14. CULTURAL HERITAGE

14.1 Introduction

This section provides information on the archaeological interest present, or potentially present, in the area of the Corrib Field, and along the proposed route of the offshore pipeline. A number of public data sources have been researched and the geophysical and geotechnical data generated by Enterprise's marine contractors has also been studied. The Heritage Service, Dúchas, requires that an analysis of the data generated from such surveys be provided to them for their own assessment of the archaeological potential of an area which could be affected by a proposed development. The maritime archaeological assessment was carried out according to the specifications of Dúchas (desktop survey, site assessment and intertidal survey) by *Management for Archaeology Underwater* Ltd (MAU), under a Dúchas licence. The assessment has been submitted to Dúchas, and this section summarises its findings, the full report is included as **Appendix 14.1**. It should be noted that the report to Dúchas was submitted in 2000, since that time the alignment of the upstream crossing of the Sruwaddacon has changed slightly. The new alignment avoids the "second crossing/creek crossing" as described in the Dúchas report. The upstream crossing of the Sruwaddacon/Glenamoy river has also changed slightly, but the alignment to which the crossing has been moved was surveyed as part of the original field visit in 2000.

Relevant archaeological observations in the area of the landfall of the pipeline in Broadhaven Bay have also been incorporated into this section.

The section provides a list of the recorded maritime wrecks and reviews the data on sidescan charts. An assessment is then made of the potential for any previously unrecorded archaeological interest along the pipeline route. Areas to the east of Broadhaven, such as the Céide Fields, have recently proved that the area was occupied approximately 5,000 years ago. Artefacts were discovered in the Céide Fields beneath up to four metres of peat.

An assessment of the potential for archaeological impacts is provided, and recommendations are made for further archaeological investigations prior to the installation of the pipeline.

14.1.1 Legislative Requirements

The protection of the archaeological heritage in a maritime environment is legislated for in The European Convention on the Protection of the Archaeological Heritage (ratified) 1997, Environmental Impact Assessment Legislation 85/337/EC and 97/11/EC, National Monuments Act 1930-1994 (as amended) and the Foreshore Acts 1933 – 1998 (as amended). Under these Acts, all archaeological heritage is the property of the nation and the relevant state bodies licence intrusive and non-intrusive investigations.

The Department of the Marine and Natural Resources, Dúchas, the Heritage Service, and The National Museum of Ireland (N.M.I.) are the legislative bodies concerned with the protection of maritime archaeology in Ireland.

14.2 Study Methods

In accordance with the specifications of Dúchas, a desktop study and intertidal survey were a prerequisite of the archaeological assessment of the proposed works.

14.2.1 Desktop Survey

A comprehensive desktop survey of the proposed development zone was completed prior to a site inspection. The desktop survey consisted of:

- researching the background history and archaeology of the site;
- inspection of both the archives of the land based 'Sites and Monuments Record' and the 'Maritime Sites and Monuments Record';
- inspection of the topographical files of The National Museum of Ireland; and
- analysis of the relevant Ordnance Survey maps from the earliest available series.

The results of geophysical surveys conducted by Gardline Surveys Ltd. and Osiris Projects Ltd. were inspected for the presence of archaeological features and landscapes. The completed desktop survey provided an indication of the archaeological potential of the development site prior to the commencement of on site investigations.

14.2.2 Intertidal Survey

A detailed intertidal survey was conducted at the site of the initial submarine pipeline landfall and at two locations where the pipeline will be installed below the high water mark in Sruwaddacon Bay.

The survey was conducted at a period of low water during a spring tide, when the greatest area of foreshore is uncovered and available for survey. Site plans provided by the developer were used in conjunction with a global positioning system (GPS) to locate the crossing areas.

14.2.3 Geophysical Investigations

Gardline Surveys Ltd. conducted a geophysical survey of the proposed export pipeline route from the Corrib Field into Broadhaven Bay in 2000, from the *M/V Sea Profiler*. Osiris Surveys Ltd. had already undertaken a survey covering the area just outside Sruwaddacon Bay, where the *Sea Profiler* would not be able to access because of depth restrictions.

14.2.3.1 Sidescan Sonar

The sidescan sonar data from both surveys were studied from an archaeological perspective. The offshore area assessed consisted of two possible routes, extended from a point at the end of the deep-sea survey in Broadhaven Bay to a point beyond the 12 mile limit (distance from closest land). The survey data consisted of a centreline run along the proposed route of the pipeline and wing lines, spaced approximately seventy meters each side of the centre line. The inshore survey carried out by Osiris covered a continuous wider band of the pipeline route.

Data from the offshore survey shows that the seabed materials generally consist of rock and gravel with an overlying layer of sand. The records indicate that bottom currents are present in the area. In the inshore area there is a central strip of superficial sand extending from the mouth of the Sruwaddacon. The sand strip, which overlies gravel and bedded sediments, is flanked to the north and south by rock. The pipeline route as presently designed is aligned along the central sand strip. No archaeological features were revealed by either sidescan survey.

14.2.3.2 Magnetometer Survey

Magnetometer data from both the offshore and nearshore surveys consisted of a single scan along the centre line of the pipeline route, using a marine caesium magnetometer. There was virtually no background noise recorded during the magnetometer survey.

The records show continuous large fluctuations in the earth's magnetic field, which have been attributed to the regional geology-large basalt rock outcrops exist in the area. The presence of the basalt means that the results of the magnetometer survey are of limited value in discerning the existence, or not, of metal based archaeological material within the area of the proposed pipeline route.

14.2.3.3 Intrusive Sampling

During the Osiris survey eight cores and five grab samples were taken in the inner part of Broadhaven Bay, in order to aid the interpretation of the geophysical data, especially the sidescan and the sub-bottom profiling. A peat layer was recorded in core sample BHBV10. This layer lies directly under the surficial sands and is recorded as being 0.55 m thick. The peat layer was noted on the sub-bottom profiling records and is plotted on **Figure 14.1**. The grab samples produced grey and grey/brown fine to medium sand. The grab, which produced the grey/brown sample (BHBG3), was located close to where the sub-bottom records indicated the presence of a peat deposit and it is possible that the peat could have caused the brown colouration of the sand.

In view of this, it was decided to further interpret the sub-bottom profiling data in order to map this peat horizon, since it could possibly cover an old landscape (**Figure 14.1**). The results of this show that the peat deposit has

a triangular shape in plan. The apex is to the south-west where the peat is approximately 1.0 m below seabed. The top surface of the deposit dips to the north-east where it reaches a depth of approximately 4.0 m below seabed, with a lateral extent (NW-SE) of about 400 m. In the central part of the peat sub crop, the peat reflector is within 1.0 m of the seabed and appears to be intermittent, suggesting that some erosion has taken place. This buried peat layer will not be disturbed, as the pipeline route will be to its north.

14.3 Receiving Environment

14.3.1 Offshore

Outer Broadhaven Bay is a deep-water bay with water depths of 30-50m. It is a large exposed north-west facing bay that provides little shelter from prevailing winds. The bay is flanked to the west by Erris Head and to the north by Kidd Island.

Table 14.1 provides records of 25 vessels that the National Maritime Wreck Inventory lists as having been lost in and around Broadhaven Bay. The record does not provide accurate locations for the wrecks.

Table 14.1: National maritime wreck inventory records from the Broadhaven Bay area

Name	Date of Loss	Place of Loss	Type of Vessel
Albion	12/11/1847	Broadhaven Bay	Sailing Vessel
Alliance	15/10/1902	Inver	Schooner
Annie	14/1/1893	Broadhaven Bay	Brig
Ann Worthington	10/1841	Broadhaven Bay	Brig
Arab	18/12/1823	Broadhaven Bay	Brig
Unknown		Inver Point	
Unknown	1665	Inver Point	Dutch Brig
Unknown	1851	Broadhaven Bay	Schooner
Unknown	8/2/1822	Erris	Large Vessel
Unknown	1588	Kid Island	Armada Vessel
Three Brothers	22/3/1847	Broadhaven Bay	
Thetis	25/11/1819	Broadhaven Bay	
Sinai	1/1/1877	Inver	
Saint Anthony	27/5/1905	Brandy Point	Cutter
River Nith	1892	Broadhaven Bay	
Ranger	12/7/1847	Erris Head	Sailing Vessel
Rain	24/4/1770	Erris	
Mary	16/7/1853	Broadhaven Bay	
Magdala	14/4/1882	Broadhaven Bay	Brig
John Willey	10/2/1854	Broadhaven Bay	
First Come	16/10/1905	Broadhaven Bay	
Favourite	17/3/1807	Broadhaven Bay	
Emerald	12/1/1847	Broadhaven Bay	
City of Limerick	20/11/1850	Broadhaven Bay	Schooner
California	5/10/1853	Broadhaven Bay	Emigrant Ship

Brief details of each of these wrecks are provided within **Appendix 14.1**. The descriptions are taken from the National Maritime Wreck Inventory.

Two vessels are believed to have been wrecked close to the landfall site; the *Santiago* (noted in **Table 14.1** as *Unknown*, 1588) thought to have been a Spanish Armada vessel, and the *Zeepard*, a 400 tonne Dutch East India company vessel (noted in **Table 14.1** as *Unknown*, 1665, Dutch Brig).

14.3.2 Nearshore

Inner Broadhaven is a more sheltered bay, which is entered via a narrow inlet between Gubacashel Point and Brandy Point. Unlike the outer bay, inner Broadhaven provides safe anchorage in water depths of up to 6 m. Inner Broadhaven is navigable up to Belmullet providing tidal conditions are suitable.

14.3.3 Landfall

Sruwaddacon Bay is located in the parish of Kilcommon (the largest parish in Ireland) and the barony of Erris. The hinterland surrounding Sruwaddacon has been subject to human settlement and exploitation throughout prehistory and up to the present day. There are a number of promontory forts, court tombs, pre bog walls and habitation sites located close to the development zone.

To the north of the proposed landfall site is the settlement site of Curraunboy, recorded in the sites and monuments record. This site is presently covered by sand dunes (the dune area will not be encroached upon), but parts may be exposed following storms. The only remains visible are two large stone fences running into the sea, approximately 25 m apart. Caulfield (c. 1950) recorded that traces of cultivation were visible in the clay below the sand. The scant remains of a possible cairn were also recorded at the site and in his description Caulfield notes “heaps of stones in circular formations”. The cultivation marks recorded by Caulfield could indicate the presence of previous areas of cultivation below the high water mark. Such drowned landscapes have been found to the south-west of Broadhaven in Blacksod Bay. The national museum files list a number of archaeological finds in the historical townlands surrounding Broadhaven Bay; however, none of these were discovered in the zone below high water mark. Finds along the onshore section of pipeline route are discussed in the Corrib Pipeline Environmental Report (**Technical Appendix A**). It should be noted that the dune area would not be encroached upon during the construction works.

Dooncarton beach is a flat fine-grained sandy beach, flanked to the south by sharp clay sea cliffs and to the north by the entrance to Sruwaddacon Bay. A small storm beach of water-rolled stones delineates the upper foreshore of the beach and above the high water mark are high sand dunes which merge with the surrounding land. A thorough visual inspection revealed no archaeological features or artefacts in this area. The foreshore immediately to the south of the beach is composed entirely of natural bedrock banked by sheer clay cliffs. The lower foreshore, through which the pipeline will be installed, consists of sand overlaying natural bedrock, which lies close to the

surface and is exposed in places. A thorough visual inspection revealed no archaeological features or artefacts in this area.

Immediately north-west of the landfall site the lower foreshore is composed of kelp covered, medium-sized water-rolled stones overlying the beach sands. No archaeology was noted in this area but it is an area of possible archaeological potential based on the location of the wreck of Dutch East Indiaman the *Zeepard*, the wreck of the Spanish Armada vessel, the *Santiago* and the potential for submerged fields recorded by Caulfield (c. 1950).

14.3.4 Sruwaddacon

14.3.4.1 Downstream Crossing of the Sruwaddacon

Across the sand dunes from the initial landfall site, on the eastern side of the beach, the proposed pipeline will cross Sruwaddacon Bay. Here the pipeline will traverse a shallow sandy tidal pool, continue across the entrance to the bay and land at Rossport/Rosdoagh.

This area of beach is composed of fine-grained sand. A tidal pool to the south, which empties at low water to expose a flat sandy base, will then be traversed. From here, the proposed pipeline route runs up onto the lower foreshore of the beach. It comprises almost exclusively irregular shaped medium-sized rocks overlying sand. The proposed route then descends into the water and crosses the fast flowing approach channel to the Bay. No archaeological features or artefacts were noted in this area.

On the opposite side, at Rossport/Rosdoagh the foreshore is composed of sloping jagged kelp-covered rock bounded by sheer clay banks. Dangerous tidal currents and the jagged rock composition make exploitation of the intertidal zone in this area difficult. No archaeology was noted in the foreshore or the sea banks in this area.

14.3.4.2 Upstream Crossing of the Sruwaddacon

The Muingnabo and Glenamoy rivers enter the eastern end of Sruwaddacon Bay. The proposed pipeline route crosses these rivers as they enter the bay as one water body. This area is largely influenced by tidal actions and a large sandy intertidal zone is visible at low tide.

The southern shoreline at the crossing point consists of fine sand / gravel seabed extending to rocky subsoil, with some areas having a light grass covering. The upper foreshore on the southern side comprises steeply sloping highly vegetated peaty scrubland.

The northern shoreline also consists of fine sand / gravel seabed, extending to a narrow, level marshy foreshore. The upper foreshore on the northern side of the Bay comprises vertical peat banks which have been eroded by the forces of wind and tide. The land above the peat banks is densely planted with softwood deciduous trees.

A thorough visual inspection of the southern and northern foreshores revealed no archaeological features or artefacts within the zone to be impacted by the pipeline route.

14.4 Characteristics of the Proposed Development

14.4.1 Construction and Operation

The proposed offshore development will involve the construction and installation of approximately 84 km of pipeline and umbilical between Dooncarton landfall (Co. Mayo) and the Corrib Field, along with a shorter nearshore length of outfall pipeline.

The work includes the drilling of three additional development wells and re-entry and completion of the five appraisal wells in the Corrib Gas Field from a semi-submersible drilling rig. A 20" gas pipeline will then be constructed from the Corrib Field to the onshore Terminal and well operations will be controlled from the Terminal by an integrated electro-hydraulic control umbilical, which will lie alongside the export pipeline in a trench on the seabed.

In addition to the above, a produced water discharge pipe will be laid in Broadhaven Bay from the Terminal site. This will be installed at the same time, and in the same trench, as the gas pipeline. It is likely that the discharge pipeline will be "piggy-backed" onto the larger gas pipeline in order to assist in the construction.

Further details of the construction and operation of the proposed scheme are provided in **Section 3**.

14.5 Potential Impact of the Proposed Development

Comprehensive developments that involve considerable excavation can disturb or even remove items of historical, cultural and archaeological interest.

The hinterland surrounding the proposed landfall area has been subject to human settlement and exploitation throughout prehistory and up to the present day. There are several visible remains of this exploitation of the landscape throughout the area and the National Maritime Wreck Inventory lists a number of vessels as having been wrecked in the bay. No listed archaeological site or upstanding monument will be impacted by the proposed pipeline installation, and no archaeological features were identified in the desk study, site visit, sidescan or magnetometer records. However, the sites of two wrecks, the *Zeepard* (1665) and the *Santiago* (1588) could possibly be located in the vicinity of the landfall site, although the wreck inventory does not give precise locations for these wrecks.

Core samples and sub-bottom profiling indicate the presence of a peat layer within the Bay, which may be a continuation of, or similar to, that recorded

by Caulfield (c. 1950). The proposed pipeline route will pass to the north of this area and therefore, no impacts upon the peat layer are expected.

14.6 Do-Nothing Scenario

If the development did not proceed, there would be no effect on the potential archaeology of the area.

14.7 Mitigation Measures

There are no known archaeological sites, features or finds affected by the proposed offshore development. Mitigation will take the form of a pre-dredging archaeological survey and archaeological monitoring during dredging and or excavation procedures.

The pre-dredging archaeological survey will consist of a deep seeking metal detection survey conducted along the pipeline route centreline. The survey will be conducted from the landfall high water line to the point at which offshore vessels will commence trenching the pipeline.

14.8 Predicted Impact of the Proposed Development

To date no archaeological deposits, finds or features have been revealed as a result of the archaeological desktop assessment, intertidal survey and geophysical investigations. Based on these investigations it is anticipated that there will be no impact upon archaeology. However, due to the buried and invisible nature of archaeological remains there is always the possibility that previously unknown archaeological remains could be encountered during construction.

14.9 Monitoring

Archaeological monitoring will be undertaken during dredging and / or excavation procedures. The procedures for the protection of archaeology will be decided in conjunction with the Department of the Marine and Natural Resources and Dúchas but will include:

- a communication procedure to control dredging operations in the advent of archaeology being discovered;
- a procedure for the integration of an archaeological inspection team into day to day dredging operations;
- a procedure to monitor the dredging process for indications of archaeology;
- a geophysical inspection procedure designed to locate archaeology;
- a procedure for the underwater inspection and documentation of archaeology;

- a procedure for the retrieval and protection of archaeology located; and
- a procedure for the reinstatement of archaeological sites impacted.

14.10 Reinstatement and Residual Effects

There will be no residual effects in relation to archaeology.