10.0 CULTURAL HERITAGE

This chapter of the Environmental Impact Assessment addresses the potential impact on the terrestrial, intertidal and subtidal cultural heritage within the area of the proposed gas storage facilities.

10.1 Terrestrial and Intertidal Archaeology

Please note that all Figures and Plates referred to within this section are located at the end of the Chapter.

10.1.1 Methodology for establishing baseline conditions

This assessment has been undertaken in accordance with the Institute of Field Archaeologists (IFA) *Standards and Guidance for Archaeological Desk Based Assessment* (1999) and DoENI Northern Ireland Environment Agency:Built Heritage (NIEA:Built Heritage) guidelines. Following the recommendations given in these, Cultural Heritage in relation to this chapter, is taken as sites or other remains of archaeological interest, historic buildings (as identified in the Historic Buildings database maintained by NIEA Historic Buildings), industrial heritage (as identified in the Industrial Heritage Record database also maintained by NIEA:Built Heritage), Defence Heritage sites (as identified in the Defence Heritage Project as maintained by NIEA:Built Heritage) and landscapes of historic and archaeological interest.

To this end, relevant sources were examined and studied for their direct relationship to the proposed scheme. These sources included:

- Northern Ireland Sites and Monuments Record (NISMR) held by NIEA:Built Heritage ;
- Historic Buildings database held by NIEA:Built Heritage;
- Industrial Heritage Record (IHR) held by NIEA:Built Heritage;
- Historic Parks and Gardens Register maintained by NIEA:Built Heritage
- Battle Sites Register maintained by NIEA:Built Heritage
- Defence Heritage Record (DHP) maintained by NIEA:Built Heritage
- Shipwreck Index as maintained by www.irishwrecksonline.net
- Aerial Photographs as held by Ordnance Survey Northern Ireland
- Historic maps and plans held by NIEA:Built Heritage;
- Historic maps, plans and documents held by the Public Record Office Northern Ireland (PRONI);
- Ordnance Survey maps;
- Topographic records held by Ulster Museum;
- Published archaeological books and journals;
- Unpublished reports held by NIEA:Built Heritage and elsewhere;
- A walk-over study of the proposed pipeline route including the locations of structures, construction compounds and access roads. The intertidal areas associated with the seawater intake and proposed brine outfall was also examined.

10.1.2 Baseline Conditions

10.1.2.1 Sites and Monuments Record

Examination of the Sites and Monuments Record revealed 14 recorded archaeological sites within a 1km wide search corridor extending from the centre line of the pipelines (Fig. 10.1). Additionally, there are a further two recorded sites lying just outside the search corridor.

As outlined in Chapter 4, the proposed pipeline will run southwest from Castle Robin on the northeast coast of Islandmagee to the main gas processing facilities at Ballylumford before turning ninety degrees to run southeast for 750m to the wellsite. Given this, discussion of the recorded archaeology will start at the Castle Robin site where the proposed seawater intake and brine outfall pipes will be located.

The first recorded site is located approximately 620m from the northeast end of the proposed pipeline. This site is a heavy anti-aircraft battery (ANT 041:050) which is located approximately 60m to the northwest of the proposed pipeline. It consists of concrete gun bases and an accommodation building which are in good condition. The site is also listed on the Defence Heritage Project as DHP No.86. NIEA:Built Heritage has awarded the site scheduled protected status. The scheduled protected area around the concrete gun bases is a rectangular area measuring 125m northwest to southeast by 95m southwest to northeast (Fig 10.2). The proposed pipeline will pass within 20m of the scheduled area but will not impact directly upon it.

The next recorded site is a settlement site (ANT 041:033) which is located approximately 1170m along and 300m to the northwest of the pipeline. This site was located on the southeast edge of a farm which is located on a height overlooking the sheltered beach at Brown's Bay to the northwest. In 1927 Donaldson reported a shell midden in the area suggesting prehistoric activity. Later, in the early 1950's, three practically complete skeletons with the remains of four other burials, were uncovered in the course of digging foundations for a new silo. The site was archaeologically excavated in 1952 (NISMR) and was found to be an Early Christian settlement with a later graveyard. One of the artefacts uncovered was an enamelled bronze buckle. No archaeological features or human remains have been uncovered at the site since.

The next recorded site is a Holy Well (ANT 041:043) which is located approximately 1430m along and 220m to the southeast of the proposed pipeline. The Holy Well was recorded by Donaldson (*ibid*) as a spring well, triangular in shape and known locally as The Chapel Well and he also stated that human remains had been uncovered from the surrounding area. Donaldson stated that the well was located at Browns Bay though its exact location is currently unknown.

NIEA:Built Heritage has surmised that the Holy Well (ANT 041:043) may have been related to Early Christian period settlement (ANT 041:033) located at Browns Bay Farm and discussed above. This would suggest that the location of the Holy Well (ANT 041:043) should actually be further to the north-northwest in the immediate vicinity of the settlement site (ANT 041:033).

A cluster of prehistoric sites are located approximately 2580m along the proposed pipeline and include a megalithic tomb (ANT 041:007), a standing stone (ANT 041:009) and four findspots (ANT 041:030-2, 006). The megalithic tomb (ANT 041:007) is the main site within this cluster and is located in front of an Edwardian house set on a steep north-south orientated ridge approximately 120m to the southeast of the pipeline.

The megalithic tomb (ANT 041:007) dates to the Neolithic period and consists of three angular basalt orthostats supporting a large capstone which tilts down to the distal end while a recumbent slab is located within the chamber. The Edwardian house, known as Druid's Cottage, is located immediately to the west of the chambered grave though the site appears undisturbed by the construction of this building. However, the Ordnance Survey Memoirs (1840) recorded that stone amulets had been uncovered in the area. These amulets were circular, varying in diameter between 0.02m to 0.05m and flat on both sides.

The Memoirs reported that one of these amulets had been found three feet (0.90m) beneath the *cromlech* (megalithic tomb). This suggests that the area under the chambered grave was disturbed during the early 19th century. The chambered grave has been taken into State Care. An archaeological evaluation took place in advance of development on a site to the north of the chambered grave in 2007. This evaluation consisted of two trenches excavated across the development site. Nothing of archaeological significance was uncovered.

A findspot (ANT 041:030) is located approximately 50m to the west of the megalithic tomb (ANT 041:007) and approximately 60m southeast of the pipeline. A ribbon torque was found in 1817 and several parts of a torque were found a few years later. These artefacts were all uncovered a few inches from the surface during ploughing in 1817 and a few years later according to the Ordnance Survey Memoirs (1840). The torques were both uncovered in an area known locally as the Golden Field which has a very steep slope. This field adjoins the field where the megalithic tomb (ANT 041:007) is located

An NIEA:Built Heritage field surveyor estimated that this field was probably too steep to be ploughed by a tractor. This would have helped protect any further artefacts that may exist. It should be noted that the NISMR report states that the Golden Field is located to the east of the megalithic tomb (ANT 041:007) whereas the map location lies to the west. Given this, it is possible that the findspot (ANT 041:030) is actually located further away from the proposed pipeline. An archaeological evaluation took place close to this area in 2000. However, nothing of archaeological significance was uncovered.

Another findspot (ANT 041:032) was located approximately 150m to the east of the megalithic tomb (ANT 041:007) and 200m southeast of the proposed pipeline. This consisted of a gold armlet or bracelet which was recovered in 1822 according to the Ordnance Survey Memoirs (1840). This object was apparently recovered from the Golden Field which, as mentioned previously, is located to the east of the megalithic tomb (ANT 041:007) and has a very steep slope which is unlikely to have been ploughed by tractor.

A third findspot (ANT 041:031) is located to the southwest of the previous sites. This site is located directly to the southeast approximately 2780m along the pipeline. The find consisted

of several gold ornaments which were uncovered in 1824 within 137m of the megalithic tomb (ANT 041:007) according to the Ordnance Survey Memoirs (1840). These gold ornaments consisted of 30-40 ounces of gold strips measuring 13mm broad and 1.5mm thick.

A fourth findspot (ANT 041:006) is located 500m to the southeast and 2330m along the proposed pipeline. This site, which was reported by O'Laverty (1884), consisted of urn burials. It is not known locally and remains unlocated. O'Laverty stated that several richly ornamented urns were uncovered approximately 280m east of the megalithic tomb (ANT 041:007). These urns contained dust and very small fragments of bone.

The last recorded site within the cluster is a standing stone (ANT 041:009) which is located approximately 200m to the southeast and 2.7km along the proposed pipeline. There are no visible remains of this site which was recorded in the Ordnance Survey Memoirs (1840) as being one of three stones (ANT 041:009-11) that stood in a line running southeast between the megalithic tomb (ANT 041:007) and a mound (ANT 041:012). Only two of these stones (ANT 041:009 & 011) were extant at the time of the Ordnance Survey Memoirs though the third (ANT 041:010) had been removed within living memory. The standing stone (ANT 041:009) was marked on the Second Edition Ordnance Survey map sheet (1857)

Another standing stone (ANT 041:010) is located approximately 200m to the northeast and 3.4km along the proposed pipeline. As mentioned previously, this site was originally one of three stones which ran in a line between the megalithic tomb (ANT 041:007) and the mound (ANT 041:012). This site (ANT 041:010) was the middle stone in the alignment and had been removed by the time of the Ordnance Survey Memoirs (1840). The exact former location of this site is unknown and NIEA:Built Heritage has given it a general location approximately midway between the megalithic tomb (ANT 041:007) and mound (ANT 041:0012).

An occupation site (ANT 041:045) is located immediately to the south, 3440m along the proposed pipeline. This site was uncovered during archaeological work which took place in 1996 in association with the construction of the Phoenix Gas Belfast Transmission pipeline (Crothers, 1996). Multi-phase settlement activity was uncovered ranging from the Late Mesolithic to the Late Bronze Age.

Features dating to the Late Mesolithic period included chipping floors used for producing flint, a possible hut site, a possible hearth and several pits. Artefacts recovered associated with this phase included mudstone axes, butt-trimmed flints, single platform cores, finely retouched blades and hammerstones. The Mesolithic site was overlain with features dating to the Bronze Age. These included a sub-circular gully, two burnt mounds and a trough and two arcs of kerb stones. Artefacts associated with this layer included flint artefacts, saddle querns and several sherds of Late Bronze Age pottery. Several flints and pot sherds dating to the Neolithic period were also recovered though no trace of associated occupation was uncovered. This area has now been reinstated into agricultural ground.

The remaining recorded sites within the study area, are located to the southeast of the well pad and access road which form the southeast extent of the proposed pipeline. The closest of these is the standing stone (ANT 041:011) which is one of the three sites mentioned by

the Ordnance Survey Memoirs (1840) as forming an alignment between the megalithic tomb (ANT 041:007) and the mound (ANT 041:012). The standing stone (ANT 041:011) was the closest stone to the mound (ANT 041:012) in this alignment. However, it was not marked on any edition Ordnance Survey map sheet and a site visit by NIEA:Built Heritage found that it had not been standing during the lifetime of the oldest resident in the townland of Ballydown. Given this, NIEA:Built Heritage has given the site a general location towards the southeast end of the alignment.

An ecclesiastical site (ANT 041:008) is located approximately 190m to the southeast of the proposed location of the well pad. This church site was reported by Reeves in 1847 though there are now no visible remains and an NIEA:Built Heritage site visit found that the oldest inhabitant within the townland of Ballydown had no memory of the site. The church remains unlocated.

The next recorded site is located approximately 350m to the southeast of the proposed well pad. This site is the mound (ANT 041:012) which was mentioned previously in relation to the megalithic tomb (ANT 041:007) and the standing stones (ANT 041:009-11). It consists of an earth and stone mound measuring 4.4m high, 18m in diameter at the base and convex at the top. The mound is located in an overgrown garden and is covered in long grass and nettles.

The Ordnance Survey Memoirs (1840) recorded the mound as being 58ft (17m) in diameter at the base, 14ft (4.26m) at the summit and 16ft (4.87m) high. There were no signs of an enclosing ditch or bank. The site is labelled as a motte on Ordnance Survey Map sheets though Dr McNeill from Queens University of Belfast Archaeology Department has rejected the site as such due to its rounded profile (McNeill, 1975). However, NIEA:Built Heritage surmise that the site may have been much altered in the past and is located in a good strategic location for a motte.

As mentioned previously, the Ordnance Survey Memoirs (1840) stated that a line of standing stones (ANT 041:009-11) ran between this site and the megalithic tomb (ANT 041:007). This suggests that the mound (ANT 041:012) is a prehistoric site. However, there is the possibility that it could have been reused as a motte during the medieval period. NIEA:Built Heritage has awarded the site scheduled protected status.

An occupation site (ANT 041:046) is located approximately 80m to the southwest of the previous site and 320m to the southeast of the well pad. As with the occupation site (ANT 041:045), this site was uncovered during archaeological monitoring of topsoil stripping along the line of the Phoenix Gas Belfast Transmission Pipeline with a substantial linear spread measuring 26m long by 3m wide uncovered (Crothers, 1996). Excavation revealed this spread to be the upper fill of a large U-shaped ditch dating to the medieval period. No artefacts were recovered from the ditch. Several gullies and a sub-circular enclosure 10m in diameter were also uncovered within the area enclosed by the ditch.

The last recorded site within the study area is located to the east of the well pad and access road and lies just outside the 1km wide search corridor. This site (ANT 041:035) was identified from an aerial photograph where it appeared as an arc of an oval cropmark sitting

astride a long ridge. It measures 90m by 40m and is cut by a road which runs northeast to southwest. A subsequent site visit by NIEA:Built Heritage found that there are no visible traces of this site on the ground.

10.1.2.2 Industrial Heritage Sites

There is one recorded Industrial Heritage sites within a 1km wide search corridor extending from the centre line of the proposed pipeline with an additional seven sites located within the vicinity (Fig 10.3). The site located within the search corridor is a landing place (IHR 06987:000:00) which is located approximately 160m to the southwest and 2830m along the proposed pipeline. The landing place was associated with a limestone quarry on the coast and was first shown on the Second Edition Ordnance Survey map sheet (1857). It was not shown on the subsequent 1905 edition map sheet but was marked again on the 1932 edition map sheet.

The remaining seven sites are all located to the north of the pipeline. Given the proximity of the pipeline to the coast, it is not surprising that these sites are all maritime related. The closest of these to the pipeline is a pier (IHR 06986:000:00) which is located approximately 800m to the northwest of the proposed pipeline. This pier was related to a ferry service which ran between Larne and Ballylumford. It was marked on the First Edition Ordnance Survey map sheet (1834) but was not shown on the subsequent 1857 edition map sheet. It was marked as a pier associated with the south ferry on the 1905 edition map sheet and was just shown as a pier on the 1932 map edition.

The next Industrial Heritage site is located approximately 700m to the northwest of the proposed pipeline. This site was also a pier (IHR 06985:000:00) associated with a ferry from Larne. It was marked as such on all map editions from 1834 onwards with the 1905 and 1932 edition map sheets marking the pier as associated with the north ferry.

Approximately 1220m to the northwest of the proposed pipeline is a quay (IHR 06984:000:00) which was first marked on the 1932 edition map sheet while 150m to the north of this site is Ferris Point Lighthouse (IHR 06983:000:00). This lighthouse was first marked on the Second Edition Ordnance Survey map sheet (1857). It was shown on all subsequent map sheets and identified as showing a fixed red light.

The remaining three Industrial Heritage sites are located to the northwest of the proposed pipeline on the headland running northwest to Barr's Point. The closest of these to the proposed pipeline is the boat harbour at Port Narrow (IHR 06988:000:00) which is located approximately 1450m away. This boat harbour was first marked on the First Edition Ordnance Survey sheet (1834) and is shown on all subsequent map sheets. An associated pier was shown from 1905 onwards.

Another port (IHR 07007:000:00) is located approximately 500m to the northwest of the previous site. This site is known locally as Englishman's Port and was marked as such on Ordnance Survey map sheets from 1857 onwards. The last Industrial Heritage site is an electric fog bell (IHR 06982:000:00) which is located on Barr's Point approximately 1.5km to

the northwest of the proposed pipeline. The electric fog bell was first shown on the 1932 edition Ordnance Survey map sheet.

10.1.2.3 Historic Buildings

Examination of the Historic Buildings database revealed that here are two Historic Buildings within the 1km search corridor along the line of the proposed pipeline (Fig 10.4). Neither of these sites will be directly affected by the development. The first Historic Building is Inisreen (HB 06/04/026) which is located on Brown's Bay Road approximately 260m to the northwest and 920m along the proposed pipeline.

This house was built in 1905 for Mr. E. C. Smith to the designs of the architect Thomas.J.Houston. It consists of a two storey house of asymmetrical plan and constructed with concrete blocks in imitation of stonework. The house has a hipped roof with Westmoreland green slates and red terracotta ridge tiles. NIEA:Historic Buildings consider Inisreen to be a good example of domestic work that displays an interesting array of details including original interior features. It is also important as it was designed by Thomas Houston who was an important specialist at the time. Inisreen has been awarded Grade B1 listed protected status.

The other Historic Building is Druid's Cottage (HB 06/04/015) which is located adjacent to the megalithic tomb (ANT 041:007) approximately 120m to the southeast and 2580m along the proposed pipeline. It is a two-storey house with rendered walls, a gabled roof and one and half storey entrance porch. Druid's Cottage was built between 1857 and 1883 incorporating an earlier building which stood to the northwest of the chambered grave. The house stands to the northeast of the state care monument and was renovated during the early 1900s. The north wing, consisting of the former house, was removed prior to 1921 and the present return to the south, was constructed sometime between 1903 and 1921.

NIEA:Historic Buildings considers Druid's Cottage to be an example of a mid Victorian house which retains most of its original appearance but is mainly distinguished by its close juxtaposition with the megalithic tomb (ANT 041:007) for whose rugged appearance it provides a genteel backdrop. The house has been awarded Grade B1 listed protected status.

10.1.2.4 Defence Heritage Project

There is one Defence Heritage Project site within the 1km wide corridor along the proposed pipeline (Fig 10.5). This is the heavy anti-aircraft battery (DHP No. 86) which has already been discussed in relation to the NISMR site (ANT 041:050). The proposed pipeline will pass within 60m of the former anti-aircraft battery though will not impact upon it.

10.1.2.5 Shipwrecks

There are three shipwrecks recorded within the area of the seawater intake and brine outfall (Fig 10.6). The closest of these is the S.S. *Ailsa* which is located approximately 150m to the southeast of the brine outfall. This vessel was an iron Steamer Coaster built in 1867 by Blackwood and Gordon in Glasgow and originally named *The Rose*. It measured 54.99m long, 4.16m wide by 7.36m high and weighed 185 net tons.

The S.S. *Ailsa* was owned by the Ayr Steam Shipping Company and was bound from Ayr to Belfast with a general cargo and one passenger when it ran aground 1.2 miles north of Portmuck on the 26th February 1892. The wreck now lies in 5m of water and part of the hull is still visible above the high water mark.

The next closest wreck is the S.V. *Berbice* which is located approximately 500m to the northwest of the seawater intake. This wreck was a four masted square rigger which was bound from Greenock to Havana with a cargo of coal. The ship was swept into Brown's Bay during a gale on New Year's Day 1827 and broke up several days later. The remains of this ship are scattered though a large anchor is located on the southwest side of Brown's Bay. The charted depth of these remains is 5m. The description of this shipwreck suggests that it actually lies in Brown's Bay which is approximately 920m to the west-southwest of the seawater intake.

The last known shipwreck within the vicinity is the S.S. *Peridot* which is located approximately 900m to the northwest of the seawater intake at Skernaghan Point. This steam coaster was built by J. Fullerton & Co of Paisley in 1890 and was powered by a two cylinder compound engine. The ship was 39.67m long, 2.92m wide and 6.01m high. It was owned by W. Robertson of Glasgow and had delivered a cargo of coal from Irvine and was heading for Portmuck to load limestone when a gale forced it to make for Larne Lough on the 25th November 1905. The S.S. *Peridot* ran aground on Skernaghan Point with the loss of all nine of her crew.

The wreck is badly broken up and lies in 10m of water with the bow section located southwest of Skernaghan Point and the stern section to the east. The wreck still stands to a height of 3m in parts including the boiler which is located just below the surface.

10.1.2.6 Previous Archaeological Investigations

As mentioned, five archaeological investigations have taken place within the study corridor along the pipe line. The first of these took place in 1952 in relation to the settlement site (ANT 041:033). Then two more (Crothers, 1996) (ANT 041:045 & 46) took place in 1996 and related to the Phoenix Gas Belfast Transmission Pipeline. The route of this pipeline can be seen on Fig. 10.1. Another took place in 2000 (Halpin, 2001) close to the location of the findspot (ANT 041:031) while the last took place in 2007 (CAF, 2007) and related to a site close to the megalithic tomb (ANT 041:007).

The Scotland to Northern Ireland pipeline runs southwest from Castle Robin to Ballylumford Power Station. The route of this pipeline can be seen in Fig 10.1. Archaeological monitoring was carried out during groundworks associated with this pipeline in 1995 including the construction of an access road between Browns Bay and Castle Robin (Duffy, 1996). Six small circular patches of charcoal, flint and clay were uncovered during topsoil stripping. These ranged in diameter between 0.15m to 0.5m and in depth between 0.05m to 0.1m. Remnants of flint working were recovered from these pits as was one complete blade. The features were covered in terram and preserved *in situ*. Worked flints were also recovered from the stripped ground surface. These flints were Mesolithic/Neolithic in date.

Features uncovered during monitoring of the 3.6km long main line of the pipeline in Ballylumford and Ballycronan included two burnt mounds, a clay lined trough and a pit (Duffy, 1996). The first burnt mound was uncovered in a waterlogged area at the base of Ballylumford Hill. It consisted of a spread measuring 17m long east to west and 4.5m at its widest point. The spread was 0.12m thick. No associated features were uncovered. The clay lined trough measured 1.75m by 1.1m and 0.4m deep. It was filled with dark grey sandy clay with charcoal lumps and burnt stones. The pit was uncovered at the north end of the trough. This was sub-circular 2.2m long, 1.5m wide and 0.6m deep. It was flat bottomed and also contained dark grey sandy clay with charcoal lumps and burnt stones

A semicircular strip of burnt mound material was uncovered to the south and east of the trough and pit. This material was 1.8m long, between 1m and 1.5m wide and 0.03m deep. In addition to the archaeological features, 325 pieces of worked flint were recovered from the 3.6km long stripped area. Collecting all worked flint was deemed impractical during the monitoring so a 3m wide strip was field walked along the entire construction area thereby giving a 10% sample of the total amount of lithics present. These flints were catalogued by the field from which they were recovered.

In 1997 an archaeological evaluation was carried out in advance of the construction of an electricity sub-station by Northern Ireland Electricity on a west facing hillside in Ballycronan More (Neighbour, 1997). A ditch of unknown date was located during testing though no other features were uncovered. A large number of worked flints were also recovered from the area. In 2000, a Bronze Age house was uncovered during work in the townland of Ballyprior Beg (Suddeby, 2001) while work at Ballylumford Powerstation between 2000 and 2001 revealed burnt spreads (Halpin, 2001). Three sites were uncovered during this work including two burnt spreads with several small features, a curvilinear stone-filled slot in association with a small slot containing a Bronze Age pottery urn while the last site was a shallow curvilinear slot and contained a sherd of post-medieval pottery.

A further archaeological investigation took place in advance of development at Ballylumford Power Station in 2000 (Long, 2001). This investigation uncovered nothing of archaeological significance.

10.1.2.7 Ulster Museum Topographical Records

It is known that archaeological artefacts have been recovered from the area of the proposed pipeline including several items made of gold recovered during the early 19th century. The Ordnance Survey Memoirs (1839) also referred to Bronze weapons being recovered including spears and dirks. Items resembling small battleaxes were also recovered as were many silver coins dating to the medieval period. These included coins from the reigns of Edward I, Henry II, Richard III, David Bruce and Robert Bruce.

Monitoring of groundworks associated with the aforementioned pipelines recovered a large number of flints so it is no surprise that the Ulster Museum has record of large numbers of flints recovered from the townlands of Ballylumford and Ballyprior Beg. These flints include a range of implements as well as cores and flakes.

10.1.2.8 Historic Cartographical Evidence

A number of historical cartographical sources relating to the area of the proposed pipeline were examined at the Public Record Office Northern Ireland. These included:

- 1570 Map of Belfast Lough showing North Down by Robert Lythe (PRONI Ref: T/1493/41)
- 1580 Map of east coast of Ireland from Dublin to Larne, County Antrim (PRONI Ref: T/1493/44)
- Map of North Antrim Coast (T/1493/5)
- 1602 Map of province of Ulster including County Antrim by Barthlet (PRONI Ref: T/2543/1)
- 1680 Map of the island of Maghe, the river of Belfast, Carrickfergus and the coast as far as the Capelan Islands (PRONI Ref T/2528/15A)
- 1654 Petty's Downe Survey maps for parishes in County Antrim (PRONI Ref: D/597/1/1-20)

The majority of these maps showed little detail regarding Islandmagee. However, Lythe's map of Belfast Lough (PRONI Ref: T/1493/41) drawn in 1570 is of interest (Fig 10.7). Few details were shown on Islandmagee though the importance of Larne Lough as a harbour was emphasised by the number of ships shown within it. Larne Lough was used as an anchorage by the Royal Navy and was originally known as Olderfleet.

Lythe's map showed a triangular feature towards the northwest corner of Islandmagee at Ballylumford. Detail of this feature is indistinct but it appeared to be a building resembling an artillery fort with a bastion at each corner as would have been contemporary at the time. This artillery fort would have protected the mouth of Larne Lough and any ships sheltered within.

The map of the east coast of Ireland from Dublin to Larne, County Antrim (PRONI Ref: T/1493/44) was drawn ten years later in 1580. This map was drawn at a large scale and only contained general details. However, a feature was marked at the northwest corner of Islandmagee opposite Olderfleet. This feature appeared to be marked in a convention used to denote other fortifications on the map. This suggests that a fortification was possibly located on the coast at Ballylumford. However, there are no records of such a site at this location and it is, therefore, uncertain that one existed. The structure marked was shown towards the northwest corner and it is likely that, if it did exist, its remains have been destroyed by subsequent development.

The First Edition Ordnance Survey map sheet (1834) showed the area of the proposed pipeline during the first half of the 19th century (Fig 10.8). The area appeared sparsely populated at this time with the main roads shown being Browns Bay Road and Mill Bay Road. Neither of these roads was identified. The townlands were clearly shown as long, linear areas orientated northwest to southeast.

Few topographic details were marked on this map and no field layouts were depicted. The pipeline started to the northeast at Castle Robin Bay. The shoreline along the east coast of Islandmagee was shown as rocky and inaccessible including Castle Robin Bay which was

shown as an unidentified curving area of the rocky shore. It did not appear to be a suitable landing place.

The route of the pipeline continued southwest crossing several farm lanes and the Brown's Bay Road before crossing an area of rough ground that ran southeast from Brown's Bay. Two other areas of rough ground were visible to the southwest in the townland of Ballylumford and the pipeline passed through both of these before crossing the Mill Bay Road and turning to run southeast through a limestone quarry located on the coast. The only archaeological features marked on this map sheet were the megalithic tomb (ANT 041:007) which was identified as a *Druid's Altar* and the mound (ANT 041:012) which was marked as a *Moat*. The only Industrial Heritage site shown was the boat harbour (IHR 06988:000:00) at Brown's Bay.

The Second Edition Ordnance Survey map sheet (1857) showed the area of the proposed pipeline 23 years later (Fig 10.9). The area was shown in much better definition with the field layouts shown. The route of the pipeline ran through several very large fields in its central section, with the fields to the northeast and southwest much smaller. All of these fields had regular linear boundaries that did not appear to deviate around topographical or possible archaeological features.

Topographical features were shown in better definition on this map edition. Castle Robin Bay was shown as a triangular area set within the rocky shoreline. It was not identified and appeared to have large rocks located immediately offshore. These would have hindered its use as a harbour. The areas of rough ground were still shown and a large stream was now shown running northwest to southeast through the townland of Ballycronin Beg. The pipeline ran across this stream.

The limestone quarry was still shown but not labelled towards the southeast end of the pipeline. This suggested that it may have gone out of use by that stage. The landing place (IHR 06987:000:00) was identified to the northwest of the quarry and it is likely that the two features were related. The boat harbour (IHR 06988:000:00) was now labelled Port Narrow and Englishman's Port (IHR 07007:000:00) was shown to the northwest.

The chambered grave (ANT 041:007) was still marked as a *Druid's Altar* and Druid's Cottage (HB 06/04/015) had been built beside it. The standing stone (ANT 041:009) was also marked to the southeast of the megalithic tomb (ANT 041:007). There were no signs of the other two standing stones (ANT 041:010 & 011) which formed the supposed alignment. The mound (ANT 041:012) was still marked as a *Moat*.

The 1932 edition Ordnance Survey map sheet showed the layout of the proposed pipeline towards the middle of the 20th century (Fig 10.10). This map sheet showed the area in good definition. The start of the proposed pipeline was now identified as *Castle Robin or Peat Stack*. The shoreline was still shown as rocky with several rocks in the bay. The bay appeared to be set in a triangular area which was bounded to the south by steep cliffs.

The proposed pipeline still ran across large fields which did not show any signs of possible archaeological features. These fields appeared to be pasture though the rough ground was still indicated towards in the middle and towards the southwest of the pipeline. The large stream was also shown and contour lines were marked giving an indication of the local terrain, which consists of several areas of high ground orientated northwest to southeast. These areas of high ground corresponded with the orientation of the townlands which suggested that the terrain had influenced the layout of these land divisions.

The limestone quarry was not marked at the southwest end of the proposed pipeline though an area of rough ground was depicted. The landing place (IHR 06987:000:00) was still marked which suggested it was still in use despite the demise of the quarry. The pier (IHR 06986:000:00) was now also shown to the northwest of the proposed pipeline. The ports in Brown's Bay were also still marked and these had been joined by the electric fog bell (IHR 06982:000:00) at the end of the point.

The archaeological sites were still shown with the exception of the standing stone (ANT 041:009) and Druid's Cottage (HB 06/04/015) was still clearly marked adjacent to the megalithic tomb (ANT 041:007). The area around the proposed pipeline showed signs of increased habitation with more dwellings. These dwellings included Inisreen (HB 06/04/026) which was identified on a bend on the Brown's Bay Road.

10.1.2.9 Aerial Photographic Evidence

Four aerial photographs relating to the area of the proposed pipeline were examined at the Headquarters of Ordnance Survey Northern Ireland at Colby House in Belfast. The earliest of these was taken in 1963 and is a Black & White aerial photograph taken at a scale of 1:9000. The aerial photograph (Run 47 934471) showed the area in very good definition. Castle Robin Bay was well defined with the coastline shown as very rocky. This photograph post dated World War Two so the anti-aircraft battery (ANT 041:050) was extant and clearly visible. The former gun emplacements were well defined as were a row of Nissan huts to the southwest. The majority of ground along the route of the pipeline was clearly agricultural with some recently ploughed. However, some of the ground had a marginal appearance and the former limestone quarry appeared as very rough ground. The Historic Buildings were clearly visible as was the mound (ANT 041:012). There were no cropmark anomalies along the route of the pipeline that could indicate possible archaeological sites.

The second aerial photograph examined was taken in March 1975. This photograph (W10 F2394) was taken in Black & White at a scale of 1:10,000. The northeast shoreline was shown to drop steeply to the intertidal area adjacent to Castle Robin Bay. The area was still largely agricultural and had been recently ploughed. Former field boundaries were quite obvious in these areas. The ground around the former limestone quarry was still very rough. The anti-aircraft battery (ANT 041:050) was clearly shown though the Nissan huts had been reduced to concrete bases. The Historic Buildings and mound (ANT 041:012) were still clearly visible. There were no cropmark anomalies along the route of the pipeline that could indicate possible archaeological sites.

The last aerial photographs examined were Ortho Tiles (71/6 & 71/9) which were taken in colour in September 2003. These showed the route of the proposed pipeline in good definition including Castle Robin and the agricultural fields which were under pasture. The two gas pipeline projects had taken place by this stage and the line of ground disturbance was still clearly visible along the route of the Scotland to Northern Ireland pipeline. This clearly ran adjacent to the anti-aircraft battery (ANT 041:050) and continued southwest to Ballylumford Power Station. The rough ground was still visible along the southwest extent of the proposed pipeline route and there were no signs of either the line of Phoenix Gas Belfast Transmission pipeline or the excavation associated with the settlement site (ANT 041:045). Again, there were no cropmark anomalies which could indicate possible archaeological sites along the route of the proposed pipeline.

10.1.3 Site Walkover.

The proposed route of the pipeline was walked by ADS Ltd in October 2009. The object of this walkover was to verify the results of the baseline study and assess the archaeological potential of the pipeline corridor. The walkover started at Castle Robin Bay where the seawater intake will be sited.

Castle Robin Bay is horseshoe shaped and defined by the steep slopes of the surrounding higher ground (Plate 10.1). The terrain in this area consists of marginal pasture which slopes gently downhill to the east to the intertidal area. The intertidal area within the bay consists of stone and pebble beach with rock outcrops projecting out to sea to the north and south. A cleft in the south slope of the surrounding higher ground allows access to the area and it is possible that small boats could be launched here from the foreshore. However, there is no visible evidence that the bay is used for this purpose and there are no signs of maritime industrial use such as boat winches or cranes.

The seawater intake will be located at the southeast corner of Castle Robin Bay (Plate 10.2). These area consists of the steep slopes of the surrounding high ground running northeast onto a rock outcrop covered with large stones and boulders. No signs of maritime archaeological features were noted within this area and it is likely that any shipwrecks that may have come aground at this point will have been broken up. It is possible that associated artefacts could be located within the stones in the intertidal area.

The seawater pipeline will run southeast from the area of the intake across the headland (Plate 10.3). This area currently consists of two fields under pasture that are divided by a low gorse hedge. The terrain within these fields is generally level but slopes gently downhill to the northeast and the cliff edge. The brine outfall pipe will be directionally drilled through the bedrock to the south of the seawater intake pipe. This area consists of steep cliffs overlooking a thin stretch of intertidal area consisting of rocky shoreline and boulders (Plate 10.4). The shoreline within this area is exposed and largely inaccessible due to the steepness of the adjacent cliffs. It is unlikely that these steep slopes were utilised in the past. The Isle of Muck is clearly visible to the south though there were no signs of the shipwreck, S.S. Ailsa, which is apparently visible at low tide.

From the shoreline, the brine outfall pipe runs southwest across pasture fields to join the seawater intake pipe (Plate 10.5). From this point the two pipelines run together southwest to the facilities at Ballylumford. The terrain within this area consists of pasture fields that slope gently uphill to the west (Plate 10.6). Towards the Brown's Bay Road, the pipelines run northwest across the access laneway and enter the field where the scheduled protected anti-aircraft battery (ANT 041:050) is located (Plate 10.7).

The remains of this site are still apparent though the former gun positions have largely collapsed (Plate 10.8). A scarped area was noted along the west edge of the field where the pipelines will enter the field (Plate 10.9). This appeared to be agricultural in nature and not associated with the Defence Heritage site. The line of the Scotland to Northern Ireland pipeline is marked with a series of posts and the area where this runs through the anti-aircraft emplacement is clearly visible (Plate 10.10).

The pipelines cross the Brown's Bay Road and enter a large pasture field which slopes downhill from a ridge of higher ground to a valley to the west (Plate 10.11). The base of the valley is level with an access laneway running north to Brown's Bay Farm. The stream noted on the Ordnance Survey map sheets also runs north along the valley floor creating an effective physical barrier (Plate 10.12). The listed Historic Building, Inisreen (HB 06/04/026), is visible from this area on the Brown's Bay Road (Plate 10.13).

The terrain slopes steeply uphill to a steep scarp to the west (Plate 10.14). The scarp consists of rough ground covered in gorse which was noted on the Ordnance Survey map sheets. The pasture fields to the west of this scarp are located on a steep ridge orientated northwest to southeast as suggested by the cartographic evidence (Plate 10.15). To the west, the terrain slopes downhill again to a valley of marginal terrain (Plate 10.16). This area has seen previous disturbance not only from the Scotland-Northern Ireland pipeline but also from the Moyle interconnector electricity station which sits in the valley. The terrain slopes steeply uphill to Ballylumford Hill which consists of rough ground as noted on the cartographic evidence (Plate 10.17). This slope also shows signs of terracing. The seawater and brine pumping facilities will be located within the area of rough ground on Ballylumford Hill. This area was inaccessible during the site walkover.

From the pumping facilities, the pipelines cross the Millbay Road and run to the southwest into a large rectangular pasture field (Plate 10.18). This field is the general location where several gold ornaments (ANT 041:031) where located in 1824. The northeast extent of the field consists of the top of the ridge and this affords good views to the south, west and north. Millbay Road runs along the top of the ridge with the megalithic tomb (ANT 041:007) located directly adjacent to the road (Plate 10.19). The listed Historic Building, Druid's Cottage (HB 06/04/015) is located immediately adjacent to the monument.

From the top of the ridge the large pasture field slopes downhill pipe to the southwest and Larne Lough. The main gas plant facilities will be located in this area and it is proposed that an access road also run through the pasture field. The gas plant facilities will be mainly located in an area within Ballylumford Power Station though the southeast extent of the gas plant will be located in an adjacent field (Plate 10.20). The area within the power station

consists of made ground approximately 8m deep and there is evidence of a covering of plastic sheeting (Plate 10.21). Services also run through this area which is noticeably higher than the ground in the adjacent field.

A vent will be located on the shoreline which will be accessed by the new road (Plate 10.22). The shoreline is visible though the made ground immediately to the north has been armoured against erosion with terraces of stone. The former landing place (IHR 06987:000:00) was located close to this spot though there are, now, no visible remains.

The pipelines will run southeast from the main gas plant facilities for 750m to the wellpad passing through the area of the former limestone quarry (Plate 10.23). This area is densely overgrown as noted on the aerial photographic evidence and was not accessible during the site walkover. Any archaeological features that would have existed within this area will have been destroyed by the quarrying activities during the 19th century.

The pipelines will run southeast from the former limestone quarry into two pasture fields (Plate 10.24). The Phoenix Gas Belfast Transmission pipeline already runs through this area and the settlement site (ANT 041:045) was uncovered during this work. The proposed pipelines will be directionally drilled through this area thereby avoiding ground disturbance which could impact upon further archaeological remains. The derelict remains of two buildings were also noted in this area. These remains will not be impacted upon by the pipelines.

The pipelines will terminate at the wellpad which will be sited in a rectangular pasture field adjacent to the shoreline of Larne Lough (Plate 10.25). The terrain within this field slopes uphill to the north. The wellpad will be located on a concrete and gravel surface. An access road will be constructed to link the wellpad to the Ballylumford Road. This will run northeast from the wellpad before turning to the southeast and running to the existing access lane (Plate 10.26). It should be noted that the Phoenix Gas Belfast Transmission pipeline already runs across part of the area where the access road will run.

The existing laneway runs uphill to the northeast to join the Ballylumford Road (Plate 10.27). The standing stone (ANT 041:011) and ecclesiastical site (ANT 041:008) are recorded as located in the adjacent fields to the southeast though there are no visible remains of either site.

As mentioned, the laneway runs uphill to the Ballylumford Road which runs along the top of the ridge. This affords good views in most directions including to the southeast where the mound (ANT 041:012) and settlement site (ANT 041:046) are located. However, a farm is set adjacent to these sites obscuring their locations (Plate 10.28).

No previously unknown above ground archaeological features were noted during the site walkover.

10.1.4 Potential Impacts

10.1.4.1 Direct Impacts

The proposed development concerns the laying of several pipelines and the construction of associated structures and infrastructure between Castle Robin Bay on the northeast shoreline of Islandmagee and Ballydown on the southwest shoreline.

Detailed descriptions of the scheme have already been given in Chapter 4, however; works associated with this scheme will cause ground disturbance and it is important that the exact nature of this disturbance is known so that the potential impacts on Cultural Heritage-terrestrial and intertidal archaeology can be accessed.

Given this, elements and proposed construction details of the proposed development are outlined below starting at the northeast end of the scheme and running through to the southwest extent (Fig 10. 11):

Construction of sea water intake pumping station at Castle Robin Bay. A sea water intake will be located on the foreshore to the immediate north of the pumping station. The intake will involve the excavation of a vertical pit into the rock on the foreshore with the intake pipelines directionally drilled from the pit. These pipelines will break through the sea bed at a point 4m below sea level

Sea Water Pipeline.

- The pipeline will run between Castle Robin Bay and Ballydown for a distance of 3585m. The majority of this pipeline (2835m) will be conventionally trenched between the sea water intake pumping station at Castle Robin Bay to the sea water intake and brine pumping station located adjacent to the Mill Bay Road and then onto gas plant facilities located adjacent to Ballylumford power station.

- The final 750m of sea water pipeline will run southeast between the gas plant facilities and the well pad which is located close to the shore line at Ballydown. This section of pipeline will be directionally drilled.

Brine Pipeline

- The pipeline will run from the northeast coast of Islandmagee to Ballydown for a distance of 3920m. The majority of this (2525m) will be conventionally trenched though part of the northeast extent and the 750m between the gas plant facilities and the well pad will involve directional drilling.

- Construction of sea water intake and brine pumping station adjacent to the Ballylumford Road with associated electrical substation, access road and car parking. This structure will be sited in an area of rough ground with the station scarped into the existing hillside with ground levels reduced by up to 3.5m in places.

Construction of main gas facilities.

- These will be constructed immediately adjacent to the southeast of the existing power station at Ballylumford with a new access curving northeast to southwest from the Mill Bay Road to the structures. The construction of the main gas facilities will see the existing ground level reduced by up to 5m in places.

- However, existing areas to the immediate southeast of Ballylumford power station were used for the disposal of basalt and rock excavated during ground works associated with the construction of the Ballylumford C power station between 2000 and 2003 (Client pers comm.). A layer of fill material approximately 5m thick lies on top of the original ground level within the area of the main gas facilities while a layer between 1.5m and 3m deep is located within the area of the access road.

- Given this, ground works associated with the main gas plant facilities will only impact on original ground level to the east where the imported fill material is less dense.

- It is also possible that imported fill material within the area of the access road may be removed for use in the construction process. This would only involve the removal of the imported fill material and would not affect the original ground level underneath. It is envisaged that the access road to the main gas facilities will be set on a layer of hardcore laid within the fill material. The sea water and brine pipelines will also run through this area. The conventional trenching associated with the construction of these pipelines will largely be set within the imported fill material. However, there may be areas towards the northeast and southwest extents of the field where the layer of imported material may not be as thick. It is possible that trenching associated with the pipelines could impact upon the original ground surface within these areas.

- Laneway and pipeline leading from the main gas facilities to a vent on the shoreline. There is no imported fill material within this area and ground works associated with these features will disturb the original ground surface.

Gas Pipeline.

- The gas pipeline will run southwest for 750m from the main gas facilities to the well head. This pipeline will be directionally drilled.

Construction of the Well Pad.

- The well pad will be located in Ballydown at the southwest of the scheme. The terrain within the site slopes downhill to the lough shore and cutting and filling will be required to create a level surface to site the well pad. An access road will also be created from the Mill Bay Road to the well pad. This will largely follow the line of an existing farm laneway though a new section will also have to be constructed. It is also possible that the existing line of laneway may require widening or upgrading.

Given the above information, it is likely that the majority of disturbance to original ground surfaces will be associated with the construction of the pumping stations and well pad as well as the conventional trenching associated with the sea water and brine pipelines. There will

also be some smaller scale ground disturbance associated with the construction of the main gas plant facilities and infrastructure.

The majority of recorded sites are located away from the proposed scheme and will not be impacted upon. However, there are four recorded sites within the immediate vicinity of the lines of the pipelines. These sites are: -

SMR Number	Site type	Period	Condition	Statutory Protection
ANT 041:050	A.A. Battery	Modern	Some remains	Scheduled
ANT 041:030	Findspot	Prehistoric	Unknown	None
ANT 041:031	Findspot	Prehistoric	Unknown	None
ANT 041:045	Occupation Site	Prehistoric	Excavated	None

The A.A. Battery (ANT 041:050) is located towards the northeast end of the proposed scheme. Above ground remains of this site are still extant and these have been awarded statutory Scheduled protected status by NIEA:Built Heritage. The line of the proposed pipelines passes to the southwest of this site and it will not be impacted upon.

The findspots (ANT 041:030) and (ANT 041:031) relate to gold objects dating to the Bronze Age which were uncovered during ploughing during the early 19th century. The NISMR has given the location of these findspots as a field to the south of the Mill Bay Road. This field is also located to the northeast of Ballylumford power station and has been used to deposit fill material resultant from the construction of the Ballylumford C power station.

This imported fill material may be removed for construction use associated with the scheme. The removal of this material will cease once the original ground surface is reached and any sub-surface archaeological features that may exist should remain undisturbed. However, both the sea water and brine pipelines will run through this field. There is the possibility that ground works associated with these could impact upon the original ground level in areas where the layer of imported fill material is less thick.

The findspots (ANT 041:030) and (ANT 041:031) were uncovered during agricultural activity with the area subject to further ploughing and agricultural activity during the intervening period. This activity may have impacted upon any further artefacts that may have existed within the area. The findspot (ANT 041:031) was described as being located approximately 137m from the megalithic tomb (ANT 041:007) which would approximately concur with the site of the field. However, the second findspot (ANT 041:030) was recovered from the ‘Gold Field’ which was located to the east of the megalithic tomb (ANT 041:007) and the Druid’s Cottage. This may suggest that the correct location of this findspot (ANT 041:030) is actually to the northeast away from the proposed scheme.

The Occupation site (ANT 041:045) is located towards the southeast of the proposed scheme. This recorded site was discovered during archaeological monitoring of ground works associated with the laying of the Phoenix Gas Belfast Transmission Pipeline in 1996 and was excavated at the time. Given this, there is the possibility that other sub-surface archaeological features could be located within the area. The sea water, brine and gas pipelines will all run through the area of the Occupation Site (ANT 041:045) though these will be directionally drilled through the bedrock rather than conventionally trenched. Given this, it is unlikely that any sub-surface archaeological features will be impacted upon.

Although the recorded sites will not be impacted upon there is the possibility that ground works associated with the construction of the structures and infrastructure and the conventional trenching associated with the sea water and brine pipelines could severely impact upon any previously unknown sub-surface archaeological features or artefacts that may exist.

The proposed scheme will also see an intake and outfall pipes extend into the intertidal areas. It is proposed that these pipes are directionally drilled through rock and, as such, will not impact upon any intertidal archaeological features, should they exist.

The intake and outfall pipes will extend into the marine environment. Several recorded shipwrecks are located within the vicinity of the intake and outfall pipes though none of these shipwrecks will be impacted upon. However, there is the possibility that these pipes could impact upon previously unrecorded shipwrecks or other maritime archaeological features. These impacts are discussed in Section 10.2 Underwater Archaeology.

10.1.4.2 Indirect Impacts

While the majority of potential impact associated with Cultural Heritage will be direct there is also the potential for indirect impact. There are several recorded sites within the vicinity of the proposed scheme that have been awarded statutory protection by NIEA:Built Heritage and NIEA:Historic Buildings. These sites are: -

SMR/HB Number	Site type	Period	Condition	Statutory Protection
ANT 041:007	Megalithic Tomb	Prehistoric	Substantial remains	State Care
ANT 041:050	A.A. Battery	Modern	Some remains	Scheduled
HB 06/04/015	Druid's Cottage	Early 19th century	Extant	Listed
HB 06/04/026	Inisreen	Early 20th century	Extant	Listed

The statutory protection awarded to these sites extends to the integrity of their settings. The integrity of these settings could be indirectly impacted upon by the proposed scheme which could create a visual impact.

The closest of these sites to the proposed scheme is the A.A. battery (ANT 041:050). The sea water and brine pipelines will pass close to this site and could impact upon its setting. However, these pipelines will be sub-surface and laid using conventional trenching. The line of the Scotland to Northern Ireland pipeline already passes adjacent to the site of the A.A. battery (ANT 041:050). This feature is not visible on the ground and does not create a visual impact upon the scheduled monument.

It is likely that some potential visual impact will be created during the construction phase when the pipelines are being conventionally trenched and laid. However, this phase will be rapidly completed with the trenches backfilled and ground reinstated to pasture. After this, it is unlikely that the line of the pipelines will be discernible on the ground and any visual impact will no longer exist.

The Historic Building, Inisreen (HB 06/04/026) is located on high ground on the Browns Bay Road potentially overlooking the lines of the pipelines. This site is located to the northwest of the proposed scheme and it is unlikely that any indirect impacts will result. There is a slight potential for visual impact during the construction phase. However, as with the A.A. battery (ANT 041:050), this visual impact will be removed once the trenches are backfilled and the ground reinstated to pasture.

The megalithic tomb (ANT 041:007) and Druid's Cottage (HB 06/04/015) are located adjacent to one another on the Mill Bay Road towards the southwest end of the proposed scheme. Both sites have been awarded statutory protected status with Druid's Cottage (HB 06/04/015) a listed building while the megalithic tomb (ANT 041:007) has been taken into State Care.

While both sites are located approximately 120m to the southeast of the proposed scheme, it is likely that mature tree growth and vegetation will help screen any associated features. Features associated with the proposed scheme within this area are the sea water and brine pipelines as well as the access road to the main gas plant facilities. The topography within this area slopes downhill to the southwest away from the recorded sites. This will help reduce the potential for visual impact. Additionally, it is likely that the access road will create a low or negligible visible impact while the pipelines will have no visual impact once the ground is reinstated to pasture.

Given these conditions, there is a low probability that the proposed scheme will cause any indirect impacts.

10.1.5 Mitigation Measures

10.1.5.1 Mitigation Measures for Direct Impacts

As outlined above, the proposed scheme will involve different levels of ground disturbance. These levels of ground disturbance vary with the nature of the feature under construction and the nature of the existing terrain.

Potentially the most severe direct impacts will be associated with the conventional trenching associated with the sea water and brine pipelines and the ground works associated with the construction of the sea water pumping stations, the well pad and the access roads including the access and pipeline leading to the vent on the shoreline in Ballylumford.

These ground works will directly impact upon the original ground surface and have the potential to disturb any sub-surface archaeological features that may exist. Additionally, the construction of the sea water intake pipe and brine pipe could potentially impact upon maritime archaeological features. (These impacts and appropriate mitigation are discussed in Section 10.2 Underwater Archaeology).

The construction of the main gas plant facilities and associated access road adjacent to Ballylumford Power Station will involve ground works within a terrain largely consisting of imported fill material. It is likely that the majority of these ground works will not directly impact upon the original ground surface. However, there is the possibility that limited disturbance could occur in areas where the imported fill material is less thick. Conventional trenching associated with the sea water and brine pipelines could also cause similar limited disturbance.

The areas where direct drilling will be employed will not directly impact upon the existing ground surface and there will be no direct impacts upon potential archaeological features.
Given these conditions, the following table can be used: -

It is recommended that mitigation should, where possible, take the form of archaeological monitoring of topsoil stripping in areas where ground disturbance will take place (Fig. 10.12).

It is recommended that the footprints of the seawater pumping stations and well pad are subject to archaeological testing. It is recommended that this testing should take the form of archaeological monitoring of top soil stripping within the footprints of these structures.

This top soil stripping must be carried out by a backacting machine equipped with a toothless bucket which is under the constant supervision of a suitably qualified archaeologist under licence to NIEA:Built Heritage.

It is also recommended that the areas where the line of the seawater and brine pipelines will be conventionally trenched is also subject to archaeological testing. It is recommended that this testing take the form of top soil stripping along the line of the pipelines. Again, this top soil stripping should be carried out using a backacting machine equipped with a toothless

bucket which is under the constant supervision of a suitably qualified archaeologist under licence to NIEA:Built Heritage.

Table 10.1 Mitigation of Direct Impact

Nature of Disturbance	Nature of Impact	Mitigation required
Conventional trenching/ construction of pumping stations and infrastructure	Disturbance to existing ground levels with possibility of disturbance to sub-surface archaeological features	Archaeological mitigation should be employed within these areas, which should consist of archaeological monitoring of topsoil stripping
Construction of main gas plant facilities, access road and conventional trenching through areas of imported fill material	Disturbance to existing ground levels which consist of imported fill material. Possibility that original ground surface will be breached in areas where imported fill material is less thick.	Archaeological mitigation should be employed to monitor ground works especially in areas where the original ground surface will be impacted.
Directional drilling of pipelines	Pipelines directly drilled through bed rock.	No archaeological mitigation required.

It is also recommended that the lines of the access roads associated with the vent at Ballylumford and the well pad at Ballydown are also subject to archaeological testing. Again, it is recommended that this takes the form of archaeological monitoring of top soil stripping along the line of these access roads. This top soil stripping should be carried out using a backacting machine equipped with a toothless bucket which is under the constant supervision of a suitably qualified archaeologist under licence to NIEA: Built Heritage.

The main gas plant facilities and associated access road will be located in an area largely consisting of imported fill material though original ground levels may be impacted upon in places. Given this, it is recommended that ground works associated with these features are carried out under archaeological supervision. These ground works should be carried out using a backacting machine equipped with a toothless bucket which is under the constant supervision of a suitably qualified archaeologist under licence to NIEA: Built Heritage.

It is recommended that no archaeological mitigation is required for sections of the pipelines where directional drilling will be employed.

Should archaeological deposits or artefacts be present, the licensed archaeologist will be responsible for communicating this to the client or appointed representative, as well as to the NIEA: Built Heritage. A sample of the archaeological deposits identified at this stage may need to be further investigated by manual excavation and recording, discussed and agreed with the relevant representative of NIEA:Built Heritage and may be subject to a separate archaeological methodology.

It is recommended that enough time is allowed in the development programme for possible archaeological excavations. It should be noted that the results of all excavation including site evaluation and monitoring, must be compiled into a fully illustrated report.

10.1.5.2 Mitigation Measures for Indirect Impacts

It is likely that there will be no indirect impacts associated with the proposed scheme though there may be some visual impacts during the construction phase. These visual impacts are short term and will be removed once the line of the pipelines is reinstated into pasture.
Given this, no mitigation measures are required in relation to indirect impacts.

10.1.6 Residual Impacts

All direct impacts will occur during the construction phase when the original ground surface is disturbed. Any previously unrecorded sub-surface archaeological features that may exist will be uncovered during this phase. These features will be resolved through appropriate mitigation agreed with client and the appropriate heritage authorities.

Given this, it is unlikely that there will be any residual impacts associated with the proposed scheme.

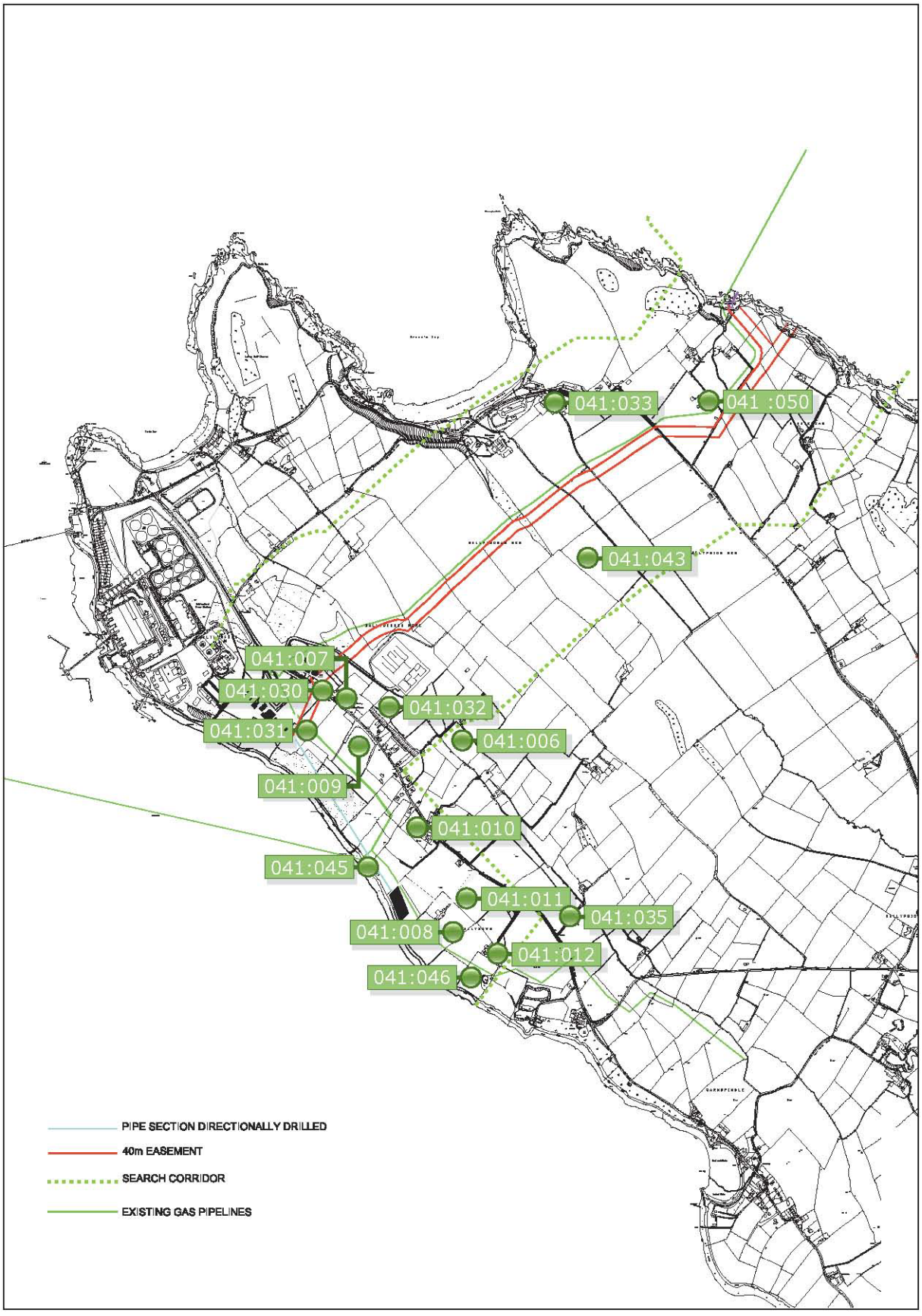


Figure 10.1 Recorded archaeology logical sites within 1km wide search corridor.

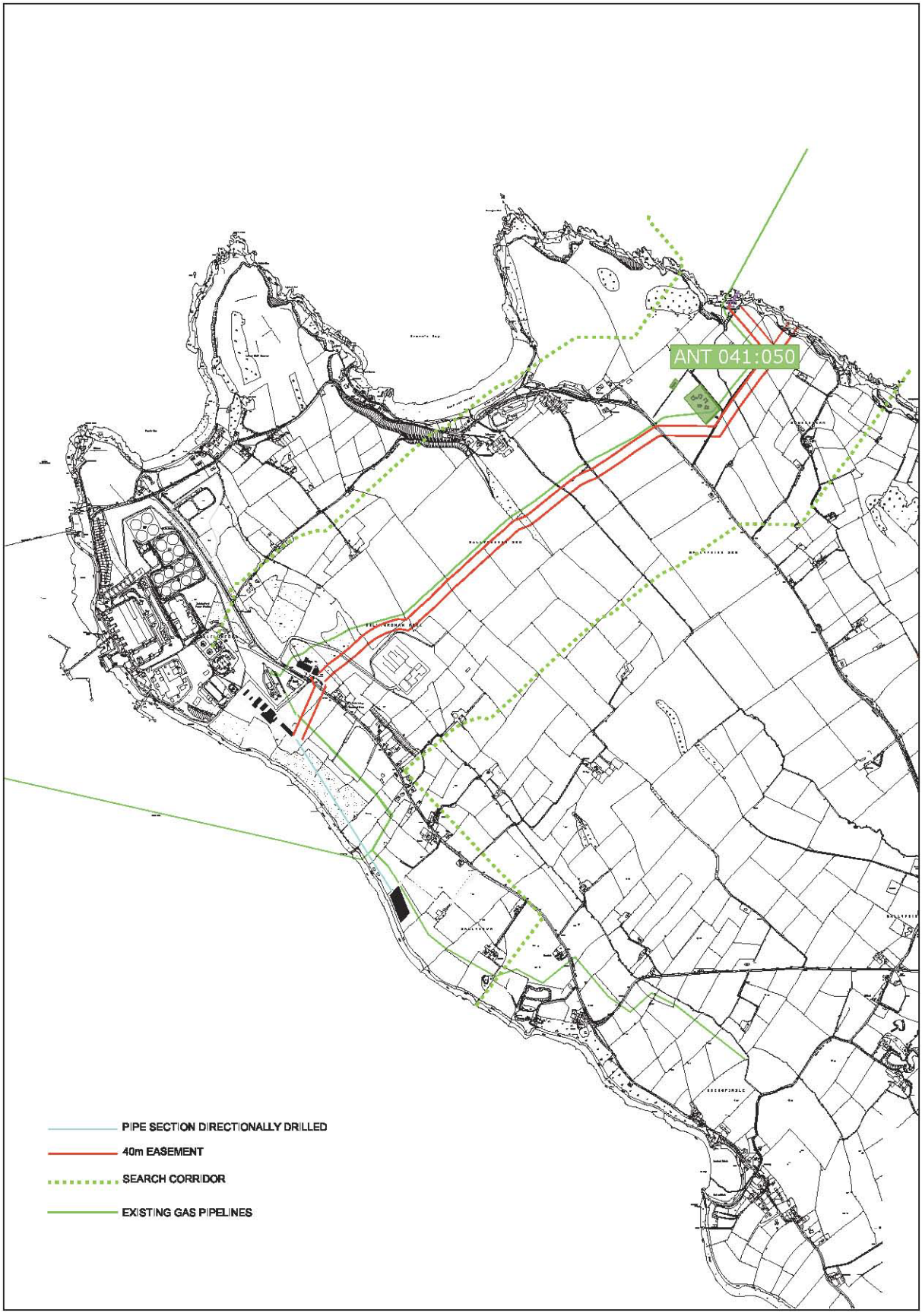


Figure 10.2 Extent of scheduled area around anti-aircraft battery (ANT 041:050)

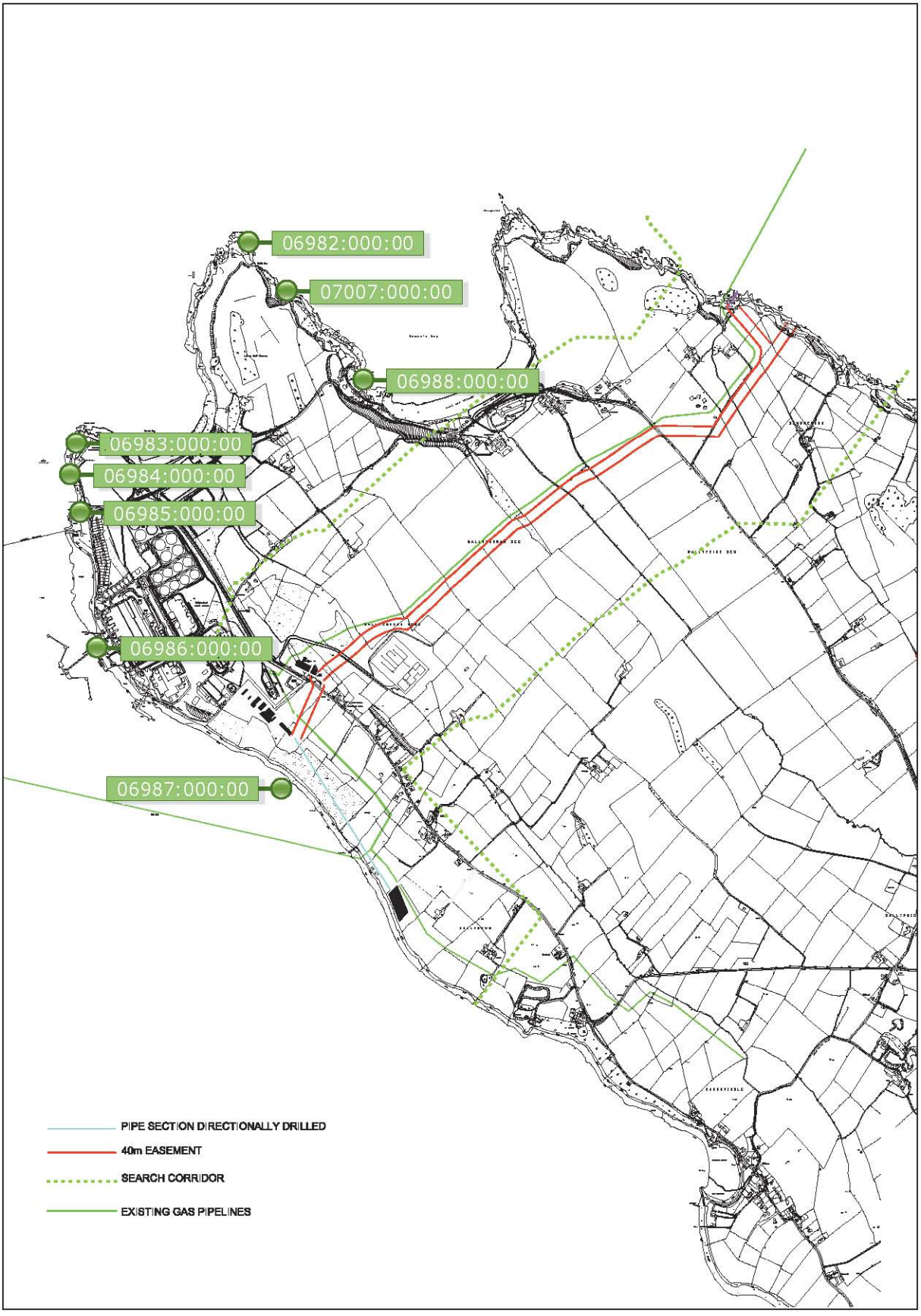


Figure 10.3 Recorded Industrial Heritage sites within vicinity of pipeline.

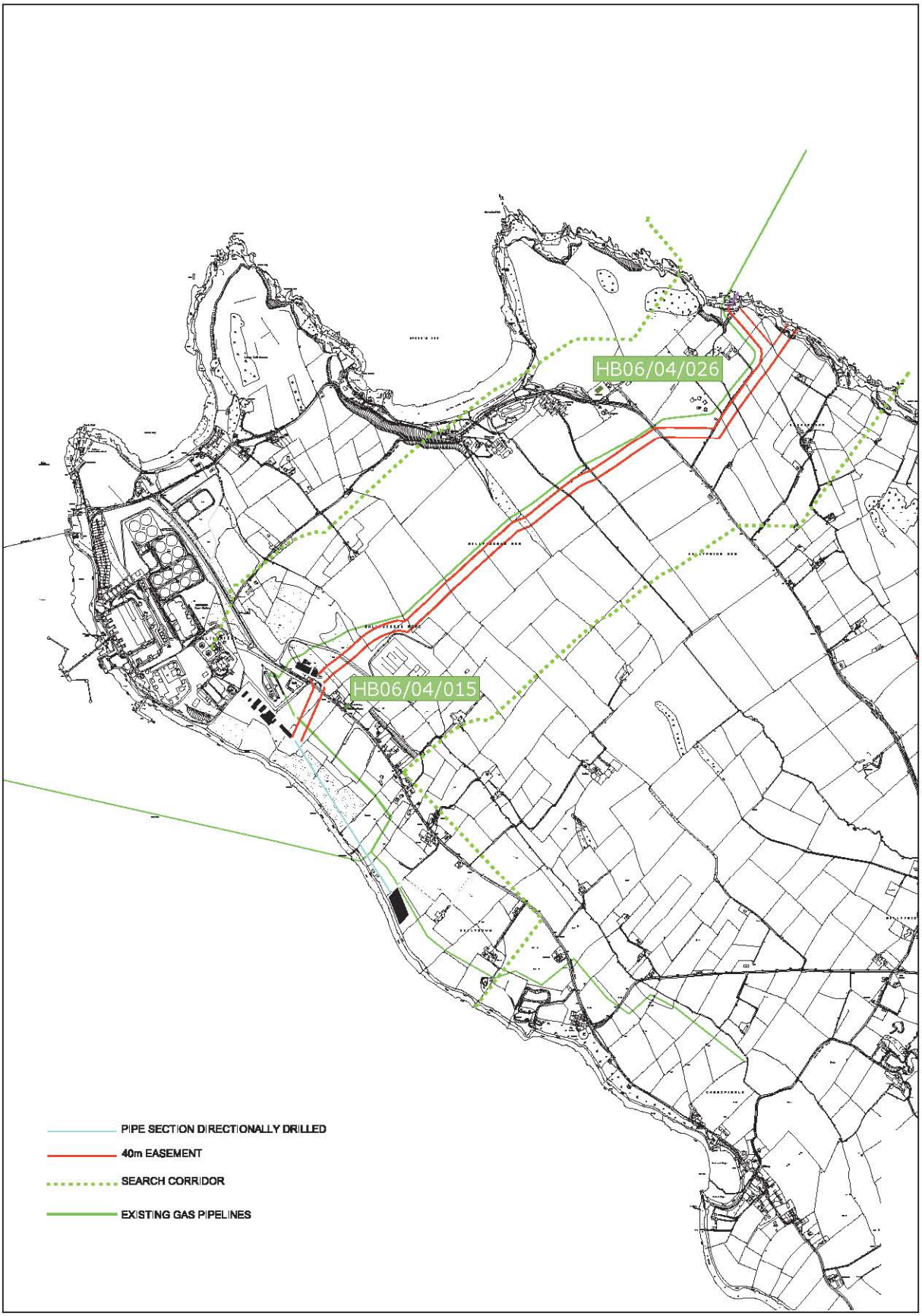


Figure 10.4 Historic Buildings within 1km wide search corridor

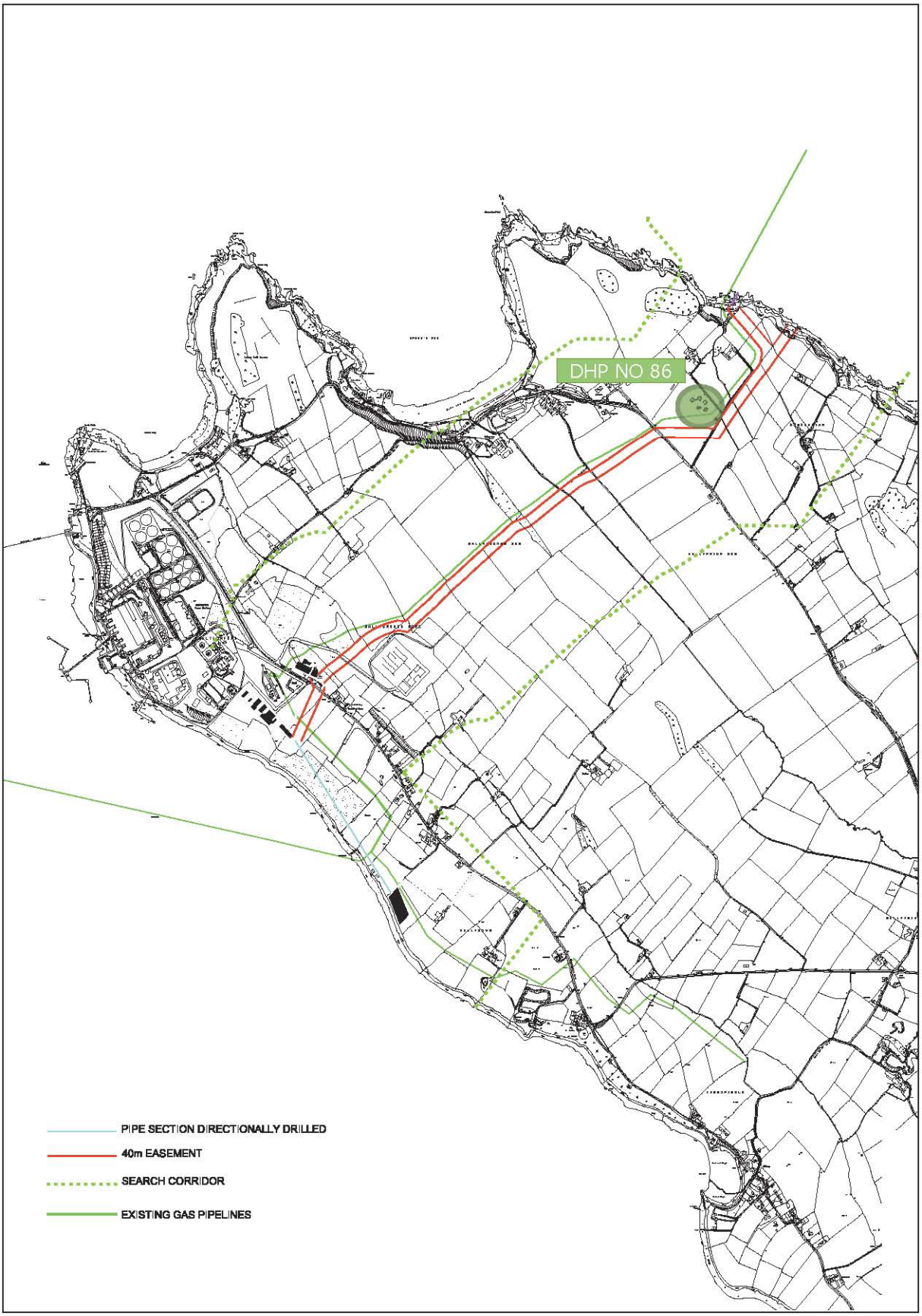


Figure 10.5 Defence Heritage Project site within 1km wide search corridor

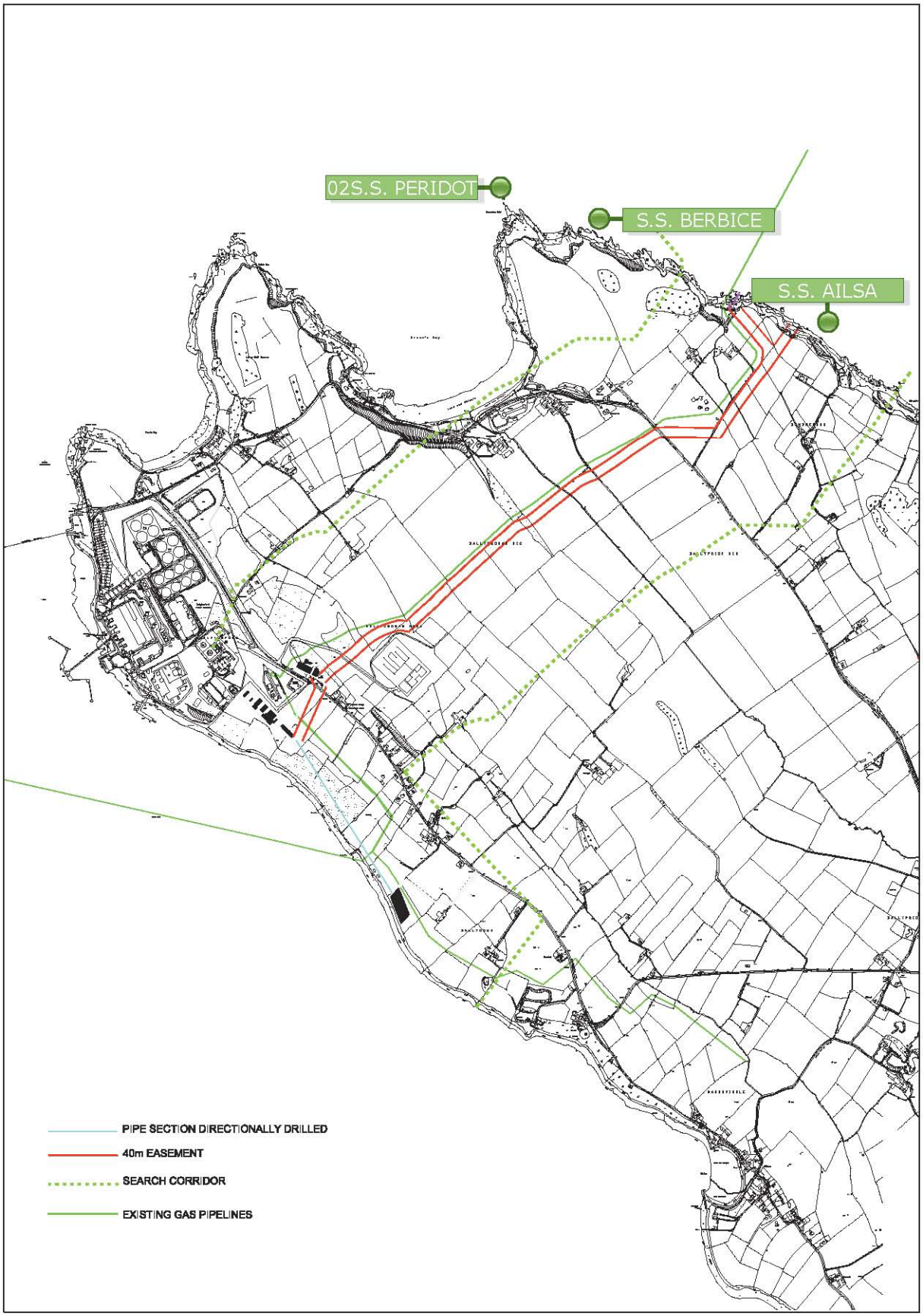


Figure 10.6 Recorded shipwrecks within vicinity of seawater intake and brine outfall pipes

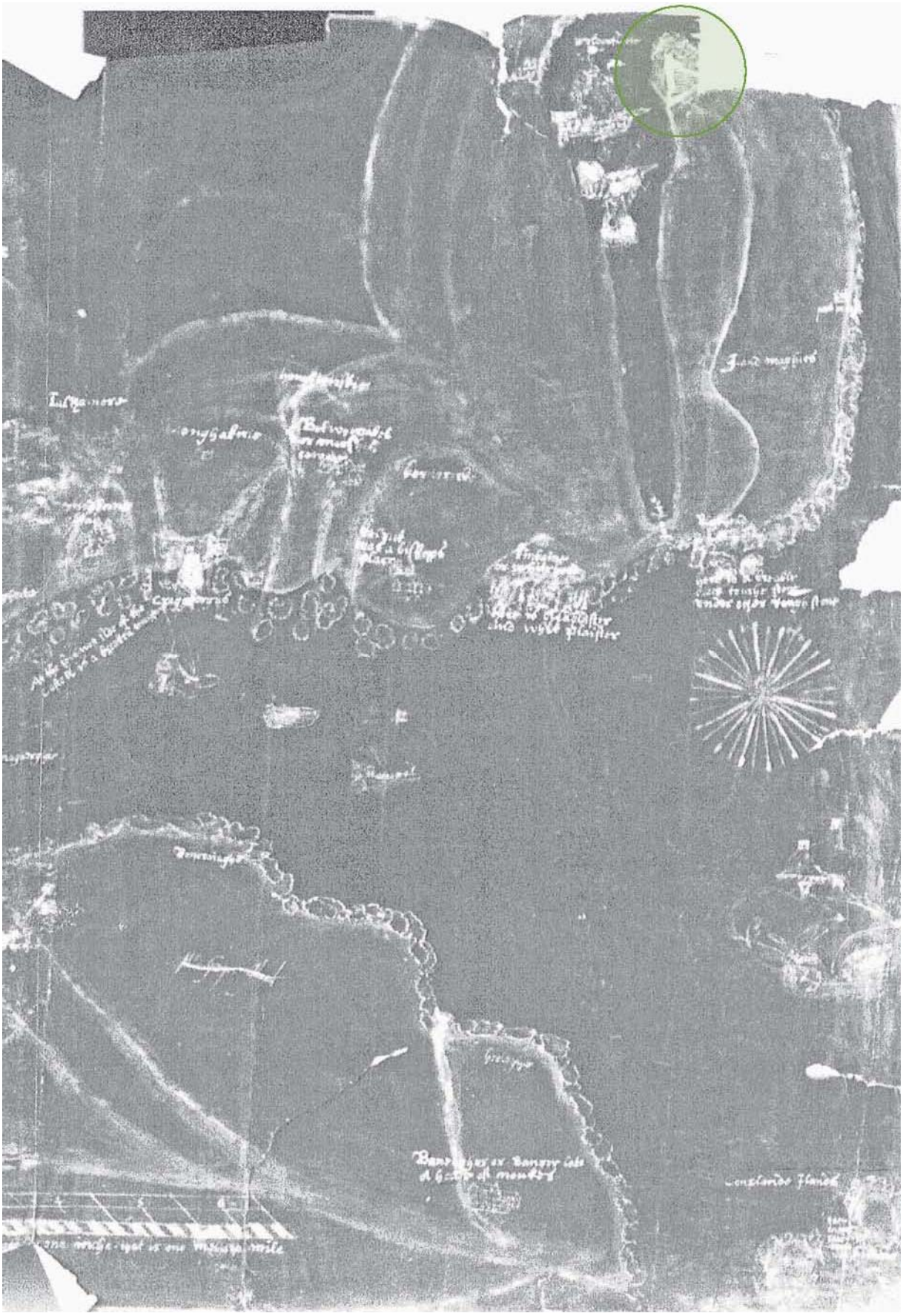


Figure 10.7 Map of Belfast Lough drawn around 1570 possibly by Robert Lythe. Island Magee is partially drawn to northeast.

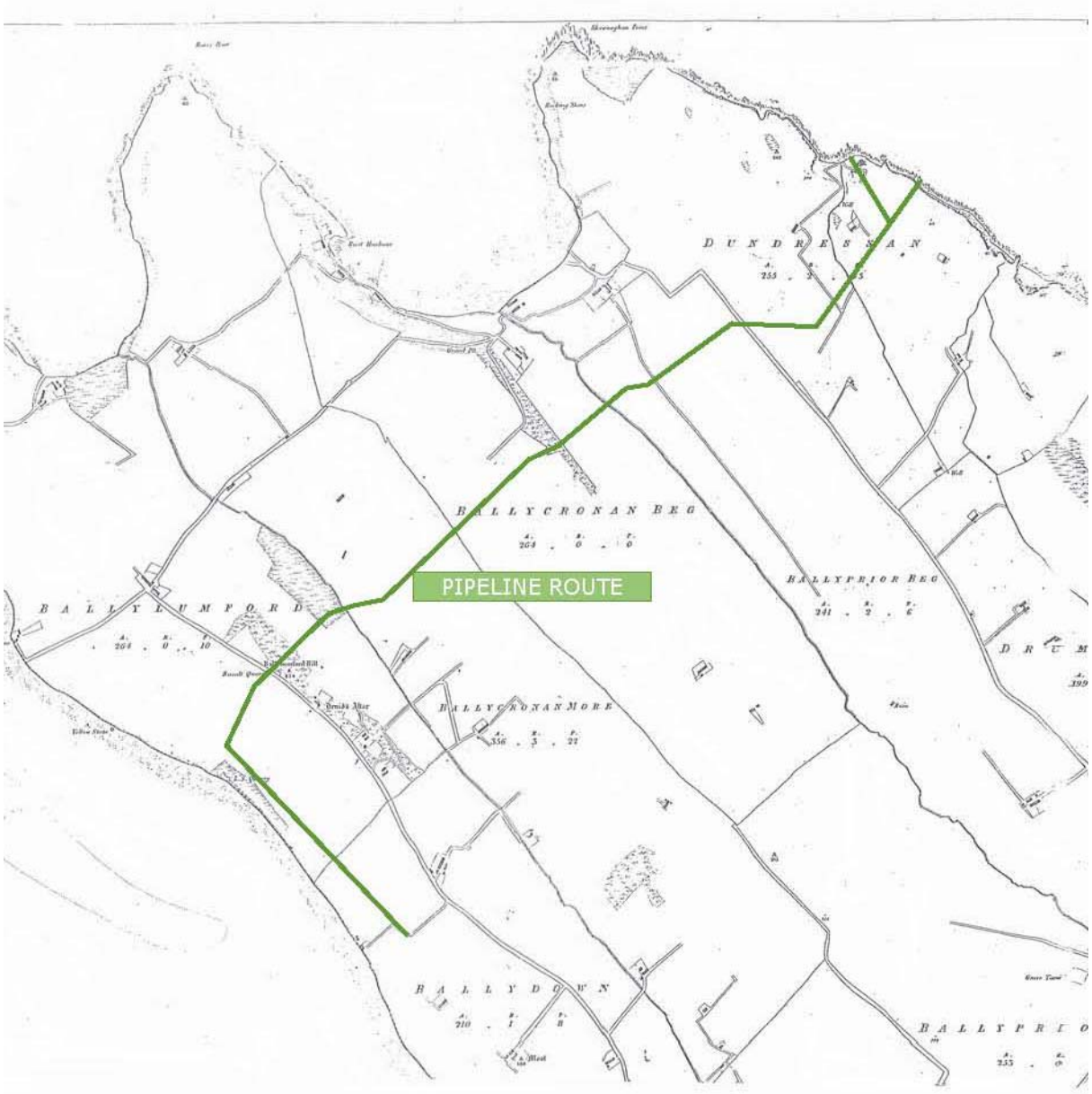


Figure 10.8 First Edition Ordnance Survey sheet (1834)

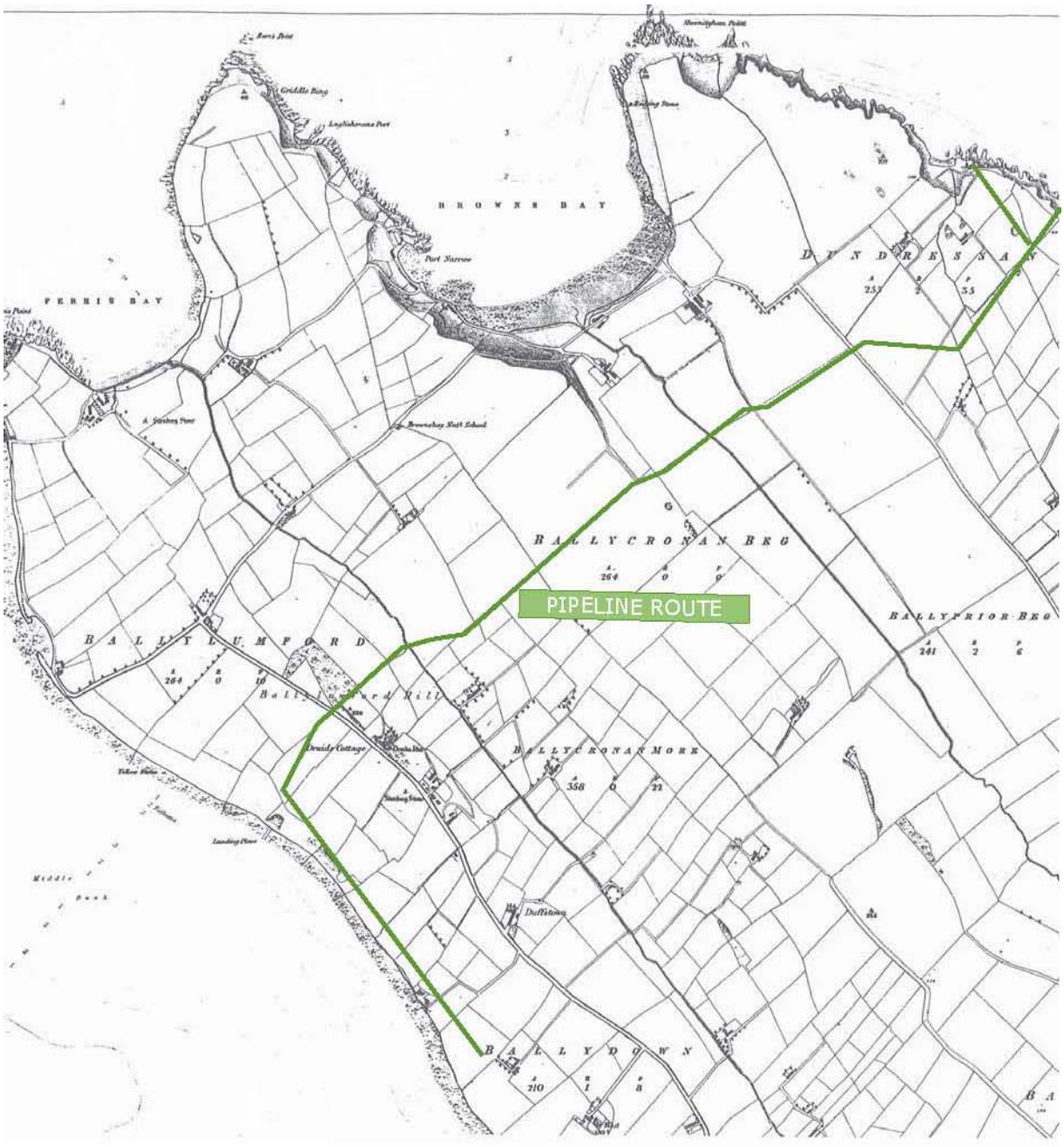


Figure 10.9 Second edition Ordnance Survey sheet (1857)

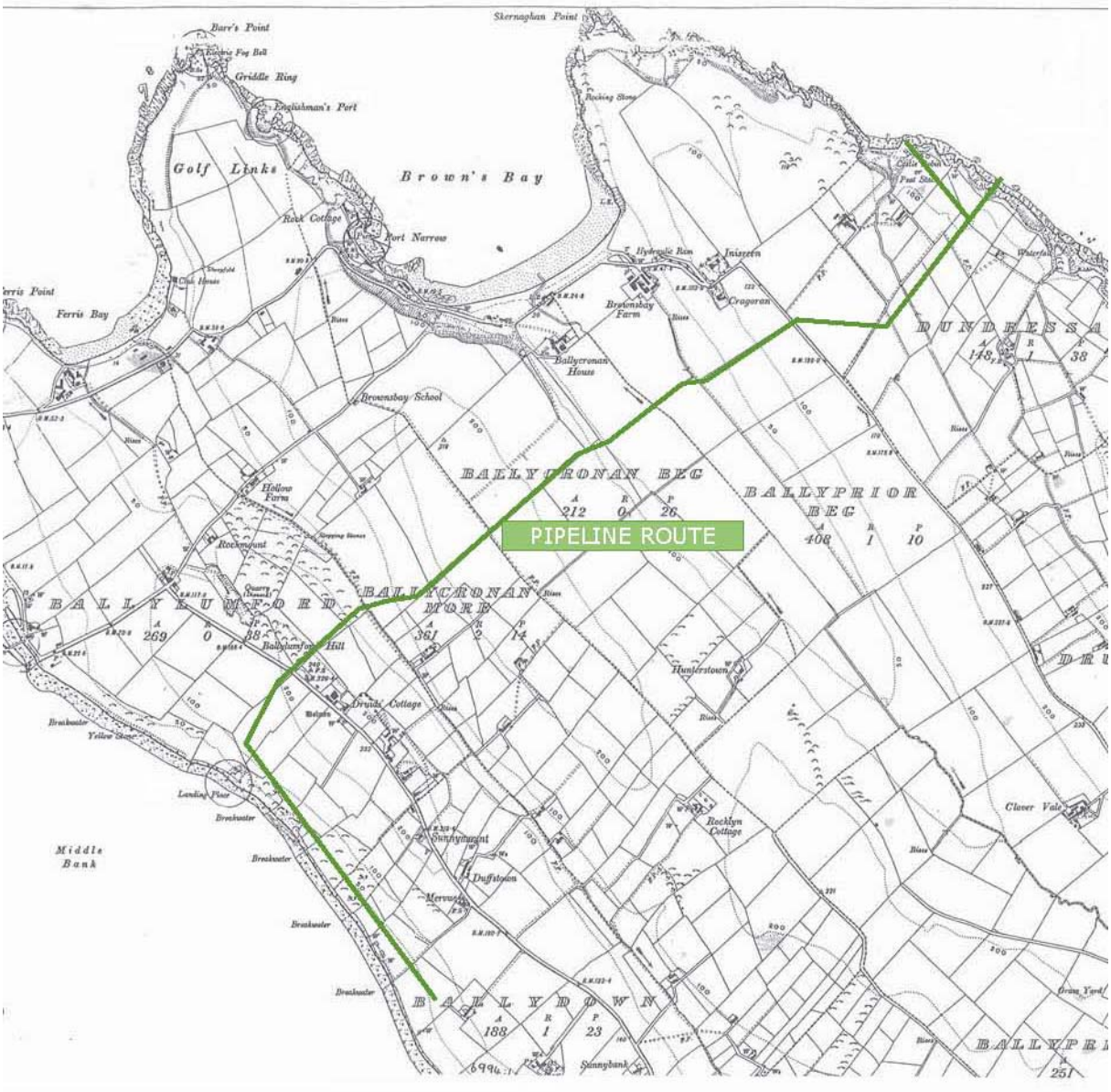


Figure 10.10 1932 Edition Ordnance Survey sheet.

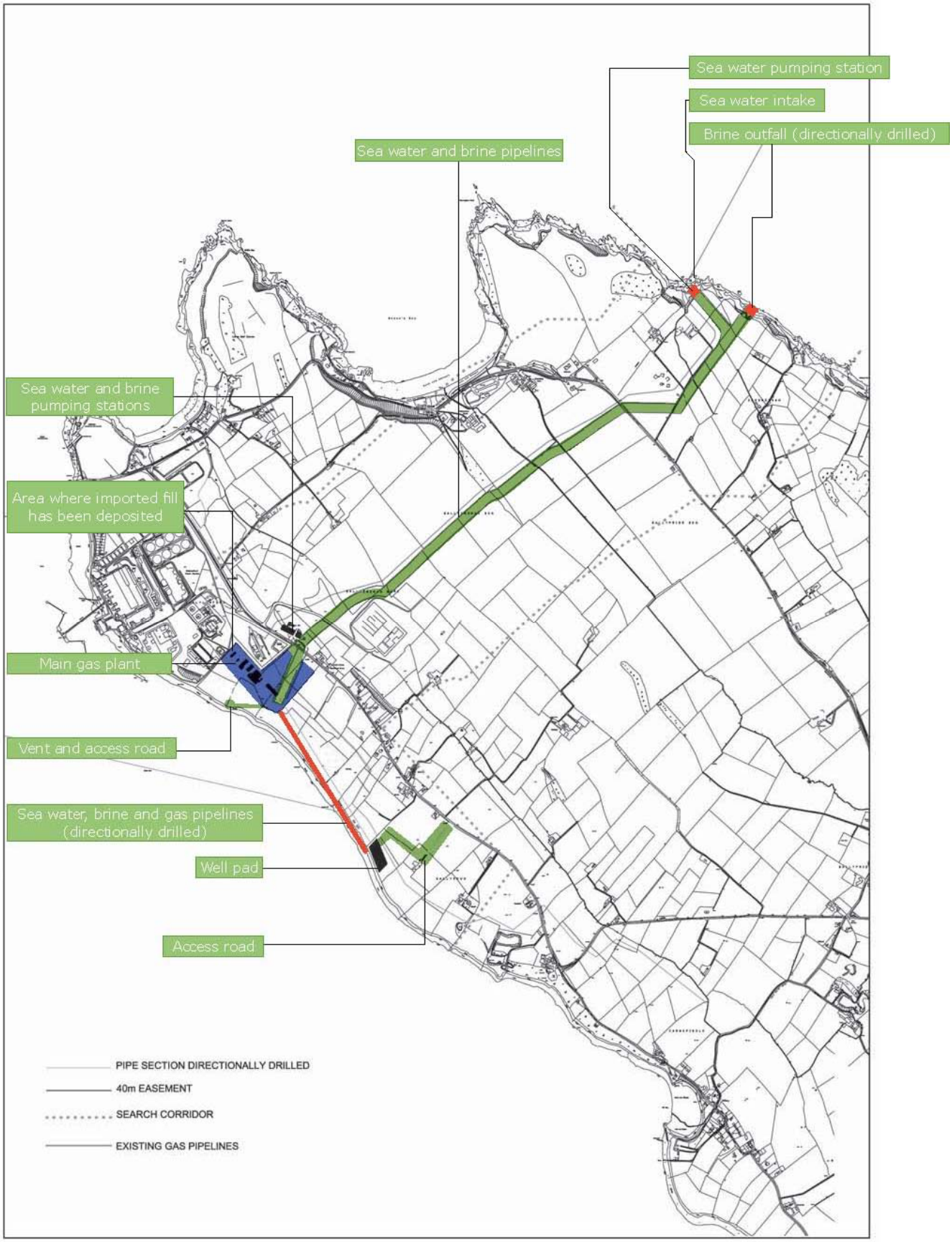


Figure 10.11 Layout of scheme showing proposed works.

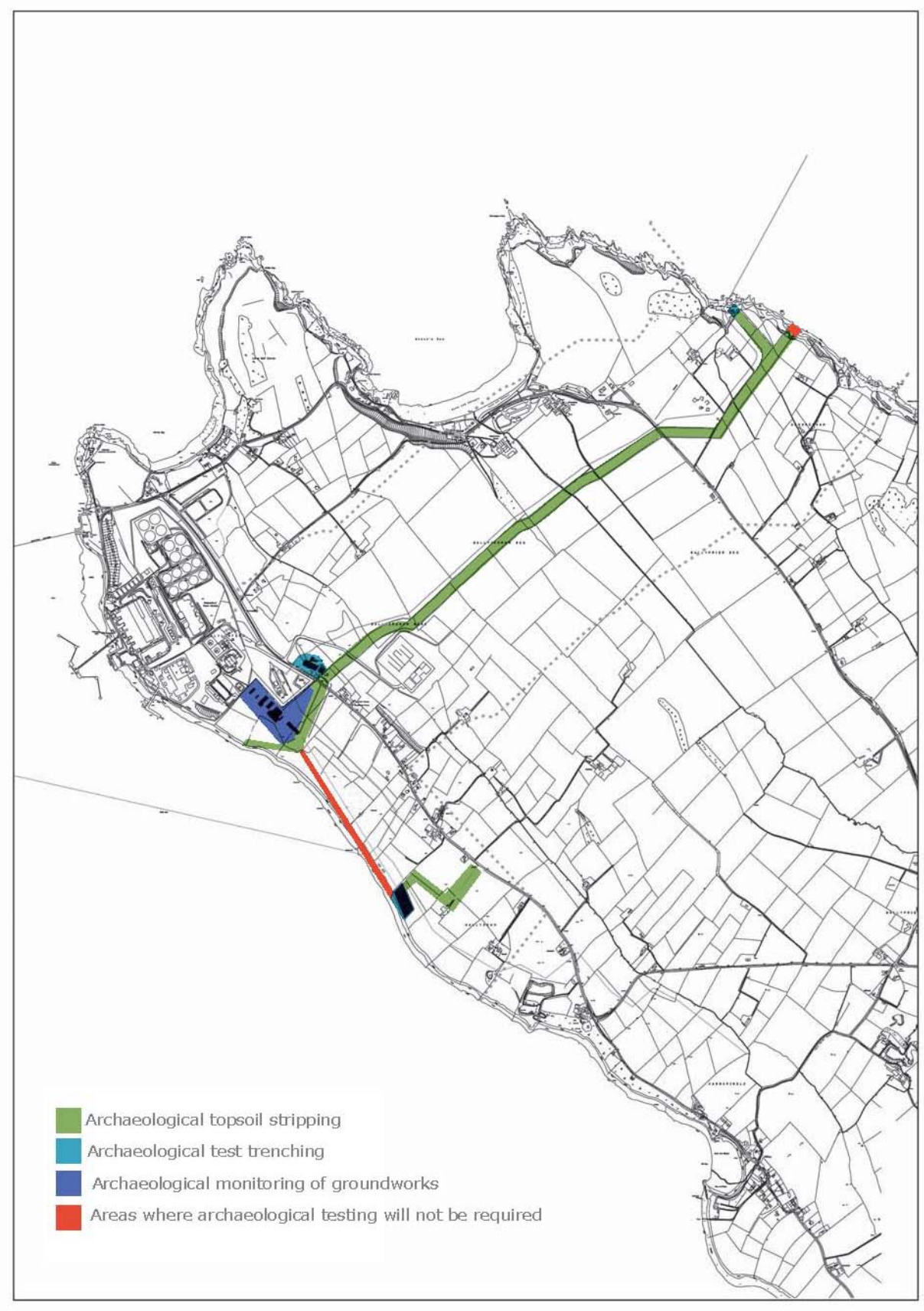


Figure 10.12 Proposed Cultural Heritage mitigation.

Plate 10.1 Looking southeast across Castle Robin bay.

Plate 10.2 Area where saltwater intake pipe will run.

Plate 10.3 Looking north at area where seawater intake pipe will run.

Plate 10.4 Looking south along shoreline at area where brine outfall pipe will run.

Plate 10.5 Area of pasture field where the two pipes start to run southwest together.

Plate 10.6 Pasture fields where the two pipelines will run.

Plate 10.7 Field where anti-aircraft battery (ANT 041:050) is located.

Plate 10.8 Remains of scheduled protected anti-aircraft battery (ANT 041:050).

Plate 10.9 Scarped area along west side of field where pipelines will enter.

Plate 10.10 Post marking the line of the Scotland-Northern Ireland gas pipeline.

Plate 10.11 Looking northeast at fields and valley to west of Brown's Bay road.

Plate 10.12 Stream running north along valley floor.

Plate 10.13 The listed Historic Building, Inisreen (HB 06/04/026) located on the Brown's Bay road.

Plate 10.14 Terrain rising uphill to middle ridge of higher ground. Note scarp of rough ground.

Plate 10.15 Pasture field on top of middle field.

Plate 10.16 Terrain sloping steeply downhill to west on middle ridge.

Plate 10.17 Terrain sloping steeply uphill to the west and Ballylumford Hill. Note marginal ground and Moyle interconnector electricity station.

Plate 10.18 Large pasture field where the gold objects (ANT 041:031) were recovered in 1824.

Plate 10.19 The chambered grave (ANT 041:007) located adjacent to the Mill bay road with Druid's cottage (HB 06/04/015).

Plate 10.20 Looking northwest at area where main gas plant facilities will be located. Note height difference between field and power station.

Plate 10.21 Made ground within Ballylumford Powerstation where gas plant facilities will be located.

Plate 10.22 Armouring along shoreline where access road and vent will run. The landing place (IHR 06987:000:00) was located close to this spot.

Plate 10.23 Area of former limestone quarry where the pipelines will run. This area is now densely overgrown.

Plate 10.24 Pasture fields where pipelines will run. The settlement site (ANT 041:045) is located within this area.

Plate 10.25 Area of proposed wellpad adjacent to Larne Lough.

Plate 10.26 Area where access road will run north from the well pad.

Plate 10.27 Existing laneway running downhill from Balylumford road. The standing stone (ANT 041:011) and the ecclesiastical site (ANT 041:008) are located in the adjacent fields.

Plate 10.28Looking southwest towards locations of the mound (ANT041:012) and settlement site (ANT041:046).

10.2 SUBTIDAL ARCHAEOLOGY

10.2.1 Introduction

This section of the Environmental Impact Statement will address the potential impact to marine archaeology of the subtidal elements of the gas storage facility.

It is proposed to construct a new sea water intake pipe at Castle Robin Bay, close in-shore and below the Low Water Mark, 50m south of an existing gas pipeline. It is also proposed to construct a brine outfall pipeline, 230m south of the intake point. The outfall pipe will extend seaward for a distance of 430m. The construction design favours directional drilling, which will result in minimal impact on the seabed surface. Disturbance is only expected at the outfall discharge point, where the Horizontal Directional Drill (HDD) will break through the seabed surface, 430m offshore at approximately ING 345079, 403469.

The location is within a zone of archaeological potential, which has been highlighted in the terrestrial archaeological desktop study carried out as part of the project EIS. Fourteen recorded monuments are located within a 1km study corridor centred on the pipeline route as it crosses Islandmagee. The sites range in date from the prehistoric (Mesolithic) to the early modern period onward. The nearest monument to the proposed intake/ outfall pipes being ANT 041:050, a Gun Battery located 460m to the west. The present report considers the archaeological potential of the subsea elements of the proposed development.

The marine impact areas associated with the present project are located within and south of Castle Robin Bay, off the northeast shore of Islandmagee peninsula, east of Skernaghan Hill (Figure 10.1 and Figure 10.2).

10.2.1.1 The Proposed Development

The Islandmagee Storage Project seeks to establish an underground gas storage facility in a salt layer approximately 1,500m beneath Larne Lough. As part of the project, it is proposed to construct a new sea-water intake point in Castle Robin Bay, close inshore and below the Low Water Mark, 50m south of an existing gas pipeline. It is also proposed to construct a brine outfall pipeline 230m south of the intake point that will extend 450m offshore. The construction design favours directional drilling, which will result in minimal impact on the seabed surface. Disturbance is only expected at the point where the drill breaks through the surface at ING 345079E 403469N (Figure 10.2).

10.2.1.2 The Receiving Environment

The First Edition Ordnance Survey mapping of 1832 depicts a rugged, rocky coastline surrounding much of the northern half of the peninsula (Figure 10.3). A series of landing places are recorded, principally on the west side looking out to sea, where a small sequence of piers, jetties, and boat harbours are indicated. The 1832 map depicts a natural rocky shoreline surrounding the intertidal locations of the proposed sea intake and outfall pipe, the closest manmade feature being the pier at Portmuck which is situated 2km to the south. The

Second and Third Edition OS mapping does not highlight any significant changes in this regard.

A trackway is marked on the First Edition map, running eastward towards Castle Robin Bay from a rectangular structure located approximately 80m to the west (Figure 10.3). The presence of this trackway suggests a need to access the foreshore at this location and highlights the possibility of some foreshore/ maritime activity within Castle Robin Bay. Another rectangular structure is depicted 50m to south of the aforementioned building and 'well' is also marked in this area.

The comprehensive account of the terrestrial and inter-tidal cultural heritage surrounding the proposed development, in section 10.1 above, has identified fourteen recorded monuments within a 1km survey corridor that focused on the route of the pipeline across Islandmagee peninsula. The sites range in date from the prehistoric to the early modern. A later Mesolithic occupation site (SMR number: ANT 041:045), a Neolithic period megalithic tomb (ANT: 041:007) and a Bronze Age occupation site (ANT 041:045) reveal a significant sequence of prehistoric features on the landscape, and these have been discovered as a direct result of investigations conducted in association with the construction of the Scotland Northern Ireland Gas Pipeline, The Belfast Transmission Pipeline and developments at Ballylumford Power Station. An Early Medieval settlement (ANT: 041:033), a later nineteenth- and twentieth-century gun battery, (ANT: 041:050), and a landing place (IHR 06997:000:00) complete the typical range of monuments and features that can be expected in such a location.

This section is focused on the sub-tidal elements of the proposed project, namely the waters surrounding the sea water intake and the brine outfall pipelines. The Admiralty Charts for the study area do not indicate the presence of shipwrecks on the seabed.

The Historic Shipwreck Inventory maintained at the Centre for Maritime Archaeology, University of Ulster, Coleraine, provides a list of one hundred and twenty-six shipwrecking events which have been recorded in the waters surrounding Islandmagee (Figure 10.4). The data provide some indication of the pattern of wrecking from *c*.1750, after which regular records were maintained of such events. However, the pattern of wrecking prior to this date cannot be appreciated comprehensively, as the records are far more irregular. The distribution of the recorded shipwreck incidents shows a concentration of wreck sites within Larne Lough, focused around the Lough's entrance and main the shipping channel. Twelve wrecks are listed for the northern coast and shoreline of Islandmagee and five for the eastern coastline/ coastal waters. Despite the spatial patterning that the recording of shipwreck events suggests, the locations are not absolute, and refer to the nearest headland or other known topographic feature that the recorders made reference to. In terms of dates, the recorded wreckings range from 1764 to 1911, but are predominately from the mid-late nineteenth-century, and most are unnamed (Table 10.2, Figure 10.4 and Figure 10.5).

Table 10.2 Instances of Shipwrecking Events Recorded in the General Area[1].

Source: Historic Shipwreck Inventory, Centre for Maritime Archaeology, University of Ulster,Coleraine

Vessel Name	Date	Location	Description
Defiance	10.01.1903	Larne Harbour; 341486E, 404243N	Unregistered (local) 1-ton fishing yawl (in ballast) stranded in NE force 10-vessel was a total loss.
Elizabeth	15.12.1848	Larne; 341430E,403160N	No details given.
Erin	Jan.1850	Larne; 342197E,403741N	247-ton vessel lost near Larne.
Foam	22.08.1877	Near Larne; 341713E, 403236N	Unregistered (local) 5-ton cutter (in ballast) stranded in ENE force 6-vessel was a total loss.
Henrietta	28.10.1871	Larne Harbour; 341628E, 401997N	33-ton schooner, burnt.
Industry	20.09.1847	Larne; 341661E, 402644N	Sailing vessel went ashore at Larne.
Jane	Nov. 1798	Off Larne (in the roadstead); 342118E, 404574N	40-ton sloop sank off Larne and was later raised.
John Alexander	01.11.1855	Larne Harbour; 341817E, 402771N	En route from Belfast with cargo of coal when wrecked in gale at entrance to Larne Harbour.
Lord Nelson	20.09.1847	Larne; 341516E, 401581N	93-ton sailing vessel that went ashore at Larne.
Ruby	15.12.1848	Larne; 341313E, 403468N	Smack lost at Larne.
Agnes Wyllie	07.03.1887	Island Magee; 343193E, 400849N	40-ton (net) schooner of Carnarvon carrying cargo of potatoes was stranded and lost in a easterly force 1.

[1] *The archive was examined with specific attention given to the following geographic markers: Larne Lough, Larne, Barr's Point, Mill Bay, Island Magee, Skernaghan Point, Browns Bay, Ferris Point, Yellowstone, Castle Robin Bay, Port Muck Bay, White Cliff, Mullroy's Point, North Head, and the Isle of Muck.*

Vessel Name	Date	Location	Description
Ailsa	26.02.1892	1mile North of Port Muck, near Island Magee; 346008E, 40453N	1158-ton (net) steamship carrying cargo of general goods was stranded and lost in a SE force 5. Vessel registered to Glasgow.
Alfred	28.02.1882	Entrance to Larne Lough; 341998E, 402153N	43-ton (net) schooner of Belfast wrecked in a E force six. Vessel was carrying cargo of coal.
Arathusa	22.12.1894	Near Larne, Larne Lough; 342077E, 403025N	320-ton barque of Belfast stranded and lost in a NNW force 11.
Ariadne	09.01.1882	Skernaghan Point, Island Magee; 343823E, 403704N	148-ton brig of Norway carrying cargo of iron ore. Stranded and lost in a WSW force 6.
Berbrice	01.01.1827	Browns Bay; 343422E, 402856N	Ship of Greenock, grounded in Browns Bay, "likely to become stripped".
Blenkinsop	26.11.1866	Larne Lough; 342194E, 401023N	Schooner of Belfast became wrecked within Larne Lough.
Empress	0.9.01.1903	1m N of Portmuck, Island Magee; 345954E, 404051N	189-ton (net) steamship registered to Glasgow with cargo of coal. Vessel stranded and lost in SE force 2.
Fair Ellen (Helen)	25.09.1851	Lighthouse Point, Larne Lough; 342080E, 402936N	39-ton sloop of Belfast with cargo of coal, wrecked in NNE force 10.
Flora	05.12.1854	Inside Lighthouse Point, Larne Lough; 341930E, 402619N	107-ton galliot of Altona with cargo of fruit. Vessel became stranded in WNW force 9. Later got off, travelling to Belfast.
George	20.12.1876	Perch Point, entrance to Larne Lough; 341995E, 402810N	87-ton brigantine of Workington with cargo of coal, stranded and lost in a E force 7.

Vessel Name	Date	Location	Description
Harriet Preston	08.03.1854	On rocks near entrance to Larne Lough; 342496E, 403350N	Schooner (of Barmouth) became stranded but later got off and towed to Belfast.
Harrington	13.01.1916	Ferris Point; 342048E, 402812N	367-ton (gross) steamship of Londonderry with cargo of Potatoes, vessel wrecked at Ferris Point.
Isabella	07.02.1821	Island Magee; 345401E, 402953N	Sloop, ran aground 'expected to be lost'.
Jane and Ellen	28.06.1876	Yellowstone, Island Mageee; 342499E, 401556N	37-ton (net) schooner of Glasgow with cargo of lime (ballast), stranded and lost in N force 3.
Louisa	24.09.1889	Browns Bay; 343827E, 403025N	43-ton (net) schooner, registered to Campbeltown, with cargo of coal, stranded and lost in NNW force 7.
Peri	13.04.1869	Near Browns Bay; 342777E, 403481N	Vessel of Belfast, ran aground and sank.
Peridot	25/26.11.1905	Skernaghan Point; Island Magee; 34719E, 403600N	82-ton (241-ton gross) steamship of Belfast, in ballast. Vessel stranded and lost in SW force 5.
Tobago	07.09.1886	Skernaghan Point; 344010E, 404022N	281-ton (net) barque of London with cargo of molasses. Vessel stranded and lost in SW force 5.
Tuskar	27.11.1891	Near Skernaghan Point; 344100E, 403958N	288-ton (net) steamship of Glasgow carrying cargo of general goods. Vessel stranded and lost in SW force 2.

The actual location of wrecksites is perhaps more useful information, and only five sites have been positively identified at the north end of Islandmagee. The five sites are the wrecks of the *Berbrice* (1827), the *George* (1876), the *Harrington* (1916), the *Alisa* (1892), and the *Peridot* (1905), Table 10.3, Figure 10.6. The steamships *Alisa* and *Peridot* are positioned closet to the development, at a distance of 1.1km (south) and 1.2km (north) respectively. No wreck sites are listed for the area of seabed to be impacted by the proposed sea intake and outfall pipe.

Table 10.3 Known Wreck-sites listed in the Historic Shipwreck Inventory for waters surrounding Islandmagee peninsula

Vessel Name	Date	Vessel Type	Condition/ Location/ Depth
Alisa	26.02.1892	*Steamship* (British)	Badly broken up, part of wreck is onshore. Position precisely known 54.8525 lat/ -5.738217 long. Depth 1-5m.
Berbrice	01.01.1827	4-mast *rigger*	Scattered wreckage. GPS position 54.85368 lat/ -5.769783 long. Depth 5m.
George	20.12.1876	*Brig*	Scattered wreckage. GPS position 54.85087lat/ -5.78925 long. Depth 5m.
Harrington	13.01.1916	*Steam-coaster*	Scattered wreckage. GPS position 54.85207lat/ -5.78925 long. Depth 6m.
Peridot	25/26.11.1905	*Steamship* (British)	Wreck is badly broken up. Bow section located 20m W of Skeenaghan Point. Stern section and boilers located 10m E of Skernaghan Point with boiler breaking surface: 54.85972 lat/ 5.762533 long. Depth 10m.

Source: Historic Shipwreck Inventory, Centre for Maritime Archaeology, University of Ulster, Coleraine

It may be concluded from the information that exists to date that the archaeological risk associated with the marine survey area is low. The wider terrestrial archaeology helps to frame the study area; the proximity of the burial monuments to the sea indicate the importance of the maritime environment to the early settlers, while the presence of landing places, jetties, and small harbours surrounding Islandmagee demonstrates a more direct maritime perspective during the nineteenth- and twentieth-centuries.

10.2.1.3 Photographic Data

A series of photographic and video information was provided to assist in the archaeological assessment of the foreshore and subsea locations. The information was initially been gathered to address ecological aspects of the EIS for the present scheme.

Foreshore

The following foreshore information is based on an examination of a series of aerial and land-based photographs of the proposed Sea Water Intake and Brine Outfall locations.

Castle Robin Bay is a small horse-shoe shaped rocky inlet that is defined by the steep slopes of surrounding higher ground (Plate 10.29 and Plate 10.30). The terrain consists of marginal pasture which slopes downhill to the east. The inter-tidal foreshore consists of stone and pebble beach with rocky outcrops on its east side projecting out to sea to the north and south

and providing shelter to the western part of the cove. A cleft in the south slope of the surrounding higher ground allows access to the area and it is possible that small boats could be launched here from the foreshore. The sea-water intake will be located at the southeast corner of Castle Robin Bay, among the rocky outcrops.

The brine outfall pipe will be directionally drilled through the bedrock to the south of Castle Robin Bay. The foreshore at the proposed location consists of steep cliffs overlooking a narrow rocky shoreline that is exposed and largely inaccessible because of the steepness of the adjacent cliffs (Plate 10.31).

Seabed

Bathymetric data indicates a steep fall-off at the shoreline to -15m with outcropping rock trends aligned NNW-SSE. The rocks give way to a more gently sloping but continually deepening subsea surface, which is c. -27m deep at the proposed outfall termination point. The data indicates a relatively flat seabed in this location, with light undulations, some of which may result from sediment ripples (Figure 2).

A series of photographs and video footage further inform the nature of the sub-tidal seascape along the proposed sea intake and brine outfall route. The images show the shelving bedrock extending below the Low Water Mean and that exposed bedrock outcrops are also located further offshore. The relatively hard, compact, nature of the seabed presented in the images examined suggests that a low-medium archaeological holding content can be ascribed to the area under assessment. Station 19 is located at the Outfall terminus point. Inspection of seabed images from this location suggest a compact seabed comprising of a silty-sand with frequent deposits of rounded stones/ pebbles and crushed shell. Regular patches of seaweed anchored to the stone deposits. Occasional larger, sub-angular, rocks (< 0.40m x 0.40m) present. Again a low to medium holding-content has been ascribed for the terminus area. However, it should be noted that these images only represent snap-shot of the seabed along the proposed outfall route. As such, the full assessment of the archaeological potential of the seabed area in question is not possible at this stage.

Table 10.4 Photographic images of seabed taken at Benthic Stations as indicated in Figure 10.18.

Location/Description	Image
Station 8-9 (Figure 10.18) Inspection of underwater images from this location suggests a seabed comprising of shelving bedrock with a fine layer of overlying silty-sand. Frequent seabed deposits of angular rocks present. Seabed holding-content: low	 
Station 17 (Figure 10.18) Inspection of underwater images from this location suggests a compact seabed comprising of a silty-sand with frequent crushed shell (oyster, muscle, clam, etc.) and small stones/ gravel inclusions. Seabed holding-content: low to medium	

Station 19 (Figure 10.18)

Pipeline Terminus

Inspection of underwater images from this location suggests a compact seabed comprising of a silty-sand with frequent deposits of rounded stones/ pebbles and crushed shell. Regular patches of seaweed anchored to the stone deposits. Occasional larger, sub-angular, rocks (< 0.40m x 0.40m) present.

Seabed holding-content: low to medium

Station 21 (Figure 10.18)

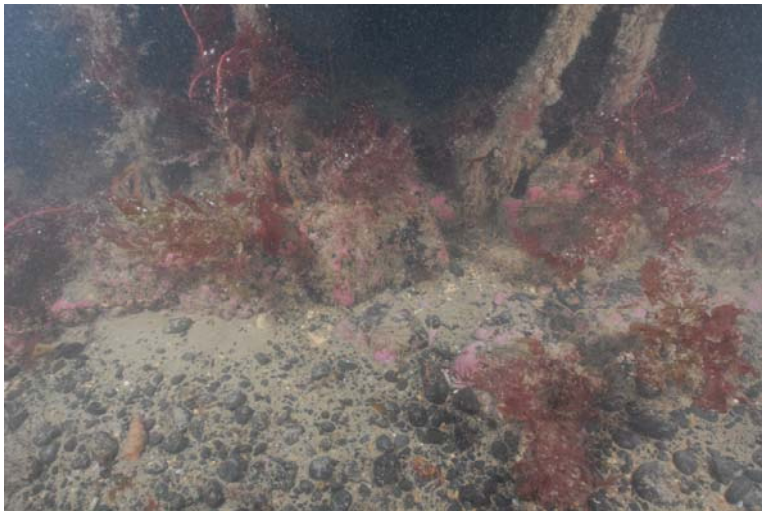
Inspection of underwater images from this location suggests a compact seabed comprising of a silty-sand with frequent deposits of rounded stones/ pebbles and crushed shell. Occasional larger stone present. Deposit of sand appears to be greater at this location.

Seabed holding-content: low to medium

Station 22 (Figure 10.18)

Inspection of underwater images from this location suggests a seabed ranging from sections of exposed bedrock and associated boulders (Landward) to a seabed comprising of a silty-sand and frequent stone/ pebble inclusions (seaward).

Seabed holding-content: low to

medium	
	

10.2.2 Impact of Development

The foreshore within the south east corner of Castle Robin Bay will be directly impacted by the proposed Sea Water Intake pipe. A direct impact to the foreshore 230m south of Castle Robin Bay will also be impacted by the launch-pit (direction drilling) associated with the insertion of the Brine Outfall pipe. Only one subsea area will be impacted by the proposed development, at the outfall discharge (HDD break-through-point), located 430m offshore at ING 345079.51E 403469.64N.

10.2.3 Conclusions

The number of shipwreck events recorded for the coastal waters surrounding Islandmagee indicate an area of relatively high archaeological potential, but this is tempered by the rugged, active nature of the rocky coastline within the development area, coupled with the compact nature of the seabed. The archaeological risk is consequently limited at both the sea-water intake and the outfall pipe launch-pit locations, where the foreshore is composed of shelving bedrock and overlying shingle deposits. The archaeological risk is however greater for the seabed surrounding the proposed outfall discharge point, where the potential for buried *in situ* archaeological material within seabed deposits still remains.

10.2.4 Suggested Mitigation Measures

10.2.4.1 Pre-construction Measures

A marine geophysical survey which covers an area of approximately 2km² around the proposed location of the intake/outfall has been commissioned. The specifications of the geophysical survey conform to the standards as set out by the Centre for Maritime Archaeology in response to a consultation request in relation to the present project[2], namely:

1. Sidescan sonar – range of 50m, line spacing of 30-50m. Dual frequency – 100Khz and 500Khz.
2. Magnetometer – ideally caesium vapour, line spacing of 30-50m.
3. Sub bottom profiles – Chirp or Boomer, line spacing of 30-50m.

A marine geophysical survey was commissioned in October 2009, however poor weather conditions delayed mobilisation of the survey vessel until late January 2010. The area was surveyed in early February 2010, however it was subsequently determined that the quality of the data recovered was not of the required quality. The area was re-surveyed in early March 2010, but it was not possible for the data to be processed and interpreted by a marine archaeologist prior to the submission of this EIS.

The geophysical survey data will be interpreted by a suitable maritime archaeologist and report will be submitted to the NIEA.

It is also recommended that the sea intake location and the brine outfall terminus points are archaeologically inspected in advance of construction.

Additional archaeological mitigation may arise following the sequence of geophysical data interpretation and onsite inspection.

10.2.4.2 Construction Phase Measures

It is premature to describe a detailed construction phase mitigation strategy since these details are still under design. Nevertheless it can be expected that a programme of archaeological monitoring may be required during seabed disturbances associated with the scheme, with the proviso for full excavation of any archaeologically significant material uncovered at this time.

10.2.4.3 Project Management Measures

Retaining An Archaeologist/s: An archaeologist experienced in maritime archaeology and dredging should be retained for the duration of the relevant works.

Time Scale: The time scale for the pre-construction and construction phases should be made available to the archaeologist, with information on where and when the various elements and ground disturbances and dredging will take place.

[2] *Correspondence from CMA to RPS 15 July 2009.*

Sufficient notice: It is essential for the developer to give sufficient notice to the archaeologist/s in advance of the pre-construction and construction works commencing. This will allow for prompt arrival on site to undertake additional surveys and to monitor ground disturbances. As often happens, intervals may occur during the construction phase. In this case, it is also necessary to inform the archaeologist/s as to when ground disturbance works will recommence.

Discovery of archaeological material: In the event of archaeological features or material being uncovered during the construction phase, it is crucial that any machine work cease in the immediate area to allow the archaeologist/s to inspect any such material.

Archaeological material. Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended. If it is not possible for the construction works to avoid the material, full excavation would be recommended. The extent and duration of excavation would be a matter for discussion between the client and the licensing authorities.

Archaeological team. It is recommended that the core of a suitable archaeological team, including an archaeological dive team, be on standby to deal with any such rescue excavation. This would be complimented in the event of a full excavation.

Secure Site Offices: Secure site offices and facilities should be provided on or near those sites where excavation is required.

Buoying: Buoying of any such areas would be necessary once discovered and during excavation.

Adequate Funds: Adequate funds to cover excavation, post-excavation analysis, and any testing or conservation work required should be made available.

Traffic: Machinery traffic during construction must be restricted as to avoid any of the selected sites and their environs.

Waste: Spoil should not be dumped on any of the selected sites or their environs.

All of the above observations and conclusions are based on the archaeological desktop information and maps supplied. Should any alteration occur, further assessment would be required.

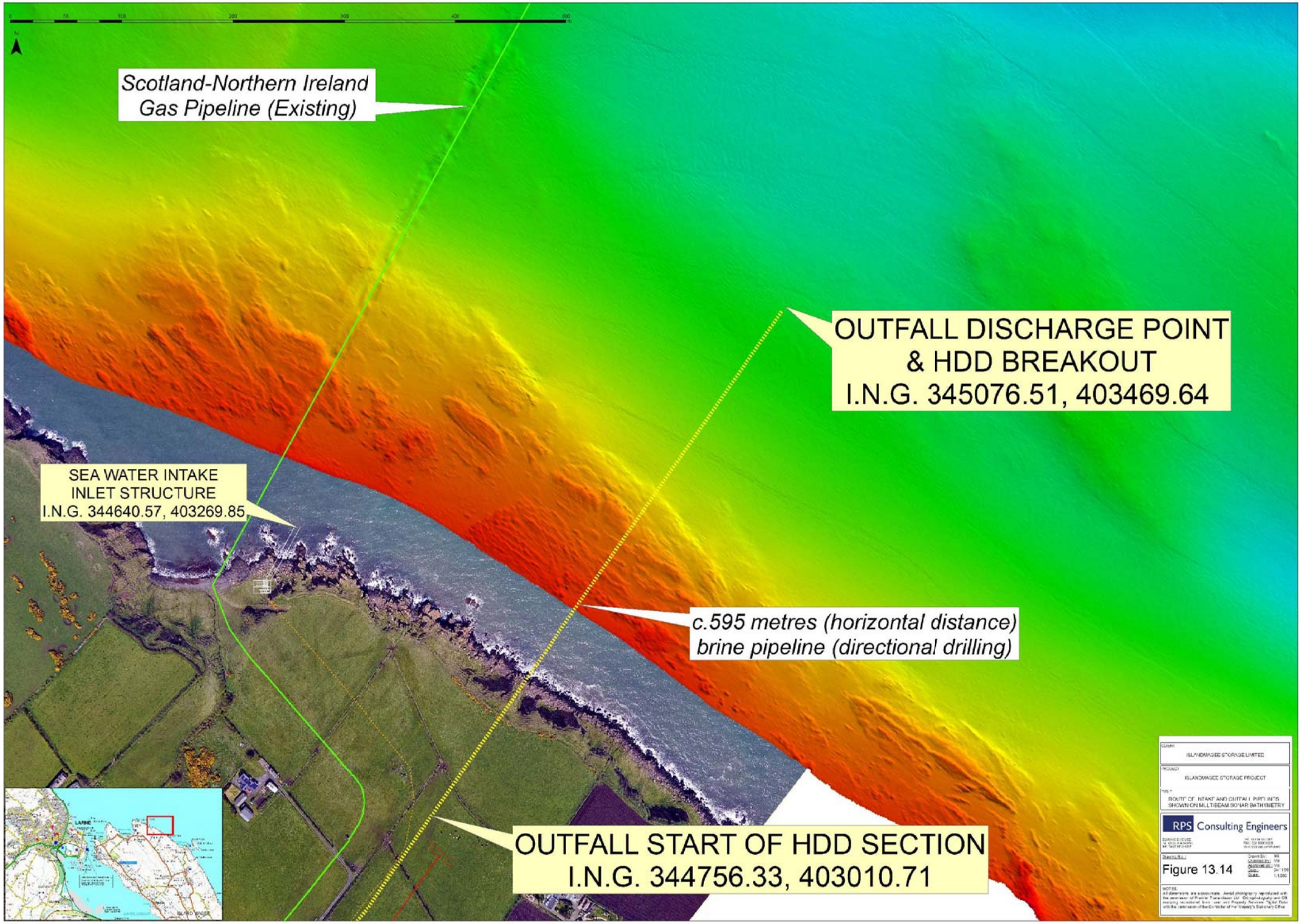
Recommendations are subject to approval by the regulatory authorities of the Northern Ireland Environment Agency.

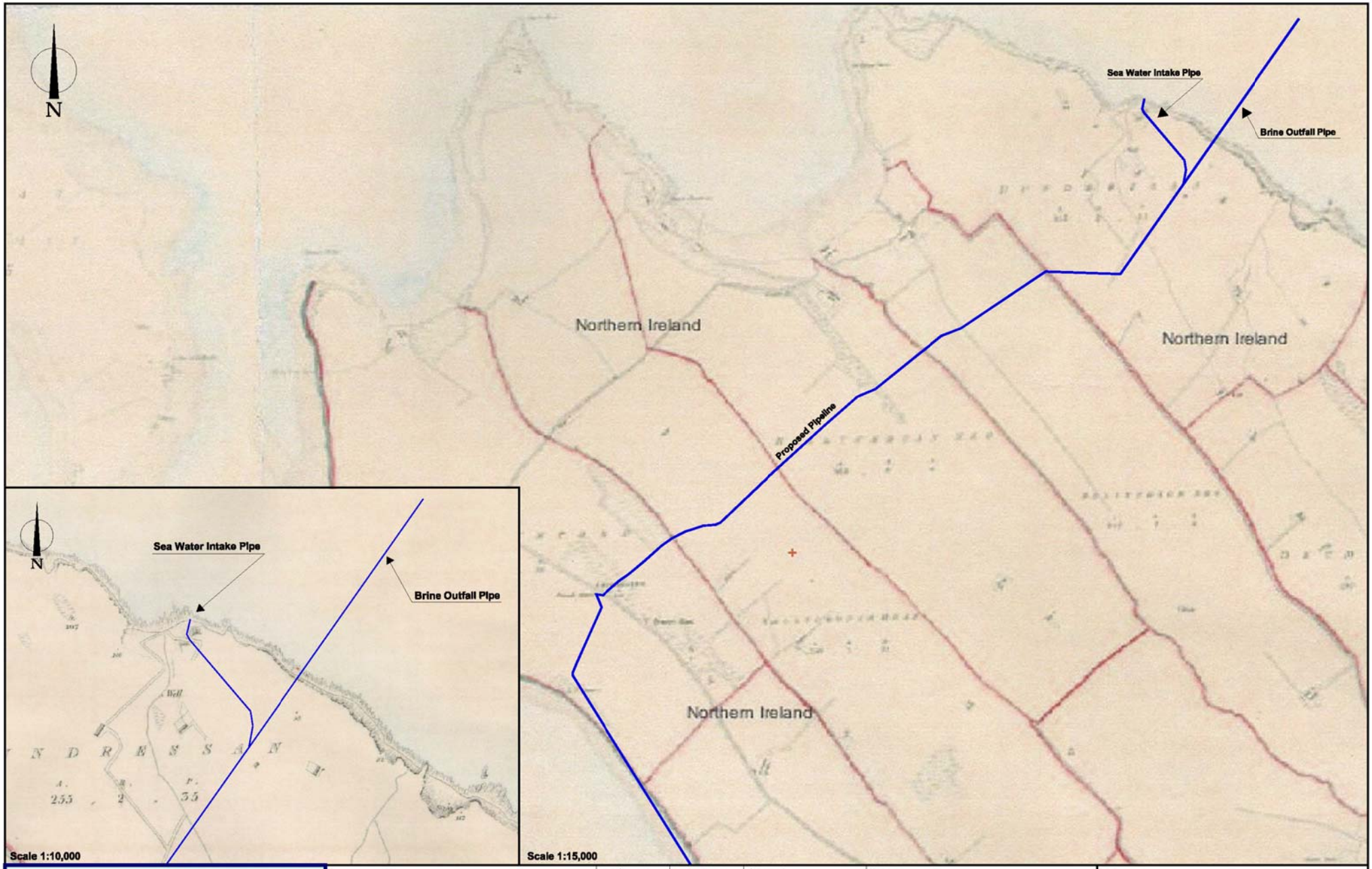
THE ARCHAEOLOGICAL DIVING COMPANY LTD.
Tel. 056 4440236 email: info@adco-ie.com

Notes
Source: RPS Group, Drawing Number IBE0096/002

Job/Exc No.	Compiled by	CAD reference	Client
———	R.Bangerter	IslandMagee	RPS Group
Date	**Scale**	**Drawing No.**	**Project**
09.03.10	1:20,000	Figure 1	Island Magee Storage Project

Title
Figure 1- High resolution aerial photograph of northern end of Island Magee peninsula showing location of proposed Pipeline, Brine Outfall, and Sea Water Intake.


Scotland-Northern Ireland Gas Pipeline (Existing)
OUTFALL DISCHARGE POINT & HDD BREAKOUT I.N.G. 345076.51, 403469.64
SEA WATER INTAKE INLET STRUCTURE I.N.G. 344640.57, 403269.85
c.595 metres (horizontal distance) brine pipeline (directional drilling)
OUTFALL START OF HDD SECTION I.N.G. 344756.33, 403010.71
ISLANDMAGEE STORAGE LIMITED
ISLANDMAGEE STORAGE PROJECT
ROUTE OF INTAKE AND OUTFALL PIPELINES SHOWN ON MULTIBEAM SONAR BATHYMETRY
RPS Consulting Engineers
Figure 13.14



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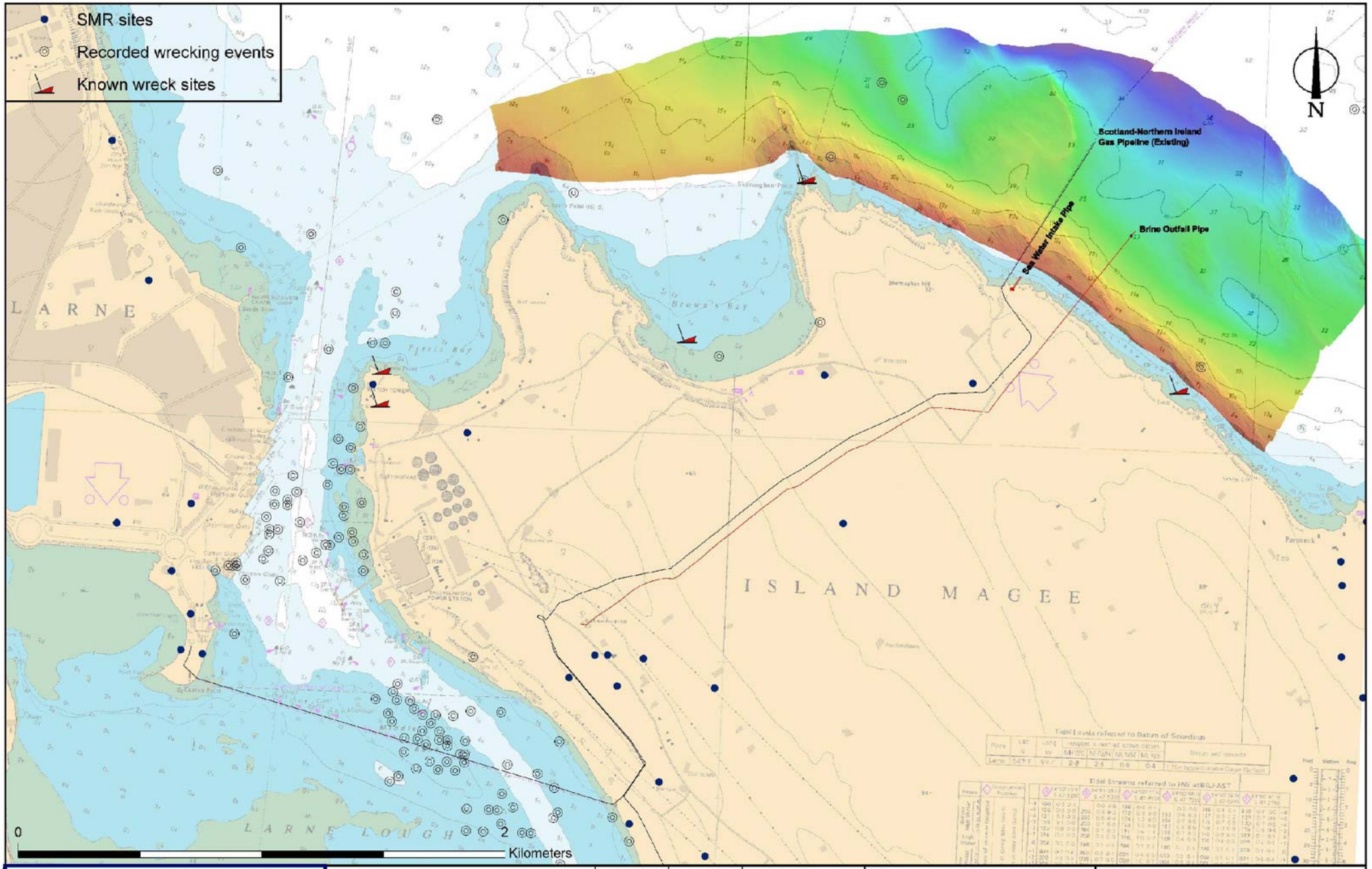
Notes
Source: OSI Historic Map Archive (Sheets: AM040 & AM041).

Job/Exc No.	Compiled by	CAD reference	Client
---------	R.Bangerter	IslandMagee	RPS Group
Date	**Scale**	**Drawing No.**	**Project**
09.03.10	1:20,000/ 1:10,000	Figure 3	Island Magee Storage Project

Title
Figure 3- Extract from First Edition (1832) OS mapping with proposed Pipeline, Brine Outfall, and Sea Water Intake superimposed.



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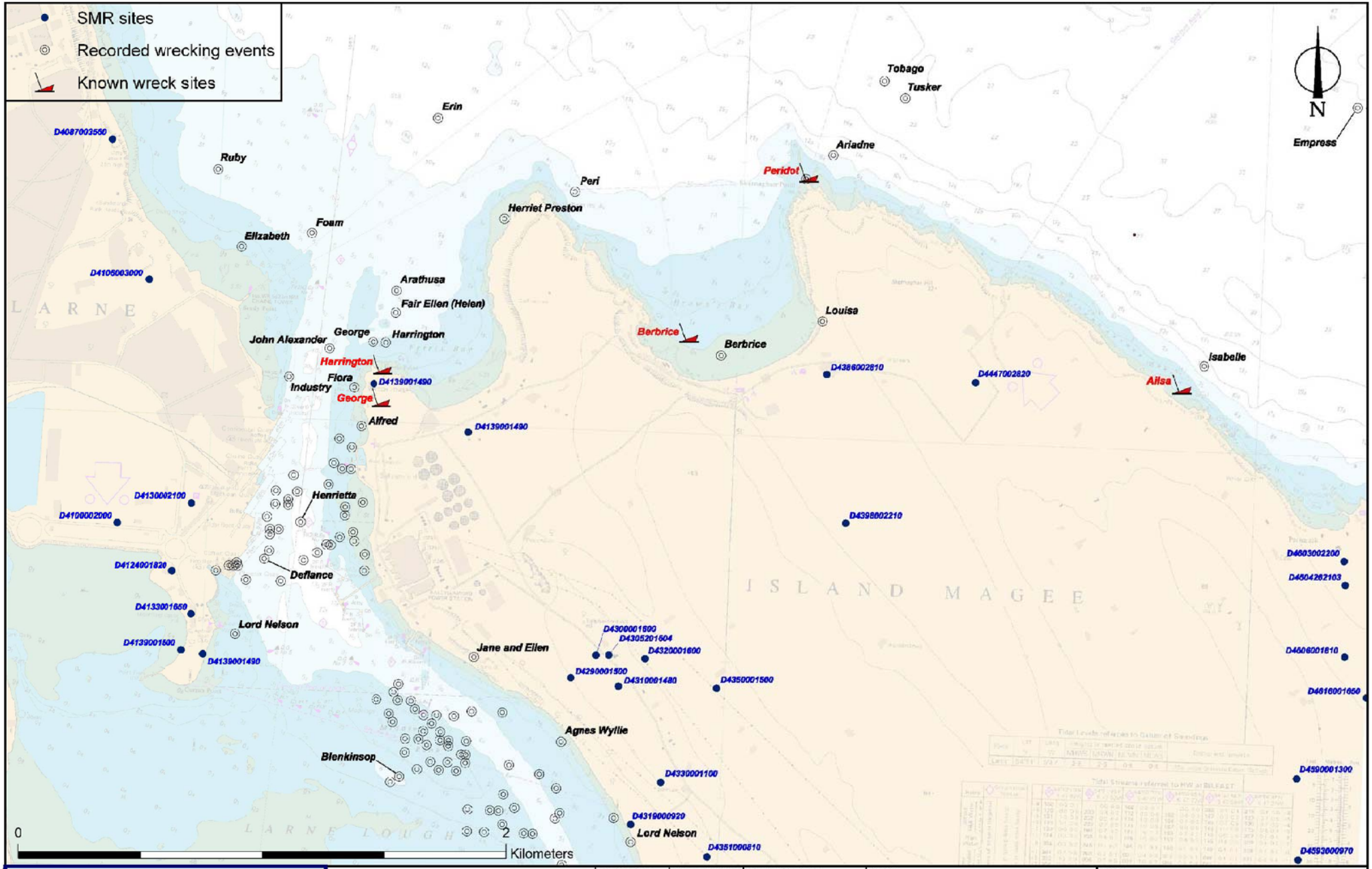
Notes
Shipwreck locations provided by the CMA, University of Colorado. This information is © Crown Copyright and reproduced by permission of the Controller of Her Majesty's Stationary Office and the UK Hydrographic Office.

Job/Exc No.	Compiled by	CAD reference	Client
-------	R.Bangerter	IslandMagee	RPS Group
Date	**Scale**	**Drawing No.**	**Project**
10.03.10	1:20,000	Figure 10.16	Island Magee Storage Project

Title
Figure 4- Extact from Admiralty Chart showing Multibeam Sonar Data, Known Wreck Sites, Recorded Shipwreck Events, & SMR Sites surrounding the prcposed development.



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Notes
Where no name is given the Shipwreck is classified as *Unknown*.
Shipwreck locations provided by the CMA, University of Coleraine. This information is © Crown Copyright and reproduced by permission of the Controller of Her Majesty's Stationary Office and the UK Hydrographic Office.

Job/Exc No.	Compiled by	CAD reference	Client
-------	R.Bangerter	IslandMagee	RPS Group
Date	**Scale**	**Drawing No.**	**Project**
10.03.10	1:20,000	Figure 10.17	Island Magee Storage Project

Title
Figure 5- Extact from Admiralty Chart with an annotated list of Known Wreck Sites, Recorded Shipwreck Events, & SMR catalogue numbers superimposed.

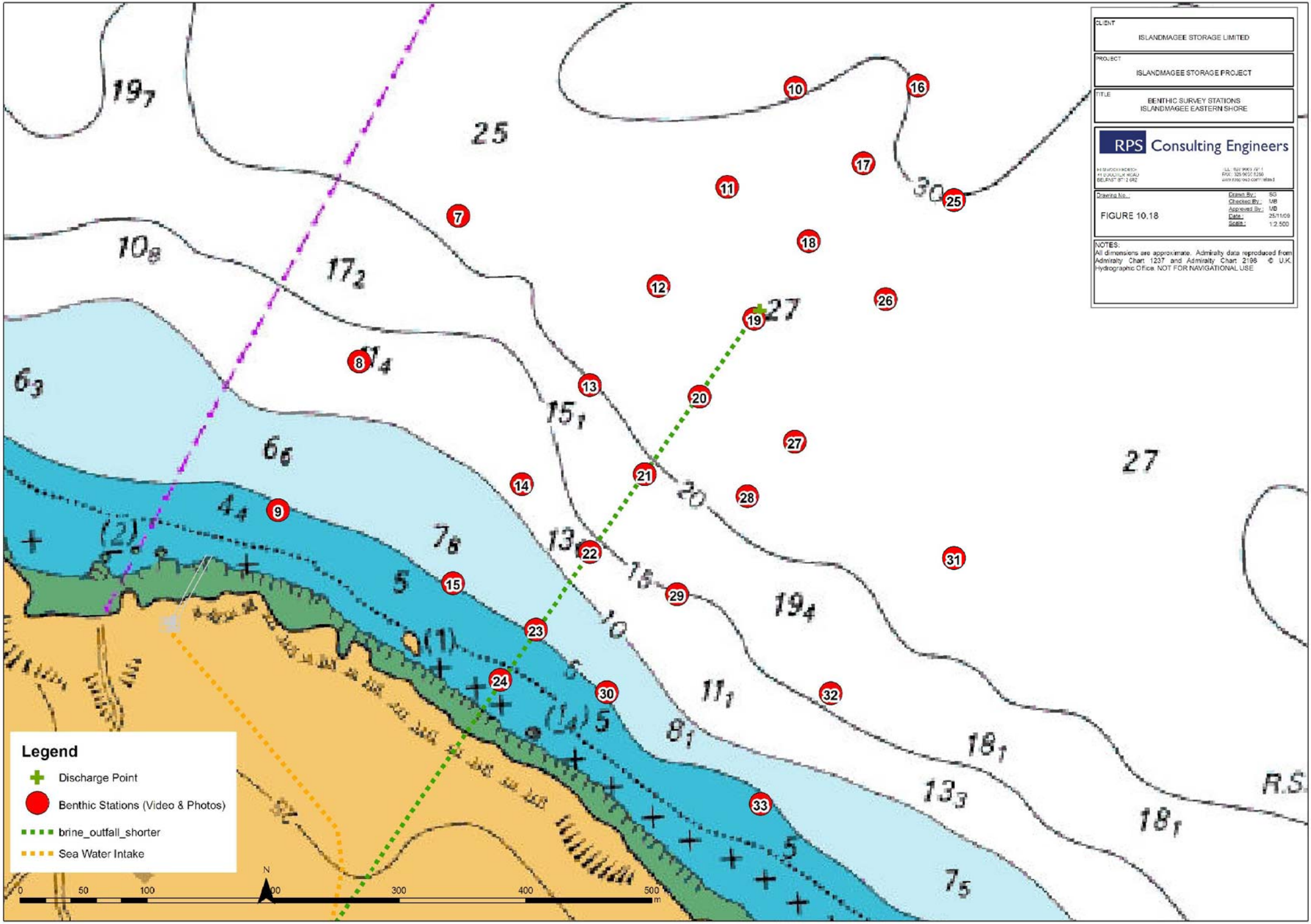
CLIENT
ISLANDMAGEE STORAGE LIMITED
PROJECT
ISLANDMAGEE STORAGE PROJECT
TITLE
BENTHIC SURVEY STATIONS
ISLANDMAGEE EASTERN SHORE
RPS Consulting Engineers
Drawing No.:
FIGURE 10.18
Drawn By: SG
Checked By: MB
Approved By: MB
Date: 25/11/09
Scale: 1:2,500
NOTES:
All dimensions are approximate. Admiralty data reproduced from Admiralty Chart 1237 and Admiralty Chart 2196 © U.K. Hydrographic Office. NOT FOR NAVIGATIONAL USE
Legend
Discharge Point
Benthic Stations (Video & Photos)
brine_outfall_shorter
Sea Water Intake
N
0
50
100
200
300
400
500
m

Plate 10.29 Southeast-facing view across shinge foreshore at Castle Robin Bay

Plate 10.30 North-northeast view across proposed sea water intake pumping station site

Plate 10.31 South-facing view along cliffs beneath which outfall will be tunnelled

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