

Project: Desktop Archaeological Impact Assessment Report
Lough Swilly Aquaculture sites.

Client: BIM

Written by: James Littleton & Julianna O'Donoghue

Licence No.:

Date: July 2017

🏠 61 Lady's Cross, Clonakilty, Co. Cork

☎ (023) 8858707 📠 (086) 3844831

🌐 www.mizen.ie ✉ info@mizen.ie

Contents

List of Figures	2
List of Plates	2
List of Tables.....	2
Acknowledgements	4
1. Introduction	5
1.1 General.....	5
1.2 Aquaculture Site.....	5
1.3 Conventions, Legislation and Guidelines	6
2. Methodology.....	6
2.1 The Record of Monuments and Places	6
2.2 The Shipwreck Inventory of Ireland.....	6
2.3 The Record of Piers and Harbours	7
2.4 The Excavations Bulletin	7
2.5 Cartography	7
2.6 Aerial Photography	7
2.7 Documentary sources	7
2.8 Geophysical Data	7
3. Consultation.....	7
4. Receiving Environment	7
4.1 Location.....	7
5. Results.....	11
5.1 Cartographic Evidence	11
5.1.1 general	11
5.1.2 Eastern shore of Lough Swilly depicted on historic Ordnance Survey maps.....	11
5.1.3 Western shore of Lough Swilly depicted on Ordnance Survey maps	13
5.1.4 Admiralty Charts	14
Admiralty Chart, Ireland – North Coast, Lough Swilly, New Edition 1914.....	14
Admiralty Chart, Ireland – North Coast, Lough Swilly, Buncrana and Rathmullan Anchorages, New edition 1924.....	15
5.2 Shipwreck Inventory	15
5.3 Record of Monuments and Places	16
5.4 National Inventory of Architectural Heritage	25
5.7 Previous Surveys	29

5.6 Geophysical Data	30
6. Potential impacts of aquaculture activity on the cultural heritage of Lough Swilly	34
6.1 Introduction.....	34
6.2 Potential impacts of sites utilising bottom culture (licence renewals)	34
6.3 Potential impacts of sites utilising suspended cultures (licence renewals).....	40
6.4 Potential impact of sites utilising trestles and baskets (licence renewals).....	43
6.5 Potential impacts of sites utilising bottom culture (new applications).....	46
6.7 Potential impacts of sites utilising suspended cultures (new licence applications).....	52
6.6 Potential impact of sites utilising trestles and baskets (new applications)	54
6.8 Summary of potential impacts of proposed aquaculture activity on the cultural heritage of Lough Swilly.....	57
7. Mitigation	58
Bibliography	59

List of Figures

Figure 1: Site Location Map.

Figure 2: Map produced by INFORMAR showing locations of grab samples.

Figure 3: Extract from National Monuments Service Database, with Recorded Archaeological Monuments located close to Lough Swilly foreshore labelled.

Figure 4: Extract from Historic Environmental Viewer overlaid with aquaculture sites.

Figure 5: Extract from Extract from National Inventory of Architectural Heritage with structures located close to Lough Swilly foreshore labelled.

Figure 6: Map showing INFOMAR survey coverage on aquaculture sites.

Figure 7: Map showing areas with applications submitted for licence renewals of sites utilising bottom culture. 35

Figure 8: Schematic drawing of suspension culture mussels

Figure 9: Map showing areas with applications submitted for licence renewals of sites utilising suspension systems.

Figure 10: Map showing areas with applications submitted for licence renewals of sites utilising trestles and baskets.

Figure 11: Map showing areas with applications submitted for new licence of sites utilising bottom cultures.

Figure 12: Map showing areas with applications submitted for new licence of sites utilising suspension systems.

Figure 13: Map showing areas with applications submitted for new licence of sites utilising trestles and baskets.

List of Plates

Plate 1: Dredge mouth and mud bar (photo courtesy of BIM).

Plate 2: Typical oyster trestle.

List of Tables

Table 1: List of proposed aquaculture sites in Upper Lough Swilly.

Table 2: Instances of shipwrecking within general area of proposed development in Lough Swilly

Table 3: List of archaeological sites in the Record of Monuments and Places close to the foreshore of Lough Swilly, within the general area of proposed aquaculture development.

Table 4: List of sites of architectural importance in the National Inventory of Architectural Heritage on the shoreline of Lough Swilly.

Table 5: Coverage of INFOMAR survey on Aquacultural site, new applications highlighted in blue.

Table 6: List of aquaculture sites utilising bottom cultures whose licences are being sought for renewal in Upper Lough Swilly.

Table 7: List of proposed aquaculture sites which utilise suspension systems and whose renewal is being sought.

Table 8: List of proposed aquaculture sites which utilise trestles whose renewal is being sought.

Table 9: List of proposed aquaculture sites utilising bottom cultures in Upper Lough Swilly for which new licences are being sought.

Table 10: List of proposed aquaculture sites involving suspended cultures in Upper Lough Swilly for which new licences are being sought

Table 11: List of proposed aquaculture sites involving trestles in Upper Lough Swilly where a new licence is being sought.

Acknowledgements

The Archaeological Impact Assessment was funded by Bord Iascaigh Mhara (BIM). We would like to thank Joanne Gaffney and Donal Maguire of BIM for their assistance during the project. We would also like to acknowledge the contribution of Karl Brady who provided details of previous surveys in Lough Swilly and Pdraig Cronin maritime archaeologist and assistant hydrographer at Hydromaster Ltd. who assisted with assessing INFOMAR data.

1. Introduction

1.1 General

This report comprises an archaeological desktop assessment of proposed aquaculture sites in Lough Swilly, Co. Donegal. The aim of the assessment was to determine the significance of the known archaeology, identify previously unrecorded archaeology; and to recommend mitigation measures to minimise negative impacts on any potential archaeological remains. The assessment was carried out by *Mizen Archaeology* on behalf of *Bord Iascaigh Mhara*.

1.2 Aquaculture Site

The culture methods to be adopted at the aquaculture sites are a mix of (1) Bottom cultures of mussel and native oysters (farmed using dredges), (2) Intertidal trestle and basket cultures of pacific oysters (accessed via tractor or boat) and (3) Suspended culture of mussels (a long line or BST system – floating systems with anchors placed on the seabed). The sites in question are a mix of those previously farmed and whose renewal is being sought, and new sites which are outlined in the table below.

Site	Species	Culture Method	History
T12/037A1	Mussel	Bottom culture	Renewal-previously under culture
T12/037A2	Oyster (Pacific)	Trestles and baskets	Renewal-previously under culture
T12/037B1	Mussel	Bottom culture	Renewal-previously under culture
T12/037B2	Mussel	Bottom culture	Renewal-previously under culture
T12/037B3	Oyster (Pacific)	Trestles and baskets	Renewal-previously under culture
T12/037B4	Oyster (Pacific)	Trestles and baskets	Renewal-previously under culture
T12/037C	Mussel	Bottom culture	Renewal-previously under culture
T12/211B	Mussel	Suspended culture	Renewal-previously under culture
T12/211C	Mussel	Suspended culture	Renewal-previously under culture
T12/251A	Mussel	Bottom culture	Renewal-previously under culture
T12/251B	Oyster (Pacific)	Trestles	Renewal-previously under culture
T12/273 A	Mussel	Bottom Culture	Renewal-previously under culture
T12/275F	Mussel	Suspended	Renewal-previously under culture
T12/278A	Mussel	Bottom Culture	Application
T12/280A1	Mussel	Bottom Culture	Renewal-previously under culture
T12/284	Mussel	Suspended	Application
T12/288C	Mussel	Suspended	Renewal-previously under culture
T12/293	Mussel	Bottom Culture	Renewal-previously under culture
T12/298	Mussel	Bottom Culture	Renewal-previously under culture
T12/311A	Oyster (Pacific)	Trestles	Renewal-previously under culture
T12/317A	Oysters	Trestles	Application
T12/325	Mussel	Bottom culture	Application
T12/328A	Mussel	Trestles	Application
T12/328B	Mussel	Bottom culture	Application
T12/328C	Mussel	Bottom culture	Application
T12/328D	Mussel	Bottom culture	Application
T12/330A	Mussel	Bottom culture	Application
T12/330B	Mussel	Bottom culture	Application
T12/330C	Mussel	Bottom culture	Application
T12/339A	Oyster (Edulis)	Bottom Dredging, hand picking	Application
T12/339B	Oyster (Edulis)	Bottom Dredging, hand picking	Application
T12/340 A&B	Oyster/Mussel	Suspended	Application

T12/341 A, B, C	Mussel	Bottom Culture	Application
T12/343	Oyster (Pacific)	Trestles and BST	Application
T12/378A	Mussels	Bottom Culture	Trial Application
T12/388A	Oysters	Trestles	Application

Table 1: List of proposed aquaculture sites in Upper Lough Swilly

1.3 Conventions, Legislation and Guidelines

The 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

2. Methodology

A range of archival and documentary sources were utilised to assess the potential impacts of the proposed aquaculture sites on the cultural heritage of Lough Swilly.

2.1 The Record of Monuments and Places

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 also accessible online from the National Monuments Section (NMS) of the DAHG at www.archaeology.ie. These were used to establish the wider archaeological context of the site.

2.2 The Shipwreck Inventory of Ireland

The Shipwreck Inventory of Ireland was examined as part of the desktop research. It is principally a desktop survey of information gathered from a broad range of cartographic, archaeological and historical sources, both documentary and pictorial pertaining of shipwrecks around Irish shores of which there is an estimate 15,000.

2.3 The Record of Piers and Harbours

The Record of Piers and Harbours is a draft unpublished document compiled by the National Monuments Service. It draws on various historical sources dealing with historical piers and harbour development in Ireland.

2.4 The Excavations Bulletin

The Excavations Bulletin and its online database which contains summaries of all archaeological excavations (marine and terrestrial) carried out in Ireland, was also examined (www.excavations.ie).

2.5 Cartography

Several historic maps and charts were examined to trace the development of the harbour and assess its archaeological potential. These including the 17th Century Down Survey of Donegal, 18th Century Admiralty Charts and MacKensie's maps and 19th/20th Century Ordnance Survey Maps.

2.6 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).

2.7 Documentary sources

Several sources were examined. For a full list of all sources examined see Bibliography below.

2.8 Geophysical Data

The INFORMAR data produced by the Geological Survey of Ireland for Lough Swilly was examined for evidence of archaeological potential in the proposed licence areas.

3. Consultation

Consultation took place between Mizen Archaeology, BIM and the Underwater Archaeology Unit (UAU) of the Dept. of Arts, Heritage, Regional, Rural and Gaeltacht Affairs regarding the scope of works and the geophysical data.

4. Receiving Environment

4.1 Location

Lough Swilly is located in Co. Donegal between the peninsulas of Inishowen to the east and Fanad to the west. The bathymetry decreases gradually from 30 m at the mouth of the Lough, towards the mouth of the River Swilly, where extensive intertidal flats are exposed at low water (Montgomery et al, 2015, 124). The tidal range averages 3.5 m on spring tides and 1.4 m on neap tides.

The outer Lough comprises high, rocky cliffs, rocky offshore islands, sand dunes, salt marshes and sandy beaches, while the inner Lough is a blend of low headlands, intertidal sand and mudflats, with

mudflats being the dominant habitat and the upper shore line is generally characterised by thin boulder fields around the high water mark (ibid, 124).

The aquaculture sites occupy the upper portion of Lough Swilly. The southern extent of the area is delimited by a line running from the townland of Greenhill on the western side of the estuary to the townland of Moneyhaughly on the eastern side. The northernmost extent is a line which runs from Portbane on the western shore to Meenalooan on the eastern side. The chief features of this portion of the estuary include Inch Island, The White Strand, Bunrana Bay and Ballynarry Strand on the eastern shore, and Ballygreen Point, Aughnish Isle, Kinnegar Strand, Killygarvan Point, Macamish Point and New Bridge Bay on the western side.

Lough Swilly 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 a diversity of habitats including tidal mud flats, salt-marshes, rocky shores, and reclaimed land or polder. The mud flats are known locally as 'glar' (Johnston 2011, 35). These 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, examples of which have been found on other inlets on the Irish coastline including, for example, the Shannon Estuary (O'Sullivan 2001, 56–61). Large areas of Lough Swilly provide good conditions for the preservation of archaeological features, from the Mesolithic, through to the Neolithic, Bronze Age and Iron Age, and into the medieval and post-medieval eras. The inter-tidal mud flats provide anaerobic conditions that are necessary for the preservation of structures and artefacts made from organic material, providing insights into the past lifeways of peoples. The preserved remains of fish traps, fish weirs, wooden jetties, trackways, or submerged settlements, for example have been found in estuaries elsewhere (O'Sullivan 2001).

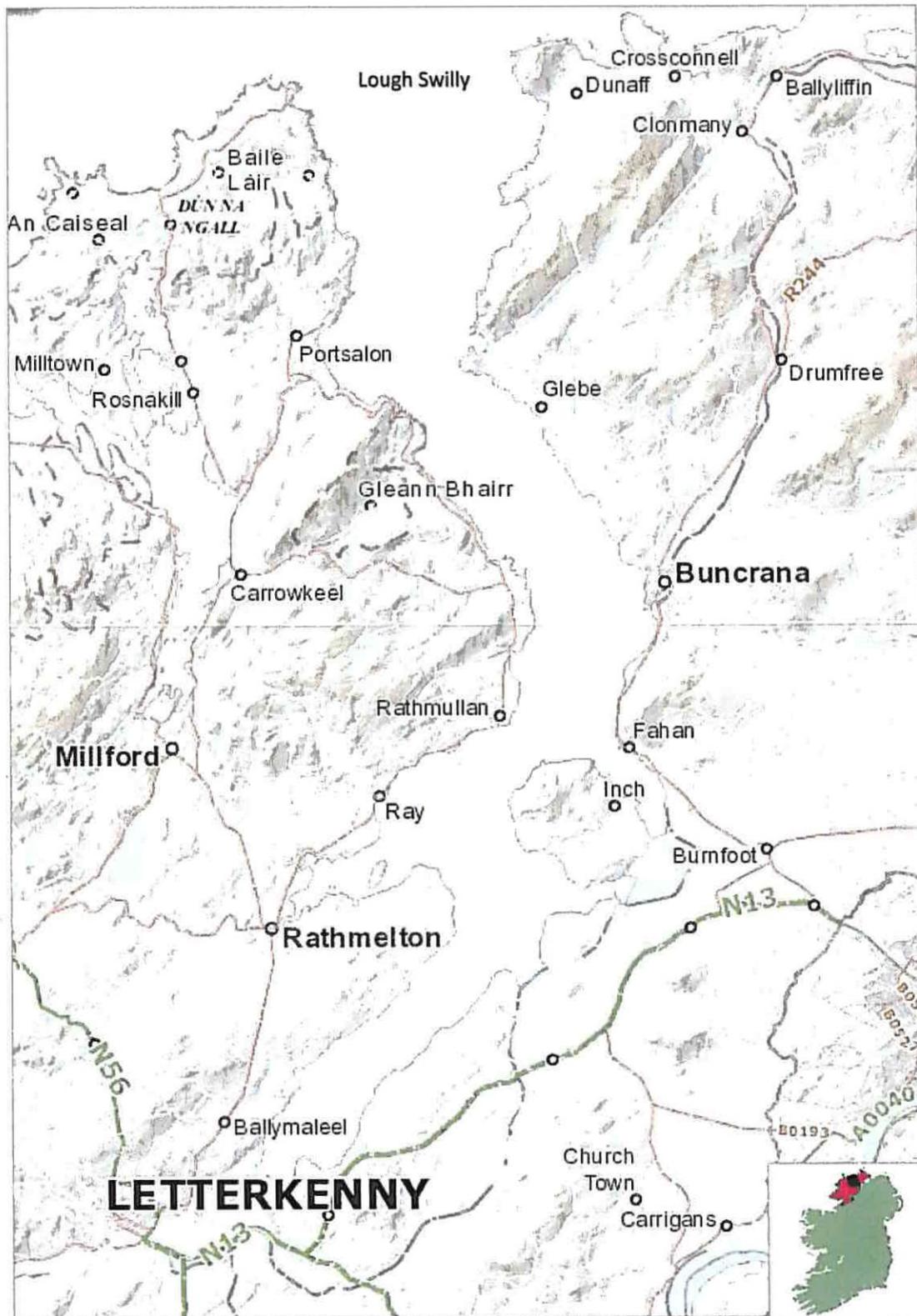


Figure 1: Site Location Map, showing location of Lough Swilly, Co. Donegal.

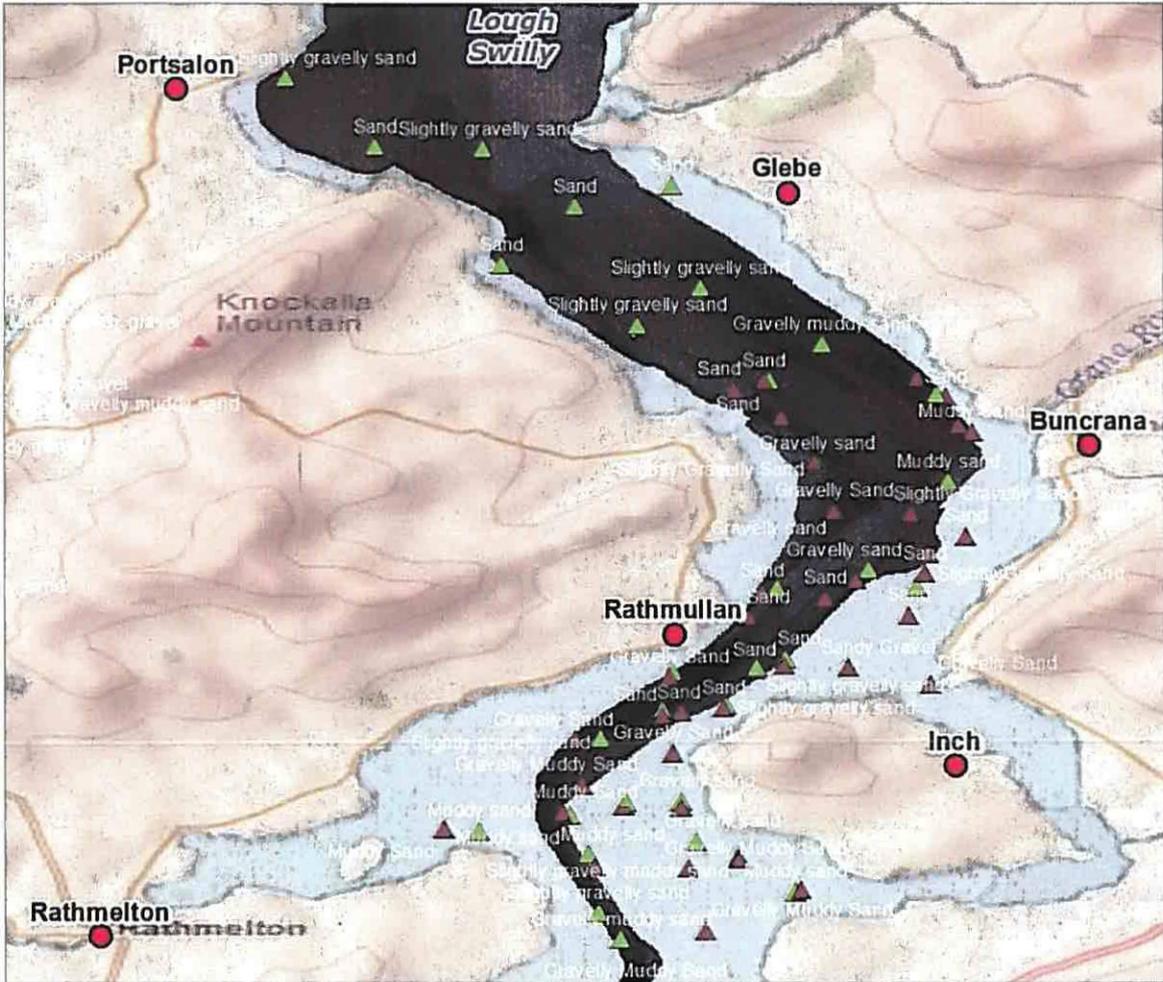


Figure 2: Extract from Map produced by INFORMAR showing locations of grab samples. A description of the samples is shown on the map. The seabed is characterised by gravelly sand in the channel and outer reaches of the lough and by muddy sand further in the inner reaches of the Lough.

5. Results

5.1 Cartographic Evidence

5.1.1 general

A number of maps were consulted to gauge the archaeological, cartographic and historical evidence for activity on the upper reaches of Lough Swilly. The earliest maps offer a baseline from which to analyse the changes which have occurred in this area of the estuary over time. Attention is drawn to aspects of settlement and landscape in the upper reaches of Lough Swilly, commencing along the eastern shore in the townland of Linsfort, and proceeding in a southerly direction down this side of the estuary as far as the townland of Moneyhaughly. Attention will then be drawn to the western side of the estuary, commencing in the townland of Portbane, and proceeding down the west side of the estuary as far as Castlewray.

5.1.2 Eastern shore of Lough Swilly depicted on historic Ordnance Survey maps

On the various editions of the Ordnance Survey maps, the coastline along the townland of Muineagh is marked by cliffs. Towards the southern end of the townland, the site of Castle Ross was marked on the second edition OS six inch map and the twenty-five inch map (c.1902) with no evidence for any standing structures. The earlier first edition OS six inch map (c.1836) does not record the presence of a castle, though three buildings partly enclosed within boundaries were depicted, though whether any of these structures were associated with the castle is not known. The coastline along the townland of Glebe and Meenalooban is similarly marked by cliffs. At the northern end of Glebe, a cave is marked as being present in the cliff line on the second edition OS six inch map and the twenty-five inch map (c.1902). On the first edition OS map (c.1836), Linsfort House is situated on a property located on the shoreline. To the rear of the house was a boathouse. There were some elements of a formal landscape in the vicinity of the house in the form of rectangular gardens and possible formal avenues. In the townland of Ballynarry, there is a stretch of unenclosed land labelled as a 'sand bed'. Later maps depict the land as part of enclosed farmland. In the same townland was a nucleated settlement called Ballynarry, which by the time of the second edition OS map had contracted in size to a couple of attached houses, testimony to demographic decline following the Great Famine of the 1840s. In the south of the townland lies Crockacashel Hill, on the summit of which are the remains of an enclosure. On the shoreline just to the southwest of the hill, beside Hegarty's Rock, is a burial site labelled as 'grave' on later OS maps, a possible prehistoric tomb known locally as the burial place of a priest killed during the penal era. On the boundary between Ballynarry and Tullyarvan at the foot of Crockacashel on the foreshore is Porthaw holy well.

At Ned's Point, on the northern side of Bunrana Bay is a coastal fortification labelled as a 'battery', which was omitted from the OS twenty-five inch sheet for security reasons. On the first edition OS six inch map, an ordnance ground is located just to the north of it. Bunrana Castle is the chief archaeological monument in this area of Lough Swilly. By the time that the surveyors arrived in the area, the medieval castle was located in the garden demesne of Bunrana House, a fine early eighteenth-century country residence. A salmon fishery weir was located close to the castle, on the Crana River as it entered the bay, though the weir subsequently disappeared by the late nineteenth century. The town of Bunrana was situated nearby, a short distance in from the foreshore. Lying

between the town and the lough was a house known as 'River View', along with its gardens. On the property was a tower, though this was not subsequently recorded as an archaeological site in the RMP or a protected structure in the NIAH. Present on the foreshore of Bunrana Bay was a bathing house, a quarry and salt pans highlighting mixed recreational / industrial usage of the estuary shore in this area. In later editions of the OS maps, a military barracks and a hotel were developed in this area. And again on later OS maps, a pier extended from the foreshore where the Mill River entered the bay on the southern side of the town. Bunrana Light was situated on this pier (for example, on the twenty-five inch series, surveyed in 1901 and published in 1902).

The White Strand is depicted as a feature on the eastern foreshore of Lough Swilly, extending from the southern outskirts of Bunrana (the townland of Ballymacarry Lower) for a number of kilometres south all the way to the townland of Figary. A railway line ran parallel to the strand, serving a train station in Bunrana. Another station stood at Rinnaraw Point. Nearby to the south, also close to the foreshore is the medieval ecclesiastical site of Fahan.

By the time of the first edition OS map (surveyed in 1833 and published in 1836), Inch Island was separate from the mainland. On later editions of OS maps (for example, the twenty-five inch series, surveyed in 1903 and published in 1904), the island was connected to the mainland with embankments extending over from Quigley Point in the east and Hill Head in the south. Since then, the stretch of the estuary inside these two embankments has been subject to extensive reclamation, creating in effect a polder called Inch Level. A small tributary bay, labelled on the first edition OS map as the Gullet has been completely reclaimed, while a headland known as Trady Point is now surrounded by reclaimed fields. A bathing house once stood on it c.1840 at the time of the first edition OS map.

On Inch Island, directly across from Quigley Point, at Bank End, was a ferry house and crossing. Moving in anti-clockwise fashion around the island, a number of sites of interest are apparent. There was a nucleated settlement in the townland of Carrickanee, which again had disappeared with only a couple of houses remaining. A nucleated settlement at Grange and Binalt did survive, however. Inch Fort was located at the northern shore of the island, then known as Down Fort, along with an ordnance ground. On the OS twenty-five inch map, it is depicted as a blank area, again presumably due to security considerations. On the south side of the island (in the townland of Glack / Bohullion), there were a couple of flax mills along with a substantial mill pond, though these had completely disappeared on later editions. Inch Castle is situated on the southernmost tip of the island and is depicted as a stand-alone building on all map editions with no apparent bawn.

On the mainland to the south of Inch Island lies a medieval castle and church in the townland of Grange. The castle, known as Burt Castle, is situated on a hill overlooking what was an inlet of Lough Swilly. Coney Island was situated inside this inlet. This inlet was subsequently reclaimed in the late nineteenth century. Continuing down the eastern shore of Lough Swilly is the location of what was the Fort Stewart Ferry (in the townland of Ballybegly) from which a causeway projected out to facilitate a ferry crossing over to the townland of Fortstewart on the western shore of the estuary. A quay was built subsequently close to this location, and the causeway is marked on a later edition OS map as being covered at high water. At the southern extent of the study area is the medieval Franciscan friary of Balleeghan where the remains of a church still stands, along with an associated graveyard. Nearby to the north was a large corn and flax mill complex with various buildings, races and mill ponds, traces of which still remain.

5.1.3 Western shore of Lough Swilly depicted on Ordnance Survey maps

The study area commences on the western shore in the townland of Bunnaton. The various OS six inch series and the twenty-five inch series maps depicts a coastline marked by cliffs, bearing names in some places such as 'Binillar', 'Binnagrann', and 'Pollacheeny'. Towards the northern end of the townland is Knockalla Battery, a triangular fortification, inside of which are a number of buildings. On the first edition OS six inch map (1836), an ordnance ground was laid out to the immediate south of the battery. On the second edition OS six inch series (c.1870s) and the OS twenty-five inch series (1904), the fort is recorded as being disused, and the ordnance ground subdivided into fields. The various farms and houses associated with the nucleated village of Bunnaton More are recorded by the OS maps to the south. The first edition OS six inch series records the infield only, while the later OS maps record both the in-field and the out-field – a pattern of landholding typically associated with post-medieval clachan-type settlements. On the later maps, Knockalla Coastguard Station had been established just to the east of the village, overlooking the cliffs, with a boat house and two slips on the shore below. A smaller nucleated settlement, Bunnaton Beg is located a short distance away to the south, but by the second edition OS six inch (c.1870s), it had contracted in size to only a couple of farms. The surrounding fields were more regular in pattern, typical of land consolidation efforts which took place from the mid nineteenth century onwards.

In the first edition of the OS six inch series (surveyed in 1834 and published in 1836), the shoreline along this side of the estuary consists of cliffs interspersed with the odd sandy inlet. New Bridge Bay is larger and contains White Strand. Nearby to the west are two corn kilns, a corn mill and a mill pond. At Muckamish Point (now Macamish Point) was a battery linked to the mainland via a drawbridge and dyke. Where the dyke met the mainland was ordnance ground, beside which on the foreshore was located a salt pans. Further south, along the shoreline, in the same townland was a 'cave' and 'old salt pans'. Kinnegar Strand is a significant topographical feature along this shoreline. Adjoining the northern side of the strand, in the townland of Glebe, lies a medieval church and glebe house, along with a country residence and gardens known as Drumhallagh House. South of Kinnegar Head is a house, a boat house and surrounding gardens known as Fort Royal. On the first edition OS map, a 'flag staff' is labelled as standing on the property, in later editions a 'tower' was recorded a short distance away.

The town of Rathmullan was located beside Kerrs Bay, in effect the southern limit of Kinnegar Strand. Rathmullan Fort is located at the eastern end of the town, commanding all approaches to the town from the water. In the town is a Carmelite Priory, later re-occupied as a fortified house, labelled erroneously on all OS maps as 'McSwynes Castle'. A few kilometres south-west of Rathmullan, along the western shore of Lough Swilly is a holy well depicted close to the foreshore in the townland of Craigmaddyroe. Much of the land along the coastline here is occupied by Rathmullan Wood. Further along to the southwest is a landing place and a couple of salt pan sites (one of which was ruined) on the foreshore, adjacent to Ray Wood.

South of Ramelton Channel, on a height in the townland of Aughinish, is a ringfort overlooking the foreshore and the nearby Aughinish Island. On this island is located a medieval church site recorded as an 'old church' on the first edition OS map (surveyed in 1834 and published in 1836), and as the site of a church and a disused graveyard on later OS map editions. South of Ballygreen Point, the estuarine flats become more extensive. In the townland of Fortstewart, there is a standing stone recorded on all editions of the OS maps, while a short distance to the south of it lies 'Fort Stewart in ruins', where two flankers – one circular, the other bastion-shaped – and part of the east bawn wall were recorded (particularly in good detail on the twenty-five inch OS map, surveyed in 1903 and published in 1904). The modern successor of Fortstewart (a country house still bearing that name) lies in the townland of

Killydonnell. The OS maps depict a ferry house and landing place on the foreshore adjacent to the grounds of the house, associated with the Fort Stewart Ferry. From this landing place extends a causeway which is covered by high water, according to the same cartographic sources. At the southern end of the townland lies Killydonnell Abbey 'in ruins', a Franciscan friary of later medieval date. On the first edition OS map c.1834, a standing stone is located short distance to the southwest of the friary, not far from the foreshore, but the prehistoric monument is not marked on later editions. In the adjoining townland of Carrowcashel, again not far from the foreshore is a 'cave' marked on all OS maps, possibly the site of a souterrain. At Eighterross lies the extensive country demesne of Castlegrove House. This demesne landscaping continues into the adjoining townland of Castlewray where a country residence of the same name is situated. This is the southern limit of the study area.

5.1.4 Admiralty Charts

Two admiralty charts were examined in the offices of the Underwater Archaeology Unit of the National Monuments Service headquartered in the Custom House in Dublin.

Admiralty Chart, Ireland – North Coast, Lough Swilly, New Edition 1914

At the southern end of the study area, just north of Big Isle, the estuary intertidal zone is quite extensive, and is described as 'mud and sand with Stones laid here and there for producing Weed'. A long linear landing causeway is depicted projecting from Fort Stewart Ferry Point on the western side of Lough Swilly. According to the chart, it was covered by the tide. On the eastern side of the estuary, just to the north of Ballybegly Point was a ferry quay. In the townland of Fortstewart, there is a ruined tower with a flax mill alongside it. On the foreshore beside this townland, stones were laid partially for producing weed. Further down Lough Swilly, on the eastern side of the estuary is Inch Island, linked to the mainland by two embankments constructed in 1855-6 according to the chart. On the southern shore of this island, Inch Castle is recorded as being in ruins. On the north side of the island was a landing place beside Down Fort (today known as Inch Fort). The Inch Flats is a stretch of estuarine mudflats to the northeast of the island. The flats here were variously described as sand, shell and sweet grass to the north, and mud and slob with stones laid down for producing sea weed to the east. A long linear structure is depicted extending from the eastern shore of Lough Swilly at Castlequarter / Glebe Large.

On the western side of the estuary is the Rathmelton Channel, where the estuary bed is described as consisting of mud, sand and stones. A quay was located on the shore nearest to Brownknowe Islet. Further north along the western side of the estuary was Delap Bay, an extensive area of mudflats labelled 'The Rough Bed' consisting of shelly sand and sweet grass. In the bay, on the shoreline beside the townland of Ray was a structure described as 'Ruins or Salt Pans'. A short distance north of that, closer to Ray Wood, was a landing place. A saw mill and holy well were located on the shoreline, in the area where Ray Wood and Rathmullan Wood merged. The estuary just to the west of Rathmullan was described with stones laid down for producing sea weed, with small oysters taken at spring tide. Rathmullan Fort overlooked a 'foul ground' and 'foul anchorage'. On both sides of the estuary at this point were extensive strands – Kinnegar Strand on the western side and the White Strand / Lisfannan Bank on the eastern side. There is a significant stretch of the estuarine intertidal zone evident beside and to the north of Buncrana on the eastern side of the estuary. North again, the estuarine flats are less prominent, with a stretch running along the eastern side of the estuary, in the midst of which is Ballynarry Strand. The western side of the estuary has some flats limited to Lambs Head Bay (now known as New Bridge Bay) and Macamish Point.

Admiralty Chart, Ireland – North Coast, Lough Swilly, Bunrana and Rathmullan Anchorages, New edition 1924

At Fahan Creek, running out from the general location of Fahan School House, is a linear arrangement of stones. At Rinnaraw Point, a ruined pier was recorded as of 1921. The estuarine flat beside Rathmullan is described with stones laid down for producing seaweed, and further out sand, shells and sweet grass. At Bunrana Bay there is a bathing slip. At Moress Point on east side of Inch Island is another potential 'groin' feature to help in the dispersal of freshwater into Fahan Creek.

5.2 Shipwreck Inventory

The Shipwreck Inventory of Ireland maintained by the National Monuments Service in the Department of the Arts, Heritage, Regional, Rural and Gaeltacht Affairs (DAHRRG), includes all known wrecks for the years up to and including 1945. The entries highlight the pattern of wrecking from c.1750, after which regular records were maintained of such events. 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 at least forty-four wrecking events for the Lough Swilly area (Appendix 1). The precise location for most of these is unknown. It should be noted that the Inventory does not claim to record shipwrecking instances in any detail before c.1750. It therefore remains possible that earlier wreckings and other sea-related instances occurred in the medieval and prehistoric past, but have left no historical record.

Wreck No.	Name	Date	Location	Description
W07099	<i>Ada</i>	Aug. 1905	Exact location not known, off Ramelton Quay.	76-ton wooden schooner from Greenock
W07335	<i>Florence</i>	03/01/1924	55 08 19.000N, 07 29 29.000W Bunrana Light	220-ton iron steamship from Stockton
W11165	Unknown	Unknown	55 07 31.475N, 07 27 39.823W N of outcrop called Black Rock at Ballymacarry Strand	Ship timber
W11378	Unknown	Unknown	55 09 11.400N, 07 31 51.000W East of Port Mary Ross	Anchor
W11379	Unknown	Unknown	55 10 21.000N, 07 33 14.400W West of Colpaghs Rocks	Anchor
W11380	Unknown	Unknown	55 10 23.400N, 07 32 59.400W West of Colpaghs Rocks	Anchor

W14425	New Leader	07/09/1910	Exact location not known, Ramelton River (Channel?)	Ketch
No number	Unknown	Unknown	Exact location not known, Ramelton Channel.	Bigger than ketch

Table 2: Instances of shipwrecking with known coordinates within general area of proposed development in Lough Swilly.

5.3 Record of Monuments and Places

The Record of Monuments & Places (RMP) is a list of archaeological sites known to the National Monuments Service with accompanying RMP Maps, based on the Ordnance Survey six-inch series, which indicates the location of each recorded site. The RMP list is based on the Sites and Monuments Record files housed in the National Monuments Services offices. The Sites and Monuments Records (SMR) are lists with accompanying maps and files of all known or possible archaeological sites and monuments, predominately pre-1700AD in date, for all counties. These lists were, in many cases, initially based on cartographic, documentary and aerial photographic sources. The record is updated on a constant basis and focuses on monuments that predate 1700AD. Buildings belonging to the seventeenth-century and later are not well represented in their archive, although they are considered as archaeological sites today.

RMP No.	Co-ordinates	Townland	Site Type
DG018-031	631369, 936107	Linsfort	Promontory fort
DG018-037	631477, 935921	Linsfort	Promontory fort
DG018-038	631739, 935582	Linsfort	Promontory fort
DG028-039	632062, 935022	Ballynarry	Promontory fort
DG028-024	629961, 930012	Killygarvan	Church
DG028-024001	629961, 930012	Killygarvan	Graveyard
DG028-027	629932, 929699	Kinnegar	Cist burial
DG028-033002	630080, 929821	Killygarvan Lower	Lintel grave
DG028-034	630295, 929819	Killygarvan Lower	Cist burial
DG028-040	630416, 932314	Saltpans	Promontory fort
DG028-041	630100, 932447	Saltpans	Promontory fort
DG028-042	630276, 932278	Saltpans	Promontory fort
DG028-043	629803, 932883	Saltpans	Promontory fort
DG029-001	632361, 935273	Ballynarry	Court tomb
DG029-017001	633359, 933949	Ballynarry	Hilltop enclosure
DG029-023	633408, 933254	Ballynarry	Holy well
DG029-025001	634254, 932626	Tullyarvan	Tower house
DG029-025002	634166, 932608	Tullyarvan	Country house
DG029-025003	634254, 932626	Tullyarvan	Bawn
DG029-064	632304, 934774	Ballynarry	Promontory fort
DG029-043	634200, 929835	Ludden	Midden
DG029-047	633136, 933575	Ballynarry	Midden
DG037-007003	629600, 927530	Rathmullan	Priory
DG037-014	626710, 926238	Craigmaddyroe Far	Holy well
DG037-017001	625776, 924070	Ballykenny	Stone circle, stone alignments

DG037-020	631004, 923457	Ballynakilly	Promontory fort
DG037-021001	625784, 922835	Aughnish Isle	Church
DG037-021003	625755, 922824	Aughnish Isle	Graveyard
DG037-025	630925, 923511	Ballynakilly	Midden
DG037-026	631430, 923348	Glack or Bohullion	Midden
DG038-013001	634427, 926327	Glebe	Church
DG038-013002	634427, 926320	Glebe	Cross slab
DG038-013004	634430, 926333	Glebe	Graveyard
DG038-005	633906, 927679	Lisfannan	Decorated stone
DG038-009	633425, 926988	Figary	Cist burial
DG038-011	634010, 926526	Carrowmullin	Megalithic tomb
DG038-012	634036, 926466	Glebe?	Holy well
DG038-016	634684, 925928	Figary	Cist burials
DG038-020	634822, 925578	Magherabeg?	Possible site of castle
DG038-023	634893, 925084	Magherabeg	Castle site
DG038-023001	634893, 925084	Magherabeg	Site of bawn
DG038-048	636255, 923547	Tievebane	Midden
DG038-052	634014, 922708	Baylet	Midden
DG038-053	635016, 924142	Magherabeg	Midden
DG038-054	634343, 923876	Carrickanee	Midden
DG046-003	626243, 922418	Aughnish	Ringfort
DG046-004	632209, 922359	Castlequarter	Tower house
DG046-004001	632196, 922238	Castlequarter	Promontory fort
DG046-008	631546, 921315	Ballymoney	Enclosure
DG046-009	631048, 921027	Ballymoney	Standing stone
DG046-010	627562, 920386	Fortstewart	Standing stone
DG046-011001	627410, 920248	Fortstewart	House
DG046-011	627420, 920251	Fortstewart	Bawn
DG046-012	631112, 919742	Grange	Church
DG046-012001	631122, 919746	Grange	Graveyard
DG046-015001	631827, 919233	Grange	Tower house
DG046-015002	631827, 919233	Grange	Enclosure / bawn
DG046-017	625006, 918294	Killydonnell	Religious House
DG046-017001	624998, 918272	Killydonnell	Graveyard
DG046-019	624455, 917954	Carrowcashel	Souterrain
DG046-020	628816, 918292	Roughan Glebe	Ringfort
DG046-035	630850, 920096	Ballymoney	Midden
DG046-036001	631895, 922569	Castlequarter	Midden
DG046-036002	631828, 922589	Castlequarter	Midden
DG046-037	632184, 922375	Castlequarter	Midden
DG046-038	632194, 922335	Castlequarter	Midden
DG046-039	631074, 919693	Grange	Midden
DG046-040	629992, 919576	Drumboy	Midden
DG054-001	624455, 917954	Ballylawn	Standing stone
DG054-003	625216, 914924	Balleeghan	Friary
DG054-003001	625214, 914914	Balleeghan	Graveyard

Table 3: List of recorded archaeological monuments close to the foreshore of Lough Swilly, within the general area of the proposed aquaculture development.

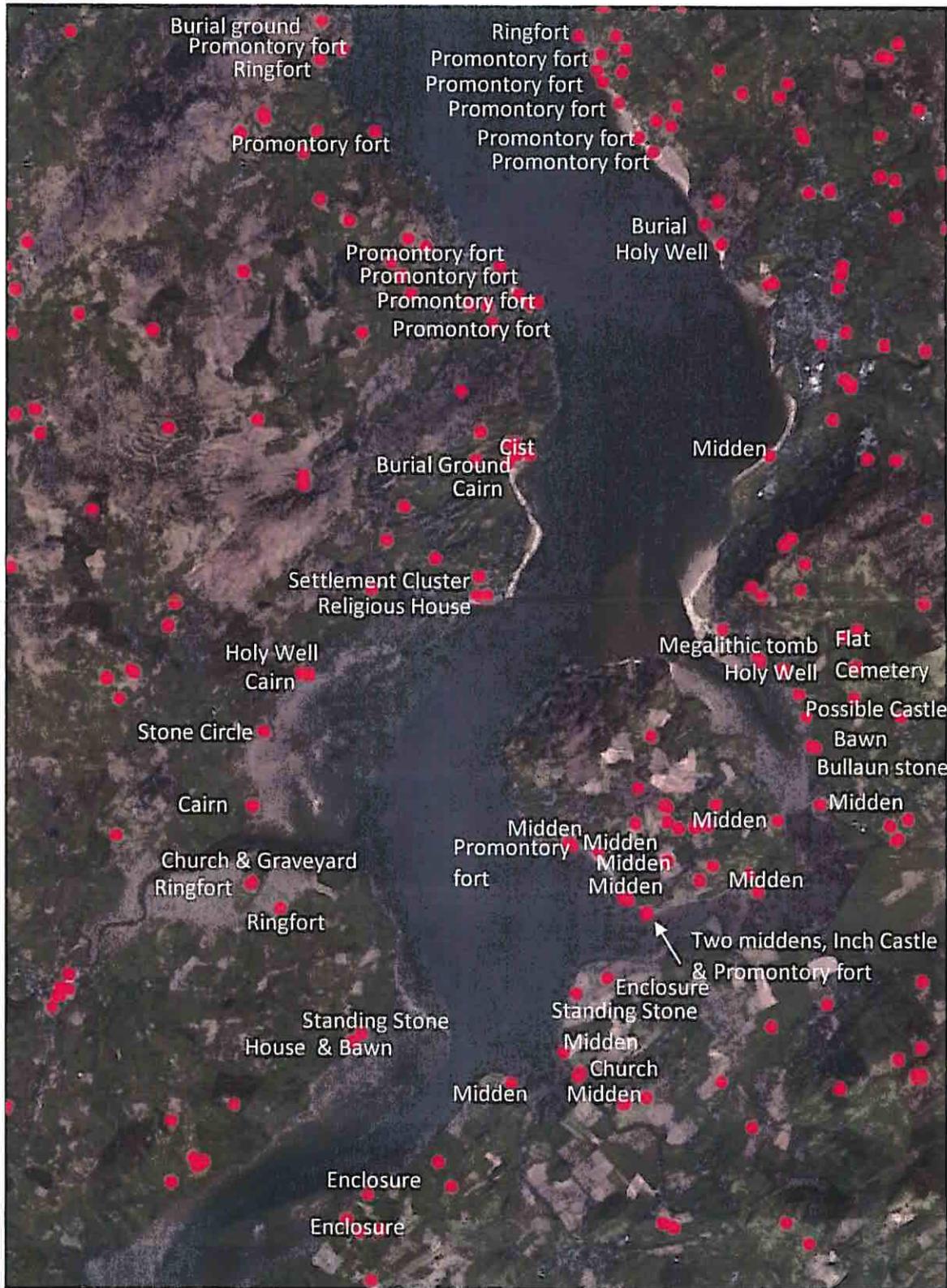


Figure 3: Extract from National Monuments Service Database, with recorded archaeological monuments located close to Lough Swilly labelled.

A myriad of archaeological sites can be found on the shores of Lough Swilly, testimony to millennia of human activity, spanning from the earliest beginnings of human settlement in the Mesolithic, the advent of farming with the Neolithic, the adoption of metalworking in the Bronze Age, an apparent decline in settlement during the Iron Age, the advent of Christianity in the early medieval period, and

the various political, cultural and economic changes experienced through the later and post medieval periods.

A number of midden sites (which can vary in date) have been found; for example in Ballymoney (DG046-035), Grange (DG046-039), and Drumboy (DG046-040) on the eastern shore, while eight sites have been recorded on Inch Island: Carrickanee (DG038-054), Ballynakilly (DG037-025), Glack or Bohullion (DG037-026), Baylet (DG038-052), and four in Castlequarter (DG046-036001, DG046-036002, DG046-037 & 38). Midden material has also been found in the sandhills between Bunrana and Fahan in the townland of Luddan (DG029-043). Flint flakes, hammer stones, fragments of pottery and part of a saddle quern were recovered. A midden (DG038-048) is located in low-lying ground at the base of a high, steep hill in the townland of Tievebane. According to local reports this may have formed part of the eastern shoreline of Lough Swilly prior to extensive land reclamation. A small portion of the top of this midden had previously been identified by P. Woodman and B. MacNaught during field-walking exercises in the Tievebane area. During the course of their work they also apparently discovered quantities of Mesolithic and Neolithic flints in the vicinity of the midden. Large quantities of individual oyster shells are visible in the fields in close proximity to the monument.

An archaeological assessment (01E0839) was carried out of the face of a shell midden (DG038-053) that was visible in a field boundary in Magherabeg on the eastern shore just across from Inch Island. Examination revealed it to be up to 33m in length and 0.6m thick. Another midden site was discovered at Ballygreen Point on the western shore during the course of a survey undertaken in 2002 by the Underwater Archaeology Unit of the National Monuments Service (Anon. 2003).

Prehistoric burial monuments along the shoreline testify to significant settlement in the region. A court tomb (DG029-001) in Ballynarry stands on level arable land c.450m from Stragill Strand on the eastern side of Lough Swilly. Little of the structure now survives. Also in Ballynarry is what was described as a possible 'prehistoric chamber tomb' (DG029-047). It is the supposed burial place of a priest killed during the era of the Penal laws (OS Revision Name Book, 1848). A modern memorial slab marks the spot.

A megalithic tomb (DG038-011) stands on sloping pasture in the townland of Carrowmullin near the village of Fahan and c.50m from the eastern shore of Lough Swilly. The megalithic remains at the site consist of four slabs: three in a line to the north, orientated NE-SW, and one to the south. These stones rise above the surface of a long grass-grown mound. The nature of the remains is somewhat uncertain, but they may be those of a megalithic gallery at least 4m long and c.1.3m wide. It seems that the site was traditionally associated with St Mura, at least in the nineteenth century, when it appears to have served as a penitential station where an annual turas, or pattern, took place (Doherty 1891, 41-2). The rather neat outline of the mound might owe something to activity related to this aspect of the site.

Later in date, a cist containing a plano-convex knife (DG038-009) was found in the townland of Figary on the eastern shore (NMI). Several other cists, one of which contained an 'urn', and several other skeletons were found in this area also. Five short cists (DG038-016) were identified on flat land close to the eastern shore of Lough Swilly in the townland of Carrontlieve in 1960. S.P. O Riordáin undertook investigations on the site on behalf of the National Museum of Ireland in the same year. During the course of his work, O Riordáin identified and recorded a sixth burial. A cist burial (DG028-034) is apparently located on Black Rock, a short distance off from the western shore from the townland of Killygarvan Lower. The source of this record is an annotation on a field map marked as 'cist 1995'.

A natural stone 0.9m wide with a small cupmark (DG038-005) is situated on the northwest slopes of Gollan Hill in the townland of Lisfannan. The 2nd edition OS six inch map notes a 'Standing Stone' (DG046-009) in the townland of Ballymoney. The 3rd edition marks it as 'Standing Stone (site of)'. There are no visible remains. The site is situated on arable land close to the eastern shore of Lough Swilly. Another standing stone is to be found in Ballylawn, measuring 1.72m high × 1.23m wide × 0.7m thick; and orientated NE-SW (DG054-001). It is situated on good land sloping west to Lough Swilly in the townland of Ballylawn. One antiquarian account (Kinahan 1889, 283) noted the presence of a mound with a circle of standing stones (DG037-017001) on Ballykenny Point on the western shore. Another account of the same site (Boyle-Somerville 1909, 226-7) noted an 'oval of stones up to 3ft high' and two alignments of stones. None of these features could be found but the area is heavily overgrown and they may remain concealed. There is no trace of the 'Standing Stone' (DG046-010) marked on the OS six inch maps in the townland of Fortstewart. It was apparently situated on good pasture land close to the western shore of Lough Swilly.

A type of settlement form found along the shores of Lough Swilly is the promontory fort. On the eastern shore, there are three examples in Linsfort (DG018-031, DG018-037 & DG018-038), and two in Ballynarry (DG028-039 & DG029-064). On Inch Island, there are two promontory forts – at Ballynakilly (DG037-020) and Castlequarter (DG046-004001). On the western shore, there are four examples, all in the townland of Saltpans (DG028-040 to 043). At Ballynarry is a hilltop enclosure (DG029-017001). It is a roughly triangular area around the summit of Crockacashel Hill enclosed by a much collapsed stone wall, measuring 53m N-S by 37m E-W internally. The wall at no point exceeds 0.75m in height. There is an external fosse on the northeast side and what is possibly a roadway approaches the site from the northwest. There is a cairn in the southeast sector at the highest point of the interior, which seems to have been a trigonometrical station (Boyle-Somerville 1909, 232-3). The hill rises directly from the rocky shore of Lough Swilly to the west.

A single-ringed circular 'Fort' (DG046-008) marked on the 1st and 2nd editions of the OS six inch maps is visible. It was situated on good open ground in the townland of Ballymoney sloping to Lough Swilly, though there is no apparent surface of it now. Another ringfort (DG046-020) is situated in the townland of Roughan Glebe. It measures 32m in internal diameter and is enclosed by an earthen bank, a fosse up to 4m wide and an outer bank. It is situated on good land sloping down to the eastern shore of Lough Swilly. Overlooking Aughnish Island from the western shore is a ringfort (DG046-003) in the townland of Aughnish. It measures 30m E-W and 24m N-S internally. Although shown on the maps as a circular feature, the site is now a D-shaped platform up to 2.5m above the surrounding land with a long sloping edge except on the north side where it drops steeply 5m to the sea shore. It appears to have been interfered with in recent times. There are extensive views over Lough Swilly and the adjacent tidal mud-flats. Souterrains are underground passages and cellars associated with both ringforts and unenclosed settlement of early medieval date. An 11m stretch of souterrain (DG046-019) aligned NNW-SSE is open not far from the western shoreline in the townland of Carrowcashel. It is partly filled with clay and stones. The walls are mainly of drystone construction but the lower sections appear to be rock-cut. The roof is composed of slabstones. The end consists of a clay and stone bank, though it is not clear if the passage extended further.

The Christian Church established a presence in Ireland from the fifth century onwards. A number of religious sites of early and later medieval date can be found along the shores of Lough Swilly. The early ecclesiastical site of Fahan (in the townland of Glebe) consists of a modern graveyard at a bend in the

road, the bend possibly reflecting something of an earlier enclosure. Inside the graveyard (DG038-013004) is part of a ruined church (DG038-013001). The east gable still stands to full height and adjoining sections of the north and south walls survive. The walls are built of rubble and the east gable has two antae-like projections. The three-light round-headed altar window has simple switch-line tracery and is probably of seventeenth-century date. There is a blocked-up rectangular window in the south wall of earlier date. Southeast of the church is St. Mura's cross-slab (DG038-013002). The top of the slab has been worked into a triangular shape. On each side is carved a cross formed of broad interlaced ribbon. This consists of a Greek cross mounted on a stem giving the effect of a Latin cross. The site of Fahan is situated in a valley at the foot of Collan Hill and Carrick Hill close to the eastern shore of Lough Swilly. About 350m northwest of the churchyard and close to the shore is a holy well (DG038-012) dedicated to St. Mura.

Burt Church (DG046-012) is located in the townland of Grange on the eastern shore. The eastern part of the church was railed off and converted (probably in the early eighteenth century) into a burial plot for the Fergusson family. There is no visible trace of the western half of the north wall and some footings probably indicate the line of the west gable. The church is 5.6m wide and the south wall is 18.5m long internally. The two-light altar window, blocked-up, retains its transom and central mullion; the upper section having been truncated when the gable was reduced in height. The window probably dates to the sixteenth century. There is a narrow, lintelled window at the west end of the south wall. Much of the interior of the church is covered with memorials.

On the western shore of Lough Swilly, Killygarvan Old Church (DG028-024) is probably of fifteenth- or sixteenth-century date, and shows many signs of patching and rebuilding. The interior wall-faces are fire-damaged. The ruins were cleared of ivy in 1981 which together with a tree at the NW corner had caused bulges in the walls. The church is located inside a graveyard (DG028-024001) which is still in use. In January 1995 a lintel grave (DG028-033002) containing an inhumation burial was discovered on an island off shore from Killygarvan Lower. It was located on the south side of the island, where erosion had exposed it in long section. The grave had been partially destroyed and lay on the high-tide line. The cist contained an extended inhumation of an adult female (NMI 1995:175) lying west/east and no accompanying artefacts were found. A number of lintel graves had been excavated in the same location by Raghnaill Ó Floinn in 1988.

Nearby, in the townland of Kinnegar, a cist burial in a cairn (DG028-027) was partially destroyed by sea erosion in 1935. Skeletal material of a cremated individual was associated with the cist, and a green staining of some of the bone fragments suggest that they had been in contact with a bronze or copper object. The cairn was located on the shore at the north end of Kinnegar Strand on the west side of Lough Swilly. Nothing now survives except perhaps some large stones strewn in the sand. The beach was unfortunately quarried for sand. A ringed-pin of possible Viking/Irish type was found on the beach. Although the cist was originally assigned to the Bronze Age, there was no specific evidence to support this. The site has been recently inspected by Richard Warner of the Ulster Museum who believed that it may possibly have been the location of a Viking cemetery.

There is now no trace of the church (DG037-021001) or graveyard (DG037-021003) which formerly stood on Aughnish Isle close to the western shore of Lough Swilly. The church was replaced by another in Ramelton town in the early seventeenth century. A small, carved, window-head is said to have been moved there from the island. The site probably dates from at least the twelfth or thirteenth century.

Holy wells are a survival of medieval religious practices and folk beliefs, and hence are an integral part of the archaeological and historical heritage of the region. On the eastern shore is Porthaw holy well (DG029-023). This well is located on the foreshore at the foot of Crockacashel Hill in the townland of Ballynarry. It is covered by a large boulder, on the north face of which is a wheeled cross carved in relief. On the western shore, there is a holy well (DG037-014) in the townland of Craigmaddyroe Far. It consists of a basin-stone in which there is some water. It is beside a field fence in low-lying ground close to the sea. According to an antiquarian source, there were two holy wells in this townland, two miles from Rathmullen on the road to Rathmelton, one on each side of the road. One of these was called Tobar Breallagh, probably associated with St. Baothallach.

In later medieval times, the Gaelic Lords such as the O'Donnells, the MacSweeneys and the O'Dohertys patronised the foundation of religious houses. On the eastern shore is Balleeghan Friary (DG054-003). It was founded by the O'Donnells probably in the later fifteenth century. Following Dissolution, the site was granted to James Fullerton in 1603 (Gwynn and Hadcock 1970, 268). The ivy-covered ruins stand close to the shore of Lough Swilly. The church consists of nave and chancel without structural division. The gables and side walls stand to full height; the latter are c.5.6m high. The east window is of three lights, and decorated with curvilinear tracery. Associated with the friary is a graveyard (DG054-003001).

On the western shore, is Rathmullan Priory (DG037-007003). This was founded for the Carmelite Order by Owen Roe MacSweeney in 1516. The priory survived intact until 1595 when it was plundered by Sir Richard Bingham; the friars returned and repaired the place. In 1601, the buildings consisted of a church and steeple, cloister, hall and three chambers. Andrew Knox, Bishop of Raphoe, having obtained possession of the site in the early seventeenth century, converted the nave and transept into a private dwelling, preserving the tower and chancel as his chapel (Gwynn and Hadcock 1970, 291). The early modern alterations included the conversion of the nave and transept into a three storey, L-shaped, fortified house with the addition of a gabled hallway, of equal height, in the re-entrant angle.

Killydonnell Friary (DG046-017) was founded in 1471 by Calvagh O'Donnell for the Franciscan Order. The friary survived intact until suppressed in c.1603 when it was granted to Captain Basil Brooke (Gwynn and Hadcock 1970, 272). The ivy-covered ruins consist of a church, which includes a chancel, nave and south transept, as well as domestic buildings ranged around the north and east sides of an open court. The building may have been maintained by the Stewart family who converted the sacristy into a family burial vault. Among the architectural features is the east window which has lost most of its tracery along with the lower jamb-stones and sill. There is a sedilia recess and a wall-press beside it at the altar end.

The Gaelic lords in Lough Swilly also patronised the construction of tower houses as their chief residences. On the eastern shore, Bunrana Castle consists of a tower house (DG029-025001), with the record of a bawn also present (DG029-025003). Situated in the townland of Tullyarvan, it was described in 1601 as a small castle inhabited by Connor McGarrett O'Doherty. It was granted to Sir Arthur Chichester at the time of the Ulster Plantation and he leased it to Henry Vaughan in 1611. The Vaughan family resided there until the present house (DG029-025002) was built in 1718 c.70m west of the tower house. Bunrana Castle is now a national monument (No. 435). The ruined and much altered tower-house is situated beside the Crana River. Most of the original features are obscured by later alterations. The date of the building must not be earlier than the fifteenth century.

Also on the eastern shore is the site of Fahan Castle (DG038-023) in Magherabeg. Mentioned in a grant to Sir John O'Doherty, the castle was partially dismantled in 1600 and seems to have been of little importance. In 1601 the castle building was described as 'a square tower surrounded by a circular bawn'. In 1939 Davies and Swan suggested that Fahan Castle site may have been located in a field close to Castletown Cottage (DG038-020). Castletown House, however, which is 400m south of Castletown Cottage is the more likely location for the siting of the medieval castle (DG038-023) and bawn (DG028-023001). According to the landowner around 40 years ago when making an addition to Castletown House, a vault was discovered adjoining the north wall of the house. On knocking this, the head of a single-light ogee-headed window was found among the rubble.

Inch Castle (DG046-004) in the townland of Castlequarter on the southern side of Inch Island was first mentioned in 1454. It was granted to Chichester at the time of the Plantation and although his tenant Mr. Skinner had 'pr' pared lyme and other materials to rebuyld the Castle' the remains do not indicate that he made any alterations. Situated on a small ridge on the southwest shore of the island, Inch Castle is protected by a cliff on the south and west and a steep slope on the north; the ridge has been quarried to a cliff face on the east, probably both as a defence and for building stone. Only the eastern half of the keep, three storeys in height survives. The western half is a mass of fallen masonry and the entrance was probably in the W wall.

Again on the eastern mainland shore is Burt Castle (DG046-015001), in the townland of Grange, which was mentioned in a grant of lands to Sir John O'Doherty in 1587. Following the Plantation, the estate was leased to Thomas Chichester in 1611. It was subsequently granted to Sir Charles Chichester and was probably still inhabited as late as 1690. Some parts of the castle had been demolished in the early nineteenth century. Situated on the top of an isolated hill, it was surrounded by Lough Swilly on all sides except to the north where lay a bog. Since the later medieval period, much of this land and sea has been reclaimed. The top of the hill was enclosed by a rampart and external fosse (DG046-015002). The tower house has circular towers at the northeast and southwest tower-house corners, a plan which is typically Scottish in character. The presence of numerous gun-loops would indicate a date in the later sixteenth century for this tower house.

On the western shore, the surviving ivy-covered remains of a house (DG046-011001) and bawn (DG046-011) still stand in the townland of Fortstewart, built by Sir William Stewart in 1610/11. The site comprises of two flankers with adjoining fragments of bawn walls. No visible trace survives of the east bawn wall depicted on the 1903 OS twenty-five inch plan. The S flanker is circular in plan and overlooks a steep fall, some 4m, to the shore below. The N flanker is a spear-shaped bastion. The small section of W bawn wall adjoining the N flanker preserves the chase for a timber jamb and socket for a large draw-bar, for a door or gate.

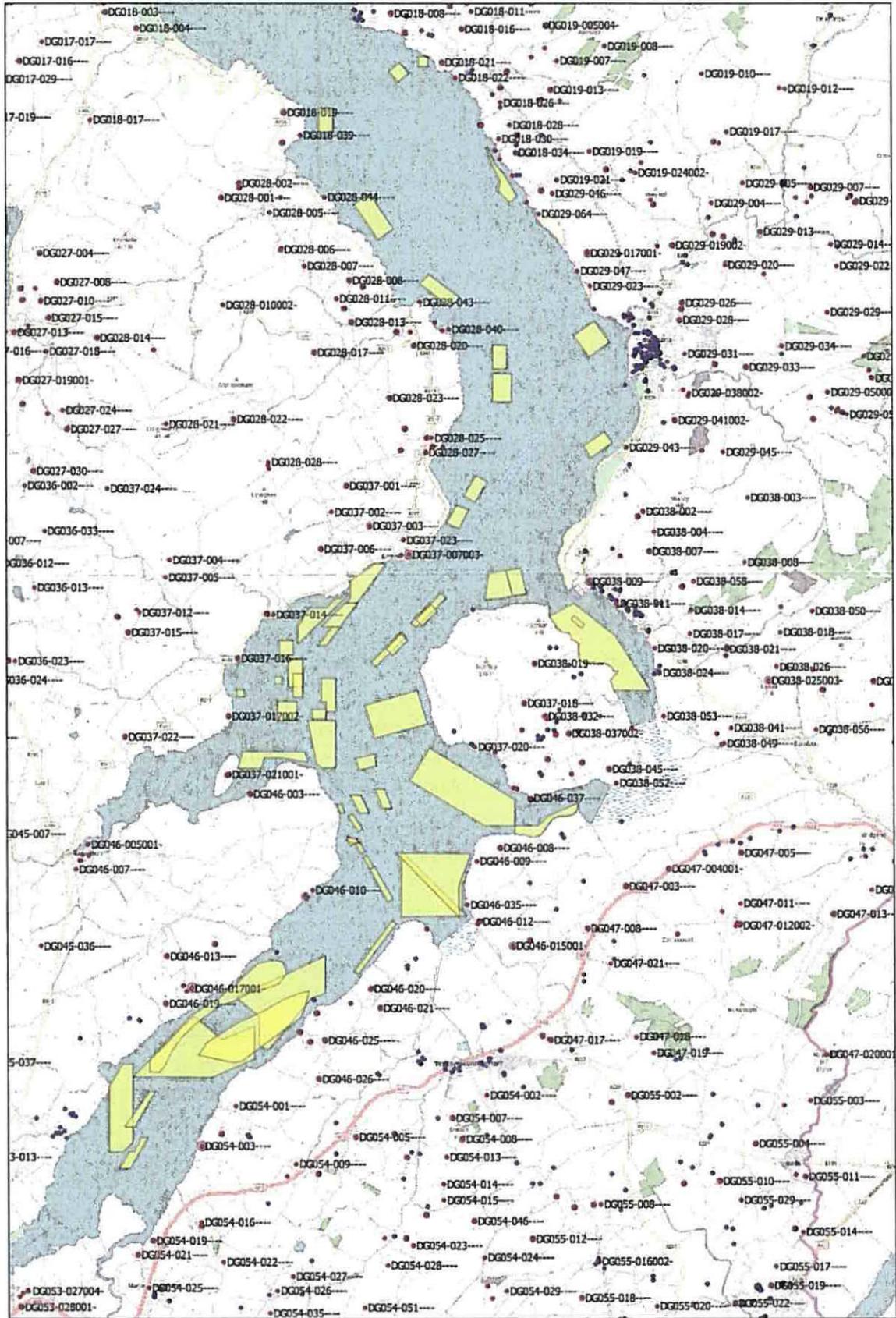


Figure 4: Extract from Historic Environmental Viewer overlaid with aquaculture sites.

5.4 National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) is a county by county database that identifies, records, and evaluates the post-1700 architectural heritage of Ireland as an aid to the protection and conservation of the country's built heritage. The NIAH surveys provide the basis for the recommendations of the Minister for the Arts, Heritage, Regional, Rural and Gaeltacht Affairs (DAHRGG) to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS). It is currently available online on the Historic Environment Viewer (www.webgis.archaeology.ie/historicenvironment) or on myplan.ie (www.myplan.ie/viewer). While there are numerous sites of architectural significance in the general vicinity of Lough Swilly, this section lists those situated directly on the shoreline.

NIAH No.	National Grid Reference	Townland	Site Type
40902922	633491, 932772	Tullyarvan	Ned's Point Fort, Battery, 1812
40815001	634169, 932607	Tullyarvan	Bunrana Castle, Country house, 1718
40815006	634341, 932423	Ardaravan	Quay / wharf, c.1850
40815007	634238, 932531	Tullyarvan	Bunrana Castle, Terraced garden, c.1720
40815008	634344, 931428	Ardaravan	Coastguard station, 1870
40815073	634168, 931161	Ardaravan	Bunrana Light, Lighthouse, 1876
40903705	630945, 926378	Grange	Inch Fort, Inch Island, c.1845
40904563	627604, 918041 626823, 919062	Ballybegly	Fort Stewart Ferry, Pier / jetty, c.1780

Table 4: List of sites of architectural importance in the NIAH on the shoreline of Lough Swilly

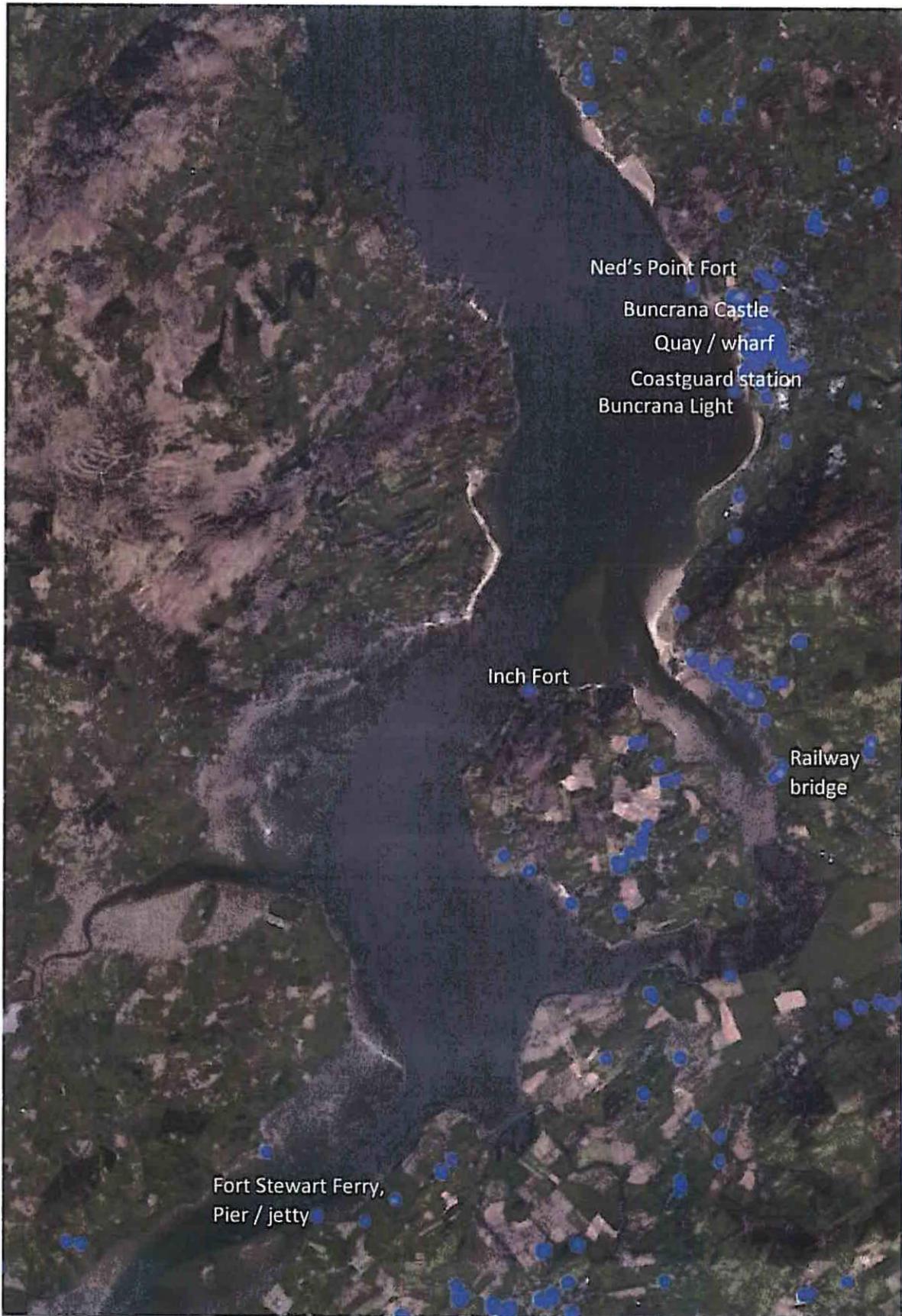


Figure 5: Extract from National Inventory of Architectural Heritage.

At Ned's Point, there stands a freestanding multiple-bay two-storey defensive battery (40902922), built in 1812 and altered in c.1897, attached to the east portion of a five-sided D-shaped battery. Located on the edge of a rocky headland on the shores of Lough Swilly with strategic views north, west and south across the Lough, the glaxis to the south-east is now a maintained lawn. A RNLI boathouse is located to the southeast and a boat slipway to the south. Ned's Point Fort formed part of the costal defences of Ireland and Lough Swilly for the duration of the nineteenth century. The fort is a style that was apparently unique to British coastal fortifications in Ireland. The site was refurbished by Bunrana Town Council in the early 1990s, and remains an important element of the built heritage of Donegal.

A short distance away, closer to the town of Bunrana, is Bunrana Castle (40815001). This is a detached nine-bay two-storey over raised basement country house, which was built in 1718, replacing an earlier tower house which still stands nearby in the grounds (RMP DG029-025001). It has a central shallow advanced three-bay breakfront to the main elevation, as well as projecting single-bay two-storey over raised basement projections\pavilions on either end of the main elevation. There is a single-bay two-storey return to the rear, as well as a later two-bay two-storey extension to the south elevation (added c.1860), and with a handball alley to the north elevation. This well-proportioned early country house is probably the most important country house still extant in Inishowen. Its design marks the transition from the semi-fortified houses of the seventeenth century and earlier to the classical designs used for country houses during the eighteenth century.

A three-tiered former terraced garden is associated with Bunrana Castle (see 40815001), laid out in c.1720, sloping from west to east towards the western bank of the Crana River. The garden consists of a series of terraces with dry stone rubble stone retaining walls, and with various sections of cut stone steps. It was built on a sloping embankment on the west side of River Crana at the entrance to Lough Swilly Estuary. Although now disused, this interesting site represents a rare and important example of an early terraced formal garden that was originally associated with Bunrana Castle. Its exact dating is difficult but it is shown, with its planting, on the Ordnance Survey first edition six inch map of c.1837. It is possible that it was originally laid-out at the same time as Bunrana Castle was built or rebuilt in 1718, on account of the formality of the plan and its formal relationship with the house. It was probably originally laid-out as a pleasure garden.

A short distance to the southeast of Bunrana Castle is a quay and retaining wall, built in c.1850. It is located on the eastern shore of the Crana River close to the point where it discharges into Lough Swilly \ Bunrana Bay. The quay is constructed of rubble stone masonry (large irregular rubble stone blocks) with a slight batter at the base. This well-built quay wall was probably originally built during the mid-nineteenth century. It retains its early form and character, and is an element of the extensive marine and maritime heritage of Bunrana. It was probably originally built to facilitate the local fishing industry as it is only reachable at high tide, and only by small-scale craft. This quay adds to the attractive seascape at Bunrana, and is a modest addition to the built heritage of the local area.

In the town of Bunrana there is a former coastguard station (40815008), built in 1870. It comprises four terraced two-storey coastguard houses (one bay in width), and a two-bay two-storey house at the south-west end of terrace, along with a single-bay three-storey observation tower. Although now altered and extended, this former coastguard station retains much of its early form and character. Of particular note is the three-storey tower at the south-west end overlooking Lough Swilly, which is a prominent local landmark. The top floor of this tower was originally in use as a viewing platform with commanding panoramic views over Lough Swilly. The coastguard station was originally built to designs

by Enoch Trevor Owen (c.1833 - 1881), an English architect working for the Board of Works in Ireland from c.1860. This building probably went out of use as a coastguard station shortly after Independence, which was the fate of many buildings of this type in Ireland. There were formerly a number of boathouses to the south of this complex adjacent to the mill river, now all demolished bar one small-scale structure. Although altered, this complex is an integral element of the built heritage and maritime history of Buncrana, and is an appealing feature along the coastline to the south-west of the town.

Buncrana Lighthouse (40815073) was erected in 1876, on a circular-plan comprising a cylindrical shaft with wrought-iron brackets supporting a circular metal platform with protective metal railings, and surmounted by a cast-iron light-base. The reflector was contained within a protective ironwork casing with tinted red glass sectors. The lighthouse was formerly sited at the west end of main pier. This interesting and unusual former lighthouse, of late nineteenth-century date, retains its original form and character. It is well constructed using good-quality cast- and wrought-iron, and it is a feature of some historic and technical merit. It was originally constructed on the pier in Buncrana in January 1876 by a James Tocker, using a cast-iron pillar formerly at Newcastle, Co. Down. It served from January 1876 to January 2009, when it was decommissioned by the Commissioners of Irish Lights. However, the Buncrana Historical Society had it restored by Crana Engineering and it was re-sited here in August 2010, overlooking Lough Swilly. This former lighthouse is not only a refined piece of Victorian technical engineering, but also an integral element of the region's rich maritime heritage.

A two-gun fortification (40903705), Inch Fort, was built on the north side of Inch Island in 1813, and was extensively modified, c.1870. The defences are triangular in plan. The inner Lough would be defended by batteries at the narrow channel between Inch Island and Rathmullan. The fort was occupied by anti-Treaty forces under Captain Mullan during the Civil War but was captured by the Free State Army on 16 July 1922. Although now derelict, it is an interesting group of buildings providing an insight into the coastal defences of Lough Swilly and indeed the whole of Ireland during successive threats of naval invasion.

On the eastern foreshore adjacent to the townland of Ballybegly, there are two sections of a pier \ embankment (40904653) constructed in c.1780. It was associated with a former ferry crossing across Lough Swilly. The pier possibly contains earlier fabric. It was built of unmortared random rubble stone masonry, covered at high tide. One section of the pier extends from the Ballybegly shoreline on the east side of Lough Swilly, the other section extends from the Killydonnell shoreline on the west side of the same estuary. These two sections of rubble stone pier were originally associated with a former ferry crossing across Lough Swilly called the Fort Stewart Ferry, which was maintained as a working ferry from the 1830s to the 1940s. The ferry was originally established to provide transit across Lough Swilly, saving a long trip around the Lough by land. Interestingly, the piers are covered by the high tide, which indicates that the ferry only operated at times of low tide. Although the ferry operated in the nineteenth century, it is likely that the ferry crossing has earlier originals, perhaps originally associated with a crossing between Killydonnell Friary and Balleeghan Friary. This curious feature is an enigmatic element of the built heritage of the local area, and is an integral element of the extensive maritime heritage of Donegal.

Site 12/298 is located in the channel between the two piers/embankment (40904653) in Ballybegly. The application relates to a renewal of an existing licence for bottom culture mussels. New

applications for an additional two sites (12/339A and 12/339B) close to the Fort Stewart Ferry crossing have also been submitted.

5.7 Previous Surveys

A walk-over survey of the foreshore between Fort Stewart and Ardrumman on the western shore of Lough Swilly by the Underwater Archaeology Unit of the National Monuments Service in 2002 and 2003 established that this stretch of foreshore was of high underwater archaeological potential with evidence of a maritime cultural landscape (Anon., 2003). Six sites were identified along the foreshore off the townlands of Killydonnell and Ardrumman: a rectangular stone platform, two wooden fishtraps, a composite stone and wooden fishtrap, a linear stone foreshore division, and an unidentified site (Anon., 2003).

Two of the fishtrap sites identified on the foreshore of Killydonnell and Ardrumman were sampled by the Centre for Maritime Archaeology in the University of Ulster during the summer of 2012 (Montgomery and Forsythe 2012; Montgomery, Forsythe and Breen 2015, 123). The Lough Swilly traps are referred to locally as the 'monks' fishing places' due to their proximity to local ecclesiastical houses. A total of four samples (two from each trap) were taken for the purposes of wood identification. One of the traps is located near the medieval Franciscan friary at Killydonnell (E - 626109.33031, N - 918496.07494). The visible part of the trap is a single line of stakes some 63m long, with an average of between 15 and 20 stumps per metre (at least 1000 stakes in total). The trap is exposed for less than 30 minutes on large tides. The trap comprises the remains of two different species – wider uprights were dark brown or black in colour with some bark remaining (birch). Smaller uprights were tan coloured and had no bark (oak) (Montgomery and Forsythe 2012; Montgomery, Forsythe and Breen 2015, 126). The surviving part of the trap is one of the leaders of what was a V- or tick-shaped weir, probably functioning as an ebb trap, based on the orientation of the leader and the ebbing tide along the foreshore (Montgomery, Forsythe and Breen 2015, 127). The trap at Ardrumman is located approximately c.2km west of Killydonnell (E - 624485.24761, N - 917113.88814). The trap is composed of a mixture of stones (9.3 metres long and 40cm wide) and 30 wooden posts of Scots pine (*Pinus* sp.) The remains of part of a wooden, wattle fence was also exposed on the surface of the site (Montgomery and Forsythe 2012; Montgomery, Forsythe and Breen 2015, 128–9). Radiocarbon dating suggested a likely date at the end of the seventeenth century or early eighteenth century (Montgomery and Forsythe 2012; Montgomery, Forsythe and Breen 2015).

As part of this research, two other potential wooden fish trap sites on the foreshore off Killydonnell and Ardrumman / Cashelshanaghan were identified through interviews with local shellfish gatherers. The first was apparently located off Killydonnell, c.190m south of the Fort Stewart ferry causeway; the second was situated on a sandbank jutting out into the lough at the boundary between Ardrumman and Cashelshanaghan. These sites are no longer visible, but may remain buried beneath the foreshore (Montgomery, Forsythe and Breen 2015, 129–30).

Three stone fish traps were also identified on the eastern side of Lough Swilly, two of the traps investigated in detail, with the third at Blanket Nook in area of soft sediment which prevented inspection. The first of these fish traps is located off the townland of Drumboy, consisting of a V-shaped trap with two arms whose opening points downstream, an arrangement indicative of an ebb trap. The arms are two to three courses in height, on average 30cm in height; the shoreward arm is 43m in length, while the seaward arm is 80m in length. The wall of the trap has been roughly pierced

close to the apex or eye of the trap creating a 1.3m gap between the two arms, which opens into a rectangular enclosure measuring 7m by 6m, formed by a line of boulders. Fish would have been collected in this small enclosure (Montgomery, Forsythe and Breen 2015, 130–33). The partial and obscured remains of a second stone fish trap have also been identified on the foreshore off Ballyeeghan townland, consisting of a long linear structure of stone covered by a shell bank, measuring at least 73m in length and c.4 to 6m in width. The remains consist of one arm of a fish trap (Montgomery, Forsythe and Breen 2015, 133). The third stone fish trap is located off Blanket Nook, an inlet now largely reclaimed, and while heavily obscured by shell and mud, takes the form of a linear shell bank running for some 1000m in a meandering manner comparable to a stone fish trap in Doonbeg, Co. Clare (Montgomery, Forsythe and Breen 2015, 134).

Record of Piers and Harbours

The Record of Piers and Harbours is a draft unpublished document compiled by the Underwater Archaeological Unit of the National Monuments Service. It draws on various historical sources dealing with historical piers and harbour development in Ireland. There are several mentions of Lough Swilly in the Record of Piers and Harbours, however, none of the structures in the record will be affected in any way by the proposed aquaculture development.

5.6 Geophysical Data

The INFORMAR Survey of Lough Swilly was produced using LiDAR collected in 2010 and multi-beam surveys carried out from the *Celtic Voyager* and *RV Keary* supported by the *M.V. Cosantóir Bradán* in 2014. The INFORMAR data was reviewed in relation to the survey area and in particular to the proposed licence areas. It was not practical to reproduce the high survey resolution maps in this report. The surveys are available to view at <http://www.infomar.ie/surveying/Bays/Swilly.php>

The INFORMAR data for Lough Swilly is generally of high quality /coverage and is very useful tool for understanding the seabed topography of the lough. A large quantity of natural seafloor features are identifiable on the map. Nothing of potential archaeological significance was observed in the data for the proposed licensed area. However, the data was not specifically produced for the purpose of identifying archaeological remains, and does not meet the National Monuments Service *Specifications for geophysical survey undertaken for archaeological purposes*. In the wider study area, two large shipwrecks are highlighted on the INFORMAR Survey; *the Florence* a 34m steamship at Buncranna Light and *the Laurentic* a 162m long merchant cruiser to the north of the mouth of Lough Swilly.

While large vessels lying on the seabed are easily identifiable on multibeam surveys carried out from the *Celtic Voyager* and *RV Keary*, smaller features of archaeological significance may go undetected in such surveys. This is particularly the case in shallower waters and inter-tidal zone where airborne LiDAR surveys are used. Furthermore, five of the proposed licenced areas were not covered in the INFORMAR Survey. Four of the areas not covered in the IFOMAR survey are new applications (T12/343A, T12/330C, T12/328D, T12/339A) and one is a renewal (T12/037B1)

Figure 7 and table 5 show the Muti-beam and LiDAR coverage of the each specific licence area.

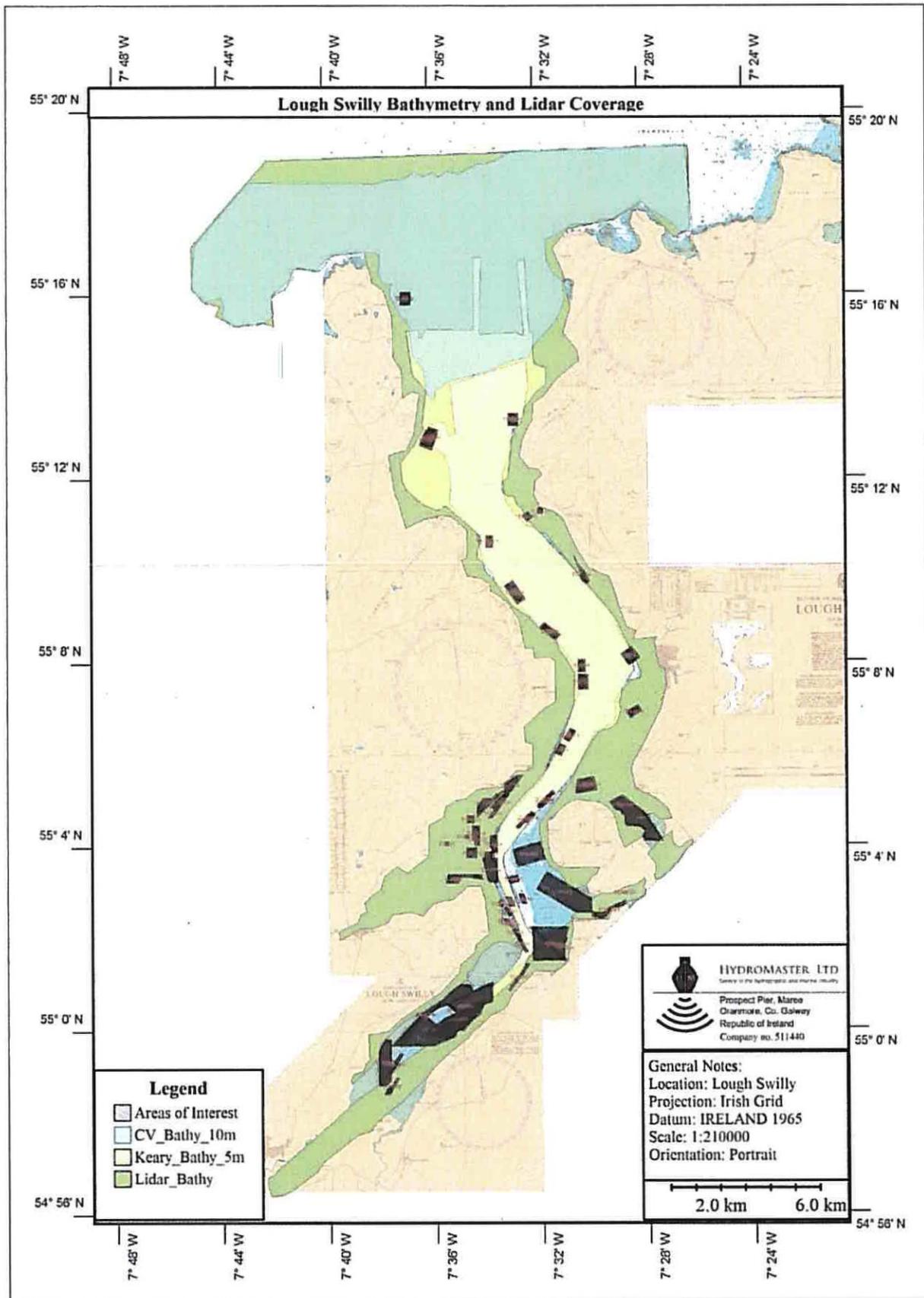


Figure 6: Map showing InFOMAR survey coverage on aquaculture sites.

Licence No.	Licence Type	Keary	Lidar	CV	No data
T12/211C	Renewal (Mussel - suspended culture)	Yes	Yes		
T12/211B	Renewal (Mussel - suspended culture)	Yes			
T12/288C	Renewal (Mussel - suspended culture)	Yes			
T12/037C	Renewal (Mussel - bottom culture)		Yes		
T12/251A	Renewal (Mussel - bottom culture)		Yes		
T12/251B	Renewal (Oysters – trestles)		Yes		
T12/273A	Renewal (Mussel - bottom culture)	Yes	Yes		
T12/284	New Application (Mussel - suspended culture)	Yes			
T12/325	New Application (Mussel – bottom culture)	Yes	Yes		
T12/330A	New Application (Mussel – bottom culture)		Yes		
T12/330B	New Application (Mussel – bottom culture)		Yes		
T12/341C	New Application (Mussel – bottom culture)		Yes		
T12/278A	New Application (Mussel – bottom culture)	Yes	Yes		
T12/343A	New Application (Oysters – trestles & BST)				None
T12/311A	Renewal (Oysters – trestles)		Yes		
T12/330C	New Application (Mussel – bottom culture)				None
T12/280/1A	Renewal (Mussel – bottom culture)		Yes		
T12/328A	New Application (Mussel – trestles)		Yes		
T12/328D	New Application (Mussel – bottom culture)				None
T12/328B	New Application (Mussel – bottom culture)		Yes		
T12/317A	New Application (Oysters – trestles)		Yes		
T12/340A	New Application (Oyster/Mussel - suspended culture)	Yes			
T12/340B	New Application (Oyster/Mussel - suspended culture)	Yes			
T12/341A	New Application (Mussel – bottom culture)		Yes		

T12/341B	New Application (Mussel – bottom culture)		Yes		
T12/275F	Renewal (Mussel – suspended culture)	Yes	Yes		
T12/037B1	Renewal (Mussel – bottom culture)				None
T12/037A1	Renewal (Mussel – bottom culture)		Yes		
T12/378A	Trial Application (Mussel – bottom culture)	Yes	Yes		
T12/388A	New Application (Oysters – trestles)		Yes		
T12/293	Renewal (Mussel – bottom culture)		Yes		
T12/298	Renewal (Mussel – bottom culture)	Yes	Yes		
T12/328C	New Application (Mussel – bottom culture)		Yes		
T12/339A	New Application (Oysters – bottom dredging, hand picking)				None
T12/339B	New Application (Oysters – bottom dredging, hand picking)		Yes		
T12/037A2	Renewal (Oysters – trestles & baskets)		Yes		
T12/037B2	Renewal (Mussel – bottom culture)		Yes		
T12/037B3	Renewal (Oysters – trestles & baskets)		Yes		
T12/037B4	Renewal (Oysters – trestles & baskets)		Yes		

Table 5: INFOMAR survey coverage on aquaculture sites, new applications highlighted in blue.

6. Potential impacts of aquaculture activity on the cultural heritage of Lough Swilly

6.1 Introduction

The archaeological and historical background of areas designated for proposed shellfish aquaculture sites in the upper portion of Lough Swilly was assessed. The northernmost extent of the area is a line which runs from Bunnaton on the western shore to Muineagh on the eastern side. The southern extent is delimited by a line running from the townland of Greenhill on the western side of the estuary to the townland of Moneyhaughly on the eastern side. Within this general area, BIM has identified up to 39 smaller discrete areas designated for aquaculture, of which 18 are already in use and whose renewal is being sought. The aquaculture sites are a mix of bottom cultures of mussel and native oysters (farmed using dredging nets); intertidal trestle and basket cultures of pacific oysters (accessed via tractor or boat); and suspended cultures of mussels supported by floating systems with anchors placed on the seabed. Each of these sites has been assessed for any potential impact on archaeological sites or features known to be situated on the seabed or foreshore of Lough Swilly.

6.2 Potential impacts of sites utilising bottom culture (licence renewals)

A number of sites involve cultivating mussel and oyster cultures on the seabed of the lough. Mussel beds are slightly elevated above the natural seabed. The dredge is composed of a fixed bar, without teeth and a frame with a net bag attached and it is designed to skim the surface of the substrate without digging into it. This bar in effect 'peels' the overlying mussel 'mat' away from the underlying substrate and in doing so removes the mussel which is caught in a bag. Depending on size, vessels may deploy two or a maximum of four dredges at a time. The iron frame of the dredge (depending on vessel size) has a maximum weight of 200 kg (J. Gaffney 2017, pers.comm, 19 July). Nine of the 18 sites where licence renewal is being sought involve this culture method. They are as follows:

Site	Species	Culture Method	History
T12/037A1	Mussel	Bottom culture	Renewal-previously under culture
T12/037B1	Mussel	Bottom culture	Renewal-previously under culture
T12/037B2	Mussel	Bottom culture	Renewal-previously under culture
T12/037C	Mussel	Bottom culture	Renewal-previously under culture
T12/251A	Mussel	Bottom culture	Renewal-previously under culture
T12/273 A	Mussel	Bottom Culture	Renewal-previously under culture
T12/280A1	Mussel	Bottom Culture	Renewal-previously under culture
T12/293	Mussel	Bottom Culture	Renewal-previously under culture
T12/298	Mussel	Bottom Culture	Renewal-previously under culture and previously subject to an AIA

Table 6: List of aquaculture sites utilising bottom cultures whose licences are being sought for renewal in Upper Lough Swilly.



Figure 7: Map showing areas with applications submitted for licence renewals of sites utilising bottom culture.



Plate 1: Dredge mouth and mud bar (photo courtesy of BIM).

T12/037A1

This area of cultivation is located off the eastern side of Inch Island, between Lackan Point to the north and Ross Point to the south. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic, documentary and geophysical sources as detailed in Section 5 did not identify any known archaeological sites on the shoreline, foreshore and seabed. Despite this, it is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be buried in the sediment within the licence area. Therefore, the utilisation of a dredge on the seabed during harvesting may impact on previously unidentified archaeological sites such as or shipwrecks may be revealed.

However, (1) as this application is a licence renewal and the area has previously been subject to harvesting; and (2) the type of dredge used in bottom culture harvesting does not penetrate the seabed deeply the likelihood of encountering in situ features are greatly reduced.

The potential negative impact is classified as low.

T12/037B1

This area of cultivation is located off the western side of Inch Island, south of Hawk's Nest. This area consists of deeper estuarine waters. Consultation of cartographic, archaeological sources as detailed in Section 5 did not identify any known archaeological sites on the shoreline, foreshore and seabed. This area was not covered in the INFORMAR Survey. It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be buried in the sediment within the licence area. Therefore, the utilisation of a dredge on the seabed during harvesting may impact on previously unidentified archaeological sites such as or shipwrecks may be revealed.

However, (1) as this application is a licence renewal and the area has previously been subject to harvesting; and (2) the type of dredge used in bottom culture harvesting does not penetrate the seabed deeply the likelihood of encountering in situ features are greatly reduced.

The potential negative impact is classified as low.

T12/037B2

This area of cultivation is located off the southwestern side of Inch Island, placed across the opening of Mill Bay. This area consists of deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed in Section 5 did not identify any known archaeological sites on the shoreline, foreshore and seabed. Despite this, it is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be buried in the sediment within the licence area. Therefore, the utilisation of a dredge on the seabed during harvesting may impact on previously unidentified archaeological sites such as or shipwrecks may be revealed.

However, (1) as this application is a licence renewal and the area has previously been subject to harvesting; and (2) the type of dredge used in bottom culture harvesting does not penetrate the seabed deeply the likelihood of encountering in situ features are greatly reduced.

The potential negative impact is classified as low.

T12/037C

This area of cultivation is located off the northern side of Inch Island. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed in Section 5 did not identify any known archaeological sites on the shoreline, foreshore and seabed. Despite this, it is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be buried in the sediment within the licence area. Therefore, it is possible the utilisation of a dredge on the seabed during harvesting may impact on previously unidentified archaeological sites such as or shipwrecks may be revealed.

However, (1) as this application is a licence renewal and the area has previously been subject to harvesting; and (2) the type of dredge used in bottom culture harvesting does not penetrate the seabed deeply the likelihood of encountering in situ features are greatly reduced.

The potential negative impact is classified as low.

T12/251A

This area of cultivation is located almost midway between Ballykenny Point on the west shore of Lough Swilly and Inch Island to the east. This area consists of deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed Section 5 did not identify any known archaeological sites on the seabed. Despite this, it is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be buried in the sediment within the licence area. Therefore, it is possible that the utilisation of a dredge on the seabed during harvesting may impact on previously unidentified archaeological sites such as or shipwrecks may be revealed.

However, (1) as this application is a licence renewal and the area has previously been subject to harvesting; and (2) the type of dredge used in bottom culture harvesting does not penetrate the seabed deeply the likelihood of encountering in situ features are greatly reduced.

The potential negative impact is classified as low.

T12/273A

This area of cultivation is located to the northeast of Whale Head on the western shore of Lough Swilly, just to the immediate south of T12/251A. This area consists of deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed in Section 5 did not identify any known archaeological sites on the seabed. Despite this, it is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be buried in the sediment within the licence area. Therefore, it is possible that utilisation of a dredge on the seabed during harvesting may impact on previously unidentified archaeological sites such as or shipwrecks may be revealed.

However, (1) as this application is a licence renewal and the area has previously been subject to harvesting; and (2) the type of dredge used in bottom culture harvesting does not penetrate the seabed deeply the likelihood of encountering in situ features are greatly reduced.

The potential negative impact is classified as low.

T12/280/1A

This area of cultivation is located to the east of Black Rock and The Cul Bay on the western shore of Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic and

archaeological sources as detailed in Section 5 did not identify any known archaeological sites on the seabed. Despite this, it is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be buried in the sediment within the licence area. Therefore, it is possible that the utilisation of a dredge on the seabed during harvesting may impact on previously unidentified archaeological sites such as or shipwrecks may be revealed.

However, (1) as this application is a licence renewal and the area has previously been subject to harvesting; and (2) the type of dredge used in bottom culture harvesting does not penetrate the seabed deeply the likelihood of encountering in situ features are reduced.

The potential negative impact is classified as low.

T12/293

This area of cultivation is located in the uppermost reaches of Lough Swilly where it narrows, between the townland of Ardrumman on the west shore and Craigawherry on the east shore. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed. A side scan anomaly (S2) was identified close to this cultivation area during the course of an archaeological assessment carried out by Boland Archaeological Services Ltd in September 2002. This was identified as an anomalous linear bedform, possibly natural in origin (Boland 2002, 32–4). Despite this, it is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be buried in the sediment within the licence area, and possible that the utilisation of a dredge on the seabed during harvesting may impact on previously unidentified archaeological sites such as or shipwrecks may be revealed.

However, (1) as this application is a licence renewal and the area has previously been subject to harvesting; and (2) the type of dredge used in bottom culture harvesting does not penetrate the seabed deeply the likelihood of encountering in situ features are greatly reduced.

The potential negative impact is classified as low.

T12/298

This area of cultivation is located in the uppermost reaches of Lough Swilly where it narrows, between the townland of Ardrumman on the west shore and the townland of Ballybegly on the east shore. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. It lies between two sections of pier/embankment, erected c. 1780 (NIAH 40904653 Fort Stewart Ferry). Two side scan anomalies (S1 and S3) were identified close to this cultivation area during the course of an archaeological assessment carried out by Boland Archaeological Services Ltd in September 2002. One of the anomalies (S1) was identified as linear, possibly an anchoring system, while the other anomaly (S3) was suggested to be a linear anomaly, possibly man made (Boland 2002, 32–4).

It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be buried in the sediment within the licence area. Therefore, the utilisation of a dredge on the seabed during harvesting may impact on previously unidentified archaeological sites such as or shipwrecks may be revealed.

However, (1) as this application is a licence renewal and the area has previously been subject to harvesting; and (2) the type of dredge used in bottom culture harvesting does not penetrate the seabed deeply the likelihood of encountering in situ features are reduced.

The potential negative impact is classified as low.

6.3 Potential impacts of sites utilising suspended cultures (licence renewals)

A number of sites involve cultivating mussel cultures on a long line or BST system. Essentially, these are methods of floating the cultures, the floating systems kept in place by 3-ton anchor blocks placed on the seabed. Four of the 18 sites where licence renewal is being sought involve this culture method.

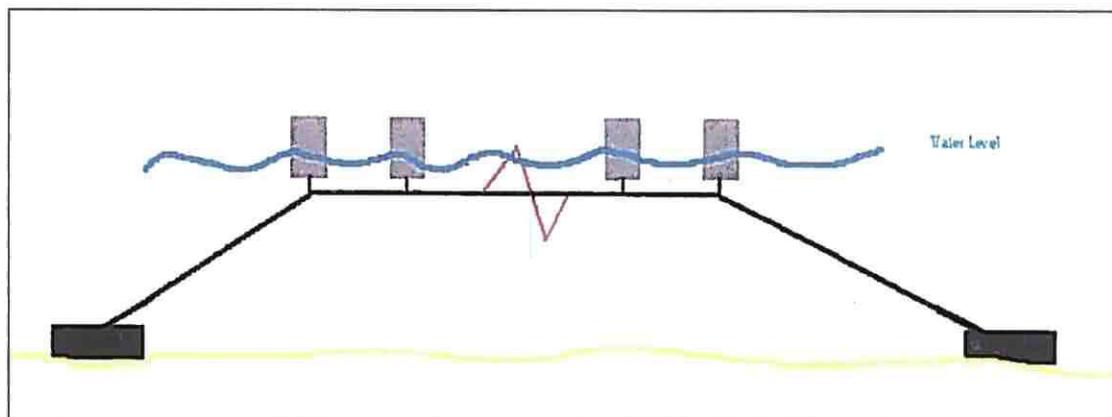


Figure 8: Schematic drawing of suspension culture mussels

Site	Species	Culture Method	History
T12/211B	Mussel	Suspended culture	Renewal-previously under culture
T12/211C	Mussel	Suspended culture	Renewal-previously under culture
T12/275F	Mussel	Suspended culture	Renewal-previously under culture
T12/288C	Mussel	Suspended culture	Renewal-previously under culture

Table 7: List of proposed aquaculture sites which utilise suspension systems and whose renewal is being sought.

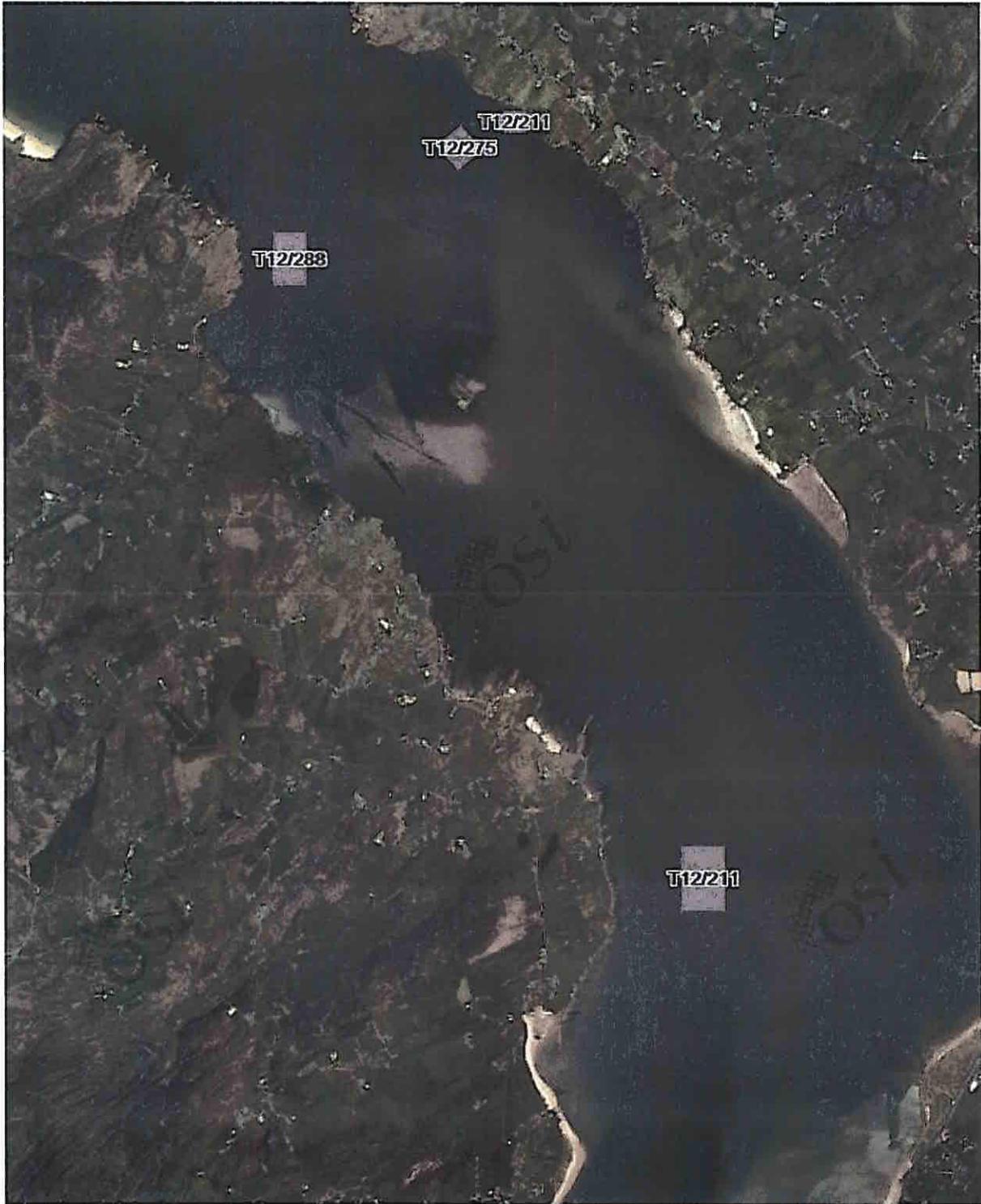


Figure 9: Map showing areas with applications submitted for licence renewals of sites utilising suspension systems.

T12/211B

This area of cultivation is located just off the townland of Muineagh on the eastern shore of Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed in Section 5 did not identify any known archaeological sites on the seabed. However, it is possible that unrecorded archaeological remains lay in the sediment and may be compressed by the placement of anchor blocks on the seafloor.

The potential negative impact is classified as low.

T12/211C

This area of cultivation is located just c.1km NNE off Killygarvan Point on the western shore of Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed in Section 5 did not identify any known archaeological sites on the seabed. Given the nature of floating mussel cultures on suspension systems held in place by anchors on the seabed, it is unlikely that unidentified archaeological sites such as fish traps or shipwrecks will be impacted upon.

The potential negative impact is classified as low.

T12/275F

This area of cultivation is located just c.500m off the townland of Muineagh on the eastern shore of Lough Swilly, just to the WSW of another proposed cultivation area T12/211B. This area consists of deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed in Section 5 did not identify any known archaeological sites on the seabed. Given the nature of floating mussel cultures on suspension systems held in place by anchors on the seabed, it is unlikely that unidentified archaeological sites such as fish traps or shipwrecks will be impacted upon.

The potential negative impact is classified as low.

T12/288C

This area of cultivation is located c.560m NE of Yellow Rock on the western shore of Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in Section 5 did not identify any known archaeological sites on the seabed, though the Shipwreck Inventory maintained by the Underwater Archaeological Unit of the National Monuments Service does indicate the presence of two shipwrecks to the southeast of the area of cultivation. Both wrecks are unidentified (W11379 and W11380) and both consist of an anchor located west of Colpaghs Rocks. Given the nature of floating mussel cultures on suspension systems held in place by anchors on the seabed, it is unlikely that unidentified archaeological sites such as fish traps or shipwrecks will be impacted upon.

The potential negative impact is classified as low.

6.4 Potential impact of sites utilising trestles and baskets (licence renewals)

A number of sites involve cultivating mussel and oyster cultures on trestles located on the foreshore of the lough. Such cultures are farmed using trestles laid directly onto the foreshore surface. Five of the 18 sites where licence renewal is being sought involve this culture method. They are as follows:

Site	Species	Culture Method	History
T12/037A2	Oyster (Pacific)	Trestles and baskets	Renewal-previously under culture
T12/037B3	Oyster (Pacific)	Trestles and baskets	Renewal-previously under culture
T12/037B4	Oyster (Pacific)	Trestles and baskets	Renewal-previously under culture
T12/251B	Oyster (Pacific)	Trestles and baskets	Renewal-previously under culture
T12/311A	Oyster (Pacific)	Trestles and baskets	Renewal-previously under culture

Table 8: List of proposed aquaculture sites which utilise trestles whose renewal is being sought.



Figure 10: Map showing areas with applications submitted for licence renewals of sites utilising trestles and baskets.

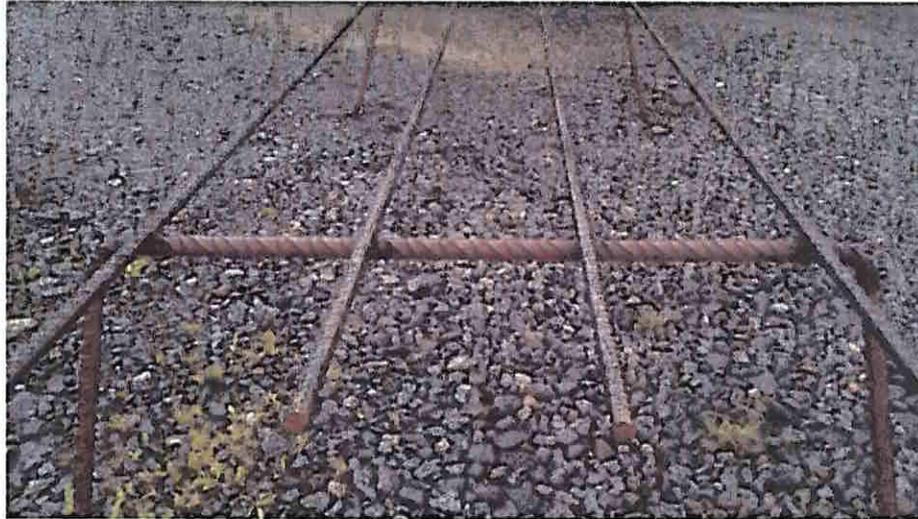


Plate 2: Typical oyster trestle.

T12/037A2

This area of cultivation is located off the north-east side of Inch Island, around Black Rocks. This area consists of foreshore subject to tidal waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed. 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, structures or features such as fish traps and shipwrecks. While the passage of tractors or other vehicles to and from the cultivation area may compress upon unknown buried archaeological remains, the routes are well established access ways have been in use for a number of years.

The potential negative impact is classified as Imperceptible.

T12/037B3

This area of cultivation is located on the east shore of Lough Swilly, running c.1.5km west of Farland Point. The area is overlooked by the site of Inch Castle to the north, on neighbouring Inch Island. This area consists of foreshore subject to tidal waters. Consultation of cartographic and archaeological sources as detailed in Section 5 did not identify any known archaeological sites on the shoreline, foreshore and seabed. 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, structures or features such as fish traps and shipwrecks. An aerial photograph supplied by BIM indicates that access onto the foreshore for work vehicles and personnel will be via a laneway in the townland of Drumgowan that leads towards Farland Point. While the passage of tractors or other vehicles to and from the cultivation area may compress upon unknown buried archaeological remains, the routes are well established access ways have been in use for a number of years.

The potential negative impact is classified as Imperceptible.

T12/037B4

This area of cultivation is located on the southern shore of Inch Island. According to the first edition of the OS six inch series (surveyed in 1834 and published in 1836), there was a ferry house located on the shoreline, which facilitated a ferry that ran between the island and Farland Point on the mainland. This area consists of foreshore subject to tidal waters. Consultation of cartographic and archaeological sources as detailed in Section 5 did not identify any known archaeological sites on the shoreline, foreshore and seabed. 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, structures or features such as fish traps and shipwrecks. While the passage of tractors or other vehicles to and from the cultivation area may compress upon unknown buried archaeological remains, the routes are well established access ways have been in use for many years.

The potential negative impact is classified as Imperceptible.

T12/251B

This area of cultivation is located just to the east of Black Rock and The Cul Bay on the western shore of Lough Swilly. This area consists of foreshore subject to tidal waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed. 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, structures or features such as fish traps and shipwrecks. While the passage of tractors or other vehicles to and from the cultivation area may compress upon unknown buried archaeological remains, the routes are well established access ways have been in use for many years.

The potential negative impact is classified as Imperceptible.

T12/311A

This area of cultivation is located south of a mudflat creek which is the mouth of the Ballasallagh Burn on the western shore of Lough Swilly. This area consists of foreshore subject to tidal waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed. 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, structures or features such as fish traps and shipwrecks. While the passage of tractors or other vehicles to and from the cultivation area may compress upon unknown buried archaeological remains, the routes are well established access ways have been in use for many years.

The potential negative impact is classified as Imperceptible.

6.5 Potential impacts of sites utilising bottom culture (new applications)

A number of sites involve cultivating mussel and oyster cultures on the seabed of the lough. Such cultures are harvested using dredgers described in Section 6.2 above.. 14 of the 21 sites where new licences are being sought involve this culture method. They are as follows:

Site	Species	Culture Method	History
T12/278A	Mussel	Bottom Culture	Application
T12/325	Mussel	Bottom culture	Application
T12/328B	Mussel	Bottom culture	Application
T12/328C	Mussel	Bottom culture	Application
T12/328D	Mussel	Bottom culture	Application
T12/330A	Mussel	Bottom culture	Application
T12/330B	Mussel	Bottom culture	Application
T12/330C	Mussel	Bottom culture	Application
T12/339A	Oyster (Edulis)	Bottom Dredging, hand picking	Application
T12/339B	Oyster (Edulis)	Bottom Dredging, hand picking	Application
T12/341 A, B, C	Mussel	Bottom Culture	Application
T12/378A	Mussels	Bottom Culture	Trial Application

Table 9: List of proposed aquaculture sites utilising bottom cultures in Upper Lough Swilly for which new licences are being sought.



Figure 11: Map showing areas with applications submitted for new licence of sites utilising bottom cultures.

T12/325

This area of cultivation is located just to the west of Bunrana Bay on the eastern shore of Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed, though the Shipwreck Inventory maintained by the Underwater Archaeological Unit of the National Monuments Service does indicate the presence of a shipwreck

some 700m to the southeast of the area of cultivation. This wreck is unidentified (W11165) and consists of a ship timber located north of a rock outcrop called Black Rock on Ballymacarry Strand (also known as The White Strand) outside Buncrana. It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as low.

T12/328B

This area of cultivation is located just off the townlands of Drumboy and Roughan Glebe on the eastern shore of Lough Swilly. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. A stone fish trap was identified on the foreshore in this cultivation area (UTM coordinates 629183, 919423) in a previous study of fish traps in Lough Swilly (Montgomery, Forsythe and Breen 2015, 130–33). It consists of a V-shaped trap with two arms whose opening points downstream, an arrangement indicative of an ebb trap. The arms are two to three courses in height, on average 30cm in height; the shoreward arm is 43m in length, while the seaward arm is 80m in length. The wall of the trap has been roughly pierced close to the apex or eye of the trap creating a 1.3m gap between the two arms, which opens into a rectangular enclosure measuring 7m by 6m, formed by a line of boulders (*ibid.*, 130–31). the utilisation of a dredge on the seabed during harvesting may impact and damage the above fish trap, while other unidentified archaeological sites such as additional sites may be revealed.

The potential negative impact is classified as high.

T12/328C

This area of cultivation is located off the townlands of Castlewray and Eightterross on the western shore of Lough Swilly. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. To the east of this cultivation area, an anomalous linear bedform (identified as S2), possibly natural, was detected during the course of a side scan survey carried out in this part of Lough Swilly by Boland Archaeological Services Ltd in September 2002 (Remote Detection Licence 02R139) (Boland 2002, 32–4). Further to the northeast of this licence area, a walk-over survey of the foreshore by the Underwater Archaeology Unit of the National Monuments Service in 2002 and 2003 established that this stretch of foreshore was of high underwater archaeological potential with evidence of a maritime cultural landscape (Anon., 2003). It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as low.

T12/328D

This area of cultivation is located off Ballylin Point on the western shore of Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic, and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed. This area was not covered in the INFORMAR Survey. It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as low.

T12/330A

This area of cultivation is located to the SE of Black Rock and The Cul Bay on the western shore of Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed. It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as low.

T12/330B

This area of cultivation stretches from Aughnish Isle to the west and Whale Head to the east on the western shore of Lough Swilly. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic, archaeological and geophysical sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed. It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as low.

T12/330C

This area of cultivation is located 1.2km east of Whale Head on the western shore of Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed. This area was not covered in the INFORMAR Survey. It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as low.

T12/339A

This area of cultivation is located off the townlands of Ardrumman and Killydonnell on the western shore of Lough Swilly, stretching for c.3.8km SW to NE. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. This area was not covered in the INFORMAR Survey. Consultation of cartographic and archaeological chapters revealed a number of archaeological sites closer into the foreshore. The OS maps depict a ferry house and landing place on the foreshore adjacent to the grounds of the house, associated with the Fort Stewart Ferry. According to the same cartographic sources, a causeway extended from this landing place, a structure which was covered by high water. In particular, on the first edition of the OS six inch series (c.1834), the terminal of the causeway is marked by what is labelled as a 'Ferry Pole'. A walk-over survey of the foreshore between Ardrumman and Killydonnell by the Underwater Archaeology Unit of the National Monuments Service in 2002 and 2003 established that this stretch of foreshore was of high underwater archaeological potential with evidence of a maritime cultural landscape (Anon., 2003). Six sites were identified along the foreshore: a rectangular stone platform, two wooden fishtraps, a composite stone and wooden fishtrap, a linear stone foreshore division, and an unidentified site (Anon., 2003). Two of the fishtraps were radiocarbon-dated to the post-medieval period, more specifically the late seventeenth or early eighteenth century (Montgomery and Forsythe 2012). A minor discrepancy exists between the location of the features shown on the map and the co-ordinates provided. Therefore, it is unclear if some of these features are beside or within the limits of T12/339. But at least one of the wooden fishtraps appears to lie within the proposed licenced area. Given that a dredge will be deployed on the seabed during harvesting, this fishtrap and possibly other archaeological features may be impacted by the proposed aquaculture activities.

The potential negative impact is classified as high.

T12/339B

This area of cultivation is located in the uppermost reaches of Lough Swilly on the east shore off the townland of Ballybegly and Ballybegly Little on the east shore. Two side scan anomalies (S1 and S3) were identified by Boland Archaeological Services Ltd in September 2002 are located in close vicinity to cultivation area, just NW of Ballybegly Point. This cultivation area is also in close vicinity to east of rubble stone pier associated with Fort Stewart Ferry (NIAH 40904653).

It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as moderate.

T12/341A

This area of cultivation located just to the NE of T12/341C on the western shore of Lough Swilly. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of

cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed. It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as low.

T12/341B

This area of cultivation is located off the townland of Rathmullan Wood on the western shore of Lough Swilly. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the shoreline, foreshore and seabed except for the presence of Millacre Well, which is a feature recorded on the landward side of the foreshore on all OS six inch and twenty-five inch maps. It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as low.

T12/341C

This area of cultivation located c.1km east of Ballykenny Point on the western shore of Lough Swilly. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in Section 5 did not identify any known archaeological sites on the shoreline, foreshore and seabed. It is possible that unknown potential archaeological sites such as shipwrecks, fish traps, and artefacts may be preserved in the sediment within the licence area, and that the utilisation of a dredge on the seabed during harvesting may impact on such remains. However, the type of dredge used in bottom culture harvesting of mussels is designed to skim the surface of the substrate without digging into it.

The potential negative impact is classified as low.

T12/378A

This area of cultivation is located across the mouth of an inlet on the eastern shore of Lough Swilly, which has been mostly reclaimed. The townland of Ballymoney is to the north and the townland of Drumboy is to the south. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in Section 6 did not identify any known archaeological sites on the shoreline, foreshore and seabed. Given the nature of dragging dredge nettings along the seabed, previously unidentified archaeological sites such as fish traps or shipwrecks may be revealed

The potential negative impact is classified as low.

6.7 Potential impacts of sites utilising suspended cultures (new licence applications)

A number of sites involve cultivating mussel cultures on a long line or BST system. Essentially, these are methods of floating the cultures, the floating systems kept in place by anchors placed on the seabed. Three of the 20 sites where licence renewal is being sought involve this culture method.

Site	Species	Culture Method	History
T12/284	Mussel	Suspended	Application
T12/340 A&B	Oyster/Mussel	Suspended	Application

Table 10: List of proposed aquaculture sites involving suspended cultures in Upper Lough Swilly for which new licences are being sought.



Figure 12: Map showing areas with applications submitted for new licence of sites utilising suspension systems.

T12/284

This area of cultivation is located c.100m off Kinnegar Strand in the townland of Rathmullan on the western shore of Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the seabed. However, it is possible that unrecorded archaeological remains

such as fish traps or shipwrecks lay in the sediment and may be compress by the placement of anchor blocks on the seafloor. Note: aerial photograph of T12/284 supplied by BIM shows suspended cultures already in place.

The potential negative impact is classified as low.

T12/340A

This area of cultivation is located c.600m NW of Matman Bay on the west side of Inch Island in Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the seabed. However, it is possible that unrecorded archaeological remains such as fish traps or shipwrecks lay in the sediment and may be compress by the placement of anchor blocks on the seafloor.

The potential negative impact is classified as low.

T12/340B

This area of cultivation is located c.500m NW of Hawks Nest on the west side of Inch Island on Lough Swilly. This area consists of deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the seabed. However, it is possible that unrecorded archaeological remains such as fish traps or shipwrecks lay in the sediment and may be compress by the placement of anchor blocks on the seafloor.

The potential negative impact is classified as low.

6.6 Potential impact of sites utilising trestles and baskets (new applications)

A number of sites involve cultivating mussel and oyster cultures on trestles laid on the foreshore of the lough. Such cultures are farmed using trestles laid directly onto the foreshore surface. Four of the 21 sites where a new licence is being sought involve this culture method. They are as follows:

Site	Species	Culture Method	History
T12/317A	Oysters	Trestles	Application
T12/328A	Mussel	Trestles	Application
T12/343	Oyster (Pacific)	Trestles and BST	Application
T12/388A	Oysters	Trestles	Application

Table 11: List of proposed aquaculture sites involving trestles in Upper Lough Swilly where a new licence is being sought.

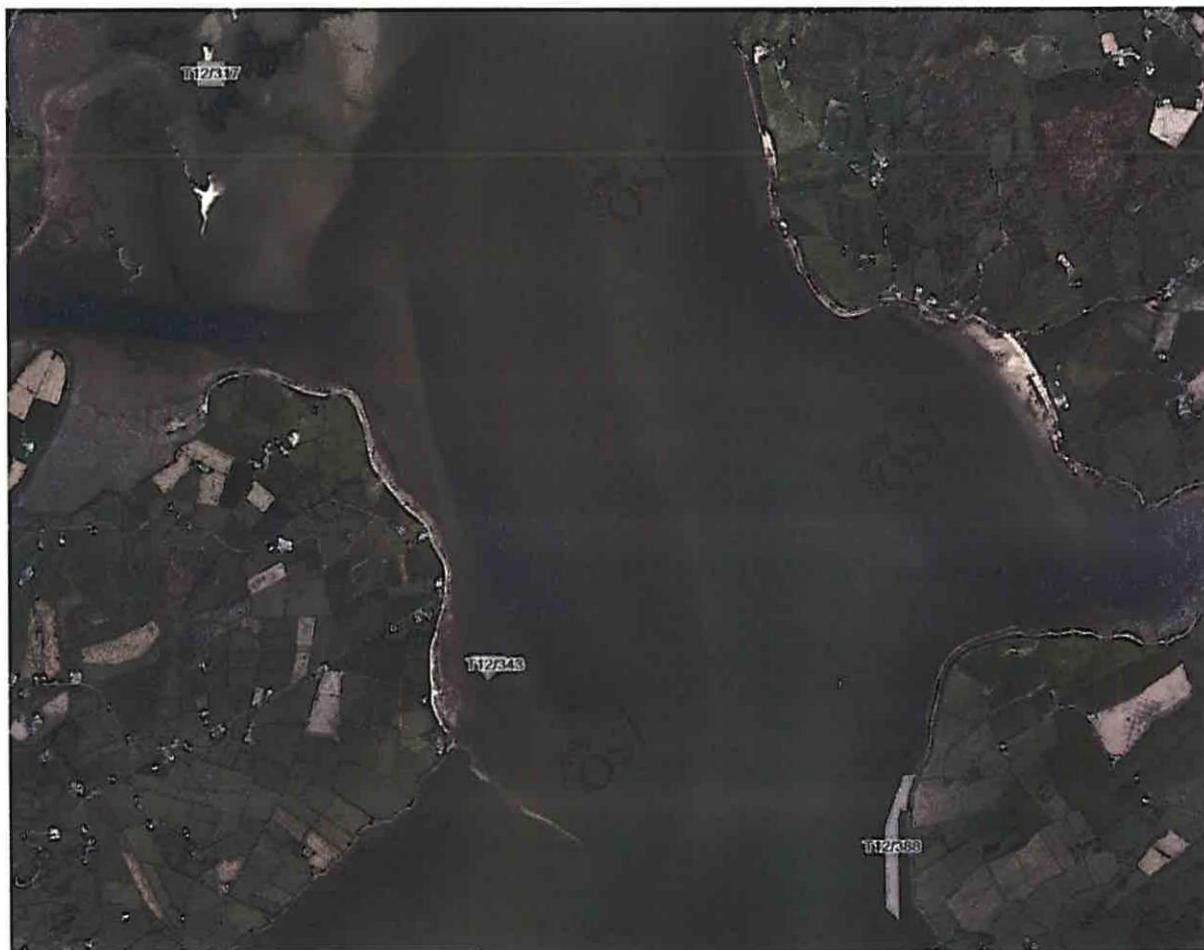


Figure 13: Map showing areas with applications submitted for new licence of sites utilising trestles and baskets.

T12/317A

This area of cultivation is located c.1km east off the townland of Drumherville on the western shore of Lough Swilly. This area consists of foreshore subject to tidal waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the foreshore and seabed. Given the nature of placing the short legs of the trestles directly onto the surface of the foreshore, there will be minimal disturbance of buried archaeological sites, structures or features such as fish traps and shipwrecks. However, the passage of tractors or other vehicles to and from the cultivation area may compress upon unknown buried archaeological remains.

The potential negative impact is classified as low.

T12/328A

This area of cultivation is located c.200m off the townland of Grange on the north side of Inch Island in Lough Swilly. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the foreshore and seabed. Given the nature of placing the short legs of the trestles directly onto the surface of the foreshore, there will be minimal disturbance of buried archaeological sites, structures or features such as fish traps and shipwrecks. However, the passage of tractors or other vehicles to and from the cultivation area may compress upon unknown buried archaeological remains.

The potential negative impact is classified as low.

T12/343

This area of cultivation is located c.400m NE off Ballygreen Point on the western shore of Lough Swilly. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the foreshore and seabed. Given the nature of placing the short legs of the trestles directly onto the surface of the foreshore, there will be minimal disturbance of buried archaeological sites, structures or features such as fish traps and shipwrecks. An aerial photograph supplied by BIM indicates that access onto the foreshore for work vehicles and personnel will be via a laneway in the townland of Ballygreen that leads towards Ballygreen Point to the south. The passage of tractors or other vehicles to and from the cultivation area may compress upon unknown buried archaeological remains on the foreshore.

The potential negative impact is classified as low.

T12/388A

This area of cultivation is located off the townland of Ballymoney on the eastern shore of Lough Swilly. This area includes foreshore subject to tidal waters, as well as deeper estuarine waters. Consultation of cartographic and archaeological sources as detailed in previous chapter did not identify any known archaeological sites on the foreshore and seabed, though a significant midden site (DG046-035) c.80m in length and c.20 to 40cm in thickness, is visible in a cliff edge on the adjacent shoreline. Subsequent archaeological testing (under excavation licence 01E0840) revealed that this midden extended c.10m in from the cliff edge, though evidence was also found 100m and 130m to the south in adjoining field.

A radiocarbon date from an oyster in the midden produced a calibrated date of 4800-4500BC. Given the nature of placing the short legs of the trestles directly onto the surface of the foreshore, there will be minimal disturbance of buried archaeological sites, structures or features such as fish traps and shipwrecks. However, the passage of tractors or other vehicles to and from the cultivation area may impact upon the midden site and compress upon unknown buried archaeological remains.

The potential negative impact is classified as low.

6.8 Summary of potential impacts of proposed aquaculture activity on the cultural heritage of Lough Swilly.

Potential impacts of renewed licenced aquaculture activity at existing aquaculture sites on the cultural heritage of Lough Swilly.

Species	Culture Method	History	Impact
Mussel	Bottom culture	Renewal	Imperceptible (T12/037A1, T12/037B1, T12/037B2, T12/037C, T12/251A, T12/273 A, T12/280A1, T12/293, T12/298)
Mussel	Suspended cultures	Renewal	Imperceptible (T12/211B, T12/211C, T12/275F) Low (T12/288C)
Oyster (Pacific)	Trestles and BST	Renewal	Imperceptible (T12/037A2, T12/037B3, T12/037B4, T12/251B, T12/311A).

Potential impacts of new licenced aquaculture activity on the cultural heritage of Lough Swilly.

Species	Culture Method	History	Impact
Mussel	Bottom culture	New application	Low (T12/278A, T12/325, T12/328C, T12/328D, T12/330A, T12/330B, T12/330C, T12/341 A, B, C, T12/378A). Moderate (T12/339B) High (T12/328B, T12/339A,)
Mussel	Suspended cultures	New application	Low (T12/284, T12/340 A&B)
Oyster (Pacific)	Trestles and BST	New application	Imperceptible (trestles installed at T12/317A, T12/328A, T12/343, T12/388A). Moderate (new access routes for the trestle sites)

7. Mitigation

Proposed mitigation measures for renewed licenced aquaculture activity at existing aquaculture sites in Lough Swilly.

Species	Culture Method	History	Migration
Mussel	Bottom culture	Renewal	No further archaeological input is deemed necessary (T12/037A1, T12/037B1, T12/037B2, T12/037C, T12/251A, T12/273 A, T12/280A1, T12/293, T12/298)
Mussel	Suspended cultures	Renewal	No further archaeological input is deemed necessary (T12/211B, T12/211C, T12/275F, T12/288C)
Oyster (Pacific)	Trestles and BST	Renewal	No further archaeological input is deemed necessary (T12/037A2, T12/037B3, T12/037B4, T12/251B, T12/311A).

Proposed mitigation measures for new licenced aquaculture activity in Lough Swilly.

Species	Culture Method	History	Mitigation
Mussel	Bottom culture	New application	Field assessment (T12/278A, T12/325, T12/328C, T12/328D, T12/330A, T12/330B, T12/330C, T12/339A, T12/339B, T12/341 A, B, C, T12/378A) Exclusion Zone around stone fish trap (T12/328B)
Mussel	Suspended cultures	New application	Field assessment (T12/284, T12/340 A&B)
Oyster (Pacific)	Trestles and BST	New application	No further archaeological input is deemed necessary for installation of trestles (T12/317A, T12/328A, T12/343, T12/388A) Walk-over survey and metal detection survey of new access routes (associated with T12/317A, T12/328A, T12/343, T12/388A).

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JOHN CRONIN & ASSOCIATES

ARCHAEOLOGY | CONSERVATION | HERITAGE | PLANNING

Lough Swilly Aquaculture Sites, County Donegal



Prepared by
Martin McGonigle,
John Cronin & Associates
28 Upper Main Street
Buncrana
Co. Donegal

For

Bord Iascaigh Mhara
Crofton Road, Dún Laoghaire,
Co. Dublin, A96 E5A0

November 2017

Contents

1. <i>Introduction</i>	3
2. <i>Context</i>	4
3. <i>Cultural Heritage Assessment of sites</i>	8
4. <i>Assessment of Impacts</i>	10
5. <i>Conclusions and recommendations</i>	12
6. <i>References</i>	14
<i>Appendix 1: Photographic record</i>	15
<i>Appendix 2: Illustrations</i>	43

1. Introduction

John Cronin & Associates have been commissioned by BIM to assess the potential archaeological impact of a proposed access routes and oyster sites in Lough Swilly, County Donegal. A programme of archaeological field survey, including a metal detection survey was to be undertaken on each of the five proposed oyster sites in Lough Swilly, County Donegal. Each of the five sites (T12/297 – Ballykenny; T12/317A – Ballykenny/Drumherville; T12/343A – Ballygreen; T12/388A – Ballymoney and T12/328A – Grange) was systematically field walked and metal detected by two experienced maritime archaeologists. The sites were walked at low tide in order to access each site. Each 'hit' picked up by the metal detector was examined and the location of all artefacts and other archaeological material was recorded by GPS. A photographic record of the site surveys was retained.

The field work was undertaken by Martin McGonigle (MSc in Maritime Archaeology from University of Ulster, Coleraine 2002) and Cormac Duffy (current PhD student in Maritime Archaeology at Ulster University, Coleraine), with the assistance of experienced archaeologists from our Buncrana office. Both archaeologists have extensive experience in undertaking archaeological surveys, including intertidal and metal detection surveys.

Being intertidal, the sites were visited at low tide in order to be fully surveyed. Certain parts of some of the sites were submerged at low tide and therefore not accessible. All available areas were field walked and metal detected under Consent to use a Detection Device (Consent No. 17R0225) issued by the Department of Culture, Heritage and the Gaeltacht. A number of modern ferrous metal objects were identified by the metal detection survey. Features with no cultural heritage designation in the form of kelp grids were noted on some sites. A Logboat of probable Prehistoric date was identified close to one of the proposed aquaculture sites (see further below).

2. Context

Location

The five proposed oyster sites are located in the lower area of Lough Swilly, on both sides of the lough and on Inch Island (**Figure 1**). Lough Swilly is an important maritime cultural landscape within County Donegal, located between the peninsulas of Inishowen to the east and Fanad to the west. The five sites that form the subject of this report are as follows:

T12/297 – Ballykenny

T12/317A – Ballykenny/Drumherrive

T12/343A – Ballygreen

T12/388A – Ballymoney

T12/328A – Grange

Background

The bathymetry decreases gradually from 30 m at the mouth of the Lough, towards the mouth of the River Swilly, where extensive intertidal flats are exposed at low water (Montgomery *et al*, 2015, 124). The tidal range averages 3.5 m on spring tides and 1.4 m on neap tides. The Inner Lough consists of mainly low headlands, intertidal sand and mudflats, with mudflats being the dominant habitat along with an upper shore line is generally characterised by narrow boulder fields around the high water mark (*ibid*, 124).

Lough Swilly 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 a diversity of habitats including tidal mud flats, salt-marshes, rocky shores, and reclaimed land or polder. The mud flats are known locally as 'glar' (Johnston 2011, 35). These 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, examples of which have been found on other inlets on the Irish coastline including, for example, the Shannon Estuary (O'Sullivan 2001, 56–61). Large areas of Lough Swilly provide good conditions for the preservation of archaeological features, from the Mesolithic, through to the Neolithic, Bronze Age and Iron Age, and into the Medieval and Post-medieval eras. The inter-tidal mud flats provide anaerobic conditions that are necessary for the preservation of structures and artefacts made from organic material, providing insights into the past lifeways of peoples. The preserved remains of fish traps, fish weirs, wooden jetties, trackways, or submerged settlements, for example have been found in estuaries elsewhere (O'Sullivan 2001).

One of the cultural heritage features most commonly found in the intertidal zone in Lough Swilly and around County Donegal in general is the kelp grid. The collection of seaweed is long attested to in Ireland. The early Irish law texts (dating to seventh and eighth centuries) mention the gathering of seaweed for animal fodder, human food and as soil fertiliser (Kelly 2000, 305). From the seventeenth century seaweed was burnt in kilns to produce kelp. The soda and iodine produced had many uses, such as making soap, bleaching linen and glass making. Rents were often paid in the Rosses in kelp around 1750 (Evans 1957, 221). In some areas where the foreshore was unsuitable for the natural growth of seaweed, structures called kelp grids were erected to aid the colonisation of seaweed in the intertidal zone. *'These sites consist of boulders set in a sandy or muddy foreshore to encourage seaweed growth'* (Forsythe & Breen 2008, 25). A number of kelp grids were encountered during the site inspections (see further below). No kelp kilns were identified on any of the sites. It is possible that the seaweed collected at these locations was used for manure or animal fodder rather than for kelp production.

Cultural Heritage sites

A number of cultural heritage sites are recorded in both the Sites and Monuments Record (SMR) and in the National Inventory of Architectural Heritage (NIAH) in close proximity to the proposed Aquaculture sites (**Tables 1 – 3**). None of these recorded cultural heritage sites will be directly impacted by the proposed developments.

Table 1: Cultural heritage sites in proximity to sites T12/297 – Ballykenny and T12/317A – Ballykenny/Drumherville

SMR No.	Townland Names	ITM_E	ITM_N	Description
DG037-016	Ráith (Tc Gleann Eala)	625967	925304	Stone circle
DG037-021001	Aughnish Isle	625783	922834	Church
DG037-017001	Ballykenny (Gleanalla Ed)	625776	924071	Stone circle
DG037-017002	Ballykenny (Gleanalla Ed)	625776	924071	Cairn - unclassified
DG037-017003	Ballykenny (Gleanalla Ed)	625776	924071	Stone row
DG037-021003	Aughnish Isle	625755	922824	Graveyard

Table 2: Cultural heritage sites in proximity to site T12/343A – Ballygreen and T12/388A - Ballymoney

SMR No.	Townland Names	ITM_E	ITM_N	Description
DG046-015001	Grange (Burt Ed)	631827	919232	Castle - tower house
DG046-015002	Grange (Burt Ed)	631827	919232	Hilltop enclosure
DG046-015003	Grange (Burt Ed)	631827	919232	Bawn
DG046-015004	Grange (Burt Ed)	631827	919232	House - 16th/17th century
DG046-015005	Grange (Burt Ed)	631827	919232	House - 16th/17th century
DG046-008	Ballymoney	631546	921313	Enclosure
DG046-012001	Grange (Burt Ed)	631123	919746	Graveyard
DG046-012	Grange (Burt Ed)	631111	919742	Church
DG046-039	Grange (Burt Ed)	631074	919691	Midden
DG046-009	Ballymoney	631048	921029	Standing stone
DG046-035	Ballymoney	630852	920096	Midden
DG046-040	Drumboy (Newtowncunningham Ed)	629993	919575	Midden
DG046-010	Fortstewart	627563	920386	Standing stone
DG046-011	Fortstewart	627418	920248	Bawn
DG046-011001	Fortstewart	627410	920246	House - 17th century

Table 3: Cultural heritage sites in proximity to site T12/328A – Grange

SMR/ NIAH No.	Townland Names	ITM_E	ITM_N	Description
DG038-009	Figary	633425	926985	Flat cemetery
DG038-019	Grange (Inch Ed)	632265	925236	Souterrain
DG037-007003	Rathmullan and Ballyboe	629599	927529	Religious house - Carmelite friars

SMR/ NIAH No.	Townland Names	ITM_E	ITM_N	Description
DG037-023	Rathmullan and Ballyboe	629471	927833	Cross-inscribed pillar (present location)
DG037-007001	Rathmullan and Ballyboe	629467	927837	Stone head
DG037-007	Rathmullan and Ballyboe	629431	927514	Settlement cluster
DG037-003	Rathmullan And Ballyboe	628753	928133	Ringfort - rath
NIAH 40820001	Figary	633476	926936	Church/Chapel
NIAH 40820002	Figary	633510	926871	Bridge
NIAH 40820003	Figary	633668	926886	Guest House/B&B
NIAH 40820004	Figary	633691	926785	Hotel
NIAH 40820005	Figary	633874	926646	House
NIAH 40903801	Moress	632986	925214	House
NIAH 40903802	Moress	633243	925013	Church/Chapel
NIAH 40903818	Lisfannan (Fahan)	633329	927635	House
NIAH 40903840	Moress	632716	925580	House
NIAH 40903841	Grange (Inch)	632588	925569	Mill (water)

Shipwreck Inventory of Ireland

The Shipwreck Inventory of Ireland maintained by the National Monuments Service in the Department of Culture, Heritage and the Gaeltacht (DoCHG), contains a list of approximately 40 wrecks within Lough Swilly. While none of these are located in close proximity to the proposed aquaculture sites, the location of the majority of these wrecks is proximal only. Additionally, the Shipwreck Inventory records do not in general record wrecks pre-dating 1750AD. Thus the possibility exists – however low - that undocumented wrecks may exist within the immediate receiving environment of the proposed development.

Excavations database

A review of the Excavations database (1970 – 2017) (www.excavations.ie) for the townlands that constitute the five proposed development areas, namely Ballykenny; Drumherville; Ballygreen; Ballymoney and Grange has revealed that one archaeological excavation has taken place. This excavation was undertaken by Peter Woodman and Nicky Milner under licence no. 01E0840 in association with the recorded shell midden (DG046-035) in the townland of Ballymoney, located close to site T12/388A. This excavation is documented as follows:

At this site an intermittent layer of shells had been noted to be eroding on the cliff face. This layer was usually 0.2–0.4m thick and extended for approximately 80m in length. Shells were also observed on the surface of the field to the south of the cliff-face exposure, about 140m south of the beginning of the midden. Test-pits were placed in the field to establish the extent of the midden.

At Point (0) on the main baseline it was established that the midden did not exist but that there was a layer of dark soil present.

At 28.5m three test-pits running in from the cliff edge showed that the midden extended for some 10m from the cliff edge but, while the dark soil could be found further away from the cliff edge, the midden itself did not extend as far as 15m from the cliff face. At 100m and 130m to the south test-pits revealed further evidence of the presence of midden, while no evidence was found at 150m.

Cartigraphic review

Map regression was undertaken for each of the five proposed aquaculture sites in the form of a review of historical cartographic sources, including the First edition Ordnance Survey (OS) maps (c.1830) and 25 Inch Ordnance Survey (OS) maps (c.1905). In addition, all available orthophotography was reviewed in detail to seek evidence for previously unrecorded cultural heritage features within and adjacent to the proposed development sites. No previously unrecorded cultural heritage features were identified on the historical cartographic sources. Many of the post-medieval/ early modern cultural heritage features, such as the kelp grids were visible on some of the orthophotography.

3. Cultural Heritage Assessment of sites

T12/297 – BALLYKENNY

The site is located in the intertidal zone in the townland of Ballykenny, proximately 400 meters south-southwest of Ray Bridge. The site was almost completely revealed at low tide, apart from the easternmost portion (*Plate 9*). The site is flat consisting of coarse sand with a muddy area along the southern part of the site (*Plates 1, 2 & 6*). There was evidence for recent aquaculture usage within the site in the form of markers, oyster bags and parts of broken trestles (*Plates 3, 4 & 5*). A series of linear stone features were noted at the western part of the site (*Plates 7 & 8*). These consisted of stones set in rows of two to four stones wide, orientated west-northwest to east-southeast and were at six to eight meters intervals. These linear features are thought to have been associated with nineteenth and twentieth-century kelp production.

The metal detection survey produced numerous 'hits' which on examination were of no cultural heritage significance. These included corroded iron objects of an unknown date or function, oyster bag fasteners and parts of aquaculture trestles. Discarded oyster bags were also noted during the walk over of the site. A timber logboat or dugout canoe was identified in the intertidal zone approximately 60 meters north of the site (*Plates 10, 11 & 12*).

T12/317A – BALLYKENNY/DRUMHERRIVE

The site is located on the foreshore in the townland of Ballykenny/Drumherive approximately 1km west-southwest of Ray Bridge. The area that the site is located within is marked as 'mud' on the 25 Inch OS map (c.1905), however the site consists of compact sand with evidence for mussel beds (*Plates 22, 23 & 24*). Nothing of cultural heritage significance was identified during the site inspection and metal detection survey (*Plate 25*). There is evidence for former / current useage of aquaculture sites to the north and northeast of the site (*Plates 20 & 21*). The foreshore between Ray Bridge and the site is stony, particularly to the south of the river channel where a rectangular area of stones orientated north/south appears to have been man made and may represent a kelp grid (*Plate 16*).

T12/343A – BALLYGREEN

The site is located in the townland of Ballygreen approximately 400m southeast of the slip at Ballylin Point (*Plates 26 & 27*). The site consists of a muddy foreshore beyond (east) a series of kelp grids visible in the intertidal zone. Most of the site was submerged during low tide and as such was not fully surveyed. The muddy underfoot conditions and murky water made a wading survey difficult. The western portion of the site was inspected and metal detected. The foreshore to the west of the site contains the remnants of kelp grids, visible for over 1km from Ballygreen Point to the south to Ballylin Point to the north (*Plate 28*). Divisions in the form, gaps approximately 1.5m wide and walls made up of lines of larger stones – both orientated east – west – are clearly visible on the ground (*Plates 29 & 30*).

A wall orientated north - south, but slightly curving with the shape of the adjacent shoreline, consisting of large boulders runs for approximately 600m southward from close to the slip at Ballylin Point (*Plate 33*). Though within the same area as the kelp grids, these two features do not seem to be directly associated. They are separated by a distance of 20m of sandy seashore. This feature is depicted on the 25 Inch OS map as a line of boulders. It is likely to have been assembled to form a barrier to protect the sandy shore and stop erosion of the adjacent lands. Another linear stone feature consisting of

boulders with what appears to be a rubble core, measuring approximately 12 meters in length was noted on the foreshore close to the slip at Ballylin Point (*Plate 34*). This feature may have been a jetty that pre-dates the kelp grids. Its association with the kelp grids and/or the line of boulders is uncertain. The walkover survey also noted several post mediaeval and modern pottery sherds. The metal detection survey produced only modern refuse.

T12/388A - BALLYMONEY

This area is situated on the shoreline of the townland of Ballymoney (Burt), north of the townland of Grange (Burt) formerly a grange of the Cistercian abbey at Macosquin (Carville, 2002). The area to the south of the survey area has been the subject of embankment and building of a railway bridge cutting off the area known as Blanket Nook (*Plate 40*). This embankment was reclaimed in the mid-nineteenth century and would have restricted the flushing action of the ebb tide and streams located within the embayed area, in turn contributing to substantial sediment accretion. Several features were observed on the foreshore during survey. The townland boundary between Grange and Ballymoney is continued onto the shoreline using a line of large boulders in line with the field boundary (*Plate 40*). A square stone structure has been erected on the northern side of the townland boundary (*Plates 36, 37, 38 & 39*). This includes a probable kelp grid, within which is a small clear square area. A previously unrecorded cleared slipway (*Plate 43*) was identified to the north of the surveyed area and several areas have been cleared to allow access along the shore at the high water mark (*Plate 44*). Several linear features running east- west into the shoreline were identified along the shore, these were possibly demarcation for kelp cultivation (*Plate 41*). A recorded midden site (DG046-035) c.80m in length and c.20 to 40cm in thickness is visible in a cliff edge on the adjacent shoreline (*Plate 42*). Several metal objects were found during a metal detection survey of the foreshore, most appeared to be iron agricultural fragments (*Plates 46 & 47*).

T12/328A – GRANGE

The site is located in the townland of Grange on a sandbar to the north of Inch Island, directly west of Down Fort (Nepolionic fort) and Inch Pier (*Plate 53*). The site consists of a flat expanse of compact sand and shells (predominated by mussels, cockles and oyster shells) (*Plates 48, 49 & 50*). The western portion of the site remained inundated at low tide (*Plate 51*). It is possible that this area had previously been dredged to allow access to Inch Pier. Occasional glass bottles and modern ceramic sherds were identified during the walkover survey (*Plate 57*). The metal detection survey produced a small number of metal debris (*Plates 55 & 56*). Nothing of cultural heritage significance was identified within the site or on the foreshore adjacent to the site.

4. Assessment of Impacts

The proposed aquaculture sites applications comprise of oyster (Pacific) and mussel cultivation on intertidal trestles and suspended mussel culture (BST) systems. The metal trestles will be set onto the surface of the foreshore, without permanent foundations. The suspended mussel culture (BST) systems comprise floating lines with anchors placed on the seabed. These types of mariculture are generally viewed as being benign and of having a low environmental impact. None of these proposed developments will directly impact any recorded cultural heritage sites. There is potential for impact on previously unrecorded sites of cultural heritage value noted during this assessment. Much of the potential impact will be posed by the additional human traffic associated with the operation of the sites.

T12/297 – BALLYKENNY

The proposed aquaculture site at Ballykenny will consist of oyster cultivation on intertidal trestles. The site appears to have previously been subject to aquaculture as evidenced by the oyster bag fasteners, parts of aquaculture trestles, and discarded oyster bags which were also noted during the site inspection and metal detection survey. A series of linear stone features were noted at the western part of the site. These may represent previous extractive industry in the form of seaweed production or shellfish collection and their date is unknown. The proposed development is unlikely to have any impact on these linear features.

The proposed access route to the site will enter the shoreline from the R247 at the existing slip at Drumherrive. It will proceed southward along the coastal margin before loping out to the southwestern corner of the proposed aquaculture site (*Figure 3*). This route will avoid impact with any features of cultural heritage significance, including the logboat.

A timber logboat was identified in the intertidal zone approximately 60 meters north of this site. Logboats are a rare find in County Donegal and are therefore of major archaeological significance. The trestles associated with the proposed aquaculture site will have no direct impact on the logboat. It is unlikely that the trestles will pose an indirect impact on the logboat, by for example affecting the movement of waterborne silts. A number of potential mitigation measures may be implemented to ensure the survival *in situ* of this important archaeological find (see below).

T12/317A – BALLYKENNY/DRUMHERRIVE

The proposed aquaculture site at Ballykenny/Drumherrive is located approximately 650m northeast of site T12/297 (Ballykenny). The site itself contains no features or finds of cultural heritage significance. However, the shoreline between Ray Bridge and the proposed site contains the remnants of possible kelp grids. There is potential for inadvertent damage to these kelp grids cause by increased human traffic and in particular by vehicular traffic associated with the operation of the aquaculture site. Potential mitigation measures are outlined below.

T12/343A – BALLYGREEN

Most of the site was submerged during low tide and as such was not fully surveyed. The murky water made a wade survey difficult also. It appears that much of the site is located beyond the foreshore and would remain inundated even during spring tides.

A series of kelp grids and linear stone alignments are visible in the intertidal zone. The proposed metal trestles and suspended mussel culture system will pose no direct impact on these cultural heritage features. However, there is potential for inadvertent damage to these kelp grids caused by increased human traffic and in particular by vehicular traffic associated with the operation of the aquaculture site. Potential mitigation measures are outlined below.

The proposed access route to the site will enter the shoreline from the access lane to the west-southwest of the site (*Figure 9*). On entering the shoreline the access route will travel east-northeast to the proposed aquaculture site, crossing over the kelp grids in the intertidal zone. Although the proposed access route will traverse part of a kelp grid, the impact may be viewed as negligible for the following reasons: The kelp grids although of cultural heritage value are not a recorded cultural heritage feature; the operation of the proposed access route will not involve the removal of any part of the kelp grids and the kelp grids are robust and extensive and have the capacity to absorb a potential impact of this scale and nature.

T12/388A - BALLYMONEY

The proposed aquaculture site at Ballymoney will consist of oyster cultivation on intertidal trestles. The foreshore contains the remnants of former kelp production grids and associated potential features, such as a possible slip of cultural heritage significance. A recorded midden site (DG046-035) is sited in the cliff face adjacent to the proposed aquaculture site.

The proposed metal trestles will pose no direct impact on these cultural heritage features. However, there is potential for inadvertent damage to these kelp grids caused by increased human traffic and in particular by vehicular traffic associated with the operation of the aquaculture site. Potential mitigation measures are outlined below.

T12/328A – GRANGE

The proposed aquaculture site at Grange will consist of mussel cultivation on intertidal trestles. No features of cultural heritage potential were noted either within the proposed aquaculture site or along the adjacent foreshore. This site will be accessed by boat, thus there will be no vehicular traffic on the foreshore adjacent to the proposed aquaculture site. The proposed development will pose no impact on either recorded cultural heritage sites or potential cultural heritage sites, thus no mitigation measures are deemed necessary.

5. Conclusions and recommendations

Conclusions

A desktop review of cultural heritage sites within close proximity to each of the five proposed aquaculture sites has revealed that a small number of such sites are located within the environs of the proposed aquaculture sites. None of these sites will be directly impacted by the proposed developments.

All available parts of each of the five proposed sites were inspected and metal detected by two experienced maritime archaeologists. A number of previously unrecorded sites of cultural heritage value were identified during the site surveys. Seaweed production areas, often referred to as kelp grids were noted at three of the sites: T12/317A – Ballykenny/Drumherrive, T12/343A – Ballygreen and T12/388A – Ballymoney.

A timber logboat was identified close to the proposed site T12/297 at Ballykenny. Logboats have been used in Ireland from the Mesolithic period (7000 – 4000BC) right up until the seventeenth century (Fry 2000, 3), and they are rarely found around coastal areas and within sea loughs (*ibid*, 24). Alder, oak and poplar are the predominant wood species used for logboats in Ireland (Gregory 1997, 59). The identification of a previously unrecorded logboat in Lough Swilly is of great archaeological importance. The finding of this logboat was reported to both the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht (DoCHG) and the National Museum of Ireland using the proforma Monument Report Form. This is in accordance with Section 23 of the National Monuments Act 1930 and Condition 6 of the Consent to use a Detection Device (Consent No. 17R0225) associated with the site surveys.

Recommendations

The following are recommendations only and will be subject to review by BIM, DoCHG and the Planning Authority.

T12/297 – BALLYKENNY

There is a high potential for inadvertent damage to the logboat caused by increased human traffic and in particular by vehicular traffic associated with the operation of the aquaculture site. It is recommended that the site of the logboat found at Ballykenny is protected from damage by establishing a 50m buffer around it (see **Figure 4** below), within which no development or vehicular traffic may occur. The agreed access and egress routes will avoid this area and should be strictly adhered to during the operation of the sites. There is potential that a physical barrier may form the basis for the protection of the logboat *in situ*. Such mitigation measures may involve the establishment of a metal strongbox over the logboat surrounded by sandbags. This would be intrusive on the landscape and would have to be undertaken under archaeological supervision and in consultation with the Underwater Archaeology Unit in the Department of Culture, Heritage and the Gaeltacht and the National Museum of Ireland.

It is recommended that the site of the logboat is added to the Record of Monuments and Places (RMP). This will afford it statutory protection under the National Monuments Acts 1930 – 2004.

T12/317A – BALLYKENNY/DRUMHERRIVE

It is recommended that a commitment is made by the developers of the proposed aquaculture site at Ballykenny/Drumherrive that the kelp grids and associated features will not be removed and will be preserved *in situ*. In the absence of an access route to this proposed site, the potential impact could not be assessed. The potential access route should avoid by as much distance as possible the logboat identified during the field survey. Crossing part of a kelp grid on the foreshore may be unavoidable. Thus, the access route should be subject to assessment and agreed to in advance of the proposed aquaculture development. Access to the site during operation should adhere strictly to agreed areas to minimise impact on features of cultural heritage significance.

T12/343A – BALLYGREEN

It is recommended that a commitment is made by the developers of the proposed aquaculture site at Ballygreen that the kelp grids and associated features will not be removed and will be preserved *in situ*. The proposed access route will traverse part of a kelp grid, however the impact is deemed negligible. Access to this site during operation should adhere strictly to agreed route to minimise impact on features of cultural heritage significance.

T12/388A – BALLYMONEY

It is recommended that a commitment is made by the developers of the proposed aquaculture site at Ballymoney that the kelp grids and associated features will not be removed and will be preserved *in situ*. In the absence of an access route to this proposed site, the potential impact could not be assessed. Crossing part of a kelp grid or the townland boundary between Grange and Ballymoney on the foreshore may be unavoidable. Thus, the access route should be subject to assessment and agreed to in advance of the proposed aquaculture development. Access to the site during operation should adhere strictly to agreed areas to minimise impact on features of cultural heritage significance.

T12/328A – GRANGE

No mitigation measures are deemed necessary for the proposed aquaculture site at Grange, Inch Island.

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www.archaeology.ie
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Appendix 1: Photographic record

T12/297 – BALLYKENNY



Plate 1: Working shot showing metal detection survey across the site, facing north



Plate 2: View across the site, facing northeast, showing metal detection survey



Plate 3: View of ferrous metal objects (possibly part of an aquaculture trestle) from metal detection survey



Plate 4: View of some of the ferrous metal objects from metal detection survey



Plate 5: View of mussel bags close to the northern end of the site, facing north



Plate 6: View across southern portion of site from southwestern corner, facing east (Inch Island in background)



Plate 7: View across northern portion of site from northwestern corner, facing east

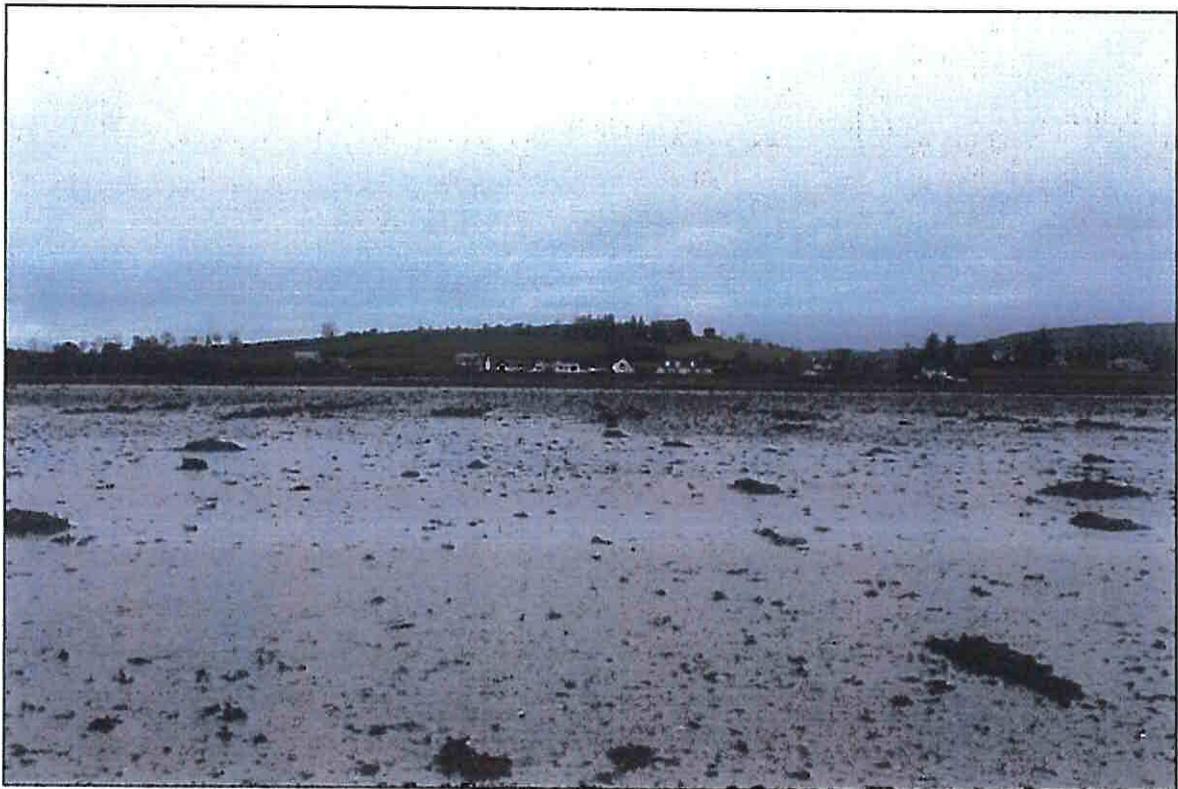


Plate 8: View across site facing west, showing lines of stone (kelp grid)

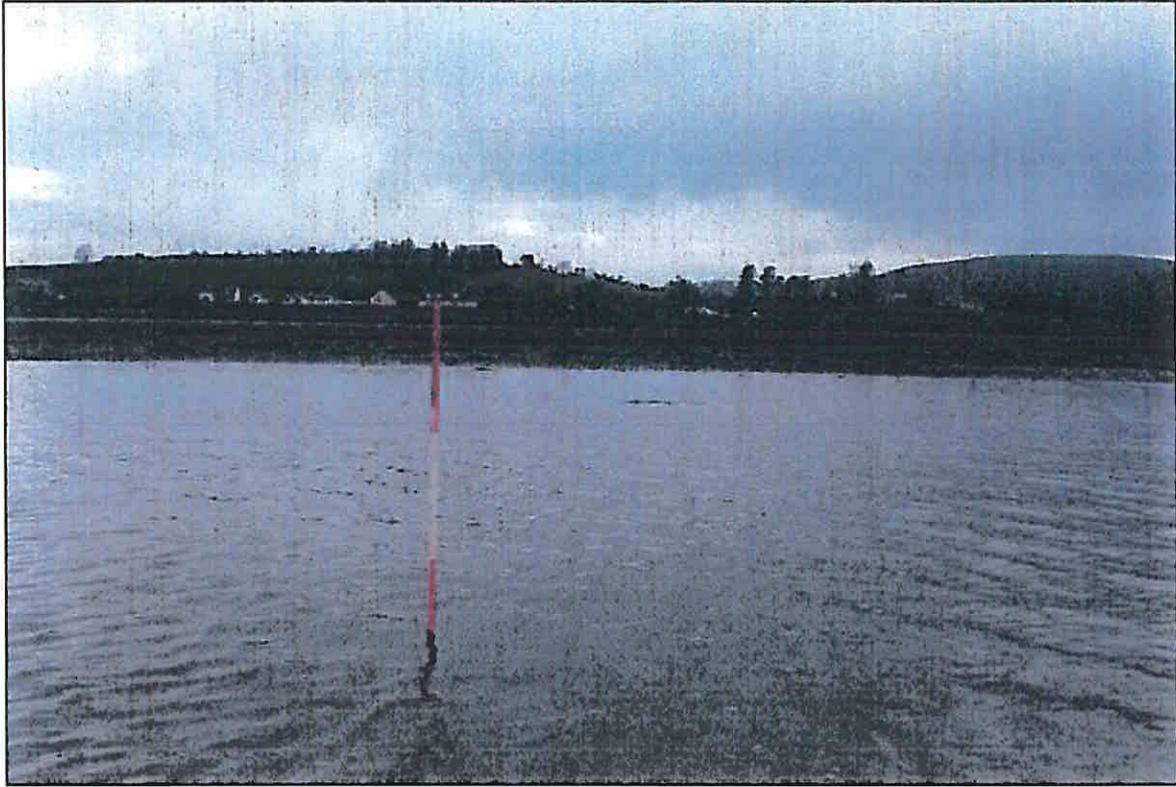


Plate 9: View from northeastern corner of the site at low tide, facing west across the site



Plate 10: View of Logboat, facing north-northeast



Plate 11: View of Logboat, facing south-southwest (1m scale)

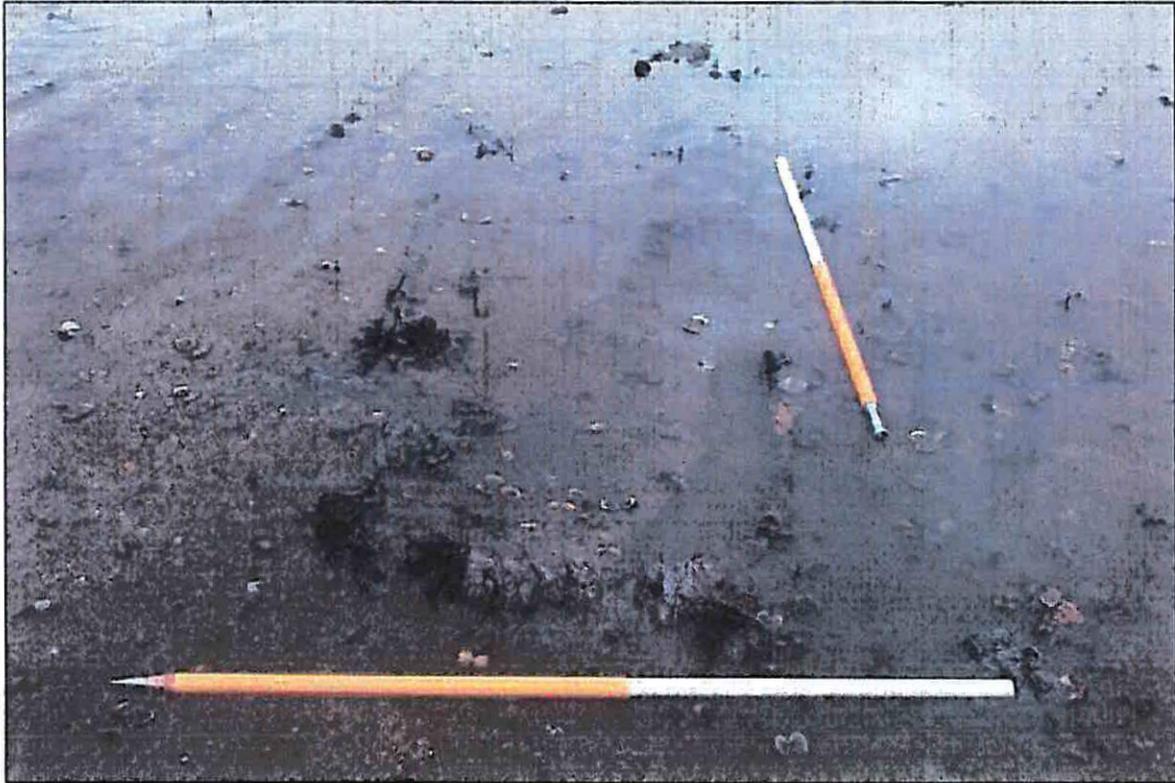


Plate 12: View of Logboat, facing south-southwest at turning of the tide (1m scales)

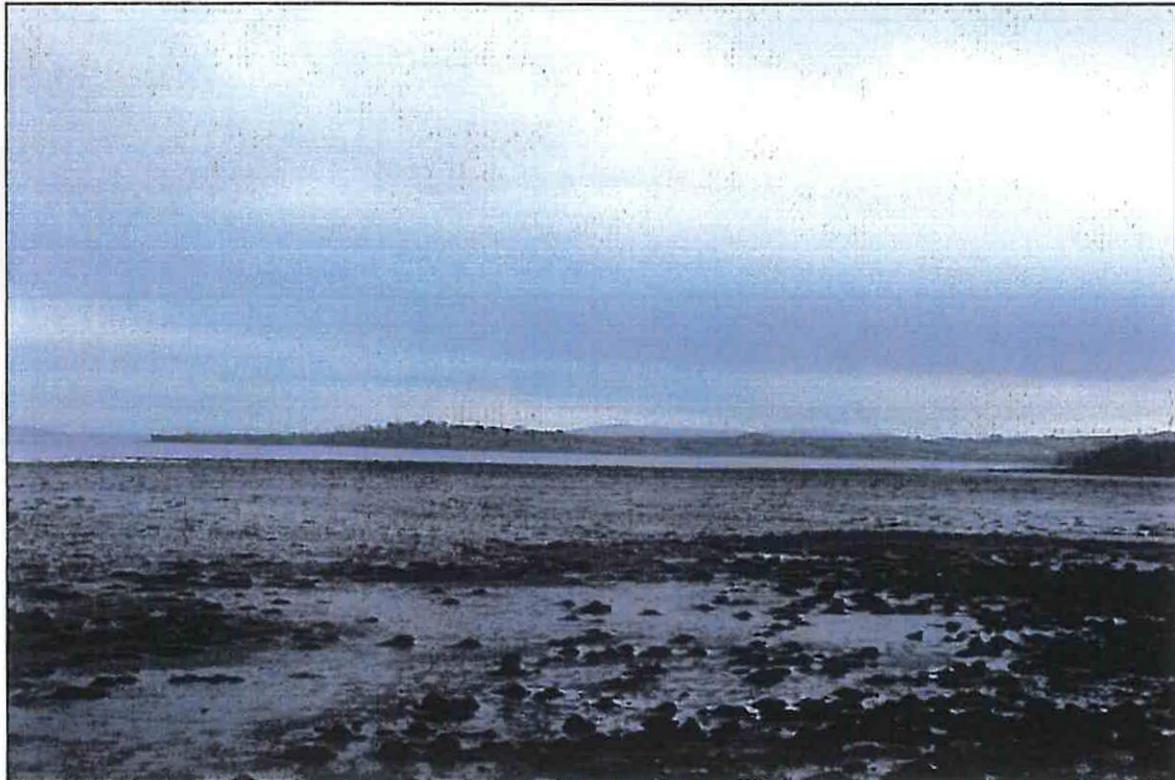


Plate 13: Overall view across site facing south-southeast

T12/317A – BALLYKENNY/DRUMHERRIVE

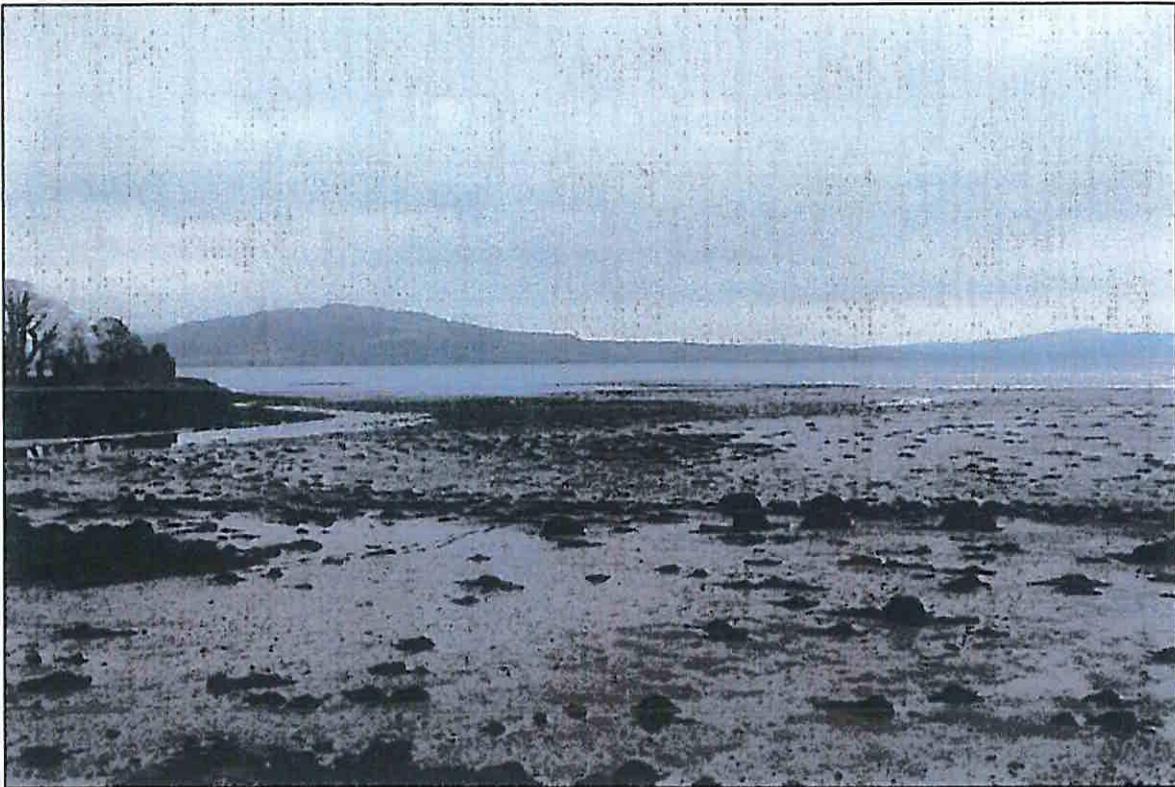


Plate 14: View from close to Ray Bridge, showing remnants of possible kelp grid and saltworks to northwest of the site facing northeast with inch island in background



Plate 15: View of saltworks from close to Ray Bridge, facing north

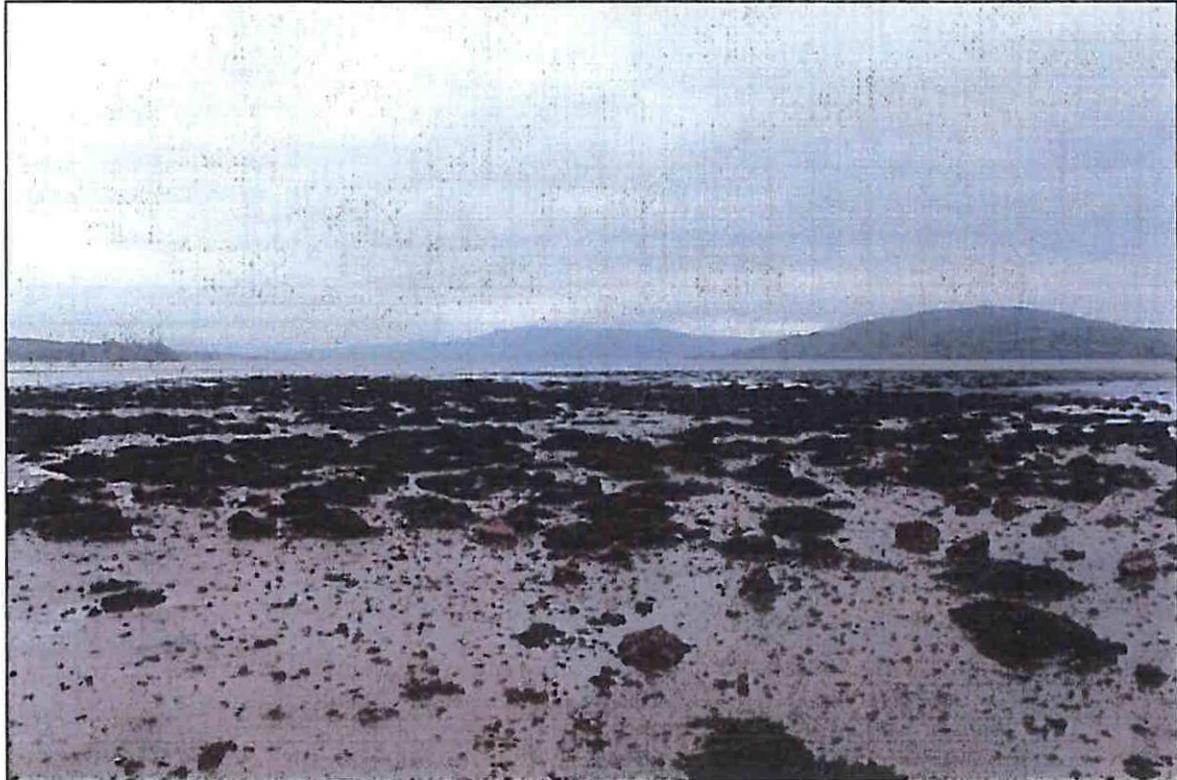


Plate 16: View towards site just before low tide, showing remnants of possible kelp grid facing northeast



Plate 17: View across site from southeastern corner, facing north

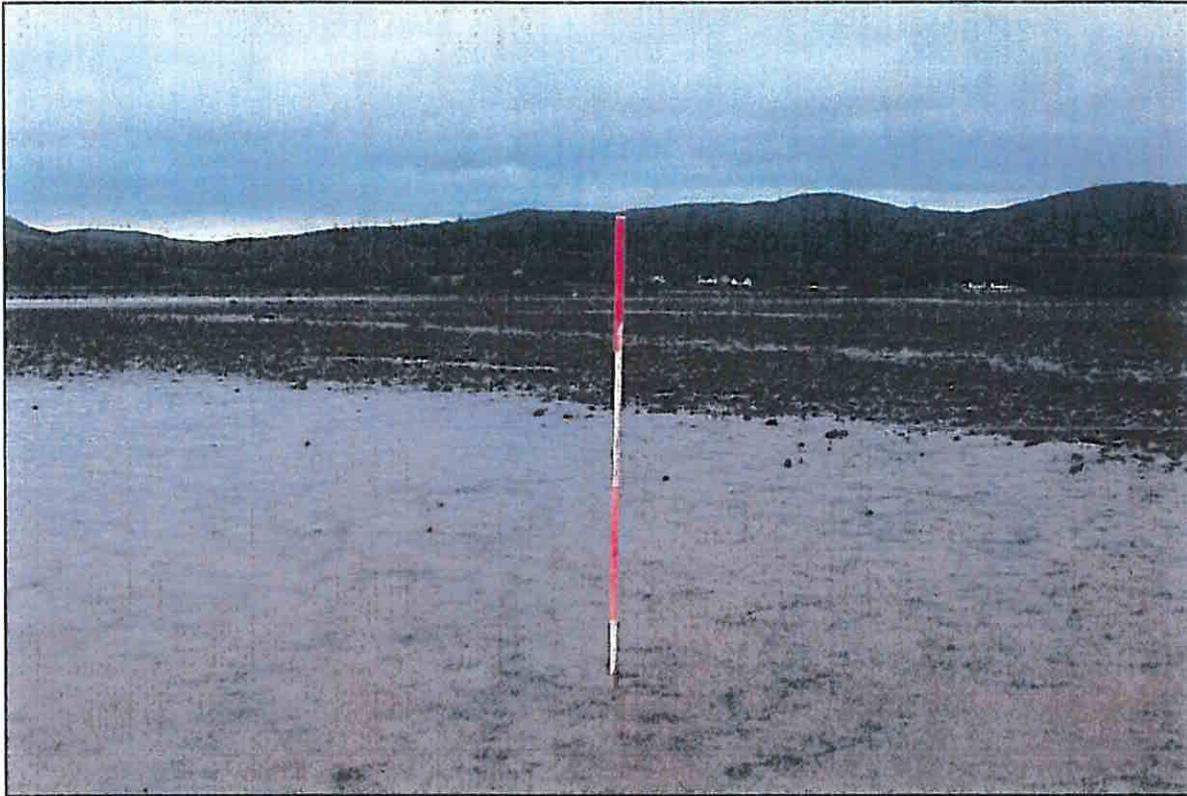


Plate 18: View across site from southeastern corner, facing west



Plate 19: View across site from northeastern corner, facing south



Plate 20: View from northeastern corner of site towards existing aquaculture sites, facing northeast



Plate 21: Close up of trestle and existing aquaculture sites, to the northeast of the site, facing northeast



Plate 22: View across site facing west, with Ray Bridge and saltworks in background



Plate 23: View across site from northwestern corner, facing east-southeast



Plate 24: Close up of part of the intertidal area within the site, showing mussel shells



Plate 25: View of one of the few objects uncovered during the metal detection survey

T12/343A – BALLYGREEN



Plate 26: View towards site as tide recedes from slip at Ballylin Point, facing southeast



Plate 27: View slip with stone setts at Ballylin Point, facing north



Plate 28: View across kelp grid to west of the site, facing north



Plate 29: View of linear division in kelp grid to west of the site, facing east



Plate 30: View across kelp grid to west of the site, facing east

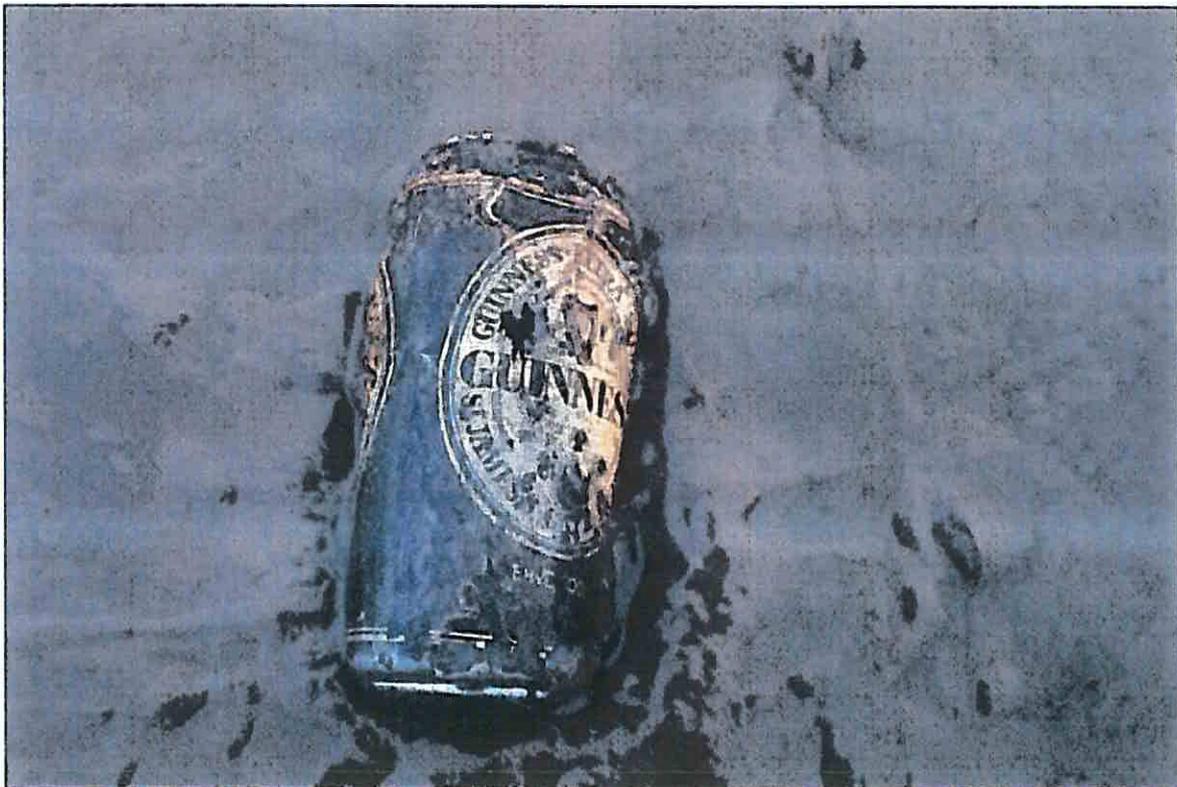


Plate 31: View find from metal detection survey



Plate 32: View one of the numerous modern pottery sherds noted in the area to the west of the site



Plate 33: View stone bank along shore to west of the site, facing north



Plate 34: View short stone wall (possible jetty) to northwest of aquaculture site, facing south

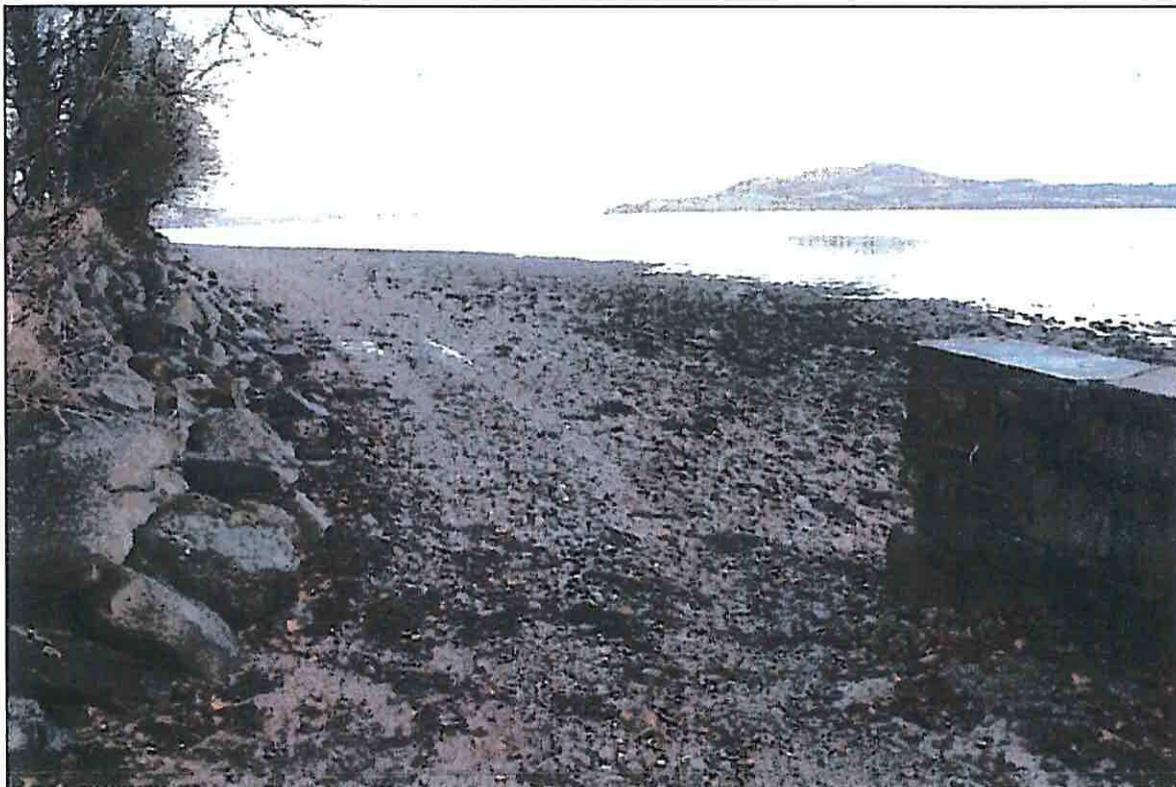


Plate 35: View of shore access from slip at Ballylin Point to north of site, facing north

T12/388A – BALLYMONEY



Plate 36: Extension of townland boundary (Ballymoney/Grange), facing east



Plate 37: View of townland boundary (Ballymoney/Grange) and kelp grid, facing west



Plate 38: View of townland boundary (Ballymoney/Grange) and kelp grid, facing north



Plate 39: View of small square within kelp grid with townland boundary, facing south-southeast



Plate 40: View from southern end of site towards Burt Castle, facing south



Plate 41: View of one of a number of linear divisions (orientated east – west) of the kelp grids, facing west



Plate 42: Eroded cliff face showing midden (DG046-035), facing east

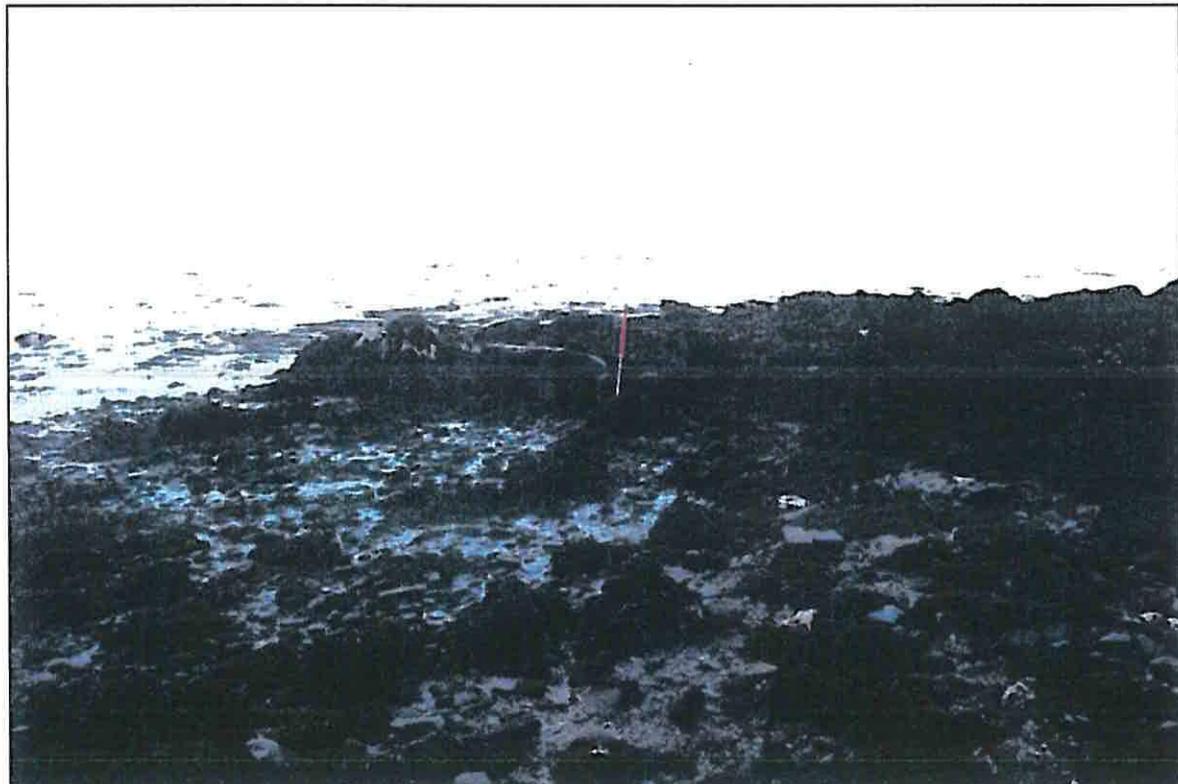


Plate 43: Cleared slipway on northern extent of site, facing northwest

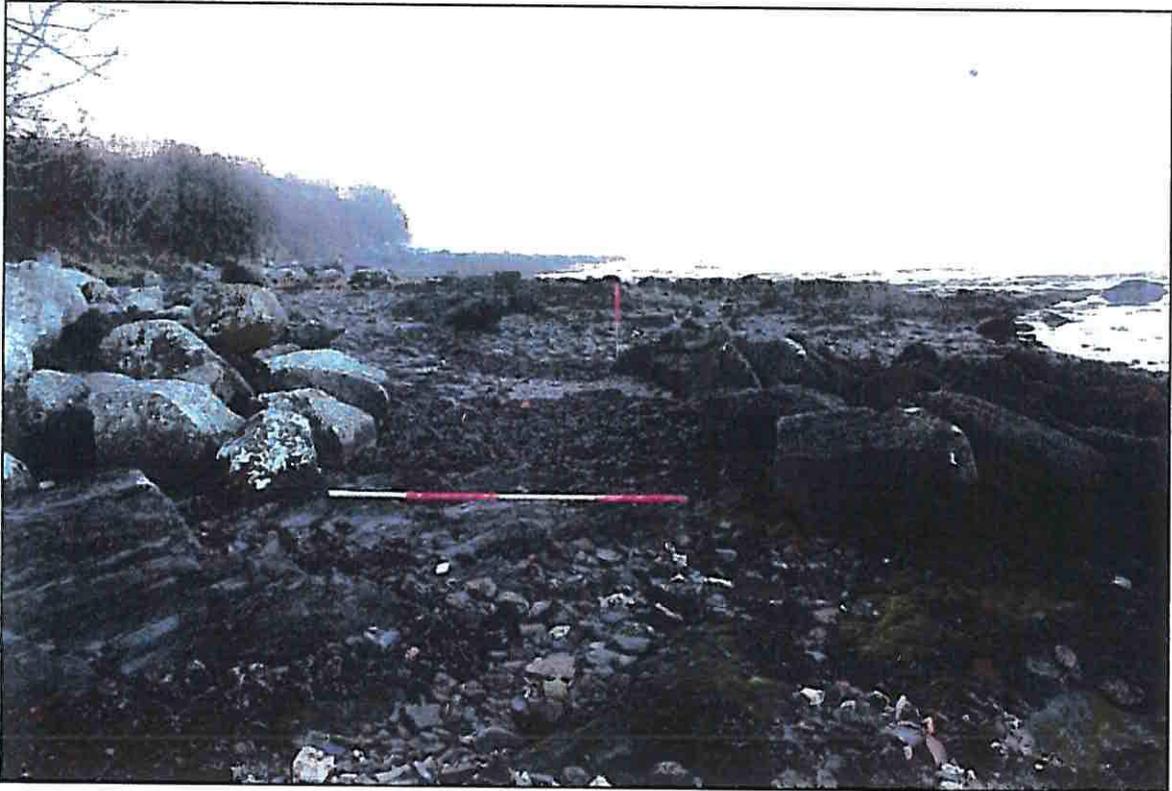


Plate 44: Cleared shore access close to the northern extent of site, facing south



Plate 45: Working shot showing metal detection on shore, facing south



Plate 16: Iron object found during metal detection survey



Plate 47: Iron sickle found during metal detection survey

T12/328A – GRANGE



Plate 48: View of site, facing north

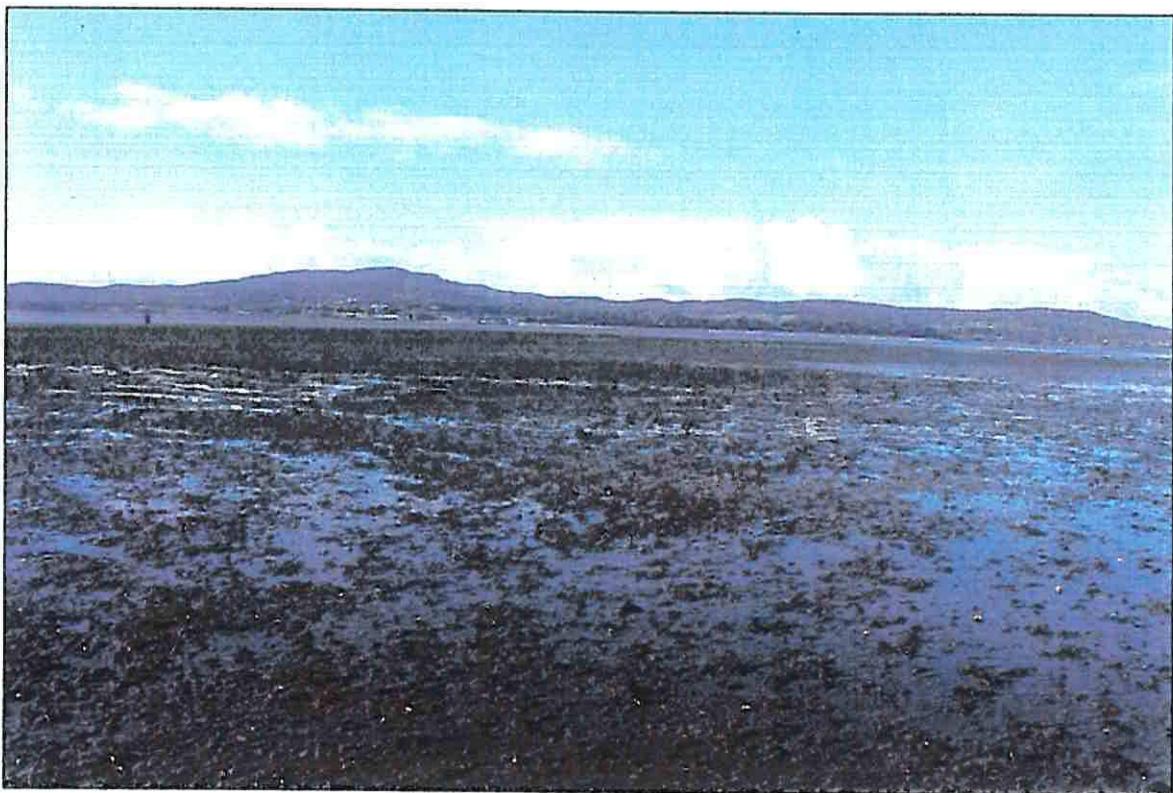


Plate 49: View of site, facing northwest

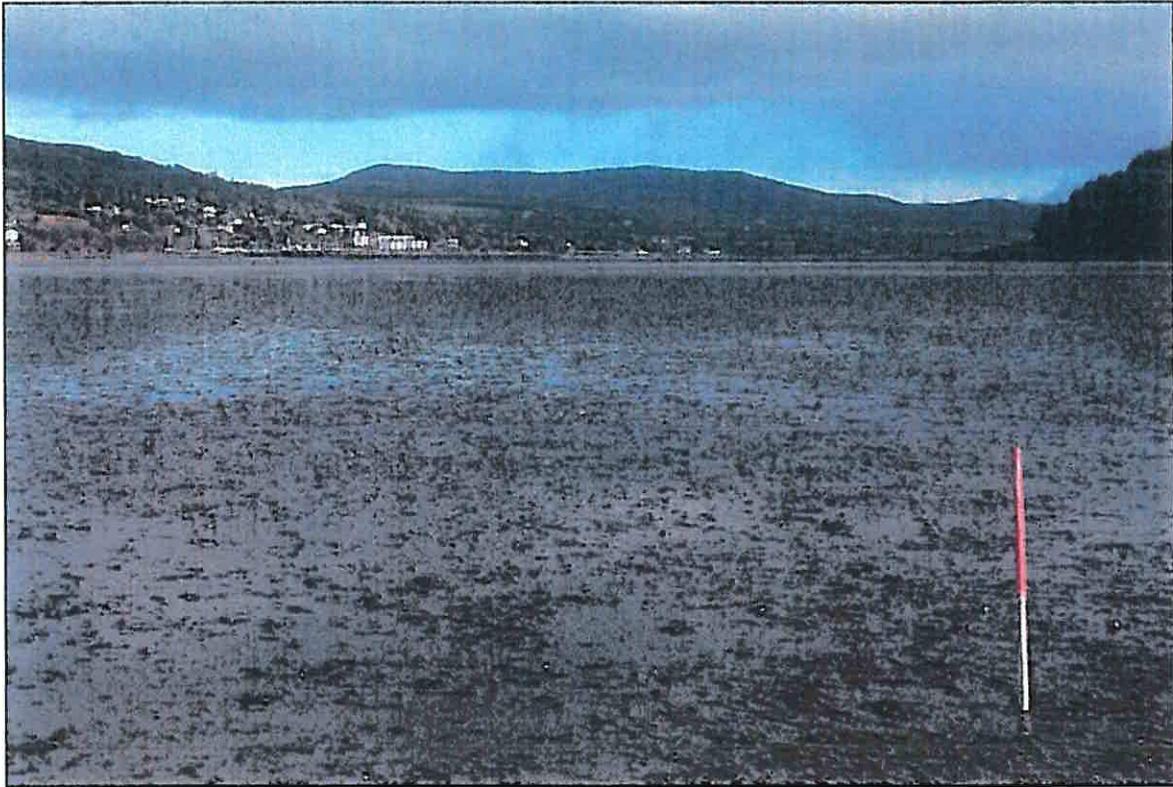


Plate 50: View from southeastern corner of site eastward towards Fahan



Plate 51: View from northeastern corner westward towards northwestern corner of site

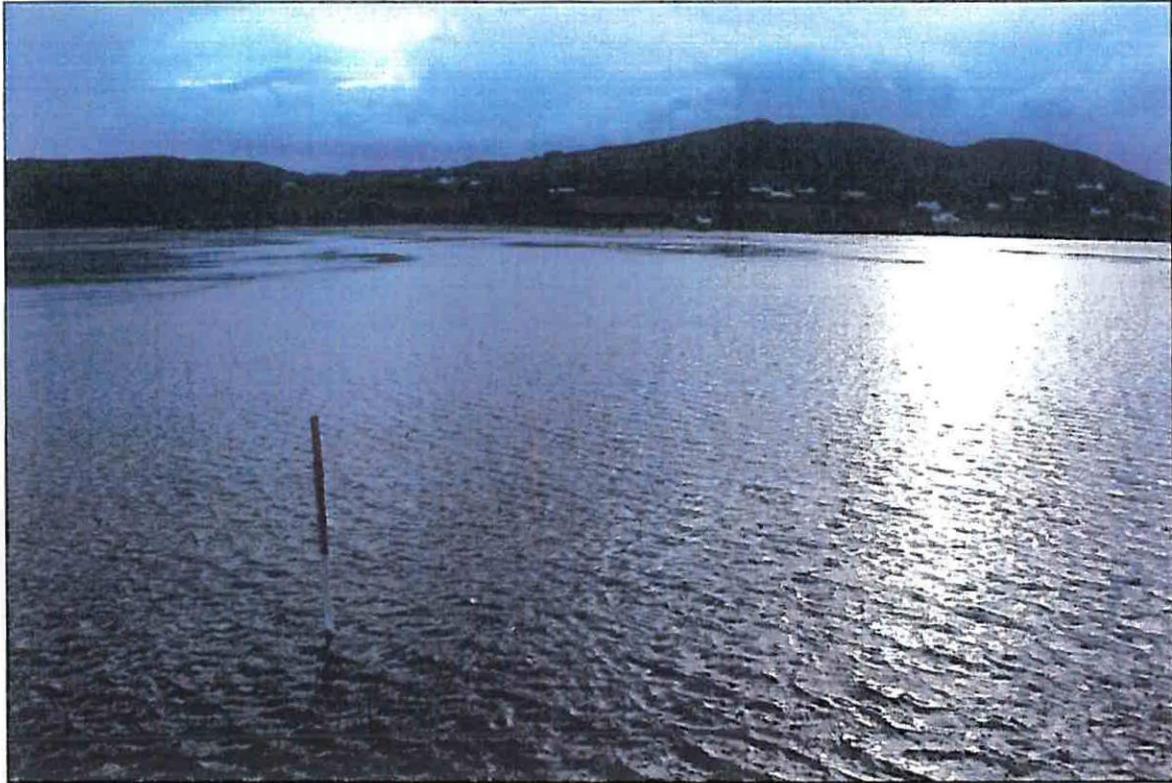


Plate 52: View from northeastern corner southward towards southeastern corner of site

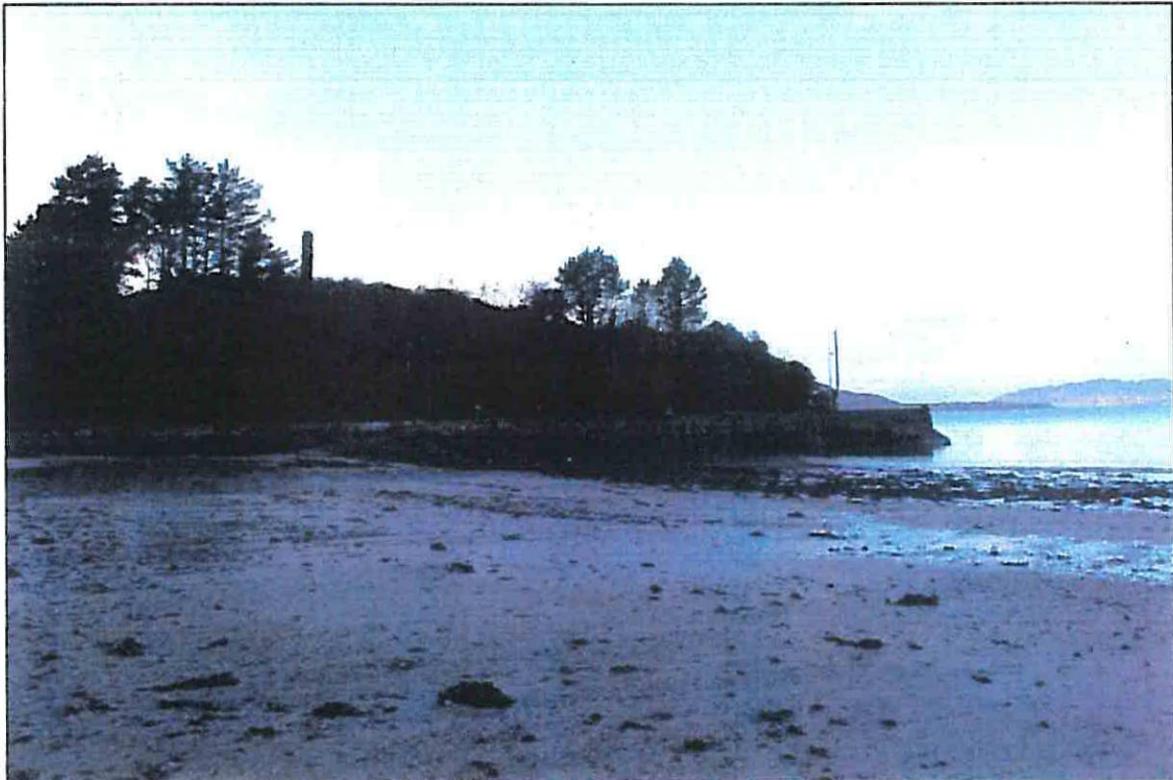


Plate 53: View of Inch Pier (NIAH 40903705), facing west



Plate 54: View towards site from close to Inch Pier at receding tide, facing northeast



Plate 55: View of one of the modern metal finds identified during the metal detection survey



Plate 56: View of one of the modern metal finds identified during the metal detection survey



Plate 57: View of one of the modern finds (Coleraine Whiskey bottle) identified during walkover survey

Appendix 2: Illustrations



Figure 1: Location map showing sites T12/297 – Ballykenny; T12/317A – Ballykenny/Drumherville; T12/343A – Ballygreen; T12/388A – Ballyn

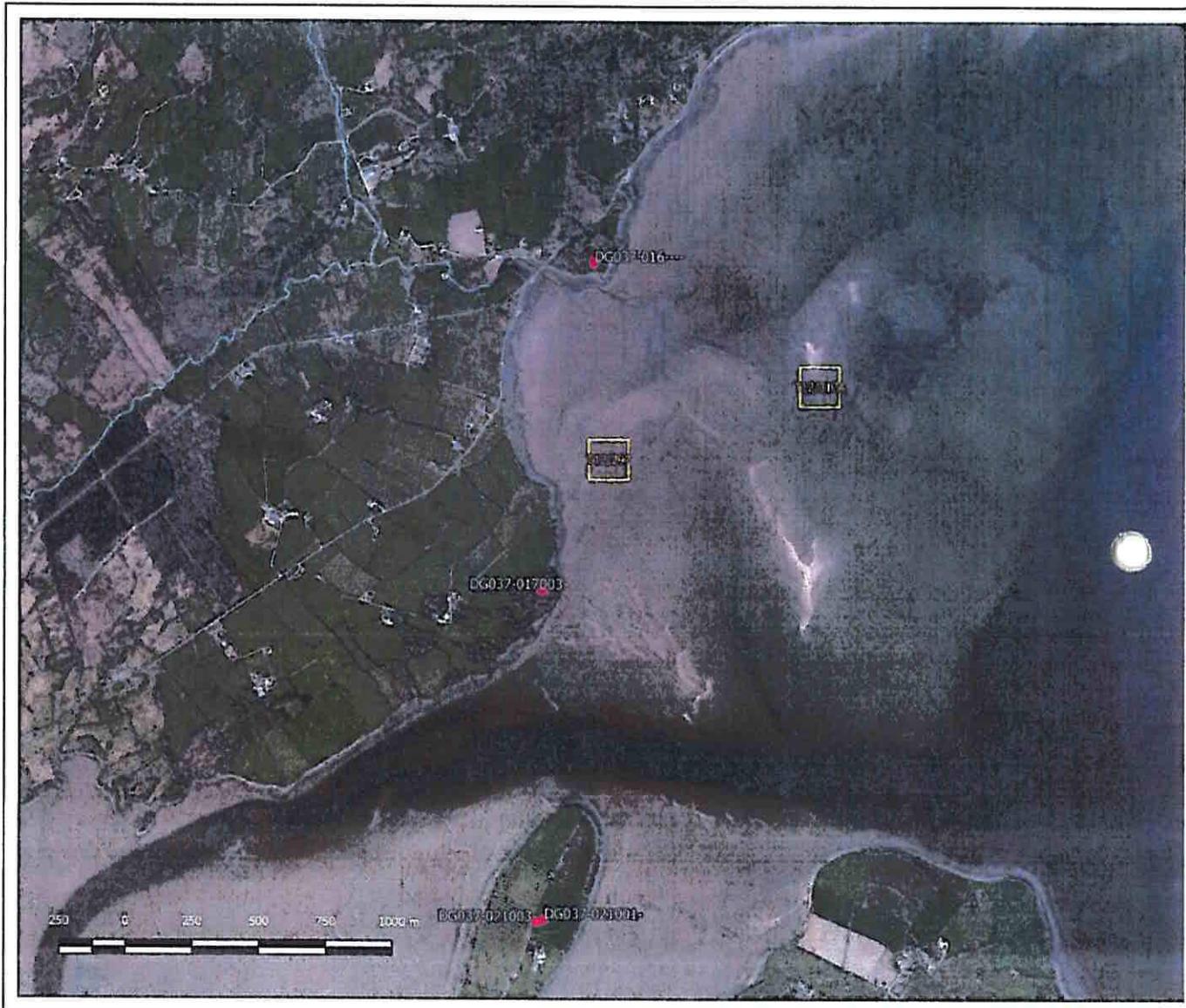


Figure 2: Location map showing sites T12/297 – Ballykenny; T12/317A – Ballykenny/Drumherrive



Figure 3: Location map showing T12/297 – Ballykenny with proposed access route in red

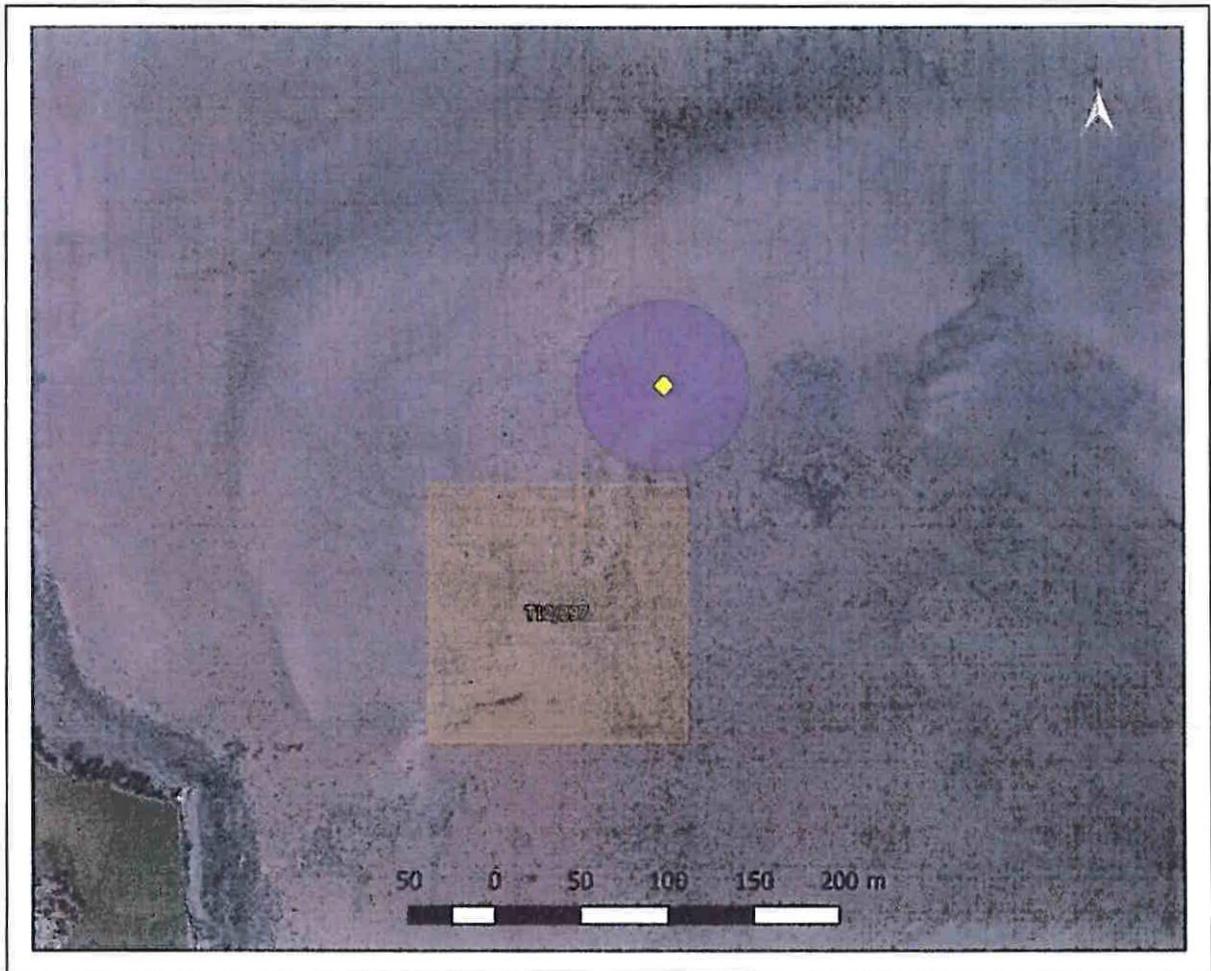


Figure 4: Aerial photograph showing the location of the logboat and 50m buffer (purple circle) in relation to the location of proposed aquaculture site T12/297 – Ballykenny



Figure 5: Location map showing T12/317A – Ballykenny/Drumherville

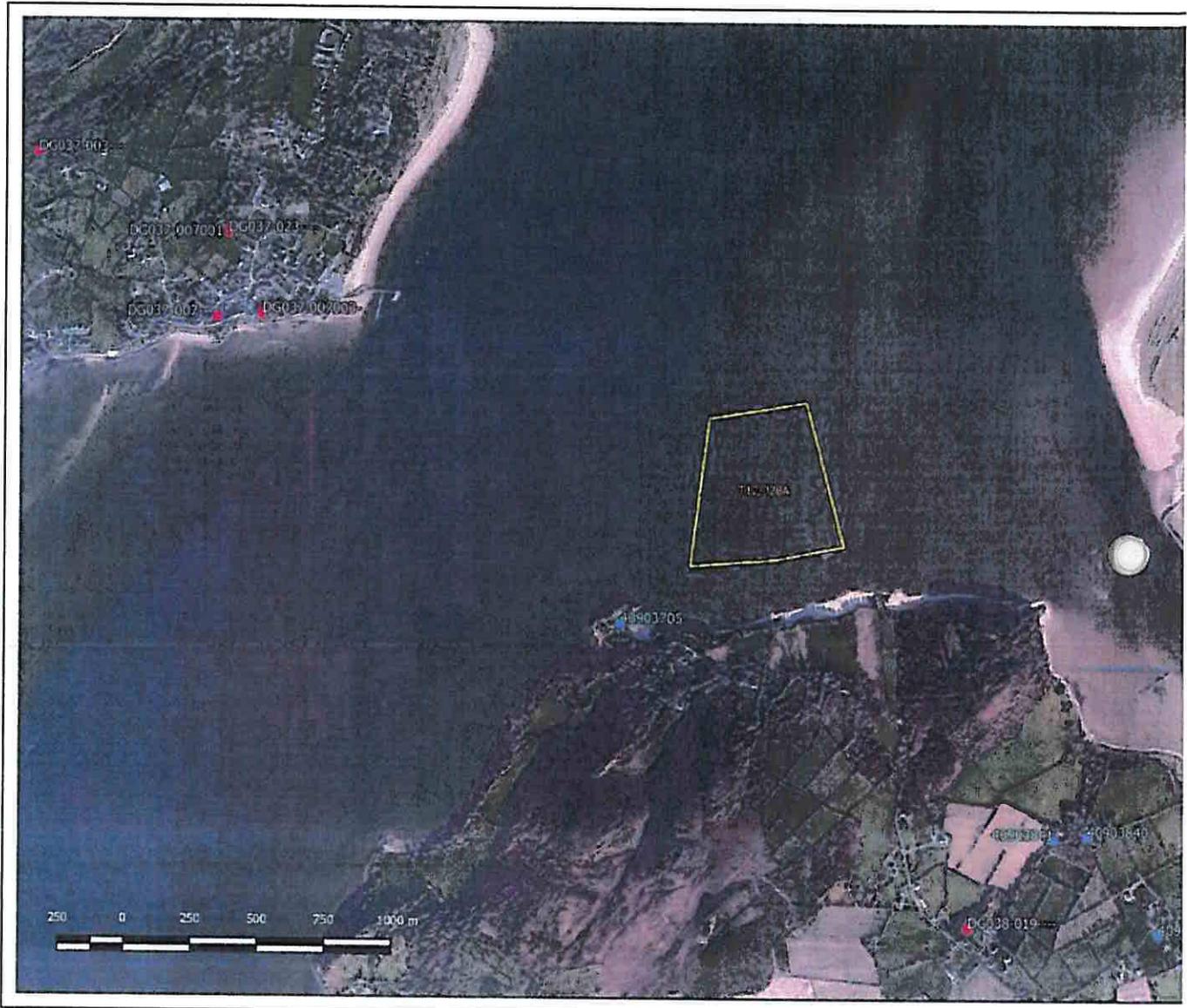


Figure 6: Location map showing T12/328A – Grange

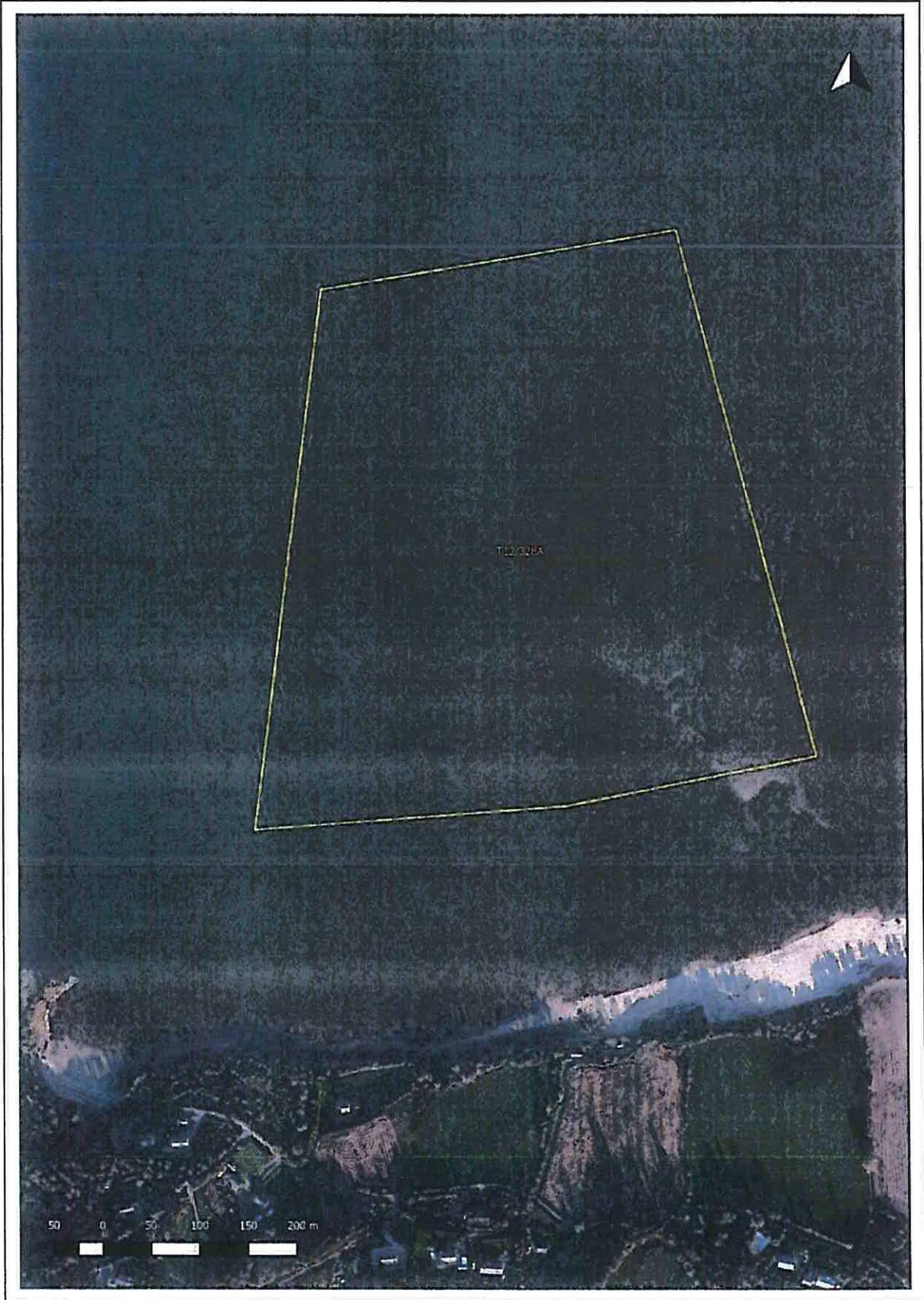


Figure 7: Location map showing T12/328A – Grange

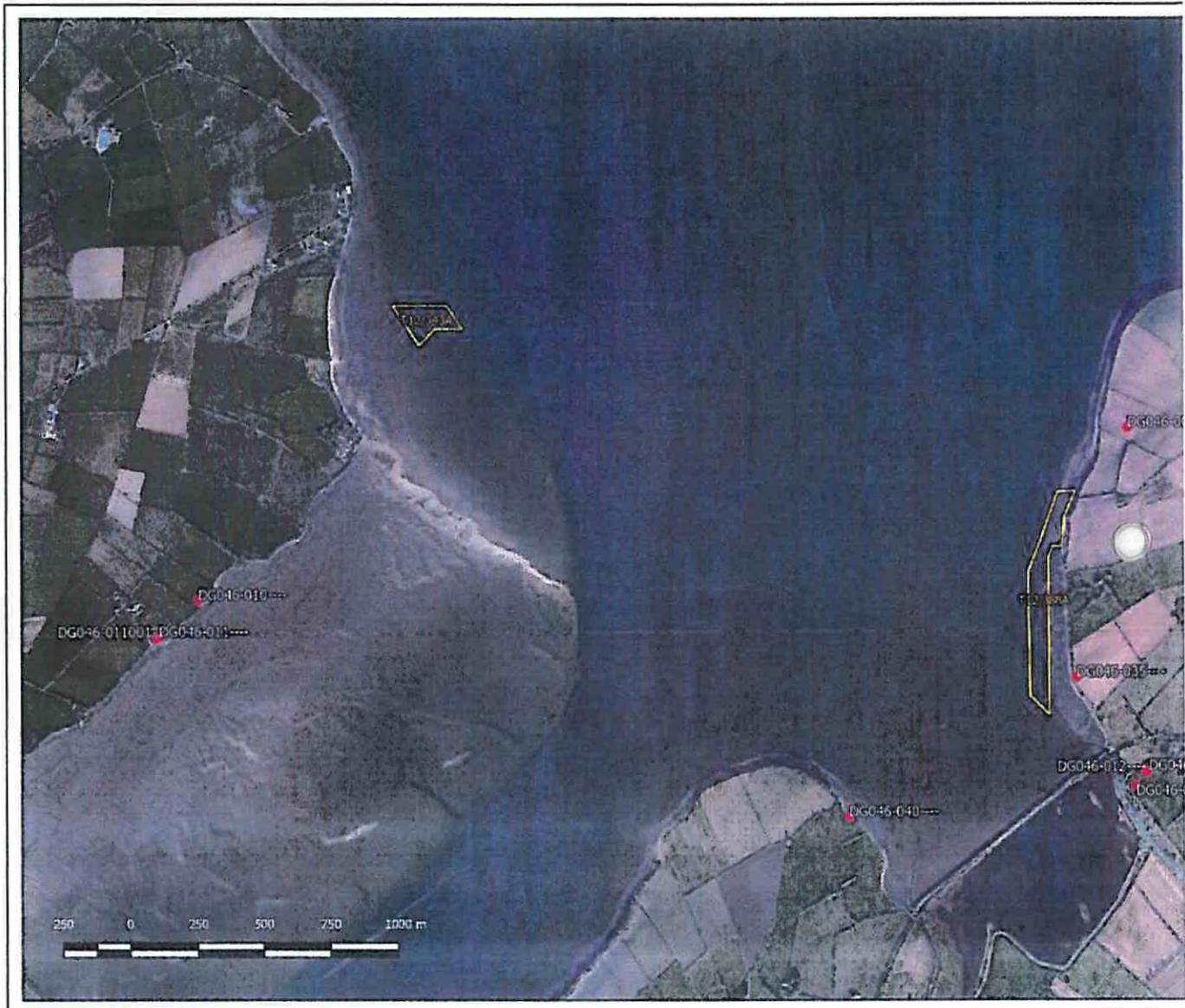


Figure 8: Location map showing T12/343A – Ballygreen & T12/388A – Ballymoney



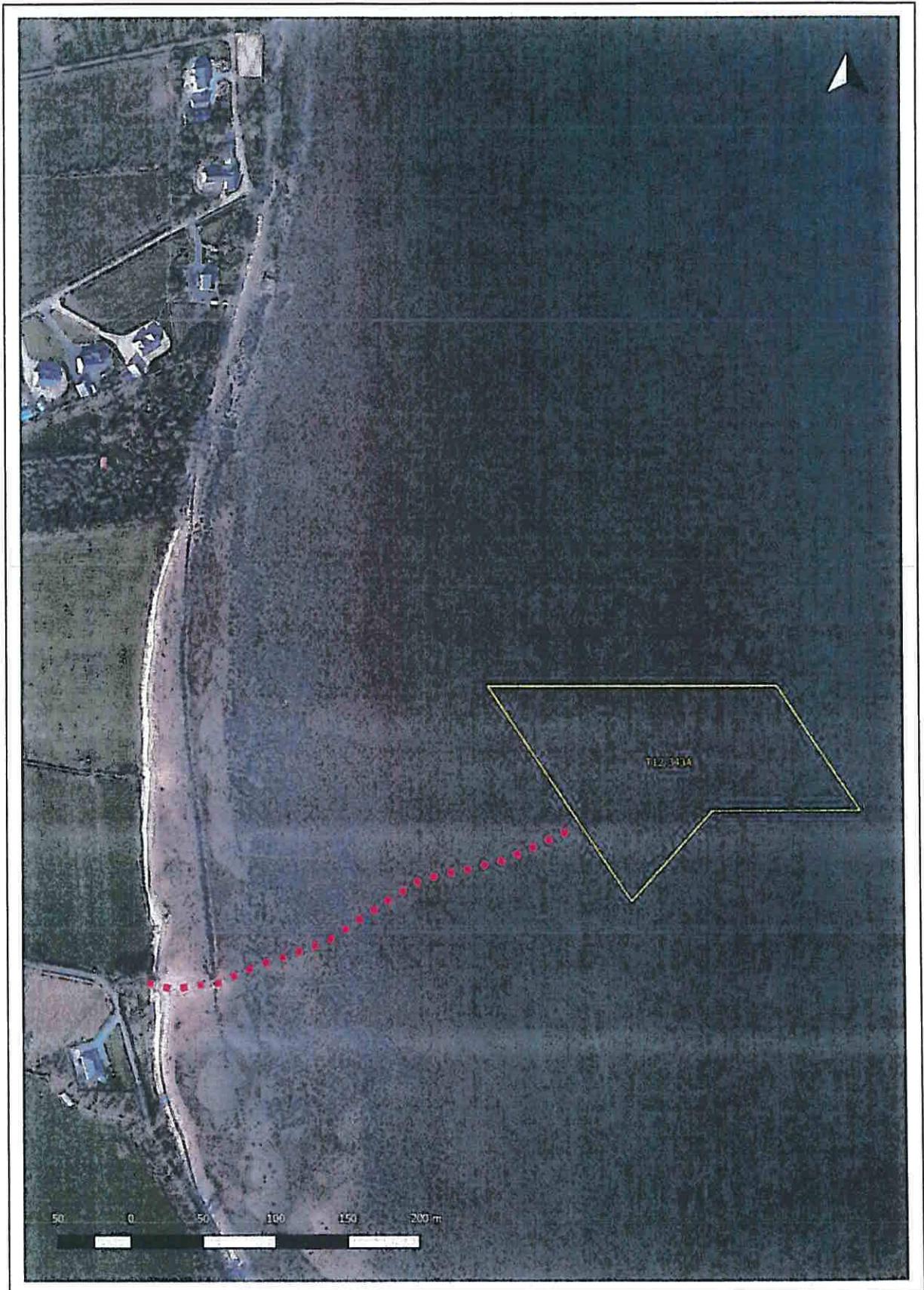


Figure 9: Location map showing T12/343A – Ballygreen with proposed access route in red



Figure 10: Location map showing T12/388A – Ballymoney