Galway Harbour Company

Galway Harbour Extension

Response to Observations and Recommendations made by Department of Arts, Heritage and the Gaeltacht to An Bord Pleanála on 5th December 2014

January 2015

INTRODUCTION

THIS DOCUMENT ADDRESSES THE OBSERVATIONS AND RECOMMENDATIONS MADE BY THE DEPARTMENT OF ARTS, HERITAGE AND THE GAELTACHT IN THEIR LETTER DATED 5TH DECEMBER 2014 TO AN BORD PLEANÁLA (REF:SID-2014-GE-02).

While paragraph numbering was not present within the letter from the Department, where possible, reference has been made to relevant page numbers in the submission, for ease of reference. This response submission also makes reference, where relevant, to previous observations from the Department, submitted to An Bord Pleanála on the 11th of March 2014 and refers to the previously submitted Natura Impact Statement Addendum/Errata Document (dated October 2014), which was submitted as part of a response to a Request for Further Information to An Bord Pleanála in October 2014. Any additional Addenda and Errata arising subsequently, have been collated into an NIS Addendum/Errata Document II (dated January 2015) which accompanies this submission.

The information within the response submissions should be read in conjunction with each other and the two Addendum/Errata documents, but the most recent Addendum Errata Documents (January 2015) contain the most up to date information regarding impact assessment and conclusions. Therefore information within the January 2015 document should be considered to supersede the information in previous documents, as applicable.

Nature Conservation

Observations relating to the Natura Impact Statement and Appropriate Assessment
Marine Annex I Habitats (Page 2, DAHG Submission)

Response 1:

It is acknowledged that the Department had previously recommended that that information incorporated within the EIS documentation should be replicated within the NIS to ensure that the latter document could exist as an independent assessment. It was indicated that the following should be included:

- Chapter 8 on Water in the EIS
- Appendix 4.2 Environmental Management Framework
- Appendix 4.3 Oil Spill Contingency Plan
- Modelling on the hydrodynamic environment
- Management of invasive species
- Management of catastrophic events/oil pollution

It is acknowledged that the Department consider that the above issues were transcribed as appendices to the NIS (NIS Addendum/Errata Document October 2014) or have been incorporated as changes within the body text of the NIS document (NIS Addendum/Errata Document October 2014) and that the Department considered this a significant improvement on the previous iteration of the NIS.

In-combination assessment (Page 3, DAHG Submission)

The Department expressed an issue with regard to the conclusion of indeterminate effect on the Galway Bay Complex cSAC from historical development.

Response 2:

In response, following more critical analysis of impacts, there are no longer indeterminate conclusions within the document and the permanent loss of Annexed habitats is confirmed.

Other projects (Page 3, DAHG Submission)

The Department outlined that scoping requests have recently been circulated to the Dept. for comment, including the Bearna Greenway coastal pathway and a plan to undertake maintenance dredging in Galway Harbour.

Response 3:

As part of their future consent processes, the Bearna Greenway and harbor maintenance dredging projects are likely to be required to be subject to Appropriate Assessment by the relevant competent authorities. These two projects will be required to consider the in-combination effects that arise as a result of the GHE development.

Coastal lagoons (priority habitat) (Page 3 and 4, DAHG Submission)

The Department have expressed concern regarding possible impacts to Renmore Lagoon as a result of increased sheltering and stabilization of the existing natural barrier.

This matter is also raised in the Section within these Observations on ***Terrestrial and Coastal Habitats*** *(on Page 4 of the DAHG Submission).*

It is acknowledged that the Department accept the previously submitted information with regard to Lough Atalia Coastal Lagoon and they consider the proposed mitigation to dredge on an ebb tide as practical and appropriate.

Response 4:

We confirm that there will be increased shelter to Renmore Beach, Cromwell's Fort and as far as Ballyloughane Beach. The consequences of this shelter are that the stability of the barrier will be enhanced. The barrier will not become more impermeable. The link to Lough Atalia is the main hydrological channel to the Renmore Lagoon and this will not be impacted. Overtopping will still occur periodically under extreme storm surge events. However velocities of this overtopping will not mobilise stones and cobbles and therefore encroachment such as that in January 2014 will not arise. Landward encroachment of stony bank material into Renmore Lagoon will be extremely unlikely to occur in the future scenario.

Terrestrial and Coastal Habitats (Page 4, DAHG Submission)

The Department have requested an updated map/drawing of the original habitat map (such as that presented in Figure NIS(A) 5.1) which shows the areas of the respective habitats and habitat complexes, including changes in distribution following the winter storms. Clarity regarding whether the habitats are within the cSAC or not is also sought.

Response 5:

Dr. Michelene Sheehy-Skeffington, an acknowledged expert on salt marshes and stony bank habitats in Ireland, was commissioned to undertake a site visit and to prepare a report in the light of the comments raised within An Bord Pleanála's Request for Further Information and comments from DAHG, in March 2014. As a field botanist, I am familiar with the shingle ridge at Renmore Lough and have visited it on many occasions to record plant species since the 1980s. In order to respond to the relevant points, the site was visited on 22nd July, 2014, with the findings outlined below, and also incorporated into the Response to the Request for Further Information and NIS Addendum/Errata Document (October 2014).

Following an additional submission in December 2015, additional clarification was provided, including updated mapping information. This updated version of the information is presented below (i.e. the information below includes an update in January 2015 and is therefore slightly different to that provided in the Response to the Request for Further Information).

Note that this additional information has also subsequently been included in NIS Addendum/Errata Document II (January 2015).

A visit was made to the seaward edge of L. Atalia to establish the changes in habitat brought about by the winter storms. The upper strandline, shingle area and habitat immediately north of this ridge were walked.

The shingle bank, formerly *ca* 1m in height, was observed to have been completely altered. Most of the shingle has been moved inland, forming a spit immediately to the south of Renmore Lough (site number 1 in Fig. 1 and area outlined in blue in Fig. 2). More shingle was spread along the inner edge of the grassy bank that used to form the inner (northern) edge of the shingle. It is likely that there were two sources of shingle : 1) that present on the shore line and 2) material thrown up from the sea floor to the south of Renmore Lough. The shingle has been moved to such an extent that the seaward edge now forms part of the strandline and vegetation comprises species tolerant of tidal submergence such as spear-leaved orache, sea rocket, sea mayweed and sea radish. On the higher ground, the vegetation and its soil was broken up, but still formed a band of grassy vegetation with creeping bent grass, perennial ryegrass, red fescue and false oatgrass forming the grass layer and a mixture of ruderal (weed) species such as colt's foot, nettle, ragwort, perennial sow-thistle and smooth sow-thistle, along with calcareous coastal grassland species such as ribwort plantain, field medick, bird's foot trefoil and kidney vetch.

The shingle, between sections of grassland, supports sea radish, spear-leaved orache and curled dock.

Notable on the strandline and shingle was the rare blue lettuce, once abundant on the shingle, but which had disappeared in recent years. This is the only known site for this alien species in Ireland. The disturbance of the storms has exposed the seed-bank and this and the rare native black mustard (*Brassica nigra*), have appeared, the latter occurring sporadically on the inner edge of the shingle. This is the first time the black mustard has been recorded not only here, but in all of east county Galway (map Fig. 3), though it has been recorded on Inishbofin and on Inishmore, Aran Islands in the past. Another rare coastal transient species that used to be common on this shingle bar is henbane. It has disappeared since the 1980s, but the recent storm-induced re-working of the shingle and exposure of dormant seed banks may yet bring about a return of the species. This illustrates the conservation interest of such naturally disturbed habitats as shingle. Such intermittent disturbance is essential to maintain this habitat. The proposed development is likely to significantly reduce this disturbance and therefore will reduce the extent and occurrence of the habitat and its constituent species.

Though the former shingle ridge has largely now been flattened and the shingle is close to the strand-line, observations indicate that the current High Water Spring Tide does not encroach on this shingle. In other words, it is not low enough to be susceptible to regular inundation by the sea from the south. Thus the effect of the proposed development, by decreasing exposure to storms, will stabilise the shingle, resulting in it being colonised by species from the adjacent grassland. The proposed development will not affect the frequency and extent of tidal inundation and the source of saline water will continue to be from the north, via L. Atalia. Only storm surges (extreme high tides) will wash over the shingle, but these, if regular enough, *i.e.* ca at least every 10 years, will prevent the spread and establishment of scrub with bramble sycamore and ash –all noted sporadically on this ridge. The complex of shingle and strandline vegetation comprises a mosaic of grassland and EU Habitats Directive Annex I habitats 1210 Annual vegetation of drift lines and 1220 Perennial vegetation of stony banks. This area is depicted in Fig. 2, which also indicates the relevant extent of the cSAC in the area. The total area of this complex inside the blue boundary is 0.31ha, of which 0.18ha lies within the cSAC.

The southwest edge of the shingle merges into an eroded salt marsh. It is not clear to what extent it was intact before the storms, but it probably has been fragmentary for some time. Upper marsh species are present such as red fescue, sea milkwort, sea arrow-grass, salt marsh rush, scurvy grass and sea aster. The shelter provided by the proposed development

may stabilise this salt marsh and result in it becoming less fragmented, though not significantly greater in extent.

Most of the vegetation landward of the shingle bar comprises marsh and wet grassland. A small, probably brackish, pond has abundant reedmace (area 2 on map Fig. 1) and areas possibly intermittently flooded support extensive creeping bent grass with a fringe of sea rush. The edge of the inlet south of the railway line is bordered by some sea rush and salt marsh rush as well as sea club-rush and all three species indicate that this is largely a lagoonal type salt marsh. All of this area is mapped as brackish saltmarsh in Fig. 1. The drier –more elevated– parts of this area support bracken and some hawthorn bushes (disturbed grassland/hedgerow on Fig. 1). Some reed also occurs nearer the railway line.

In summary, there is now a low area of cobbles below High Water Spring Tide (HWST) with strand-line species as well as the higher bank behind this that comprises mixed shingle and grassland on soil. This bank would only be overtopped by a storm surge. The proposed construction will attenuate the wave force and therefore it is less likely that the shingle bank will be structurally altered to any extent in the future, least of all to the extent it was in January 2014. The proposed construction will not affect the flooding of Renmore Lough, via the inlet from Lough Atalia to the north, and therefore the salinity of the lagoonal salt marsh and grassland will not alter significantly. The vegetation, already a mosaic of species tolerant of brackish or saline water (lagoonal marsh) is thus unlikely to alter to any great extent.

The area to the east of Renmore Lough, which comprises a narrow shingle bank above a rocky shore as far as Ballyloughan Beach will be afforded the same level of protection from the proposed development, i.e. reducing its exposure to and disturbance from storms. However, this shingle shore is narrower and does not support a wide assemblage of shingle species, aside from the ubiquitous sea radish and therefore its habitat quality will not be significantly altered. There is no significant area of shingle along Ballyloughan Beach itself. Further to the east, the promontory opposite Hare Island has been protected from storm action by rock revetment and is of little to no conservation value.

An amended habitat map and information regarding the areas of respective habitats has been prepared and included within the NIS Addendum/Errata Document II (January 2015). An additional figure shows the extended area of single to the south of Renmore Lough following the storms of January 2014 and also indicates the position of the cSAC. Both maps have been presented below as Figure 1 and 2.

The area of the stony bank habitat at the isolation hospital and the shoreline that was built upon to the south east of Galway Harbour Enterprise Park was 0.28ha. The area of the stony bank near Renmore Lagoon before 2014 was estimated at 0.10 ha. The present area of stony bank is 0.31ha (see area outlined in blue in the figure below) of which 0.18 ha is inside the cSAC boundary. The map (Figure 1) is attached herewith showing the cSAC boundary. The total area therefore that has been and will be impacted is 0.28 ha plus 0.18 ha = 0.46 ha.

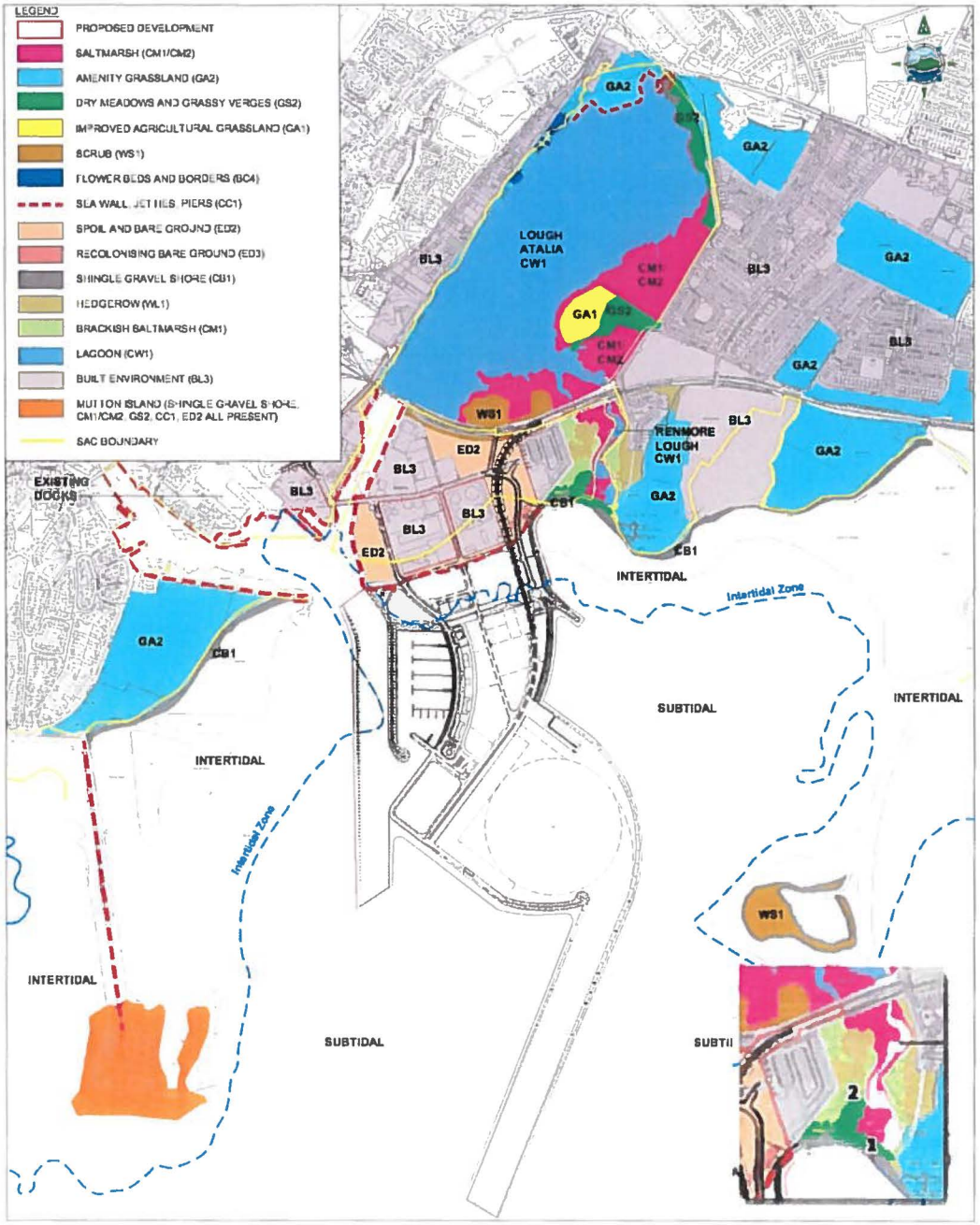

Figure 1. Terrestrial habitats present in the vicinity of the proposed harbour extension N.B. Brackish saltmarsh is not defined by Fossitt (2000).

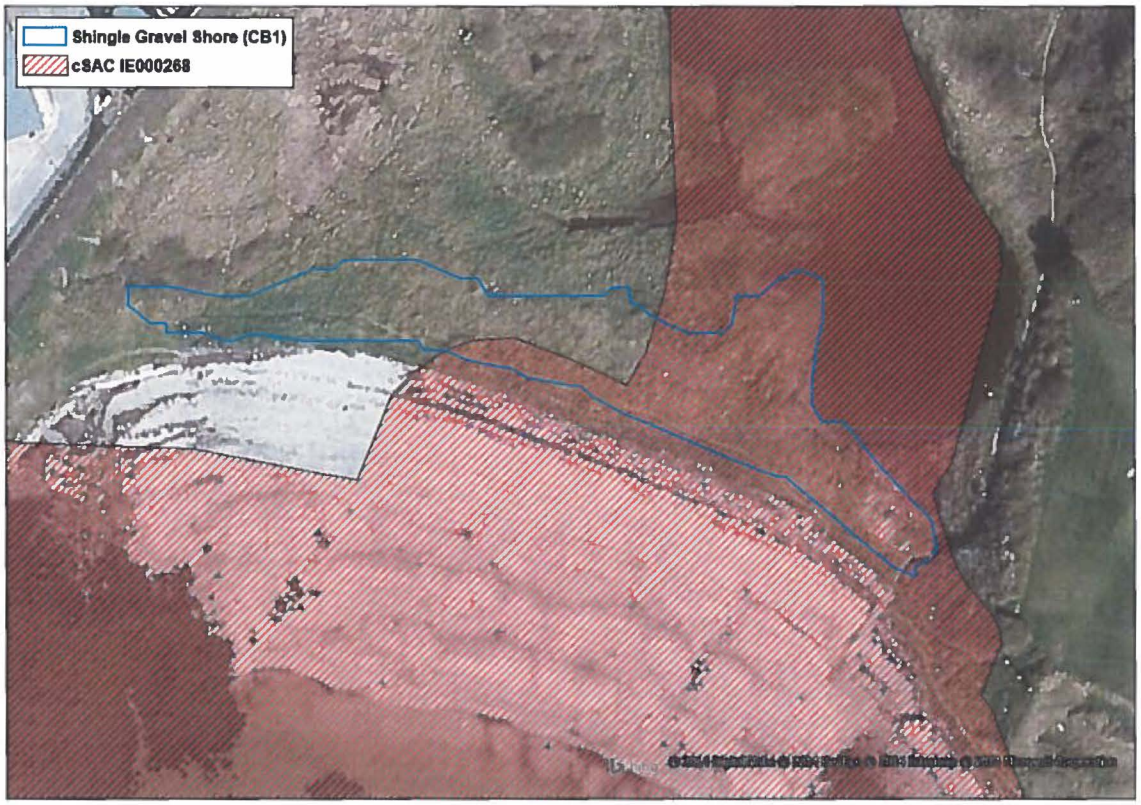

Figure 2. Extended area of shingle outlined in blue and boundary of cSAC in striped red.

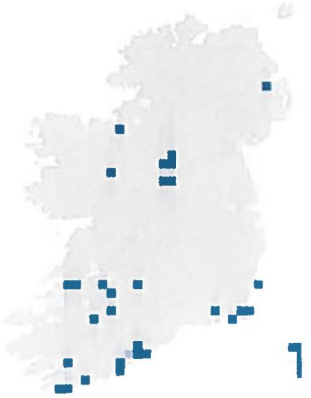

Fig. 3. BSBI map of 10 x 10km squares where Brassica nigra was recorded in Atlas 2000 (Preston et al 2001). Lighter squares represent pre-1970 records. Note its complete absence from mainland County Galway and from inner Galway Bay specifically.

The Department have also sought clarification on the likely significant effects of the proposed development on coastal habitats and on other coastal habitats in the SAC further east, with specific reference to the relevant attributes and targets of the site specific conservation objectives for each of the qualifying interest habitats in question. They have indicated that any related modelling should be used to support the determinations.

Response 6:

The area to the east of Renmore Lough, which comprises a narrow shingle bank above a rocky shore as far as Ballyloughan Beach will be afforded the same level of protection from the proposed development, i.e. reducing its exposure to and disturbance from storms. However, this shingle shore is narrower and does not support a wide assemblage of shingle species, aside from the ubiquitous sea radish and therefore its habitat quality will not be significantly altered. There is no significant area of shingle along Ballyloughan Beach itself. Further to the east, the promontory opposite Hare Island has been protected from storm action by rock revetment and is of little to no conservation value.

The coastal process models of Galway Bay used in the assessments were developed and applied to extreme return period hydrodynamic and wave climate conditions of a severity worse than observed in December 2013 and January 2014 and the results and impact findings presented remain valid over the full range of hydrodynamic and meteorological conditions.

Harbour Seal (Page 4, 5, 6 DAHG Submission):

With regard to Harbour Seal, the Department has expressed issues with regard to the following items:

- *Clarity of the conclusions and mitigation measures supplied to date.*
- *Concentration of desktop analysis on individual impacts of selected activities (e.g. dredging, pile driving, etc).(Page 5, DAHG Submission)*
- *Clarity with regard to the proposed use of Acoustic Deterrent Devices (ADDs) and their intended role within the construction and operation of the project.(Page 6 DAHG Submission)*
- *Clarification with regard to how the estimates of proximity causing Permanent Threshold Shift (PTS) or Temporary Threshold Shift (TTS) in seals were arrived at. (Page 6, DAHG Submission).*
- *Assessment of impact with regard to underwater shipping noise and its management and/or mitigation.*
- *Further information regarding vessel collision with seals*
- *Clarification regarding Seal Haul out during Moult Period*

Response 7:

In the interests of clarity, relevant information pertaining to impacts on seals and cetaceans which was included within EIS Chapter 10, has now been incorporated into NIS Addendum/Errata Document II (January 2015).

Following more critical analysis and inclusion of additional design refinements to the scheme, which include a wildlife pass (as presented in Figure NIS(A2) 2.1 of the NIS Addendum/Errata Document II, January 2015), Table 4.24, which considers impacts on Harbour Seal, has been amended in the NIS Addendum/Errata Document II (January 2015).

The current population estimate for Harbour seal in the Republic of Ireland is a minimum of 3,489 (NPWS Article 17 report, 2013). The latest published figure for the population counted in the two main areas of importance for this species in inner Galway Bay was 289 (130 in Kinvara Bay and 159 in Oranmore Bay) in 2011 (NPWS report). Surveys carried out by the development EIS team indicates that there may be approximately another 30 Harbour Seal in other parts of inner Galway Bay, giving an estimated population of approximately 320.

This would equate to approximately 9% of the national population and therefore inner Galway Bay is a very important site both nationally and regionally for this species. Maximum counts from elsewhere in the Republic of Ireland during 2011 recorded the following important populations: Ballysadare Bay, Co. Sligo, 270; Kenmare River, Co. Kerry, 309; inner Bantry Bay, Co. Cork, 365.

Kelp Marine Research (who completed the desktop analysis and risk assessment for marine mammals, as presented in response to the Request for Further Information), used available information from within Ireland, but found that this was sparse and mostly in the form of reports. All of the available documentation was used and cited.

With regard to information on multiple impacts, published information for similar developments is not generally available, rather only, information for individual impacts. In that instance it was considered that the approach adopted as part of the marine mammal risk assessment was representative of the types of work that will occur as part of the project.

Acoustic Deterrent Devices (ADDs)

Regarding the use of Acoustic Deterrent Devices (ADDs) the Edren et al (2013) paper referred to is inconclusive regarding the use of ADDs. Underwater noise levels were not measured as part of that study. Reference is made to extremely high noise levels measured on other projects using a different method of piling which is significantly louder than that used during the Edren *et. al.* study. The majority of the piles driven during that study were either smaller diameter piles or driven using vibratory drivers. Noise levels from vibratory piling are in the order of 175-182 dB. Edren *et. al.* state that the seal deterrent used in their study had a source level of 189 dB. It is therefore probable that the seal deterrent has an effect equal to or greater than the pile driving activity. The Edren *et. al.* study found a significant short-term decrease in the number of seals on land during sheet pile driving. It is possible that the seal deterrent displaced the seals from the area but the study is inconclusive on this issue also.

Schakner & Blumstein (2013) conducted a review of current practice regarding the use and effectiveness of marine mammal deterrents. They describe at least four potential management concerns regarding their use: impacts on non-target wildlife, animal welfare, applicability and overall effectiveness. Describing Acoustic Deterrent Devices (ADDs) as one of the most widespread non-lethal deterrent methods implemented for marine mammal/fishery conflict. They cite the 'so called "dinner bell effect" observed when depredators learn to associate the deterrent sound with food resources'. In order to avoid the dinner bell effect, the source level of most ADDs on the market can potentially influence hearing by causing temporary threshold shifts or even risk permanent hearing damage. They recommend a cautious approach to deterrents and 'emphasise that the value of using a threatening or painful stimuli is that if effectively conditioned, it can create long-term learned avoidance that does not require using the painful stimulus in the future.' They view the use of deterrents, ultimately, as a welfare-friendly solution to human-wildlife conflict.

While Schakner & Blumstein (2013) concluded that acoustic pingers were effective for dolphin and porpoise species, the evidence indicates that seals tend to habituate to the sound if it is not sufficiently loud to cause 'fear conditioning' in the animals and thus risk hearing damage. The unintended consequence of 'fear conditioning' on this project may be to deprive a Qualifying Interest species of a foraging area post-construction. For this reason it is not proposed to use ADDs unless there is a greater risk to an animal which has habituated to blasting or pile driving and is at risk of permanent hearing damage from construction noise. If such a case were to arise during the course of construction a derogation licence would be sought from the National Parks and Wildlife Service for the use of ADDs.

Blasting Noise, Permanent and Temporary Threshold Shift

Blasting noise is dealt with in section 10.5.2.3 of the EIS. For blasting, the estimates of proximity causing PTS and TTS are the same as those given for impulsive piledriving and are thus not significantly shorter than those for piledriving. Tables 10.5.3 to 10.5.5 of the EIS (also provided as Appendix I of the NIS Addendum/Errata Document II, January 2015), show the predicted impact distances that have been calculated. Noise modelling for blasting and impulsive piledriving has predicted the following ranges for Harbour Seal: permanent threshold shift (PTS, permanent hearing damage) 100 metres, temporary threshold shift (TTS, temporary hearing damage) 500 metres, disturbance high within 100 metres, disturbance moderate with 1,000 metres and disturbance low at greater than 1,000 metres. Modelling for construction activities has predicted the following ranges: PTS 60 metres, TTS 350 metres, disturbance high within 100 metres, disturbance moderate with 1,000 metres and disturbance low at greater than 1,000 metres. Modelling for shipping traffic impact has predicted the following ranges: PTS, does not occur, TTS, less than 2 metres, disturbance high within 100 metres and low at greater than 100 metres. No major haul-out site lies within

one kilometre of the proposed work site and no known moulting or breeding haul-out sites lie closer than 1.5 kilometres from the proposed work site. Low levels of disturbance at greater distances than one kilometre cannot be ruled out, but it should be remembered that the shallow nature of the inner bay, along with Mutton Island and Hare Island and their associated causeways will serve to muffle sound to greater degree than would be the case in a deeper water site.

The marine mammal risk assessment complied by Kelp Marine Research should be read in conjunction with the information given in chapter 10 (Noise and Vibration) of the EIS. Information on the hearing of pinnipeds is given in section 10.3.5.2 of the EIS and details of the information used to define TTS and PTS levels are given in section 10.3.6.2. The sources of data from which critical levels for the hearing of seals and other marine mammals have been obtained are detailed in Finneran *et al.* (2002) and Southall *et al.* (2007) and these were used for the assessment.

Section 10.5.1 of the EIS sets out in detail the various underwater noise sources. While drilling is not given a section of its own Table 10.5.1 does provide a source level for an offshore drilling rig at 185 dB. Kyhn *et. al.* (2014) measured the source level of another offshore drillship at 184 dB. The drilling required for this development will be significantly quieter than either of these two examples. Noise from dredging, which will take place in the same area and will be louder than drilling noise and this has been addressed in section 10.5.2.1 of the EIS.

Appendix 10.2 of the EIS provides detailed plots of underwater noise levels arising from activities along with species specific threshold values. The threshold values are set out in Tables 10.3.1 and Table 10.3.2 of the EIS and conform with best international practice. Based on the plots in Appendix 10.2, Appendix 10.3 provides detailed maps indicating the areas underwater noise could have a potential impact. This methodology is based on the DAHG Guidance (2014). Appendices 10.2 and 10.3 formed the basis from which the ecologists prepared the risk assessment. This is stated on pages 6, 7 and 20 of the Risk Assessment. Table 1 of the Risk Assessment is based on Table 10.5.3 and Table 10.5.4 of the Environmental Impact Statement.

The potential zones of disturbance have been set out in Tables 10.5.3, 10.5.4 and 10.5.5 and Appendices 10.1 and 10.2. These have been examined by Kelp Marine Research, marine mammal ecologists. Kelp Marine Research concluded that 'Marine mammals either are unlikely to be affected at a population level (grey seal, minke whale, common dolphin, bottlenose dolphin), or are likely to recover from any impacts of the construction activities (harbour seal, harbour porpoise).

Underwater Shipping Noise

Regarding the long term impact of shipping noise, the zone of disturbance from a moving vessel is shown on the plots in Appendix 10.3 of the EIS. This is shown in the shipping channel on each plot. When at the dockside the noise emissons from a ship will be lower than this as the main propulsion engine will be shut down. The footprint will be smaller as a consequence.

With the introduction of shore power the noise emissions from ships in port will be lower again. There is no risk to species in the outer bay as due to low frequency noise cut-off, shipping noise does not propagate out the bay effectively.

Vessel Collision

Research from the U.K. suggests that there is the potential for seals to be killed by ducted propellers if barges etc. with this propeller type are used in the construction works and

perform manoeuvres while either static or moving slowly (*i.e.* while still operating the propeller/propellers). Examination of seal corpses found in the U.K. (eastern Scotland, north Norfolk and Strangford Lough) has led researchers (Thompson *et al.*, 2010) to believe that the seal had been killed by being drawn through ducted or cowled ship propellers, such as fixed Kort or Rice nozzles, or ducted azimuth thrusters. Indications are that these accidents are unlikely to have happened as a result of casual collisions. The workers have theorised that the seals were killed after being attracted to the vicinity of the propellers, either as a result of concentrations of prey fish close to vessels, or as an inappropriate response to the acoustic output of the propellers. This type of propeller is common in tugs, construction vessels and construction barges and is used when such vessels are either manoeuvring slowly, or trying to maintain position. This situation could occur for long periods during the construction phase. It should be possible to specify that vessels used by contractors are fitted with grilles or guards to prevent seals being pulled through the ducts. The use of MMO's will further reduce the risk associated with vessel collision.

Seal Haul Out during Moult Period
In the response to the RFI it is stated that "most of the harbor seal population will be hauled out on shore in this period". This should be taken to mean that numbers of haul out are greater during the moult and the time spent out of the water is greater during moulting. Haul outs are still concentrated around low tide rather than during the whole day.

Mitigation Measures
A full outline of mitigation measures are presented in Chapter 5, 10, 15 and the Environmental Management Framework.

In summary with regard to harbor seal and marine mammals this includes no drilling and blasting, sheet piling and back hoe dredging during the night-time. No works will be undertaken in water during April, May, June and July. Marine Mammal Observers will observe DAHG protocol. Ducted propellers will be used on Kort and Rice Vessels. The use of Acoustic Deterrent Devices will not be used unless entirely necessary. Noise and water quality monitoring programmes will be implemented.

Additional measures include the incorporation of a wildlife pass into the scheme design, which will reduce the navigation route for species which wish to move around the outside of the proposed harbour extension.

Proposed Harbour Seal Monitoring Programme (Page 7, DAHG Submission)

Response 8:

Since studies carried out by the NPWS indicate that a minimum time series of 6-7 years of Harbour Seal count data are required to properly detect population trends, it is proposed that seals counts will be started on a decision to grant permission being made and will continue through construction for a period of seven years after operation begins. The suggested method is haul-out site counting, carried out during a period from two hours before to two hours after low tide and following the conditions on weather and visibility that are used by NPWS staff for the seal haul-out monitoring that they currently conduct. It is proposed that the major sites at Oranmore Bay, Kinvara Bay, Tawin and Deer Island, along with the largest haul-out in the harbour area (Rabbit Island) will be counted and that this will be done on a quarterly basis in February, May, August (moulting period) and November. Comparison will be also be possible with the annual August counts made by the NPWS at Oranmore Bay and Kinvara Bay.

Blasket Islands SAC – Harbour Porpoise Qualifying Interest (Page 7, DAHG Submission)

The Department has identified an omission whereby the results of further analysis and assessment of the impact of the proposed development on Harbour Porpoise as a qualifying interest of the Blasket Islands SAC was missing from the relevant section within the NIS documentation.

Response 9:

The conservation objectives attributes for Harbour porpoise within the Blasket Islands SAC are:

- Access to suitable habitat (measure number of artificial barriers)
- Disturbance (measures level of impact)

The proposed development will not create any artificial barriers for Harbour Porpoise that will restrict their use of the Blasket Islands cSAC (the site of the proposed development lies approximately 160 kilometres north-east of the Blasket Islands). Although land will be reclaimed within the Galway Bay Complex cSAC and a deepwater pier will be built, there will be no permanent artificial barriers for the potential use by Harbour Porpoise of the remaining areas of Galway Bay.

It is certain that (given the distance between the development and the Blasket Islands cSAC and the fact that areas of land lie across the direct sea route from the development site to the cSAC) disturbance within Galway bay will not affect Harbour Porpoises when they are within the Blasket Islands cSAC. Although satellite telemetry studies have revealed relatively large movements of tagged animals (at the scale of 100s of kilometres), including one from Danish waters into UK waters east of the Shetland Isles (a distance of some 1000 km in several weeks) it is to be expected that the Blasket Islands population spends the majority of its time in that area. The likelihood of single animals (from any population) being harmed by construction activities within Galway Harbour is considered to be low. Given that current information suggests that Harbour Porpoise occur either singly or in small groups of up to eight individuals, it is highly unlikely that a significant proportion of the Blasket Islands populations would be present in the small area of Galway Bay that will be intermittently affected by construction activities. Thus (due to the small area that will be affected and the distance between the site of the proposed development and the Blasket Islands cSAC), the possibility of a negative impact on an individual of the Blasket Islands population is the product of two small probabilities and the likelihood of a significant impact at the population level will be even smaller. In addition the implementation of proposed mitigation measures which include the use of Marine Mammal Observers will ensure no significant impacts will arise.

Otter (Page 8, DAHG Submission)

The Department expressed an issue with regard to the conclusion of indeterminate effect on Otter as a qualifying interest of the Galway Bay Complex cSAC and Lough Corrib cSAC..

Response 10:

Following more critical analysis and inclusion of additional design refinements to the scheme, which include a wildlife pass (as presented in Figure NIS(A2) 2.1 of the NIS Addendum/Errata Document II, January 2015), Table 4.23, which considers impacts on Otter, has been amended in the NIS Addendum/Errata Document II (January 2015). It has been concluded that significant negative residual impacts associated with the development will not occur, given the mitigation of the wildlife pass and the net gain in main foraging habitat for Otter (which has been calculated at approx. net gain of 18.8 ha).

Inner Galway Bay Special Protection Area (Pages 8, 9, 10, 11, 12, DAHG Submission)

The Department has expressed a number of outstanding issues with regard to birds and the Inner Galway Bay SPA which require clarification including:

- *For many species for which the site is listed, analysis and assessments have not been undertaken against key attributes by which the conservation objectives for the site are defined.*

- *This is particularly the case for wintering species, concerning the understanding of how the development will affect the range, timing and intensity of use of areas within the SPA, and for breeding birds, such as Common and Sandwich Tern.*

Response 11:

Conservation objectives (breeding species)

The conservation objectives list seven attributes that define the favourable conservation condition of the breeding Cormorant, Sandwich Tern and Common Tern populations: breeding population abundance, productivity rate, distribution of breeding colonies, prey biomass availability, barriers to connectivity and disturbance at breeding site.

The following text summarises the results of the assessment in relation to these attributes.

The productivity rate depends upon the ability of the population to find sufficient suitable food resources, which could be negatively affected by displacement from important feeding areas and/or reductions in foraging efficiency due to disturbance. The assessment has concluded that there will not be any significant displacement or disturbance impacts to the breeding populations of these species. Therefore, there will be no significant impact to the productivity rate attribute.

Displacement impacts can be considered as a surrogate measure of prey availability: i.e., if an area supports a high level of prey biomass it will attract a high number of birds and, therefore, significant degradation of the habitat, or complete loss of the area, would result in a large displacement impact. Therefore, the absence of any significant predicted displacement impacts indicates that there will be no significant impact to the prey biomass availability attribute.

The assessment has concluded that there will not be any disturbance impacts to the breeding colonies of these species. Therefore, there will be no impact to the disturbance at breeding site attribute.

The development will not create a barrier between the breeding colonies of the species and important foraging areas. Therefore, it will not have any impact on the barriers to connectivity attribute.

The breeding population abundance and distribution of breeding colonies attributes are higher-level attributes, which represent the cumulative influence of the other attributes. Therefore, as there will not be any significant impacts to any of the other attributes, there will be no significant impacts to the breeding population abundance or distribution of breeding colonies attributes.

Conservation objectives (non-breeding species)

The conservation objectives list two attributes that define the favourable conservation condition of the non-breeding Light-bellied Brent Goose, Wigeon, Red-breasted Merganser, Great Northern Diver, Cormorant, Grey Heron, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull, Common Gull populations: population trend and distribution.

In the conservation objectives, the distribution attribute is measured by the "number and range of areas used" with a target of "no significant decrease in the range, timing and intensity of use of areas … other than that occurring from natural patterns of variation"[1].

The population trend attribute is a higher-level attribute that represents the cumulative influence of displacement and disturbance impacts. There are also other possible impacts that could contribute to the population trend attribute (e.g., reduced prey biomass due to fishing) but these are not relevant to the GHE project. Furthermore, the population trend attribute may also reflect ex-situ factors, such as impacts on the breeding grounds, or changes in migratory patterns.

Impacts to the population trend attribute will only become apparent over a period of many years (due to the natural degree of variation in population sizes that would occur in the absence of any overall trend). However, impacts to the distribution attribute can be detected within a single winter. Therefore, the distribution attribute can be viewed as an "early-warning" indicator of pressures that may ultimately result in impacts to the population trend attribute.

It is noted that the DAHG's own assessment of the conservation condition of the SCI species in Inner Galway Bay (as contained within the SPA Conservation Objectives Supporting Document) is based purely on the population trend attribute, with no reference to the distribution attribute, indicating that the population trend attribute is considered to be the ultimate measure of conservation condition.

Interpretation of the distribution attribute

As the target for the distribution attribute is "no significant decrease", not "no decrease", it is necessary to establish criteria against which any projected decrease can be assessed to determine whether or not it is significant.

The interpretation of this attribute in the assessment is based upon an extensive review of the scientific literature on the impacts of displacement due to disturbance and/or habitat loss on waterbird populations. The consensus in the literature is that the potential impact of displacement should be assessed in terms of whether the displacement will result in density-dependent mortality and/or loss of body condition. Therefore, the assessment has explicitly focussed on this question.

The interpretation of the distribution attribute is criticised in the DAHG submission on the grounds that, as it is linked to population-level consequences, it is ultimately assessing the population trend attribute and, therefore, there has been no separate assessment of the distribution attribute.

[1] For the non-breeding Cormorant population, the target is "no significant decrease in the numbers or range of areas …"

The DAHG submission states that "the proposed development should be assessed against each of the attributes separately". However, it is not clear how objective scientific criteria could be used to assess the distribution attribute without having some linkage to population-level consequences.

Assessment against the conservation objectives

The assessment has concluded that there will be no significant displacement impacts from habitat loss or modification, or disturbance for any of the non-breeding SCI populations. Therefore, there will be no significant impacts to the distribution attribute.

As there will not be any significant displacement impacts, and the assessment also concluded that there will not be any significant non-displacement disturbance impacts, and there are not any other possible impacts that could affect the population trend, there will be no significant impacts to the population trend attribute of the non-breeding SCI populations.

Turnstone and other species (Page 10, DAHG Submission)

Clarity with regard the effects on the attributes and targets to provide for favourable conservation condition of Turnstone and other species was suggested as necessary by the Department of Arts, Heritage and the Gaeltacht in their submission.

Response 12:

TURNSTONE

The assessment concluded that the construction of the GHEP did not cause a significant displacement impacts. In fact, because the population showed a strong sustained increase for several winters after the intertidal reclamation was completed, any displacement impact from the GHEP did not push the population close to its effective carrying capacity. Therefore, for a significant cumulative impact to arise from the construction of the GHEP, in-combination with the proposed development of the GHE, a large displacement impact would be required from the latter (so that the combined impact would push the population close to/over its effective carrying capacity).

The predicted displacement impact, based on the count data from the 2011/12 and 2012/13 winters, is 5.9 birds. This represents 2.1% of the mean I-WeBS count for those winters. However, for a cryptic species like Turnstone, the intensive survey effort involved in the GHE monitoring counts will have recorded significantly larger numbers, compared to the numbers that would have been recorded by a similar survey effort to that used for the I-WeBS counts. There are two reasons for this: the duration of the counts, and the size of the area covered.

The 3-8 hour duration of each of the GHE monitoring count days allowed transient birds that may have only been present within the site for a short period to be counted. This is illustrated by comparing the maximum and mean counts for each count day (0, below). In an I-WeBS count, each counter has to cover a large area and will only be present at any one vantage point for a short period of time. Therefore, I-WeBS counts have a low probability of detecting transient birds that are only present for a short period of time.

There is only a small area of intertidal habitat within the GHE count area and the configuration of this habitat means that there was a high probability of detecting any Turnstone using the habitat. The I-WeBS subsites can cover several kilometres of shoreline. Each I-WeBS subsite is counted from a few vantage points, with long stretches of shoreline counted at each vantage point. Due to the nature of the habitat used by Turnstone, and their cryptic plumage, there is a low probability of detecting birds more than a few hundred metres distant from a vantage point.

For the above reasons, the I-WeBS counts will significantly underestimate the total Turnstone population of the SPA, and the true population size is likely to be much larger than the numbers counted. Therefore, the percentage displacement impact calculated using the mean I-WeBS count as the denominator will significantly overestimate the true displacement impact. Even with this overestimation, the calculated displacement impact was only 2.1%. Therefore, the assessment concluded that the true displacement impact from the GHE will be very minor and not significant.

As the GHEP development did not push the Turnstone population close to its effective carrying capacity, and as the GHE development will only have a very minor displacement impact, it can be concluded that the cumulative impact on the distribution attribute of the conservation objectives is not significant.

Therefore, as the cumulative displacement impact is not significant, and there are no other potential impacts, the cumulative impact on the population trend attribute of the conservation objectives is not significant.

Table 1: Hourly count data for Turnstone from the GHE monitoring counts, 2011/12 and 2012/13.

Date	Hourly counts								Max	Mean
	1	2	3	4	5	6	7	8		
26/09/2011	5	5	6						6	5.3
12/10/2011	3	4	11						11	6.0
11/11/2011	0	5	2						5	2.3
29/12/2011	0	0	1						1	0.3
13/01/2012			0	0	1	0	0		1	0.2
20/01/2012	0	6							6	3.0
05/02/2012	0	0	10						10	3.3
28/02/2012			0	13	0	3	19	11	19	7.7
06/03/2012	1	16	7						16	8.0
25/03/2012			0	0	10	0	0		10	2.0
30/10/2012	1	0	0	1					1	0.5
16/11/2012		0	0	7	1	1			7	1.8
27/11/2012	0	0	0	0	0				0	0.0
27/12/2012	0	0	1	4	3				4	1.6
22/01/2013	0	0							0	0.0
02/02/2013					0	3	7	4	7	3.5
22/02/2013	5	0							5	2.5
25/02/2013	2	2	0	1					2	1.3
04/03/2013					2	6	1	0	6	2.3
14/03/2013		1	1	0	0	1			1	0.6

Only includes counts within 2.5 hours of low tide (corresponding to the period of time when Turnstone mainly occurred within the GHE site).

Nature, timing and extent of the increased activity (Page 10, DAHG Submission)

The Department have requested more detailed information regarding the assessment of impact based on the nature, timing and extent of the increased commercial and recreational vessel activities that will be associated with the development, in particular, on Great Northern Diver.

Response 13:

Commercial shipping traffic

The number of ships which entered the docks in 2014 was 177. In the future once the port is fully operational the average annual is forecast as 210 which will be a 25% increase (although catering for the increased tonnage stated). All this shipping traffic will keep to the commercial shipping lane, which is shown on Tobin Consulting Engineers Drawing No. 2139-2103. Given the low intensity of this shipping traffic (on average 2 ship movements per 3 days) and its spatial restriction to the shipping channel, sufficient detail was available to allow for a properly informed assessment of the likely impacts associated with such movements.

Recreational boat traffic

The existing level of boating activity across the whole of the Inner Galway Bay SPA is as follows, based on information supplied by Tobin Consulting Engineers. During the winter (October-March), there is an average of 8 fishing boats and 2 recreational boats on the water on any one day. In addition, yacht races take place on Sundays with an average of 22 boats involved. During the summer (April-September), there is an average of 8 fishing boats and 5 recreational boats on the water on any one day giving a total of 13. However when shoals of mackerel come into the inner bay the number of fishing / recreational vessels on the sea increases temporarily to an average 16. In addition, yacht races take place on Wednesdays with the same average of 22 boats involved.

In the winter period of 2009/10, the National Parks and Wildlife Service carried out five waterbird counts across Inner Galway Bay. These counts also systematically recorded all potential disturbance-generating activities encountered. There were only five instances of potentially disturbing activity classified as "Powered watercraft (jet-skis, motorboats, etc.)" across all five counts. Non-powered watercraft were not recorded as a separate activity, but would presumably have been classified under "Other" or "Other vehicles", and there was a combined total of six instances of such activities across the five counts. While offshore areas only had limited coverage during these counts, the NPWS data indicates a similar level of boat activity to the figures provided by Tobin Consulting Engineers.

The total numbers of recreational boats moored in Galway Bay are estimated to be in the order of 150 motorised vessels and 100 sailing vessels (Section 10.5.3.1.4 of the EIS). The development of the GHE will increase the number of recreational boats in Galway Harbour from around 50 to 300 (100 in the inner harbour and ultimately 200 in the new marina). This would increase the overall number of recreational boats in Galway Bay from 250-500. Therefore, there would be an approximately sixfold increase in the number of boats operating out of Galway Harbour and a two fold increase in the overall number of recreational boats in Galway Bay[2]. Based on the existing usage patterns (see above), the average number of boats (recreational boats and fishing boats) on the water per day would increase from around 10 to 12 in the winter months, and from 13 to 18 in the summer months. Virtually all recreational boat activity would be expected to take place during daylight hours.

[2] Note that the figure cited in Appendix 3.4 in the NIS Addendum Errata of a tenfold increase is incorrect.

Great Northern Diver (Page 10, 11, DAHG Submission)

The Department has queried some of the data analysis with regard to Great Northern Diver and count data used within the assessment. Uncertainty with regard to how Great Northern Diver react to shipping and boating activities was also identified as an issue in their submission.

Response 14:

GREAT NORTHERN DIVER

March-May counts
The DAHG submission refers to "relatively high counts" during the March-May period of 2011 and 2014.

In the assessment, count data from the September-March periods of 2011/12 and 2012/13 (24 counts), was used to allow comparison with I-WeBS data. This produced a mean count for Great Northern Diver of 4.1 birds.

If the dataset is extended to include all counts in the September-May periods, across all winters (30 counts), the mean count rises to 4.5 birds. This would equate to an increased displacement impact under the worst-case habitat loss and degradation scenario of 0.1 bird. This would not have any material effect on the conclusions of the assessment.

Mean versus maximum counts and sample sizes
The DAHG submission queries the use of mean counts on the basis of the "low" sample sizes. The submission also refers to the high level of statistical processing and questions "how the relatively small sample sizes may have influenced the results".

The number of counts used in the analyses in the assessment was 24, which were carried out on 24 separate days (count days). This is not considered to be a low sample size.

These counts were distributed across two winters. Within each winter, the count days were spread out, with a mean separation between consecutive count days of 15 days.

Each count day was either a three hour watch (counts up to 01/01/2012) or an eight hour watch (counts from 13/01/2012), with maximum counts recorded every 60 minutes (2011-2013), or every 30 minutes (2014). The counts included in the analyses were the maximum counts across all of the 3-16 counts from each count day.

This sampling effort is comparable to sampling efforts used in other similar assessments in Ireland. For example:

- 28 counts across two winters for the assessment of the proposed extension of the Port of Cork (but with counts carried out on consecutive count days).
- 18 counts on 13 days between January and March in one winter for the assessment of intertidal aquaculture at Dungarvan Harbour.

This sampling effort is also comparable to sampling efforts used in many peer-reviewed publications on the spatial ecology of waterbirds in Ireland and elsewhere. For example:

- 29-32 counts across 5 days between October and February in one winter in Murphy et al. (2006).
- 27 counts across six winters in Lewis and Kelly (2012).

- 26 counts across two winters in Alves et al. (2010).
-

The publications cited above include complex statistical analyses.

It is also noted that the population trend analysis included in the SPA Conservation Objectives Supporting Document uses a statistical method which effectively represents a mean count for each winter (not a maximum count), with these being based on only three counts per winter.

Therefore, it is not considered that the sample size is low and, for the reasons explained in Section 3.1.2 of Appendix 3.4 in the NIS Addendum/Errata Document (October 2014). It is considered that the mean count is a more appropriate measure than the maximum count.

Type I errors

The DAHG submission questions "why post hoc tests were not employed to reduce the possibility of Type I errors when undertaking multiple correlations". This presumably refers to the analyses of the relationships between species distributions across subsites and habitat availability included in Appendix 1 of Appendix 3.4 in the NIS Addendum/Errata Document (October 2014).

A Type I error refers to the rejection of the null hypothesis when it is true. Bonferroni-type corrections can be used to reduce the possibility of a Type I error by adjusting the p-value to reflect the number of comparisons made. However, the use of Bonferroni-type corrections is controversial and there is disagreement within the scientific community about when they should be used, or whether they should be used at all.

Bonferroni-type corrections are most useful when a large number of exploratory analyses (without a clear hypothesis in mind) are carried out with the same response variable. An example would be carrying out separate correlations of the distribution of Great Northern Diver across Galway Bay against 20 different environmental variables.

However, the analyses in Appendix 1 of Appendix 3.4 in the NIS Addendum/Errata Document (October 2014) were carefully targeted. Each species was only analysed in relation to one or two explanatory variables, with the explanatory variables selected on the basis that they represented habitat parameters that were known to be likely to influence the distribution of the species concerned. Where two explanatory variables were tested, these were variants of the same broad environmental parameter (e.g., shallow/moderately deep subtidal habitat and all subtidal habitat).

A recent review of the use of Bonferroni-type corrections concluded that no corrections should be made "if the study is restricted to a small number of planned comparisons" (Armstrong, 2014). This describes precisely the nature of the analyses in Appendix 1 of Appendix 3.4 in the NIS Addendum/Errata Document (October 2014).

Due to the small number of tests, and the high significance of the correlations, most of the correlations reported in Appendix 3.4 in the NIS Addendum/Errata Document (October 2014) would remain significant after applying a Bonferroni-type correction. However, the considered scientific opinion of the author of the assessment is that Bonferroni-type corrections would not be appropriate for these analyses.

Disturbance distances

As stated in the response to the Request for Further Information (October 2014), it is certain that Furness *et al.*, (2012) have mis-quoted when they cite authors as claiming that Great Northern Diver can be flushed at distances of one kilometre or more; this recorded flushing distance is actually attributed to Red-throated Diver. Experience from within inner Galway Bay has shown that Great Northern Diver do not take to the air at the approach of large slow-moving vessels (i.e. the type of situation that would be likely near to the proposed harbour extension), but either

dive of swim out of the path of the vessel. Smaller fast-moving vessels (e.g. RIBs travelling at speed) will cause Greta Northern Diver to flush to flight.

Distribution of Great Northern Diver in Inner Galway Bay

The DAHG submission expresses concern about the apparent lack of data "on the numbers and distribution of Great Northern Diver using the middle part of the bay".

The analysis of Great Northern Diver distribution across subsites presented in Appendix 1 of Appendix 3.4 in the NIS Addendum/Errata Document (October 2014)indicates that the species is more or less uniformly distributed throughout suitable subtidal habitat in Inner Galway Bay.

There are no unusual habitat features in the middle of the bay that would attract high concentrations of divers. If anything, densities might be expected to be lower, due to the more exposed nature of the area.

Therefore, there is no scientific reason to expect densities of Great Northern Diver to be significantly higher in the middle of the bay.

Recreational boat traffic

Further details of the projected increase in recreational boat traffic are provided in Response No. 13 above.

The projected increase in number of boats on the water during the winter is 2 boats. Given the size of Inner Galway Bay, the low density of the Great Northern Diver population, and the nature of the disturbance response of Great Northern Diver, it is not plausible to suggest that this level of increased boat activity will cause any measurable impacts.

Commercial shipping traffic

Commercial shipping traffic will involve an average of 2 ship movements per 3 days. Given the size of Inner Galway Bay, the low density of the Great Northern Diver population, and the nature of the disturbance response of Great Northern Diver, it is not plausible to suggest that this level of shipping traffic will cause any measurable impacts.

Note also that the shipping lane, and adjoining habitat, is in waters of more than 5 m depth, which are unsuitable habitat for Red-breasted Merganser.

Attribute: Wetland Habitat of Inner Galway Bay SPA (Page 11, 12, DAHG Submission

The Department requests clarification with regard the loss of wetland habitat within the SPA, as details within tables in documents submitted included differing information.

Response 15:

This information has been amended in Table 4.28 as presented in the NIS Addendum/Errata Document II, January 2015.

Loss of 2.1 ha of intertidal habitats plus 24.8ha of subtidal habitat plus 16.27ha of legacy wetland loss has been calculated. This constitutes 0.32% of the SPA.

Loss of 0.32% of the SPA wetland habitat is not considered significant in the context of the overall area of wetland; however, as it cannot be predicted beyond scientific doubt that there will be no significant impact as a result of the loss, and on the basis of the precautionary principle, this impact is considered to be significant for the purposes of this assessment.

It is considered that the walling/edge of the new reclaimed land area will (after 2 years) have been covered by a natural growth of invertebrates and algae and will constitute intertidal shoreline reef habitat. The area of this habitat has been calculated at 1.15 hectares (taking the tidal range to be four metres, the wall slope to be 35 degrees and the new shoreline to be 2,005 metres ([16.04 X 10.000]/80). This habitat will be useful foraging habitat for Curlew, Redshank, Turnstone and Grey Heron and potential resting/roosting habitat for Cormorant, Common Tern and Sandwich Tern.

Mitigation Measures (Page 12, DAHG Submission)

The Department submission enquired if assessment of cumulative impacts of proposed mitigation measures was considered.

Response 16:

The assessment considered cumulative impacts of mitigation measures. The measures proposed are considered to be the most suitable for the ecology of area as a whole.

Assessment in-combination with other projects and plans (Page 12, DAHG Submission)

The Department acknowledged that an appropriate assessment of aquaculture for the Inner Galway Bay SPA is currently in train by the Department of Agriculture, Food and the Marine.

Response 17:

Updated information regarding the cumulative impact on Common Tern as a result of in-combination effects with Aquaculture developments in Galway Bay has been presented below. This information has also been included within the NIS Addendum/Errata Document II (January 2015) with regard to in-combination impact assessment and the assessment of impact on Common Tern (Table 3.27).

The Inner Galway Bay SPA: Appropriate Assessment of Aquaculture and Shellfisheries & Fisheries Risk Assessment identified that there was a potential risk of impact to Sandwich Terns and Common Terns, due to mussel bottom culture in Rinville Bay, which is within the likely core foraging range of their colonies, and occurs partly within shallow water zones where benthic fish prey would be accessible to terns. As the GHE development is not considered likely to have measurable impacts on foraging resources for the Sandwich Tern colony, there is no potential for cumulative impacts in-combination with impacts from mussel bottom culture for this species. In the case of the Common Tern, the GHE development could possibly have a measurable, but not significant, impact, so, the assessment in the aquaculture AA, raises the possibility for significant cumulative impacts in-combination with impacts from mussel bottom culture for this species.

The aquaculture AA reviewed the biotope characteristics of the mussel bottom culture plots in Rinville Bay in relation to fish survey data from Kinvarra Bay and concluded that the plots could contain suitable benthic prey resources for terns. However, this conclusion was not informed by local knowledge of the area. More specific information on Rinville Bay indicates

that, in fact, the area is not likely to provide important benthic prey resources for feeding terns:

Rinville Bay is of minor value as a feeding resource for terns as the sea bed is anoxic and benthic production is therefore low. This is due to the fact that water exchange with Galway Bay is restricted due to the narrow and shallow opening to the open sea. It behaves more like a mill pond than an open mouthed bay - the tide rises and falls quite passively giving rise to low current speeds. It also acts as a sink for suspended sediments - these fall out to the sea bed at slack high water and are not exported on the following ebb tide as bottom velocities are not high enough to re-mobilise them. However, there is no reason why juvenile fish (including sand eels) cannot enter the bay giving rise to at least some source of prey items for fish-eating birds. (Brendan O'Connor, pers. comm.)

The potential impact of bottom mussel culture to prey resources to terns is limited to impacts on benthic prey. Therefore, in light of the further assessment, it can be concluded that the precautionary assessment in the aquaculture AA is incorrect and that, beyond reasonable scientific doubt, there will not be any significant impact from bottom mussel culture on benthic prey resources for terns. Therefore, no potential cumulative impacts from the GHE development in-combination with impacts from mussel bottom culture arise.

General Mitigation (Page 12, DAHG Submission)

The Department submission enquired if assessment of cumulative impacts of proposed mitigation measures was considered, with particular regard to the role of ADDs.

Response 18:

It is not proposed to use ADDs unless there is a greater risk to an animal which has habituated to blasting or pile driving and is at risk of permanent hearing damage from construction noise. If such a case were to arise during the course of construction a derogation licence would be sought from the National Parks and Wildlife Service for the use of ADDs. Since the routine use of ADDs is not anticipated and would only affect aquatic bird species when underwater, significant impacts on SCI bird species are not expected.

Monitoring, Conditions and Commitments (Page 12, DAHG Submission)

Response 19:

The applicant accepts the Department suggestions regarding the submission of monitoring reports, etc to the relevant authority, in addition to copying the information to the Department. An Bord Pleanala will be requested to identify the most appropriate authorities with regard to the submission of such information. Monitoring of harbor seal for a period of at least seven years has also been proposed, in line with Department suggestions, as outlined in the NIS Addendum/Errata Document II (January 2015).

EIS: Cetacean species and the associated Risk Assessment (Page 13, 14, DAHG Submission)

The Department have identified a number of issues with regard to the risk assessment which was undertaken with regard to Cetacean Species, which require clarification, including:

- The approach regarding the risk assessment
- The use of acoustic deterrent devices
- The consideration of the extended footprint of the development within the assessment
- Potential cumulative risk arising from multiple stressors
- The arrival at estimates for Permanent and Temporary Threshold Shift in cetaceans
- Analysis with regard to underwater shipping noise and vessel collision

Response 20:

Some of the issues identified above, have been clarified in Response 7, above, with regard to Harbour Seal.

In the interests of clarity, relevant information pertaining to impacts on seals and cetaceans which was included within EIS Chapter 10, has now been incorporated into NIS Addendum/Errata Document II (January 2015) as Appendix I. An Addendum to the EIS (EIS Addendum/Errata Document II, January 2015) has also been prepared, which includes amended Figures NIS(A2) 2.1.

The marine mammal risk assessment complied by Kelp Marine Research should be read in conjunction with the information given in Chapter 10 (Noise and Vibration) of the EIS, now included as Appendix I of the NIS Addendum/Errata Document II (January 2015). Information on the hearing of pinnipeds is given in section 10.3.5.2 of the EIS and details of the information used to define TTS and PTS levels are given in section 10.3.6.2. The sources of data from which critical levels for the hearing of seals and other marine mammals have been obtained are detailed in Finneran *et al.* (2002) and Southall *et al.* (2007) and these were used for the assessment.

As mentioned above in the response to a similar query in respect of acoustic impacts on Harbour Seal, numerical modelling of potential acoustic impacts and the distances over which they may have effect was included in the EIS. This work followed the DAHG 2014 guidance and was used by Kelp Marine Research in the discussion of these potential impacts in their assessment report.

Schakner & Blumstein (2013) concluded that acoustic pingers were effective for dolphin and porpoise species. Acoustic pingers will only be used in cases where there may be a problem with cetaceans frequenting the work site, or is there is evidence that one has been injured or killed during the course of the works. It is not proposed to use ADDs unless there is a greater risk to an animal which has habituated to blasting or pile driving and is at risk of permanent hearing damage from construction noise.

The assessment of risk undertaken was as comprehensive as the available data allowed. Risk assessment of possible acoustic impacts of particular construction activities has been modelled using the best available data on species sensitivities and following the NPWs guidelines (2014). Note also that Chapter 10 of the EIS would have been considered as part of the assessment.

The potential zones of disturbance have been set out in Tables 10.5.3, 10.5.4 and 10.5.5 and Appendices 10.1 and 10.2 of EIS Chapter 10. These have been examined by Kelp Marine Research, marine mammal ecologists. Kelp Marine Research concluded that 'Marine mammals either are unlikely to be affected at a population level (grey seal, minke whale, common dolphin, bottlenose dolphin), or are likely to recover from any impacts of the construction activities (harbour seal, harbour porpoise).

Appendix 10.2 of the EIS provides detailed plots of underwater noise levels arising from activities along with species specific threshold values. The threshold values are set out in Tables 10.3.1 and Table 10.3.2 of the EIS and conform with best international practice. Based on the plots in Appendix 10.2, Appendix 10.3 provides detailed maps indicating the areas where underwater noise could have a potential impact. This methodology is based on the DAHG Guidance (2014). Appendices 10.2 and 10.3 formed the basis from which the ecologists prepared the risk assessment. This is stated on pages 6, 7 and 20 of the Risk Assessment. Table 1 of the Risk Assessment is based on Table 10.5.3 and Table 10.5.4 of the Environmental Impact Statement.

The sightings records of the Irish Whale and Dolphin Group indicate that Minke Whale has not been recorded in Galway bay with very great frequency (24 times since 1991). Most of these sightings have been reported from near the Aran Islands, some records mentioning Foul Sound and Gregory's Sound. While whales in this area may be at risk from boats arriving at or leaving from the islands, they would not be at risk from commercial shipping using the lanes into the port of Galway.

Construction noise has been assessed and is not deemed to be significant. Vessel activity is not increasing significantly. On this basis cumulative impacts were not considered significant.

Blasting noise is dealt with in section 10.5.2.3 of the EIS. As with Harbour Seal, the estimates of blasting proximity causing PTS and TTS are the same as those given for impulsive piledriving and are thus not significantly shorter than those for piledriving. Tables 10.5.3 to 10.5.5 show the predicted impact distances that have been calculated. Noise modelling for blasting and impulsive piledriving has predicted the following ranges for cetaceans: Harbour Porpoise, permanent threshold shift (PTS, permanent hearing damage) 16 metres, temporary threshold shift (TTS, temporary hearing damage) 90 metres, disturbance high within 100 metres, disturbance moderate with 1,000 metres and disturbance low at greater than 1,000 metres; dolphin, permanent threshold shift (PTS, permanent hearing damage) 19 metres, temporary threshold shift (TTS, temporary hearing damage) 100 metres, disturbance high within 100 metres, disturbance moderate with 1,000 metres and disturbance low at greater than 1,000 metres.

Regarding the long term impact of shipping noise, the zone of disturbance from a moving vessel is shown on the plots in Appendix 10.3 of the EIS. This is shown in the shipping channel on each plot.

When at the dockside the noise emissons from a ship will be lower than this as the main propulsion engine will be shut down. The footprint will be smaller as a consequence.

With the introduction of shore power the noise emissions from ships in port will be lower again. There is no risk to species in the outer bay as due to low frequency noise cut-off, shipping noise does not propagate out the bay effectively.

The impacts as identified on cetaceans in the EIS remain unchanged. A temporary slight negative impact as a result of disturbance during construction and operation phase (incorporating mitigation measures) is anticipated. A moderate negative impact on harbor porpoise was identified within the EIS as a result of pile driving. Mitigation measures have been proposed to minimise this impact. It is intended that reduction for the likelihood of vessel collision will be mitigated through the use of MMOs.