Marine Archaeological Assessment

Of a Proposed

Marine Survey and Site Investigation Works Associated with the Proposed FARICE Cable System

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Non-Technical Summary:

McMahon Design and Management have commissioned Geomara Ltd. to undertake a marine archaeological assessment of the proposed survey and site investigations associated with the proposed sub-sea telecoms cable system, IRIS, linking Iceland to Ireland, from a landfall on the Reykjanes Peninsula to a landfall on the west coast of Ireland. This report addresses the section within the 12 M limit.

The assessment comprises an introduction to the study area; and the identification of cultural heritage sites, features and deposits located along and close to the proposed survey route corridor. In order to provide a comprehensive assessment, an extensive desk-based study of the survey corridor was undertaken. The potential impact of the proposed scheme on the receiving environment is addressed and mitigation measures to ameliorate these impacts are presented.

*The assessment has identified two wreck sites (**W15898 & W17455**) within the proposed survey and site investigation corridor. In the surrounding area 15 other known shipwrecks have been recorded in the Shipwreck Inventory (Appendix 1). The precise locations of these shipwrecks are sometimes difficult to identify even when location details are present in the inventory. The sheer numbers of known and unknown wrecks recorded from the area means any proposed site investigations have the potential to impact on a wreck site or other related cultural heritage assets.*

Any site investigations on the seabed, foreshore or beach have the potential to impact unrecorded features, finds and deposits.

Consequently, given the results of the impact assessment the mitigation strategies outlined here detail the measures to be adopted in order to ameliorate any direct, indirect and secondary impacts that the proposed survey and site investigations may have on features of maritime cultural heritage interest. If these measures are employed it is envisaged that the survey and site investigations will have no impact on features of maritime cultural heritage interest.

The following mitigation recommendations are presented in connection with the proposed survey and site investigations:

1. *It is recommended that all sites of cultural heritage interest included in this report are avoided by the site investigations.*
2. *As the survey proceeds, processing and charting should be carried out in a 200m zone around all of the proposed site investigation sampling locations. The data and charts should be reviewed and analysed by a licensed archaeologist for the presence of unrecorded seabed and subseabed archaeological features finds or deposits. Only where no such features are identified within the 200m zone surrounding the proposed sampling location will the sampling be allowed to proceed.*
3. *Archaeological analysis of the full data set from the geophysical and bathymetric pre installation surveys should be undertaken to both confirm the locations of any identified wreck sites, especially known sites within the survey corridor, such as **W15898 & W17455** and also to identify any potential unrecorded seabed and sub seabed maritime archaeological features or cultural heritage assets.*
4. *Due to the approximate location details for many shipwrecks in the inventory it is not recommended that the survey corridor be re-routed to avoid the two known wrecks.*

5. *Where the location of a wreck site is found during the survey and site investigations any proposed further development corridors should be re-routed to avoid them.*
6. *Archaeological monitoring of the grab sampling, gravity core, CPT, trial pits and bar probing should be undertaken in order to identify any previously unrecorded cultural heritage features.*
7. *The location of all of the proposed trial pits and probing on the beach and on the foreshore should avoid the seven sites and find spots noted during the storm damage mitigation report and detailed in this report.*
8. *All of the proposed trial pit excavations and probing on the beach and on the foreshore should be subject to full archaeological monitoring.*
9. *It is recommended that procedures should be put in place to ensure that any previously unrecorded cultural heritage assets encountered during the survey and site investigations should be assessed by a suitably qualified archaeologist and avoided by any future works*
10. *Should the proposed survey route be subject to further revision, details of these revisions should be forwarded to the project archaeologist for assessment.*
11. *On completion of the survey and site investigations a report will be produced summarising all archaeological aspects of the project and submitted to DCHG and the National Museum of Ireland.*

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1. INTRODUCTION

1.1 Introduction

It is planned to construct a new sub-sea telecoms cable system, IRIS, linking Iceland to Ireland, from a landfall on the Reykjanes Peninsula to a landfall on the west coast of Ireland as shown in Figure 1 below. This report relates to the marine survey and sire investigations in Galway Bay from a proposed landfall at Ballyloghane Strand out to the 12 Mile Limit and it covers a number of possible route options.

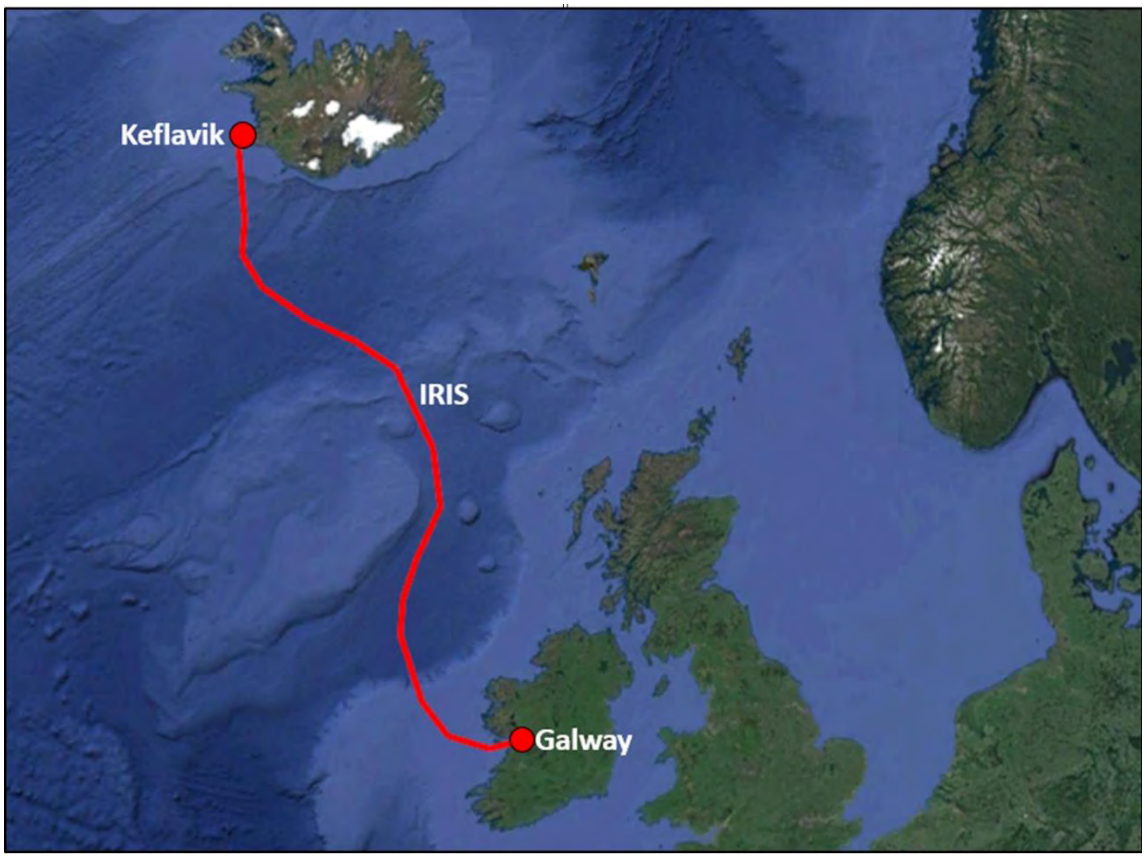

Figure 1. Proposed IRIS subsea Cable System

The assessment comprises an introduction to the study area; and the identification of cultural heritage sites, features and deposits located along the proposed survey corridors. In order to provide a comprehensive assessment, an extensive desk-based study of the survey route corridor was undertaken. The potential impact of the proposed survey and site investigations on the receiving environment is addressed and mitigation measures to ameliorate these impacts are presented.

1.2 Site Location and Survey Route:

The proposed survey is divided into four sections in order to determine an optimum route for the proposed cable system to traverse Galway Bay. The general lines of the proposed offshore survey corridors are shown on an Admiralty Chart base in Figure 2.

The four proposed survey route sections are as follows;

1. **Section A** – 375m wide survey corridor heading south-west from Ballyloughane Strand, Renmore and then generally westwards until it ends at a point approximately 13.9km from the landfall.
2. **Section B** – 500m wide survey corridor from the end of Section A heading west out of Galway Bay, through the North Sound and finishing at the 12 Mile Limit. Section B is approximately 80.4km long.
3. **Section C** - 500m wide survey corridor from the end of Section A heading south-west out of Galway Bay, through the South Sound and then turning north-west and running parallel to the Aran Islands before turning west and finishing at the 12 Mile Limit. Section C is approximately 91km long.
4. **Section D** - 500m wide survey corridor from an intersection point with Section B to the north west of Inishmore, heading south west to intersect with Section C at a point to the west of Inishmore. Section D is approximately 9.6km long.

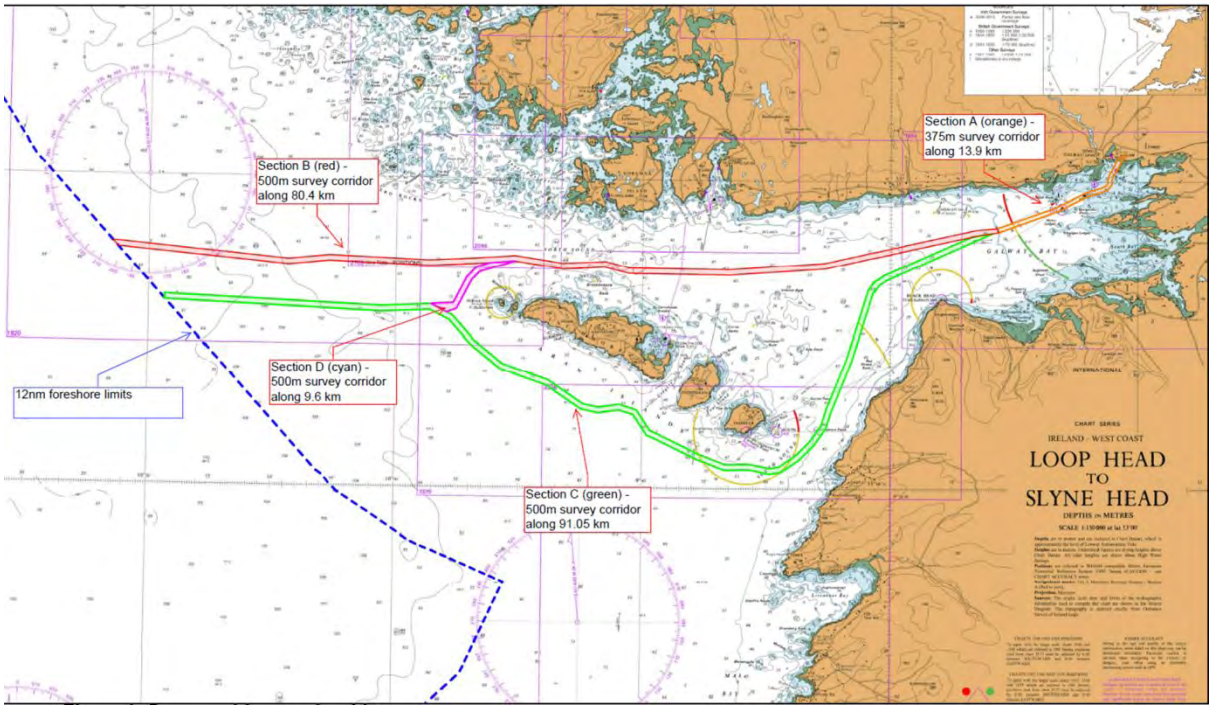

Figure 2. Proposed survey corridor – Sections

The proposed Route Position Lists for the four survey sections are presented below in Tables 1-4;

Idx	Length	Total Length	Latitude	Longitude
1	341.55 m	---	53° 16' 14.7535" N	9° 01' 07.9290" W
2	396.6 m	341.55 m	53° 16' 06.9877" N	9° 01' 21.0380" W
3	417.32 m	738.15 m	53° 15' 56.8229" N	9° 01' 34.0929" W
4	509.17 m	1.155 km	53° 15' 44.2947" N	9° 01' 42.4778" W
5	405.68 m	1.665 km	53° 15' 30.0525" N	9° 01' 56.2741" W
6	87.007 m	2.07 km	53° 15' 19.2903" N	9° 02' 08.7952" W
7	73.522 m	2.157 km	53° 15' 16.7165" N	9° 02' 10.6942" W
8	249.86 m	2.231 km	53° 15' 14.4583" N	9° 02' 11.9387" W
9	94.034 m	2.481 km	53° 15' 06.6779" N	9° 02' 15.5871" W
10	105.91 m	2.575 km	53° 15' 03.6907" N	9° 02' 16.5429" W
11	198.38 m	2.681 km	53° 15' 00.2654" N	9° 02' 16.6467" W
12	205.3 m	2.879 km	53° 14' 53.8481" N	9° 02' 16.6306" W
13	152.01 m	3.084 km	53° 14' 48.1391" N	9° 02' 22.2863" W
14	145.58 m	3.236 km	53° 14' 44.4402" N	9° 02' 27.6874" W
15	371.51 m	3.382 km	53° 14' 41.6711" N	9° 02' 34.0377" W
16	362.56 m	3.753 km	53° 14' 36.5845" N	9° 02' 52.1887" W
17	311.7 m	4.116 km	53° 14' 32.8810" N	9° 03' 10.7390" W
18	749.48 m	4.428 km	53° 14' 30.0056" N	9° 03' 26.8493" W
19	184.43 m	5.177 km	53° 14' 22.7413" N	9° 04' 05.4056" W
20	1.226 km	5.362 km	53° 14' 20.0720" N	9° 04' 14.2989" W
21	1.485 km	6.588 km	53° 14' 01.9734" N	9° 05' 13.1330" W
22	187.26 m	8.073 km	53° 13' 40.0421" N	9° 06' 24.3729" W
23	3.866 km	8.26 km	53° 13' 38.0187" N	9° 06' 33.8874" W
24	1.733 km	12.127 km	53° 12' 56.1922" N	9° 09' 50.2829" W
25	---	13.86 km	53° 12' 37.4890" N	9° 11' 18.3081" W

Table 1. RPL Section A

Idx	Length	Total Length	Y (View Proj)	X (View Proj)
1	638.88 m	---	53° 12' 37.4890" N	9° 11' 18.3081" W
2	1.277 km	638.88 m	53° 12' 34.9517" N	9° 11' 52.4726" W
3	4.59 km	1.916 km	53° 12' 29.8788" N	9° 13' 00.7723" W
4	9.38 km	6.506 km	53° 11' 57.8962" N	9° 17' 02.2747" W
5	8.676 km	15.886 km	53° 10' 51.4781" N	9° 25' 15.1959" W
6	9.048 km	24.562 km	53° 10' 31.8395" N	9° 33' 01.2156" W
7	2.236 km	33.611 km	53° 10' 34.5782" N	9° 41' 08.3680" W
8	3.805 km	35.847 km	53° 10' 52.3027" N	9° 43' 05.1192" W
9	4.37 km	39.652 km	53° 10' 45.8665" N	9° 46' 29.6985" W
10	3.503 km	44.022 km	53° 11' 07.0548" N	9° 50' 22.3604" W
11	4.187 km	47.525 km	53° 10' 59.0327" N	9° 53' 30.5335" W
12	9.052 km	51.712 km	53° 10' 51.4361" N	9° 57' 15.6546" W
13	3.733 km	60.765 km	53° 11' 03.0079" N	10° 05' 22.7291" W
14	15.945 km	64.497 km	53° 10' 50.7476" N	10° 08' 42.6973" W
15	---	80.442 km	53° 11' 37.7459" N	10° 22' 57.8399" W

Table 2. RPL Sectoin B

Idx	Length	Total Length	Latitude	Longitude
1	10.361 km	---	53° 12' 34.9517" N	9° 11' 52.4726" W
2	967.86 m	10.361 km	53° 10' 18.8744" N	9° 20' 22.4504" W
3	918.8 m	11.329 km	53° 10' 01.3821" N	9° 21' 05.6621" W
4	6.439 km	12.248 km	53° 09' 37.0608" N	9° 21' 34.0881" W
5	4.84 km	18.687 km	53° 06' 18.1672" N	9° 23' 16.9705" W
6	1.644 km	23.527 km	53° 03' 53.0367" N	9° 24' 54.4694" W
7	1.853 km	25.171 km	53° 03' 02.2865" N	9° 25' 20.8593" W
8	1.831 km	27.024 km	53° 02' 13.4490" N	9° 26' 18.5319" W
9	1.874 km	28.855 km	53° 01' 31.7847" N	9° 27' 28.3613" W
10	981.73 m	30.728 km	53° 00' 57.6851" N	9° 28' 51.4823" W
11	1.834 km	31.71 km	53° 00' 53.2169" N	9° 29' 43.6194" W
12	2.267 km	33.544 km	53° 01' 04.8921" N	9° 31' 20.0622" W
13	2.553 km	35.811 km	53° 01' 03.8148" N	9° 33' 21.6603" W
14	4.931 km	38.364 km	53° 01' 33.3756" N	9° 35' 29.5438" W
15	2.258 km	43.295 km	53° 02' 42.4237" N	9° 39' 28.0737" W
16	1.523 km	45.553 km	53° 03' 43.0779" N	9° 40' 35.6155" W
17	1.822 km	47.076 km	53° 03' 57.2314" N	9° 41' 53.9705" W
18	1.552 km	48.898 km	53° 03' 48.5249" N	9° 43' 30.7300" W
19	3.802 km	50.45 km	53° 03' 58.3993" N	9° 44' 52.4652" W
20	4.43 km	54.252 km	53° 05' 07.3714" N	9° 47' 41.5653" W
21	3.308 km	58.682 km	53° 05' 53.5866" N	9° 51' 26.8706" W
22	3.034 km	61.99 km	53° 07' 00.6057" N	9° 53' 45.5283" W
23	2.077 km	65.024 km	53° 08' 13.5381" N	9° 55' 34.6826" W
24	4.349 km	67.101 km	53° 08' 43.7084" N	9° 57' 14.5323" W
25	19.603 km	71.449 km	53° 08' 36.6549" N	10° 01' 08.1938" W
26	---	91.053 km	53° 09' 03.5560" N	10° 18' 41.9976" W

Table 3. RPL Section C

Idx	Length	Total Length	Latitude	Longitude
1	3.489 km	---	53° 11' 07.0548" N	9° 50' 22.3604" W
2	1.208 km	3.489 km	53° 10' 34.6199" N	9° 53' 22.3195" W
3	2.622 km	4.697 km	53° 10' 06.3723" N	9° 54' 07.2695" W
4	303.01 m	7.319 km	53° 08' 50.9844" N	9° 55' 11.9361" W
5	2.013 km	7.622 km	53° 08' 46.3596" N	9° 55' 26.3102" W
6	---	9.636 km	53° 08' 43.7084" N	9° 57' 14.5323" W

Table 4. RPL Section D

1.2.1 Inshore - Section A

The general line of the inshore section of the proposed survey route is shown on an Admiralty Chart base in Figure 3. The route has a landfall at Ballyloughane Strand, Renmore and heads southwest from the landfall staying west of Hare Island and to the east of Mutton Island reaching 10 metres water depth at approximately kilometre point KP 5. The route continues in a general southwest direction until it reaches Turning Point 25 (TP25). At TP25 the route divides into Sections B & C as described above.

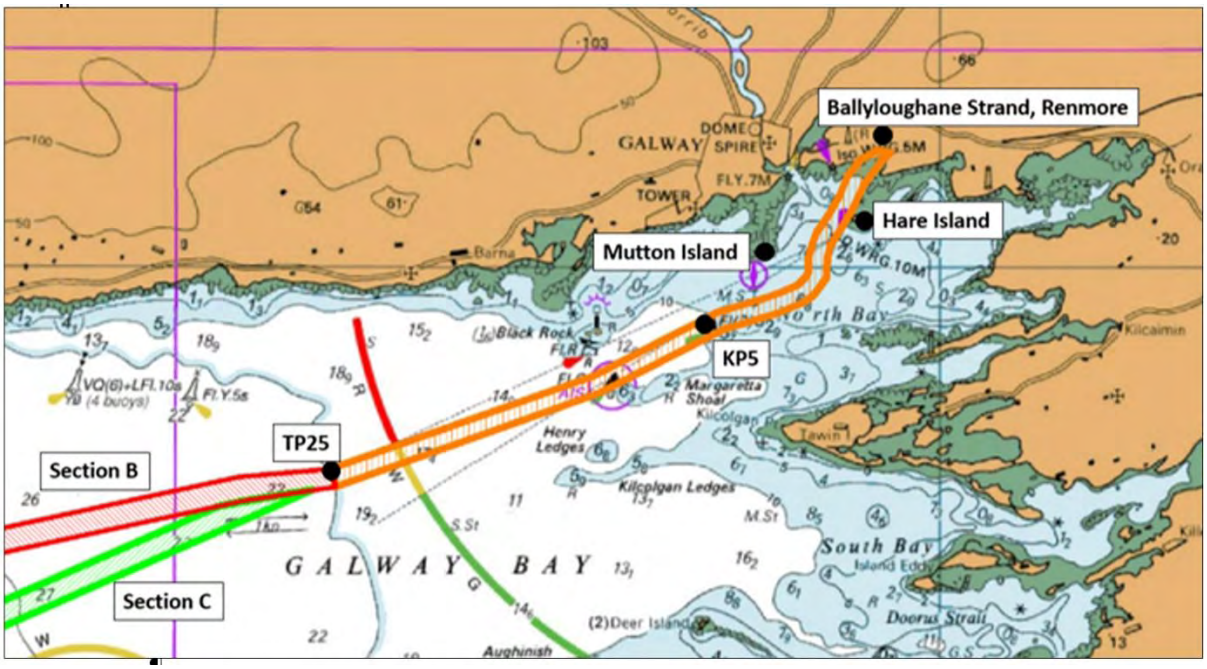

Figure 3. Proposed Inshore Survey Corridor

1.2.2 Landfall Location

The proposed landfall is at Ballyloughane Strand, Renmore, Co. Galway and the general location is shown in below in Figures 4 and 5.

Figure 4. Landfall Location

Figure 5. Landfall Location

1.3 Legislative Framework and Guidance

This assessment takes into account the following legislative procedures and guidelines:

- The National Monuments Act (1930-2004),
- The Foreshore Act (1933),
- Merchant Shipping Act (1995);
- Valetta Convention;
- ICOMOS; and
- UNESCO

2. ASSESSMENT METHODOLOGY

Archaeological assessment has been described as "the overall process of assessing the impact of a development" (DAHGI, 1999, Policy and Guidelines on Archaeological Excavation. Govt. Publications Office, Dublin).

The principle aim of assessment is to anticipate and avoid impacts on the archaeological resource. Archaeological assessment may be required as part of the planning process in response to developments which may be located in the vicinity of archaeological monuments (The Heritage Council. 2000).

This document has been prepared with reference to specific criteria set out in the Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002) and the Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).

This report details 3 individual phases, all of which followed in succession and contributed towards the complete assessment of the project. These phases were:

1. Desktop study
2. Impact Assessment
3. Provision of suggested mitigatory measures

2.1 Desk Based Assessment

The desk-based assessment is a documentary and cartographic search utilising a number of sources in order to locate all known cultural heritage assets within the study area and within the general location of the proposed survey and site investigation. An additional purpose of the desktop study is to provide an historical and archaeological background to the subject site.

Geomara consulted the following sources:

- Local and National Libraries
- The National Monuments and Site Register,
- The National Museum – topographical files
- The Geological Survey of Ireland – aerial photographs,
- Examination of historic maps and related sources,
- The Architectural Archive of Ireland,
- The National Archives of Ireland,
- Historic Annals,
- Lewis' Topographical Dictionary
- Genealogical Societies and Local Historical Societies.

- The Ports and Harbour Archive
- The National Shipwreck Inventory
- Galway City Development Plan 2017 - 2023
- Online and web sources

A variety of sources have been consulted to provide information on potential impacts and the relationship of the proposed survey route within the wider maritime context to include all known maritime and terrestrial cultural heritage assets. Together these provide an overview of the proposed survey and its surroundings which can then be used to determine areas of archaeological potential.

2.2 Impact Assessment

Impact Assessment is the penultimate stage of the assessment process. It involves dissemination of the results of the desktop assessment and the determination of impact.

2.3 Mitigation measures

The final aspect of the overall assessment process is the provision of suggested mitigation measures. There are various ways potential impacts of a development can be mitigated. Mitigation measures usually involve avoidance (the implementation of exclusion zones and design alterations), reduction (the introduction of measures to deal with unexpected discoveries during works), or offsetting (excavation and recording of a site before an impact occurs). Ideally, sites and features of cultural heritage interest should be subject to as little disturbance as possible, where policy normally dictates a presumption in favour of preservation in situ in line with current national policy.

3. EXISTING ENVIRONMENT

3.1 Introduction

In describing the receiving environment, the context, character, significance and sensitivity of the baseline receiving environment into which the proposed development will fit is assessed. This takes account of any other proposed developments that are likely to proceed.

3.2 Planning Context in Relation to Archaeology and Cultural Heritage

Galway City Development Plan 2017-2023 addresses issues relating to Cultural Heritage and sets out a wide range of policies under a number of sub headings. This assessment takes account of all the stated policies and related objectives. The Galway City Development Plan implements applicable Ministerial Planning Guidelines to help resolve any issues relating to any cultural and heritage sites onshore or offshore.

Chapter 5 of the Galway City Development Plan and its relevant appendices contains a committed protection and conservation of buildings, areas, structures, sites and features of archaeological, architectural, historical, artistic, cultural, scientific, natural heritage, social or technical interest:

The Planning and Development Act (2000) allows for the listing of important structures in Development Plans in order to provide protection to cultural heritage assets.

Details of protected structures are entered by the authority in its Record of Protected Structures, which is part of the Development Plan.

Balancing development pressures and the protection of this heritage can pose a challenge; however, protective measures can be implemented to ensure no adverse effects occur on Recorded Monuments or Protected Structures.

The Galway City Development Plan outlines some strategic aims:

- Enhance the existing character and distinctiveness of the city and maintain its strong sense of place.
- Protect and enhance the built and archaeological heritage of the city.
- Promote the use of urban design principles and high standards of architectural design in the redevelopment of regeneration areas.
- Promote the use of urban design principles and high standards of architectural design in all new developments.
- Encourage the development of sustainable neighbourhoods with a distinctive urban character and identity

- Support proposals for development and extension of port facilities and an extension of the rail line to the port

Archaeological Heritage

The *National Monuments Acts 1930-2004* provide for the protection of archaeological sites, monuments, artefacts and shipwrecks that are listed in the Record of Monuments and Places (RMP). Although the archaeological resource is finite (refer Appendix 3), sites continue to be discovered. Where new development is being considered, it therefore advisable to check the National Monuments Service's Archaeological Survey Database on www.archaeology.ie in order to assess the archaeological potential of a site.

- Protect the archaeological heritage of the city.
- Ensure that proposed development within the designated city centre Zone of Archaeological Potential is not detrimental to the character of an archaeological site or its setting.
- Have regard to the archaeological recommendations of the Department of Arts, Heritage, Rural, Regional and Gaeltacht Affairs on any planning applications.
- Endorse the sustainable use of archaeological heritage as an educational and cultural resource and promote public awareness of the archaeological heritage of the city.
- Require the surveying, recording or excavation of archaeological heritage during the development process where appropriate.
- Seek the preservation in-situ or, at a minimum, preservation by record of archaeological sites/monuments included in the Record of Monuments and Places.
- Ensure that any development proposal with potential to impact on archaeological heritage includes for an archaeological assessment. This includes within terrestrial, riverine, inter-tidal and sub-tidal environments.
- Promote the protection of the varied industrial heritage of the city and encourage greater appreciation and public awareness of this heritage.

Architectural Heritage

Galway has exceptionally strong links with its past. This is evident in the built form, architecture and archaeology of the city. The city centre has a distinct physical character, with narrow streets, contrasting buildings, canals, millraces and a relationship with the river and sea creating a unique urban setting. Most of the significant built heritage and archaeology is located in the city centre which largely follows a medieval pattern of irregular streets, varying building heights and plot widths. These characteristics, which include the remnants of the city walls, have endured notwithstanding changes over the centuries. The built heritage of the city is also enhanced by a number of village settlements, such as Menlough and Coolagh. This heritage is a significant element in the definition and experience of the urban environment. It is a valuable cultural and

tourism asset and contributes to the economic vitality of the city. Growth and redevelopment can impact on the protection of the historic core. Good urban design and architecture can meet the challenge of a historical context and can, with sensitive design, complement the historic core. Where opportunities exist in the city for regeneration, high quality urban design and architecture creates new vibrant areas which will attract investment and new uses. A quality urban design approach is also appropriate for new expanding areas and can create sustainable neighbourhoods with good legibility and a strong sense of place.

Part IV of the *Planning and Development Act, 2000, as amended* provides the legal basis for the conservation and enhancement of the architectural heritage. There are two principal mechanisms within this legislation for the protection of these assets; the Record of Protected Structures (RPS) and Architectural Conservation Areas (ACAs). Specific direction on the implementation and management of these statutory protections is provided in the Department of Arts, Heritage and the Gaeltacht's publication *Architectural Heritage Protection: Guidelines for Planning Authorities (2011)*. The Department has also issued a range of publications under its *Advice Series* to provide more detailed guidance and advice on historic building materials and issues e.g. maintenance, access, windows, iron, and brickwork.

Record of Protected Structures (RPS)

A protected structure is defined in planning legislation. A significant number of buildings and structures within the city are deemed worthy of protection and 619 are currently on the Record of Protected Structures (RPS). The RPS list is set out in Schedule 3. 8 Built Heritage and Urban Design Galway City Development Plan 2017-2023 117 The RPS is not a static document and additions or deletions, where appropriate, can be made to this record, by invoking the statutory process. It is policy to encourage the protection, enhancement and active use of protected structures. Any alteration to protected structures is required to enhance the character or setting of the structure and be carried out to best conservation practice. The Architectural Heritage Protection Guidelines for Planning Authorities (2011) provides detailed guidance in this regard. A number of measures exist to promote the appropriate restoration of protected structures. In particular, a reduced development contribution can apply when changes to a protected structure includes for a high standard of conservation works. In addition, a change of use of a protected structure to a use compatible with the conservation of the structure, notwithstanding the zoning of the area, can also be considered. Public funding to subsidise conservation works has diminished in recent years. The main funding stream available for private conservation works is the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs Structures at Risk Fund. The Heritage Council provide funding for Local Authority projects under the Heritage Plan Programme. Normal planning exemptions do not apply to protected structures. Under Section 57 of the Planning and Development Act as amended, the Planning Authority can issue a Declaration which sets out the extent of works that can be exempt

The following policies are considered relevant:

- Encourage the protection and enhancement of structures listed in the Record of Protected Structures.
- Ensure new development enhances the character or setting of a protected structure.
- Avoid protected structures becoming endangered by neglect or otherwise by taking appropriate action in good time.
- Consider the inclusion in the Record of Protected Structure of buildings and structures of special interest.
- Consult with the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs regarding any planning applications relating to protected structures and national monuments.
- Implement proactive measures to encourage the conservation of protected structures.

Architectural Conservation Areas (ACA)

An Architectural Conservation Area (ACA) is a place, area, group of structures or townscape that is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or value, or contributes to the appreciation of protected structures. ACAs could encompass, for example, a terrace of houses, a whole streetscape, town centre or a small cluster of structures associated with a specific building such as a mill or country house. Most structures in an ACA are important in the context of their contribution to the streetscape or character of an area and so the protection status generally relates only to the exterior of the buildings or the streetscape, except for Protected Structures within ACAs where the protection extends to the interior and curtilage of these properties. Any works that would have a material effect on the special character of an ACA require planning permission.

Galway has a number of distinctive areas of special interest, which in terms of streetscape, arrangement of streets and spaces, composition of buildings and structures and architectural styles creates a character worthy of protection. These areas of special character require management, protection and enhancement. Eleven areas are designated as ACAs. They represent different periods in, and functions of, the development of the city. The next stage after designation is the preparation of management plans for the streetscapes which will involve extensive public consultation and will include a strategy for Local Authority works and improvements to the public realm.

The following policies are considered relevant:

- Encourage the protection and enhancement of the character and special interest of designated Architectural Conservation Areas.
- Prepare and implement management plans for the conservation and enhancement of designated Architectural Conservation Areas.
- Complete the Eyre Square Architectural Conservation Area Management Plan.

- Ensure that developments within Architectural Conservation Areas enhance the character and special interest of the Architectural Conservation Areas.

Vernacular Heritage

Twenty three thatched buildings survive in the city and are excellent examples of vernacular architecture using traditional building forms, local materials and local building techniques. A Survey and Inventory of Galway City's Thatched Buildings was carried out in 2013. It is a valuable detailed record of the remaining thatched structures in the city and will be published in 2017 to raise awareness of this valuable heritage. Their importance is reflected in their designation as protected structures. The active use and maintenance of these thatched structures by their owners, have contributed to their survival and some have been supported over the years by heritage grants.

In addition to structures of special interest included in the RPS and designated ACAs, the city contains a wide variety of structures and features, that contribute to local heritage and the distinctive character of the city. That character can be extensively diminished by their loss through demolition and replacement. The Council will encourage the retention and continued use of such structures recognising their contribution to local identity and continuing a sense of the familiar. The conservation of original windows, doors, roof coverings and other significant features that contribute to the character of structures and the overall area will also be encouraged. Shaping the Future: Case Studies in Adaptation and Reuse in Historic Urban Environments (DAHG, 2012) details good examples of adaption and reuse, setting out principles of urban reuse and is a useful guiding document.

The following policies are considered relevant:

- Encourage the rehabilitation, renovation and re-use of existing structures that contribute to the character of the city.
- Increase public awareness of the vernacular heritage of the city through publication of the Survey and Inventory of Galway City's Thatched Buildings.

The Coast

Galway Bay is an integral part of the aesthetic landscape and culture of the city. The ties between the city and the sea are exhibited in its strong maritime history and the traditions of areas such as The Claddagh, Fishmarket, The Docks and Salthill originally a traditional seaside village which attracts visitors throughout the year. The coastline is an important tourist and recreation attraction stimulating economic activity, providing local amenity and related socio-economic and health benefits. The southern section of Inner Galway Bay is designated as economically significant shellfish growing waters. Both Salthill and Silverstrand beaches are significant assets for the city and have Blue Flag status. The Council will seek to retain the Blue Flag status of

Salthill and Silverstrand beaches and extend this status to Ballyloughane and Grattan beaches through improved water quality standards in co-operation with Irish Water.

The following policies are considered relevant:

- Protect and maintain the integrity of the coastal environment and waterways by avoiding significant impacts and meeting the requirements of statutory bodies, national and European legislation and standards
- Have regard to European and National best practice guidance when assessing development in or near coastal areas which is likely to have significant effects on the integrity, defined by the structure and function, of any designated European Sites, protected coastal and marine fauna and flora.
- Encourage uses which will facilitate conservation of the industrial archaeology legacy of mill buildings, warehouses and associated features.
- Maintain and extend the achievement of the Blue Flag Beach status in co-operation with IW.
- Ensure any development within the aquatic environment shall be carried out in consultation with prescribed bodies and with adherence to their guidelines.

Views of Special Amenity Value and Interest

There are views within the city's landscape, which require special protection due to their distinctive scenic amenity, aesthetic or cultural value. Views of scenic amenity value and interest define the character of the city, engender a strong sense of place and significantly enhance local amenities. Important views in the city include panoramic views which allow expansive views over landscape for example Galway Bay and over the cityscape and linear views which are views towards a particular landscape, observed from a particular point. The enjoyment of protected views by the community and visitors is a key part of the experience of the city. It is acknowledged that views are not static and some changes in a view can be absorbed without visually depreciating the integrity of the view and in some cases make a positive contribution to the characteristics and composition of protected views, while other changes can have a negative impact reducing the experience of that view irreparably. It is the objective of the Council to assess proposed developments, which are located within the foreground, middle ground or background of a protected view, in the context of their scale, design and location.

The following policies are considered relevant:

- Seascape views of Galway Bay at Ballyloughane from south of the railway bridge

3.3 Geological Baseline

A major feature in the geology of Galway Bay is the transition from the limestone of the Aran Islands and the Burren, Co. Clare to the granite of west Galway and Connemara. The rock outcrops in the seabed around the

Aran Islands and along the Connemara coast have strikingly different appearances, with the limestones of the islands showing regular layers and the granite outcrops of the north of the bay having a much craggier and irregular nature. In this map the boundary between the two rock types is interpreted as a fault line.

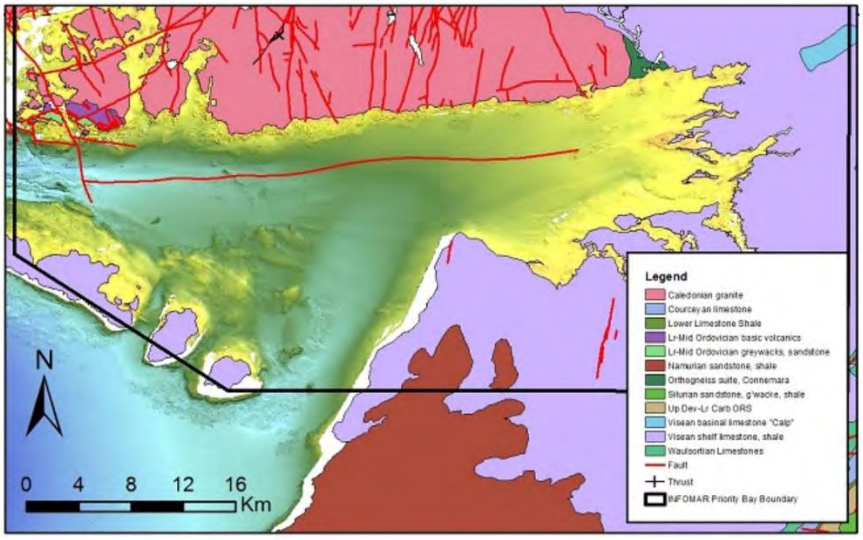

Figure 6. Bedrock map of Galeway Bay

3.4 Bathymetry and Seabed Typology

Galway Bay is a large bay located on the west coast of Ireland bordered by Co. Clare to the south and Co. Galway to the north. The bay is 62 kilometres long from the Brannock Islands to the west to Oranmore in the east. From Doolin to Lettermullan the mouth of the bay is 33 kilometres wide but narrows at Black Head to 10 kilometres. The bay is dominated and protected by the Aran Islands. The largest of these is Inishmore to the north, Inisheer to the south and Inishmaan between them. The main rivers entering the bay are the River Corrib at Galway and the Owenboliskey at an Spidéal. Along the south coast of the bay there are many minor freshwater inputs as well as submarine freshwater sources due to the drainage patterns associated with the karst landforms of the Burren.

In general terms, to the east of Black Head water depths remain shallow with depths shallower than 20 metres. The bay gradually deepens to the west, with two distinctive areas of deep water between the Aran Islands and the mainland with water depths around 60 metres between Inishmore and Connemara, Co. Galway (the North Sound) and 50 metres between Inisheer and Co. Clare. There are also channels of deeper water between the islands themselves known as Gregory's Sound (between Inishmore and Inishmaan) and Foul Sound (between Inishmaan and Inisheer) where water depths are around 30 metres.

The offshore Galway area shaded relief data indicates a mixture of soft sediment and outcropping bedrock. The bedrock is characterised by dipping beds that have undergone brittle and ductile deformation. Numerous northeast – southwest orientated faults are found in the area.

3.5 Galway City

Situated on the northern shore of Galway Bay, at the mouth of the River Corrib, in ancient times known as the Gailleamh which in Irish means stoney river. The first reference to Galway dates to 1124 when the annals record that the Connachta erected a castle or fortification at Galway, which is referred to as Bun Gaillimhe or Dún Gaillimh. The castle was burnt by a fleet of Munstermen in 1132 and following its rebuilding was burnt again in 1149, 1161 1170 an 1177. Records indicated that following Richard de Burgo's invasion of Connacht in 1230 he fought the O'Flaherty's at Caisleán Bhun na Gaillimhe. De Burgo subsequently withdrew but returned to Galway in 1232 and constructed a castle there. The castle became the 'caput' or administrative centre of the de Burgo estate. While it is likely that the castle was constructed on the site of the pre-existing Gaelic fortification or dún, no evidence dating to the period immediately preceding the Anglo-Norman arrival has been uncovered at the site or within the city.

Records from 1233 indicate that the castle was destroyed by Felimid O'Conchobair within one year of its construction. The first official record of a town at Galway dates to 1247 when 'both the town and castle were burned' and many of the town's inhabitants were killed13. Richard de Burgo's son Walter can be credited with the establishment and development of the town and the construction of the earliest town defences. Walter came into possession of his father's lands in 1250 and died at the castle of Galway in 1271. Murage returns dating to 1272-75 and 1277- 80 indicated that murage charges were being collected and used for the purchase of lime and tools and the payment of tradesmen and labourers engaged in the making of walls. The requirement for fortification was strongest along the east side of the settlement which did not have the same natural topographical advantages and was in fact overlooked by rising ground giving advantage to an enemy force. It is likely that the earliest stretch of wall was constructed on this side of the settlement. The pre-existing watercourses, salt-water marsh and slobland were used in combination with the curtain walls to enclose a roughly rectangular area at the end of the northern of two ridges of higher ground. Additional advantages were gained in its proximity to both a ford on the River Corrib and the sea. The street pattern was probably established at an early stage with the main thoroughfare running along the crest of the ridge and then forking into two with Bridge Street, leading to the fording point on the river in the west and Quay Street, leading to the quays and strand in the southwest.

The defences along the eastern side of the town were strengthened with an external fosse and the principal entrance gateway, fortified by a bulwark or barbican, was constructed along this section of the wall. Further murage returns are recorded from 1298, indicating that that William de Burgo's son Richard continued the process of the town's enclosure. The builders of the wall sought to strike a balance between the provision of an enclosed area that would provide enough space for the settlement and allow for future growth while also satisfying the requirement of defence. Measuring approximately 1,330m in length, the wall enclosed an area of only 11ha which is considerably smaller than many of the other significant medieval port towns, such as Drogheda (43ha), Dublin (20ha), New Ross (39ha), Waterford (23ha) and Limerick (28ha). Galway was,

however, comparable in size medieval with towns such as Cork and Kinsale (14ha), Carlow and Kilmallock (both 13ha) and Athlone (llha)16. The first murage charter for Galway dates from 1361 in the reign of Edward III. It was provided for a period of five years and suggests that the enclosure of the town was substantially complete at this stage. This is supported by historical records referring to land lying without the walls of Galway and others indicating that entry and egress from the town could only be gained by one of the town gates. Monies collected as the result of a murage charter made in 1395 in the reign of Richard II, may have been used to strengthen inadequate or incomplete sections. From the middle of the fifteenth century there are records of fines collected in the town which were used for the repairing of the walls and other works.

Historical references dating to the sixteenth century indicate that works were undertaken on three key areas of the city defences including the southern curtain wall, the western curtain wall and the area around the Spanish Arch. From 1499-1500 a section of the southern curtain wall was constructed adjoining the New Tower. This work continued towards the Quay in 1503- 4 and a further section was built in the vicinity of Michael's Tower in 1519-20. A new opening, the New Quay Gate, was broken through the western curtain wall in1536-7 to ease traffic on the quays. A school located in the area of the Spanish Arch was converted into a fortification around 1586-8. This area was known as ceann an bhalla or wallshead. The continued threat of Spanish invasion in the early seventeenth century led to Galway, and other strategic Irish ports, constructing additional defences. Substantial improvements to the city defences, including the introduction of the bastion system, were undertaken to counter the threats posed by artillery. This arrangement combined defence, offensive fire power and flanking cover. A large fort was constructed on a ridge of high ground to the south of the city in 1602. Named St. Augustine's Fort, it was constructed on a site containing the remains of the Augustinian Friary. By November 1602, the fort was occupied by a garrison of 150 soldiers. The garrison was reduced following the cessation of hostilities between England and Spain in 1604 and it appears that the fort was never fully completed. In 1614 the lord president of Connacht, Sir Oliver St. John described Galway as."*a small city built upon a rock, environed with a strong wall and good defences after the ancient manner, such as with a reasonable garrison may defend itself against an enemy"*.

The construction of a new fort, located at the West Gate into the city, began in 1625 but was stopped in 1628 when the hostilities between England and Spain ceased. Excavation on the site of the Galway Arms Hotel at Dominick Street revealed the remains of a substantial stone wall which may have formed part of this structure. In 1641 during the Civil War in England, the town declared itself for the king but the commander of the fort, Captain Willoughby was loyal to parliament. Disagreements broke out between the citizens and the garrison. The citizens laid siege to St. Augustine's Fort on a number of occasions between 1642 and 1643. During this period other works were constructed along the coast to stop relief for the garrison coming in by sea. This included a gun platform or redoubt on the west side or the river at what is now Nimmo's Pier; a gun emplacement on Mutton Island; a bastion fort on the headland at Renmore; and an earthen redoubt at

Rintinnane. In the aftermath of the siege the citizens demolished and levelled St. Augustine's fort and the land was returned to the Augustinians.

A strategic rethink of the city defences was undertaken in the mid-seventeenth century. The programme of works included the construction of substantial stone-faced batteries to protect the east side of the city. Bastions were constructed around the Lions Tower in 1646 and the New Tower in 1647, located at the north-east and south-east corners of the eastern curtain wall. Archaeological excavations have uncovered the South Bastion and photographs taken of the Lions Bastion prior to its demolition in the 1970's indicate the substantial size of these structures. Following the curtailment of work due to an outbreak of plague, the construction of two further bastions was undertaken. Sections of both of these, named the Middle Bastion and North Bastion, survive some of their remains being uncovered during archaeological excavations. The construction of the works is commemorated in carved stone plaques bearing the Coat of Arms of Galway. A small defensive structure known as a ravelin was also added to the West Bridge in 1650 to protect the western approaches to the city. The Parliamentary forces of Charles Coote laid siege to Galway in 1651, after nine months the city surrendered. The Cromwellian army subsequently constructed two citadels at the main entrances to the city. The Upper or East Citadel was constructed at the east end of the city at the Great Gate, while the Lower or West Citadel was constructed at the west end of the city by the West Bridge. Both were square in plan with corner bastions projecting into the streets and are depicted on Phillip's plan drawn in 1685. Local houses were confiscated and incorporated into the citadels. Repairs to the citadels and to the fortifications are noted in the 1660's, and both citadels were recorded as being in poor condition by the 1680's. Bollingbrook was the northernmost of three forts erected by the Parliamentary forces in 1651. The pictorial map shows it as a quadrangular fort with corner bastions.

During the Jacobite and Williamite Wars the citizens of Galway aligned themselves with King James II. In preparation for a possible siege of the town, in 1689 the Corporation of Galway ordered that buildings adjoining the walls were to be pulled down to facilitate repairs on the walls. The ditches were also scoured out, the gates improved or blocked up and the forts demolished. At this time the general condition of the city defences appears to have been quite poor and to provide a greater depth of defence, additional outworks were constructed in front of the eastern, northern and southern curtain walls and the works on Fort Hill were initiated.

No additional large-scale works were undertaken following the defeat of James II and the existing fortifications were only maintained when the need arose. The establishment of the Barrack Board in 1697 was a pivotal point in the history of the city defences and emphasis moved away from providing a defensive wall circuit to providing accommodation within the city for horse and foot soldiers. By this time, the condition of the wall was quite poor with collapsed gates, breaches in the curtain wall and collapsed sections of the older city wall to the east. There is evidence that the holes and passageways through the wall were made at various locations

by smugglers. In the early eighteenth century the west citadel was replaced by a new barrack to accommodate three companies. This was constructed to the southeast of the Upper Citadel around 1734. Colonel Stratford Eyre was appointed governor of the garrison in 1747 and soon after made a number of returns to the government on the state of the city's fortifications at this time. Two additional barracks were erected in Galway in 1749, one at the rear of the barracks in Lombard Street and another at the West Bridge. A report by Colonel William Roy of the Royal Engineers in 1765 led to the abandonment of the city defences, when he suggested that it would be better to pull down the walls. The Board of Ordnance prepared a report with similar recommendations in 1769 where only the barracks, stores and magazines were deemed to be of importance to the defence of the city.

The second half of the eighteenth century saw a period of rapid decay in the walls of Galway and by the end of the century almost all of the fortifications had been demolished. Sections of the city wall were built upon and property along the wall was let by the corporation or taken over by private individuals. Merchant's Road was laid out in 1779 alongside the wall and warehouses were built up against it. During the early nineteenth century when Galway was beginning to recover its position as a major Irish port and mercantile centre, the old remaining fortifications were considered to be an impediment to progress. Logan's map of 1818 best indicates the condition of the wall at that time. By 1824 it would appear that the walls were fast becoming a memory, the Great Gate and the whole of the South Bastion, with the adjoining outer wall to the north having been removed. The stretch of the northern circuit from Abbeygate Street Upper to the West Gate had also been removed. This is clear on the Ordnance Survey city plan, of 1839-40, which demonstrates that segments of the southern and remaining northern curtain walls had been removed by this time. In 1851 the section of the wall from Williamsgate Street to the Lion Tower, together with a portion of the bastion was demolished to make way for Eglington Street. The only substantial sections remaining at that time were the North Bastion, the stretch of city wall south of Williamsgate Street, which formed the main boundary wall of Castle barracks, and the wall at the Spanish Arch. The twentieth century saw further destruction of the surviving sections. In 1970, the Lion Bastion fell victim to development and was demolished and in 1971 the last surviving bastion of the Upper Citadel was removed after a fire gutted the neighbouring premises. Since the mid-1980s there has been a growing interest in the city's heritage and a number of archaeological excavations have been undertaken during urban renewal schemes. These schemes have involved the preservation of the eastern curtain wall within Eyre Square Shopping Centre and the Spanish Arch as part of the Galway City Museum complex.

3.6 Cartographic Evidence

Cartographic sources indicate the landfall location on Ballyloughane Strand and the surrounding area is a sandy beach area facing directly out to Galway Bay and boasts views stretching for miles across the bay to County Clare, the Aran Islands, Hare Island and Mutton Island. It is accessed from the Ballyloughane Road off the R338 (Dublin Road). No discernible cultural heritage assets are noted to be in the vicinity of where the

survey or site investigations take place and there are no envisaged direct impacts on any known cultural heritage site.

Three sites of cultural heritage are represented below on the aerial photo of Ballyloughane Strand and its surrounding areas:

- A Ringfort (**GA-094-059)**, is located in the townland of Rinmore c. 430m directly north,
- A Fulacht Fia (**GA-094-115)** is located in the townland of Rinmore 1.1km west
- A Church and Graveyard ***(GA-094-10 & GA-094-10-001)*** is located in the townland of Ballyban Beg 1km north

Figure 7. RMP sites located close to Ballyloughane Strand

3.7 Galway City Council Storm Damage Mitigation Report

Storm damage since 2011 and more particularly since 2013 has led to the discovery of many site finds and features of archaeological importance and the destruction or partial destruction of others.

The primary aim of the survey was to identify, map and describe a number of archaeological sites and find spots which had come to the attention of the Galway City Heritage Office in recent years from a variety of sources. The resulting catalogue includes 43 sites/finds of which only three have any specific formal protection.

The coast from Silverstrand to Roscam was surveyed over a series of low water spring tides in August 2014.

The survey and the new finds and sites discovered graphically highlight the impact natural factors such as increased storm severity are having on the coastal cultural heritage resource. Only three of the forty three sites and find sites were recorded prior to the survey. The archaeological and cultural heritage potential of the coastal zone is therefore substantial. It is vital that any proposed work within the coastal zone whether or not recorded sites are identified should be subject to archaeological assessment in advance of any ground works.

4. ARCHAEOLOGY WITHIN THE SURVEY ROUTE CORRIDOR

The proposed survey route is divided into four sections in order to determine an optimum route for the proposed cable system to traverse Galway Bay which has been outlined in section 1.2 above.

4.1 Sites of Cultural Heritage Interest Surrounding the Survey Corridor

The baseline environment has been divided into five categories, each of which is addressed individually. These are as follows:

1. Onshore cultural heritage assets listed by DCHG and National Museum of Ireland,
2. Storm damage mitigation report sites and finds
3. Known wrecks and obstructions as per Shipwreck Inventory/Receiver of Wreck and UKHO,
4. Unrecorded maritime archaeological sites, features and deposits identified through assessment of geophysical and hydrographic data,
5. Areas of archaeological potential.

4.1.1 *Onshore cultural heritage assets listed by DCHG and National Museum of Ireland*

Three sites of cultural heritage are represented below on the aerial photo of Ballyloughane Strand and its surrounding areas.;

- A Ringfort (**GA-094-059)**, is located in the townland of Rinmore c. 430m directly north,
- A Fulacht Fia (**GA-094-115)** is located in the townland of Rinmore 1.1km west
- A Church and Graveyard ***(GA-094-10 & GA-094-10-001)*** is located in the townland of Ballyban Beg 1km north

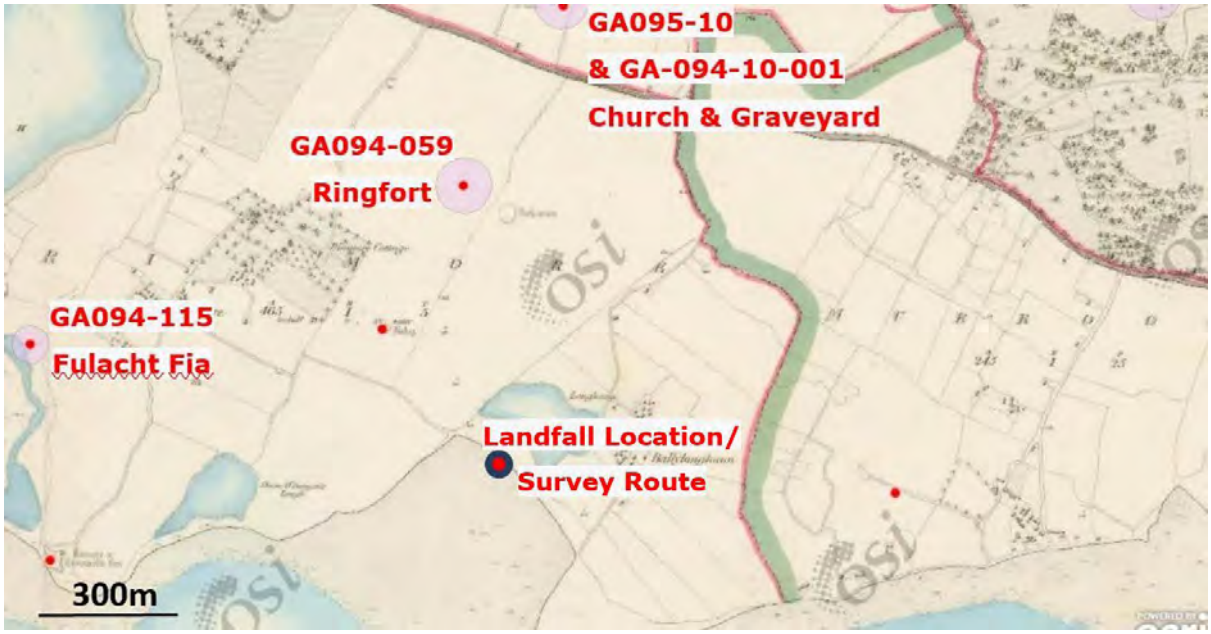

Figure 8. RMP site overlaid on the first edition Ordnance Survey six inch map

4.1.2 Strom damage mitigation report sites and finds

Seven sites and find sites were identified at or around Ballyloughane beach including a possible old quay and some ships timbers.

Figure 9. Site and find locations Ballyloughane Strand

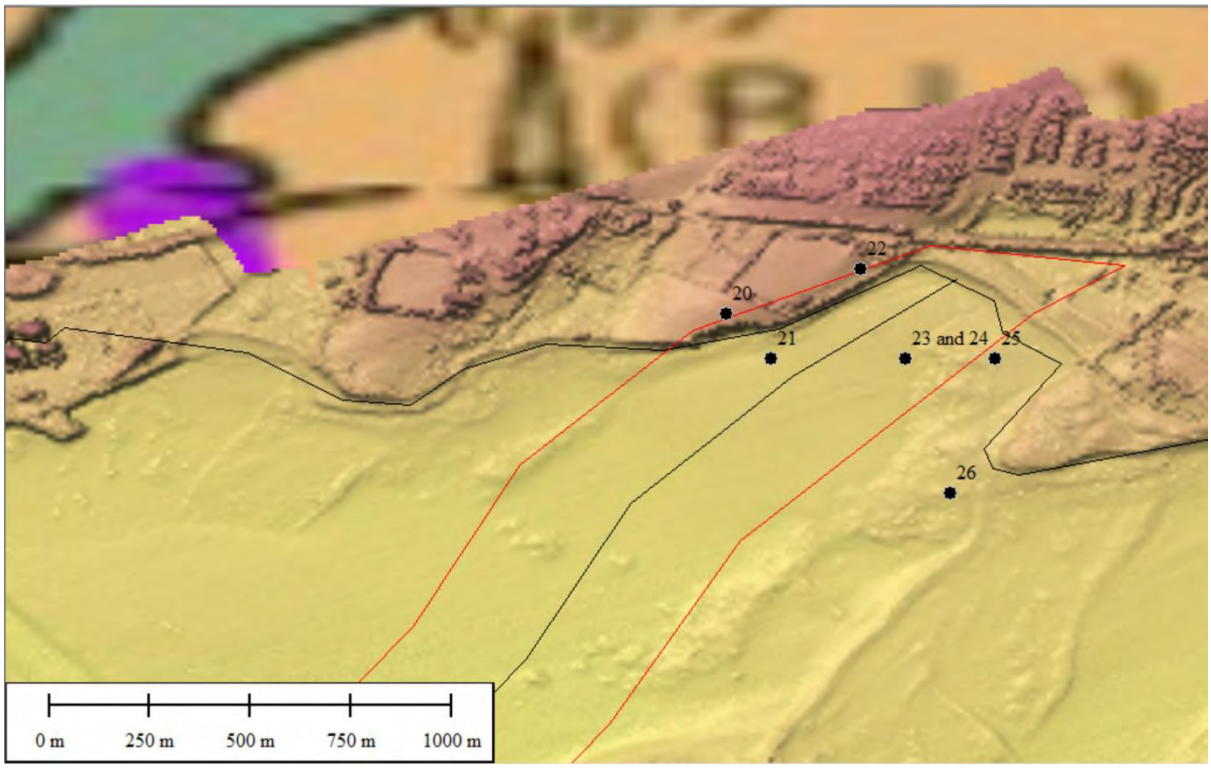

Figure 10. Site and find locations Ballyloughane Strand

#	Description	Townland
20	Find Site – Medieval Pot Sherd	Rinmore
21	Site of - Stone wall in peat	Rinmore
22	Site of - Midden	Rinmore
23	Ship Timbers	Rinmore
24	Old Quay	Rinmore
25	Ship Timbers	Rinmore
26	Ballast Fields	Hare Island

Table 5. Sites noted at Ballyloughane Strand.

4.1.3 Known Shipwreck sites

The national seabed mapping project, INFOMAR, has been developed over the last number of years and has presented a clear record of known shipwreck locations. This has most recently been absorbed by the National Monuments Service, which has produced an online map of known and recorded shipwrecking events around Ireland. The NMS map will absorb observations made from marine geophysical surveys and diver-truthing and related third-party records, and represents the most robust data set to hand for assessing the archaeological risk of offshore and nearshore environments around the Irish coast.

The distribution of known shipwreck locations highlights the seabed around the proposed survey route retains a high archaeological potential.

There are 17 known wreck sites within or surrounding the proposed survey corridor survey corridor. Of those 17 sites two lie with the survey route corridor, these are **W17455** and **W15898** (see appendix 1).

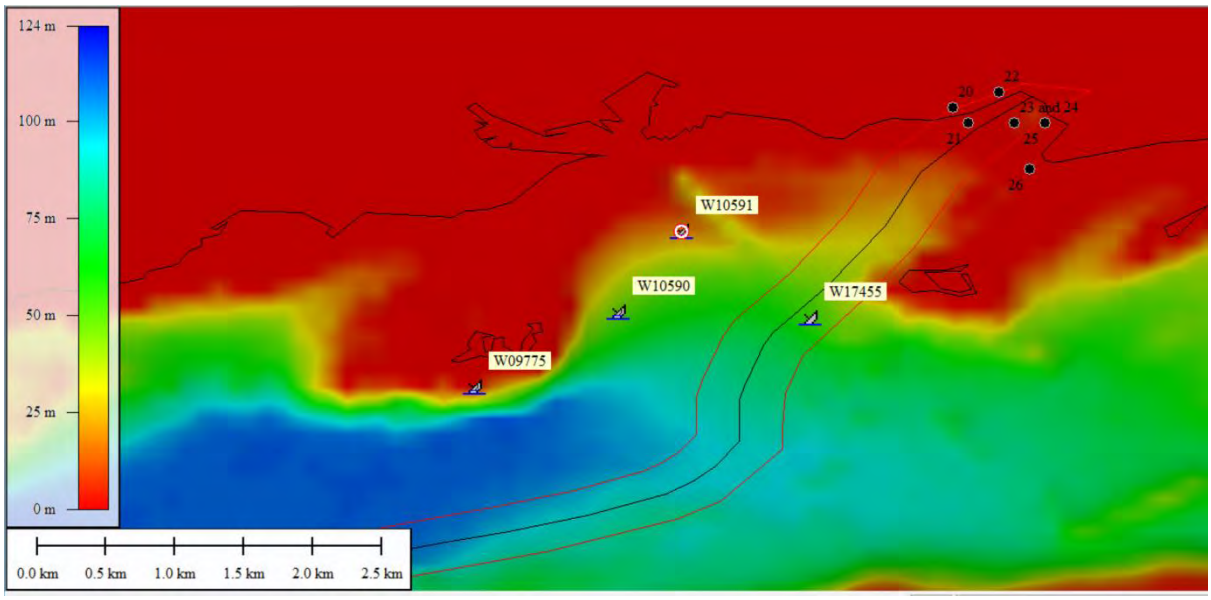

Figure 11. Known shipwreck sites - nearshore

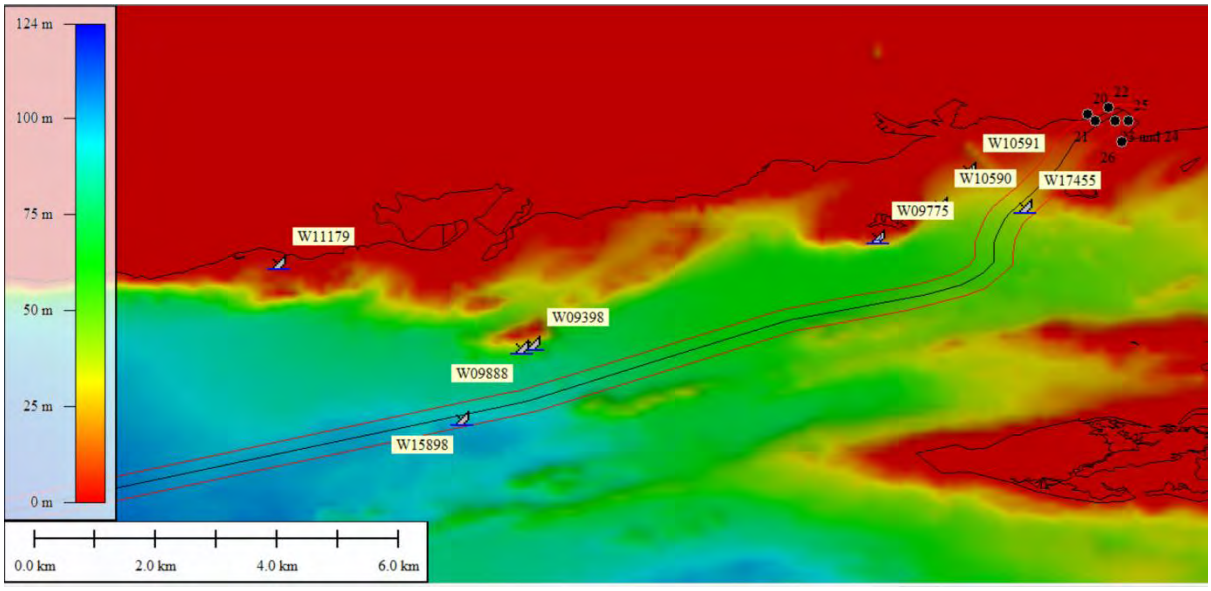

Figure 12. Known Shipwreck sites

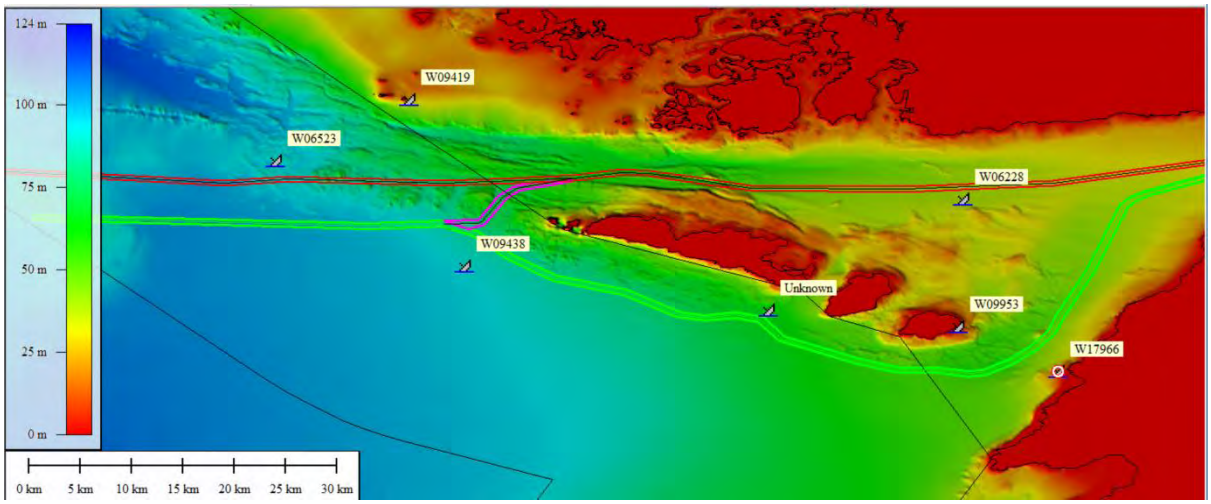

Figure 13. Known Shipwreck Sites offshore

Table 6 below offers detailed information about the known shipwrecks in close proximity to the survey and site investigations area with known co-ordinates To view all known and unknown wreck sites with co-ords/locations and unidentified locations within or close to the survey corridor please refer to the appendix 1.

Known Wreck Sites in Proximity to Survey Area				
Site Name	**Date of Loss**	**Place of Loss**	**Description**	**Reference**
Arosa W09419	03/10/2000	53.25350 -9.98333	N/A	UKHO
Pretty Polly (FV) W06523	31/05/1918	Roundstone Bay, Co Galway, off / 53 12 00N, 010 06 00W	Ketch	UKHO Wreck Data 1996; PP 1919, Vol. LXII, 123 (749); BVLS 1914-18, 123.
Bambino W09438	22/11/1993	53.10833 -9.93486	N/A	UKHO
Magpie W17966	03/04/1864	Loop Head - Slyne Head 53.01667 -9.41667	N/A	Lloyd's List No. 15, 594, Monday 4th April 1864.
Plassy W09953	08/03/1960	Inisheer, west side at 53.05578 -9.50373	Coaster wrecked in 1960.	UAU
Magpie (HMS) W06228	03/04/1864	Doolin 53.16667	Screw Gunboat	Lloyd's List, No. 15, 594, Monday 4th April 1864; Bourke 1994, 177-8; Larn &

		-9.50000		Larn 2002; LSHL, 22; PRO Kew Adm - 1/5914, Court Martial, 25.04.1864; SRN Vol 1, 215; Hocking 1989, 442.
Unknown W11324	Unknown	The Rinn, the sandspit about 2kmNW of Ballyvaghan on the N clare coast. 100 yards off the rocks at , off 53.13755 -9.17731	N/A	Michael Moore
Unknown W15898	11/11/1928	Spiddall, Galway Bay, 1.2 miles S. of 53.22500 -9.11667	N/A	Lloyd's List 35, 630, Monday 12th November 1928.
Moyalla (SS) W09888	17/02/1946	53.23556 -9.10778	Steamship	UKHO
Angmering (MV) W09398	29/01/1975	Galway Bay, south side of Black Rock Shoal 53.23617 -9.10617	N/A	UKHO Wreck Data.
Unknown W11170	Unknown	Knocknacarra, Bearna, Galway Bay 53.24807 -9.14384	Logboat Unnamed report of Dug-out Canoe from Bearna	National Monuments Service.
June (MV) W09775	16/01/1962	Mutton Island, southside. Galway Bay 53.25183 -9.05517	Dutch cargo ship in ballast went ashore on the south side of Mutton Island during a severe storm. 8 crew on board were rescued.	www.wrecksite.eu
Unknown W10590	Unknown	53.25667 9.04583	N/A	UKHO

Unknown W10591	Unknown	53.26194 -9.04167	N/A	UKHO
Unknown W17455	Unknown	53.25633 -9.03333	Remains of a wooden wreck were discovered by divers in Galway Harbour during excavation works to uncover and free the keel of a modern yacht which had become embedded in the seabed. The wreckage was buried 1m below the then seabed level. A possible framing timber, several sods of turf and some animal bone (adult cow's left scapula) were encountered during the works. A timber recovered from the site and examined by Julianna O'Donoghue was provisionally identified as Quercus Sp. It was heavily eroded, terredo infested and amorphous in shape measuring 48cm by 12cm by 9cm. None of its original surfaces survive but there was evidence that one of its fixings was originally iron.	Julianna O'Donoghue 2014. Addendum to Archaeological Chapter 13.2 of EIS (Galway Harbour Extension). 1-7
Unknown W10594	Unknown	53.24167 -8.95111	N/A	UKHO

Table 6. List of known wreck sites close top and within the survey route corridor

4.1.4 Unrecorded sites

Unrecorded maritime archaeological sites, features and deposits may be identified through the assessment of geophysical and bathymetric data.

4.1.5 Areas of archaeological potential

The assessment of the desktop study data indicates that the survey route corridor of the seafloor is typified by a sandy substrate. It is possible the sediments along the route corridor are not conducive for the preservation of archaeological material. However, with quite a few coastal sites in Galway Bay and along the Clare coast such as Churches, Promontory Forts, Ringforts and Burial grounds, it should be noted, the potential for areas of archaeological activity is possible especially during the site investigations such as the 3 trial pits and the bar probes. In this report a number of onshore and offshore cultural heritage sites have been identified, as outlined by through the Shipwreck Inventory and the Galway City Storm Damage survey which listed two wrecks sites (**W15898 & W17455**) and some potential onshore archaeological features including ship timbers and an old quay.

Archaeological Excavations

Examination of the online excavations database www.excavations.ie revealed no archaeological sites in the immediate area to the cable route corridor. Excavations throughout the peninsula have been carried out in various locations (Appendix 4).

Topographical Files

The topographical files identified a number of archaeological artefacts close to Galway Bay and along the Clare Coast (Appendix 2).

5. PROPOSED SURVEY DETAILS

5.1 Survey

A detailed marine survey will be undertaken over the full width of the selected route corridor. The basis of the survey is to ground-truth the sea-bed conditions and check for any anomalies in terms of marine archaeology and any subsea environmental features. The survey will include Bathymetry, Side Scan Sonar, Sub-Bottom Profiling and Magnetometer. The principal objective of the Marine Survey & Site Investigations is to ascertain a feasible and safe route for cable system design, deployment, survivability and subsequent maintenance with due regard for environmental and ecological considerations. The survey will also enable decisions to be made on cable armouring and burial. The survey will identify all route features, obstacles and cable hazards and provide detailed information to support cable route and installation engineering. The site investigations will provide "ground-truthing" of the seabed along the route.

The survey operations will be broken down into separate but overlapping areas, with boundaries defined by water depth as specified in the technical requirements outlined below. These water depth boundaries may be adjusted due to suitability of the survey vessel(s) and survey gear. The survey and survey line spacing will be designed to ensure adequate coverage and overlap of geophysical measurements. For the route survey, the sidescan ranges will be limited to those providing the greatest resolution possible (able to resolve a 0.5m object or better), while following the requisite line spacing and overlap. The maximum speeds outlined will be used as guidelines. Bathymetry data collection will, at minimum, comply with the requirements in this document and with International Hydrographic Office standards (S44).

For swathe bathymetry, "20% overlap" signifies that adjacent acquisition swathes within the survey corridor overlap by 20%. For side scan sonar (SSS), 100% overlap requires two passes of complete coverage over a given area of sea-floor, with the two passes each ensonifying the sea-floor from opposite directions to ensure targets are adequately imaged. The basic survey equipment is to comply with the requirements of the Underwater Archaeology Unit.

5.2 The Landfall at Ballyloughane

The proposed landfall is located at Ballyloughane Strand at Renmore in Galway City. Ballyloughane is sheltered from sea conditions generated by westerly winds by Mutton Island and causeway. It is sheltered from the south by Hare Island and the reef connecting it to the shoreline. The beach is exposed to sea conditions generated by south westerly winds but the fetch is quite short and the water depths are quite shallow. The shoreline is in the form of a stable sandy beach with a low stub wall protecting a footway which defines the sea-land boundary. Inland of the footway there is a grass strip which separates the footway from end-on parking bays and a local road.

Figure 14. Proposed cable landfall at the beach in Ballyloughane

5.3 Proposed Marine Survey and Site Investigations

The basic survey equipment is to comply with the requirements of the Underwater Archaeology Unit. The requirements are as follows;

Side Scan Sonar:

- For archaeological purposes, the Side Scan Sonar will have an operational frequency of 410/500 khz.
- Side scan will be set at 50m survey line spacing
- This will not be slant-range corrected
- There will be 100% coverage of sites and therefore overlap of areas may be required.

It is proposed that in shallow water (0-15 metre water depth) the line spacing may be reduced to 25 metres. In deeper water (15 to 1500 metres) the line spacing may be increased to 150 metres whilst maintaining the requisite seabed coverage.

Magnetometer:

- A magnetometer will be used in tandem with side scan sonar
- Proton or caesium magnetometer will be used and will have a 50m side spacing
- This will be used with DGPS

Sub-bottom profiler (optional):

Sub-bottom profile information may be required for both the inshore and shallow water sections of the route. Sub-bottom profile data may be acquired on all lines of the proposed line plan so that an accurate interpretation of the geology can be obtained.

The Survey Contractor will recommend sub-bottom profiling equipment that typically resolves to twenty centimetres (0.2m) within the top three metres (3m) of the seabed. The equipment will be capable of penetrating to a minimum of six metres (6m) in suitable seabed conditions.

Vessel mounted sensors will be fully compensated for heave. In-water sensors will be dynamically positioned and steered along the predefined survey lines using industry standard techniques. In water depth less than one hundred metres (100m), equipment positioning may be determined using fixed layback to counteract poor acoustic positioning.

The system shall be capable of providing data in both digital and analogue form.

- If using a sub-bottom profiler then the Chirp system is the preferred one as this gives the ultimate resolution
- This should be used in conjunction with DGPS

General:

- Track plots will be recorded. Track plots will be superimposed onto a locational chart
- All geophysical survey will be carried out by suitably qualified personnel. Preferably they will also have underwater archaeological experience. If this is not possible then the results must be viewed by a qualified archaeologist with experience in underwater archaeology.
- A copy of the original data/traces as well as the interpreted results of the geophysics should be sent to the Underwater Archaeological Unit of DCHG. Further archaeological mitigation may be required once the data has been reviewed by DCHG.
- Vessels should not travel faster than 4-5 knots when carrying out surveys.

Landfall Site Survey & Site Investigations

- A non-intrusive topographic survey of the beach at Ballyloughane along the line of the proposed cable route is required from the carpark to the low water mark.

Site Investigations at Ballyloughane Strand will consist of;

- 3 Trial Pits on the beach. (2.5 metres target depth, excavated and immediately reinstated by JCB)
- Bar probes on the beach
- Bar probes from the Low Water Line to the 3m water depth contour.

The sampling required on the beach at Ballyloughane Strand will involve 3 No. Trial Pits at 50m centres starting seaward of the High Water Mark. The 3 No. Trial Pits will be excavated, logged, photographed and backfilled in a single intertidal period. The trial pits will be backfilled with the original excavated materials in the sequence in which they are excavated.

A summary Method Statement for excavation of the Trial Pits is as follows;

- 3 No. Trail Pits
- JCB or equivalent small mechanical excavator.
- Maximum depth 2.5m.
- Excavate sand and place to one side.
- Excavate substrate and place separate from sand.
- Measure, log and photograph each Trial Pit.
- Backfill in sequence compacting with bucket of back hoe as the backfilling proceeds.

The bar probes on the beach and out to the 3m depth contour are simply to prove the depth of sand, gravel or soft material and are effectively non-intrusive.

Small Boat Survey

The area extending seaward from the 3m water depth contour and inshore of the safe working draft limits of the primary survey vessel will be accurately surveyed with a small craft using Multibeam Echosounder (MBES), sidescan sonar and sub-bottom profile equipment. Sub-bottom profile equipment will be able to discern the nature and density of the upper 3 metres of seabed and will be used on a non-interfering basis with other sounding systems. Tie-lines will be performed to verify primary survey data and will have a nominal spacing of 10 times the primary line spacing with a minimum of two tie-lines. A minimum of seven survey lines, based upon the Survey RPL, is required.

Features such as shallow reefs, surge channels, debris fields, archaeological features or anything that could be a hazard to the cable or installation team will be noted. General reconnaissance of the survey corridor beyond the planned survey lines and tie-lines may be necessary to describe the seabed as accurately as possible. A line plan showing number of survey lines as a function of depth will be provided prior to start of survey operations.

Survey Area	Depth Range	Corridor	Min. # of Lines	Min. Overlap	Max. Speed
Small Boat	3m to 15m	350 -500m	7	SSS: 100% MBES Bathy: 20%	4 knots

Table 7. Small boat survey requirement

Offshore Survey

A continuous bathymetric swathe (Multibeam Echosounder), along with side scan sonar imagery and sub-bottom profile will be obtained, centred on the preliminary route and along all wing lines needed to complete the corridor coverage. A minimum depth accuracy of 0.5% is required. Sub-bottom equipment will be able to discern the nature and density of upper 3m of seabed, and is to be used on a non-interfering basis with other sounding systems. Additional sounding lines may be necessary to identify any obstacles or archaeological features that may be encountered, and/or to meet the overlap and corridor requirements.

Survey Area	Depth Range	Corridor	Min. # of Lines	Min. Overlap	Max. Speed
Offshore	> 15m	350 - 500m	3	SSS: 100% MBES Bathy:20%	4 knots

Table 8. Offshore survey requirements

Seabed Sampling

- Seabed sampling will be required at locations covered by the Small Boat and Shallow Water Surveys.
- A minimum of two attempts will be made at each sampling location to acquire a suitable seabed sample. If an acceptable sample is achieved on the first attempt, there is no need to perform a second attempt.
- An acceptable sample is defined as;
- Grab Sample – recovery of approximately a full bucket of soils. Recovery of rocks and/or large size granular material will be taken as indication of a hard seabed and be deemed an acceptable sample.
- Gravity Core – recovery of no less than a 2m deep core of soil. If stiff or hard soils are encountered below 1m of seabed and are clearly indicated in the sample, a 1m+ soil sample will be deemed acceptable. Any sample site yielding less than 1m of recovery must be investigated a second time unless there is obvious damage to the coring equipment indicating a hard or rocky substrate.
- CPT – Penetration to the 2m target, but a maximum of 3m below seabed. Any push resulting in less than 2m penetration will warrant a second attempt.

Survey Area	Depth	Type	Avg. Spacing	No. of Samples
Small Boat	3 – 15 m	Grab Sampler	1 per 500 m	8
Offshore	> 15m	Gravity Corer (GC), Cone Penetrometer (CPT), Grab Sampler (After GC/CPT Failure)	1 per 10km	45

Table 9. Seabed sampling requirements

- The site investigations in the area from the Low Water Line to the 15m contour will be undertaken from a small vessel having the appropriate draft.
- The site investigations seaward of the 15m contour will be undertaken from a larger sea-going vessel.
- The marine survey and site investigations will be undertaken in compliance with best practice and having regard for the protection of marine mammals.

The marine survey and site investigations will be undertaken along the route line shown on the Foreshore Licence Map Drawings. However, a 500m wide route corridor is shown to allow for local diversions in the event of obstructions or other routing considerations.

The schedule of Site Investigations is set out in Table 10.

Survey Area	Depth	Type	Avg. Spacing
Landfall	HWM - LWM	Trial Pit	50 m
Landfall	HWM - LWM	Bar Probing	1 per 25 m

Table 10. Site Investigation schedule

The overall scope of the Site Investigations is as follows

- Trial Pits 3 No. on the beach
- Bar Probes 24 No. on the beach
- Bar Probes 20 No. from Low Water to the 3.0m contour
- Grab Samples 6 No. from the 3m to the 15m contour
- Gravity Cores or Cone penetration Test 45 No. from the 15m contour to the 12 Mile Limit

6. IMPACT ASSESSMENT

The survey and site investigation works will have no direct or indirect cause to impact on cultural heritage assets within area of the proposed survey area if the correct mitigation measures are implemented.

Direct impacts may be caused during site investigations when trial pits and bar probing take place at the low watermark on the beach and during grab sampling, Coring or CPT operations in the offshore section. Indirect impacts during seabed sampling, both positive and negative, may be caused by the disturbance and subsequent redeposition of sediments which may partially or completely cover or uncover cultural heritage assets. Further indirect impacts may be caused by the deployment of anchors or burial/deburial tools in the vicinity of cultural heritage assets.

6.1 Impacts on Maritime Cultural Heritage

The types of impact that the proposed development will have on the baseline environment is addressed under the following categories:

Type of Impact	Description
Direct Impact	Direct impacts on marine archaeological sites, features, deposits and artefacts that may be affected during the survey and site investigations.
Indirect Impact	Potential damage to marine archaeological sites and features within the proposed development may be caused by indirect impacts.
Secondary Impact	Secondary impacts on marine archaeological sites, features and artefacts that may be affected by the development.
Cumulative Impact	The assessment will consider the potential for the effects of cumulative impacts on sites, features and artefacts of cultural heritage interest associated with the proposed development. Possible impacts may include effects within the proposed development such as continued interference through cable laying activities upon a relict landscape surface or deposit. Impacts outside the development area may include the effects of several developments within the same locality on the cultural heritage resource.

Table 11. Table of Impacts

6.2 Direct Impacts

The assessment has identified two wreck sites (**W15898 & W17455**) within the proposed survey and site investigation corridor. In the surrounding area 15 other known shipwrecks have been recorded in the Shipwreck Inventory (Appendix 1). The precise locations of these shipwrecks are sometimes difficult to identify even when location details are present in the inventory. The sheer numbers of known and unknown wrecks recorded from the area means any proposed site investigations have the potential to impact on a wreck site or other related cultural heritage assets.

The three recorded RMP's (**GA094-115, GA094-059 & GA094-010/001)** within close proximity to Ballyloughane Strand is a good indication of the possible remains of unrecorded archaeological features finds and deposits which may be disturbed particularly during any site investigations on the beach or foreshore.

The recorded cultural heritage sites on the coast at Galway Bay, the Islands and along the coast of Clare highlight the intense human activity in the general area from earliest times up to the present day (Appendix 3 and 4). This activity has the potential to yield associated features finds or deposits and these may be identified

during the survey and disturbed during the site investigations. As outlined in this report, the Galway City Storm Damage Survey (see table 5) identified ship timbers and an old quay which are present on Ballyloughane beach.

Any site investigations on the seabed foreshore or beach has the potential to impact on associated or other unrecorded features, finds and deposits.

6.3 Indirect Impacts

Although there may be some minor changes in the sediment regime around the site investigations, no significant indirect impacts from the proposed scheme have been identified as part of this assessment.

6.4 Secondary Impact

No secondary impacts have been identified during the survey and site investigations.

6.5 Cumulative Impacts

The survey and site investigations may lead to the installation of a fibre optic cable. As with mitigating potential impacts from survey and site investigation there are established procedures which will mitigate any cultural heritage impact associated cable installation.

7. MITIGATION MEASURES

There are various ways that potential impacts of a development can be mitigated. Mitigation measures usually involve avoidance (the implementation of exclusion zones and design alterations), reduction (the introduction of measures to deal with unexpected discoveries during works), or offsetting (excavation and recording of a site before an impact occurs). Ideally, sites and features of cultural heritage interest should be subject to as little disturbance as possible, where policy normally dictates a presumption in favour of preservation in situ in line with current national policy.

Overall, the aim is to minimise the impact on cultural heritage assets through the appropriate siting of infrastructure and works. As such, the preferred mitigation for the disturbance of a site of cultural heritage interest would be avoidance, so that any site investigationsare micro-sited to avoid wrecks or identified sites and features of cultural heritage interest.

This can be achieved through the use of 'exclusion zones'. These should be marked on project charts to avoid potential sites and features of maritime cultural heritage interest. The size of the exclusion zone is normally dependent on the certainty the target represents a wreck or site and the potential importance or sensitivity of that asset (historically significant or not).

Adherence to the implementation of the exclusion zones during scheme operations can be checked through procedures and protocols set out in a works method statement. Protocols should be established before the start of scheme operations detailing instructions to follow in the event of unexpected discoveries, with contact details of the relevant stakeholders.

Given the results of the impact assessment above, the mitigation strategies outlined here detail the measures to be adopted in order to ameliorate the direct, indirect and secondary impacts that the proposed survey and site investigations may have on features of maritime cultural heritage interest within the proposed scheme. If these measures are employed it is envisaged that the proposed survey and site investigations will have no impact on features of maritime cultural heritage interest.

The following mitigation recommendations are presented in connection with the proposed cable:

1. It is recommended that all sites of cultural heritage interested included in this report are avoided by the site investigations.
2. As the survey proceeds, processing and charting should be carried out in a 200m zone around all of the proposed site investigation locations. The data and charts should be reviewed and analysed by a licensed archaeologist for the presence of unrecorded seabed and subseabed archaeological features

finds or deposits. Only where no such features are identified within the 200m zone surrounding the proposed sampling location will the sampling be allowed to proceed.

3. Archaeological analysis of the full data set from the geophysical and bathymetric pre installation surveys should be undertaken to both confirm the locations of any identified wreck sites, especially known sites within the survey corridor, such as **W15898 & W17455** and also to identify any potential unrecorded seabed and sub seabed maritime archaeological features or cultural heritage assets.
4. Due to the approximate location details for many shipwrecks in the inventory it is not recommended that the survey corridor be re-routed to avoid the two known wrecks.
5. Where the location of a wreck site is found during the survey and site investigations any proposed further development corridors should be re-routed to avoid them.
6. Archaeological monitoring of the grab sampling, gravity core, CPT, trial pits and bar probing should be undertaken in order to identify any previously unrecorded cultural heritage features.
7. The location of all of the proposed trial pits and probing on the beach and on the foreshore should avoid the seven sites and find spots noted during the storm damage mitigation report and detailed in this report.
8. All of the proposed trial pit excavations and probing on the beach and on the foreshore should be subject to full archaeological monitoring.
9. It is recommended that procedures should be put in place to ensure that any previously unrecorded cultural heritage assets encountered during the project should be assessed by a suitably qualified archaeologist and avoided by any future works
10. Should the proposed survey route be subject to further revision, details of these revisions should be forwarded to the project archaeologist for assessment
11. On completion of the survey and site investigations a report will be produced summarising all archaeological aspects of the project and submitted to DCHG and the National Museum of Ireland

APPENDIX 1 SHIPWRECK INVENTORY

The Shipwreck Inventory of Ireland includes all known wrecks for the years up to and including 1945. The Shipwreck Inventory is principally a desktop survey with information gathered from a broad range of cartographic, archaeological and historical sources, both documentary and pictorial. Approximately 10,000 records have been compiled and integrated into the shipwreck database thus far. Wrecks over 100 years old and archaeological objects found underwater are protected under the National Monuments (Amendment) Acts 1987 and 1994. Significant wrecks less than 100 years old can be designated by Underwater Heritage Order on account of their historical, archaeological or artistic importance as is the case with the wreck of the RMS Lusitania located off Kinsale Head. Underwater Heritage Orders can also be used to designate areas of seabed or land covered by water to more clearly define and protect wreck sites and archaeological objects. Under the legislation all diving on known protected wreck sites or with the intention of searching for archaeological underwater material is subject to licensing requirements. The Shipwreck Inventory for Dublin was consulted in the Underwater Archaeology Unit offices for vessels lost in the survey area using the following place names; ***Galway (near or off), Galway Bay, Inisheer Island, Inismann Island, Clare, Doolin, Doonbeg (Dunbeg), Loop Head, Spanish Point and Kilkee****. There were a large number of shipwrecks recorded in the area which were either with co-ords or some without. The tables below are broken down into known wrecks sites with co-ords, wrecks sites with unknown co-ords and wrecks found online at irishwrecks.net which were in the immediate vicinity.*

All known co-ordinate sites were recorded in the vicinity and are listed below:

Table below identifies known wreck sites with co-ords:

Site Name	Date of Loss	Place of Loss	Description	Reference
Arosa W09419	03/10/2000	53.25350 -9.98333	N/A	UKHO
Pretty Polly (FV) W06523	31/05/1918	Roundstone Bay, Co Galway, off / 53 12 00N, 010 06 00W	Ketch	UKHO Wreck Data 1996; PP 1919, Vol. LXII, 123 (749); BVLS 1914-18, 123.
Bambino W09438	22/11/1993	53.10833 -9.93486	N/A	UKHO
Magpie W17966	03/04/1864	Loop Head - Slyne Head 53.01667 -9.41667	N/A	Lloyd's List No. 15, 594, Monday 4th April 1864.

Plassy W09953	08/03/1960	Inisheer, west side at 53.05578 -9.50373	Coaster wrecked in 1960.	UAU
Magpie (HMS) W06228	03/04/1864	Doolin 53.16667 -9.50000	Screw Gunboat	Lloyd's List, No. 15, 594, Monday 4th April 1864; Bourke 1994, 177-8; Larn & Larn 2002; LSHL, 22; PRO Kew Adm - 1/5914, Court Martial, 25.04.1864; SRN Vol 1, 215; Hocking 1989, 442.
Unknown W11324	Unknown	The Rinn, the sandspit about 2kmNW of Ballyvaghan on the N clare coast. 100 yards off the rocks at , off 53.13755 -9.17731	N/A	Michael Moore
Unknown W15898	11/11/1928	Spiddall, Galway Bay, 1.2 miles S. of 53.22500 -9.11667	N/A	Lloyd's List 35, 630, Monday 12th November 1928.
Moyalla (SS) W09888	17/02/1946	53.23556 -9.10778	Steamship	UKHO
Angmering (MV) W09398	29/01/1975	Galway Bay, south side of Black Rock Shoal 53.23617 -9.10617	N/A	UKHO Wreck Data.
Unknown W11170	Unknown	Knocknacarra, Bearna, Galway Bay 53.24807 -9.14384	Logboat Unnamed report of Dug-out Canoe from Bearna	National Monuments Service.
June (MV) W09775	16/01/1962	Mutton Island, southside. Galway Bay 53.25183 -9.05517	Dutch cargo ship in ballast went ashore on the south side of Mutton Island during a severe storm. 8 crew on board were rescued	www.wrecksite.eu

Unknown W10590	Unknown	53.25667 9.04583	N/A	UKHO
Unknown W10591	Unknown	53.26194 -9.04167	N/A	UKHO
Unknown W17455	Unknown	53.25633 -9.03333	Remains of a wooden wreck were discovered by divers in Galway Harbour during excavation works to uncover and free the keel of a modern yacht which had become embedded in the seabed. The wreckage was buried 1m below the then seabed level. A possible framing timber, several sods of turf and some animal bone (adult cow's left scapula) were encountered during the works. A timber recovered from the site and examined by Julianna O'Donoghue was provisionally identified as Quercus Sp. It was heavily eroded, terredo infested and amorphous in shape measuring 48cm by 12cm by 9cm. None of its original surfaces survive but there was evidence that one of its fixings was originally iron.	Julianna O'Donoghue 2014. Addendum to Archaeological Chapter 13.2 of EIS (Galway Harbour Extension). 1-7
Unknown W10594	Unknown	53.24167 -8.95111	N/A	UKHO
W06234 Mary	14/08/13 1913	Loop Head, 3miles NE of Rosses Point/ 52.35.25N 09.52.50W Zone 905	84-/ 103-ton 6 year old wooden ketch of Milford, owned by Francis, W&G, official no 127,411. Built in 1907 by MacKellar, P.H. Greencock. Measured L.25.12xB6.50xD2.87. Powered by a 2-cylinder 50 Hp single boiler screw engin, machinery by Shanks & Morrice, Glasgow. En route from Bridgewater to Galway with 6 crew and a cargo of building materials, stranded and lost in gale force wind conditions.	BOT WkRtn 1913 Appx C Table 1, 25 (1055); Bourke 1994, 176; Larn&Larn2002LR 1913-14 No 324(M), PP1920, Vol. XL, 25.

W06262 San Estaban	20/01/88 1588	Doonbeg Zone 905 52 44 51.566N, 09 31 37.929W	736/936-ton Armada ship en route from Lisbon with the invasion fleet. Carrying 409 men/crew of 78 and 196 passengers and 26 guns, One of the squadron of Guipuzoca. Sixty of the 264 man crew survived but were hanged at Cnoc na Crocaire, near Spanish Point. '...commanded by Don Miguel de Oquenda, survived the action in the English Channel, fled to the North Sea and rounded Scotland, heading back for Lisbon, when wrecked north of Doonbeg, somewhere in Doughmore Bay, probably the strand. The survivors were said to have been executed by the sheriff of Clare...'	Bourke 1994, 172, Larn&Larn 2002. Full Fathom Five, Martin, C. 1975, 89 & 1972; From Merciless Invaders, Kee, A. 1963 & 1987, 226.The Armada in Ireland, Fallon N. 1978; SIC Vol 1, 172; IJNA (2000) 29.2, 247-259
W06263 San Marcos	15/09/88 1588	Bad Bay, on the reef between Mutton Is. and Lurga Point, near Spanish Point. Zone 905. 52 48 27.845N, 09 30 08.874W	790-ton Spanis Armada ship en route to Lisbon with an invasion fleet, was carrying 409 men (117 crew and 292 soldiers) and 33 guns. Under the command of the Marquis of Penafiel. Some of those lost were buried at Kilfarboy. '... Having been battered for weeks and leaking badly,the San Marcos struck a reef of rocks... and became a total wreck'.	Bourke 1994, 172; The Armada in Ireland, Fallon N. 1978;Larn&Larn 2002; Full Fathom Five,Martin C.1975, 20 & 226; The defeat of the Spanish Armada, Mattingly, G.

				1959, 278-87; From Merciless Invaders, McKee,A. 1963 & 1987, 218-20;SIC Vol 1, 172.
W11300 Unknown	No date provided.	Kilkee, Co.Clare, Poulnasherry, Blackwier Bridge, Doonbeg. Zone 905. 52 40 00.509N,09 35 06.426W	Turf cot.	This data transferred from the Web Field on 8th June 2017.
W17966 Magpie (alternative location)	03/04/1864	Loop Head/ Slyne Head Zone 905 53 01 00.000N, 09 25 00.000W	Gunboat Steamship	Lloyd's List No 15, 594, Monday 4th April 1864
W06458 Justitia	22/11/1940	Inishmore, Co. Galway, c 80 miles W of N. Zone 908	4562-tonshiobuilt by Burntisland Shipbuilding Co, i 1935 and owned by Chellew Steamship Management Co. Measured 412 x 56 x 25ft. Powered by a 283 triple expansion engines capable of 10.5 knots. Torpedoed and sunk by a german submarine while under the command of D. L. Davis. 13 people were lost.	Hocking, 169, 366; BVLS 1939-45
W09398 Angmering (MV)	29/01/75 1975	Galway Bay, south side of Black Rock Shoal. Zone 908. 53 14 10.200N, 09 06 22.200W	Cargo ship ran aground after hitting the Black Rock Shoal. The cargo of coal was later salvaged.	UKHO Wreck Data.
W09775 June (MV)	16/01/1962	Mutton Island, Southside, Galway Bay. Zone 908.	Dutch cargo ship in ballast went ashore on the south side of Mutton Island during a	Www.wrecksite.eu

		53 15 06.600N, 09 03 18.600W	severe storm. 8 crew aboard were rescued.	
W09940 Patriarch	01/09/04 2004	Aran Islands , Co Galway, BroadHaven Bay, between. Zone 908 53 22 00.000N, 09 55 30.000W	Fishing boat.	Web Feld on 8th June 2017
W09953 Plassy	08/03/1960	Inisheer, west side of. Zone 908 53 03 20.810N, 09 30 13.410W	Coaster	UAU
W11170 Unknown	Unknown	Knocknacarra, Bearna, Galway Bay Zone 908 53 14 30.000N, 08 57 04.000W	Unknown	Info transferred from the Web Field on 8th June 2017
W15898 Unknown	11/11/1928 (r)	Spiddal, GalwayBay, 1.2 miles S.f.	The Picton Castle struck a submerged object, possibly a wreck at co-ordinates c. 1.2 miles S. of Spiddal in Galway Bay, 11 november1928	Lloyd's List 35, 630, Monday 12th November 1928.
W06319 Warner	13/03/17 1917	Loop Head, offshore. Zone 905	1273-ton steel steamship.	

Table below identifies known wreck sites with no-cords within close proximity to the survey route:

Site Name	Date of Loss	Place of Loss	Description	Reference
W06085 Ajax	12/02/88	Kilkee Bay	1-ton 5-year unregistered wooden fishing boat. The owner was J. Sheehan of Kilkee. Fishing from Kilkee in ballast with 3 crew aboard. Capsized in NW force 10 gale and partially wrecked. Two lives lost.	PP 1889, LXIX, 163
W06117 Owen Glendower	1851	Kilkee	Pleasure yacht owned by William Moore. En route from the Kenmare River to Boland's Bay, Co. Clare. Caught in a storm and was driven past the Blaskets at 14 Knots. The mast fell injuring 5 of the crew. The barque, John, came across the stricken vessel and with great difficulty, rescued all those aboard. They were brought to Kilrush and were seen to at Valdaleur House. The yacht was found drifting off the Duggerna reef and was towed into Kilkee where goods were removed from the vissel. The wreck ws sold in December.	Bourke, 1994, 176; Marrinan, 19-20.
W06135 Volant	12/02/88	Kilkee Bay/Greatman's Bay, Galway Bay, 2.5 miles S of zone 905	94-ton 36-year old timber schooner of Greencock.Master was R.Rossand owner was J. Mawhinny of Island Magee, Co. Antrim, En route from Kinvara to Glasgow with4 crew and a cargo of limestone. Partially	PP 1889, LXIX, 164.

			wrecked when giving way of tackle in a southerly force 5 wind. One life was lost.	
W06164 Edmund	Between19/ 11/1850 and 20/11/1850	Duggarna Rocks, Edmund Point, off Kilkee Bay	400-ton Emigrant ship of London was built around 1840. Chartered by Mr John McDonald, TC of Limerick. Left Carrigaholt on Sunday 18th of November 1850 under Captain Wilson. There were 207 people aboard en route to New York or Quebec. On Monday, when 30 miles into the Atlantic, a WNW or SW to NW force 10 gale was encountered, which blew her back onto the Clare coast, Mast was carried away and she became un-managable. At around 11pm on the 20th hit the rocks and was then driven further inshore. Wilson had the foremast cut but the vessel broke in two . The broken mast fell towards the shore and formed a bridge that allowed 111 people to get ashore. Capt. Wilson was the last to leave the vessel. (CPS 1852-3)/ 96 (Hocking and Bourke)/ 99 (CSP) lives were lost. The bow remained on the ledge which she struck, while the stern drifted down the bay to a bridge ove a stream, The vessel was wrecked and almost a total loss but was insured.	Bourke 1994, 170; Hocking 1969, 203; Marrinan, 1997, 19, PP 1852, VolXLIX, 72-73; PP Vol. XCVIII, 4; PP 1861, Vol. LXIII, 38: Lloyd's List, No 11442, Fri. Nov. 22, 1850.

			The cargo was almost a total loss as well but was insured. Although the vessel entered the bay along the normal route, she did not drop her anchors. If she had done so she would have beached in safety.	
W06185 Fulmar	31/01/86 1886	Kilkee and Farrihy, between/Slyne Head and Loop Head, between zone 905.	UKHO wreck no. 010100180. The Fulmar, 418 -ton screw steamer of Cardiff, built in Middlesboro in 1868 purchased by Messrs Harris and Dixon in 1897. The vessel left Troon for Limerick with 800 tonnes of coal, under Captain Webb with a crew of 17 on 28th Jan 1886. A number of life bouys marked 'SS Fulmar', a portion of the ship's stern and a number of bodies includingthat of Capt. Webb were washed ashore at Kilkee, 'Doaghmore' and elsewhere on the Clare coast between 31st January and 12th February 1886. All 17 on board died. Captain Webb's remains were buried in Farrihy Graveyard. The vessel was insured for £8000 and he freight valued at £235, was not insured. Three boats were onboard. While the wreckage washed ashore close to Kilkee, the chief of the Coastgaurd Station at Kilkee suggested the vesel had been wrecked	

			between Slyne Head and Loop Head.	
W06148 Aurora	16/10/14 1814	Loop Head, near. Zone 905	Brig sprang a leak and sank en routefrom Belfast to Quebec under Capt. McArvill. All those aboard transferred into two lifeboats and made it safely to Kilkee and Carraigaholt. Another says that 2 crewmen were lost and 2 locals drowned in a rescue attempt.	Bourke 1994, 173; Lloyd's List, No. _____. 18th Oct. 1814; Marrinan, 1997. 19
W06176 Eupion (SS)	03/10/18 1918	Loop Head, 10 miles W of zone 905.	3573 ton 4 year old tanker built i 1914 by Mackay Bros. And ws owned by the British Tanker Co., measured 325.3 x 44.7 x 28 x 2 ft. Powered by a triple expansion engines with 401 nhp and could travel at 11 knots, Torpedoed and sunk by a german submarine. 11 of the crew were lost. The captain was one of the survivors.	Bourke 1994, 220; Hocking, 1969, 232; BVLS 1914-18, 98; Lloyd's List,No. 32, 625, Mon. 27th Jan. 1919, 9, Lloyd's List No. 32, Mon. 10th Feb, 1919; Lloyd's List,No. 32, 638, Tue. 11th Feb. 1919, 9; Lloyd's List, o 32, 652, Thur. 6th March, 1919, 9.
W06186 Ganges	24/12/1848	Loop Head, off/ River Shannon, Kilcredaun Head	The Ganges, a 67-ton schooner of Aberystwyth collided with the Carlotta off Loop Head and sank. The crew survived. Limerick, 31.12.1849. 'The masts and spar of a vessel, apparently attached to a sunken hull, is reported to have been seen off KilcredaunPoit,	Bourke, 1994, 177; PP1852-3, Vol XCVIII, 2; Lloyd's List 10, 855, Tuesday 2nd January 1849.

			and are supposed to belong to the Ganges, a schooner of Aberystwyth , which sank off Loop Head 24th inst. ' (NB** 24/12/1849 – Different date)	
W06195 Guiding Star	24/04/1888	Duggerna Reef, Kilkee Bay/Moore Bay, Kilkee. Zone 905	100-ton 9 year old wooden Schooner.	Lloyd's List no
W06204 Hope	20/01/21	Loop Head Zone 905	146-ton Brig.	N/A
W06208 Inistrahull (SS)	02/01/95 1895	Loop Head, estimated area of loss is 8-10 miles N of Zone 905.	10 year old screw Schooner.	N/A
W06209] Intrinsic	28/01/36 1836	Bishops Island, Intrinsic Island near Loop Head.	No ship details given.	N/A
W06215 John	1851	Galway Bay	Russian barque of Odessa.	N/A
W06224 Lonsdale	08/02/18 1818	Near Loop Head.	Vessel of Saltcoates.	N/A
W06241 Mercator	31/12/37 1837	Dunbeg Zone 905	No ship specifications given.	N/A
W06242 Minerva	14/01/1819	Loop Head, near lighthouse. Zone 905	168-ton brig.	N/A
W06243 Morcombe Belle	08/02/81 1881	Loop Head and Kilcreadane, between. Zone 905	122-ton 17 year old wooden schooner.	N/A
W06249 Os	No date.	Loop Head, 20 miles N of. Zone 905	900 ton Norwegian vessel.	N/A
W06258 Rose	13/12/1889	Mutton Island, Seafield Point Pier, Galway bay.	87-ton schooner.	N/A

		Zone 905		
W06259 Rose	10/12/1890	Mutton Island, Seafield Point, Co. Galway Zone 905	87-ton 41 year old wooden schooner.	N/A
W06269 Successor	20/11/1850	Mutton Island, Seafield Point , Co Galway Zoe 905	294-ton vessel of Sunderland.	N/A
W06282 Unknown	No date provided	Near Kilkee Station Zone 905	No clear details of vessel given 'five canoes were washed away and broken up during a storm.	N/A
W06292 Unknown	12/12/1821 (r)	Loop Head Zone 905	Sailing vessel with cargo of wood.	N/A
W06302 Unknown	18/02/26 1826	Loop Head at Kilbaha. Zone 905	Large fully rigged ship.	N/A
W06305 Unknown	23/11/1822	N. of Loop Head. Zone 905	Large ship.	N/A
W06312 Unknown	No date given.	Bridges of Ross near Loop Head. Zone 905	Wooden wreck in shallow water.	N/A
W06320 Waterlily	30/09/36	Near Kilkee Zone 905.	Schooner.	N/A
W06336 Kelp	01/01/1916	Spanish Point, rocks 250 yards from cliff. Zone 905.	315-ton steel schooner.	N/A
W11300 Unknown	14/08/1913 (r)	Loop Head, 3 miles NE Zone 905	84-ton, 6 year old wooden Ketch.	N/A
W12655 Burnock (SS)	08/12/1893 (r)	Loop Head c. 8 miles west. Zone 905	215-ton steel steamship.	N/A
W13523 Breeze	17/02/33 1833	Kilkee. Zone 905.	No vessel details given.	N/A

W13570 Clarence	31/01/1836	Kilkee Zone 905.	No vessel details provided.	N/A
W13676 Unknown	01/01/28 1828	2 leagues north of Kilkee. Zone 905	Schooner.	N/A
W13998 Unknown	25/01/40 1840	Kilkee, rock near Zone 905	American Schooner – timber,	N/A
W14580 Queen Bee	13/10/19 1919	Kilkee Zone 905	Motor vessel.	N/A
W15133 Unknown	26/01/94 1894	Loop Head Zone 905	No vessel details. Wreckage washed ashore.	N/A
W15170 Unknown	10/07/95 1895	Kilkee	Whaling boat.	N/A
W15523 Helena Thekla	24/02/55 1855	Doonbeg Bay Zone 905	No vessel details given,	N/A
W15616 J. W. Collingwood	17/11/56 1856	N of Loop Head Zone 905	No vessel details given.	N/A
W16000 Unknown	27/05/54 1854	Kilkee Zone 905	Wreckage.	N/A
Wi7131 Unknown	08/09/74 1874	10M WNW of Loop Head Zone 905	Small vessel.	N/A
W17249 Unknown	22/03/1907 (r)	0.25 miles NW of Loop Head.	Submerged hulk.	N/A
W17290 Unknown	18/01/1919 (r)	3.5 miles ESE of Loop Head.	Trawler lifeboat.	N/A
W17443 Unknown	26/09/1883 (r)	23 miles N of Loop Head.	Wreckage	N/A
W18281 Ontario	13/10/1867 (r)	Loop Head Zone 905	Schooner	N/A

W18508 Alta	09/12/1881 (r)	Near Kilkee	No vessel details given,	N/A
GALWAY				N/A
W06357 Admiral Hawke	22/12/69 1769	Hare Island, Galway Bay.	Wooden sailing vessel	N/A
W06359 Albion	25/11/34 1834	Hare Island, Galway Bay	Vessel	N/A
W06366 Ann	12/02/1820	Galway Bay	Ship.	N/A
W06392 Commerce	17/01/05 1805	Galway Bay/Loop Head	117-ton brig.	N/A
W06393 Commerce	22/01/1782	Galway Bay	150-ton wooden fully rigged ship.	N/A
W06395 Commerce	02/03/10 1810	Galway Bay	Ship	N/A
W06410 Don Quixote	Between 13/01/1879 and 14/01/1879	Inismore	425-ton 12 year old brig.	N/A
W06413 Earl of Buckinghamshire	05/11/22 1822	Galway Bay	Abandoned ship.	N/A
W06414 Edward	01/09/91 1891	Galway docks.	98-ton Schooner.	N/A
W06421 Enterprise (SS)	1890	Inishmore	Steam ship i deralict state.	N/A
W06429 Gem	21/11/1848	Galway Bay	98-ton vessel.	N/A
W06431	29/01/43	Galway Bay	462-ton 3 year old barque.	N/A

George	1843			
W06432 Gipsey	14/10/1891 (r)	Inishmore	Deralictship.	N/A
W06434 Glenora	01/11/39 1839	Galway Bay/lough	Brig.	N/A
W06436 Good Luck	01/11/1896	Mutton Island, Galway bay	5-ton wooden vessel	N/A
W06437 Grizzie	17/03/97 1797	Galway Bay	50-ton vessel.	N/A
W06440 Hero	07/02/06 1906	Inishmore Island, near Killeany Bar, Aran Islands.	18-ton Dandy/trawler.	N/A
W06441 Heroes	17/10/89 1889	Hare Island/Mutton Island	599-ton wooden Barque.	N/A
W06447 Isabella	04/01/1834	Galway Bay.	103-ton vessel.	N/A
W06450 Janet and Ann	13/05/03 1903	Straw Island, Inishmore.	77-ton composite Schooner.	N/A
W06452 Jenny	31/10/06 1806	Galway Bay	No vessel description available.	N/A
W06455 Joseph	28/12/1899	Killeany Bay, Inishmore	24-ton wooden fishing yawl.	N/A
W06458 Justita	22/11/40	Inishmore, Co. Galway.	4562 ton ship.	N/A
W06459 Kate	08/06/85 1885	Black Rock, Galway Bay	112-ton wooden schooner.	N/A
W06464 Knapton	03/02/21 1821	Galway Bay	No vessel details available.	N/A
W06471 Lass	29/05/88 1888	Galway Bay, Spiddal Harbour	3-ton wooden hooker.	N/A

W06475 Lily	30/11/89 1889	Mutton Island, Co. Galway.	225-ton wooden brigantine or schooner.	N/A
W06478 Lituania	06/06/50 1850	Black Rock, Galway Bay	No vessel details provided.	N/A
W06479 Lively	06/01/1839	Galway Bay	Brigantine.	N/A
W06480 Lively Lass	06/02/03 1903	Kilronan Pier, Galway Bay	2-ton fishing canoe.	N/A
W06482 Magnet	31/01/1825	Galway Bay	No vessel details.	N/A
W06483 Magpie	02/04/64 1864	Aran Islands	236-ton Draper Class British Steam Navy boat.	N/A
W06484 Majestic	20/12/17 1917	Mutton Island, 0.25/0.5 miles NE of	47-ton fishing ketch.	N/A
W06485 Margaret	02/11/22 1822	Mutton Island	155-ton Brig.	N/A
W06490 Mary	27/02/03 1903	Murriugh Beach, Galway Bay.	34-ton wooden fishing cutter.	N/A
W06496 Makurka	12/05/52 1852	Galway Bay	No vessel details available.	N/A
W06500 Morning Star	17/09/73 1873	Galway Bay (just S of the city)	5-ton fishing boat.	N/A
W06501 Morning Star	22/11/1881	Ballylaughan, Galway Bay (Just S of the city)	7-ton wooden lugger.	N/A
Reaper	20 Dec, 1875	St Michael's Rock, 4 miles west of Spiddal, Galway Bay	This square-rigged wooden brigantine of St. Johns, New Brunswick, weighed 349 tons. She was built at Quaco, St. John's in November 1874 and	CSP, 1876, Vol. LXVII, 'Inquiries into Wrecks etc.' 208, 372

			measured 130.5 x 30.7 feet. Her official number was 72,196. Her owner was F. Tufts of St. John's and her master was J. de Long. She was en-route from St. john's to Galway with 9 crew and a cargo of deals etc. When Inisheer was abeam about ¼ mile distant, the vessel had all plain sail set and was going about 4 ½ knots. The master gave orders to the mate to steer NE for 1 ½ hours, and keep the lead and log constantly going. About two hours later surf was seen. The bower anchor was let go and the sails were taken up. The vessel drag and a second anchor was let go, but failed to bring her up. The vessel was stranded and eventually became a wreck – the crew landed in safety. At the inquiry it was found that the master was in default for not been constantly on deck on approaching land. His cert. was suspended for 6 months. The mate was found to have been grossly in default for presuming to place the ship on the port tack in direct opposition to the master's orders. His cert, was suspended for 12 months	
Saint Patrick	2 Feb, 1877	Spiddal	This new 15 ton wooden	CSP, 1877, Vol.

			hooker was en-route from Costello Bay to Galway. She had a cargo of oats and 4 crew on board. She was stranded in a W by N force 9 gale and was totally wrecked. There was no loss of life.	LXXV, 108
Unknown	Dec, 1833	Spiddle	Two fishing boats were driven ashore on the coast of Spiddle. The crews were lost	Freemans Journal, 3rd December 1833, Galway Free Press

Table below identifies known wreck sites from irishwrecksonline.net with no-cords within or near to Galway, Galway Bay, Inisheer Island, Inismann Island, Clare, Doolin, Doonbeg (Dunbeg), Loop Head, Spanish Point and Kilkee which are all within close proximity to the survey route:

Date of Loss	Name of Vessel	Type of Vessel	Cargo	Comments
1743	vrede	dutch sail vessel	gold ingots & bullion	on a rock near; curacoa for amsterdam
1750	friendship	dublin sail vessel	*unknown*	in galway river; possibly salvaged; norway for galway
1752	judith	bristol sail vessel	*unknown*	near harbour,
1762	royal charlotte	sail vessel	timber	ran ashore in galway river; quebec for london
1769	admiral hawke	sail vessel	sugar	on horse island; cargo part salvaged; st. eustatia for rotterdam

1776	dispatch	brig - 90 tons	*unknown*	near; cargo part salvaged; limerick for london
1781	lancashire witch	liverpool sail vessel	general	near; cargo part salvaged; liverpool for africa
1782	richard of lancaster	sail vessel	*unknown*	50 miles from,
1783	william	full rigger - 300 tons	14 x 6 pounder guns	near; bristol for galway
1792	ann	sail vessel	*unknown*	on coast of; the clyde for charlestown
1794	sra des chagas	sail vessel	*unknown*	possibly salvaged; lisbon for limerick
1804	ann	sail vessel	*unknown*	near; limerick for liverpool
1804	betty	sail vessel	*unknown*	near; limerick for liverpool
1804	hope	brig - 125 tons	*unknown*	came ashore; possibly salvaged; from galway
1806	james & kitty	sail vessel	*unknown*	near; galway for bristol
1813	juno	aberdeen sail vessel	*unknown*	near; novascotia for limerick
1815	oporto packet	sail vessel	*unknown*	caught fire & sank
1822	good intent	sail vessel	*unknown*	near; galway for bristol
1825	magnet	sail vessel	flax seed	ran ashore; philadelphia for

				galway
1832	brilliant	scarborough sail vessel - 266 tons	timber	drove ashore near; newport for quebec
1833	sarah margaret	sail vessel	*unknown*	possibly salvaged; st. john's n.b. for london
1839	lelia	brig	timber	driven ashore west of,
1839	st. patrick	barque	*unknown*	near; possibly salvaged
1852	john toole	sail vessel - 822 tons		near; new orleans for liverpool
1881	shamrock	dublin fishing smack - 32 tons	ballast	broke from moorings & drove ashore 2 miles south-east of,
1886	ocean queen	galway hooker - 12 tons	ballast	sunk in collision with "*conqueror*"
1891	edward	schooner - 98 tons	*unknown*	1 mile off galway docks; tralee for newport
1903	gladan	swedish barque - 604 tons	timber	stranded & wrecked on kilcolgan point; pensacola for galway
1903	mary	galway cutter - 34 tons	ballast	wrecked on murrough beach
1939	courae ous h.m.s.	aircraft carrier - 22,000 tons	*unknown*	torpedoed by u-29 west of,
1940	forfar	armed merchant	*unknown*	torpedoed by u-

		cruiser - 16,402 tons		99, 500 miles west of,
1769	maria	sail vessel	*unknown*	foundered off omey island; dublin for galway
1782	commerce	liverpool full rigger - 150 tons	*unknown*	stranded; possibly salvaged; liverpool for west indies
1796	union	bristol brig - 84 tons	*unknown*	struck rocks; cargo part salvaged; bristol for newport pratt
1797	grizzie	dumfries sloop - 50 tons	*unknown*	stranded; possibly salvaged; limerick for london
1797	tristram	full rigger - 140 tons	timber	scuttled; newfoundland for poole
1799	tom	sail vessel	*unknown*	liverpool for limerick
1805	commerce	appledore brig - 117 tons	6 carriage mounted guns	struck rocks at loop head; plymouth for limerick
1806	jenny	sail vessel	*unknown*	liverpool for galway
1810	concord	sail vessel	*unknown*	limerick for greenock
1815	anna sophia	swedish sail vessel	*unknown*	driven ashore; limerick for cadiz
1820	ann	sail vessel	*unknown*	went ashore;

				cargo salvaged; berbice for london
1820	trim	liverpool sail vessel - 128 tons	*unknown*	from new brunswick
1821	knapton	london full rigger - 514 tons	*unknown*	quebec for london
1822	earl of buckingham shire	sail vessel	*unknown*	abandoned & drifted onto rocks; quebec for greenock
1830	lillas	sail vessel	*unknown*	at black rock; troon for limerick
1839	albion	sail vessel	*unknown*	driven onto rocks at hare island
1839	glenora	brig	*unknown*	driven ashore; possibly salvaged
1839	lively	brig	*unknown*	driven ashore; possibly salvaged
1848	gem	sail vessel - 98 tons	ballast	stranded & wrecked; limerick for liverpool
1848	susan	sail vessel	*unknown*	at hare island; from galetz
1850	san spiridone	*unknown*	*unknown*	at hare island
1851	john	russian barque	*unknown*	possibly salvaged
1852	san dionigio	sail vessel	*unknown*	at galway bank; possibly salvaged; from galetz
1769	maria	sail vessel	*unknown*	foundered off omey island; dublin for galway
1863	anglia	galway iron steamer -	general & passengers	struck black rock;

		1,659 tons		thought to have been re-floated; liverpool for galway
1864	magpie h.m.s.	naval steam gunboat - 236 tons	crew	at crabb island, inside of,
1879	hiawatha	galway sail vessel - 12 tons	ballast	stranded & wrecked near costello coastguard station; galway for kilkerrin
1882	curbat	dublin fishing smack - 32 tons	ballast	wrecked on renmore point
1882	st. mary	galway sail vessel - 10 tons	coal	foundered in kinvarra bay; galway for kinvarra bay
1882	thetis	glasgow iron steamer - 217 tons	coal	at black rock; garston for galway
1884	st. mary	lettermullen sail vessel - 5 tons	poteen	in brannock bay; lettermullen island for the shannon
1884	st. patrick	galway sail vessel	seaweed	foundered off hare island; ardfry for galway
1884	williama	cardigan schooner - 59 tons	oats & limestone	foundered 7 miles south-west of black rock lighhouse; limerick for aberdovey
1885	kate	london schooner - 112 tons	salt, pipes & passengers	on black rock; runcorn for

				galway
1886	mary	lettermore sail vessel - 10 tons	timber	foundered in kilkerrin bay; kilkerrin for lettermore
1889	heros	swedish barque - 599 tons	ballast	struck rocks at hare island; galway for newport mon.
1889	mary ann	southampton smack - 33 tons	ballast	stranded & wrecked in kilkerrin bay
1892	o'connell	galway sail vessel - 26 tons	barley	stranded & wrecked at kilcolgan point; kilvarra for galway
1892	st. patrick	ballinacourty lugger - 2 tons	ballast	stranded & wrecked in kinvarra bay; parkmore for ballinacourty
1897	st. john	galway sail vessel - 5 tons	ballast	foundered 1 mile east of black rock
1905	st. patrick	lettermore sail vessel - 12 tons	turf	sunk in collision with "*s.s. duras*" in galway roadstead
1906	no name	inishmaan island sail vessel - 1 ton	ballast	foundered off cloughmore point
1908	no name	sail vessel - 7 tons	*unknown*	struck cockle rock; costello bay for oranmore
1911	st. columkill	galway sail vessel - 8 tons	ballast	foundered off castle point;

				island eddy for bunnahown
1912	mary	galway smack - 41 tons	ballast	on renmore beach
1912	rosa v.	dundee schooner - 89 tons	ballast	wrecked at inverin castle point; clifden for kilronan
1917	neptune	galway fishing smack - 50 tons	ballast	mined
1922	cornubia	london steamer - 420 tons	ballast	struck mantle rock; galway for ayr
1923	inverspey	fleetwood trawler - 280 tons	ballast	stranded & wrecked; from fleetwood
1924	*unknown*	sail vessel	coal	*none*
1938	hatano	steam trawler	ballast	foundered in bay; from milford haven
1939	victor	peterhead steam trawler - 201 tons	ballast	foundered in bay; other source says 1938; from peterhead
1946	moyalla	limerick steamer - 642 tons	tar, soda, ammonia & copper pipes	struck black head; liverpool for galway
1975	angmerling	london motor vessel - 1,045 tons	2,450 tons coal	2 miles off black rock; lies in 20m; gdansk for galway
1652	*unknown*	grain ship	grain	struck rocks at aran mor
1753	betty canahan	sail vessel	kelp	galway for newry
1768	charming	sail vessel	*unknown*	offshore; cargo

	molly			part salvaged; london for halifax
1798	margaret	naval tender	crew	struck reef between aran & mainland
1823	*unknown*	sail vessel - 250 tons	timber & hides	at branock isle
1825	*unknown*	american sail vessel	timber	west of,
1835	providence	sloop	*unknown*	*none*
1852	dove	beaumaris schooner	kelp	struck finnis rock, inisheer island; galway for dundalk
1896	w.e. gladstone	aran lugger - 14 tons	ballast & passengers	stranded & wrecked at aillinera point
1898	elizabeth	galway yawl - 22 tons	ballast	went ashore & wrecked in killeany bay
1899	joseph	tralee yawl - 24 tons	ballast	wrecked in killeany bay
1899	louisa	galway dandy - 26 tons	ballast	wrecked in killeany bayq
1899	success	galway dandy - 40 tons	ballast	wrecked in killeany bay
1899	*unknown*	aran fishing boat	*unknown*	several boats were lost
1900	rapid	hulk - 328 tons	ice	on carrigfada point
1938	nogi	steam trawler	ballast	ran ashore at straw island, killeaney bay; later refloated; from milford haven
1941	lurigethan	steamer - 3,564 tons	*unknown*	bombed 250

				miles west of,
1968	ard aengus	aran wooden bim motor trawler - 56ft.	ballast	broke up in heavy seas off,
1917	ocean scout	naval drifter - 200 tons	*unknown*	off lighthouse
1992	ocean tramp	trawler - 33ft.	*unknown*	1.5 miles west of; fenit for westport
1968	ard angus	trawler	fish	between inis maan & inishmore
1986	*unknown*	trawler	fish	in sound between inisheer
1837	1837	1837	1837	1837
1805	robert	sail vessel	*unknown*	in crab's bay; cork for galway
1821	elizabeth	sloop - 66 tons	*unknown*	driven ashore at haggs head; wales for galway
1821	*unknown*	sail vessel	iron	at ballaghaline; mostly salvaged
1864	magpie	navy wooden steam gunboat - 236 tons	ballast	in south sound; queenstown for galway
1588	san estaban	armada ship - 936 tons	troops & 26 carriage mounted cannon	north of on white strand; mostly salvaged in 1589
1807	*unknown*	sail vessel	*unknown*	in bay
1996	maria	wooden bim motor trawler - 50ft.	ballast	struck rocks off; possibly the same "maria" listed above at donegal point
1588	*unknown*	armada vessel	troops	*none*
1588	*unknown*	armada vessel	troops	*none*
1837	mercator	barque	timber	possibly

				salvaged; newbrunswick for belfast
1794	flora	cork brig	*unknown*	near; lisbon for limerick
1796	bon visage	sail vessel	*unknown*	in killbaha bay; st. ubes for limerick
1814	aurora	brig	*unknown*	sank near; belfast for america
1818	lonsdale	saltcoates sail vessel	*unknown*	foundered offshore; limerick for greenock
1819	minerva	brig - 168 tons	*unknown*	near lighthouse; newfoundland for limerick
1821	hope	brig - 146 tons	*unknown*	near; london for limerick
1821	*unknown*	sail vessel	timber	on kilbaha rocks,
1822	*unknown*	large sail vessel	spirits & tobacco	north of; possibly salvaged
1826	albion	hull sail vessel	timber	between loop head & kilbaha; miramichi for hull
1848	ganges	aberystwyth schooner - 67 tons	*unknown*	foundered off; from aberystwyth
1871	*unknown*	greek coaster	*unknown*	off,
1891	hero	glasgow brigantine - 199 tons	coal	driven ashore near kilclogher; ardrossan for limerick;
1906	morven	greenock 4 masted	3,500 tons wheat	stranded &

		steel barque - 2,150 tons		wrecked at horse island; oregon for limerick
1913	mary	milford haven ketch - 103 tons	building materials	stranded & wrecked 3 miles north-east of; bridgwater for galway
1917	penhale	falmouth armed steamer - 3,712 tons	sugar	torpedoed by u-46, 80 miles west-north-west of; halifax for queenstown
1917	os	norwegian vessel - 900 tons	coal	20 miles north of; llanelly for kristinsand
1917	warner	glasgow armed steamer - 1,273 tons	ballast	torpedoed by u-38 offshore
1918	eupion	london steam tanker - 3,575 tons	oil	torpedoed by ub-123, 10 miles west of; philadelphia for limerick
1941	fort richepanse	motorship - 3,485 tons	*unknown*	bombed & torpedoed 480 miles west of,
1971	trustful	fishing vessel	ballast	off,
1999	iolan chleire	schull trawler	ballast	sank after collision with french trawler "*ashling*" west of,
2000	en orient	french trawler	ballast	swamped 60 miles off,
2003	shearwater ii	fishing vessel	ballast	sank under tow 58 miles west-

				north-west of,
1916	kelp	port stanley schooner - 315 tons - 127.5 x 26 x 11ft.	mahogany & general	stranded & wrecked; falklands for london
1836	clarnece	sail vessel	*unknown*	off,
1836	waterlily	schooner	guitars & violins	offshore,
1850	edmund	barque - 400 tons	emigrants & general	at duggerna rocks; shannon for new york
1886	fulmar	london iron steamer- 418 tons	800 tons of coal	between kilkee & farrihy; troon for limerick (note- year sunk & vessel name misspelling corrected by captain webb's great great grandaughter fiona price)
1888	guiding star	padstow schooner - 115 tons	salt	on duggerna reef; liverpool for iceland

APPENDIX 2. TOPOGRAPHICAL FILES

The following information was collected for Galway Bay, The Aran Islands, and Co. Clare coast line. These are listed below:

Townland	Finds Description
Bearna	Record: Shell Deposit
An Roisín	1971: 954 (a) 954(b)) - Wooden Mill Shaf (?) Mould binding (?)
An Roisín	Axehead. Polished stone
Tawin East	1933: 758 Stone Tool
Tawin East	1933:751 Stone Axehead
Murrooghtoohy South	1968:443-447 2 Bone Needles/Pins; Shells; Animal Bone' Burnt Earth Sample.
Fanore Beg	Record: Gold Object
Ballynahown	E498: 1-4 1964:57 2 Lignite Rings, Human Remains, Animal Bone.
Ballynahown	1964: 57 Human Bones
Craggycorradan East	Bell Barrow
Teergonean	1A49 1988: Stone Disc
Doolin	IA/178/2000 - Fragment of Cerami/ Burnt Clay
Doonnagore	1975:267- 274 - Various Excavated Finds
Carrowduff	1A/251/2009 - Bronze Socketed Axehead
Carrowmore	1960: 507-9 SEg Bone point; Bone point (Frag) Conical Stone Object
Ballyonan or Doonaghboy	1966:97 Perforated Stone Mace Head or Axe Handle
Kilbaha South	1987:101 Cast Bronze Cauldron (Post Medieval)
Inis Oírr	1A/124/1994 Pottery Fragment
Inis Oírr	1962: 104-105 Two Stone Axeheads
Inis Oírr	A: Bronze Pin B: Limestone Pebble
Inis Oírr	1974: 107-108 Samples of Shell and Bone. Piece of Iron
Inis Oírr	1885:350-351 Cordened Urn/Food Vessel/ Urn
Ceathrú an Lisín, Inis Meáin	1929:1299 Flint Flake
Cill Éinne, Inis Mór	1A/66/84 5 Skeletons: 4 Adults one Child, and one bone belonging a 6th.

* The cable route has no direct impact on any archaeological sites or monuments in the vicinity, therefore the likelihood of stray artefacts or archaeological features in the study area is unlikely.

APPENDIX 3. RECORDED SITES AND MONUMENTS

The following townlands/locations were researched:

Galway Bay, Rinville West, Galway Harbour, Galway Docks, Inis Oírr, Kilronan, Kileany, Inis Meáin, Ballyvaughan, Kilkee, Carrowmore, Dúnbeag, Spanish Point, and Loop Head.

SMR No.	Class	Townland	ITM Easting	ITM Northing	Irish Grid Easting	Irish Grid Northing
GA094-057	Bastioned Fort	Rinmore West	531101	724763	N/A	N/A
GA094-141	Monumental Structure	Galway Bay	529783	724285	N/A	N/A
GA094-112	Fortification	Rahoon Park	530066	724579	N/A	N/A
GA094-142	Monumental Structure	Galway Bay	529721	724129	N/A	N/A
GA094-143	Monumental Structure	Galway Bay	529581	724108	N/A	N/A
GA094-0323	Battery Fortification	Mutton Island	529692	723190	N/A	N/A
GA094-072004-	Round Tower (stump)	Roscam	534291	724259	N/A	N/A
GA094-072001-	Church	Roscam	534289	724209	N/A	N/A
GA094-072002-	Ecclesiastical Enclosure	Roscam	534326	724219	N/A	N/A
GA094-072013-	Leacht	Roscam	534331	724190	N/A	N/A
GA094-072012-	Cross Slab	Roscam	534326	724169	N/A	N/A
GA094-072008-	Bullaun Stone	Roscam	534326	724150	N/A	N/A
GA102-039	Enclosure	Twain West	530083	719351	N/A	N/A
GA102-040004-	House	Twain West	530142	719304	N/A	N/A
GA102-040003-	Field System	Twain West	530155	719278	N/A	N/A
CL003A001----	Martello Tower	Auginish (Burren by.)	528677	713642	N/A	N/A

SMR No.	Class	Townland	ITM Easting	ITM Northing	Irish Grid Easting	Irish Grid Northing
CL003-037	Megalithic Tomb	Auginish (Burren By.)	527460	713232	N/A	N/A
CL002-070	Martello Tower	Rine (Burren By.)	524047	711645	N/A	N/A
CL002-079	Midden	Gleninagh	521388	710163	N/A	N/A
CL002-077	Burial	Gleninagh North	521242	710190	N/A	N/A
CL002-007003	Graveslab	Gleninagh North	519297	710309	N/A	N/A
CL002-007004	Fulacht Fia	Gleninagh North	519364	710414	N/A	N/A
CL002-007002	Ritual Site Holy Well	Gleninagh North	519284	710309	N/A	N/A
CL001-009	Ringfort/ Cashel	Murrooghtoohy North	515646	711856	N/A	N/A
CL001-007002	Fulacht Fia	Murrooghtoohy North	515024	711499	N/A	N/A
CL001-002002	Kiln	Murrooghtoohy South	514204	710441	N/A	N/A
CL001-001	Hut Site	Murrooghtoohy South	513781	708496	N/A	N/A
CL001-019	Midden	Fanore More	513516	707729	N/A	N/A
CL001-021	Midden	Fanore More	513331	707517	N/A	N/A
CL004-094	Ringfort/Cashel	Craggagh	512630	706260	N/A	N/A
CL004-002	Ringfort/Cashel	Derren West	512233	755942	N/A	N/A
CL004-029003	Hut Site	Crumlin	511188	704475	N/A	N/A
CL008-124001	Cliff edge Fort	Cahermaclancy	508079	700426	N/A	N/A
CL008A005002	Hut Site	Dunmacfelim	506227	697979	N/A	N/A
CL008A003002	Enclosure	Ballaghaline	505804	697437	N/A	N/A
CL008A002	Earthwork	Ballaghaline	505804	697238	N/A	N/A
CL008A006	Habitation Site	Ballaghaline	505671	696960	N/A	N/A

APPENDIX 4. ARCHAEOLOGICAL EXCAVATIONS

www.excavations.ie was consulted and the following townlands/locations were studied for archaeological excavations:

Rathnapura, Rinville West, Galway Harbour, Galway Docks, Inis Oírr, Kilronan, Kileany, Inis Mór, Ballyvaughan, Kilkee, Carrowmore, and Doonbeg.

County	Galway	**Site Name**	*Rathnapura, Rinville West*
SMR No.	94:60	**Licence No.**	-
Site Type	Ringfort	**Description**	https://www.excavations.ie/report/1992/Galway/0001288/
ITM	E 534965m, N 722730m	**Latitude/Longitude**	53.250942, -8.974537

County	Galway	**Site Name**	Galway Docks
SMR No.	N/A	**Licence No.**	01E0791
Site Type	Dredging	**Description**	https://www.excavations.ie/report/2001/Galway/0006447/
ITM	E 529966m, N 724873m	**Latitude/Longitude**	53.269563, -9.049902

County	Galway	**Site Name**	Galway Harbour
SMR No.	N/A	**Licence No.**	05D019, 05R013
Site Type	Dredging	**Description**	https://www.excavations.ie/report/2005/Galway/0013603/
ITM	E 529948m, N 750392m	**Latitude/Longitude**	53.271527, -9.050217

County	Galway	**Site Name**	Rinmore
SMR No.	N/A	**Licence No.**	09E0067
Site Type	Monitoring	**Description**	https://www.excavations.ie/report/2009/Galway/0020757/
ITM	E 530530m,	**Latitude/Longitud**	53.269371, -9.041445

	N 724843m	e	
County	Galway	**Site Name**	Lough Atalia Bridge
SMR No.	N/A	**Licence No.**	15E0140
Site Type	Monitoring	**Description**	https://www.excavations.ie/report/2015/Galway/0025288/
ITM	E 130470m, N 225129m	**Latitude/Longitude**	48.604816, -14.369403

County	Galway	**Site Name**	Rinville West
SMR No.	N/A	**Licence No.**	97E0351
Site Type	Environs of possible souterrain	**Description**	https://www.excavations.ie/report/1997/Galway/0002771/
ITM	E 535231m, N 722774m	**Latitude/Longitude**	53.251370, -8.970562

County	Galway	**Site Name**	St. Gobnet's Church, Inis Oírr.
SMR No.	N/A	**Licence No.**	-
Site Type	Church	**Description**	https://www.excavations.ie/report/1980-84/Galway/0000470/
ITM	E 497473m, N 702834m	**Latitude/Longitude**	53.066287, -9.529798

County	Galway	**Site Name**	Inis Oírr
SMR No.	N/A	**Licence No.**	09E0322
Site Type	Monitoring of water treatment plant development.	**Description**	https://www.excavations.ie/report/2011/Galway/0022384/

ITM	E 497964m, N 702364m	**Latitude/Longitude**	53.062159, -9.522327
County	Galway	**Site Name**	Kilronan Harbour, Kileany, Inis Mór
SMR No.	N/A	**Licence No.**	08E0546
Site Type	Dredging	**Description**	https://www.excavations.ie/report/2008/Galway/0019577/
ITM	E 488297m, N 709042m	**Latitude/Longitude**	53.120217, -9.668812

County	Clare	**Site Name**	St. Senan's Altar, Tullagher, Co. Clare
SMR No.	N./A	**Licence No.**	-
Site Type	Altar	**Description**	https://www.excavations.ie/report/1990/Clare/0000948/
ITM	E 492774m, N 661843m	**Latitude/Longitude**	52.6970, -9.586384

County	Clare	**Site Name**	Kilkee, Upper
SMR No.	56:35	**Licence No.**	04E0525
Site Type	Test Trenching	**Description**	https://www.excavations.ie/report/2004/Clare/0011294/
ITM	E 487364m, N 659998m	**Latitude/Longitude**	52.679415, -9.665754

County	Clare	**Site Name**	Blackweir Bridge, Doonbeg.
SMR No.	N/A	**Licence No.**	08D094, 08R310
Site Type	Underwater Survey/Dredging	**Description**	https://www.excavations.ie/report/2008/Clare/0019132/
ITM	E 731623m, N 750823m	**Latitude/Longitude**	53.346885, -6.260923

County	Clare	**Site Name**	Stand Line Road, Kilkee
SMR No.	N/A	**Licence No.**	15E0100
Site Type	Monitoring, Sea Wall remedial works	**Description**	https://www.excavations.ie/report/2015/Clare/0024059/
ITM	E 488666m, N 660220m	**Latitude/Longitude**	52.681683, -9.646580

County	Clare	**Site Name**	Doonbeg Golf Course, Carrowmore
SMR No.	N/A	**Licence No.**	00E0007
Site Type	Monitoring of ground works	**Description**	https://www.excavations.ie/report/2000/Clare/0004879/
ITM	E 503406m, N 681167m	**Latitude/Longitude**	52.872897, -9.434838

County	Clare	**Site Name**	Ballyvaghan
SMR No.	N/A	**Licence No.**	03E0212
Site Type	Test trenching at site of Visitor Centre	**Description**	https://www.excavations.ie/report/2000/Dublin/0005139/
ITM	E 523013m, N 707866m	**Latitude/Longitude**	53.115788, -9.150013