



T06/386;

Related Foreshore Licence applications references:
KY-DAFFKY-A180523-0051 & M00051/2018

Re: Underwater Archaeological Impact Assessment (UAIA) Report on 10 aquaculture applications over a large area of seabed (foreshore and subtidal zones) in Ballylongford Bay, Co. Kerry.

The results of the UAIA were comprehensive and clear and the Underwater Archaeology Unit (UAU) of the National Monuments Service concurs with the attendant recommendations. We therefore have the following requested follow up archaeological mitigation:

We have no objections to the following aquaculture licence applications, for bags and trestles:

- 386A;

With regard to we require that all aquaculture activity is located off the features marked as St Senan's Road and which is a recorded archaeological monument afforded statutory protection under Section 12 of the 1994 National Monuments Amendment Act. All activity, including access and egress movements by tractors, 4xwheel drives, etc. shall not impact within the Zone of Notification of the recorded monument. This is an area of high archaeological potential with direct links to the activities of the early monastics in the area and could have even earlier origins as a maritime routeway.

Two anomalies were identified within the subtidal area for the aquaculture activity and these should be the subject of an underwater archaeological survey to determine their nature and extent.

Underwater Archaeological Dive Inspection:

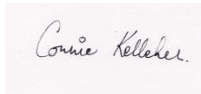
The identified anomalies shall be subject to archaeological dive inspection as per the following details:

- The services of a suitably qualified and suitably experienced underwater archaeologist should be engaged to carry out the dive inspections.
- The dive inspections shall be subject to the statutory licensing requirements, under a Dive Survey Licence.
- A detailed methodology should be submitted with the dive survey licence application to this Department.
- The dive survey should be accompanied by a hand-held metal detection survey and this too shall be subject to the required licence.
- A report on the results of the archaeological dive inspection should be submitted to the UAU for further consideration and comment in advance of any permit being granted for this application (and).

It is advised that all diving adhere to the Health and Safety Authority's Safety in Industry (Diving at Works) Regulations, SI 422.

Further archaeological mitigation may be required following consideration of the results of the archaeological dive inspections, including avoidance/preservation *in situ*; test excavation/ full excavation or request for refusal if proposed aquaculture is to go ahead within an area of identified cultural significance.

Is mise le meas,

A rectangular box containing a handwritten signature in cursive script that reads "Connie Kelleher".

Dr Connie Kelleher
Underwater Archaeology Unit
National Monuments Service
Department of Culture, Heritage and the Gaeltacht

Date: April 9th, 2019

To: Geraldine O'Donovan AFMD-DAFM

From: Francis O'Beirn, Marine Institute

CC: Terry McMahon, Jeff Fisher – MI; Kevin Hodnett-AFMD

Re: MI observation on Statutory Consultee submission from An Taisce to Shannon Aquaculture licencing

An Taisce in its submission has provided observations on the existing and proposed activities in the Shannon Natura sites (i.e., Lower Shannon River SAC and the Shannon and Fergus Estuaries SPA). Four specific areas of concern are highlighted, which are identified below with the MI response following. In the communication, An Taisce cite precedence from Case law. It is important to note that it is beyond the remit of the MI to comment on An Taisce's interpretation of these rulings.

Bird Displacement:

In previous correspondence with DAFM (06/03/2019) the MI has attempted to provide some clarity regarding the conclusions drawn in relation to interactions with shorebirds in a number of specific locations within the SPA that might be provided in the Conclusion statement. These conclusions are summarized below and specify specific actions which we believe will address the concerns highlighted in the An Taisce communication.

The output of the AA reports for the SPA indicated that there is, in a number of areas within the SPA, a risk of significant disturbance to a number of bird species as a consequence of a combination of pressures including, among others, aquaculture (licenced, applications) and green algal accumulations (eutrophication) in intertidal areas.

It is important to note that these conclusions are based on an assessment within, what is in relation to the SPA overall, relatively small but important areas for bird conservation features. (The assessment examined interactions with bird species in these arbitrary locations (aquaculture zones) in the SPA which are not specific zones used in the current monitoring of birds within the SPA.) Furthermore, it should be noted that these were conservative conclusions (highly precautionary) that considered the likely pressures resulting from all aquaculture activities as well as any other pressures likely to act on the conservation features, e.g., eutrophication – green algae in Poulnasherry Bay. On this basis, the initial management responses will be similarly precautionary.

In Poulnasherry Bay, it is advised that (re)licencing of existing intertidal oyster culture activities proceed and be subject to ongoing monitoring of bird use in the bay. The monitoring would consider bird use at the site in light of existing aquaculture activities in-combination with, among others, the pressure caused by the presence of large accumulations of green algae in the inner-Bay. The output of the monitoring will present a summary of site-use by the shorebird species while also providing a commentary on the likely interactions with aquaculture activities and other pressures specifically, as it relates to species distribution at within the survey area. The outputs and conclusions of monitoring efforts will provide the basis for any subsequent management actions.

Given the existing licences are confined to the eastern portion of the bird count sector near Bunaclugga Bay it is proposed that renewal of existing licences () will not adversely impact on bird distribution. It is advised that new applications in this area T06/ 386 would not be licenced on the basis that a moderate risk of disturbance (particularly on Ringed Plover) was concluded if all activities are licenced. Review of ongoing bird monitoring (IWeBS) for this sector will determine if consideration can be given to any future applications. In Ballylongford Bay, it is recommended that intertidal oyster culture can be licenced with conditions relating to

access and interactions with night roosts of some bird species. Subtidal bottom culture of mussels might be licenced with certain conditions relating to timing of activities and site extent.

In the Askeaton area, the existing licenced oyster culture site () can continue with normal conditions. The AA report recommended that new licences of extensive areas should be licenced on the basis of potential significant disturbance to birds () and cumulative impact of seabed habitats ().

Marine Mammals:

The importance of the site for Bottlenose Dolphin is acknowledged. It not entirely clear if bottom dredging of shellfish will result in damage to dolphin habitat. The unknown nature of the activities and their extent within the OFOs meant that we assumed full occupancy of the sites and assumed disturbance to this habitat type. In our assessment, we therefore, identified those activities that may act in-combination with other disturbing activities. Notwithstanding these conservative assumptions, we note the recent publication on interactions between dolphin and floating structures used in the culture of shellfish (rafts)¹. The study concluded that shellfish farms appeared to have a positive impact on dolphin occurrence, with increased bottlenose dolphin occurrence at mussel farm locations and in waters close to the aquaculture zones. In summary, it would appear that the observations from An Taisce reflect broadly what has been concluded in the Assessment Report and subsequent Conclusion Statement.

Fishery Orders:

The AA report for the Aquaculture activities within the Lower Shannon River SAC, prepared by the MI, acknowledges the unknown nature and extent of the activities within the Oyster Fishery Order Areas. To this end, a precautionary approach was employed such that any aquaculture activities likely to result in disturbance on the seafloor was considered in-combination with those as likely to occur in the OFOs. On this basis, it was advised that caution be employed when considering if these aquaculture activities were to be licenced. Identifying the extent of the activities within the OFO was not possible for the assessment. Also, management of these areas is within the remit of the Department of Communications, Climate Action and Environment therefore, it is not possible to dictate the extent of activity that may/may not be permitted within the OFO. Therefore, we assumed 100% occupancy/utility of the sites.

Water Quality:

The Marine Institute is fully aware of the goals of both WFD and the MSFD. We note that An Taisce have reverted to using dated and inappropriate literature as it relates to interaction of intertidal shellfish culture with sedimentary habitats. We identify more recent publications that support our conclusions with regard to shellfish aquaculture and environmental interactions². The relevance of the quote taken from the EPA State of the Environment Report is questionable. The quote specifically relates to finfish culture and has little or no bearing on shellfish culture which is not a 'fed' aquaculture practice. We feel there is nothing substantive in these water quality comments that requires further comment.

¹ Díaz López, B. & Methion, S. (2017) The impact of shellfish farming on common bottlenose dolphins' use of habitat. *Marine Biology* 164: 83. doi:10.1007/s00227-017-3125-x

² Forde, J., F. O'Beirn, J. O'Carroll, A. Patterson, R. Kennedy. 2015. Impact of intertidal oyster trestle cultivation on the Ecological Status of benthic habitats. *Marine Pollution Bulletin* 95, 223–233.

O'Carroll J, et al. 2016. Impact of prolonged storm activity on the Ecological Status of intertidal benthic habitats within oyster (*Crassostrea gigas*) trestle cultivation sites. *Marine Pollution Bulletin*. 110: 460-469

Mallet A.L. et al. 2006. Impact of suspended and off-bottom Eastern oyster culture on the benthic environment in eastern Canada. *Aquaculture* 255:362-373

Date: April 9th, 2019

To: Geraldine O'Donovan AFMD-DAFM

From: Francis O'Beirn, Marine Institute

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Re: MI observation on Statutory Consultee submission from the Department of Culture, Heritage and the Gaeltacht to Shannon Aquaculture licencing

The Department of Culture, Heritage and the Gaeltacht (DCHG) in it's submission has provided observations on the existing and proposed activities in the Shannon Natura sites (i.e., Lower Shannon River SAC and the Shannon and Fergus Estuaries SPA). In addition to Nature conservation observations, it has have identified that an underwater archaeological impact assessment (UAIA) should be completed. This is beyond the remit of the MI and will not be addressed further in this note.

In their submission, DCHG have noted that the 15% threshold for a number of community types have been exceeded and that based upon their own advice that a precautionary approach be adapted in future licencing decisions. In addition, they highlight the risk to Bottlenose Dolphin habitat.

MI Response: The AA report for the Aquaculture activities within the Lower Shannon River SAC, prepared by the MI, acknowledges the unknown nature and extent of the activities within the Oyster Fishery Order Areas. To this end, a precautionary approach was employed such that any aquaculture activities likely to result in disturbance on the seafloor was considered in-combination with those as likely to occur in the OFOs. On this basis, it was advised that caution be employed when considering if these aquaculture activities were to be licenced. Identifying the extent of the activities within the OFO was not possible for the assessment. Also, management of these areas is within the remit of the Department of Communications, Climate Action and Environment therefore, it is not possible to dictate the extent of activity that may/may not be permitted within the OFO. Therefore, we assumed 100% occupancy/utility of the sites.

In relation to Bottlenose dolphin, it not entirely clear if bottom dredging of shellfish will result in damage to dolphin habitat. The unknown nature of the activities and their extent within the OFOs meant that we assumed full occupancy of the sites and assumed disturbance to this habitat type. In our assessment, we therefore, identified those activities that may act in-combination with other disturbing activities. Notwithstanding these conservative assumptions, we note the recent publication on interactions between dolphin and floating structures used in the culture of shellfish (rafts)¹. The study concluded that shellfish farms appeared to have a positive impact on dolphin occurrence, with increased bottlenose dolphin occurrence at mussel farm locations and in waters close to the aquaculture zones.

DCHG also, make reference to the likely disturbance of shorebird species from aquaculture activities and request clarification on the adaptive management plan proposed for a number of areas.

MI Response: I refer to the previous correspondence with DAFM (06/03/2019) wherein the MI clarify the conclusions drawn in relation to interactions with shorebirds in a number of specific locations within the SPA. These conclusions are summarized below and specify specific actions, address the concerns highlighted in the DCHG communication.

¹ Díaz López, B. & Methion, S. (2017) The impact of shellfish farming on common bottlenose dolphins' use of habitat. Marine Biology 164: 83. doi:10.1007/s00227-017-3125-x

The output of the AA reports for the SPA indicated that there is, in a number of areas within the SPA, a risk of significant disturbance to a number of bird species as a consequence of a combination of pressures including, among others, aquaculture (licenced, applications) and green algal accumulations (eutrophication) in intertidal areas.

It is important to note that these conclusions are based on an assessment within, what is in relation to the SPA overall, relatively small but important areas for bird conservation features. (The assessment examined interactions with bird species in these arbitrary locations (aquaculture zones) in the SPA which are not specific zones used in the current monitoring of birds within the SPA.) Furthermore, it should be noted that these were conservative conclusions (highly precautionary) that considered the likely pressures resulting from all aquaculture activities as well as any other pressures likely to act on the conservation features, e.g., eutrophication – green algae in Poulnasherry Bay. On this basis, the initial management responses will be similarly precautionary.

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Given the existing licences are confined to the eastern portion of the bird count sector near Bunaclugga Bay it is proposed that renewal of existing licences () will not adversely impact on bird distribution. It is advised that new applications in this area T06/ 386 () would not be licenced on the basis that a moderate risk of disturbance (particularly on Ringed Plover) was concluded if all activities are licenced. Review of ongoing bird monitoring (IWeBS) for this sector will determine if consideration can be given to any future applications. In Ballylongford Bay, it is recommended that intertidal oyster culture can be licenced with conditions relating to access and interactions with night roosts of some bird species. Subtidal bottom culture of mussels might be licenced with certain conditions relating to timing of activities and site extent.

In the Askeaton area, the existing licenced oyster culture site () can continue with normal conditions. The AA report recommended that new licences of extensive areas should be licenced on the basis of potential significant disturbance to birds () and cumulative impact of seabed habitats ().

Finally, DCHG raise concerns in relation to the generic wording proposed as part of the licence conditions.

While we understand that the wording (in the conditions) is meant to convey that negative interactions with Natura features will not be tolerated, there is a certain lack of clarity as it specifically relates to the licence decisions within the Shannon Natura sites. We suggest the response above as it relates to specific management actions, might help clarify some of the ambiguity and address the concerns of DCHG.

PROJECT

Archaeological Impact Assessment of proposed aquaculture sites in Ballylongford, Co. Kerry.

PREPARED BY

Julianna O'Donoghue and Caitríona Devane

LICENCE NO.

19R0007, 19D0002

DATE

June 2019

CLIENT

Bord Iascaigh Mhara



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine



EUROPEAN UNION

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Acknowledgements

Mizen Archaeology would like to thank *Bord Iascaigh Mhara* and in particular Joanne Gaffney for their help and assistance throughout the project. The license holder was Julianna O'Donoghue. The historical and archaeological background was researched and written by Caitriona Devane. The walk- over survey was undertaken by Julianna O'Donoghue and Sarah Madden. The geophysics was undertaken by Brian Smith of *Hydromaster*.

1. Introduction

1.1 General

Mizen Archaeology was engaged by *Bord Iascaigh Mhara* (BIM) to undertake an underwater archaeological impact assessment (UAIA) comprising a desktop, intertidal and metal detection survey at Ballylongford, in the lower Shannon Estuary, Co. Kerry. The UAIA forms a component of a planning application for nine aquaculture sites.

The UAIA explores the archaeological and historical context of the Shannon Estuary at Ballylongford and investigates the character, significance and sensitivity of its cultural heritage. The aim of the assessment was to determine the significance of the known archaeology, identify previously unrecorded archaeology on the seabed/foreshore, to assess the potential for discovering previously unrecorded archaeology during construction works and to recommend mitigation measures to minimise negative impacts on any archaeological remains.

1.2 Proposed Development

The culture methods to be adopted at the proposed aquaculture sites are of—(1) bottom cultures of mussel (farmed using dredges), and (2) intertidal trestle and basket cultures of pacific oysters (accessed via tractor) (Tab. 1 and Fig. 1).

Site Ref.	Species	Production method
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
T06/386A	Oysters	Bag and trestle
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

Table 1 1 Scope of works.

2. Conventions, Legislation and Guidelines

The Underwater Archaeological Impact Assessment was undertaken with due regard to the following national and international protective conventions, legislation and guidelines and legislation:

- National Monument Act, 1930, amended 1954, 1987, 1994 and 2004
- Heritage Act, 1995
- National Cultural Institutions Act, 1997
- The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous) Provisions Act, 1999
- Framework and Principles for the Protection of the Archaeological Heritage, 1999, Department of Arts, Heritage, Gaeltacht and the Islands
- Local Government (Planning and Development) Act, 2000
- European Convention on the Protection of the Archaeological Heritage (the 'Valletta Convention') ratified by Ireland in 1997
- Council of Europe Convention on the Protection of the Architectural Heritage of Europe (the 'Granada Convention') ratified by Ireland in 1997
- International Council on Monuments and Sites (ICOMOS), advisory body to UNESCO concerning protection of sites and recommendation of World Heritage sites ratified by Ireland in 1992

3. Methodology

A range of methodologies were utilised to assess the potential impacts of the proposed aquacultural sites on the cultural heritage of Ballylongford, including a desktop study, an intertidal visual and metal detection survey and a geophysical survey.

3.1 Desktop study

A number of sources were consulted for a desktop study of the proposed aquaculture sites in Ballylongford. For a full list of sources consulted, please see bibliography below.

- The Record of Monuments and Places (RMP) compiled by the Archaeological Survey of Ireland comprises lists, classifications of monuments and maps of all recorded monuments with known locations and zones of archaeological significance. The monument records are accessible online from the National Monuments Section (NMS)

of the Department of Arts,

- Heritage and Gaeltacht (DAHG) at www.archaeology.ie. These were used to establish the wider archaeological context of the site.
- The Excavations Bulletin online database (www.excavations.ie) which contains summaries of all archaeological excavations in Ireland, was consulted to review archaeological investigations done previously in the area.
- The Shipwreck Inventory of Ireland is principally a desktop survey of information gathered from a broad range of cartographic, archaeological and historical sources, both documentary and pictorial pertaining to shipwrecks around Irish shores. The files of the unpublished Inventory of Shipwrecks, very much a work in progress, are located in the UAU in Dublin and records a substantial list of wrecks for the Shannon Estuary area.
- The Record of Piers and Harbours is a draft unpublished document compiled by the DCHG. It draws on various historical sources dealing with historical piers and harbour development in Ireland.
- Cartography: Several historic maps and charts were examined (see references below for a full list).
- Aerial Photography: A variety of low- and high-altitude aerial photography (vertical and oblique) was examined. Infra-red aerial photos undertaken by the Marine Institute were also examined as well as the aerial orthophotos from the National Monuments web site, www.archaeology (see references below for full list).
- Documentary sources: Several sources were examined (see references below for full list)

3.2 Site Inspection

The intertidal sites were inspected at low spring tides during December 2018 and January 2019. A visual inspection in tandem with a handheld metal detection survey was undertaken at six sites. (T06/386A, [REDACTED]) Features of potential archaeological significance were recorded including scaled drawings, written and photographic record.

A geophysical survey of three of the proposed sites ([REDACTED]) was undertaken by Hydromaster Ltd. in March 2019. Equipment used for the side scan sonar, multibeam, and magnetometry survey include a Edgetech 4125P side-scan sonar tow-fish, a Reson Teledyne T-50 P Multibeam, and a Marine Magnetics SeaSPY magnetometer.

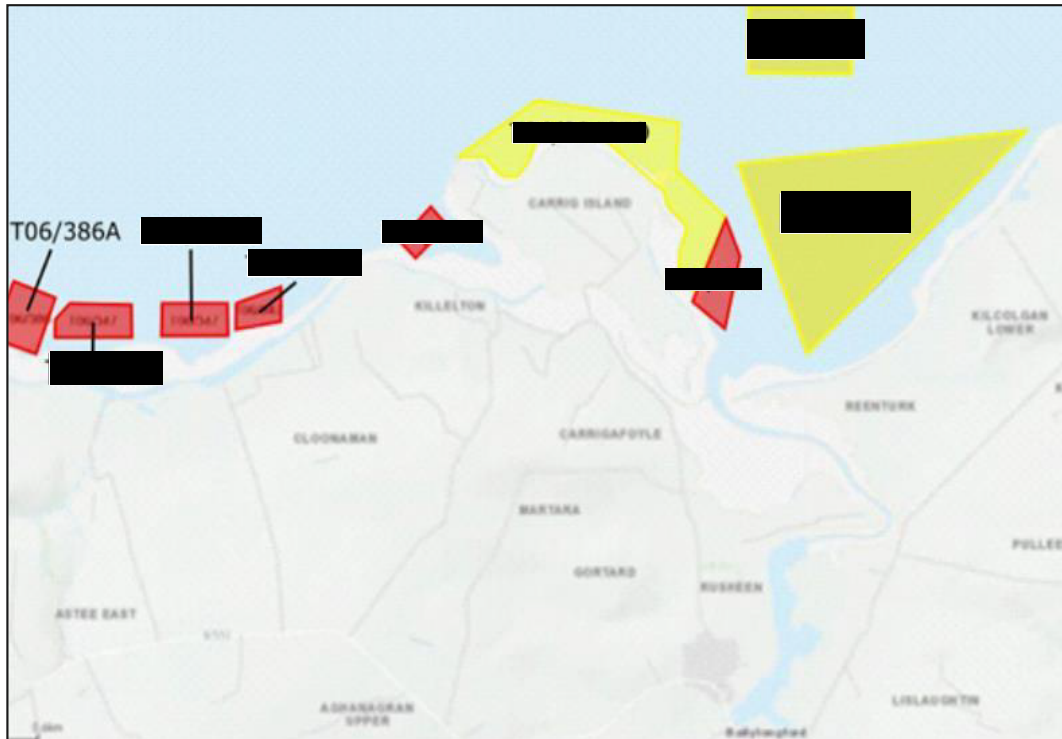


Figure 1 Intertidal survey sites highlighted in red, geophysical survey sites highlighted in yellow.

4. Existing Environment

The proposed aquaculture sites extend along the southern shore of the Shannon estuary close to the village of Ballylongford. They are located in the historic barony of *Iraghticonnor*, a name derived from *Oidhreacht Uí Chonchobhair* – the inheritance (hereditary lands) of *Uí Chonchobhair* (the O’Connors) who were the leading family of the population known as *Ciarraighe*. *Oidhreacht* came into use in placenames in the fifteenth and sixteenth centuries (Simms 1987, 69). The *Ciarraighe* gave their name to the county of Kerry which was also known as *Ciarraighe Luachra*. *Luachair* (the nominative case) means a rushy area.

The Shannon Estuary is a large waterway that has seen significant human activity over the centuries, including foraging, fishing, shipping and settlement. The estuary is a dynamic ecological environment with diverse habitats including tidal mud flats, rocky shores, and reclaimed land. The low-lying wetland areas are prone to changes in sea levels and consequently can preserve evidence of past environments such as submerged forests dating back to prehistoric times (O’Sullivan 2001, 56-61).



Figure 2 Map from National Monuments Services database of recorded sites showing density of archaeological sites (red) and architectural heritage (blue) in the area of the proposed sites.

5. Desktop Assessment

5.1 Prehistory

There is currently no recorded archaeological evidence from the Mesolithic period (10,000-4,000BC) in the North Kerry area in the archaeological record. However, there is a high probability that Mesolithic sites occur on the coastal inter-tidal fringe as several sites were recorded in the recent past along the upper southern reaches of the Shannon Estuary at Carrigadirty (O’Sullivan 2001, 69-72). Currently, however, the earliest settlement evidence from the study area, thus far recorded, dates from the Neolithic period (4,000-2,400BC).

Monumentally, the number of Neolithic sites in the area is very small, essentially comprising of four embanked enclosures at Gullane East, Knockenagh North, Garryard and Ballynorrigh West (Toal 1995, 69-72). North Kerry is devoid of any megalithic tombs although there are references to possible examples that are denoted on the 1st Edition OS maps as ‘Diarmuid & Grainne’s Beds’, one of which, KE006-013, is located in the townland of Ballyline West less than 10km to the south of Carrig Island

Neolithic settlement sites have been discovered in recent years during archaeological monitoring at development sites in Tarbert and Lixnaw.

The evidence of Bronze Age activity occurs principally in the form of Burnt Mounds, more commonly referred to as '*fulachta fiadh*' in the archaeological literature. Three (KE002-005, KE002-006, and KE002-007) are located in the vicinity of Sites [REDACTED]. Fulacht fia KE002-007 is located in the bank that is less than 200m east of [REDACTED] and can be seen in the bank stratigraphy.

In a megalithic context a single three-stone alignment is situated on the Shannon mouth at Beale Middle. While orthostatically, there are only twenty Bronze Age standing stones recorded in North Kerry (Toal 1995, 43).

As elsewhere in Munster, Iron Age evidence is not plentiful. However, at least two sites in the wider area may possibly reflect Iron Age settlement. In 1985 two stone-lined cists, containing the burials of three males were discovered in a garden at Dromkeen East, near Causeway.

5.2 Ballylongford as a port

Orosius, a Briton who lived from c. 384 to c. 420 AD, was captured in his youth by people he described as seaborne barbarians. They sold him to Irish traders who held him for a number of years on the southern shore of the Shannon estuary. He survived by using his wits, avoiding those who were hostile and by flattering the masters. The environment in which he found himself was one that required anchorage, lock up yards and warehouses for the merchandise that was imported and exported by the traders. *Orosius* most likely spoke British Celtic and, having grown up in Roman Britain, may have served as a Latin interpreter. C. 405 he escaped in fog and, pursued by sea with rocks and spears, he made it to Galicia in Spain where he was ordained. (Ó Corráin 2017, 113-8).

Orosius' familiarity with Ireland is evident from a passage in which he wrote "from that remarkable promontory where the mouth of the River Shannon is and where the *Velabri* and *Luceni* are settled". The promontory, used as a navigational reference in the text, is Kerry Head to the west of the current project area.

The archaeological footprint for the fourth and fifth centuries is scant. The Anglo Saxons, who settled in Britain throughout the fifth century lived in single-roomed thatched wooden houses and it is possible, since ringforts were not yet part of the Irish landscape, that the traders of *Iraghticonnor* lived in similar houses.

Tarbert, 8km to the west of the proposed development is the deepest harbour in the region and has strong ebb tides which may have made it unsuitable for trade. The Vikings, some centuries later, chose Ballylongford for anchorage and it is likely that the traders who held *Orosius* worked out of there. Asdee, to the west, and within the scope of the BIM project, was associated with ships in 1151 (MIA). The coastal topography, however, suggests that the inlet near Ballylongford was the most rational choice of port.

5.3 Early populations of *Iraghticonnor*

The *Velabri* appear in an earlier map based on the coordinates of the Greek geographer Ptolemy (100- 170 AD). The information, gathered from merchants in the Mediterranean in the second century, placed the *Velabri* some distance from their later location in *Orosius's* time. This indicates that they were pushed northwards towards Ballylongford between the late second century and the late fourth century (Ó Corráin 2017, 119-120).

Velabri is a Latinisation of the Irish name *Fellubar* that survives in an early genealogical poem in the Book of Leinster. The text mentions *cath Luachra laechdu Fellubair* – the heroic battle of *Luachair Fellubair* (LL i, 90; Ó Corráin 2017, 120-1). It is not known where or when the battle took place. By the sixth century, however, the *Fellubair (Vellabri) of Luachair* were either subsumed or expelled by people known as *Alltraighe*.

The *Alltraighe* previously lived in the, barony of *Trughanacmy*. In the second half of the sixth century the up and coming *Ciarraighe* pushed them northwards and westwards towards the Shannon. In the Early Medieval period the kingship of *Iar Mumu* (West Munster) was dominated by *Eóghanacht Locha Léin* based, near Killarney. Their power waned in the late eighth century resulting in a rebellion by a group of West Munster kingdoms led by the *Ciarraighe*.

The situation is partly explained in a late-eighth century narrative referred to as the West Munster Synod. The synod was presided over by *Macc Ardae Mac Fidaig*, described as king of *Ciarraighe Luachra*. In reality he was king of *Alltraighe* and a contemporary of St. Brendan who was also of the *Alltraighe*. The document includes details of the services and stipends that were to be exchanged between the *Ciarraighe* with the *Eóghanachta*, giving a 'most favourite nation' status to the *Ciarraighe* (Meyer 1912, 315-7; Charles-Edwards 2000, 522, 549; Ó Cróinín 1989, 224).

The *Ciarraighe* lived in the barony of *Magunihy* and, like the *Fellubair (Velabri)* and the *Alltraighe* before them, they expanded northwards. They subsumed the *Alltraighe* by the late eighth century and adopted St. Brendan as their patron saint. Although the *Alltraighe* do not appear in the annals, they maintained enough status to leave their name on the Norman cantred of Altry in north Kerry following the invasion in 1169. It was still known in the fourteenth century that Uí

Néidhe (Neville) and Clann Conaire were the leading families of the Altraighe (Carney 1943, 52). Ringforts, built throughout the sixth, seventh and eighth centuries, became the homes of the strong landholders. Earthen ringforts were generally called *lios* or *rath*. Lismoyle (KE002-034) and Lisheenanulty (KE002-035) are in the townland of Astee. There are forts in Killelton (KE002-039). Carrigafoyle (KE002-04601) and Carrig Island (KE002-09), Reenturk (KE003-014) and Ralappane (KE003, 003; KE003-004). The latter placename comes from *Rath Lappáin*, the fort of *Lappán/Lapa*. Two individuals of this name are found in the early genealogies of Corcu Modruad, who lived across the Shannon in Co. Clare (O'Brien 1976, 315). Another fort in Carhoonakineely is called Cahergal (*Cathair Gheal*), meaning a bright/white stone fort (KE003-005). The proposed aquaculture development will not impact on the above ringforts.

The *Ciarraighe*, like their predecessors in the Mesolithic, Neolithic, Bronze and Iron Ages, used the shoreline for fishing. Research on the Shannon estuary has uncovered the remains of fish traps, fish weirs, wooden jetties, trackways and submerged settlements (O'Sullivan 2001). Sections of withy chains were discovered by *Mizen Archaeology* during archaeological monitoring of dredging works at Kilpaddoge, just 4km to the east of the proposed aquaculture site (O'Donoghue, 2019). It is possible that such archaeological structures could be buried in the vicinity of the proposed aquaculture sites.

5.4 Viking activity on the Shannon

The Vikings arrived in Ireland in 795 and were familiar with the Shannon estuary by 812 (Todd 1867, 4-7). In 869 the *Ciarraighe* and their neighbours massacred the foreigners. In 873 a Viking called *Báraid*, with a great fleet from Dublin, plundered *Ciarraighe Luachra* "underground, i.e. the raiding of the caves". In other words, they looted the souterrains in ringforts in which valuables were stored (AI; Todd 1867, 25, 33). The Vikings established anchorages that the Irish referred to as *longphoirt* (plural of longphort) which were fortified harbours. The word long comes from the Latin '*navis longa*'—long ship and came to mean ship in Irish; port comes from Latin '*portus*' meaning a harbour (Maas 2008, 258). Longphort was an annalistic creation coinciding with the Viking incursion and it is likely that Ballylongford became the Viking safe haven from which they plundered *Ciarraighe Luachra* in 873. In 963 it was recorded that *Congal*, the king of *Ciarraighe Luachra*, was slain. Soon afterwards the men of *Tuadmumu* (North Munster, i.e. Co. Clare) were slaughtered on the Shannon and they abandoned their vessels and were drowned (AI). Scattery Island, immediately opposite Ballylongford, was in the path of the Viking fleets as they sailed up the Shannon and was frequently raided.

The placename Ballylongford (*Béal Átha Longphoirt*) means ‘the mouth of the ford of the longphort’, indicating that there was a fording point nearby.

5.5 Early ecclesiastical dedications

St Seanán (Senan), whose mother belonged to the *Alltraighe*, founded the monastery on *Inis Cathaigh* (Scattery Island) which lies on the Shannon opposite Ballylongford (Stokes 1890, 201; Ó Riain 2011, 557). A submerged road on the eastern side of Carrig Island is called St Senan’s Road on the 1st and 2nd editions OS 6-inch maps. It was a pilgrims’ road from Carrig Island to Scattery Island (KE002-010). Another dedication to St Seanán is found in Killelton where a holy well is marked ‘site of Toberscattery’ (Scattery Well) on the 1841 Ordnance Survey map (KE002-040). The Ordnance Survey Name Books, however, say that the map should read ‘*Tober Eiltín*’. *Eiltín*, the saint after whom Killelton, (the church of *Eiltín*) is named. is primarily associated with Kinsale. A holy well in Astee West, called *Tober Eoin*, was known locally as St Owen’s Well or St Senan’s Well (KE002-033).

The Ordnance Survey recorded ‘parts of the ruins of an abbey’ on Carrig Island above St Senan’s Rd and opposite the Castle of Carrigafoyle (O’Donovan 1841). There is a holy well beside it called Friars’ Well. St *Laichtín* is celebrated in the townland of Lislaughtin in the parish of Kilnaughton immediately east of the parish of Aghavallen. *Laichtín*, who came from Muskerry, Co Cork, had a monastery in Freshford, Co. Kilkenny. He died in 622 (Ó Riain 2011, 387-8). There is no sign of the ruins of the early medieval monastery which was replaced by a friary for Franciscans of the Strict Observance, founded by *Seaán Ua Conchobhair Ciarraighe* in 1478 (Gwynn & Hadcock 1988, 254). The Observantines were members of the 15th century reform movement. *Laichtín* had a monastery in Freshford, Co. Kilkenny and died. in 622. *Seaán*, who funded the friary was the father of the builder of Carrigafoyle Castle and similarities can be seen in the architecture. There is a processional cross, believed to be from Lislaughtin and known as the ‘Ballylongford Cross’, in the National Museum of Ireland. It dates from 1521.

The parish of Kilnaughton – the church of Neachtan – is named after St Neachtan whose cult is mainly associated with Fennor in the barony of Duleek, Co. Meath (Ó Riain 2011, 512-3). John O Donovan, in the course of survey work for the Ordnance Survey in the nineteenth century, was unable to find any information associated with the dedication (O’Donovan 1841; *ibid* 1983)

5.6 The rise of Dál Cais

While the *Ciarraighe* gained influence in West Munster in the eighth century at the expense of *Eóghanacht Locha Léin*. The *Eóghanacht of Caisel* in *Oirr Mumu* (East Munster, i.e. Ormond), remained powerful until the rise of *Dál Cais* in *Tuad Mumu* (North Munster, i.e. Thomond) in the tenth and eleventh centuries. Kincora on the northern side of the Shannon, was the caput of *Dál Cais*, the leader of whom, in 970, led an army into *Ciarraighe* where he demolished many forts. It included *Dún na Fithrech (Dnnferris)* in the parish of Lisselton in *Iraghticonnor* (AFM). Lisselton lies immediately south of Aghavallen and Dunferris is accessible via a long inlet on the Atlantic coast. It seems likely that the forts of the *Ciarraighe* that overlook the current study area were also attacked by sea in the same campaign. The *Dál Cais* expedition that plundered the ringforts of *Iraghticonnor* was led by *Mathghamhain*, a brother of *Brian Ború* whose descendants, *Uí Briain* (the O'Brian's) became the ruling dynasty of *Dál Cais*. The *Ciarraighe* were their allies in 1014 when *Mac Bethad*, king of *Ciarraighe Luachra*, was killed supporting *Brian Ború* at the Battle of Clontarf. There was constant unrest both locally and further afield and in 1019 *Cú Luachra*, king of the *Ciarraighe*, was treacherously killed (AI; AFM). Another king, Flann, son of *Mathgamain*, was slain in 1032 and *Conchobar Ua Muiredaig*, king of *Ciarraighe Luachra*, was treacherously slain by his own kinsmen the following year. In 1067 the men of Leinster, Thomond and Munster went on an expedition to Connacht. Although their mission was successful, *Conchobar Ua Conchobhair*, king of *Ciarraighe Luachra*, was killed. In 1086 two *Ua Muirchertaigh* kings of *Eóghanacht Locha Léin* and *Cathal Ua Conchobhair*, king of *Ciarraighe Luachra*, killed one another (AI). There is no historical evidence that suggests that any of these events occurred in the parishes of Aghavallen or Kilnaughten. The events are relevant, however since, in the twelfth century if not before that, the headquarters of the king of the *Ciarraighe* was in Aghavallen.

5.7 Uí Chonchobhair Ciarraighe (the O'Connors of Kerry)

Surnames emerged in Ireland during the late-eleventh/early-twelfth century and leading families declared descent from a grandfather or earlier illustrious ancestor. *Ua Conchobhair* (O'Connor, i.e. grandson of *Conchobhar*) became the chief *Ciarraighe* surname. The *Ciarraighe* supported *Uí Briain* and in 1103 when three of their leaders died supporting *Uí Briain* in Ulster (AI; AU; ATig). In 1121 *Ciarraighe Luachra* was burnt from north to south (AI) but the perpetrators are not named.

In the late eleventh century *Uí Briain* became the most influential power in Munster and moved their powerbase across the Shannon from Kincora, County Clare, to Limerick. They pushed the leading families of *Eóghanacht Chaisil* into *Des Mumu* (i.e. Desmond) where *Mic Cárthaigh* – the

descendants of *Cárthach* – established themselves as kings of Des Mumu (Desmond). In 1124 Cormac, the son of *Mac Cárthaigh* banished *Cú Luachra*, the king of *Ciarraighe*, and the kings of *Eóghanacht Locha Léine* and *Corcu Duibhne*. The following year the foreigners of *Luimnech* (Limerick) and the *Ciarraighe* were massacred by *Uí Briain* (AI). This suggests that the *Ciarraighe* were disloyal to *Uí Briain* by supporting the Vikings of Limerick. In 1128 *Mac Cárthaigh* went into *Ciarraighe Luachra* in a great fleet. *Ua Conchobhair*, king of the *Ciarraighe* is said to have behaved treacherously and killed some of their followers before they retreated (AI; MIA). In 1130 *Mac Craith Ua Conchobhair*, son of the king of *Ciarraighe Luachra*, was treacherously slain in the ‘*tearmon*’ – sanctuary – of Scatterry Island (AI). In 1134 *Uí Briain*, who had a truce with *Mic Cárthaighll* of Desmond, withdrew support from *Cormac Mac Cárthaigh* which effectively divided Munster into two rival spheres of influence. The *Ciarraighe* sided with *Uí Briain* while *Eóghanacht Locha Léin* supported *Mic Cárthaigh*.

5.8 Astea and Diarmaid Súgach Ua Conchobhair

According to the Ordnance Survey Name Books, *Eas Duibhe* (*Astea*) is named after a black quarry near a waterfall. The part of stream where the waterfall was, was quarried before the Name Books were compiled in the early 1800s and there was no sign of a waterfall.

Diarmaid Súgach Ua Conchobhair Ciarraighe was king of *Ciarraighe Luachra* between 1142 and 1154. The adjective ‘*súgach*’ means ‘merry’. In 1138 he took part in the assassination of the powerful *Cormac Mac Cárthaigh*, described as “king of the two provinces of Munster”, i.e. Desmond and Thomond, at the instigation of *Toirdhealbhach Ua Briain* (MIA). According to the annals, Diarmaid erected an Easter house, the “*Cáisc*” of *Eas Duibhe*, in 1146 (MIA; DAI). *Eas Duibhe*, anglicised ‘*Astea*’, is less than five kilometres west of Ballylongford. The structure and site of the *Cáisc* (Easter House) is unknown.

Diarmaid proved his loyalty to *Toirrdelbhach Ua Briain* again in 1151 when he helped Tadhg, son of *Diarmaid Ua Briain*, capture *Toirrdelbhach*’s son *Muircheartach Ua Briain* who had deposed his father. *Mic Cárthaigh* saw the dissent among *Uí Briain* as an opportunity and attacked them and their allies, including *Ua Conchobhair Ciarraighe*. *Mic Cárthaigh* spent a night in *Ciarraighe Luachra* burning and plundering. The following day the *Ciarraighe* routed them (MIA).

Diarmaid Súgach was north of the Shannon at the time. He crossed the river to *Ciarraighe* (Kerry) with large forces and met *Toirrdelbhach Ua Briain* in *Uí Chonaill Gabra*. Diarmaid allegedly brought seven ships on wheels from *Eas Duibhe* (*Astea*) to *Loch Léin*. Desmond was laid waste in the war. *Mic Cárthaigh* asked *Ruaidrí Ua Conchobhair*, king of Connacht, and *Diarmaid Mac Murchadha*, King of Leinster, for help against *Uí Briain*. The Battle of *Móin Mór*, not far from Fermoy, ensued

in which *Uí Briain* were defeated and thousands allegedly slain (MIA). *Toirrdelbhach Ua Briain* and *Diarmaid Súgach Ua Conchobhair*, with a few horsemen escaped northwards over the River Blackwater. *Mic Cárthaigh* then went into *Ciarraighe* where they plundered and levelled the houses and *dúnta* (fortresses). They searched their *daingneaca* (defences/fortresses) and their woods and carried off hostages from *Ua Conchobhair* for whom Diarmaid soon paid a ransom. In 1152 *Toirrdelbhach Ua Briain* went to *Ciarraighe* to support *Ua Conchobhair* against *Mic Cárthaigh*. *Toirrdelbhach* and *Diarmaid Súgach* were driven out of the territory which was destroyed and plundered. *Mac Cárthaigh* put *Mac Beathadh* and *Mac Craith*, two sons of *Diarmaid Súgach's* father, in charge. *Uí Briain*, meanwhile, made peace among themselves and attacked *Mic Cárthaigh* in *Uí Chonaill Gabra* while supporters of *Mic Cárthaigh* attacked the *Ciarraighe* territory. In 1153 there was a great famine in Munster because of the war (MIA). *Diarmaid Súgach* died in 1154 after much suffering (MIA). It is unlikely that the ships he brought to *Loch Léin* in 1151 returned to *Astee*.

Following the defeat of *Toirrdelbhach Ua Briain*, *Diarmaid Súgach Ua Conchobhair* and their allies by *Mic Cárthaigh* and their allies in the Battle of *Móin Mór* in 1151, the profile of *Uí Chonchobhair* diminished as they were absorbed into the kingdom of Desmond. Their loyalty nevertheless remained with *Uí Briain*.

The castle in *Astee*, marked on Smith's map of 1756, was not built by *Diarmaid Súgach Ua Conchobhair* since the first stone castle in Munster was built in Adare by *Domhnall Mór Ua Briain* c. 1193 (Devane 1916, 59-60). It is recorded that "the (castle) contained huge boulders and that none of the stones had been dressed. Mortar containing hair and sea shells was used in the construction" (Toal 1995, 274). Smith's map shows that the castle was in the village of *Astee* and not in proximity to the BIM project area. Following the defeat of *Toirrdelbhach Ua Briain* and his allies in the Battle of *Móin Mór* in 1151, the profile of *Uí Chonchobhair* diminished and the sub-kingdom of *Ciarraighe* was included within the kingdom of Desmond. *Ciarraighe* loyalty, nevertheless, remained with *Uí Briain*.

Toirrdelbhaach Ua Briain, king of Thomond, died in 1168 and was succeeded by his son, *Domhnall Mór Ua Briain* who, in 1175, plundered the churches of the *Ciarraighe*. It is not known if the churches in the parishes of Aghavallen and Killnaughter were attacked. When a great war broke out between *Uí Briain* and *Mic Cárthaigh* in 1177 much of Munster was laid waste. Church and lay property was destroyed and the leaders of *Ciarraighe Luachra* crossed the Shannon into Thomond (AI; MIA). *Domhnall Mór Ua Briain* was king of all Munster.

5.9 The Norman Invasion

Irish kingdoms did not unite in response to the Norman invasion in 1169 and often aligned themselves expediently with the newcomers. They continued to plunder each other and *Mic Cárthaigh* raided *Ciarraighe* in 1194. *Domnall Mór Ua Briain's* death the same year led to *Uí Briain* fighting among themselves, weakening their hold on Thomond and Munster. Traditional rivalries continued and the *Ciarraighe* were routed by *Eógancht Locha Léin* in 1200 (AI). Henry II, meanwhile granted most of the *Mac Cárthaigh* kingdom of Desmond. *Altry*, where the study area lies, was granted to two Normans, Robert fitz Stephen and Milo de Cogan. The lands were parcelled out to relatives and clients and *Altry* was given to Milo de Cogan's son in law *Simon de Poher* who, between 1185 and 1190, granted it for a fee to *William de Burgo* who conquered the region before 1203. After *De Burgo's* death in the winter of 1205/1206 Meiler Fitz Henry was granted *Altry*, divesting it before 1214 (MacCotter 2004, 40-3). William Fitz Elias, ancestor of the McElligotts, was the principal land holder in the cantred of *Altry* c. 1240 and it has been suggested that his father, Elias Fitz Norman, previously held lands there under de Burgh and later Fitz Henry and succeeded the latter as its lord. In the 1260s William Fitz Elias either sold or exchanged the *Altry* manors of Listowel and Beal with Thomas Fitz Robert whose son Maurice had married Fitz Elias' daughter. It is from this Maurice that the Kerry family known as FitzMaurice took their name (*ibid.* 62-3).

When *Ciarraighe Luachra* was colonised, *Uí Chonchobhair* retained a small measure of their hereditary lands at the northern end of *Altry*. It was most likely in recognition of their support for *Uí Briain* who joined forces with the Normans in the initial assault on north-western Desmond. *Uí Chonchobhair* collaboration with the colonists was recorded in 1212 when *Ua Conchobhair* handed his own father-in-law, who was a close ally of *Mac Cárthaigh*, over to the Normans who executed him (AI).

In the thirteenth and fourteenth centuries *Uí Chonchobhair* individuals were fined for breaches of the peace. Around 1295 *Uí Chonchobhair* intimidated the surrounding colony to such an extent that "a royal army" was called to subdue them (MacCotter 2004, 72). In 1302 Maurice Fitz Thomas, ancestor of the FitzMaurice, sought recovery of nearly two ploughlands in Aghavalalen and Lislaughtin from Simon Branagh who was the feudal tenant there (MacCotter 2004, 85, n,169). 'Branagh' is an anglicisation of the modern Irish surname '*Breathnach*' which becomes Walsh/Welsh in English. The FitzMaurices were a junior branch of the FitzGerald's whose leader, Maurice FitzGerald became the first Earl of Desmond in 1329.

The Fitz Maurices, who held a court in *Altry*, were in possession of much of the parish of Kilnaughten (MacCotter 2004, 72-3). There was collaboration between them and *Uí Chonchobhair* when, in 1325, the *Mac Cárthaigh* King of Desmond was killed by the son of Nicholas FitzMaurice

and others including *Uí Chonchobair* (AI). Around this time the Fitz Maurice lordship in Altry passed to the FitzGerald of Desmond and *Ua Conchobhair* was a tenant of the first Earl (MacCotter 2004, 72-3).

By 1335 enmity had developed between the FitzMaurices and *Uí Chonchobhair*. The sons of *Domhnall Ua Conchobhair* plundered the FitzMaurice territory and FitzMaurice's son was killed. The FitzMaurices retaliated and raided the perpetrators. The Branagh name cropped up again in 1366 when they killed *Conchobar Ua Conchobhair*, "Lord of *Ciarraighe Luachra*" (AFM). The FitzMaurices made an agreement with the Earl of Desmond in 1421 that they would hold their lands in Kerry, that included the half-cantred of Altry, subject to the Earl (Mac Cotter 2004, 65). The Irish lived in clusters of rectangular houses in this period and there was also continued use of ringforts. The Normans, built rectangular "moated house sites", only one of which is within the BIM study area in Cloonaman (KE002-037). It will not be impacted on by the BIM project.

5.10 Carrigafoyle Castle

Carrigafoyle Castle (KE002-045) was built c.1490 by *Conhcobhar Liath Ua Conchobhair Ciarraighe* whose father *Seaán* built Lislaughtin Abbey (KE003-016). The door, at the E end, was situated high above the ground so that the tide could not reach it. An illustration in George Carew's *Pacata Hibernia*, dated 1633, shows the area between the bawns which was used as a dock for boats of up to 400 tons. It seems that *Uí Chonchobhair* were able to intercept ships going up the Shannon to Limerick, board them and take a part of their cargoes, a custom that continued to the middle of the sixteenth century (Barrington 261-2; O'Grady, opposite 97). In 1837 it was written that Ballylongford's position was "favourable for export trade, the creek forming a port for lighters which bring corn and turf to Limerick. The trade in turf is very considerable from the vast supply afforded by the extensive tracts of bog in the vicinity, forming part of the possessions of TCD. The harbour has 16 feet of water at high tide (Lewis i, 142). Carrigafoyle Castle is a national monument in State care (NM no. 349).

Carrigafoyle takes its name from Carraig an Phoill – the rock of the hole. In 1756 it was described as follows:-

"This Castle is situated on the west side of an arm of the Shannon (that which extends to Ballylongford) about six paces from a Channel or Esk which lies between it and Carrick Island, and the tide surrounds it at every Springtide. The name signifies the Rock of the Hole, the Castle itself having been styled the Rock in consequence of it's strength, and there being a very deep hole near it in Esk just referred to".

The castle at Astee and the castle of Carrigafoyle were said to have been fortified by *Uí*

Chonchobhair, partly in Elizabeth's time and partly in 1641 (Smith 1756, 225). The tower-house, which was 26m in height, stood at the centre of a bawn which, in ordinary times, would have enclosed a dock for boats (Toal 1995, 274-6).

5.11 The Desmond Rebellion and the Siege of Carrigafoyle

After Christmas 1580, the Lord Justice, Sir William Pelham, requested that an admiral and the Queen's fleet, with provisions and arms, be sent to Ireland for the purpose of confiscating the towns in Fitzgerald possession. Carrigafoyle was regarded as one of these towns. The fleet sailed up the Shannon estuary to Carrigafoyle while Pelham marched with an army by land. They pitched two camps around the castle, by sea and land. On Palm Sunday Pelham brought five cannon from the ships that were anchored near Carrigafoyle and positioned them opposite the castle. The castle was held for *Ua Conchobhair* and the Earl of Desmond by an Italian engineer, Captain Julio, with 50 Irish (including women) and 16 Spaniards. Pelham's artillery battered the bawn. The western side of the castle was broken from the top to the foundations by the power of the cannons and the warders were crushed to death by the collapse. Pelham took the castle after two days and hanged the survivors. He remained for five days but was forced to go to Limerick because the ship that carried provisions had not arrived. An illustration of the siege, with the cannon in position and the ships on the Shannon, dating 1633, survives among George Carew's papers (AFM v; O'Grady i, 1896, 94-97; Fig. X+4, opposite p.95). Towards the end of the Desmond rebellion "*O Conywr de Kery*" was among the earl's followers who gave hostages to the administration (Sayles 1966, 26-7).

5.12 The Desmond Survey

Following the death of the Earl of Desmond in 1583 the Fitzgerald estates and those of his followers were confiscated by the Crown. In 1584 a survey known as the Desmond Survey was commissioned to value the land, much of which was depopulated and waste after the rebellion (1579-83). In September 1584 a survey was done along the Shannon estuary. It has no reference to fisheries in the study area. It is noted, however that "a fishing on the river Shannon belongs to the inhabitants of the country so far as it extends along the country" (Murphy, 127). The parish of Aghavallen does not appear in the Desmond Survey but the parish of Kilnaughtin does. Some of the lands in Kilnaughtin are near Tarbert and are outside the study area (Murphy 180). Other lands in the parish belonged to Scatterry Island and were valued at £6. 13s. 4d. The placenames have not all been identified but there is no evidence that they are within the study area (Murphy 192-3). Woodland described in the Desmond Survey would be representative of the woodland in

the study area. It is recorded that in Kilnaughtin “there are many woods and underwoods of divers kinds of the ages of 40, 60 and 80 years growing on the premises near the great river of Shannon containing by estimation 300 acres (Murphy 180). It indicates that the great forests along the Shannon had been felled, possibly for ship building etc., long before the Desmond rebellion. The Shannon estuary is tidal and changes in sea level would have occurred throughout millennia. Submerged forests dating back to prehistoric times have been found on the northern side of the Shannon estuary (O’Sullivan 2001, 56–61). The preserved remains of fish traps, fish weirs, wooden jetties, trackways, or submerged settlements have been found in the estuary during the course of research work undertaken by the Discovery Programme in the 1990s (Report: Archaeological monitoring on Moneypoint – Kilpaddogue subsea cable installation; O’Sullivan 2001). The placename Saleen (*Sailín*), a sub-unit in the townland of Kilcolgan, means quay, pier or wharf. It suggests there was ongoing activity at this spot in the Shannon. A hill in the townland of Ralappane is called *Cnoe Finnghlaise*, the hill of the clear river, where salmon and trout were fished as they were in other streams and rivers.

Confiscations following the Desmond Rebellion led to the ‘plantation of Munster’ and the escheated lands of north Kerry were granted to English planters between 1587 and 1592. Captain John Hollis was granted 4,422 acres in Kilnaughtin. He tried to settle, but found the Crown rent excessive (O’Connor 1982-3, 31-2).

5.13 The Nine Years’ War

The Nine Years’ War took place between 1593 and 1603 against English rule and the ongoing Tudor conquest. It was led by *Aodh Ua Néill* of *Tír Eoghain* (Tyrone) and *Aodh Ua Domhnaill* of *Tír Chonaill* (Donegal). The Fitzgeralds of Desmond who forfeited their lands after the Desmond Rebellion, saw the rebellion as an opportunity to reclaim their inheritance. In 1598 James FitzThomas FitzGerald claimed the title Earl of Desmond and was soon in charge of eight thousand soldiers. *Seaán Ua Conchobhair* of Carrigafoyle supported him. *Seaán’s* brother, *Donnchadh Maol*, was killed in 1599 by gallowglass soldiers of the Earl of Desmond. Because the *Ciarraighe* were allies of the earl in the war, it was seen a great misfortune by the earl. The Earl of Desmond was captured in 1600 and word got around that his forces were thinned, When the castle of Glin, which is upstream from Carrigafoyle, was taken without difficulty in 1600, *Seaán mac Conchobhair*, the chief of *Uí Chonchobhair Chiarraighe*, went to the Lord President, George Carew and the Earl of Thomond (*Ua Briain*) and promised to support the queen. He handed his castle at Carrigafoyle over to Carew (AFM). This gave Carew his first foothold in Kerry and a headquarters for his campaign. In return, *Seaán Ua Conchobhair* was granted 13 ploughlands (1560 acres) in

Co. Clare by Carew's ally, the Earl of Thomond (Barrington 262). In 1601 *Aodh Ua Domhnaill* marched southwards. George Carew failed to stop him and *Ua Domhnaill's* ally, FitzMaurice who had spent the previous year with *Ua Domhnaill*, retook three castles in North Kerry. *Seán Ua Conchobhair* at the same time succeeded in recapturing Carrigafoyle which had been in the possession of the English for over a year. He also made an alliance with *Ua Domhnaill*. In 1602 the Earl of Thomond went, unsuccessfully, to attack *Ua Súilleabháin Béara* and his supporters. These included both FitzMaurice and *Ua Conchobhair* of Kerry (AFM vi; Walsh 323, 325). The Nine Years' War ended in defeat for the Irish at the Battle of Kinsale in the winter of 1601-2. The Treaty of Mellifont came into effect in 1603. The Flight of the Earls followed in 1607.

The English administration, meanwhile, punished those who opposed English authority and, on 28 June 1597 Carrigafoyle, Carrig Island, Cloonaman (*Cluain na mBan*), all within the BIM study area, were granted to the provost and fellows of Trinity College Dublin. The lot comprised 20 carucates of land (c.2400 acres) that had been confiscated from *Conchobhar Ua Conchobhair* of Carrigafoyle and his brother Briain, "a gentleman" (DKPR 63, F. 6123).

5.14 The Cromwellian War

Uí Chonchobhair reoccupied the castle of Carrigafoyle during the Cromwellian war and it was one of the last castles to fall to English forces. By 1649 the castle was destroyed. The Franciscan Friary in Lislaughton was sacked in 1652, but the order survived in the area until the 1860s (Kerry Archaeological Magazine)

The Civil Survey (1654-6) describes the area around Carrigafoyle as follows:-

"There is a castle four miles distant from Tarbert which stands in a little creek that runs to the river of Shannon and in the said creek lyes ½ a ploughland called the little Island wherein is about eight acres of stubby wood and good pasturing and from the said castle runs the said creeke into the land by the Abby of Lislaughten and soe to the place called Beallalonghirt which ebbs and flowes where great boates may float" (Simington 81).

The *Uí Chonchobhair* lands in Carrigafoyle, Carrig Island and Cloonaman were granted to Trinity College Dublin in 1587 following the Desmond rebellion (DKPR 63, F. 6123). In 1666 land in the parish of Aghavallen was forfeited by "Conor O'Connor", i.e. *Conchobhar Ua Conchobhair*, in Clooneman, Killelton, Islandbeg and Lislaughtin and given to Trinity College, as was Mary Edmonds' lands in Astee (BSD). Islandbeg is probably Carrig Island. The crossover between the transactions of 1587 and 1666 suggest that Trinity College had leased some Kerry property back to *Uí Chonchobhair* who lost it again in 1666. Land in Reenturk in the parish of Kilnaughtin belonging

to “James Connor & Donnell Mc Teige” was also granted to Trinity College. Both men belonged to *Uí Chonchobhair*. The neighbouring glebe in Ralappane belonging to Dominick Richard Blennerhassett (deceased) was granted to Sir William King, Blennerhassett’s lands were confiscated because he was in the Kings Irish Army, suggesting that he fought on the side of the Royalists against Cromwell’s Parliamentary force (BSD).

Carrigafoyle and much of the barony of Iraghticonnor was confirmed to the Provost, Fellows and Scholars of Trinity College, Dublin, by letters patent dated 14 September 1666. *Uí Chonchobhair* held on to one estate. Trinity College was granted a total of 61,017 acres in Munster, 54,479 of which were in county Kerry. In the 1870s the college still possessed over 10,000 acres that included Ballylongford. Around 1909 an offer was made by the Congested Districts Board on over 9,600 acres of the College’s Kerry estate (Landed Estates Database, NUIG; Griffith’s Valuation; McCarthy 1992, 67, 157, 174, 226; Lewis i, 17).

5.15 Shipwreck inventory

The Shipwreck Inventory of Ireland includes all known wrecks for the years up to and including 1945. It is principally a desktop survey with information gathered from a broad range of cartographic, archaeological and historical sources, both documentary and pictorial.

The inventory includes over 240 known wrecking events in the Shannon, with over 30 within the Estuary. Two of which are in close proximity to Carrig Island: 19th century *Quereda* (W05867) and an unknown vessel (W15123).

A map compiled by the Underwater Archaeology Unit of the National Monuments Service illustrates several known wreck sites within the vicinity of the licenced areas (Fig. 4). Despite the continuous traffic along the Shannon from prehistoric times to the present, no specific location of a shipwreck is marked on the Wreck Viewer website made available online by the National Monuments Service, Department of Culture and the Gaeltacht. The map illustrates no wreck sites on the footprint of any of the areas. It should be noted that the precise co-ordinates of these shipwrecks site are unknown and the red dots are an indication of their approximate location.

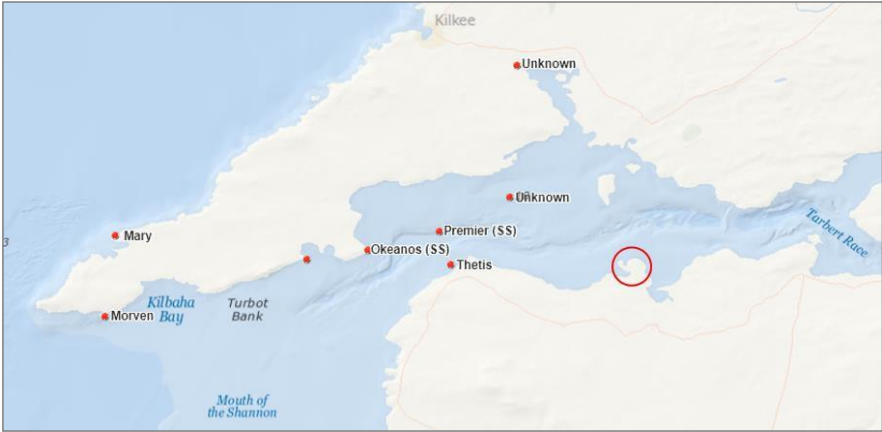


Figure 3 map taken from UAU showing known wrecks in the vicinity of the survey sites.

6. Results

6.2 Site Inspection: Intertidal survey

6.1.1 Site [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



Figure 3 1st edition survey map showing Saint Senan's Road (1841-2).



Figure 4 2nd edition survey map showing Saint Senan's Road (1914).



Figure 5 6 Saint Senan's road sitting within [redacted].



Plate 1 View of spit trackway KE002-010 on Site [redacted], taken from south east.



Plate 2 View of trestles along north-west border of site [REDACTED] taken from south-east.

6.1.2 Site [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



Figure 6 Close up view of sites T06/386a, [REDACTED]



Plate 3 View of site [REDACTED] taken from south-west.

6.1.3 Site [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



Plate 4 View of site [REDACTED], taken from south-east.

6.1.4 Site [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



Plate 5 View of metal detection survey on southern limit of Site [REDACTED] taken from north-west.

4.1.5 Site [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

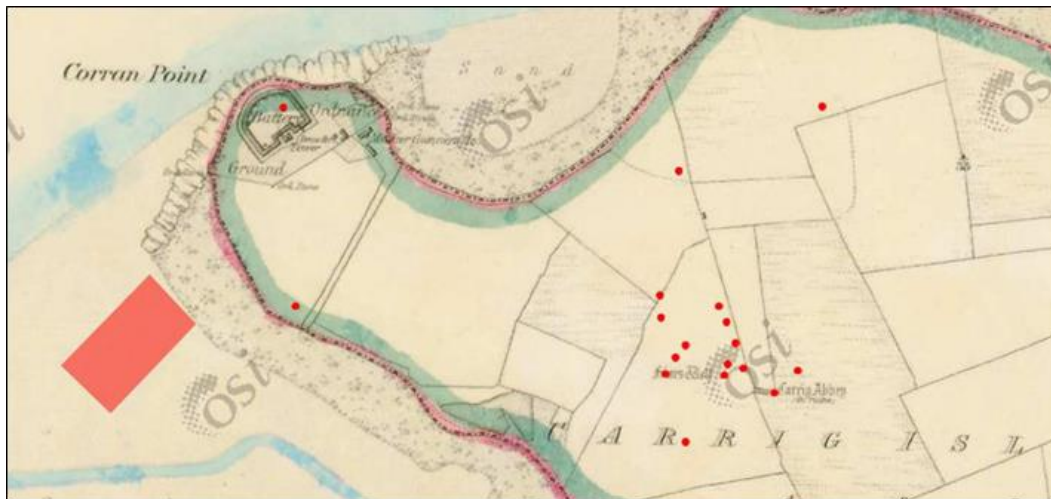


Figure 7 OSI historic first edition map from 1841-2

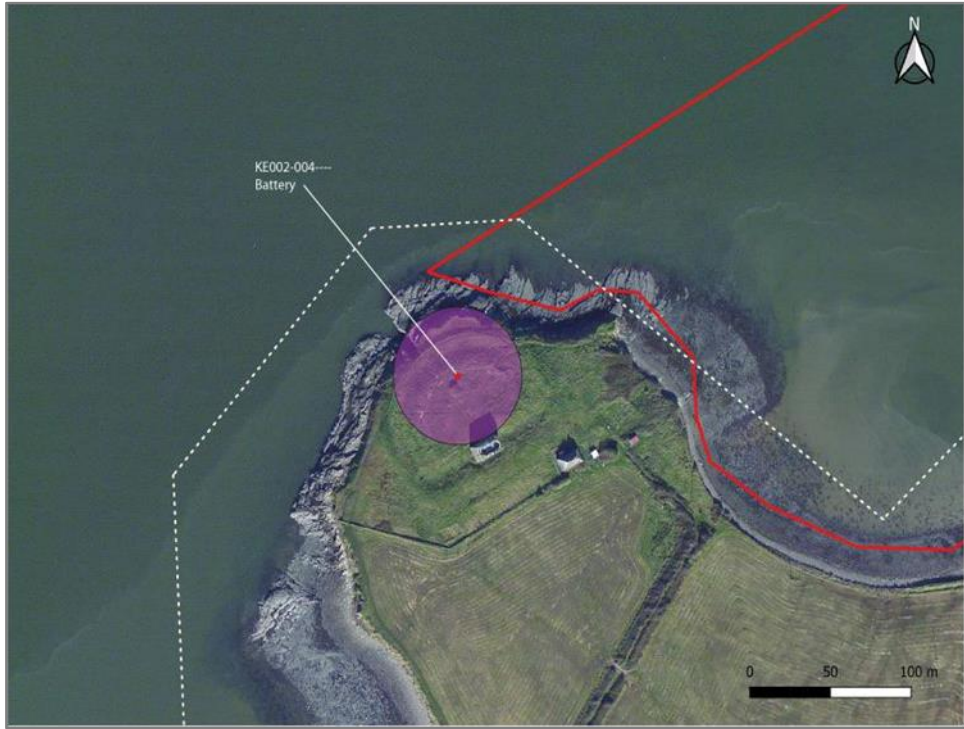


Figure 8 Battery (KE002-004----) in proximity to the survey area.



Plate 6 View of fulacht fiadh (KE002-007) in bank stratigraphy on shore east of site [REDACTED], taken from south-w



Plate 7 View of battery (KE002-004), taken from north.



Plate 8 View of site [REDACTED] with battery (KE002-004) on headland, taken from west.

4.1.6 Site T01/386A

The designated access route leads from an unnamed road to the north of the R511 onto the foreshore in a northerly direction towards [REDACTED], and then turns in a north-northwest direction to the site.

The access route transverses the stony upper foreshore which is clad in seaweed. The seabed within the cultivation site is comprised of firm medium grained brown sand (Pl. 11). A single isolated timber was noted close to the southern limits of the site (Pl. 12). The timber measured 1.28m x 0.33m and tapered from 0.28m to 0.08m. It is very eroded and displays no evidence of fixtures.

Nothing of archaeological significance was noted in the visual and metal detection survey.



Plate 9 View of Site 386A, taken from south



Plate 10 View of southern limit of site 386A with timber, taken from west.

4.2 Site Inspection: Geophysical survey

The geophysical survey of sites [REDACTED] was undertaken by *Hydromaster* in March 2019 and complied with due regard to the unpublished guidelines for the undertaking of maritime geophysics provided by the Underwater Archaeology Unit (UAU) of the Department of Culture, Heritage and the Gaeltacht.

The instruments used were a vessel mounted sidescan with 900 KHz with chirp compression. The magnetometer survey was carried out using a G882 Self-oscillating split-beam Cesium Vapor marine magnetometer which was towed behind the vessel. It has a 0.01 nT sensitivity at a data collection rate of 10 Hz.

The survey produced no targets in site [REDACTED]. Two potential archaeological anomalies were identified in [REDACTED] OFO. Ten potential archaeological anomalies were identified within the confines of site [REDACTED] and another three are located in close proximity to the site

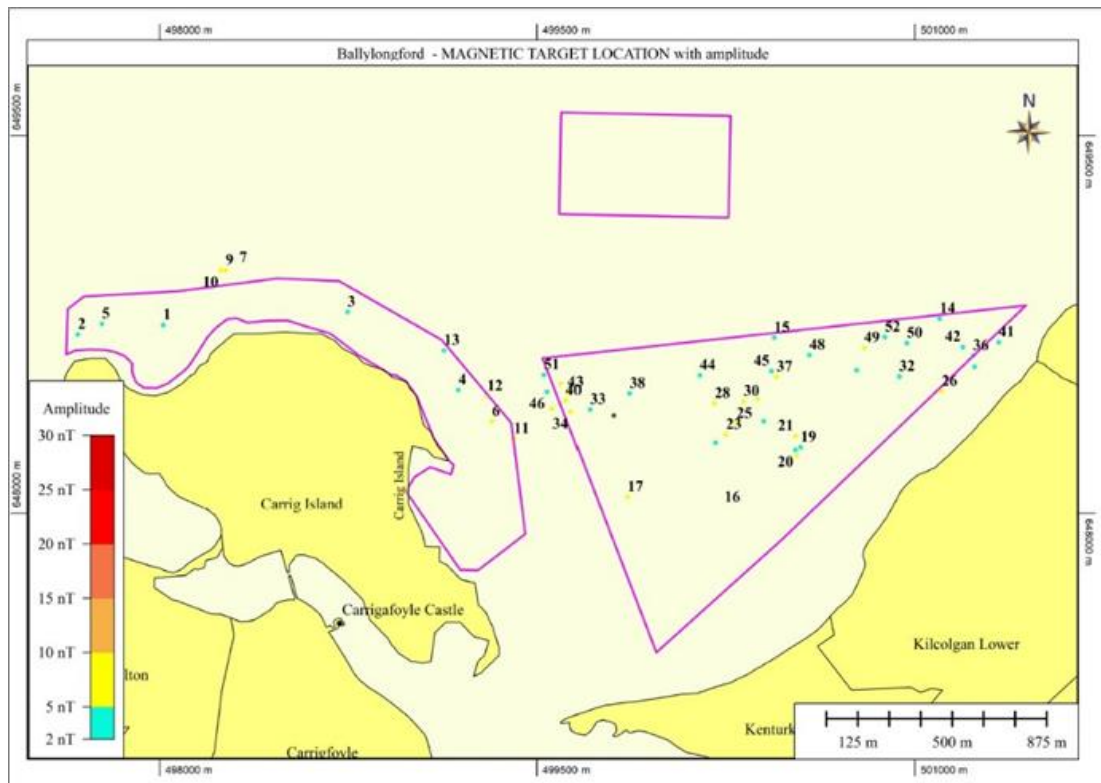


Figure 9 Magnetic target locations.

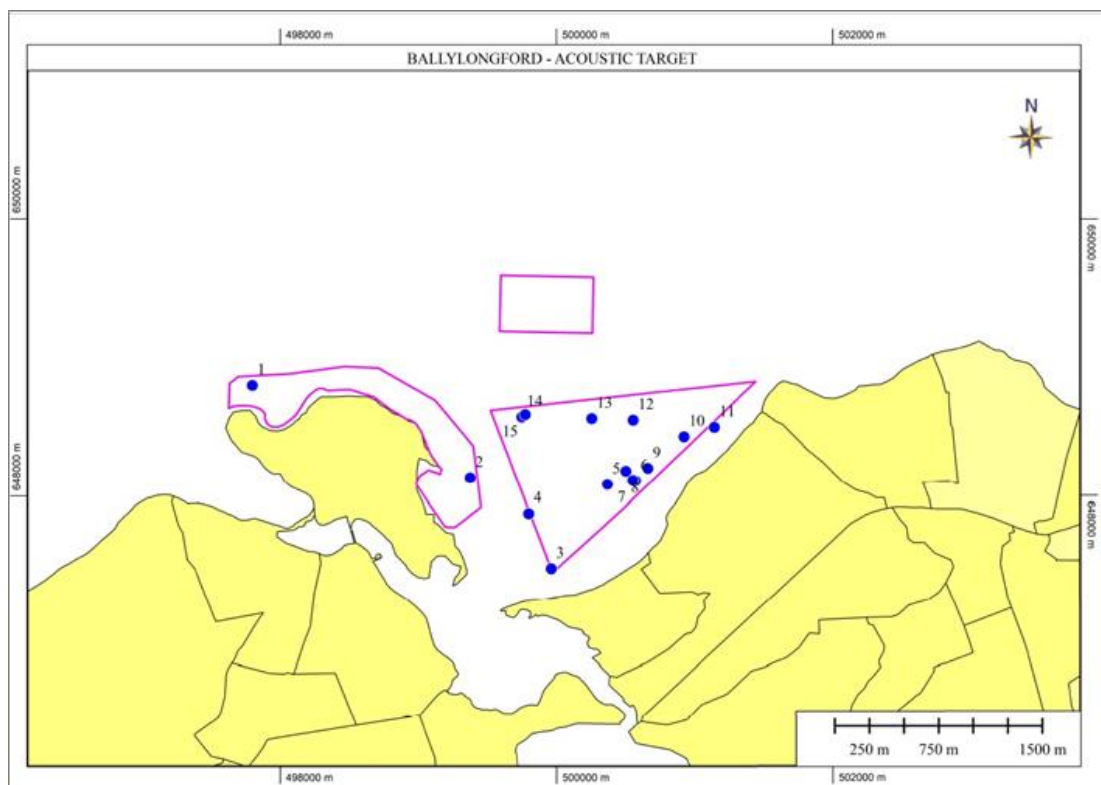


Figure 10 Acoustic target locations

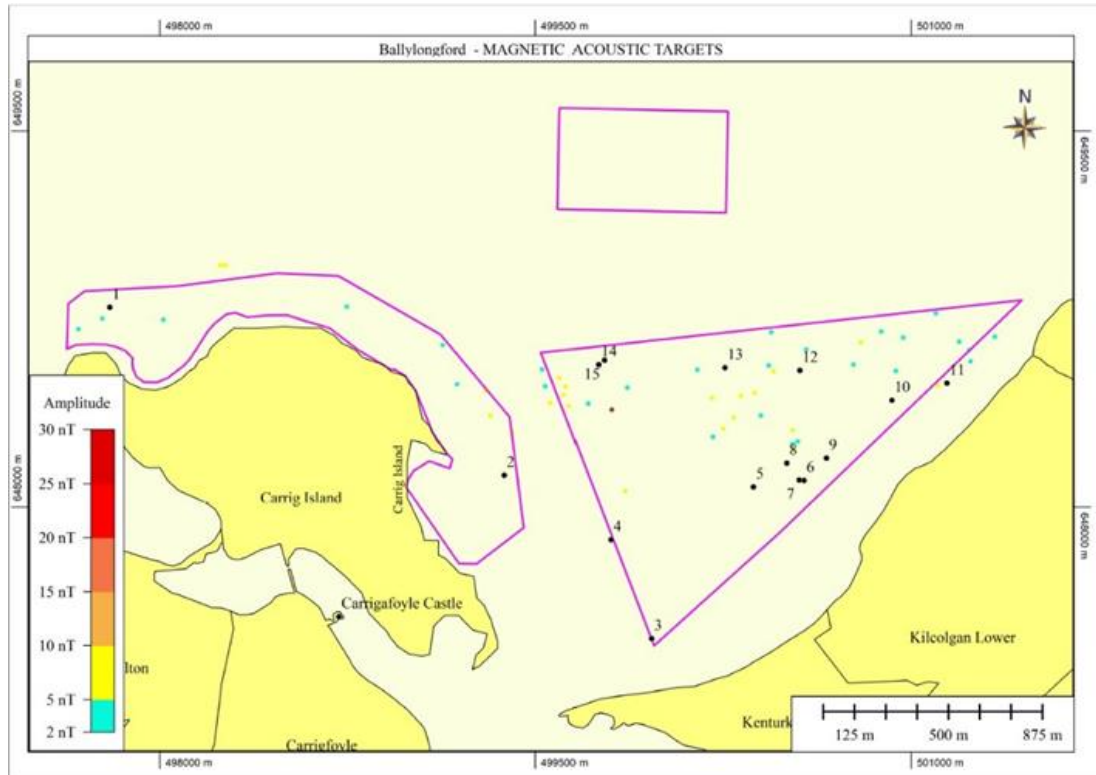


Figure 11 Magnetic and acoustic targets,

5. Impacts and Mitigation

██████████ and 386A

Consultation of cartographic and archaeological sources as detailed in Section 4 did not identify any known archaeological sites on the access route or cultivation areas. Nor did the inter-tidal survey reveal any previously unrecorded archaeological sites. However, it is possible that archaeological remains such as fish weirs, landing areas, coherent sections of wrecks and associated artefacts may be contained within the underlying subsea sediment.

It is possible that the passage of tractors or other vehicles to and from the cultivation area may compress upon unknown buried archaeological remains. However, given the nature of placing the short legs of the trestles directly onto the surface of the foreshore, there will be minimal disturbance to potential buried archaeological sites.

The likely direct impact of the development on known archaeological sites is classified as null. The likely direct impact of the development on potential unknown archaeological sites is classified as imperceptible. No further archaeological mitigation measures are deemed necessary for sites ██████████ and 386A

[REDACTED]

[REDACTED]

[REDACTED]

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Ordnance Survey of Ireland online historic mapping www.osi.ie

Appendix I – Previous archaeological investigations

A search of the excavations database was made of the town of Ballylongford. The results of archaeological investigations in Ireland are published in summary form on Excavations.ie

Excavation No	Licence No	Summary
2019:014-Coolkeragh, Kerry	18E0486	Site is located c. 5.5km west of Ballylongford. Four test trenches were excavated and no features of archaeological significance were uncovered.
2017:155-Leanamore Windfarm	17E0022	Development works associated with the construction of the windfarm required topsoil monitoring. No archaeologically significant features or artefacts were uncovered.
2014:092-Lislaughtin, Ballylongford	14E0147	Topsoil removal was monitored during the Ballylongford- Tarbert Sewerage Scheme. No thing of archaeological significance was uncovered.
2012:409-Sroolane North, Limerick	12E0024	Test trenches were undertaken for a road development. In one trench a Bronze Age cremation of a juvenile was uncovered and fully excavated.
2009:427-Ballymacasy, Ballylongford	08E1022	Test excavations were undertaken at a proposed development site in the village of Ballylongford, Co. Kerry, within and adjacent to a farmyard complex. A total of eight test-trenches were excavated. Nothing of archaeological significance was uncovered.
2009:426- Ballyline West	08E0989	An investigation was conducted to define the extent of the enclosing elements of ringfort KE005-023. Two test trenches were opened to define the ditch, but were not successful in finding the ringfort limits.
2008:644-Tullahinnell North, Kerry	08E0972	Nine test trenches were opened in advance of a windfarm development. Nothing of archaeological significance was uncovered.
2008:631-Alappane and Kilcolgan Lower, Co Kerry	08E0587	Linear test trenches were excavated for the proposed Shannon LNG site. 60 areas of archaeological potential were identified throughout the site. One-third of these areas comprised burnt mounds. Other areas of potential identified

		ranged from isolated features to concentrations of activity with features including possible cereal-drying kilns, hearths, structural features various types of pits and linear features, a possible curvilinear bank and post-medieval house remains.
2008:778-Island MacTeige/Aughinish West/Glenbane Limerick	07E0805	Trench testing and monitoring were carried out prior to development of a housing project. a burnt spread as well as eight other areas of possible archaeological interest were uncovered during testing phase
2007:722- Clieveragh, Listowel, Kerry	06E1180	Topsoil monitoring was done prior to construction of a housing development. Nothing of archaeological significance was uncovered.
2007:182- St Senan's Church, Kilrush, Clare	07E0015	Monitoring of redevelopment works on property of St Senan's Church of Ireland church (CL067-011). Nothing of archaeological significance was uncovered.
2007:181-Ennis Road, Kilrush, Clare	07E0764	Five trenches were opened prior to construction works. Nothing of archaeological significance was uncovered.
2007:180-Cappagh Road, Kilrush, Co Clare	07E0725	Twenty test trenches were opened prior to road construction. No archaeologically significant materials were uncovered.
2007:151-Cappagh, Clare	07E0680	22 test-trenches were excavated prior to construction of a development. 2 areas of archaeological potential were identified, the foundation remains of a post-medieval stone building and walls, and a spread of burnt-mound material.
2003:0082Ballynote Clare	03E1455	Monitoring during construction of housing and related sewage and water facilities. Nothing of archaeological significance was uncovered.
2003:0081- West, Ballynote Clare	03E0609	Monitoring of topsoil stripping prior to housing development construction. Nothing of archaeological significance was uncovered.
2001:095- Scattery Island, Clare	01E0661	Human remains were uncovered while clearing an area for a visitor trackway. Test trenches were excavated to determine the extent of human remains and relationship to the graveyard walls. During excavation a burnt mound with a

		piece of slag was uncovered, possibly representing prehistoric occupation of the island.
2001:094- Scatterry Island, Clare	01E0660	An archaeological impact assessment was undertaken to determine a suitable dumping site for marine spoil. Twenty archaeological features were recorded between the pier and Fawley's Point. These included a possible trackway, two shell middens, two possible walls, a landing-place, a linear alignment of stone, three stone-lined drains, a possible clearance cairn, an extensive sea wall, a possible pit, an eroding cliff face containing human remains, four slipways, a vernacular cottage and an associated slipway.
2001:078- Cappagh Roadh, Kilrush, Clare	01E0313	Monitoring of topsoil removal prior to development construction. Nothing of archaeological significance was uncovered.
1992:013- 'Mooghaun Fort', Mooghaun South, Clare	n/a	A small, trial excavation was undertaken in a secondary enclosure located in the middle rampart of a hillfort as part of the North Munster Research Project. Three potentially medieval nails and animal bone fragments were recovered.

Table 2 Previous archaeological investigations in the area.

Appendix II – Previous underwater archaeological investigations

Excavation No.	Licence No.	Summary
1996:031- Knocknalappa, Clare	1996:031	4 sites were excavated to determine the potential of other Bronze Age settlement sites within the vicinity of a large Bronze Age settlement at Knocknalappa. 2 sites indicated they may be of Bronze Age, while one is likely to be an early Christian crannog.
2002:1256- Shannon River Crossing, Leahys, Co Limerick- Shanakea, Co Clare	02E0469	Monitoring of dredging operations for the laying of a submarine section of gas pipe. No archaeologically significant materials were discovered.
2009:084- River Shannon, Carrowdotia South, Co Clare and Kilpaddoge/Coolnanonna gh, Co Kerry	09D061 ; 09R155	Underwater and intertidal assessment of two cable landfall locations associated with the Tarbert to Moneypoint 220kV submarine cable project. No archaeologically significant materials were discovered.
2017:415- Foynes Port and Durnish Td., Shannon, Limerick	17D0017 ; 17R0012	Archaeological impact assessment for the Capacity Extension and Harbour Development project. Nothing of archaeological significance was uncovered.



Underwater & Land Based Archaeological Services

Ballylongford

Archaeo-Geophysical report



NOTES

Survey type	Geophysical (Sidescan sonar and Magnetometer)
Survey date	190405 to 190406
Revision	Rev 0
Report date	07/05/2019
Location	Ballylongford, Ireland
Projection	ITM

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1. Introduction

Hydromaster undertook an Acoustic and Magnetic survey in Ballylongford County Kerry, from the 05/04/2019 to the 06/04/2019, as shown on figure 1.



Figure 1: Survey area - Ballylongford

The main survey area [redacted] was in the shallow Bay by Ballylongford with an additional area to the West at Carrig island. the 3rd area, [redacted] was further North in the deeper water of the channel. The area presented some technical for traditional geophysics in such an extensive shallow area. For the most part the water depth was between -1m to +1.5 m deep (Chart Datum). The risk of running aground or damaging sensors and reduced line spacing means that progress is slightly slower than in deeper water. The additional area around Carrig Island was Rock outcrop with sand area further to the North.



Figure 2: Survey area Chart datum depths

2. Equipment used

- **Sidescan sonar**
 Due to the extremely shallow nature of the site, a vessel mounted sidescan was used in the operation. Depth limitations on the range of the equipment meant that the line spacing was reduced to 40 m from the required 50 m to ensure full coverage. The high frequency sidescan used 900 KHz with chirp compression.
- **Magnetometer**
 The Geometrics G-882 Marine Magnetometer was used for the magnetic survey. The G882 is a Selfoscillating split-beam Cesium Vapor marine magnetometer which is towed behind the vessel. It has a 0.01 nT sensitivity at a data collection rate of 10 Hz.

3. Acoustic survey result

3.1 Acoustic target location

Targets are identified where there are anomalies in the acoustic data of an area or where a return has man-made characteristics. Anything which is identified as not corresponding with its natural surroundings may be marked as a target. This could be an isolated boulder or recent debris. Positive identifications are based on the acoustic data in conjunction with any other information but should be subject to visual inspection for certainty. In total, 15 acoustic targets have been detected by the sidescan sonar, as shown in the following charts (figure 3). Those targets have been listed in the table 2. There were a number of fishing related targets observed and there was no obvious

archaeology.

In total, 15 acoustic targets have been detected by the sidescan sonar, as shown in the following chart. Those targets have been listed in the table 2. There were no targets in zone [REDACTED].

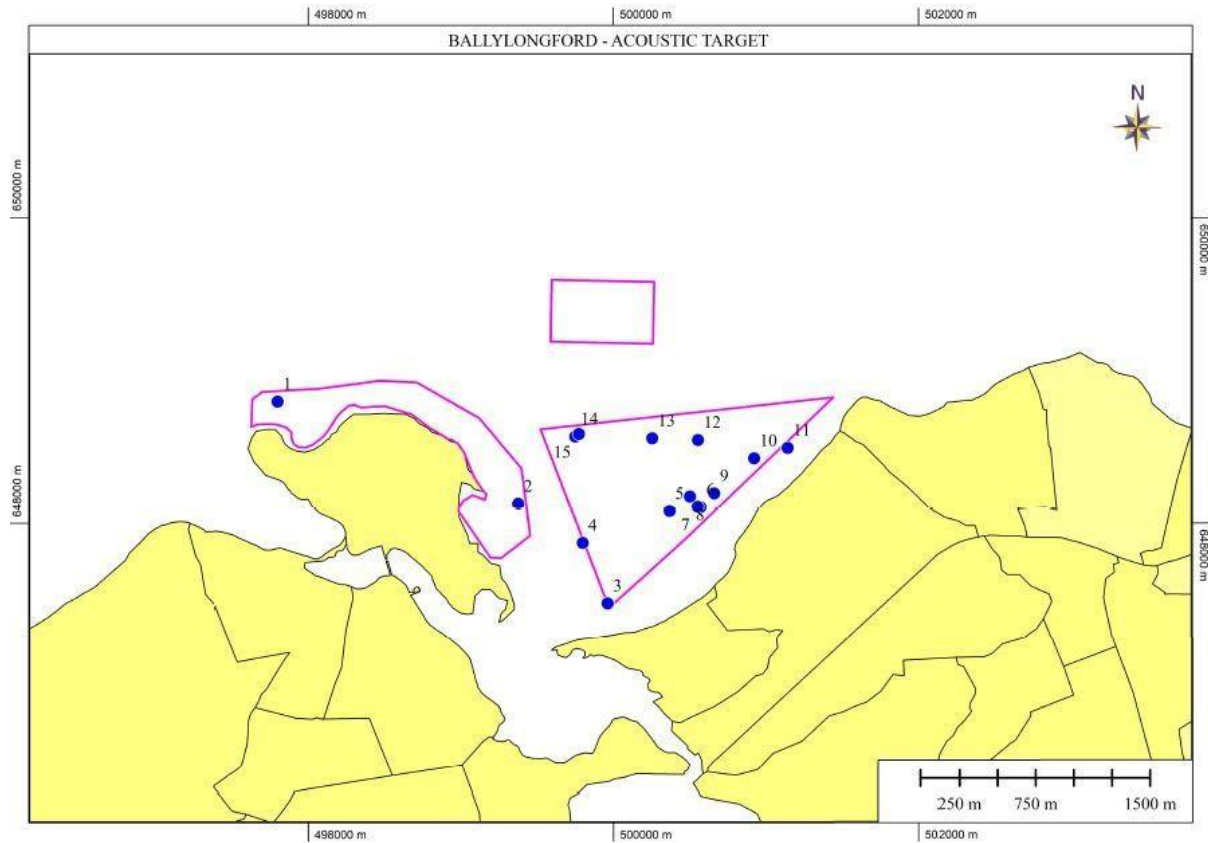


Figure 3: Acoustic targets overview

3.2 Acoustic target coordinates and description

Table 1: Acoustic target tags meaning

Tag	Meaning
N/A	Not available
U	Unknow
Cb	Cable
Cb/F	Cable and rope related to fishing
D	Debris
Mo	Mooring
F	Fishing gears

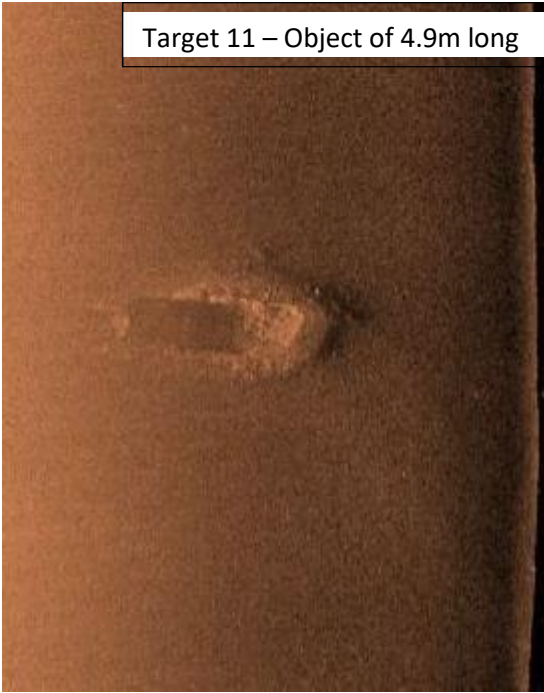
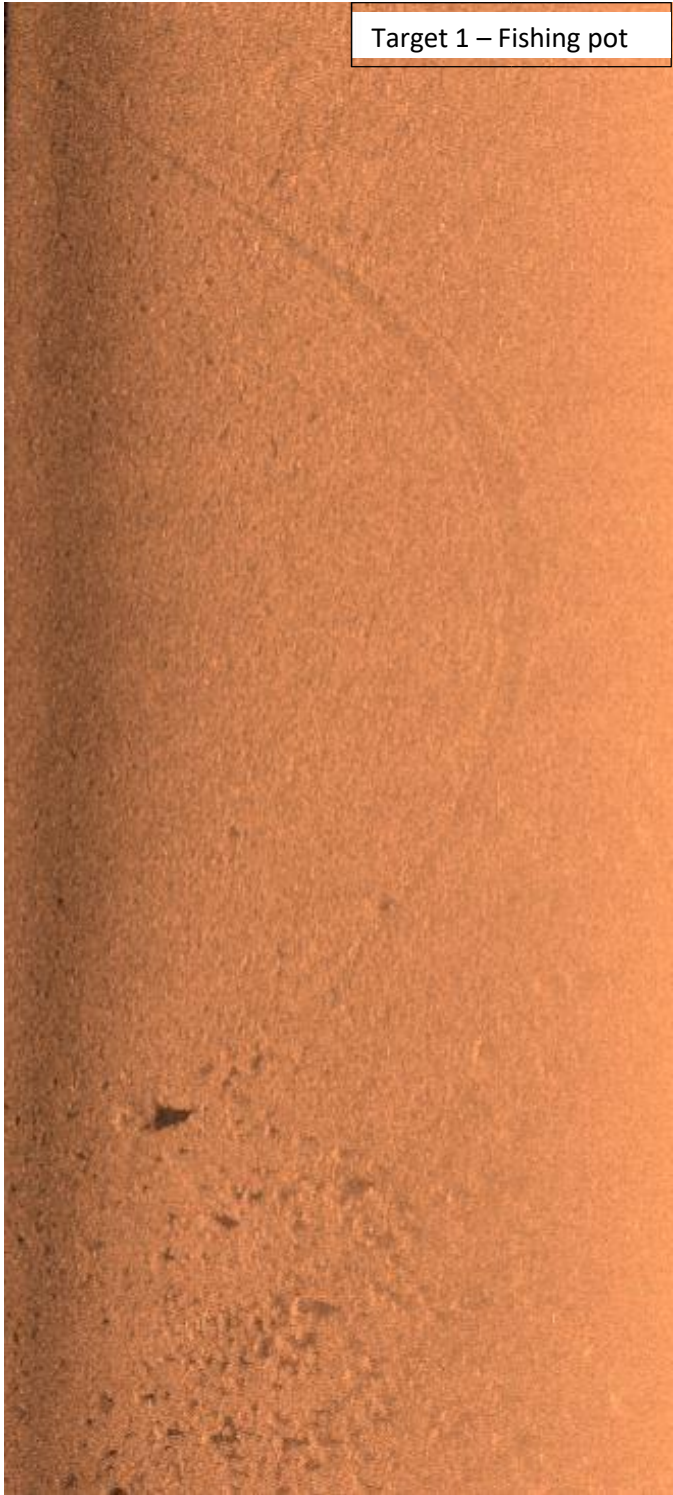
Table 2: Acoustic target list (coordinate system in ITM)

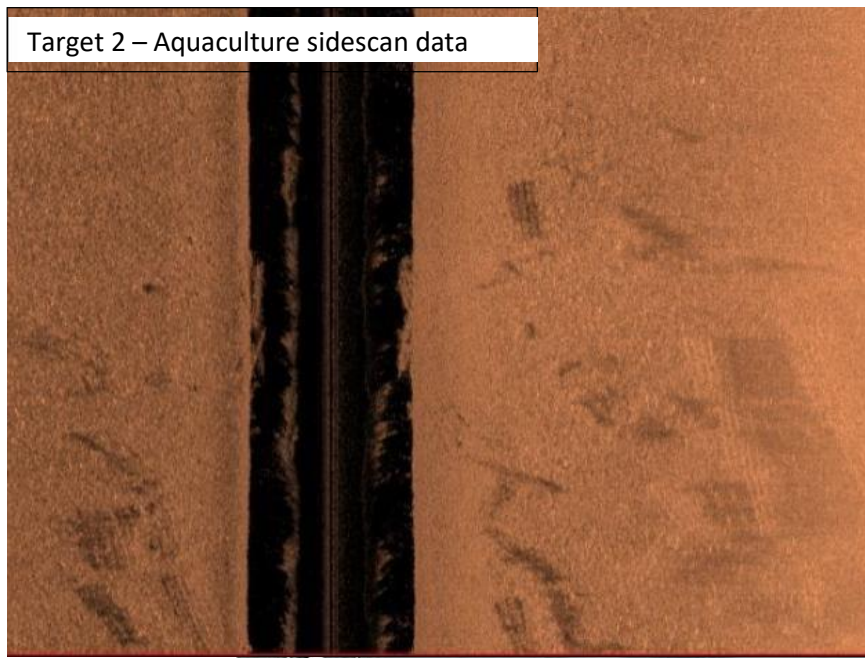
Target #	Easting	Northing	Length	Width	Height	Description	Tag
1	497799.3	648797.0	1.0	0.5	0.6	Object and line possibly fishing gear	F
2	499376.4	648126.8	9.6	2.4	0.2	Aquaculture	F
3	499962.8	647474.4	22.1	4.4	N/A	Fishing pots	F

4	499799.9	647869.2	2.1	0.2	N/A	Unknown object	U
5	500368.8	648079.5	5.8	N/A	N/A	Unknown object	U
6	500571.4	648105.8	2.2	1.5	0.5	Probably associated with aquaculture	F
7	500552.2	648107.7	2.1	0.8	N/A	Unknown object	U
8	500502.9	648175.2	8.7	1.5	N/A	Unknown object	U
9	500661.5	648195.4	4.1	0.9	N/A	Unknown object	U
10	500923.0	648425.6	1.3	1.0	0.4	Unknown object, possibly boulder	U
11	501143.1	648493.6	4.9	3.8	0.5	Unknown object	U
12	500554.8	648544.8	N/A	1.1	N/A	Unknown object	U
13	500255.2	648556.4	1.2	0.7	N/A	Unknown object	U
14	499750.8	648568.1	0.8	1.0	0.2	Unknown object	U
15	499774.1	648585.6	N/A	N/A	N/A	Unknown object	U

3.3 Acoustic target data

This section shows some example of the acoustic targets listed on the table 2.





Target 2 – Aquaculture Google Earth picture



4. Magnetic survey result

The magnetometer survey was carried out at a 40 m line spacing.

The targets are numerous and well dispersed. There is some correlation with acoustic targets, although there are a lot more. The fish was towed at about 2 meter above the seabed where possible at a speed of about 3 knots.

The analysis of the data was done in two ways. Firstly, each survey line is examined for magnetic anomalies. Looking at the table of common targets (Table 3), we can set 1 nT as the lower limit for target amplitudes. Adjacent lines are checked for correlation to confirm or identify a target (targets forming a liner pattern across many lines, for example, could be interpreted as a cable or pipeline). A table of targets is compiled and plotted on a chart.

4.1 Magnetic target list

Magnetic targets have been mapped according to their positions and amplitude (nT). The chart in figure 4 below shows the amplitude of each targets. In total, 52 magnetic targets have been detected by the magnetometer, as shown in table 4 and in the chart figure 4. There were a good spread of targets on the inshore sites but again there were no targets in zone [REDACTED].

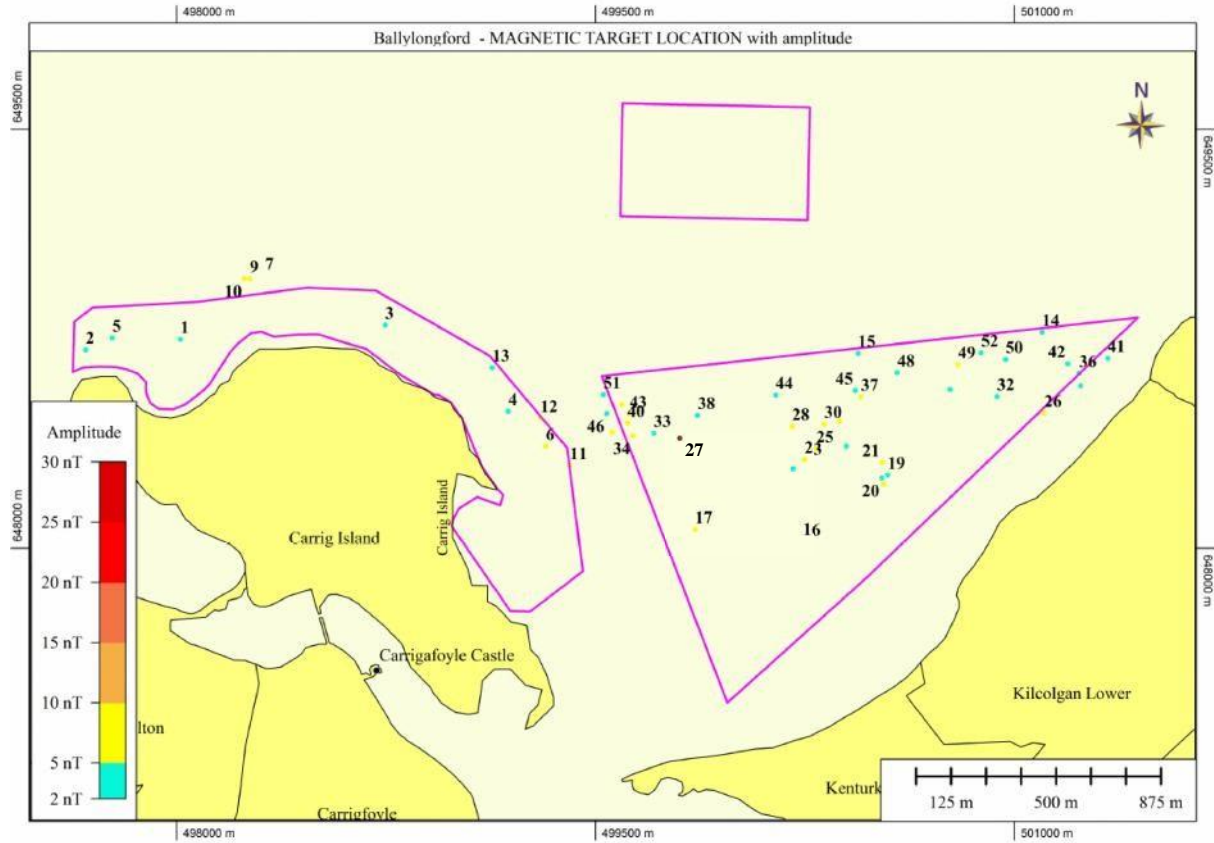


Figure 4: Magnetic targets overview

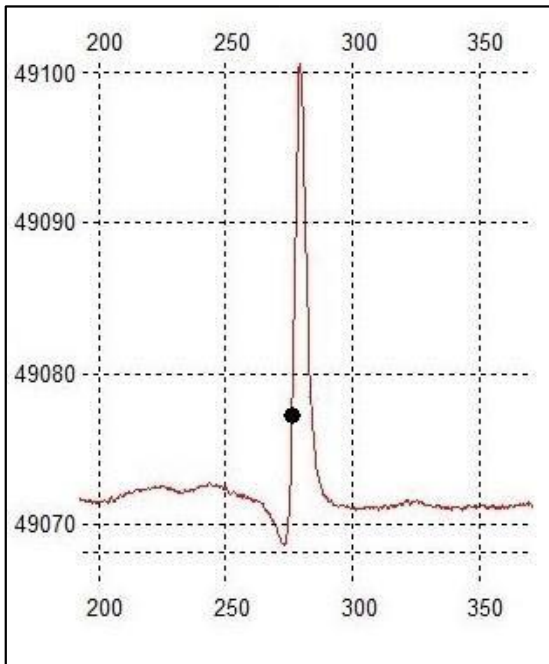
Table 3: Magnetic targets coordinates (ITM) and Magnitude field values

Target #	Easting	Northing	Amplitude
1	498013.6	648747.7	2.9
2	497673.8	648710.3	3.5
3	498746.9	648799.2	2.6
4	499187.9	648489.6	3.8
5	497769.6	648752.8	1.9
6	499321.0	648364.5	5.1
7	498316.6	648975.1	3.2
8	498289.5	648975.7	3.4
9	498262.2	648965.1	6.8
10	498241.9	648965.5	6.1
11	499407.7	648295.9	7.1
12	499302.7	648465.0	7.4
13	499130.2	648646.6	4.5
14	501334.2	648679.5	2.1
15	500439.7	648697.7	2.5

16	500242.9	648022.8	4.2
17	499857.2	648064.1	9.8
18	500531.8	648228.4	7.2
19	500546.1	648261.5	3.5
20	500525.5	648250.8	4.1
21	500526.6	648306.4	8.8
22	500207.4	648279.5	4.1
23	500248.8	648312.0	8.3
24	500399.0	648364.6	4.2
25	500290.3	648355.7	5.2
26	501106.5	648483.8	6.6
27	499802.8	648387.9	31.9
28	500203.8	648435.4	5.3
29	500373.7	648454.2	6.8
30	500319.3	648444.2	5.9
31	501237.3	648581.3	1.6
32	500938.2	648542.9	2.6
33	499708.4	648412.1	3.0
34	499633.6	648402.5	5.4
35	500769.3	648568.6	4.9
36	501231.5	648626.0	3.0
37	500450.1	648541.7	7.5
38	499865.6	648475.7	4.5
39	499559.3	648415.2	5.2
40	499614.2	648447.5	5.5
42	501191.5	648660.2	2.2
43	499621.7	648480.7	7.6
44	500145.1	648547.9	1.8
45	500430.2	648564.3	1.7
47	499595.2	648514.6	8.3

Target #	Easting	Northing	Amplitude
48	500580.6	648628.0	1.6
49	500798.2	648657.0	5.3
50	500968.1	648675.8	2.0
51	499528.2	648549.4	4.6
52	500880.4	648699.9	3.6

4.2 Magnetic target data example



5. Acoustic and Magnetic result

5.1 Associated acoustic and magnetic targets

The following chart shows the magnetic and acoustic targets, couple of acoustic and magnetic targets are co-located as shown on figure 5.

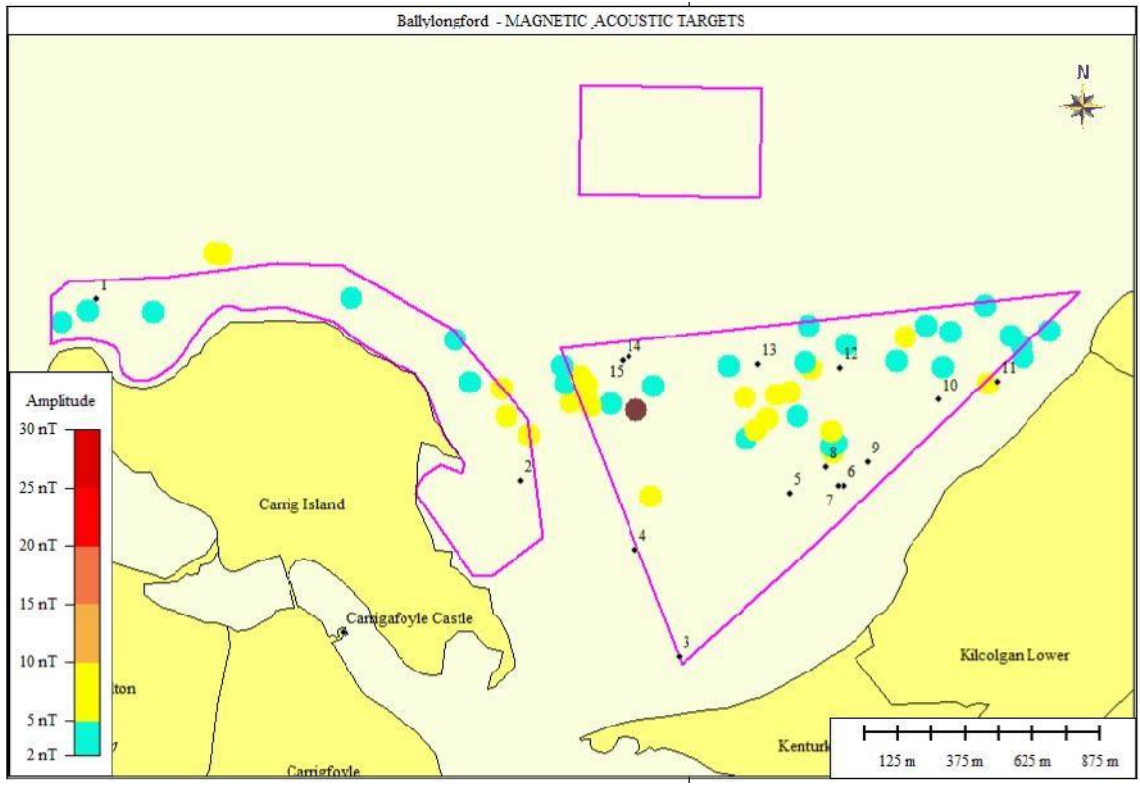


Figure 5: Acoustic and Magnetic targets

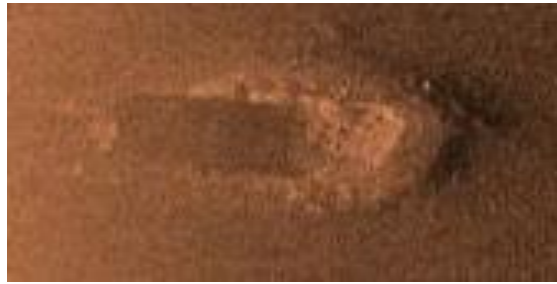
Table 4: Co-located acoustic and magnetic targets

Acoustic target #	Magnetic target #	Description
1	5	Fishing pot with probably chain.
11	26	Unknow object

Target 1 – fishing pot with chain or rope



Target 11 – Object of 4.9m



Appendices

- Chart 1_Magnetic targets_1904Ballylongford(A3 PDF)
- Chart 2_Acoustic targets_1904 Ballylongford (A3 PDF)
- Chart 3_Acoustic and Magnetic targets_1904Ballylongford (A3 PDF)

- List 1_Magnetic targets_ 1904Ballylongford
- List 2 _Acoustic targets_1904Ballylongford ▪ Sidescan target data picture

- DXF 1 – MaggyTargets_ITM
- DXF 2 – Acoustic Ta

Kelleher, Evan

From: ODonovan, Geraldine
Sent: 30 September 2019 10:22
To: Kelleher, Evan; McDonald, Bernie; Farr, Brendan
Subject: FW: Shannon Sites Ballylongford

Hi all,
Please see the MI comments [REDACTED] [REDACTED] [REDACTED] T06/386A.

Thanks,
Geraldine.

Geraldine O'Donovan

Administrative Officer

Aquaculture and Foreshore Management Division

An Roinn Talmhaíochta, Bia agus Mara

Department of Agriculture, Food and the Marine

National Seafood Centre, Clonakilty, Co. Cork, P845 TX47

An Lárionad Bia Mara Náisiúnta, Cloich na Coillte, Corcaigh, P85 TX47

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From: Francis X O Beirn [<mailto:Francis.XOBeirn@Marine.ie>]

Sent: 30 September 2019 09:21

To: ODonovan, Geraldine

Cc: Terry McMahon

Subject: Shannon Sites Ballylongford

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear Geraldine,

In relation to aquaculture site [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] site T06-386A directly overlaps with habitat considered important to Ringed Plover (i.e., dry intertidal sandy shore habitat) and therefore, the risk to this species on the basis of location (and preferred community type) cannot be discounted.

I hope this clarifies the issues for you?

All the best,

Francis

Francis O'Beirn

Team Leader Benthos Ecology

Marine Institute

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Galway, Ireland

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