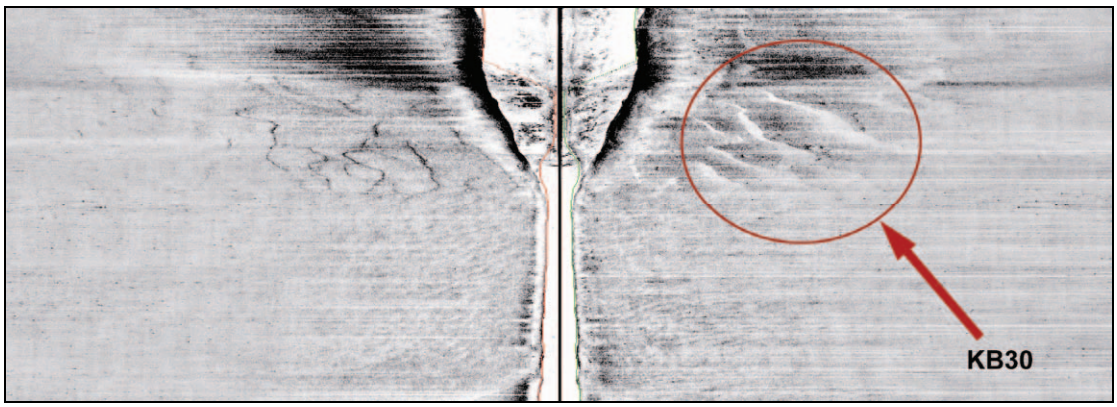
KB 29

This target represents a dark oval spread approximately 5–10 m long and 3–4 m in width. Although the target did not cause a reaction with the magnetometer the precautionary principle should be employed as a safeguard against possible impact on a feature of cultural heritage interest. This potential target may have an impact on the positioning of T94.



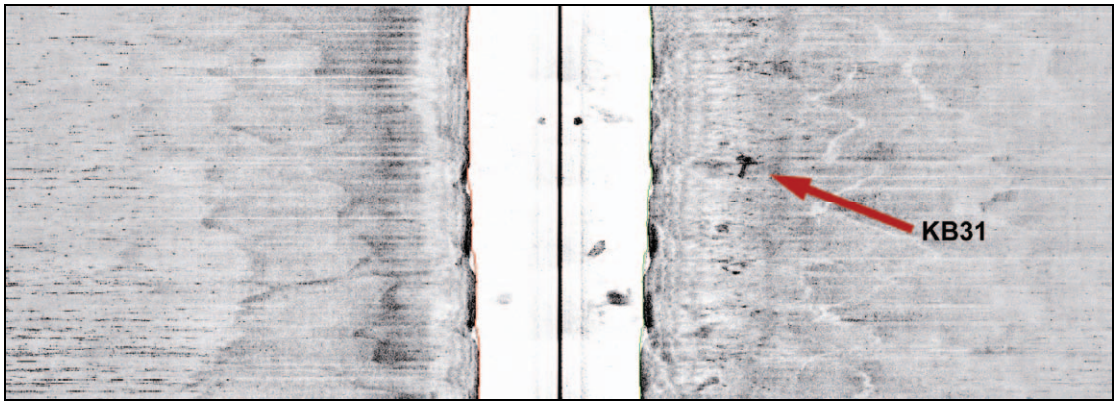
KB 30

These targets represent a number of possible objects located within an area approximately 60 m by 60 m. At least six objects were identified although there was no reaction with the magnetometer. Similar to KB29, the precautionary principle should be employed in this instance.



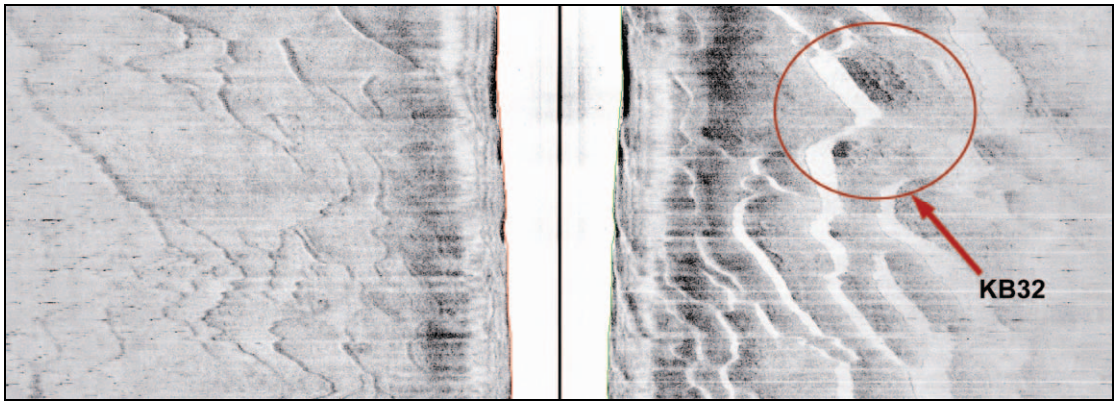
KB 31

The target identified as KB31 represents a possible object noted as a T-shape several meters in length. There was no signal on the magnetometer, although the precautionary principle should be employed in this instance.



KB 32

KB 32 represents two possible objects located within close proximity to one another. The first looks like a roughly circular object approximately 5–10 m in diameter; the second represents two parallel lines approximately 30 m long by 10 m wide.



Targets along the cable route

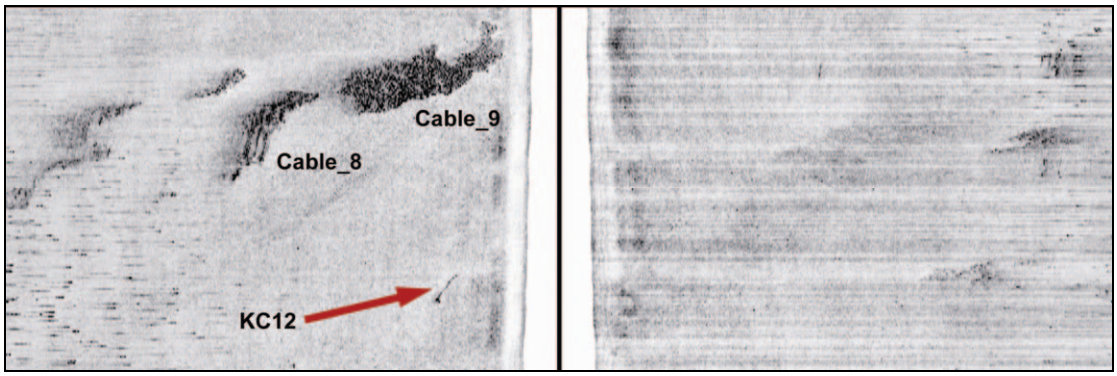
A total of 11 targets were identified by HSL. In addition, one further potential target was identified as part of this review, the results of which are presented in the table below.

Target ID	*Easting*	*Northing*	*Description*
KC12	327185	219519	Possible curvilinear feature

Targets Cable_3 to Cable_9 have been interpreted by HSL as dark areas that may represent natural anomalies such as bedrock outcropping, especially given the insignificant magnetometer readings. While the targets may not be indicative of more recent cultural heritage features, it is possible that the targets may represent the exposed remains of a relict submerged landscape, such as former soil profiles and/or peat deposits.

KC 12

This target represents a possible curvilinear object approximately several meters in length and may be associated with Cable_8 and Cable_9 located in close vicinity. The feature does not give a pronounced signal on the magnetometer and may represent a redundant mooring line and block, or alternatively may be a natural anomaly. The 'precautionary principle' should be applied in this instance.

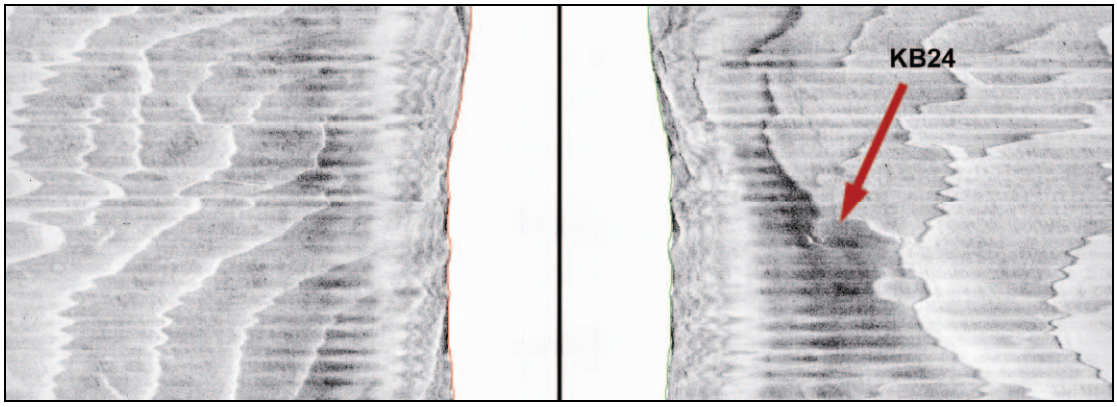


Targets outside the survey area

One potential target was identified within the 100 m buffer out-with the survey area.

KB 24

This target was identified approximately 100 m outside the survey area and represents a dark roughly oval spread approximately 30 m by 10 m. There also appears to be a possible object associated with the target. This has been included in the results in keeping with the 'precautionary principle' due to the proximity of the target to the survey area boundary.



4. DISCUSSION

The results of the data review have indicated the likely presence of features and groups of features of cultural heritage interest within the area of the proposed offshore wind farm and associated cable route. This is perhaps not surprising given the location of the site in the busy shipping lanes of the Irish Sea and the approaches to a long established harbour and safe haven utilised over many centuries.

The high level of known maritime losses in the area of the Kish and Bray Banks would lead to the recommendation that the 'precautionary principle' should be adopted to safeguard against any damage or loss to unrecorded cultural heritage assets. It is suggested that the potential for the discovery of unrecorded assets in this area is high.

The identification of targets of cultural heritage interest along the proposed cable route (Landfall B) also indicates the possibility for the discovery of unrecorded cultural heritage assets. The potential for the discovery of further features therefore is regarded as moderate. In addition, the suggestion that the target Cable-8, 9 may represent the remains of a relict early landscape is perhaps significant. Models indicating the possible nature of sea level change in the Irish Sea and the study area indicate that the inshore margins of the east coast may well have been dry land possibly as recent as 7500 BP (Shennan *et al* 2008; Flemming 2004; Wessex Archaeology 2006). The potential for the discovery of submerged archaeological remains dating to the prehistoric period is a possibility (possibly mid- to late Mesolithic). Perhaps one archaeological find of note was the discovery of a logboat discovered just offshore near Gormanstown further up the coast to the north of the study area. The remains were discovered during pipeline excavations for the IC2 Gaspipeline Interconnector: Scotland to Ireland in 2002 (Wessex Archaeology 2006). The targets may also indicate interesting paleo-environmental remains.

REFERENCES

Flemming I., 2004 *The scope of Strategic EnvironmentalAssessment of North Sea Area SEA5 in regard to prehistoric archaeological remains* Dept. of Trade and Industry report

Hydrographic Surveys Ltd., 2008 *Rosslare Europort Deepening. Volume2: Archaeological Assessment Study Side Scan Sonar and Magnetometer Survey PN_18/08* Client Report

O'Malley M., 2008 *Archaeological Assessment for Kish and Bray Banks Offshore Wind farm Development, Co. Dublin and Co. Wicklow* Headland Archaeology client report

Shennan *et al*, 2000 *Holocene Land – Ocean Interaction and Environmental change around the North Sea* Geological Society. London

Wheeler A.J, Walshe J, Sutton G.D, 2001 'Seabed mapping and seafloor processes in the Kish, Burford, Bray and Fraser Banks area, south-western Irish Sea' Irish Geography, Vol. 34(2), 194-211

Wessex Archaeology 2006 *Strategic Environmental Assessment, Irish Sea: Maritime Archaeology, SEA6* Dept. of Trade and Industry report

Appendix 12: Final Report on the Results of a Metal Detector Survey at Shanganagh, Co. Dublin and Ravenswell, Co. Wicklow

Author: Scott Harrison, Headland Archaeology (Ireland) Ltd

Surveyors: Scott Harrison and Greg Laban, Headland Archaeology (Ireland) Ltd

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Summary

Headland Archaeology Ltd conducted a metal detector survey in October 2008. The survey took place outside Bray, Co. Wicklow in the townlands of Shanganagh, Co. Dublin and Ravenswell, Co. Wicklow (Figure 1). The survey was intended to assess the extent of any potential sub-surface archaeology at two potential landfall sites for cabling associated with a proposed windfarm development on the Kish and Bray sandbanks approximately 12 km offshore. The purpose of the metal detector survey was to fulfill pre-planning obligations on behalf of Saorgus Energy Ltd.

The landfall locations were designated as Landfall A and Landfall B by Saorgus Energy Ltd. Landfall A is located at NGR 326353/221319 in the townland of Shanganagh, Co. Dublin and Landfall B is located at 326750/219407, in the townland of Ravenswell, Co. Wicklow.

The landfall locations have experienced severe erosion in the past, a process which is still ongoing. Both locations are also subject to a considerable amount of modern dumping, all of which has implications for the findings of the survey. The metal detector results are highly corrupted by modern debris, much of which was visible on the ground surface. With this in mind, it is clear that the presence and extent of any archaeological remains could not be assessed with any clarity. Independent of the metal detector survey results, the nature of the erosion of the cliff face implies that there is very little archaeological potential in the vicinity of the landfall locations.

Introduction

Headland Archaeology Ltd. conducted a metal detector survey in October 2008. The survey took place outside Bray, Co. Wicklow in the townlands of Shanganagh, Co. Dublin and Ravenswell, Co. Wicklow. The survey was intended to assess the extent of any potential sub-surface archaeology at two potential landfall sites for cabling associated with a proposed windfarm development the Kish and Bray sandbanks approximately 12 km offshore.

The survey, along with a Desk Based Assessment undertaken by Maura O'Malley of Headland Archaeology (see O'Malley 2008 above), was designed to assess the extent of any potential sub-surface archaeology at two proposed landfall sites for a proposed windfarm development. The combined document is intended to provide further information in support of an application for planning permission to construct an offshore windfarm and associated onshore landfall sites.

Saorgus Energy Ltd. contracted Hydrographic Surveys Ltd. to conduct pre-development offshore magnetometry of the Kish and Bray Banks, within the following licence limit constraints (in ING coordinates):

Kish Bank	**Bray Bank**
336866.55 222286.26	337979.15 222318.30
336637.80 230259.98	341316.93 222415.95
339970.01 230356.79	341591.29 213144.40
340204.34 222383.14	338247.03 213046.66
336866.55 222286.26	339797.15 222318.30

Hydrographic Surveys Ltd. contracted Headland Archaeology Ltd. to conduct a metal detector survey of the proposed landfall sites on the coastline. The landfall locations were designated as Landfall A and Landfall B by Saorgus Energy Ltd. Landfall A is located at NGR 326353/221319 in the townland of Shanganagh, Co. Dublin (Figure 12.1 and 12.3; Plates 12.6 and 12.7) and Landfall B is located at 326750/219407, in the townland of Ravenswell, Co. Wicklow (Figure 12.2 and 12.4).

Geography and Topography

Several local residents encountered while conducting the survey in Shanganagh stated that along much of the coastline, the Harcourt Street to Bray Railway had formerly followed the cliff edge until the lines closure in 1958. Following the line closure, a new line was built further inland, a position it still occupies today. Adjacent to Landfall A, the remains of the old line are still visible on the very edge of the cliff but are currently fenced off due to the risk of collapse. Here, the new line is some 400 m inland from the beach. In 1958 the maintenance of the granite embankments for the old line ceased causing much of it to fall in to disrepair. This is very apparent around Landfall B where granite blocks can be seen strewn along the beach front. The new line is located approximately 20 m to the west of Landfall B.

It is clear that this stretch of coastline has been subjected to rapid and extensive erosion which would have had a detrimental impact on any archaeology on or near the foreshore (Plate 12.8). The current foreshore area was, until very recently, some distance inland and between 10 m and 20 m below the ground surface. The exact rate of erosion is difficult to determine accurately but the present location of the old railway line in relation to the foreshore indicates the extent of the erosion. Also, Figures 12.1 and 12.2 show the extent of the erosion though the date the photograph was taken is unknown. As a result of this erosion the current coastline is “new”. The recovery of maritime artefacts deposited on the beach would be unlikely. Any archaeological material identified along this coastline is more likely to have originated inland.

The solid bedrock geology of both landfall sites is categorized as deep marine, slate, schist and minor greywacke. The quaternary or drift geology of Landfall A comprises glaciofluvial sands and gravels,

and tills, with gravels. The surface geology of Landfall B is limestone sands and gravels, and alluvial deposits (*Geological Survey of Ireland)*.

Adjacent to Landfall A the cliff face is heavily stratified and the distinct soil horizons are clearly visible in the face. The most clearly visible layer from the beach is the substratum composed of fine reddish brown silt. It is notable that this layer contains very few inclusions (less than 10% of the composition and no larger than 10 cm in size) and it is possible that the lack of any substantial aggregate material within this layer plays an important role in the speed at which the cliff face is aggraded. This layer is between 4-5 m deep and may possibly extend below sea level as no bedrock was observed at the base. A second substratum horizon is observed immediately above this and is composed of a similar silty material. Up to 65% of this layer is composed of rounded inclusions >30 cm in size and the interface both above and below this horizon is clearly visible.

The subsoil, which lies immediately above the substrata, is approximately 3-4 m in depth. It is of a uniform structure with a composition of approximately 15-20% small inclusions >5 cm. The remainder is predominantly sand but its height above ground level precluded any further investigation.

The topsoil (approximately 0.3 m deep) could not be investigated due to its height above sea level and therefore identification is based purely on its dark black hue derived from root zone activity and the decomposition of organic matter.

The location given for Landfall B is currently occupied by a wave break (Plate 12.1) constructed from large limestone boulders. This is to protect a complex of workshops and a storage compound on a leveled piece of land (Plate 12.2). The location is next to a gradually sloping area, the cliff face proper beginning 20 m to the north. The cliff face here contains a basal layer similar to the second substrata described above for Landfall A. The subsoil and topsoil are also present; however the topsoil and approximately 1-2 m of the subsoil are turbated. This was a recent action and evident in the presence of refuse, including plastics, rebar and concrete, within this horizon (Plate 12.3). It was likely to have been disturbed when the land was leveled for the construction of the DART line, only 20 m to the west. The DART began service in 1984 so it is possible that the consolidation happened then, however much of the DART utilises older lines so this is not certain.

It is clear that the land in the region of Landfall B has undergone a considerable amount of landscaping, however, Landfall B appeared largely unaffected by large scale human activity, at least at the substrata depths detailed above. It appears that the description of the quaternary deposits given by the Geological Survey of Ireland is accurate at Landfall B in so far as the substratum stratification may have been glaciofluvial in origin, *i.e.* caused by glacial meltwater, with the second substratum formed in the immediate post-glacial period.

Aims and Methodology

The objective of the metal detection survey was to assess the archaeological potential of the landfall locations by looking for metal find concentrations deposited on the beach and immediately inland. If

such concentrations were identified then an appropriate mitigation strategy would be suggested for any archaeology impacted by the landfalls for the windfarm development.

After consultation between Headland Archaeology Ltd. and Saorgus Energy Ltd. it was agreed that a metal detector survey of the beach front from the high water mark to 25 m inland would be sufficient in a corridor approximately 100 m long north/south and centered on the landfall location (Figures 12.1-12.4).

A Minelab Xterra 70 metal detector was used in 1 m sweeps to complete the survey. This is sufficient to identify any areas of potential finds. Metal detector hits were recorded using a differential GPS providing ± 1 cm accuracy and plotted within AutoCAD.

Unfortunately, the terrain prevented adherence to the proposed methodology because adjacent to landfall A the high water mark was against the cliff face (Figure 12.3). The corridor was widened to ensure that some of the beach front was surveyed. This did not affect the inland section and the survey proceeded as outlined. Adjacent to Landfall B, the beachfront survey began 250 m north of the proposed landfall and continued south until it reached the wave break detailed above and could not proceed (Figure 12.4). Inland, the surveyors found that the area was heavily vegetated and the survey could not proceed over much of the area (Plate 12.4). In addition, the level of modern refuse rendered the results invalid.

The survey was carried out to the highest professional standards as laid out in Geophysical Survey in Archaeological Field Evaluation, English Heritage Research and Professional Services Guideline No. 1 (2nd ed) (English Heritage 2008). This covers metal detecting specifically (*ibid*, 40) but also contains more general guidelines for the standards expected when employing any geophysical survey method (*ibid*, 3 -5).

Results

It is clear that Landfall B and its environs are heavily affected by modern refuse dumping (Plate 12.5). This is less of an issue at Landfall A where the practice is mostly limited to small-scale littering *i.e.* bottle tops, beer cans, etc.

Landfall A is heavily eroded exposing clearly defined stratification in the cliff face. Unfortunately the height of the cliff top above the beach level precluded detailed investigation, however upon visual inspection the area appeared to be archaeologically sterile. According to local sources the area was until very recently under tillage and was known locally as 'The Four Fields'. Recently (date unknown, but judging by the development of the trees, within the last ten years) the land has been purchased by Dublin County Council and converted into an amenity area with planted trees, viewing benches, a pathway and lawn. Immediately adjacent to the edge of the cliff are the remains of the old railway line.

The results from the amenity area show a spread of metal fairly evenly along the site with no obvious concentrations. On the beach front itself the northern extent does contain a slightly greater number of hits than the southern extent but the entrance to the beach front is immediately north of the survey. Therefore it is likely that concentrations of modern refuse will be higher in this area. It was apparent

at the time of the survey that the level of non-archaeological debris on the surface was much higher in the north.

Landfall B is much closer to Bray and was affected by several factors which render the metal detection of questionable validity. These were:

a) The quantity of beer cans, bottle tops and other debris resulting from frequent littering.

b) The level of dumping activity within the area. The beach here is easily accessible from a quiet road and within close proximity to Bray Town.

c) The debris (including plastic sheeting, rebar, rubble, etc.) incorporated within the upper strata of the eroding cliff in this area.

It seems likely that this area was leveled and consolidated to build the DART line and was probably used as a dumping ground prior to the consolidation of the land as debris was incorporated within the upper strata.

The selectivity of the metal detector was increased and a pattern designed to discriminate against ferrous and aluminum (the most common type of hit, with a hit rate in the region of one every 5 cm and undoubtedly caused by bottle tops and cans) was used to try and achieve meaningful results. There was a considerable quantity of hits in the area even with the selective settings and to differentiate between modern debris and archaeological material is impossible due to the dumping and leveling in this area. These factors, in conjunction with the erosion, mean that there are likely to be no undisturbed archaeological remains present.

Conclusion

As there is no stable beach front in either Landfall A or B the occurrence of artefacts is unlikely. The tides in this area seem to be eroding the cliff at an extreme rate with very little material being deposited by this activity. The nature of erosion and deposition in this area means that very little material of an archaeological nature would be found. The metal detector hits are most likely to be indicative of modern material either dumped directly or eroded from the rubble layer around Landfall B.

In terms of archaeological remains of a terrestrial nature, Landfall B is the product of leveling and depositional activities and therefore any archaeology present would most likely have been destroyed or seriously compromised by the building of the new DART line and the construction of the small industrial compound nearby.

The area around Landfall A is for the most part untouched by development, though if any archaeological remains were present they are likely to have been severely truncated by ploughing as the topsoil is relatively shallow. There is no evidence to suggest that there are any archaeological remains present.

The metal detection survey did not provide sufficient evidence for the presence of sub-surface archaeology in the vicinity of either landfall location. Several factors contributed to this conclusion. The topographical nature of the site made the deposition of any artefacts unlikely and the constant erosion of the cliff face is likely to have removed any artefacts that were deposited. Secondly, the presence of modern rubbish on the surface of both landfall locations and within the made-up ground in the vicinity of Landfall B adds considerably to the amount of background noise encountered. It is unlikely that there will be anything of an archaeological nature affected by Landfall A and while Landfall B may provide a more likely candidate for the survival of archaeological material, the anthropogenic pressures here are likely to have destroyed or severely truncated any remains.

References

English Heritage (2008) *Geophysical Survey in Archaeological Field Evaluation*, English Heritage Research and Professional Services Guideline No. 1 (2nd ed).

Geological Survey of Ireland (accessed 21 July 2008)

http://www.gis3.dcmnronline.ie/imf5104/imf.jsp?site=GSI_Simple

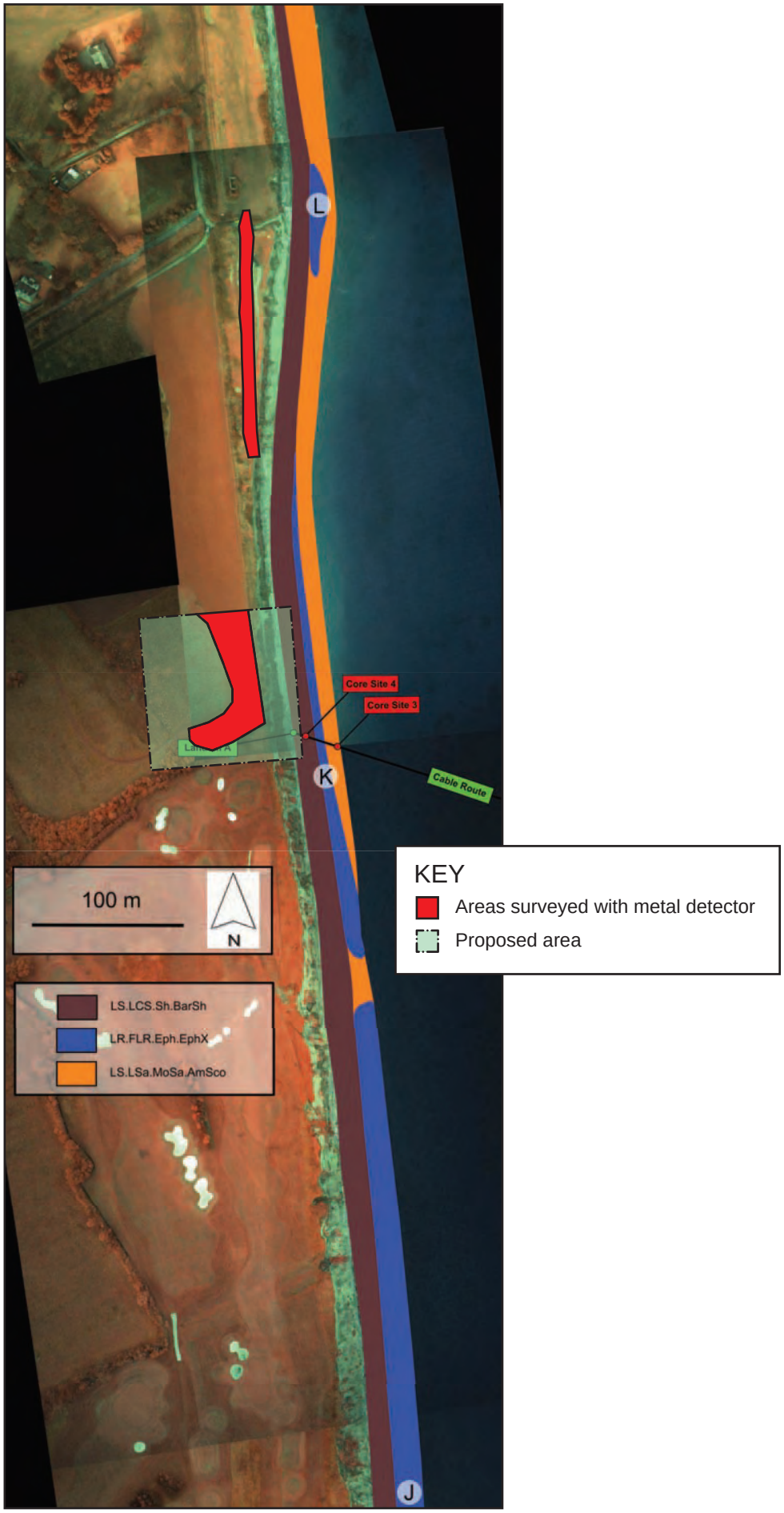


Figure 12.1 - The Kish and Bray Banks, Co. Dublin and Co. Wicklow: Location of surveyed areas at Landfall A, overlaid on client supplied aerial photographs.

Figure 12.2 - The Kish and Bray Banks, Co. Dublin and Co. Wicklow: Location of surveyed areas at Landfall B, overlaid on client supplied aerial photographs.

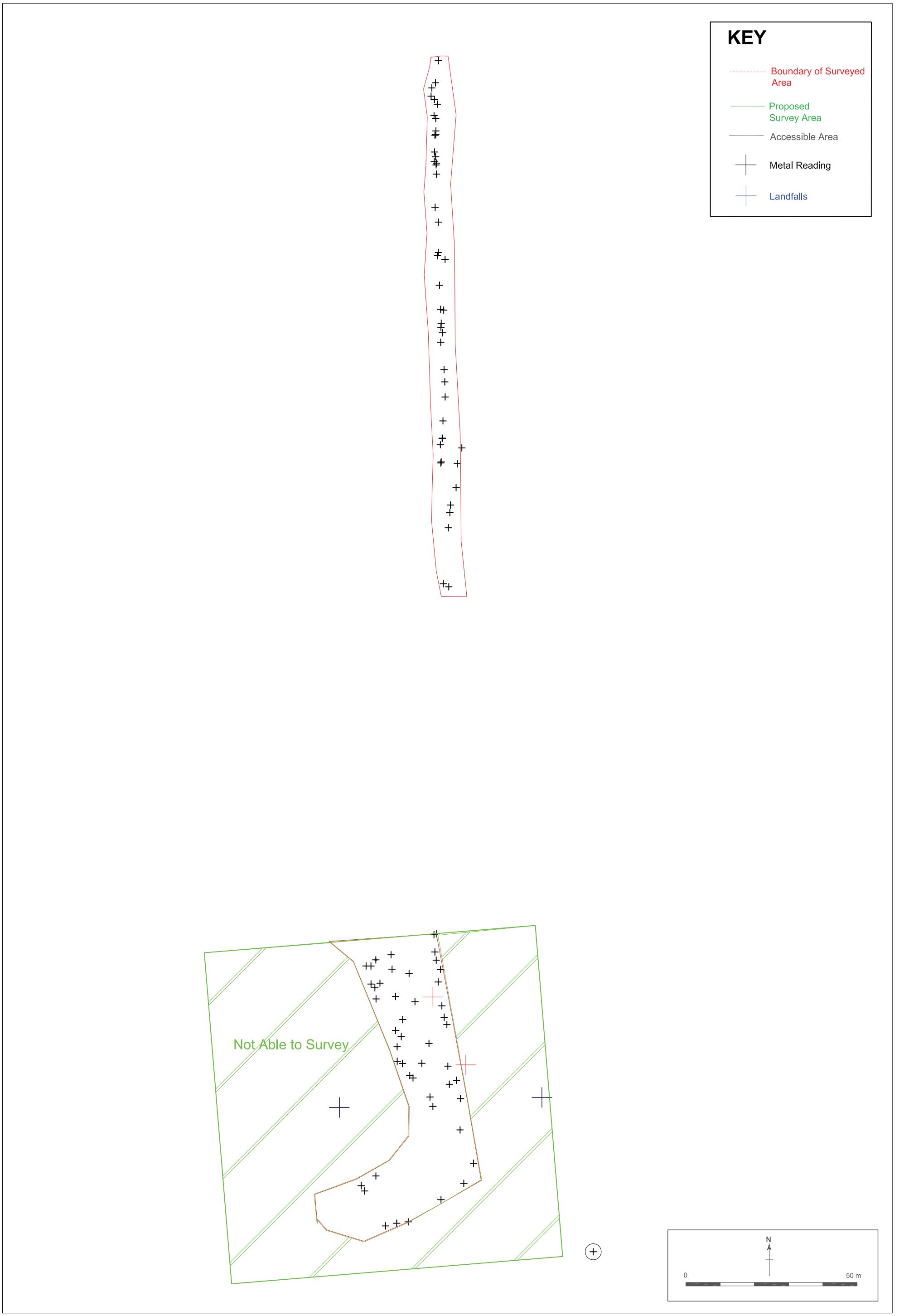


Figure 12.3 - Kish and Bray Banks, Co. Dublin and Co. Wicklow:
Location of surveyed areas at Landfall A

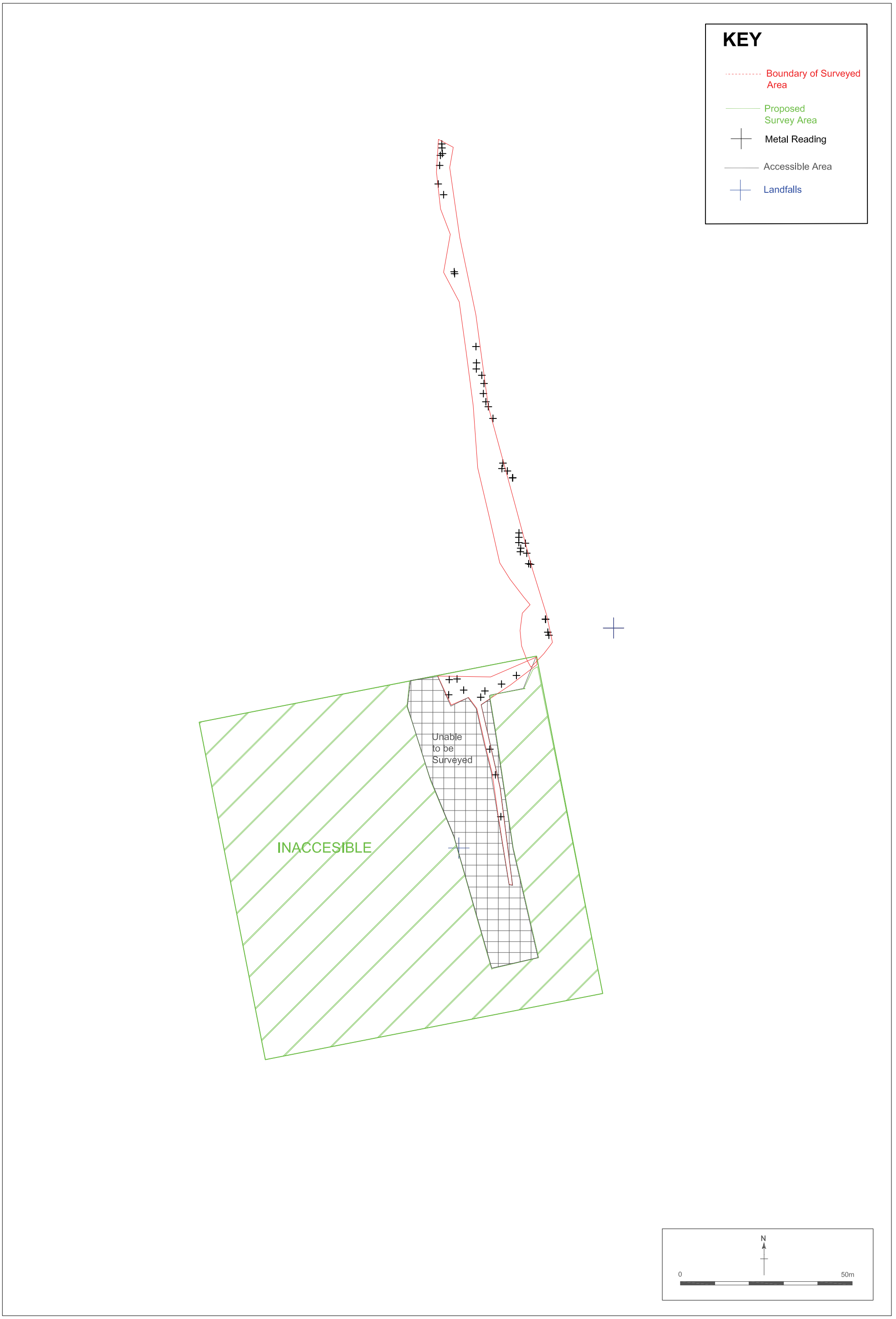


Figure 12.4 - Kish and Bray Banks, Co. Dublin and Co. Wicklow:
Location of surveyed areas at Landfall B

Plate 12.1 - Wave break protecting teh compound looking north towards Landfall B

Plate 12.2 - View from behind the compound lookin north up the beach from Landfall B

Plate 12.3 - View of consolodated ground with refuse inclusions and the remains of the embankment wall in the foreground, Landfall B

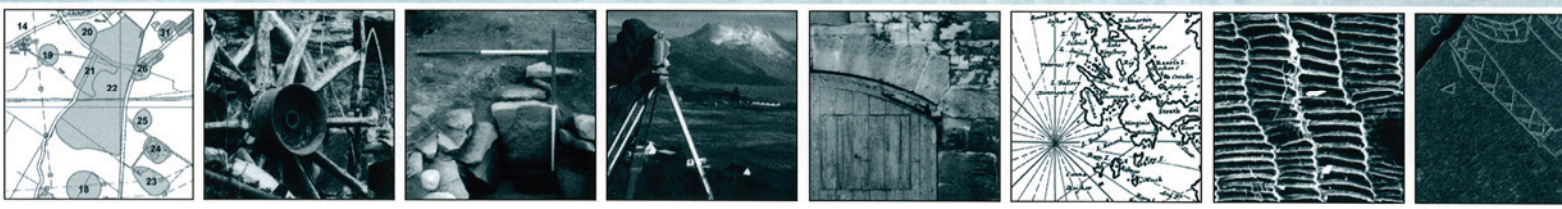
Plate 12.4 - Deep vegetation adjacent to landfall B looking northwest

Plate 12.5 - Photograph showing the degree of litter in the area surrounding Landfall B

Plate 12.6 - View northwards from the proposed location for Landfall

Plate 12.7 - View southwards from the proposed location for Landfall A

Plate 12.8 - View Southwards from immidiately below Landfall A showing cliff erosion



An Archaeological, Architectural and Cultural Heritage Impact Assessment of a Proposed Development Site Close to the Cable Landfall for Dublin Array

Client: Saorgus Energy

Planning Ref. No.: In advance of application for Wayleave permission

Author: Louise Baker

Headland Project Code: KBLS11

Date: September 2011

HEADLAND ARCHAEOLOGY Ltd

An Archaeological, Architectural and Cultural Heritage Impact Assessment of a Proposed Development Site Close to the Cable Landfall for Dublin Array

Client: Saorgus Energy

Planning Ref. No.: In advance of application for Wayleave permission

Author: Louise Baker

Headland Project Code: KBLS11

Date: September 2011

Reference Sheet for Planning Authority

Planning Ref. No.: In advance of application for Wayleave permission

National Grid Ref. (Irish Grid): 326032/ 221026

Townland/s: Cork Little, Shanganagh and Shankill

Town/ City: Dublin

County: Dublin (Dún Laoghaire-Rathdown)

OS 6" Sheet No.: DN026

Planning Authority: Dún Laoghaire-Rathdown County Council

Archaeological Contractor: Headland Archaeology (Ireland) Ltd

Relevant RMP No.: DU026-054001- to RMP DU026-054006-, RMP DU026-055001-, RMP DU026-055002-, RMP DU026-106----, RMP DU026-116---- and RMP DU026-120----

Reason for assessment: In advance of an application for Wayleave permission.

Summary: Please see Executive Summary

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Appendices

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Appendix 2 Methodology Used for Assessing Baseline Values of Sites, Magnitude of Impacts and Significance of Impacts

Appendix 3 Inventory of identified sites of cultural heritage significance and potential within study area

Appendix 4 Extracts from the Archaeological Survey of Ireland Archive Files

Appendix 5 Legislative framework

Appendix 6 Policies

Figures

Figure 1 Site location and RMP extract showing sites of cultural heritage significance.
Figure 2 Extract from First Edition 6″ OS map showing proposed cable route.
Figure 3 Extract from Second Edition 25″ OS map showing proposed cable route.
Figure 4 1995 Aerial photograph of site showing proposed cable route.
Figure 5 2000 Aerial photograph of site showing proposed cable route.
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Figure 7 Amended proposed cable route.

Executive Summary

The purpose of this report is to assess the importance and sensitivity of the known as well as the potential archaeological, architectural and cultural heritage environment of the proposed cable installation at Shanganagh Park, Shankill, Co. Dublin close to the cable landfall for the Dublin Array offshore windfarm, to identify the impact of the proposed development on this environment and to propose mitigation measures to reduce any impacts on said environment. An assessment was made of relevant and readily available literary and cartographic sources, and a visual inspection was made of the site.

The construction of the proposed development will potentially have a substantial impact on any sub-surface archaeological features or material at the site. Four previously unregistered upstanding features of archaeological significance were identified in the area which is proposed to be excavated for the cable. These are two townland boundaries, a disused rail line and a boundary associated with a demesne. The presence of further sites of cultural heritage interest in the surrounding area indicates that the area proposed for development is an area of archaeological potential.

Mitigation proposals which amend the proposed cable route are presented which allow two of the unregistered upstanding features of archaeological significance to be avoided. It is recommended that the excavation of the remaining two upstanding features is carried out under archaeological direction and a full record of the profile of the features is made. Reinstatement of the original morphology is recommended. It is proposed that a suitably qualified archaeologist carry out monitoring of all ground works associated with the proposed cable route. In the event that any archaeological features or deposits are identified, then the archaeologist will have to advise the National Monuments Service, Department of Arts, Heritage and the Gaeltacht and agree an appropriate mitigation strategy; this strategy may include a requirement for archaeological excavation or for preservation in *situ*.

Please note all recommendations are subject to the approval of the National Monuments Service, Department of Arts, Heritage and the Gaeltacht.

1. Introduction

This report details the archaeological, architectural and cultural heritage issues that need to be addressed in respect of a section of the onshore cable route for the Dublin Array, offshore wind farm project, which extends from the proposed cable landfall though Shanganagh Park, Shankill, Co. Dublin. This report was requested by the client as part of work being carried out in response to a further information request by the Department of the Environment, Community and Local Government for the foreshore lease application of Dublin Array.

1.1. Objective

This study aims to assess the baseline archaeological, architectural and cultural heritage environment, evaluate the likely significant impacts that the proposed development will have on this environment and provide mitigation measures, in accordance with the policies of the Department of Arts, Heritage and the Gaeltacht (DAHLG) and Dún Laoghaire-Rathdown County Council, the National Monuments Acts 1930-2004 and best practise guidelines, to ameliorate these impacts.

In order to provide a comprehensive assessment, an extensive desktop study in addition to a field inspection of the proposed development area was undertaken.

2. Proposed Development and Site Location

2.1. Proposed Development

The proposed development comprises groundworks associated with cable installation as part of the Dublin Array offshore windfarm. It is proposed that the cables are brought ashore by directional drilling under the beach to the east of Shanganagh Park with very limited disturbance to the beach and foreshore. The cable will extend west through Shanganagh Park to reach the R119 road (Figure 1). Directional drilling will also be carried out under the modern railway line which traverses the site.

2.2. Site Location

The site is located within the townlands of Shanganagh and Shankill located in the parish of Rathmichael, within the barony of Rathdown. Part of the cable route runs briefly along the townland boundary with Cork Little in the parish of Old Connaught within the Barony of

Rathdown. The site is within Shanganagh Park which is bounded by the coast to the east, the road R119 to the west, urban settlement of Shankill to the north and Shanganagh cemetery and Woodbrook golf course to the south.

3. Legislative and Policy Framework

3.1. Legislative Procedures

This assessment has been undertaken in accordance with the provisions of the following legislative procedures which are further detailed in Appendix 5.

- EIA Directive 85/337/EEC as amended by 97/11/EC and 2003/35/EC
- National Monuments Acts 1930-2004
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999
- Local Government (Planning and Development) Acts 2000-2001

3.2. Policies

This assessment was undertaken in accordance with policies set out in the Dún Laoghaire-Rathdown County Development Plan 2010-2016 (Appendix 6). The Woodbrook/ Shanganagh Local Area Plan 2006-2016 was also consulted.

4. Study Methodology

Details about the guidelines upon which this methodology is based and the terms and definitions used are provided in Appendix 1.

4.1. Study Area

The study area has been defined in respect of two factors: 1.) the ability of sites/information sources to provide information pertaining to the archaeological potential of the proposed development site, and 2.) the potential physical impact, as well as impact on setting, that the proposed scheme may have on sites of cultural heritage significance.

Taking these factors into account the study area has been defined as follows:

Subject	Study area
National Monuments and Recorded archaeological monuments (RMPs)	Within 1km of proposed development site
Protected Structures and/or their curtilage	Within approx. 500m proposed development site
Architectural Conservation Areas (ACAS)	Within approx. 500m proposed development site
Structures recorded in the NIAH	Within approx. 500m of proposed development site
Unregistered features of cultural heritage	Within approx. 100m of proposed development site
Townland boundaries	Within proposed development site
Areas of archaeological potential	Within approx. 100m of proposed development site
Previous Excavations	Within townlands encompassed by and adjacent to the proposed development site including Cork Little, Shanganagh and Shankill
Topographical files	Within respective townlands incorporated by and adjacent to the proposed development site including Cork Little, Shanganagh and Shankill

Table 4.1 Dimensions of Study Area

4.2. Desktop Study Methodology

The present assessment of the archaeological, architectural and cultural heritage of the proposed development area is based on a desktop study of a number of documentary and cartographic sources. The desktop study was further augmented by an examination of aerial photography as well as a field survey. The main sources consulted in completing the desktop study are listed here.

- Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP)
- Archaeological Survey of Ireland Archive Files
- National Inventory of Architectural Heritage
- Dún Laoghaire-Rathdown County Development Plan 2010-2016
- Woodbrook/Shanganagh Local Area Plan 2006-2016.
- National Museum of Ireland (NMI) Topographical Files

- Excavations Bulletin
- Aerial Photographs
- Cartographic Sources
- Ordnance Survey Namebooks and Letters

4.3. Field Inspection Methodology

A field inspection of the proposed development site was undertaken by Headland Archaeology (Ireland) Ltd on 19 September 2011.

The primary purpose of a field inspection is to assess local topography in order to identify any potential low-visibility archaeological and/or historical sites that are not currently recorded and which may be impacted upon negatively by the proposed development. It is also the purpose of the field inspection to survey any known monuments or sites and to consider the relationship between them and the surrounding landscape, all of which need to be considered during the assessment.

The methodology used during the field inspection involved recording the present land use as well as the existing topography for the entire area comprising the proposed development site. A photographic record and written description were compiled for any known and/or potential sites of archaeological, architectural and/or cultural significance. In addition, a GPS (Global Positioning System) waypoint was taken for each identified site of said significance.

5. Study Results Detailing Archaeology/Baseline Environment

A description of the proposed development site and a summary of the baseline environment are provided here in Section 5.1 and Section 5.2 respectively. Following on from this, the baseline environment has been sub-divided into four categories, each of which is addressed individually below in Sections 5.3 – 5.6 inclusive. These are as follows:

(i) Designated Archaeological Sites

(ii) Designated Architectural Sites

(iii) Undesignated Cultural Heritage Sites

(iv) Areas of Archaeological Potential

An inventory detailing each identified feature of cultural heritage significance and/or potential within the study area is provided in Appendix 3.

5.1. Summary of Receiving Environment

The receiving environment of the proposed development is a coastal plain which forms part of the green belt area around Dublin between the urban settlements of Shankill and Bray. At the east of the area is a pebble and shingle beach which leads to steep cliffs of up to approximately 10 m height. The land to the west of the cliffs is fairly level with gradual slopes up to around 15 m OD. Most of the land is under recreational use as grass parkland with some areas of trees and playing fields and is zoned as such in the county development plan. The grounds surrounding the 18th century Shanganagh Castle, which are zoned for housing development, are located to the north-west of the area. To the south-west is Shanganagh cemetery and to the south-east is Woodbrook Golf Course.

5.1.1. Past Impacts on Site

Most of the site remains undeveloped with field boundaries persisting since the first edition Ordnance Survey map was surveyed in 1837. Significant construction undertaken during the urbanisation of the adjacent area of Shankill to the north will have had an effect on cultural heritage in this area. The use of the land to the south for Shanganagh cemetery and development of both the historic Dublin and Southeastern railway and the modern DART rail-line within the proposed development site will have had a direct impact on any subsurface archaeology. Coastal erosion is active at the east of the area.

5.2. Summary of the Baseline Environment

Site Type	Summary
RMPs/ National Monuments/ Sites with Preservation Orders/ Sites listed in the Register of Historic Monuments	There are 11 recorded archaeological monuments in the RMP incorporated by the study area, one of which is also a protected structure. There is one further recorded archaeological monument which does not have a precise location but is recorded within Shanganagh townland. Of the monuments with known locations, none are located within the proposed development site. None of these RMPs are National Monuments and none have Preservation Orders placed on them.
Protected Structures	There are 8 Protected Structures incorporated by the study area, one of which is also a recorded archaeological monument in the

Site Type	Summary
	RMP. Of these, none are located with the proposed development site.
Architectural Conservation Areas (ACAs)	There are no Architectural Conservation Areas incorporated by the study area.
Sites Listed in the NIAH	There is no published NIAH for this area.
Unregistered Cultural Heritage Sites	There are four unregistered cultural heritage sites incorporated by the study area.
Areas/features of archaeological potential	There is one area/feature of archaeological potential incorporated by the study area.

Table 5.2 Summary of baseline environment

5.3. Designated Archaeological Monuments

5.3.1. Record of Monuments and Places (RMPs)

Section 12 (1) of the National Monuments Act 1994 made provision the establishment and maintenance of a Record of Monuments & Places (RMP). Under this Act, each site recorded in the Record of Monuments and Places is granted statutory protection. When the owner or occupier of a property, or any other person proposes to carry out, or to cause, or to permit the carrying out of any work at or in relation to a recorded archaeological monument they are required to give notice in writing to the Minister of the Environment, Heritage and Local Government 2 months before commencing that work.

There are 11 recorded archaeological monuments incorporated by the study area (please refer to Section 4.2: Study Area) and one archaeological monument of unknown location within the townland of Shanganagh.

The earliest evidence for human activity represented by these monuments dates from the Bronze Age. This is in the form of a fulacht fiadh site (CH 10), which was excavated in advance of a housing development around 1990 to the north-east of the proposed cable route. The remains of two fulachta fiadh were excavated but no report was submitted to the database of excavation reports and so no additional information about this site is known. These excavations also recovered deer bones from within a rectangular enclosure. This lay to the west of the fulacht fiadh site was identified from aerial photographs as surrounding the church site (CH 1). The material recovered was consistent with an ecclesiastical foundation.

The church site comprises the upstanding remains of the stone church (CH 1) reputed to have been established by St. Tucha; it is mentioned in the papal bull of 1179. Low masonry walls of three sides of a rectangular building survive to a height of 0.65m. Associated with this church is a graveyard (CH 2), of which there are no upstanding remains, a stone cross base (CH 3), two stone crosses (CH 4 and CH 6) and a further building (CH 5).

There is little information available about the isolated burial in the townland of Old Connacht (CH 12) and this could date from any period from prehistory onwards.

The remaining monuments date from the post-medieval period. The upstanding building of Shanganagh Castle (CH 11) was constructed in the 1760s, although this replaced an earlier ruinous tower. This earlier structure could date to the late medieval period, possibly a towerhouse, however the evidence for this is entirely anecdotal. The present building has additions which were constructed in modern times. The grounds associated with the castle retain many landscape features shown on Ordnance Survey maps and some of these were noted in the field survey.

On the coast to the north of the proposed cable route is the site of a Martello Tower (CH 7) and defensive redoubt (CH 8). Neither of these monuments remains upstanding and both are likely to have been removed by coastal erosion. A water mill (CH 9) recorded on the Down Survey was located in the townland of Shanganagh. No precise location for this monument is known and there is no other information about it. Further details about the monuments can be found in Appendix 4.

5.4. Designated Architectural Heritage Sites

5.4.1 Record of Protected Structures

The Dún Laoghaire-Rathdown County Development Plan (2010-2016) was consulted for schedules of Protected Structures. These are buildings that a planning authority considers to be of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social, and/or technical point of view. Protected Structures receive statutory protection from injury or demolition under Section 57 (1) of the Local Government (Planning and Development) Act 2000. Protected structure status does not exclude development or alteration but requires the developer to consult with the relevant planning authority to ensure that elements which make the structure significant are not lost during development.

There are eight Protected Structures within the study area (please refer to Section 4.2: Study Area). These include Shanganagh Castle (CH 11) which is also recorded on the RMP. In the Record of Protected Structures it is noted as a 'house, castle and gate lodge'. The former gate lodge of Shanganagh Castle is noted in the Record of Protected Structures as Crinken Cottage (CH 17). This building is located to the north of the present gate lodge. A further four houses are listed in the Record of Protected Structures. These are Beauchamp House (CH 13), Askefield House (CH 14), Rosedale House (CH 18) and Locksley (CH 19). Saint James's Church along with its railings and gates (CH 15) and the building of Shanganagh Marble and Stone Centre (formerly Hackett Memorial Hall) along with its railings and gates and a granite milestone (CH 16) are also included in the Record of Protected Structures.

5.5. Undesignated Cultural Heritage Sites

This section deals with sites that are considered to be of cultural heritage value but which do not fall within the above categories as they are not registered. Such sites may include lime kilns, dwellings/outhouses, trackways or townland boundaries etc identifiable on the First Edition 6"/25" OS maps (Figure 2) or noted during the field visit.

There are four unregistered cultural heritage site located within the study area (please refer to Section 4.2: Study Area). Elements of the designed landscape (CH 20) surrounding Shanganagh Castle which are on the first edition Ordnance Survey map (Figure 2) are still present. These include a boundary which is between what is now Shanganagh Park and the area to the west of Shanganagh Castle (see Section 5.2.6 below). Areas of trees, including a circular copse to the west of Shanganagh Castle, which were part of the designed landscape are indicated on the first edition Ordnance Survey map. Some of these have been incorporated into modern planted areas (Figures 4 to 6).

The initial 180 m long section of the cable route runs along the line of a part of the townland boundary between Shanganagh and Cork Little (CH 21) which is currently formed by field-boundaries). The cable route also passes across the townland boundary between Shankill and Shanganagh (CH 22).

The remains of the disused rail line of the Dublin and South Eastern Railway (CH 23) is upstanding in two fields adjacent to the route of the proposed cable. This is indicated on the

second edition Ordnance Survey map (Figure 3) and can also be seen on aerial photographs (Figures 4 to 6). It was also observed during the field survey.

5.6. Areas of Archaeological Potential

There is one area of archaeological potential within the study area. The route corridor of the proposed cable is considered to be an area of archaeological potential (CH 24). It is located wholly within the demesne lands of Shanganagh Castle, an 18th century estate, potentially with medieval origins (see above). The cable route intersects with the original route of the Dublin and South Eastern Railway (a significant industrial heritage feature) and the known archaeological sites within the study area point to settlement in the area from at least the Bronze Age.

The criteria which were applied during this study to help to identify individual low-visibility, unrecorded archaeological sites and the sites which were identified during this process are provided in the following sections.

5.6.1 Aerial photography

One process by which the archaeological potential of a site can be assessed is through the examination of aerial photography. Aerial photographs from 1995, 2000 and 2005 at http://maps.osi.ie/publicviewer were examined in order to identify any previously unrecorded archaeological sites indicated by crop marks, soil differentiations and/or patterns of field boundaries (Figures 4 to 6).

As noted in Section 5.5 the line of the Dublin and South Eastern Railway, indicated on the second edition Ordnance Survey maps adjacent to the coastline, was observed on the aerial photographs. Designed landscape features, such as copses of trees, associated with Shanganagh Castle were also observed on aerial photographs. No further features of potential archaeological significance were noted within the study area (please refer to Section 4.2: Study Area).

5.6.2. Features of Archaeological Potential Identified During the Field Survey

During the field survey of the study area (please refer to Section 4.2: Study Area), two features of archaeological potential were identified which are detailed in Appendix 3. These include designed landscape features, such as copses of trees, associated with Shanganagh Castle (CH 20). The proposed route of the cable follows the south boundary of the area around the castle. This boundary has persisted since the first edition Ordnance Survey map was surveyed and may have an earlier origin. During the field survey it was observed that the hedgerow which forms this boundary has a ditch up to 1.5m wide and 1.5m deep running parallel to its south side. This could be associated with a designed landscape.

Also observed was the line of the disused Dublin and South Eastern Railway (CH 23) which is on the second edition Ordnance Survey map (Figure 3). The disused railway was observed as an earthen bank approximately 3m wide by 1.5m high. The disused railway extends beyond the study area to the north and south and extensive sections have been removed through coastal erosion.

5.6.3. Toponomy and Associated Cartographic Evidence Relating to Townlands

A search was undertaken to establish if any of the archaeological features from which a particular townland appears to have taken its name, are identifiable on historic cartographic sources. For instance, the inclusion of the term 'Killeen' (meaning 'little church' or 'children's burial ground') in the townland name 'Killeendaniel' would imply that a graveyard site is present within the townland. If evidence for this graveyard is not identifiable on accessible historic mapping then there is potential for this feature to be present within the proposed development site. A list of the townlands where there is potential for unrecorded archaeological sites, the nature of which is implied by the toponomy of the respective townland, is provided in the following table:

Townland Name	Discussion
Shankill	The townland name Shankill is derived from the Irish 'seanchill' meaning old church. This refers to the church of the same name; a foundation referred to in various early medieval sources, which subsequently became the focus for the archiepiscopal manor of Shankill in the later medieval period. Its exact location is unknown, but believed to lie close to the medieval tower house in Shankill over 1.5 km from the

Townland Name	Discussion
	proposed development.
Cork Little	The townland name Cork is derived from the Irish 'corcaigh' meaning marsh.

Table 5.6.3 Townland cartographic/toponomy evidence

6. Impact on Baseline Environment prior to Implementation of Mitigation Measures

This section assesses the likely significant impacts that the proposed scheme will have on the baseline environment prior to mitigation measures. The methodology used in ascertaining the baseline value of sites, the type, magnitude and significance level of impacts is set out in Appendix 2.

Mitigation measures to ameliorate these impacts and the residual impact that the proposed scheme will have on each site of cultural heritage significance and/or potential are provided in Section 7 and 8 below.

6.1. Direct impacts

Excavation of the proposed cable trench will require the partial truncation of two townland boundaries (CH21 and 22), as well as the alignment of the original railway cutting of the Dublin and South Eastern Railway (CH 23).

At least one section of the cable route is aligned within a substantial boundary ditch which may be a historic landscape feature within the demesne landscape of Shanganagh Castle (CH 20); excavation of this section of the cable would substantially alter this feature.

As the proposed cable route constitutes an area of archaeological potential (CH 24), there is the possibility that excavation of the proposed cable trench could uncover previously unknown sub-surface archaeological features.

CH No.	Impact Type	Description of Impact	Magnitude of impact prior to implementation of mitigation measures	Baseline Value	Significance level of impact prior to implementation of mitigation measures
21	Direct	Removal of 180 m long section of townland boundary between Shanganagh and Cork Little	Major	Medium/ High	Moderate
22	Direct	Transection of townland boundary between Shanganagh and Shankill	Major	Medium/ High	Moderate
23	Direct	Transection of Dublin and South Eastern Railway Line	Major	High	Significant
20	Direct	Removal or disruption of 500 m long section of demesne/designed landscape ditch feature	Major	Medium/ High	Moderate
24	Direct	Excavation of cable trench within area of archaeological potential	Major	Medium/ High	Moderate

Table 6.1 – Magnitude of Impacts

6.2. Indirect Impacts

The indirect impacts, such as deposition of spoil and visual impact on the known cultural heritage sites within the study area will be moderate and short in duration, as they will be restricted to the construction phase of the project only. No long-term or permanent indirect impacts on Cultural Heritage sites or features are likely as result of the proposed development.

7. Mitigation Measures

The mitigation strategies outlined in this section detail the techniques to be adopted in order to ameliorate the impacts that the proposed development may have on features of archaeological, architectural and/or cultural heritage within the study area. The residual impacts that will remain once these mitigation measures have been implemented are identified in Section 8 further on.

The following mitigation measures proposed are subject to approval by the National Monuments Service, Department of Arts, Heritage and the Gaeltacht.

The route of the proposed cable should be adjusted to follow the amended proposed cable route (Figure 7) so as to avoid the section of ditch which forms the townland boundary between Shanganagh and Cork Little (CH 21) and also to avoid the demesne/designed landscape ditch to the south of Shanganagh Castle (part of CH 20). Repositioning of the cable location should takes account of the Cultural Heritage sites identified by this study and further direct impacts on any of these sites are avoided. The study area around the amended route does not incorporate any further sites of cultural heritage.

A written, drawn and photographic survey of the section of the townland boundary between Shankill and Shanganagh (CH 22) and the section of the Dublin and South Eastern Railway line (CH 23), which will be transacted by the proposed cable route should be undertaken in conjunction with the development works. Both sections of the cable trench should be excavated under archaeological direction and a full record of the profile of each recorded. Any significant archaeological artefacts should be retained in accordance with the guidance of the National Museum of Ireland. Following construction work the areas of the townland boundary and the disused railway should be reinstated to match their original morphology. This will allow for the industrial heritage feature of the railway to can continue to be read in the landscape.

As there is a potential that previously unknown sub-surface archaeology could be uncovered along the entire proposed cable route, it is proposed that a suitably qualified archaeologist carry out monitoring of all ground works associated with this section of the proposed cable route. In the event that any archaeological features or deposits are identified, then the archaeologist will have to advise the National Monuments Service, Department of Arts, Heritage and the Gaeltacht and agree an appropriate mitigation strategy; this strategy may include a requirement for archaeological excavation or for preservation in *situ*.

The results of all archaeological work undertaken should be fully described in a report submitted to the National Monuments Service, Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland.

8. Residual Impacts

Following the implementation of the mitigation measures outlined above the residual impact on the possible boundary associated with Shanganagh Castle (part of CH 20) and the townland boundary between Shanganagh and Cork Little (CH21) will be indirect and negligible while the construction work is taking place. The townland boundary between Shanganagh and Shankill (CH22), industrial remains of the Dublin and South Eastern Railway Line (CH 23), and any newly identified archaeological remains will be preserved by record. A table indicating the significance level of impact taking into account implementation of mitigation measures is below.

CH No.	Impact Type	Magnitude of impact taking into account mitigation measures	Baseline Value	Significance level of impact taking into account implementation of mitigation measures
21	Direct	Negligible	Medium/ High	Negligible
22	Direct	Moderate	Medium/ High	Slight
23	Direct	Moderate	High	Moderate
20	Direct	Negligible	Medium/ High	Negligible
24	Direct	Moderate	Medium/ High	Slight

Table 8 – Magnitude of residual impacts

References

Literary Sources

Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI) 1999 *Frameworks and Principles for the Protection of the Archaeological Heritage*, DAHGI, Ireland

Department of the Environment, Heritage and Local Government 2004 *Architectural Heritage Guidelines*

English Heritage 2005 *Wind Energy and the Historic Environment*. London: English Heritage

English Heritage 2008 *Conservation Principles – Policies and Guidance for the Sustainable Management of the Historic Environment*. London: English Heritage

EPA 2002 *Guidelines on the information to be contained in Environmental Impact Statements*

Environmental Protection Agency 2003 *Advice notes on current practice (in the preparation of Environmental Impact Statements)*

National Roads Authority 2005a *Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes*

National Roads Authority 2005b *Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes*

Cartographic Sources

First Edition Ordnance Survey map, 6":1 mile, published 1837; Co. Dublin – Sheet No 26

First Edition Ordnance Survey map, 25":1 mile, published 19010; Co. Dublin – Sheet No 26

Appendix 1 Guidelines upon which methodology is based and terms and definitions used.

This section presents the methodology used in assessing the baseline cultural heritage environment. The scope and methodology for the baseline assessment has been devised in consideration of the following guidelines:

- Environmental Protection Agency (2002) "Guidelines on the information to be contained in Environmental Impact Statements"
- Environmental Protection Agency (2003) "Advice notes on current practice (in the preparation of Environmental Impact Statements)"
- Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI) (1999) "Frameworks and Principles for the Protection of the Archaeological Heritage"
- Department of the Environment, Heritage and Local Government (2004) "Architectural Heritage Guidelines"
- National Roads Authority (2005) "Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes"
- National Roads Authority (2005) "Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes"

The following sets out the definitions of the terms which are used throughout the report:

(i) The phrase 'cultural heritage' is a generic term used in reference to a multitude of cultural, archaeological and architectural sites and monuments. The term 'cultural heritage', in compliance with Section 2(1) of the Heritage Act (1995), is used throughout this report in relation to archaeological objects, features, monuments and landscapes as well as all structures and buildings which are considered to be of historical, archaeological, artistic, engineering, scientific, social or technical interest.

For the purpose of this assessment, each identified cultural heritage site is assigned a unique cultural heritage number with the prefix 'CH'.

(ii) A feature recorded in the 'Record of Monuments and Places' (RMP) refers to a recorded archaeological site that is granted statutory protection under the National Monuments Act 1930-2004. When reference is made to the distance between an RMP and the proposed development site (see below), this relates to

the minimal distance separating the site from the known edge of the RMP. Where the edge of the RMP is not precisely known, the distance relates to that which separates the site from the boundary of the RMP zone of archaeological potential as represented on the respective RMP map; where this is applied, it is stated accordingly.

(iii) An 'area of archaeological potential' refers to an area of ground that is deemed to constitute one where archaeological sites, features or objects may be present in consequence of location, association with identified/recorded archaeological sites and/or identifiable characteristics.

(iv) The term 'proposed development site' refers to the defined area of land within which the proposed development, including access tracks etc, may be constructed.

(v) In relation to the term 'study area' please see section 3.2 below.

(vi) The term 'receiving environment' refers to the broader landscape within which the study area is situated. Examination of the site's receiving environment allows the study area to be analysed in its wider cultural context.

(vii) The terms 'baseline environment' and 'cultural heritage resource' refer to the existing, identifiable environment against which potential impacts of the proposed scheme may be measured.

Appendix 2 Methodology Used for Assessing Baseline Values of Sites, Magnitude of Impacts and Significance of Impacts

Methodology Used for Assessing Baseline Value of Sites

In order to categorise the baseline environment in a systemised manner, 'baseline values' have been assigned to each identified site of cultural heritage significance and/or potential within the study area. The baseline value of a site is determined with reference to the 'importance' and 'sensitivity' of the site.

In accordance with NRA Guidelines, the importance of a site is determined based on the following criteria: legal status, condition, historical associations, amenity value, ritual value, specimen value, group value and rarity.

The sensitivity of a site is determined based on the presence of extant remains and/or the potential for associated subsurface remains of the feature to be present *in situ*.

It should be noted that the National Monuments Act 1930-2004 does not differentiate between recorded archaeological sites on the basis of relative importance or sensitivity. In addition, the Local Government (Planning and Development) Act, 2000 does not differentiate between Protected Structures or Areas of Architectural Conservation on the basis of relative importance or sensitivity either. Consequently, professional judgement has been exercised to rate these features based on their perceived importance and sensitivity in relation to physical impacts and impacts on setting.

Taking the above factors into consideration, the criteria that have been defined are provided in Table 1 below.

Subject	Baseline Value
- Recorded Archaeological Monuments - Protected Structures - Architectural Conservation Areas (ACAs)	Very High
- Sites listed in the NIAH that are not Protected Structures - Unregistered built heritage sites that comprise extant remains which are in good condition and/or which are regarded as constituting	High

Subject	Baseline Value
significant cultural heritage features - Unrecorded features of archaeological potential	
- Unregistered built heritage sites that comprise extant remains which are in poor condition - Unregistered cultural heritage sites (not including built heritage sites) that comprise extant remains - Townland boundaries that comprise extant remains - Marshy/wetland areas	Medium/High
- Unregistered cultural heritage sites for which there are no extant remains but where there is potential for associated subsurface evidence - Townland boundaries for which there are no extant remains	Medium/Low
- Unregistered cultural heritage sites for which there are no extant remains and where there is little or no potential for associated subsurface evidence	Low

Table 1 Baseline Values of Sites

Caution should be exercised when assessing the perceived significance of an archaeological, architectural or cultural heritage site as such categorisation is open to subjectivity. In addition, the perceived levels of importance as identified in this report are liable to future revision in the instance where new information, through the undertaking of further archaeological investigations, is provided.

Type of Impacts

The following table lists the type of impacts that a proposed development may have on the cultural heritage resource:

Type of Impacts	Definition
Direct	Direct impacts arise where an archaeological, architectural and/or cultural heritage feature or site is physically located within the

Type of Impacts	Definition
	footprint of the proposed development, or its associated physical impact zone, whereby the removal of part, or all of the feature or site is thus required.
Indirect	Indirect impacts may arise as a result of: - Subsurface works undertaken outside the footprint of the development; - Soil deposition; - Parking lots; - Vibrations during the construction and/or operation of the scheme; - Visual impacts.
Cumulative	The addition of many impacts to create a large, significant impact.
Undeterminable	Whereby the full consequence that the proposed development may have on the cultural heritage resource is not known
Residual	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Table 2 Type of Impacts

Methodology Used for Assessing Magnitude of Impacts

The methodology used to assess the magnitude of potential pre-mitigation impacts, as well as residual impacts, of the proposed development on the baseline environment is presented in Table 3 below.

Impact magnitude	Criteria
Severe	An impact that obliterates the architectural heritage of a structure or feature of national or international importance. These effects arise where an architectural structure or feature is completely and irreversibly destroyed by the proposed development. Mitigation is unlikely to remove adverse effects.

Impact magnitude	Criteria
Major	An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about an archaeological or cultural heritage site. An impact that by its magnitude, duration or intensity alters the character and/or the setting of the architectural heritage. These effects arise where an aspect or aspects of the architectural heritage is/are permanently impacted upon leading to a loss of character and integrity in the architectural structure or feature. Appropriate mitigate is likely to reduce the impact A beneficial or positive effect that permanently enhances or restores the character and/or setting of a feature of archaeological or cultural heritage significance in a clearly noticeable manner.
Moderate	A medium impact arises where a change to a site/monument is proposed which though noticeable, is not such that the archaeological integrity of the site is compromised and which is reversible. This arises where an archaeological feature can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible. A medium impact to a site/monument may also arise when a site is fully or partly excavated under license and all recovered data is preserved by record. An impact that results in a change to the architectural heritage which, although noticeable is not such that alters the integrity of the heritage. The change is likely to be consistent with existing and emerging trends. Impacts are probably reversible and may be of relatively short duration. Appropriate mitigation is very likely to reduce the impact. A beneficial or positive effect that results in partial or temporary enhancement of the character and/or setting of a feature of archaeological or cultural heritage significance in a clearly noticeable manner.

Impact magnitude	Criteria
Minor	An impact which causes changes in the character of the environment, such as visual impact, which are not high or very high and do not directly impact or affect an archaeological feature or monument. An impact that causes some minor change in the character of architectural heritage of local or regional importance without affecting its integrity or sensitivities. Although noticeable, the effects do not directly impact on the architectural structure or feature. Impacts are reversible and of relatively short duration. Appropriate mitigation will reduce the impact. A beneficial or positive effect that causes some minor or temporary enhancement of the character of an architectural heritage significance which, although positive, is unlikely to be readily noticeable.
Negligible	An impact on archaeological features or monument capable of measurement but without noticeable consequences. An impact on architectural heritage of local importance that is capable of measure merit but without noticeable consequences. A beneficial or positive effect on architectural heritage of local importance that is capable of measurement but without noticeable consequences.

Table 3 Criteria used for rating magnitude of impacts

Methodology Used for Assessing Impacts on Setting

There is considerable debate over definitions of setting and approaches to the assessment of setting impacts[1], with no standardised industry-wide approach. The assessment methodology used here has been developed in house by Headland Archaeology Ltd.

The definition of setting used here is that provided by English Heritage[2]:

> *'Setting' is an established concept that relates to the surroundings in which [an asset] is experienced, its local context, embracing present and past relationships to the adjacent landscape. Definition of the setting of a [cultural heritage asset] will*

[1] Lambrick 2008

[2] 2008, 39

normally be guided by the extent to which material change within it could affect (enhance or diminish) the [asset's] significance.

Hence setting is not simply the visual envelope of the asset in question. Rather, it is those parts of the asset's surroundings that are relevant to the significance of the asset and the appreciation thereof. The same document[3] sets out a range of values that are relevant when considering an asset's significance:

- Evidential;
- Historical (Illustrative and associative);
- Aesthetic (Design and fortuitous); and
- Communal (commemorative/symbolic, social and spiritual).

These values have been used in the current assessment in order to define the setting of the asset. The asset's values are identified and the relationship of these values to the surroundings established. Those elements of the surroundings that contribute to the asset's values are considered to form the setting.

In most instances setting will relate to the historical value of the asset, where an appreciable relationship between the asset and an element of its surroundings helps the visitor understand and appreciate the asset. This may be in terms of a physical relationship, such as between a castle and the natural rise that it occupies, or a more distant visual relationship, such as a designed vista or the view from, for example, one ringfort to another. The former is referred to as immediate setting and the latter as landscape setting. Many assets will only have an immediate setting. Some assets will have aesthetic value that relates to the surrounding landscape, such as in the case of a designed view incorporating a distant hill, or that relates to the contribution the asset makes to the local landscape, for example a church spire providing a focal point in a view down a valley.

Factors to Consider When Assessing Impacts Upon Setting

English Heritage (2005) has provided a list of factors to be considered when assessing impacts upon setting. These are broad factors and have been taken into consideration when assessing magnitude of impact and sensitivity. They are summarised in Appendix 3 Table 4.

[3] Ibid, 28-32

Factor	Discussion
Visual dominance	Where an historic feature (such as a hilltop monument or fortification, a church spire, or a plantation belonging to a designed landscape) is the most visually dominant feature in the surrounding landscape, adjacent development may be inappropriate.
Scale	The extent of a development will also contribute to its visual impact.
Intervisibility	Certain archaeological or historic landscape features were intended to be seen from other historic sites. Any development should respect this intervisibility.
Vistas and sight-lines	Designed landscapes invariably involve key vistas, prospects, panoramas and sight-lines, or the use of topography to add drama. Location of development within key views, which may often extend beyond any designated area, should be avoided.
Unaltered settings	The setting of some historic sites may be little changed from the period when the site was first constructed, used or abandoned. Largely unaltered settings for certain types of sites, particularly more ancient sites, may be rare survivals and especially vulnerable to modern intrusions. This may be a particular issue in certain upland areas.

Table 4 English Heritage Factors to be Considered when Assessing Impacts upon Setting

Methodology Used to Assess Magnitude of Impact on Setting

The magnitude of an impact reflects the extent to which relevant elements of the cultural heritage asset's setting are changed by the development, and the effect that this has upon the character and value of the asset and the appreciation thereof. Guideline criteria for magnitude defined as high, medium, low or negligible magnitude are described in Table 5.5. As with other criteria presented, this is intended as a general guide, and it is not anticipated that all the criteria listed will be present in every case.

The following are guides to the assessment of magnitude of impact:

- *Obstruction of or distraction from key views*. Some assets have been sited or designed with specific views in mind, such as the view from a country house

with designed vistas. The obstruction or cluttering of such views would reduce the extent to which the asset could be understood and appreciated by the visitor. Developments outside key views may distract from them and make them difficult to appreciate on account of their prominence and movement. In such instances the magnitude is likely to be greatest where views have a particular focus or a strong aesthetic character. Sympathetic development may improve key views by removing features that obstruct or distract from key views and hence preserve or enhance the importance of the asset.

- *Changes in prominence*. Some assets are deliberately placed in prominent locations in order to be prominent in the surrounding landscape, for example prehistoric cairns are often placed to be silhouetted against the sky and churches in some areas are deliberately placed on ridges in order to be highly visible. Developments can reduce such prominence and therefore reduce the extent to which such sites can be appreciated or the contribution that they make to the local landscape. Similarly, sympathetic development can enhance the setting of such sites by, for example, removing modern forestry that would otherwise compromise the setting of a cairn that had been placed on a skyline.
- *Changes in landscape character*. A particular landuse regime may be essential to the appreciation of an asset's function, for instance the fields surrounding an Improvement period farmstead are inextricably linked to its appreciation. Changes in land use can leave the asset isolated and reduce its value. In some instances, assets will have aesthetic value or a sense of place that is tied to the surrounding landscape character. Conversely, sympathetic development may restore or preserve the relevant landuse and hence preserve or enhance the relevant value of the asset.
- *Duration of impact*. Impacts that are long term or permanent are generally of greater magnitude than those that are short term.

Readily reversible impacts are generally of lesser magnitude than those that cannot be reversed.

Impacts upon the defined setting will be of greater magnitude than those that affect unrelated elements of the asset's surroundings or incidental views to or from an asset that are unrelated to the appreciation of its value.

Magnitude	Guideline criteria
Major beneficial	The contribution of setting to the cultural heritage asset's significance is considerably enhanced as a result of the development; a lost relationship between the asset and its setting is restored, or the legibility of the relationship is greatly enhanced. Elements of the surroundings that detract from the asset's cultural heritage significance or the appreciation of that significance are removed.
Moderate beneficial	The contribution of setting to the cultural heritage asset's significance is enhanced to a clearly appreciable extent as a result of the development; as a result the relationship between the asset and its setting is rendered more readily apparent. The negative effect of elements of the surroundings that detract from the asset's cultural heritage significance or the appreciation of that significance is appreciably reduced.
Minor beneficial	The setting of the cultural heritage asset is slightly improved as a result of the development, slightly improving the degree to which the setting's relationship with the asset can be appreciated.
Negligible	The setting of the cultural heritage asset is only imperceptibly changed as a result of the development; the only noticeable adverse changes to the landscape are to elements that are not considered relevant to the setting of the cultural heritage asset.
Minor adverse	The contribution of the setting of the cultural heritage asset to its significance is slightly degraded as a result of the development, but without adversely affecting the interpretability of the asset and its setting; characteristics of historic value can still be appreciated, the changes do not strongly conflict with the character of the site, and could be easily reversed to approximate the pre-development conditions.
Moderate adverse	The contribution of the setting of the cultural heritage asset to its significance is reduced appreciably as a result of the development and cannot easily be reversed to approximate pre-development conditions. Relevant setting characteristics can still be appreciated but less readily.
Major adverse	The contribution of the setting of the cultural heritage asset to its significance is effectively lost or substantially reduced as a result of the development, the relationship between the asset and its setting is no longer readily appreciable.

Table 5 Guideline Criteria for Assessment of Magnitude of an Impact on the Setting of a Cultural Heritage Asset

Methodology Used for Assessing Significance Level of Impacts

The significance level of a construction or operation impact on a feature is assessed by combining the magnitude of the impact and baseline value of the feature. The matrix in Appendix 3 Table 4 provides a guide to decision-making, but is not a substitute for professional judgement and interpretation, particularly where the baseline value or impact magnitude levels are not clear or are borderline between categories. The permanence of the effects are also taken into account, with irreversible effects being more significant while temporary or reversible changes are likely to be less significant.

Magnitude of Impact	Baseline Value				
	Very High	**High**	**Medium/High**	**Medium/Low**	**Low**
Severe	Very significant	Very significant	Significant	Moderate	Slight
Major	Very significant	Significant	Moderate	Slight	Slight
Moderate	Significant	Moderate	Slight	Slight	Negligible
Minor	Moderate	Slight	Slight	Negligible	Negligible
Negligible	Slight	Slight	Negligible	Negligible	Negligible

Table 6 Criteria for assessing significance level of impacts

Appendix 3 Inventory of identified sites of cultural heritage significance and potential within study area

CH No.	Category	Legal status	Baseline Value	Description	Townland	Approx. distance to proposed cable route (m)	NGR_N	NGR_E
1	RMP	RMP DU026-054001-	Very High	Church	SHANGANAGH	300m	221155	325343
2	RMP	RMP DU026-054002-	Very High	Graveyard	SHANGANAGH	300m	221152	325364
3	RMP	RMP DU026-054003-	Very High	Cross	SHANGANAGH	300m	221159	325355
4	RMP	RMP DU026-054004-	Very High	Cross	SHANGANAGH	300m	0	0
5	RMP	RMP DU026-054005-	Very High	Building	SHANGANAGH	300m	221167	325343
6	RMP	RMP DU026-054006-	Very High	Cross	SHANGANAGH	300m	0	0
7	RMP	RMP DU026-055001-	Very High	Martello tower	SHANGANAGH	500m	221793	326354
8	RMP	RMP DU026-055002-	Very High	Defensive redoubt	SHANGANAGH	500m	221796	326353
9	RMP	RMP DU026-106----	Very High	Water mill - unclassified	SHANGANAGH	?	0	0

CH No.	Category	Legal status	Baseline Value	Description	Townland	Approx. distance to proposed cable route (m)	NGR_N	NGR_E
10	RMP	RMP DU026-116----	Very High	Fulacht fia	SHANGANAGH	260m	221191	325465
11	RMP	RMP DU026-120---- / RPS no. 1845	Very High	RMP Castle - unclassified RPS House, Castle & Gate Lodge	SHANGANAGH	120m	221173	325680
12	RMP	RMP DU026-067----	Very High	Burial	OLDCONNAUGHT	800m	219999	325321
13	RPS	RPS no. 1862	Very High	Beauchamp House - House	ASKE	360m	220413	325484
14	RPS	RPS no. 1860	Very High	Askefield House - House	ASKE	220m	220534	325458
15	RPS	RPS no. 1863	Very High	Saint James's Church - Church (Original Building and Railings and Gates)	CORK LITTLE	420m	220393	325645
16	RPS	RPS no. 1858	Very High	Shanganagh Marble and Stone Centre (formerly Hackett Memorial Hall) - Hall, Railings and Gates and Granite Milestone	ASKE	200m	220610	325513
17	RPS	RPS no. 1850	Very High	Crinken Cottage (former Gate Lodge to Shanganagh Castle) - House	SHANGANAGH	280m	221070	325280
18	RPS	RPS no. 1834	Very High	Rosedale House - House	SHANGANAGH	380m	221594	326163
19	RPS	RPS no. 1836	Very High	Locksley - House	SHANGANAGH	340m	221577	326200
20	UCH		Medium/high	Designed Landscape - Demesne landscape associated with Shanganagh Castle including a c. 500	SHANGANAGH	0	221183	325923

CH No.	Category	Legal status	Baseline Value	Description	Townland	Approx. distance to proposed cable route (m)	NGR_N	NGR_E
				m long section of boundary ditch. Areas of trees shown on the first edition OS map as part of the designed landscape around the castle are incorporated into modern planting within Shanganagh Park and the area around Shanganagh Castle to the northwest of the park.				
21	UCH		Medium/high	Townland boundary between Shanganagh and Cork Little	SHANGANAGH	0	221241	326348
22	UCH		Medium/high	Townland boundary between Shanganagh and Shankill	SHANGANAGH	0	220932	325603
23	UCH		Medium/high	Dublin and South Eastern Railway Line	SHANGANAGH	0	221258	326345
24	AAP		Medium/high	Proposed cable route constitutes an area of archaeological potential as it passes through the demesne/designed landscape of Shanganagh Castle and there is evidence for activity within the area from at least the Bronze Age.	SHANGANAGH	0	221084	325781

Appendix 4 Extracts from the Archaeological Survey of Ireland Archive Files

RMP Archive Files

CH_No	1		
RMP_No	DU026-054001-		
Townland	SHANGANAGH		
Classification	Church		
NGR-E	325343	NGR-N	221155

Description

Just the foundations of the church survive in an overgrown area. There are three sides of a rectangular building defined by rough large boulders, surviving to a height of 0.65m. The SE angle is the best preserved section (L 9.20m E-W; W 5m N-S). There are no visible gravestones. In 1979 Henry Wheeler identified a plain cross base along the E boundary of the site. This cross base wasn't visible when site inspected in 1993. This is a round boulder 0.70 m diam. with a level upper surface and socket.

There were formerly two small corsses at the church of Kiltuc. One has moved to a laneway between Shankill and Rathmichael; moved again since […] next land N of this (RMP 026-051---). The other cross head was moved to St Anne's new RC church Shanganagh (JRSAI 1958, 106-7). It is lying against a pedastal of the statute of St Anne in the church grounds. The head is circular in shape with short arms and chamfored. It has a crucifixion scene outlined on one face. The shaft for this cross was in Rev Sherwin garden in Ballybrack in 1958. It bears a human head in high relief.

A recent vertical AP of the site shows cropmark of a rectangular enclosure. The church remsina would form the NW corner of the enclosure site (L c. 25m; W c. 20m) - OS9 2202. The foundation of the church is attributed to St Tucha mentioned in the Bull of 1179 which defined the extent of the dioceses of Dublin and Glendalough (Kiltuc in Dublin).

References

Healy, P 1975 Second report on monuments and sites of archaeological interest in county Dublin. An Foras Forbartha Teoranta.
Crawford, H. S. 1907 A descriptive list of early Irish crosses. JRSAI 37, 221
Ball, FE, 1905 History of county Dublin. Vol. 3. 92-4
Ball, F.E. 1902, Rathmichael and its neighbourhood. JRSAI 32, 113-127
Turner, K. 1983 If you seek monuments. A guide ot the antiquities in the barony of Rathdown. 46-7.

CH_No	2		
RMP_No	DU026-054002-		
Townland	SHANGANAGH		
Classification	Graveyard		
NGR-E	325364	NGR-N	221152

Description

No description on file.

CH_No	3		
RMP_No	DU026-054003-		
Townland	SHANGANAGH		
Classification	Cross		
NGR-E	325355	NGR-N	221159

Description

In 1979 Henry Wheeler identified a plain cross base along the E boundary of Kiltuc Church. This cross base wasn't visible when site inspected in 1993. This is a round boulder 0.70 m diam. with a level upper surface and socket.

References

Healy, P 1975 Second report on monuments and sites of archaeological interest in county Dublin. An Foras Forbartha Teoranta.
Crawford, H. S. 1907 A descriptive list of early Irish crosses. JRSAI 37, 221
Ball, FE, 1905 History of county Dublin. Vol. 3. 92-4
Ball, F.E. 1902, Rathmichael and its neighbourhood. JRSAI 32, 113-127
Turner, K. 1983 If you seek monuments. A guide ot the antiquities in the barony of Rathdown. 46-7.

CH_No	4		
RMP_No	DU026-054004-		
Townland	Shanganagh		
Classification	Cross		
NGR-E		NGR-N	

Description

There were formerly two small corsses at the church of Kiltuc. One has moved to a laneway between Shankill and Rathmichael; moved again since […] next land N of this (RMP 026-051---). The other cross head was moved to St Anne's new RC church Shanganagh (JRSAI 1958, 106-7). It is lying against a pedastal of the statute of St Anne in the church grounds. The head is circular in shape with short arms and chamfored. It has a crucifixion scene outlined on one face. The shaft for this cross was in Rev Sherwin garden in Ballybrack in 1958. It bears a human head in high relief.

References

Healy, P 1975 Second report on monuments and sites of archaeological interest in county Dublin. An Foras Forbartha Teoranta.
Crawford, H. S. 1907 A descriptive list of early Irish crosses. JRSAI 37, 221
Ball, FE, 1905 History of county Dublin. Vol. 3. 92-4
Ball, F.E. 1902, Rathmichael and its neighbourhood. JRSAI 32, 113-127
Turner, K. 1983 If you seek monuments. A guide ot the antiquities in the barony of Rathdown. 46-7.

CH_No	5		
RMP_No	DU026-054005-		
Townland	SHANGANAGH		
Classification	Building		
NGR-E	325343	NGR-N	221167

Description

Antiquarian accounts of the church at Kiltuck note the existance of a small square building standing to the SE of the church, which was subsequently removed, leaving only the foundations visible.

There are no modern accounts on file of this structure.

References

Ball, F.E. 1902 Rathmichael and its neighbourhood. JRSAI 32, 113-127

CH_No	6		
RMP_No	DU026-054006-		
Townland	SHANGANAGH		
Classification	Cross		
NGR-E	0	NGR-N	0

Description

A cross head from Kiltuc church was moved to the church grounds of St. Anne's Shanganagh.

There were formerly two small crosses at the church of Kiltuc. One has moved to a laneway between Shankill and Rathmichael; moved again since […] next land N of this (RMP 026-051---). The other cross head was moved to St Anne's new RC church Shanganagh (JRSAI 1958, 106-7). It is lying against a pedastal of the statute of St Anne in the church grounds. The head is circular in shape with short arms and chamfored. It has a crucifixion scene outlined on one face. The shaft for this cross was in Rev Sherwin garden in Ballybrack in 1958. It bears a human head in high relief.

References

Healy, P 1975 Second report on monuments and sites of archaeological interest in county Dublin. An Foras Forbartha Teoranta.
Crawford, H. S. 1907 A descriptive list of early Irish crosses. JRSAI 37, 221
Ball, FE, 1905 History of county Dublin. Vol. 3. 92-4
Ball, F.E. 1902, Rathmichael and its neighbourhood. JRSAI 32, 113-127
Turner, K. 1983 If you seek monuments. A guide ot the antiquities in the barony of Rathdown. 46-7.
O hEailidhe, P 1958 Fassaroe and associated crosses. JRSAI 88, 104-7
O' Reilly, PJ 1901 The Christian sepulchral leachts and free-standing crosses of the Dublin half-barony of Rathdown. JRSAI 31

CH_No	7		
RMP_No	DU026-055001-		
Townland	SHANGANAGH		
Classification	Martello tower		
NGR-E	326354	NGR-N	221793

Description

Shown on the 1st edition OS map (1843) but gone by the 1937 edition. It stood above the beach E of now disused railway line. Its disappearance may have resulted from coastal erosion. No visible trace.

Duncan's map of 1821 gives a tower and battery here.

References
Turner, K 1983 If you seek monuments. A guide to the antiquities of the barony of Rathdown.

CH_No	8		
RMP_No	DU026-055002-		
Townland	SHANGANAGH		
Classification	Defensive redoubt		
NGR-E	326353	NGR-N	221796

Description

A letter written by General Cockburn in 1818 was uncovered during renovations to Shanganagh Castle in the 1950s, in it he describes a redoubt and fortification in his north field, adjacent to the Martello Tower (DU026-055001-), which had been (even by 1818) largely eroded by the sea.

No modern traces recorded. It is presumed that the defensive redoubt has been removed by coastal erosion along with the Martello tower.

CH_No	9		
RMP_No	DU026-106----		
Townland	SHANGANAGH		
Classification	Water mill - unclassified		
NGR-E	0	NGR-N	0

Description

Noted as recorded on Downs Survey. No precise location noted.

CH_No	10		
RMP_No	DU026-116----		
Townland	SHANGANAGH		
Classification	Fulacht fia		
NGR-E	325465	NGR-N	221191

Description

Paddy Healy excavated at the ecclesiastical site at Kiltuck, Shankill, in advance of a housing development. He did not submit a report to Excavations for the 1990 volume. He found material within the area of the enclosure around the church that would be consistent with and ecclesiastical foundation - including meat bones of deer and other material. At a slight distance from the church remains he uncovered and excavated two fulacht fiadh sites.

CH_No	11		
RMP_No	DU026-120----		
Townland	SHANGANAGH		
Classification	Castle - unclassified		
NGR-E	325680	NGR-N	221173

Description

Built in the late 18th century (1760s), nineteenth century correspondence relating to alterations being undertaken at Shanganagh Castle mention the remains of an old castle. Two cannon shot were recovered from the site prior to its re-building (Turner 1987, 58).

Correspondence found in a bottle sealed up in one of the turrets in the 1950s:

1818, 2nd May, I G. Cockburn commenced the alterations and addition to my house.

There was an old tower here, but in a ruinous state, being some of the small remains of the old castle. The tower was badly built, so I took its remains down, and built this on the site of the former one, both as ornamental and as a chimney to my picture gallery. In taking it down we found two cannon shot, which we replaced at the same height as they were in the old tower, but how they came there no-one can tell.

References

Turner, K 1987 Rathmichael: a parish history.

Appendix 5 Legislative framework

EIA Legislation

EIA Directive 85/337/EEC as amended by 97/11/EC and 2003/35/EC requires that certain developments be assessed for likely environmental effects before planning permission can be granted. The EIA Amendment Regulations, SI 93 OF 1999 specifies in Section 2(b) of the Second Schedule, 'Information to be contained in an Environmental Impact Statement', that among other factors, information is to be provided on:

> *'Material assets, including the architectural and archaeological heritage, and the cultural heritage'*

Each of these assets is addressed within this assessment report.

Cultural Heritage Legislation

Archaeological Monuments/Sites

Archaeological heritage is protected primarily under the National Monuments Acts 1930-2004. Section 2 of the 1930 National Monuments Act defines the word "monument" as including:

"*any artificial or partly artificial building, structure, or erection whether above or below the surface of the ground and whether affixed or not affixed to the ground and any cave, stone, or other natural product whether forming part of or attached to or not attached to the ground which has been artificially carved, sculptured or worked upon or which (where it does not form part of the ground) appears to have been purposely put or arranged in position and any prehistoric or ancient tomb, grave or burial deposit, but does not include any building which is for the time being habitually used for ecclesiastical purposes*"

Under the 1994 Act, provision was made for a Record of Monuments & Places (RMP). The RMP is a revised set of SMR (Sites and Monuments Record) maps, on which newly-discovered sites have been added and locations which proved not to be of antiquity have been de-listed by the National Monuments Service.

In effect, the National Monuments Acts 1930-2004 provide a statutory basis for:

- Protection of sites and monuments (RMPs)
- Sites with Preservation Orders
- Ownership and Guardianship of National Monuments
- Register of Historic Monuments (pre-dating 1700AD)
- Licensing of archaeological excavations
- Licensing of Detection Devices
- Protection of archaeological objects
- Protection of wrecks and underwater heritage (more than 100 years old)

In relation to proposed works at or in the vicinity of a recorded archaeological monument, Section 12 (3) of the National Monuments (Amendment) Act 1994 states:

"*When the owner or occupier (not being the Commissioners) of a monument or place which has been recorded [in the Record of Monuments and Places] or any person proposes to carry out, or to cause or permit the carrying out of any work at or in relation to such monument or place, he shall give notice in writing of his proposal to carry out the work to the Commissioners and shall not, except in the case of urgent necessity and with the consent of the Commissioners, commence the work for a period of two months after having given the notice*".

Archaeological artefacts

Section 2 of the 1930 National Monuments Act (amended) defines an archaeological object as (in summary) any chattel in a manufactured or partly manufactured state or an unmanufactured state but with an archaeological or historical association. This includes ancient human, animal or plant remains.

Section 9 (1) of the National Monuments (Amendment) Act 1994 states that any such artefact recovered during archaeological investigations should be taken into possession by the licensed archaeological director and held on behalf of the state until such a time as they are deposited accordingly subsequent to consultation with the National Museum of Ireland.

Architectural Sites

In 1997 Ireland ratified the Granada Convention on architectural heritage. This provided the basis for a national commitment to the protection of the architectural heritage throughout the country. The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 and Local Government (Planning and Development) Act 2000 made the legislative changes necessary to provide for a strengthening of the protection of architectural heritage. The former Act has helped to provide for a forum for the strengthening of architectural heritage protection as it called for the creation of a National Inventory of Architectural Heritage which is used by local authorities for compiling the Record of Protected Structures (RPS). The Record of Protected Structures (RPS) is set out in each respective county's Development Plan and provides statutory protection for these monuments.

Section 1 (1) of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 states:

> *"architectural heritage" means all—*
> *(a) structures and buildings together with their settings and attendant grounds, fixtures and fittings,*
> *(b) groups of such structures and buildings, and*
> *(c) sites, which are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest"*

The 1999 Act was replaced by the Local Government (Planning and Development) Act 2000 where the conditions relating to the protection of architectural heritage are set out in Part IV of the Act. Section 57 (1) of the 2000 Act states that:

> *"…the carrying out of works to a protected structure, or a proposed protected structure, shall be exempted development only if those works would not materially affect the character of –*

(a) the structure, or

(b) any element of the structure which contributes to its special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest"

Appendix 6 Policies

This assessment was undertaken in accordance with the following policies contained in the Dún Laoghaire-Rathdown County Development Plan 2010-2016.

Policy AH1: Protection of Archaeological Heritage

It is Council policy to protect archaeological sites, National Monuments (and their setting), which have been identified in the Record of Monuments and Places (RMP), whilst at the same time reviewing and assessing the feasibility of improving public accessibility to sites and monuments under the direct ownership or control of the Council or of the state.

Policy AH2: Protection of Archaeological Material In Situ

It is Council policy to seek the preservation in-situ (or, as a minimum, preservation by record) of all archaeological monuments included in the Record of Monuments and Places, and of previously unknown sites, features and objects of archaeological interest that become revealed through development activity. In respect of decision making on development proposals affecting sites listed in the Record of Monuments and Places, the Council will have regard to the advice and/or recommendations of the Department of the Environment, Heritage and Local Government.

Policy AH4: Designation of Archaeological Landscapes

It is Council policy to identify, designate and protect Archaeological Landscapes in co-operation with relevant government departments.

Policy AH5: Historic Burial Grounds

It is Council policy to protect historic burial grounds within the County and encourage their maintenance in accordance with good conservation practice.

Policy AR1: Record of Protected Structures

It is Council policy to compile and maintain a Record of Protected Structures and will include in the Record every structure or parts of such structures which, in the Planning Authority's opinion, are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. The Council will ensure that interventions to Protected Structures shall have regard to the Department of Environment, Heritage and Local Government document "*Architectural Heritage Protection Guidelines for Planning Authorities*" (2004).

Policy AR5: Energy Efficiency of Protected Structures

It is Council policy to have regard to any future advisory documents issued by the Department of the Environment, Heritage, and Local Government and existing international guidance on energy efficiency of historic buildings to ensure that best conservation practice is followed.

Policy AR6: Protection of Historic Street Furniture

It is Council policy to promote the retention of historic items of street furniture where these contribute to the character of the area.

Policy AR7: Protection of Coastline Heritage

It is Council policy to promote the retention of features of the County's coastal heritage where these contribute to the character of the area.

Policy AR8: Architectural Conservation Areas (ACA)

It is Council policy to protect the special character of places, areas, groups of structures or townscapes, which have been designated as Architectural Conservation Areas.

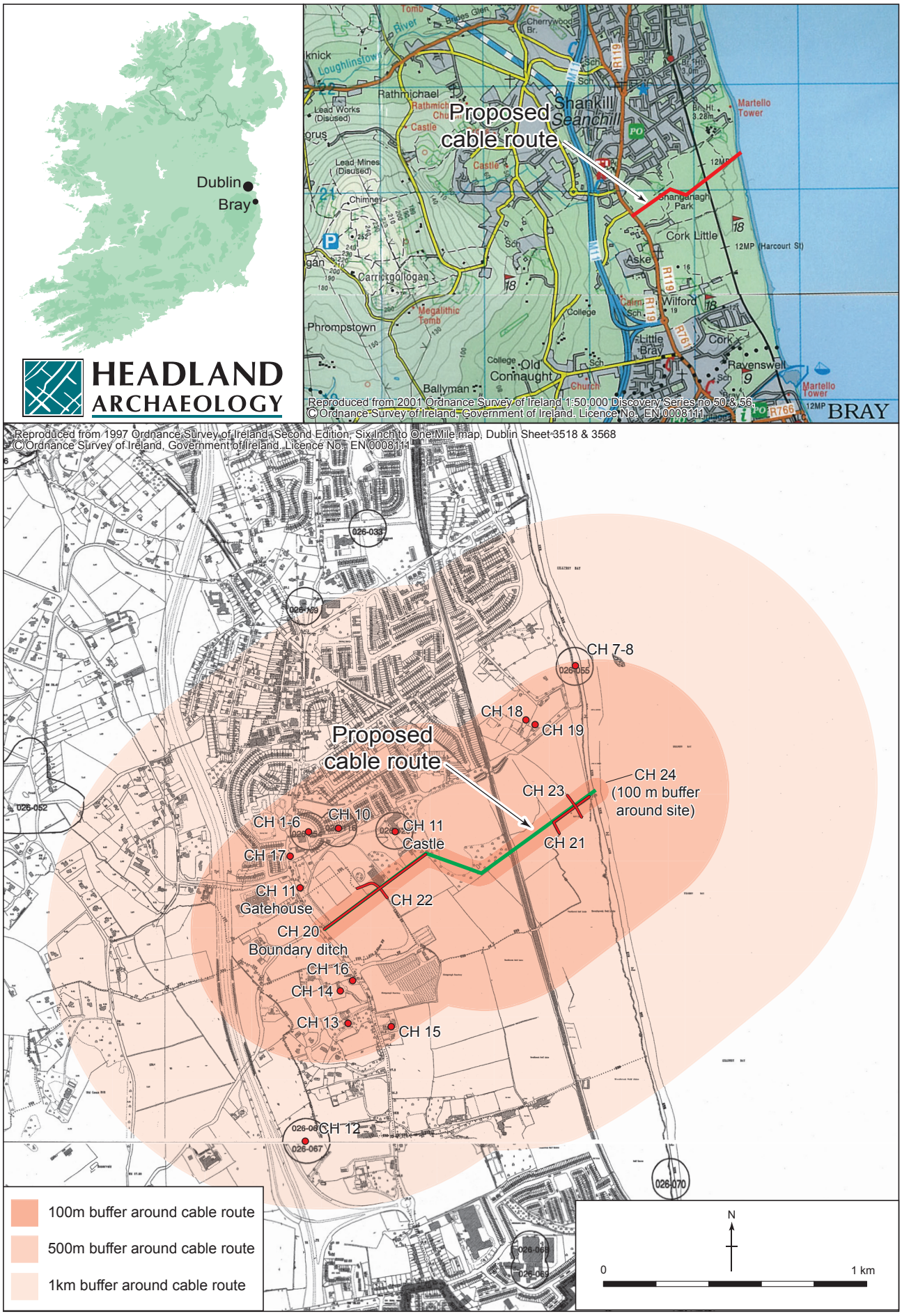

Figure 1 - Development site close to the cable landfall for Dublin Array, County Dublin: Site location and RMP extract showing sites of cultural heritage significance.

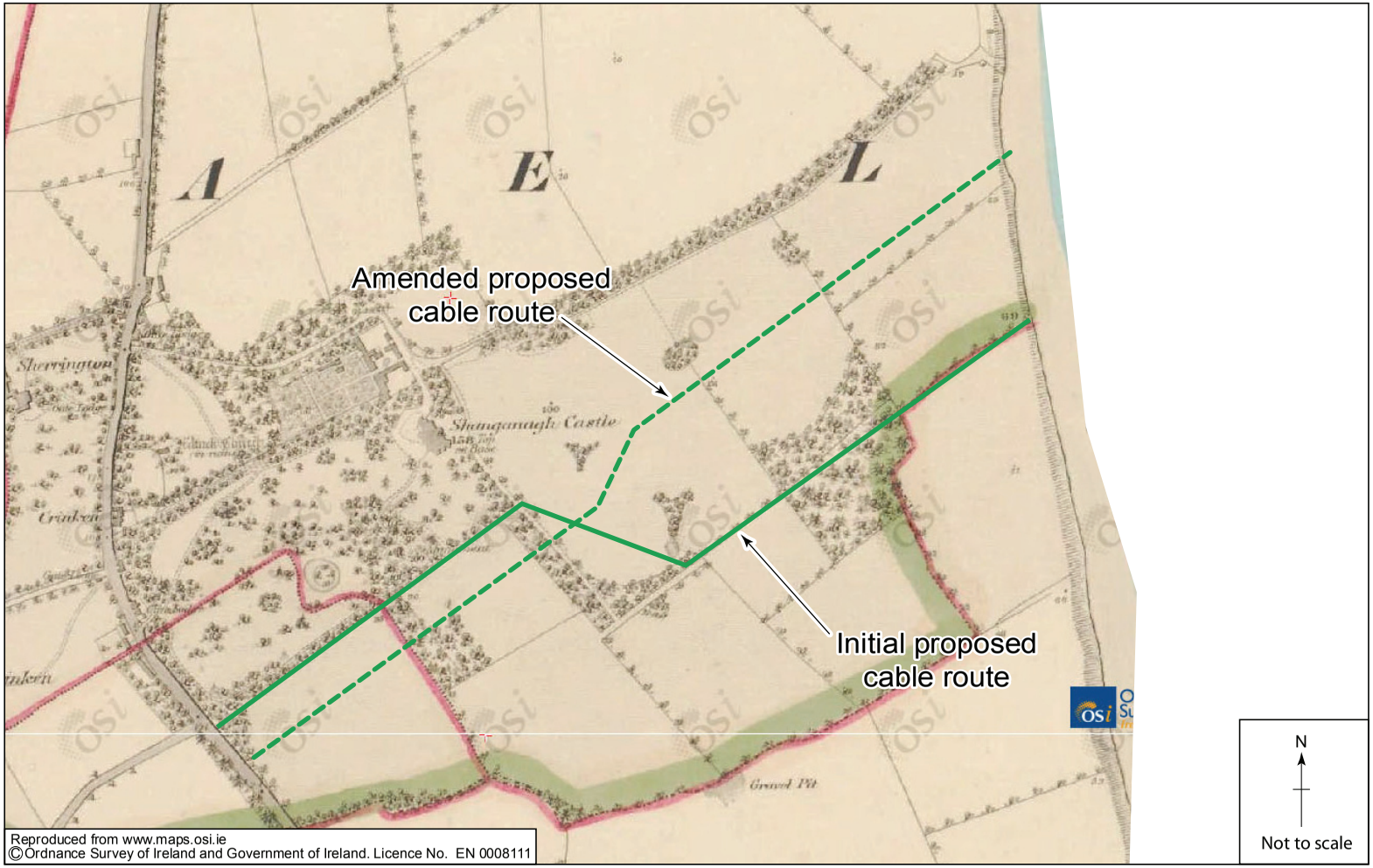

Figure 2 - Extract from First Edition 6” OS map showing proposed cable route.

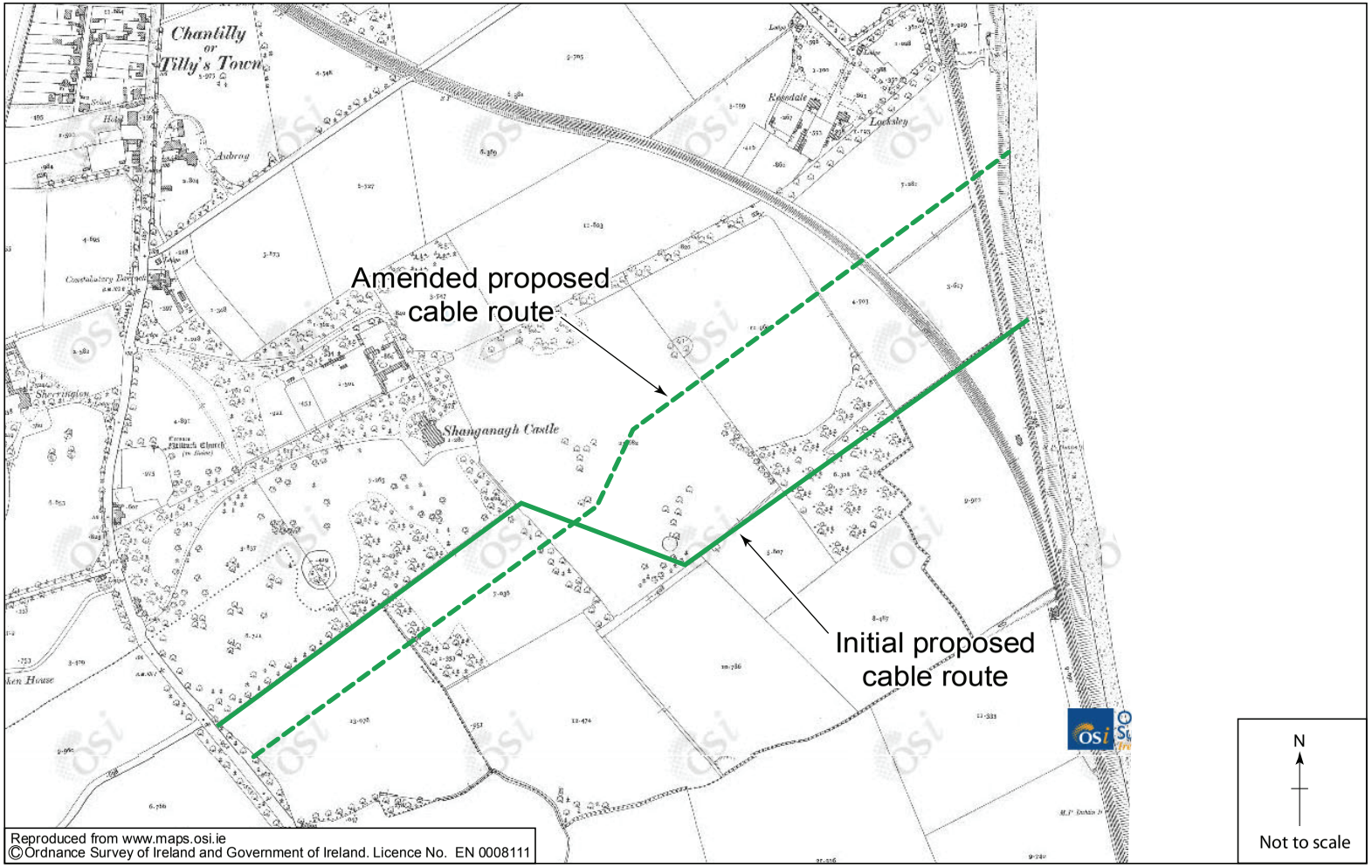

Figure 3 - Extract from Second Edition 25" OS map showing proposed cable route.

Figure 4 - 1995 Aerial photograph of site showing proposed cable route.

Figure 5 - 2000 Aerial photograph of site showing proposed cable route.

Figure 6 - 2005 Aerial photograph of site showing proposed cable route.

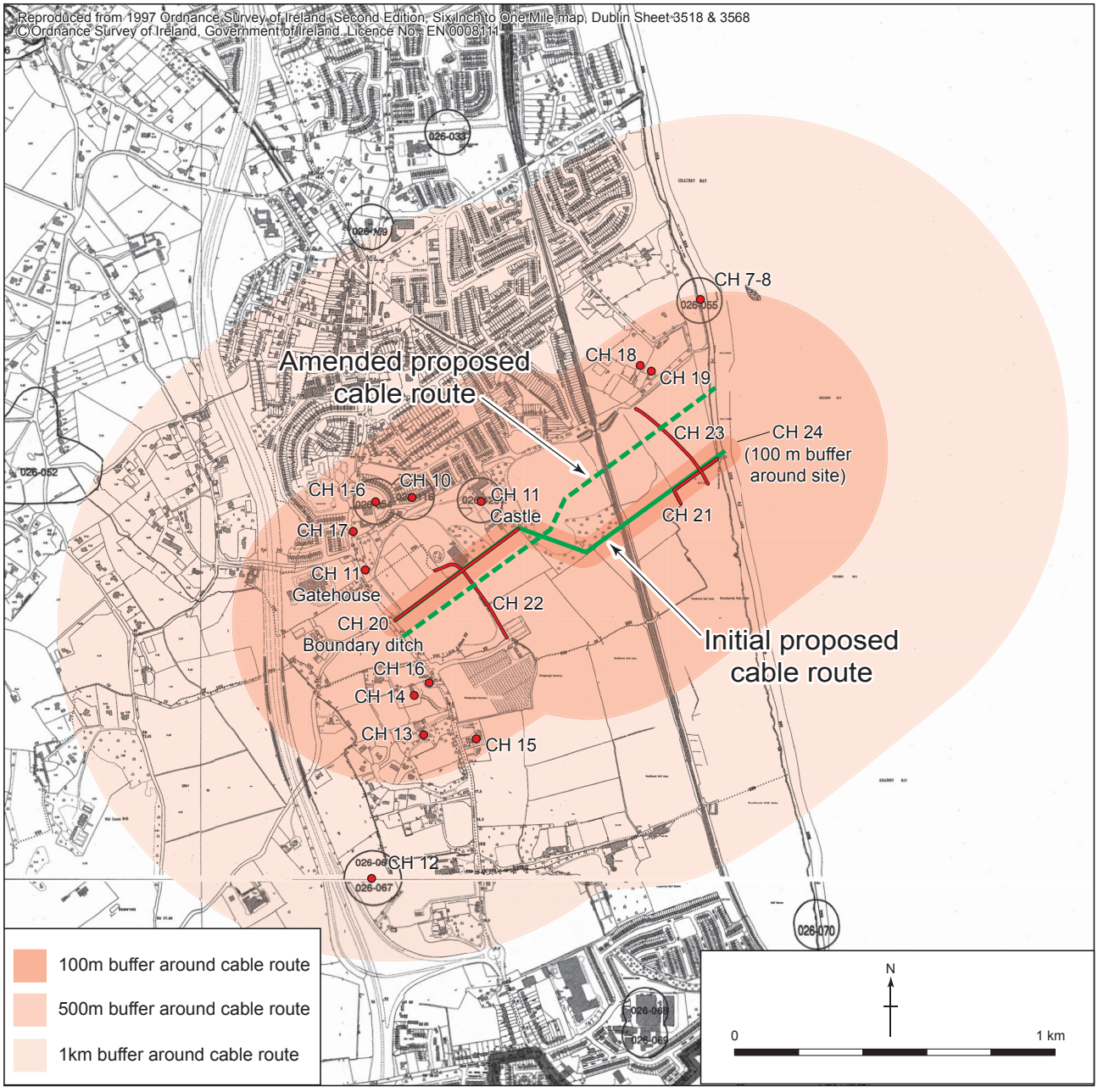

Figure 7 - Development site close to the cable landfall for Dublin Array, County Dublin: Amended proposed cable route.