12. Biodiversity

12.1 Introduction

Dixon.Brosnan Environmental Consultants have conducted an appraisal of the potential impacts of the Resource Recovery Centre (including waste to energy facility) on terrestrial and intertidal flora and fauna. This chapter describes and evaluates the habitats with their representative flora and fauna and addresses the impacts of the development on the terrestrial and intertidal ecology of the site.

12.2 Methodology

12.2.1 Introduction

This appraisal is based on surveys of the entire Indaver site and surrounding area and a review of desktop data. A flora and fauna report was prepared previously by the Aquatic Services Unit, University College Cork in 2001 for an EIS for the Indaver Ireland planning application for a Waste Management Facility at this location. DixonBrosnan previously prepared the Flora and Fauna chapters for a similar Indaver EIS submitted in 2008 and an addendum to the EIS prepared in 2010. These reports were consulted during the preparation of this chapter of the EIS.

In addition to the baseline surveys carried out for previous applications, the following surveys were carried out in 2014/2015:

- Habitat mapping
- Surveys of wintering birds
- Breeding birds surveys
- Common tern breeding survey
- Mammals, with a particular emphasis on badger, otter and bats
- Intertidal survey

The assessment follows the structure and protocols detailed in Advice notes on current practice in the preparation of Environmental Impact Statements (EPA, 2003 and revised draft 2015) and Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002 and revised draft 2015) and Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EU Commission, 2013). Potential impacts on designated Natura 2000 or European sites are specifically addressed in a Habitats Screening and Natura Impact Statement (NIS), which has been submitted as part of this application

12.2.2 Desktop Review

The purpose of the desktop study was to identify features of ecological value occurring within the proposed development site and those occurring in close

proximity to it. A desktop review also allows the key ecological issues to be identified early in the appraisal process and facilitates the planning of surveys. Sources of information utilised for this report include the following:

- National Parks & Wildlife Service (NPWS) - www.npws.ie
- Environmental Protection Agency (EPA) – www.epa.ie
- National Biodiversity Data Centre – www.biodiversityireland.ie
- County Cork Biodiversity Action Plan 2009 2014 (Cork County Council, 2009);
- Ringaskiddy Port Redevelopment EIS (Port of Cork/RPS, 2015)
- Bat Conservation Ireland - http://www.batconservationireland.org
- Birdwatch Ireland
- British Trust for Ornithology (BTO)-www.BTO.ie
- Scottish Natural Heritage Guidelines (Winter Bird Survey Method), 2014
- Natura Impact Statement (Screening Stage 1) at Haulbowline, Ringaskiddy, Co. Cork for proposed bridge remediation works (Dixon Brosnan, 2014)
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011)
- Guidance on integrating climate changes and biodiversity into environmental impact assessment (EU Commission, 2013)
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2009).
- Cork lower Harbour Energy Group EIS and NIS (ARUP, 2011)

12.2.3 Consultation

Meetings were held with Dr. Jervis Good and Danny O' Keefe (National Parks and Wildlife Service of the Department of Arts, Heritage and the Gaeltacht) on May 27 2015 and September 8 2015. In its letter dated 11 September 2015 the Development Application Unit specifically requested that the following be addressed:

1. Effects on otters (including coastal protection measures and bioaccumulation of pollutants).
2. Effects on Annex 1 bird species and regularly occurring migratory birds, to which the conservation objectives of the SPA do not apply, e.g. little egret (a piscivorous species), whimbrel (in terms of collision risk) etc.
3. Effects on red listed and amber listed bird species (e.g yellow-hammer (habitat removal), barn owl (rodenticide use), etc.
4. Effects of any blasting or pile driving (if required during construction) on marine mammals occurring in the Lower Harbour.
5. Effects of coastal protection measures on the fauna and flora of the shingle beach; a survey for protected flora should be undertaken.

Issues raised during those pre-application meetings that relate specifically to the Cork Harbour SPA are examined separately in the NIS.

12.2.4 Surveys Overview

The following surveys were carried out at the site:

- Habitat mapping and flora surveys were carried out over several visits in the period from June 2014 to July 2015. (See **Appendix 12.1- Flora Surveys**)
- Six separate winter bird counts were carried out from November 2014 to March 2015 (See **Appendix 12.2 - Bird Surveys**)
- A survey for otters and badgers was carried out over several visits in the period from June 2014 to July 2015. (See **Appendix 12.3 - Mammal Surveys**)
- Bat surveys using standard detectors were carried out in September, 2014 and August 2015. (See **Appendix 12.3 - Mammal Surveys**)
- Breeding bird surveys were carried out in the period from May 2015 to June 2015. (See Appendix **12.2 - Bird Surveys**)
- Breeding bird counts at a common tern colony at Ringaskiddy were carried out from May 2015 to June 2015. (See **Appendix 12.2 - Bird Surveys**)
- An intertidal survey was carried out on June 18-19, 2015. (**See Appendix 12.4 - Intertidal Survey**)

This report was prepared by Carl Dixon MSc Applied Ecology, Vincent Murphy MSc Ecosystem Conservation and Landscape Management, and Aine Sands BSc Ecology. Bird surveys, general mammal surveys and habitat mapping was carried out at the site by Vincent Murphy. Bat surveys were carried out by Mark Donnelly BSc who has extensive bat surveying experience in Ireland and the UK. The intertidal survey was carried out by Dr. Stiofan Creaven, who has extensive experience in marine biology including surveys in Ireland and internationally.

12.3 Receiving Environment

12.3.1 General Landscape

The Indaver site is approximately 13.55 hectares in size and surrounds the Hammond Lane Metal Company facility. The proposed development area is located in the eastern section of the site.

The Indaver site runs east-west parallel to the L2545 Ringaskiddy Road, an extension of the N28, which leads to Haulbowline Island and runs along the northern boundary of the site. To the south, the study area is bordered by agricultural land dominated by intensive pasture. A Martello Tower is located on the crest of a small hill (43m approx.) in agricultural land to the south of the study area.

To the east, the site extends towards the edge of the Cork Harbour West Channel that separates the mainland from Spike Island. The shoreline here is characterised by shingle beach with steep earthen cliffs. To the west, the site

adjoins agricultural land (tillage and pasture) and a small group of residential dwellings.

The proposed development area is located in the eastern section of the study area, between the coast and the Hammond Lane facility. A small walkway will be created along the eastern boundary between the public car park and the Martello tower facilitate recreational users. A rectangle of land, used as a public car park, to the northeast of the site is not included in the development area, but is included in the study area.

A high proportion of the study area, including the proposed development site, is covered in scrub, which has become more dominant over time. The remainder of the site consists of pasture and tillage fields that remain under conventional agricultural management. The Indaver site and the proposed development are shown in **Chapter 4, figures 4.1 and 4.3.**

12.3.2 Designated Conservation Areas

Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites. Natural Heritage Areas (NHAs/pNHAs) are national designations under the Wildlife Act 1976, as amended.

There are no environmental designations located in the study area. Thus, the site of the proposed development does not form part of any Natural Heritage Area (NHA), Special Protection Area (SPA), Special Area of Conservation (SAC) or candidate Special Area of Conservation (cSAC), Nature Reserve, or National Park.

The proposed development site is located within 20km of a number of these designated sites. Designated sites, along with their distance from the site of the proposed development, are listed in **Table 12.1** and are shown in **Figure 12.1.** Site synopses for the closest Natura 2000 sites (Cork Harbour SPA and Great Island Channel cSAC) are provided in **Appendix 12.5.**

Table 12.1 Designated areas and their location relative to the Indaver site.

Designated site	Distance from site of proposed development
cSAC sites	
Great Island Channel candidate Special Area of Conservation and proposed Natural Heritage Area (Site code 001058)	Approximately 5.6 km north
SPA sites	
Cork Harbour Special Protection Area (Site code 004030)	Approximately 0.5 km south
Ballycotton Bay Special Protection Area (Site code 004022)	Approximately 18.4km east
Sovereign Islands SPA (Site code 004124)	Approximately 19.7km southwest
pNHA sites	

Designated site	Distance from site of proposed development
Lough Beg proposed Natural Heritage Area (Site code 001066)	Approximately 0.3 km south
Monkstown Creek proposed Natural Heritage Area (Site Code 001979)	Approximately 1.5 km northwest
Whitegate Bay proposed Natural Heritage Area (Site Code 001084)	Approximately 2.8 km east
Owenboy River proposed Natural Heritage Area (Site Code 001990)	Approximately 3 km southwest
Cuskinny Marsh proposed Natural Heritage Area (Site code 001987)	Approximately 3.5 km northeast
Fountainstown Swamp proposed Natural Heritage Area (Site code 000371)	Approximately 6 km south
Rostellan Lough, Aghada Shore and Poulnabibe Inlet proposed Natural Heritage Area (Site Code 001076)	Approximately 5 km east
Minane Bridge Marsh proposed Natural Heritage Area (Site code 001966)	Approximately 8.5 km southwest
Ballynaclashy House, North of Midleton proposed Natural heritage area (Site code 000099)	Approximately 14.2 km northeast
Templebreedy National School, Crosshaven proposed Natural heritage area (Site code 000107)	Approximately 3.3 km south
Lough Aderry and Ballybutler proposed Natural Heritage Area (Site code 000446)	Approximately 15.3km northeast
Carrigahane Hill proposed Natural Heritage Area (Site code 001042)	Approximately 13.1km northeast
Douglas estuary proposed Natural Heritage Area (Site code 001046)	Approximately 6.3 km north
Glanmire Wood proposed Natural Heritage Area (Site code 001054)	Approximately 11.1km N
Great Island Channel proposed Natural Heritage Area (Site code 001058)	Approximately 5.6km N
Leamlara Wood proposed Natural Heritage Area (Site code 001064)	Approximately 13.4 km northeast
Rock farm Quarry, Littleisland proposed Natural Heritage Area (Site code 001074)	Approximately 7.5 km north
Cork Lough proposed Natural Heritage Area (Site code 001081)	Approximately 14km northwest
Dunkettle Shore proposed Natural Heritage Area (Site code 001082)	Approximately 9.6 km north
Carrigacrump Cave proposed Natural Heritage Area (Site code 001408)	Approximately 10.8km east

Important areas for birds within Cork Harbour are interrelated, with bird populations moving between different areas at different times. The closest Natura 2000 sites are the Cork Harbour SPA, which is located 0.5km to the south of the proposed development site and the Great Island Channel cSAC, which is located 5.6km to the north. The closest pNHA is Lough Beg, 0.3km to the south and Monkstown Creek pNHA, 1.5km northwest. These sites are part of a network of

sites which support important bird numbers within Cork Harbour and are considered relevant to this proposed development. The remaining sites are located a considerable distance from the proposed development and no potential impact on these other sites has been identified.

12.3.3 Ramsar Sites

The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A key commitment of Ramsar Contracting Parties is to identify and place suitable wetlands onto the List of Wetlands of International Importance. Cork Harbour is listed as a Ramsar site, which is a non-statutory designation.

12.3.4 Habitats

Terrestrial habitat mapping was carried out in line with the methodology outlined in the Heritage Council publication *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011) in 2014 and 2015. All habitats within the study area were classified to level 3 of the classification scheme outlined in *A Guide to Habitats in Ireland* (Fossit, 2000) and cross-referenced with habitats listed under Annex I of the Habitats Directive. A flora species list is included in **Appendix 12.1.** No rare species were noted, nor are they expected to occur given that the habitats within the study area are common.

As noted, previous surveys at the site were carried out in 2001 and 2008. These surveys are referred to where relevant. A current habitat map is included as **Figure 12.2** and the habitats recorded on site are described below in **Table 12.2.** The ecological value of habitats is defined by the classification scheme outlined in *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) which is included in **Appendix 12.6.**

Table 12.2. Terrestrial Habitat Values

Habitat	Description/ Habitats Directive Annex I Status	Ecological value (NRA guidelines)
Hedgerow WL1/Treelines WL2	The southern boundary of the site consists of native hedgerow dominated by Hawthorn and Blackthorn, with Gorse and Bramble also noted. The width of the hedge ranges from approximately 1-4m. The western boundary, which is more sheltered, consists primarily of semi-mature Ash.	Local importance (Low value)
Dry meadow and grassy verge GS2/Wet grassland GS4	The survey in 2008 recorded Neutral Grassland GS1 and Wet Grassland GS4 in a mosaic with scrub in the eastern section of the site. Since then, in the absence of active management, scrub has come to dominate most of this area. Grey Sedge, which is classified as having an occasional occurrence in Ireland (Webb *et al*., 1996), was recorded within the proposed development area in 2001 and 2008 but is now absent. Grassland habitat is now confined to small pockets. Dry Meadows and Grassy Verge GS2 habitat occurs primarily on an old track and is dominated by tall tussocky species such as False Oat Grass and Yorkshire Fog. Herb species	Local importance (Low value)

Habitat	Description/ Habitats Directive Annex I Status	Ecological value (NRA guidelines)
	include Knapweed, Yellow-wort, Cat's Ear, Meadow, Goat Vetchling and Birds-foot Trefoil. In places dry meadow and grassy verge occurs with remnants of wet grassland with Soft Rush, Rosebay Willowherb and Mint. Bee orchid was also recorded within this habitat for the first time during the 2014/2015 surveys. Dry meadow and grassy verge GS2 corresponds to the Habitats Directive Annex I habitat: 'lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) (6510)'. However the dry meadow and grassy verge habitat within the site is very common locally and does not represent a valuable example of this Annex 1 habitat type.	
Scrub WS1	The proposed development will be concentrated in the eastern part of the study area. This area which previously supported grassland communities (in 2001 and 2008), is now almost entirely dominated by scrub. The scrub has developed due to the absence of grazing or other forms of agricultural management. Species noted include Gorse, Bramble, Hawthorn, Blackthorn, Willow and Elder. The encroachment of scrub has resulted in the loss of some grassland.	Local importance (Low value)
Immature woodland WS2	Immature trees are developing within the scrub habitat in the eastern section of the site and on the western boundary of the Hammond Lane site. Willow species (White Willow, Grey Willow and Goat Willow) are predominant. Other species include Pedunculate Oak, Ash, Beech and Sycamore. In the absence of changes in site management, these areas would probably develop into mature woodland.	Local importance (Low value)
Broadleaved woodland WD1	An area of semi-mature broadleaved woodland occupies the north western part of the site along an escarpment. The woodland has developed because this area has not been grazed for a number of years. The area has been colonised by a number of species from the surrounding hedges including Sycamore, Ash and Elm.	Local importance (Low value)
Improved agricultural grassland GA1	This habitat occupies the higher, relatively level area close to the southern boundary. It is dominated by Rye Grass and common herbaceous species such as Creeping Thistle, White Clover and Meadow Buttercup. It also occurs along the border of the L2545 Ringaskiddy Road. This habitat is of limited ecological value.	Negligible
Conifer woodland WD3	A small area of planted conifers was recorded, which consists of Sitka Spruce and Monterey Cypress. The trees are approximately 15-20 years old.	Negligible
Dense bracken HD1	Bracken occurs scattered throughout the study area as a minor component of scrub and hedgerows. However there are significant areas of dense bracken to the west of the Hammond Lane facility and at the south east corner of the Indaver site. In places trees are starting to become established within this dense bracken including Elder and Hawthorn	Negligible
Arable crops BC1	Two low -lying fields were amalgamated and converted from permanent pasture to arable crops (fodder beet in	Negligible

Habitat	Description/ Habitats Directive Annex I Status	Ecological value (NRA guidelines)
	2015). Very few arable weeds or other wild flora were noted, and this habitat is of low ecological value.	

12.3.5 Flora

The site of the proposed development lies within Ordnance Survey National Grid 10km square W76. The National Parks and Wildlife Service (NPWS) rare plant database notes the presence four protected plant species within W76; Meadow Barley *Hordeum secalium,* Penny Royal *Mentha pulegium*, Lesser Snapdragon *Misopates orontium* and Annual Knawel *Scleranthus annus*. These species are protected by the Flora Protection Order 2015 (S.I. No. 356 of 2015)). These species were not recorded within study area during site surveys.

Grey Sedge (*Carex divulsa*), which is classified as having an occasional occurrence in Ireland (Webb *et al*., 1996), was recorded within the site on previous occasions (2001 and 2008), but was not recorded on the site during 2014/2015. Bee Orchid (*Ophrys apifera*) has a scattered distribution in Ireland and was recorded in the study area in 2014/2015. Neither of these species are protected by the Flora Protection Order 2015 (S.I. No. 356 of 2015**)**

12.3.6 Invasive species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality.

The non-native invasive species Japanese Knotweed, Montbretia, Snowberry, Buddleia, Winter Heliotrope, Cotoneaster, Sycamore and Travellers' Joy were recorded within and adjacent to the study area. Of these species Japanese Knotweed is listed on both the "Most Unwanted: Established Threat" and on the "High Risk: Recorded Species" list compiled by Invasive Species Ireland a joint initiative by the Northern Ireland Environment Agency and NPWS. Sycamore, Montbretia, Snowberry, Cotoneaster are on the "Amber List: Recorded Species" (which under the right conditions could represent a significant impact on native species or habitats) while Buddleia, Traveller's Joy and Winter Heliotrope are on the "Amber List: Uncertain Risk" (their ecological impact remains uncertain due to lack of data showing impact or lack of impact). Japanese Knotweed, Montbretia, Buddleia, Winter Heliotrope, Cotoneaster and Travellers' Joy are also included in the NRA Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads (NRA, 2010) as these species have been shown to

have an adverse impact on landscape quality, native biodiversity or infrastructure; and are likely to be encountered during road schemes.

There is a statutory obligation under S.I. 477 of 2011 of the European Communities (Birds and Natural Habitats) Regulations 2011 to address invasive species in Ireland. Japanese Knotweed is the only species recorded in the study area which is listed under the *3rd Schedule: Part 1 – Plants; Non-native species subject to restrictions under Regulations 49 & 50*. Regulation 49 deals with the '*Prohibition on introduction and dispersal*' while Regulation 50 deals with the '*Prohibition on dealing with and keeping certain species*'. Regulation 50 has yet to be brought into Irish law. Regulation 74 is a transitional provision in relation to Regulation 49 and 50.

Montbretia, Cotoneaster, Snowberry were recorded in the immediate verge or roadside hedgerow on the southern side of the L2545 Ringaskiddy Road just outside the study area. These species are likely garden escapees from a derelict cottage. Winter Heliotrope was found present in the immediate verge on both the northern and southern side of the L2545 Ringaskiddy Road. The southern infestation is within the study area. Cotoneaster, Buddleia and Sycamore were recorded from the scrub areas within the development site, while Travellers' Joy, Sycamore and Buddleia were found to have invaded hedgerows throughout the study area. Sycamore and Travellers' Joy were observed in the broadleaved woodland on the escarpment while Buddleia was noted present on the steep earthen cliffs at the coast within the study area.

A number of mature stands and scattered emerging shoots of Japanese Knotweed were recorded within and adjacent to the western end of the study area. One mature dense stand of Japanese Knotweed was recorded in a hedgerow on the boundary of the study area between the two fields of arable crops (beet fodder) and the adjoining roadside hedgerow while a second younger stand was recorded within scrub just inside the study area. The remaining infestations are located outside of the study area within hedgerows adjoining the beet crops and along the southern and northern boundaries of L2545 Ringaskiddy Road. Japanese Knotweed was also recorded in the headlands and towards the centre of beet crop.

Given statutory obligations in relation to Japanese Knotweed, the extent of this species within the study area is shown on **Figure 12.3** with details of the infestations provided below in **Table 12.3.** Specific measures relating to the control of this species are included in the mitigation measures section (**Section 12.7.3)** below.

Table 12.3 Infestations of Japanese Knotweed

Japanese Knotweed	Description (Origin, Maturity & Nature)	Area
1 (inside study area)	Large continuous mature dense linear stand on the boundary of the study area. Located within a hedgerow between the two fields of arable crops (beet fodder) and the adjoining roadside hedgerow boundary. Number of plants/crowns unknown due to density. Approximately 8-10yrs old and on average of 2.5m high. In flower at time of survey; no evidence of senescence. Likely source of infestation is plant fragments from the adjacent hedgerow infestation.	

Japanese Knotweed	Description (Origin, Maturity & Nature)	Area
2 (inside study area)	Small stand within scrub just inside the boundary of the study area. Twelve plants/crowns recorded along with emerging shoots. Approximately 4-6yrs old and on average 1.5m high. No evidence of flowering under shade of scrub canopy. Flowering present where it emerges through canopy. No evidence of senescence. Likely source are plant fragments from crop cultivation.	
3	Large fragmented mature dense linear stand within a hedgerow boundary shared by a derelict cottage and a field of beet fodder. Number of plants/crowns unknown due to density. Approximately 8-10yrs old and on average 2.0m high. In flower at time of survey; no evidence of senescence. Likely source are plant fragments from the infestation along the adjacent L2545 Ringaskiddy Road (more mature).	
4	Large fragmented mature dense linear stand within a roadside hedgerow boundary along the southern side of the L2545 Ringaskiddy Road behind which is the field of beet fodder. Number of plants/crowns unknown due to density. Approximately 8-10yrs old and on average of 2.5m high. In flower at time of survey; no evidence of senescence. This is the most mature infestation recorded and probably the source of the infestation within and adjacent to the study area. Likely origin of this infestation is plant fragments distributed along the roadside by tyres and tracks of passing vehicles.	
5	Three small stands on an embankment on the northern side of the L2545 Ringaskiddy Road. Approximately 4-6yrs old and on average 1.5m high. In flower at time of survey; no evidence of senescence. Likely source are plant fragments from the infestation on opposite side of the road.	< $2m^2$ x 3 = $6m^2$
6	Scattered emerging shoots recorded in abundance along the headlands of the beet fodder crop and occasional towards the centre of the crop field. Likely sources are shoots emerging from lateral rhizome growth from parent plant and plant fragments from the mature stands in the hedgerow which have been distributed by mechanical methods during crop cultivation.	
7	Scattered emerging shoots within the immediate verge on the southernside of the L2545 Ringaskiddy Road. Likely sources are shoots emerging from lateral rhizome growth from parent plant and plant fragments distributed by mechanical methods during maintenance of the adjacent roadside hedgerow.	< $3m^2$

12.3.7 Mammals

The NPWS species record database notes the presence of five protected mammal species in 10km Grid square W76. These species are Hedgehog, Stoat, Red Squirrel, Otter and Pygmy Shrew. Of these species Otter, Hedgehog, Pygmy Shrew could potentially occur. Badger and Common Pipistrelle Bat were previously recorded from the site and Grey and Harbour Seal are known to occur

within Cork Harbour. Cetaceans have also been recorded from Cork Harbour. Relevant species are discussed in more detail below.

12.3.7.1 Badgers

Badgers and their setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badger setts are formed by a complex group of interlinked tunnels, and therefore works in proximity to setts can potentially cause damage.

A survey of the study area in 2001 recorded an active badger sett in the northern section of the site adjoining an area of pasture. A survey by DixonBrosnan in 2008 found that this sett remained in active use although the adjoining field had been changed from pasture to arable land. Evidence of activity was recorded at this sett, with one large latrine located in close proximity to an active burrow entrance. A short distance to the west of the active sett, there are further entrances close to a small thicket. A disused sett entrance was also located to the south of the active sett, and signs of badger activity including tracks, feeding signs and a latrine were recorded in pasture in the southern section of the site.

Surveys in 2014 and 2015 did not record any signs of badger activity, and the previously identified sett is no longer in active use (refer to **Appendix 12.3 Mammal surveys**). The reasons for this change are uncertain. However it is possible that over time the site has become less valuable for badgers due to the incremental change from large areas of grassland to a predominance of tillage and scrub, which is of less value as feeding habitat. It is noted that only one active sett entrance was recorded at the site in 2008; this may have been a subsidiary sett which is no longer used. Lack of usage does not necessarily mean that this population of badgers is no longer present in the wider landscape A pre-construction survey and further monitoring surveys during construction for badgers are recommended to confirm the absence of badgers and monitor any potential badger activity or re-establishment in the development area. This will minimise any potential impacts on the species.

12.3.7.2 Bats

All bat species in Ireland are protected under the Wildlife Act 1976, as amended, and the Habitats Directive and Irish implementing legislation. Ireland is also a signatory to the Bonn convention (Convention on the conservation of migratory species of wild animals, Bonn 1979) and the Bern convention, 1982 (The Convention on the Conservation of European Wildlife and Natural Habitats), and it has a commitment to the “Eurobats” agreement (Agreement on the Conservation of Bats in Europe, 1991).

Bat Conservation Ireland has recorded seven of the ten Irish bat species within the general Ringaskiddy area (Common Pipistrelle, Soprano Pipistrelle, Leisler’s Bat, Brown Long-eared, Daubenton’s, Natterer’s and Whiskered). There are no records of Lesser Horseshoe Bat, which is listed on Annex II of the Habitats Directive, in the Ringaskiddy area nor is this species likely to occur. Lesser Horseshoe Bat has a limited distribution and is generally confined to the western

counties of Ireland, the closest known roost is located in Ballincollig, County Cork (Port of Cork, 2014).

Bat surveys were undertaken in 2012 for the Ringaskiddy Port Redevelopment EIS (Port of Cork/RPS, 2014). Three bat species were recorded; Common pipistrelle, Soprano Pipistrelle and Leisler's Bat. Both Pipistrelle species were recorded foraging within woodland areas at the base of a training wall and jetty and along hedgerows, treelines and scrub habitats 1500m west from the Indaver site.

Bat activity was assessed at the DePuy site in 2011, in relation to the development of a wind turbine. This site is located approximately 240m south of the Indaver site. Three species of bat were recorded within the DePuy site, namely Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat. However activity within the site was relatively low. (DePuy Ireland, 2011.)

Surveys by DixonBrosnan in 2014 and 2015 indicated that there are no suitable roosting sites for bats within the Indaver site boundary. There are no structures which could potentially support roosts, and the trees are all relatively young and lack the structural complexity (i.e. rotten wood, holes etc), that would provide suitable roosting sites for bats. The EIS prepared for the Hammond Lane development (Doherty Environmental, 2012) likewise did not record any high value roosting habitat. In conclusion, the hedgerows and treelines on external boundaries are of some local value for feeding bats, but do not provide roosting habitat.

Dixon.Brosnan carried out night-time bat activity surveys using standard heterodyne bat monitors (Batbox III and Batbox Duet) at different areas within the site in May 2008. The survey recorded foraging Common Pipistrelle and commuting activity at different areas within the site, including the hedgerows/treelines along northern, western and southern site boundaries. As expected, most activity occurred close to better quality hedgerows. No other species were detected.

DixonBrosnan resurveyed the site in September 2014 and August 2015. A transect was walked along the perimeter of the site and bat activity monitored using a Bat Box Duet heterodyne/frequency division detector. (See **Appendix 12.3**). The following were recorded:

- Common Pipistrelle were recorded feeding along the hedgerow which runs along the southern boundary (2014 and 2015).
- Common Pipistrelle feeding along the southern boundary in the southwest corner of the site and along the woodland boundary. (2015).
- Soprano Pipistrelle fly-over along the shoreline boundary (2015)
- Common Pipistrelle flyover/feeding over the proposed development site close to the boundary with Hammond Lane. (2015).

The highest level of activity was along the external hedgerow along the southern boundary and the scrub/woodland in the western section of the site. These results are broadly similar to those obtained in 2008. The surveys found that bat activity was low, with only limited Common and Soprano Pipistrelle activity recorded. Only small numbers of individuals were recorded. In conclusion, the

hedgerows and treelines on external boundaries are of some local value for feeding bats, but do not provide roosting habitat.

12.3.7.3 Otters

Otters, along with their breeding and resting places, are protected under the provisions of the Wildlife Act 1976, as amended. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive, as transposed into Irish law. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered Species (CITES).

Otters are common along the Irish coastline however they are shy and generally nocturnal in areas subject to disturbance. Signs of their presence are readily identifiable, and include spraints, tracks, holts, resting areas, slides and feeding signs. Due to the proximity of the seashore, the site could potentially be used by otters.

Signs of otter activity were recorded during surveys for the Ringaskiddy Port Redevelopment EIS (Port of Cork/RPS 2014). These included the following:

- Signs of otter were noted along the ADM Training Wall, including old spraints and an active trail
- Otter activity was widespread at the base of the ADM Jetty.
- A single sighting of an otter leaving the eastern side of the ADM Training Wall
- A large amount of fresh spraint and three well-used sprainting sites were identified at the point where the existing ADM Jetty leaves the land.
- The spaces between boulders to the north of the existing ADM Jetty are extremely large and well-connected right down to low water level. An otter couch is likely present within these boulders.
- The most likely holt location was identified off-site, further to the west of Paddy's Point, where boulders were larger. This off-site area was surveyed in 2014 and a potential temporary holt/lying-up site was identified here within rocks at sea level.
- It was noted in 2012 that, despite human disturbance at Ringaskiddy East (the area being regularly used for boating, swimming and dog walking), evidence of otter presence was widespread along the shoreline; however, a holt was not identified.

It is noted that these areas are a considerable distance from the proposed development site. Paddy's Point and the ADM jetty are located approximately 550m and 1500m respectively from the Indaver site boundary.

Surveys by DixonBrosnan in 2014 and 2015 did not record the presence of otter within a radius of 150m from the study area, although some sprainting activity was recorded 300m north of the site. It is noted that the upper shore of the beach, which adjoins the site, is extensively used by the general public, and that usage is highest in proximity to the car park that is located immediately adjacent to the proposed development site. These circumstances, particularly where dogs

are also present, may reduce usage of the area by otter. Whilst otters may use the shore areas in proximity to the site on occasions, no holts were noted in this area, nor are they likely to occur in the area affected by beach nourishment works in the future.

12.3.7.4 Seals

Harbour Seal and Grey Seal are listed on Annex II of the Habitats Directive, and both are known to occur and feed within Cork Harbour. There are no known haul-out sites for Grey Seal in Cork Harbour; generally this species uses more exposed sites (Kiely, 1998).

Haul-out sites for harbour seals may occur inshore, for example on estuaries, coves, islands etc. and this species tends to forage within a relatively short distance of such haul-out sites. Over half of foraging trips may be within 5km of the haul-out sites (Cronin *et al*., 2007; Cronin *et al*., 2008). Although there is no evidence for significant haul-out sites or breeding sites in Cork Harbour, there are several small haul-out sites in this general area, as noted below. The beach adjoining the proposed development site is not of value as a haul-out site due to high levels of disturbance by walkers and dogs.

- A small haul-out site near Haulbowline Island (RPS, Port of Cork, 2014)
- An adult Harbour Seal occasionally uses a partially submerged tyre to haul-out on at mid-high tide approx. 10m from the shoreline adjacent to the National Maritime College in Ringaskiddy
- Approximately six Harbour Seals were recorded using the slipway at the National Maritime College (DixonBrosnan, 2014, RPS/Port of Cork, 2014)
- During winter bird counts by DixonBrosnan in 2014/2015, four Harbour Seals were recorded in the channel between the mainland and Spike Island

Although there is nothing to indicate that the area in the immediate vicinity of the Indaver site is of particular value for seals, it is within the feeding range for local Harbour Seal populations. Given the distance of the recorded haul-out sites from the proposed development site, no direct disturbance of haul-out sites will occur, and any impact on feeding areas will be minimal.

12.3.7.5 Cetaceans

Species that have been recorded by the Irish Whale and Dolphin Group within the overall harbour include Bottlenose Dolphin (*Tursiops truncatus*), Harbour Porpoise (*Phocoena phocoena*), Common Dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus),* Killer Whale (*Orcinus orca*) and Minke Whales (*Balaenoptera acutorostrata*). Of these, it is the smaller species such as harbour porpoise which are most likely to occur in the channel offshore from the site. No impact on cetaceans is predicted.

12.3.8 Other Mammals

Rabbits are numerous and signs of fox were noted on site. Small mammal surveys in the study area in 2001 and 2008 recorded the presence of Field Mouse, Bank Vole and Brown Rat. Such species are common in the Irish

countryside. Pygmy Shrew, Hedgehog and Stoat were not recorded, but may be present.

12.3.9 Reptiles and Amphibians

No habitat suitable for amphibians was recorded. Common Lizard is unlikely to be present.

12.3.10 Birds

12.3.10.1 Breeding Bird and site usage

Breeding bird surveys were carried out by DixonBrosnan during May 2008 using transect and point count methods (Bibby *et al*., 1992). A total of 35 bird species were recorded during site visits. These results were largely comparable with those from surveys carried out at the same site in 2001. In 2008 the mosaic of grassland and scrub was noted as particularly beneficial for warblers, with Blackcap, Whitethroat, Willow Warbler and Chiffchaff recorded. Stonechat was also noted and suitable habitat for ground nesting species such as Skylark and Meadow Pipit was also recorded.

A breeding bird survey was carried also carried out by DixonBrosnan in May and June 2010 using similar transect methods to Bibby *et al.*, (1992), covering the area of shoreline potentially affected by coastal works and adjoining areas of habitat. Areas of scrub and grassland was found to support a mixture of typical countryside birds including Chaffinch, Willow Warbler, Wood Pigeon, Blackbird and corvid species.

As the coastal area in proximity to the site does not have extensive mudflats, there was a preponderance of species associated with rocky/shingle shore habitats. Such species include Rock Pipit, Ringed Plover and Oystercatcher. Other species noted include piscivorous species such as Common Tern, Cormorant, Grey Heron and Little Egret. Four gull species namely Herring Gull, Greater Blackbacked Gull, Common Gull and Blackheaded Gull were also recorded.

Of the species recorded during the survey, six species (Oystercatcher, Cormorant, Common Tern, Grey Heron, Blackheaded Gull and Common Gull) are listed as birds of special conservation interest for the Cork Harbour SPA.

Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (Lynas et al., 2007). Red List bird species are of high conservation concern, and Amber List species are of medium conservation concern. Two Red Listed species were recorded (Herring Gull and Black Headed Gull) and five amber listed species were recorded. (Swallow, Starling, Greater Black-Backed Gull, Cormorant and Common Gull).

In 2015, breeding bird surveys were undertaken over three visits in May and June using a adapted version of the British Trust for Ornithology's (BTO) Common Bird Census Technique (Bibby *et al*., 2000 & Gilbert *et al*., 1998), with aspects of species specific survey methodologies employed where required (Gilbert *et al*., 1998). More detail on the methodology and the results of the survey are provided in **Appendix 12.2**

A total of 28 species were recorded in the breeding bird survey. However it is noted that not all of these species were breeding within the site. The results indicate that the bird community currently using the site is similar to that recorded previously. The reduction in bird species diversity (35 species in 2008 in comparison to 28 species in 2015) may be due to increased dominance of scrub and a reduction in areas of semi-natural grassland.

Although the area of semi-natural grassland within the site has reduced, Skylark was still recorded within the site boundary. Common Gull was recorded flying over the site and utilising the adjoining shore area. No high tide roosts for gulls or other waders/waterfowl were recorded within the study area. No nest sites for marine birds such as gulls or Ringed Plover were located within, or along the coast in proximity to the shore. Eight species recorded are Amber listed; of these species five are terrestrial species (Skylark, Kestrel, Starling, Swallow and Tree Sparrow). The remaining three species (Common Tern, Oystercatcher and Common Gull) are associated with marine habitats and do not breed within the study area.

A list of the bird species recorded during winter surveys in 2014/2015 is provided in **Table 12.3** (refer also to **Table 12.4** for the relevant BTO breeding bird survey codes).

Table 12.3. Breeding bird survey results (refer also to Table 12.4 for explanation of codes)

Bird species	Breeding status	Estimated No. of Pairs	Conservation status
Blackbird	Br-FF	2	
Blue tit	Br-FL	3	
Bullfinches	Pr- A	1	
Chaffinch	Br-FL	2	
Chiffchaff	Pr-D	2-3	
Common gull	N-F	0	Amber List
Dunnock	Po- S	1	
Goldcrest	Pr-D	1	
Goldfinch	PR-N	1	
Great tit	Br-DD	1	
Greenfinch	Pr-P	1	
Heron	N-F	0	
Hooded crow	N-F	0	
Kestrel	Pr-P	1	Amber Listed
Long tailed tits	Pr-P	1	
Oyster catcher	N-F	0	Amber Listed
Robin	Br-UN	1	
Rook	N-F	0	
Sedge warbler	Po-H	0-1	
Skylark	Po-S	1-2	Amber Listed

Bird species	Breeding status	Estimated No. of Pairs	Conservation status
Song thrush	Pr-N	1	
Starling	N-F	0	Amber Listed
Swallow	N-F	0	Amber Listed
Common tern	N-F	0	Amber Listed/Annex I
Tree sparrow	Po-H	0-1	Amber Listed
Common Whitethroat	Pr-A	1	
Wood pigeon	Pr-D	2-3	
Wren	Br-ff	2	

Table 12.4. British Trust for Ornithology breeding bird survey codes

Breeding status	Confirmed breeder (Br)	Probable breeder (Pr)	Possible breeder (Po)	Non-breeder (N)
Observed behaviours	Distraction-display or injury feigning (DD)	Pair in suitable nesting habitat (P)	Observed in suitable nesting habitat (H)	Flying Over (F)
	Used nest or eggshells found from current season (UN)	Permanent Territory (T)	Singing Male (S)	Migrant (M)
	Recently fledged young or downy young (FL)	Courtship and Display (D)		Summering non-breeder (U)
	Adults entering or leaving nest-site indicating occupied nest (ON)	visiting probable nest site (N)		
	Adult carrying faecal sac or food for young (FF)	Agitated Behaviour (A)		
	Nest containing eggs (NE)	Brood patch of incubating bird (I)		
	Nest with young seen or heard (NY)	Nest Building or excavating nest-hole (B)		

12.3.11 Survey of Common tern-breeding

A breeding population of Common Tern is known to occur near the entrance to the Port of Cork approximately 750km from the proposed development area. A previous survey for the Ringaskiddy Port Redevelopment EIS (Port of Cork/RPS, 2014) recorded 45-50 breeding pairs on concrete structures (dolphins) adjacent to the entrance of the Port of Cork. DixonBrosnan resurveyed this Common Tern

breeding colony over three days in May and June 2015, as this is the most significant breeding bird colony in the surrounding landscape. Approximately 50-55 breeding pairs were recorded (mean 53 breeding pairs) (refer to **Appendix 12.2** *Bird Surveys*).

12.3.12 Winter bird surveys

The winter bird surveys were undertaken on six dates between October 2014 and March 2015 (refer to **Appendix 12.2** *Bird Surveys*). The survey methodology was based on that used by the British Trust for Ornithology's (BTO) Wetland Bird Survey (WeBS) and also that for the Irish Wetland Bird Survey (I-WeBS), as outlined in Gilbert *et al.* (1998). Ninety minute counts were undertaken monthly at either high tide, mid tide and low tide. Survey vantage point locations for the winter bird counts are shown in **Appendix 12.2. Table 12.5** lists the bird species observed and the total number of birds recorded.

A total of 38 bird species were recorded during the 2014/2015 winter bird surveys as detailed below in **Table 12.5**. It is noted that many of these birds were recorded overflying the channel, and that the survey covered a radius of approximately 300m from each vantage point. The conservation status/designation of birds recorded during winter bird counts is also shown in **Table 12.5**.

Birds species listed in Annex I of the Birds Directive are considered a conservation priority. Five species (Mediterranean Gull, Dunlin, Little Egret, Great Northern Diver and Common Tern) are listed on Annex 1 of the Birds Directive. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Six red listed species were recorded namely Herring Gull, Curlew, Redshank, Black-Headed Gull, Dunlin and Knot. Thirteen species are Amber listed. Twenty four bird species are listed under the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA), to which Ireland is a signatory. Refer to **Table 12.5**, which gives the conservation status for each species recorded.

Table 12.5. Conservation status for species recorded.

Species		**Birds Directive Annex**					**Bird Red**	**Bird Amber**	**AEWA**
		I	II(I)	II(II)	III(I)	III(II)			
Cepphus grylle	Black Guillemot							X	X
Haematopus ostralegus	Oystercatcher							X	X
Columba palumbus	Woodpigeon		II(I)		III(I)				
Larus canus	Common Gull							X	X
Larus melanocephalus	Mediterranean Gull	I						X	X
Larus argentatus	Herring Gull						X		X
Larus fuscus	Lesser black-backed Gull							X	X
Larus marinus	Great black-backed Gull							X	X

Species		Birds Directive Annex					Bird Red	Bird Amber	AEWA
Phalacrocorax carbo	Cormorant							X	X
Numenius arquata	Curlew			II(II)			X		X
Tringa totanus	Redshank						X		X
Larus ridibundus	Black-headed Gull						X		X
Calidris alpina schinzii	Dunlin	I					X		X
Anas platyrhynchos	Mallard		II(I)		III(I)				X
Ardea cinerea	Grey Heron								X
Passer montanus	Tree Sparrow							X	
Egretta garzetta	Little Egret	I							X
Tringa nebularia	Greenshank							X	X
Anas crecca	Teal		II(I)			III(II)		X	X
Podiceps cristatus	Great-crested Grebe							X	X
Branta bernicla	Brent Goose							X	X
Calidris alba	Sanderling								X
Arenaria interpres	Ruddy Turnstone								X
Calidris canutus	Knot						X		X
Gavia immer	Great Northern Diver	I							X
Sturnus vulgaris	Starling							X	
Hirundo rustica	Swallow							X	
Alauda arvensis	Skylark		II(II)					X	
Sterna hirundo	Common Tern	I						X	X
Falco tinnunculus	Kestrel							X	

EU habitats and birds directive annexation descriptions		
Symbol	Meaning	Brief definition
I	Annex I bird species	Endangered species
II(I)	Annex II, section I bird species	Species may be legally hunted in all EU member states
II(II)	Annex II, section II bird species	Species may be legally hunted in named EU member states
III(I)	Annex III, section I bird species	Species may be deliberately killed or captured, nests disturbed or eggs taken, and traded live or dead in all EU member states
III(II)	Annex III, section II bird species	Species may be deliberately killed or captured, nests disturbed or eggs taken, and traded live or dead in named EU member states

The closest Special Protection Area (SPA) to the proposed development is the Cork Harbour SPA (Site Code 004030). A total of thirteen species listed as qualifying interests for the Cork Harbour SPA were recorded, namely, Cormorant, Oystercatcher, Dunlin, Curlew, Redshank, Greenshank, Great Crested Grebe, Grey Heron, Teal, Blackheaded Gull, Common Gull, Lesser Blackbacked Gull

and Common Tern. The Natura Impact Statement (NIS), which accompanies this application, provides a more detailed appraisal of the impact of the proposed development on Natura 2000 sites including the Cork Harbour SPA.

Table 12.6 Cork Harbour SPA –Special Conservation Interests for the Cork Harbour SPA and Qualifying Populations

Cork Harbour SPA [IE0004030]			**Season**
[A004]	Little Grebe	*Tachybaptus ruficollis*	Wintering
[A005]	Great Crested Grebe	*Podiceps cristatus*	Wintering
[A017]	Cormorant	*Phalacrocorax carbo*	Wintering
[A028]	Grey Heron	*Ardea cinerea*	Wintering
[A048]	Shelduck	*Tadorna tadorna*	Wintering
[A050]	Wigeon	*Anas penelope*	Wintering
[A052]	Teal	*Anas crecca*	Wintering
[A056]	Pintail	*Anas acuta*	Wintering
[A065]	Shoveler	*Anas cylpeata*	Wintering
[A069]	Red-breasted Merganser	*Mergus serrator*	Wintering
[A130]	Oystercatcher	*Haematopus ostralegus*	Wintering
[A140]*	Golden Plover	*Pluvialis apricaria*	Wintering
[A141]	Grey Plover	*Pluvialis squatarola*	Wintering
[A142]	Lapwing	*Vanellus vanellus*	Wintering
[A149]*	Dunlin	*Calidris alpina*	Wintering
[A156]	Black-tailed Godwit	*Limosa limosa*	Wintering
[A157]*	Bar-tailed Godwit	*Limosa lapponica*	Wintering
[A160]	Curlew	*Numenius arquata*	Wintering
[A162]	Redshank	*Tringa totanus*	Wintering
[A179]	Black-headed Gull	*Larus ridibundus*	Wintering
[A182]	Common Gull	*Larus canus*	Wintering
[A183]	Lesser Black-backed Gull	*Larus fuscus*	Wintering
[A193]*	Common Tern	*Sterna hirundo*	Breeding
[999]	Wetlands		

* Indicates a priority species under the Habitats Directive.

12.3.13 Winter roost cormorant

A night-time tree-roosting Cormorant survey was undertaken within Monkstown Creek during the 2011/12 and 2013/14 wintering seasons as part of the Ringaskiddy Port Redevelopment, Environmental Impact Statement (Port of Cork, 2014). The surveys recorded that during both wintering periods the Monkstown Creek tree-roost regularly supported nationally important numbers of roosting Cormorants. The number of cormorants using the Monkstown Creek tree-roost rose through late summer and autumn, peaking in October/November. The total peak number of birds recorded using the tree-roost was 334 birds, representing 2.45% of the most recently published Irish wintering population of

13,710 and 54.19% of the Cork Harbour SPA qualifying population at the time of designation (620 wintering individuals). The peak count also represents 133% of the most recently 5-year mean for Cork Harbour (252 individuals). The closest site, included within this night-time tree-roosting Cormorant survey, is located 1km from the proposed development area within the Indaver site.

12.3.14 Birds summary

Overall, the study area is of local value for a range of terrestrial bird species that are relatively common in the Irish countryside. The study area is of more value than the intensively agriculturally managed land in this area due to the presence of a greater diversity of habitats and semi-natural habitat. These have arisen due to an absence of active management of parts of the site. However, the study area does not support a community of birds or individual species that would be considered significant conservation priorities, and the study area, which is small, does not provide critical resources for such communities and/or species.

The coastal area adjoining the site consists primarily of rock and shingle, and therefore does not support the high numbers of wintering waders that are characteristic of high value mudflats with high densities of macro-invertebrates. Some species that are considered of high conservation value (Annex I of the Birds Directive, qualifying species for the Cork Harbour SPA and Red List) were noted in this general area. Many of these birds were recorded overflying the channel, and the site itself and the shoreline adjoining the site, did not support high numbers of these species.

12.3.15 Invertebrates

The complexity and diversity of vegetation types within the site provides a mixture of habitats for insects, although encroachment by scrub has reduced the available grassland habitat.

A specialised moth survey was carried out during August 2008 using a mercury vapour lamp trap survey and butterflies were identified during walkover surveys. In total 33 moth and butterfly species were recorded. No species of particular rarity were recorded, although some of the moth species do have specialised or localised distributions. All species recorded are dependent on scrub/semi-natural grassland with the exception of Wainscot Moth, which are associated with wetland reed beds. Reedbed habitat does not occur within the proposed development site but does occur within the vicinity of the site.

A previous survey of the site carried out by the Aquatic Services Unit in 2001 recorded 30 moth and butterfly species. A single species of Odonata (Dragonfly and Damselfly species) was recorded. None of the species recorded on the site during the 2001 survey were considered of special conservation significance, and the report concluded that “the species recorded strongly suggest that the site is of little entomological interest.”

Given the above background information, specialised surveys were not considered necessary in 2014/2015. Overall it can be concluded that the site supports a mixture of common invertebrate species that would be typical for the habitats noted within this general area. The presence of rare or uncommon species is unlikely, and some reduction in species diversity may have occurred

since the previous survey in 2008 due to an increased dominance of scrub habitat.

12.3.16 Marine Ecology

As a coastal protection measure, it is intended to place approximately 1,100m^3 of imported rounded shingle of appropriate size on Gobby beach at the base of the cliff at the eastern boundary of the site. This beach nourishment scheme will extend from the car park at the northern end to the southern boundary of the Indaver site. The material will be deposited above the high water mark.

A survey of the intertidal area in proximity to the proposed development was carried out by Dr. Stiofan Creaven on Thursday 18th and Friday 19th June, 2015. The survey report is included as **Appendix 12.4** of this EIS. The marine flora and fauna was examined with survey effort timed to correspond with low water on a Spring tide when as much of the shore as possible is exposed. The survey consisted of the following:

- a general walkover of the shore parallel to the waterline
- the examination of three shore transects perpendicular to the waterline extending to the low tide mark including the collection of six sediment core samples for faunal analysis
- an excursion to a large boulder on the lower shore
- the recording of a GPS track of the survey route
- the creation of a photographic record of the shoreline as encountered. Two cameras were used to record details of the shore – both cameras were synchronised (to within a second) with GPS time immediately prior to the start of the survey

The survey classified the habitats encountered during the survey as follows:

The upper shore here can be classed as Barren Littoral Shingle (EUNIS habitat code A2.111). This substrate typically supports virtually no macrofauna. There is often a temporary cover of the green seaweeds *Enteromorpha* spp. or *Ulva* spp. during periods of stability in the summer - as was observed during the current survey. This area is likely to be influenced by variable salinity. Energy (exposure) for the site is likely to vary considerably with the seasons.

Bedrock and boulders were found scattered throughout the mid and lower shore. Vertical surfaces on these were characterised by a barnacle-limpet community (EUNIS habitat code A1.1131) *Semibalanus balanoides* and *Patella vulgata* dominated community on bedrock. Occasional cracks and crevices in the rock provided a refuge for small individuals of the mussel *Mytilus edulis*, the winkle *Littorina saxatilis* and the dog whelk *Nucella lapillus*. This habitat was found in crevices on the prominent glacial erratic and in crevices found in the limestone bedrock outcrop seen on Transect 3.

Boulder tops, dominated by *Fucus spiralis*, can be classified as *Fucus spiralis* on sheltered upper eulittoral rock (EUNIS habitat code A1.312). In summer, the green alga *Ulva intestinalis* can become very common – as seen on the shore at Ringaskiddy. Vertical surfaces often lack the fucoid cover and are characterised

by the barnacle-limpet community (EUNIS habitat code A1.1131) also seen on this beach.

The presence of a substantial deposit of decaying algal matter in the mid shore complicates the allocation of a habitat type to this zone though the floral and faunal community encountered closely resembles *Fucus vesiculosus* on variable salinity mid eulittoral boulders and stable mixed substrata (EUNIS habitat code A1.323). The presence of ephemeral seaweeds (green algae here) occupying available space and patches of sediment found between the hard substrata containing the lugworm *Arenicola marina* and the sand mason *Lanice conchilega*, support this classification. The exposure level of this shore probably changes seasonally from sheltered to moderately exposed/exposed during storm events.

The lower shore is characterised by littoral muddy sands with the habitat falling into a Polychaete/Bivalve-dominated muddy sand shore (EUNIS habitat code A2.24). Based on analysis of infaunal samples taken during the transects, this most closely resembles a *Macoma balthica* and *Arenicola marina* in muddy sand shores biotope (EUNIS habitat code A2.241) though with *Abra* present instead of *Macoma*. It also has elements of *Lanice conchilega* in littoral sand (EUNIS habitat code A2.245).

An attempt was made to obtain faunal samples at all stations visited. Due to the rocky nature of the substrate it was only possible to obtain samples at two stations namely at Station 5 on Transect 1 and at Station 5 on Transect 3. Using a spade, digovers to a depth of 30cm were carried out at those stations where coring for fauna was not possible. The assemblage recorded is close to the EUNIS LS.LSa.MuSa.Lan Lanice conchilega in littoral sand grouping but instead of *Macoma balthica*, *Abra* is present. (EUNIS code A2.24 – Polychaete/bivalve dominated muddy sand shores). The common cockle (*Cerastoderma edule*) was also present here.

The report concluded that these habitats are all commonly encountered in an Irish context. Samples were faunally poor with only ten taxa present. All species found are typical of fine grained sediments of the North East Atlantic. No rare or uncommon species were recorded.

12.4 Characteristics of the Proposed Development Site

The proposed development will be located on the Ringaskiddy Peninsula, overlooking Cork's inner harbour approximately 800m east of the village of Ringaskiddy in County Cork. The site of the proposed development is currently a greenfield site of approximately 13.55 hectares and is located on the northern slopes of the Ringaskiddy peninsula at its eastern end. The location of the site is shown in **Figure 1.1 of this EIS**.

The main element of the proposed Ringaskiddy Resource Recovery Centre project is a waste-to-energy facility (waste incinerator). Other elements include an upgrade of a section of the L2545 road, coastal protection measures on Gobby beach, a connection to the national electrical grid, and raising the ground levels in part of the site. Refer to **Figure 1.3** for the overall site layout. The proposed development is described in detail in Chapter 4 **Project Description** of this EIS**.**

12.5 Evaluation of Potential Impacts

During construction, potential impacts could arise from increased noise and disturbance during works on land and from spreading of the invasive species Japanese Knotweed during site works. On the adjoining beach, impacts could arise from increased noise and disturbance associated with the coastal protection works. Impacts on the marine environment could arise during construction from increased run-off of suspended solids or from inadvertent spillages of hydrocarbons during construction works.

During the operation phase of the proposed development, there will be a net, permanent loss of an area of semi-natural terrestrial habitat and potential impacts on the ecology of the upper shore from the beach nourishment scheme. Increased traffic and noise associated with the site could potentially increase levels of disturbance which could result in the disturbance/displacement of birds and mammals such as otter and seals. The stack of the main process building could theoretically create a collision risk for birds thus leading to a risk of increased bird mortality and potential subsequent impacts on bird populations. Emissions to air could theoretically have eco-toxicological impacts particularly on piscivorous birds, otters and seals due to bioaccumulation. The importation of organic waste could attract increased predator numbers which in turn could have implications for nesting success for birds and for ground nesting birds in particular. Accidents during operation or during the transport of ash and flue gas residues could theoretically impact on marine ecology.

12.5.1 Impact Appraisal

When describing changes/activities and impacts on ecosystem structure and function, important elements to consider include magnitude, duration and probability of occurrence (IEEM, 2006).

Magnitude refers to the 'size' or ‘amount’ of an impact, determined on a quantitative basis if possible. Duration refers to the time for which the impact is expected to last prior to recovery or replacement of the resource or feature. This should be defined in relation to ecological characteristics (for example species’ lifecycles) rather than human timeframes. Appropriate criteria for the assessment of magnitude and duration for this project are provided in **Tables 12.7 and 12.8** below.

Table 12.7: Criteria for Determining the Magnitude of Ecological Impacts

Magnitude	Examples
Very High	e.g. The proposal (either on its own or with other proposals) will result in – The total loss of or very major alteration to key elements/features of the baseline conditions such that post-development/character/composition/attributes will be fundamentally changed and may be lost from the site altogether.
High	e.g. The proposal (either on its own or with other proposals) will result in – Major alterations to key elements/features of the baseline (predevelopment) conditions such that post-development/character/composition/attributes will be fundamentally changed.
Medium	e.g. The proposal (either on its own or with other proposal) will result in – The loss of or alteration to one or more key elements/features of the baseline conditions such that post-

	development/character/composition/attributes of baseline would be partially changed.
Low	e.g. The proposal (either on its own or with other proposals) will result in – A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline conditions would be similar to predevelopment circumstances/patterns.
Negligible	e.g. The proposal (either on its own or with other proposals) will result in – A very slight change from baseline condition. Change barely distinguished approximating to the "no change" situation.

Table 12.8 Criteria for assessment of duration.

Duration	Criteria
Permanent	Effects continuing beyond one human generation (c.25 years) are expected. There is likely to be a substantial improvement after this period, whereby these would be described as "very long term effects."
Temporary	Long term-(15-25 years) Medium (5-15 years) Short term (0-5 years)

Probability of occurrence

It is important to consider the likelihood that a change/activity will occur as predicted and also the degree of confidence in the assessment of the impact on ecological structure and function. The following scale (IEEM, 2006) is often utilised in ecological assessment:

- Certain/near-Certain: probability estimated at 95% chance or higher.
- Probable: probability estimated above 50% but below 95%.
- Unlikely: probability estimated above 5% but less than 50%.
- Extremely Unlikely: probability estimated at less than 5%

Significance of impacts

Based on the above and the value of habitats and species a matrix of significance can be used to determine specific impacts. This matrix is shown below in **Table 12.9.**

Table 12.9: Impact Significance Matrix

Impact Significance		Ecological Value				
		Very High	High	Medium	Low	Negligible
Magnitude	Very High	Major	Major	Major	Moderate	Minor
	High	Major	Major	Moderate	Minor	Negligible
	Medium	Major	Moderate	Minor	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible

12.5.2 Do nothing scenario

In the absence of development it is expected that the small areas which are currently managed intensively for agriculture (arable and pasture) would remain under the same management regime. The general pattern of succession from scrub with patches of grassland to woodland would be expected to continue on areas that are not currently grazed. If sufficient time elapsed without development, the unused areas of the site would be expected to develop a covering of woodland with a mix of native and introduced species. However Japanese Knotweed is likely to spread if active control measures are not implemented.

12.6 Predicted Impacts on Terrestrial Habitats

12.6.1 Predicted Impacts on Terrestrial Habitats

Impacts on terrestrial habitats are generally restricted to direct removal of habitats and possible impacts from the spread of invasive species. Levels of dust during construction are predicted to be low and effectively managed by mitigation. The impact on vegetation in adjoining habitats from wind-blown dust is predicted to be negligible. Based on the criteria outlined by the IEEM, as described above, the predicted impacts are detailed in **Table 12.10.**

Table 12.10 Impacts on Terrestrial Habitats

Habitat	Ecological value (NRA guidelines)	Predicted Impact
Hedgerow WL1/Treelines WL2	Local importance (Low value)	Minor
Dry meadow and grassy verge GS2/Wet grassland GS4	Local importance (Low value)	Minor
Scrub WS1	Local importance (Low value)	Minor
Immature woodland WS2	Local importance (Low value)	Minor
Broadleaved woodland WD1	Local importance (Low value)	Negligible
Improved agricultural grassland GA1	Negligible	Negligible
Conifer woodland WD3	Negligible	Negligible
Dense bracken HD1	Negligible	Negligible
Arable crops BC1	Negligible	Negligible

12.6.2 Non-native invasive species

Following best practice guidance Montbretia, Snowberry, Buddleia, Winter Heliotrope, Cotoneaster and Travellers' Joy can be readily managed through standard eradication/control methods. On the basis of their invasive qualities, the

ecological value and types of habitats recorded during the walkover survey and their Amber Listing by Invasive Species Ireland, these species are unlikely to result in a significant effect. If not eradicated, however, prior to construction they are likely to further invade adjacent semi-natural habitats and disturbed ground associated with construction activities and cause long-term landscape maintenance issues relative to the proposed development with associated costs. For this reason, these species should be included in an invasive species management plan for the site. Given the dominance of Sycamore in the Irish landscape it is not considered feasible to include this species in the management plan for the site.

Given its invasive qualities, the high risk categorisation by Invasive Species Ireland, statutory obligations and the potential for significant effects arising from this species, Japanese Knotweed will be carried forward for further assessment.

Introduced into Ireland in the early part of the 19th Century, Japanese Knotweed is a highly invasive herbaceous perennial which grows up to 3m tall. The leaves and stems die back during winter, but growth is extremely rapid during spring. It can grow on almost any substrate and has invaded semi-natural riparian habitats including riverbanks, roadside and railway verges, coastal habitats, disturbed ground and waste areas and gardens in both urban and rural landscapes in Ireland. From an ecological viewpoint, its early emergence, great height and density of stands combine to shade out and suppress native plants. It has been shown to reduce species diversity of invertebrate populations and is therefore likely to reduce the quality of ecosystems for amphibians, reptiles, birds and mammals, whose diets are largely composed of arthropods.

The plant can spread rapidly to form dense stands 1 to 3 acres in area by sending shoots up from an extensive radial rhizome network (root-like structures). When established the rhizomes can extend several metres (up to 7m) from the parent plant and deep into the soil up to 3m (depending on ground conditions and disturbance regimes). As plants mature plants a large central bulbous rhizome crown develops from which the main stems emerge. Spreading out from this central region are a number of radial penetrating rhizomes that twist together to form a sizeable and considerable penetrating force. It is this characteristic of the plant which gives it the ability to penetrate weak points in structures, break through bituminous materials and concrete thus damaging footpaths, hard standing areas, road surfaces, services and foundations.

The major issue with this species is its ability to disperse by plant fragments and to colonise and invade disturbed land. Japanese Knotweed can regenerate from less than 0.7g of rhizome. Stem material cannot regenerate once it has dried, but rhizome material may be viable for up to 20 years in the soil. During flood events fragments of rhizomes may be broken off and washed downstream establishing new populations. Vegetation management, landscaping and construction activities can disturb Japanese Knotweed and it may spread within or off site in the form of plant fragments in the soil load or on the tyres of machinery and dumpsters, especially on machinery with tracks. Mowing or strimming can distribute fragments, which can then be carried along road corridors by wind or on the tyres of vehicles including cars (see Wace, 1977; Wilcox, 1989) or downstream where they can further invade riparian vegetation. Thus control of this species is therefore very difficult and requires a detailed non-native invasive species management plan (Invasive Species Ireland, 2008).

The potential for impacts arising from Japanese Knotweed are dependent on a do nothing or a do something scenario. The do something scenario refers to the eradication of Japanese Knotweed prior to construction stage of the proposed development. Under a do nothing scenario the infestation will continue to spread due to lateral rhizome growth and through disturbance from road maintenance and arable crop cultivation into adjacent lands with potential for significant impacts on

In this instance it is proposed to control invasive species including Japanese Knotweed adjacent to the site prior to the commencement of construction and thus any impact from invasive species will be negligible.

12.6.3 Impacts on Marine Habitats

Potentially, impacts on marine habitats could arise due to the deposition of the shingle above the foreshore on Gobby Beach. This will impact on the physical structure of the upper shore above the high tide line and on any flora/fauna occupying this zone. Some of this material could impact on the intertidal zone if the material moves position during storm surges. Depending on the chemical composition of the deposited material and its similarity to the existing beach material, there could be changes in floral communities. However, it is noted that no rare or uncommon species or habitats have been recorded within the area of the proposed coastal protection works and re-colonisation of this area is expected to proceed quickly. The material to be deposited will be similar to the existing material in this area and thus no changes in flora/fauna communities will occur. Similarly, if any of this material reaches the intertidal zone during storm surges, it will be rapidly re-colonised and will not have a significant impact on marine ecology. Any direct impacts on marine ecology arising from the beach nourishment scheme are predicted to be negligible.

Again, potentially, impacts could arise from any inadvertent spills of hydrocarbons or other chemicals during construction. High levels of suspended solids in surface water run-off could potentially have localised impacts on marine ecology. It is noted that such impacts are easily prevented by standard mitigation measures, which will be implemented during construction, and which are set out in detail in **Chapter 5** of the EIS. No habitats of high sensitivity to pollutants or high conservation value occur in close proximity to the development site and the marine environment provides a high level of dilution in relation to possible inadvertent minor spills of hydrocarbons or other chemicals. Any indirect impacts on water quality and marine ecology during construction are predicted to be negligible.

No significant impacts on water quality in the marine environment are predicted during operation of the facility. All trucks carrying solid waste will be covered. Aqueous waste will come in tankers. All trucks will have to comply with the road transport legislation and regulations.

Circa 2,000 tonnes per annum of boiler ash and circa 9104 tonnes per annum of flue gas cleaning residues will be produced in the waste-to-energy plant. The boiler ash and flue gas cleaning residues will be in the form of fine particles and will contain heavy metals.

These residues will be disposed of to a landfill for hazardous waste after treatment if necessary or to a salt mine, either in Ireland, if one is available, or

abroad. The regulation of the transport of the ash would be subject to Trans Frontier Shipment (TFS) licence which is a licence which must be approved by the origin/destination/transit authorities consenting to the movement/transit and acceptance of wastes between EU member states. The regulation governing this is EU Regulation 1013/2006. This licence tracks waste from origin to destination and ensures that each authority is aware of the status of the waste until final recovery when the individual TFS notification annex consigned with each shipment is signed off as having been received and treated by the receiver. This completed licence is then circulated back to us as the producer as well as all relevant authorities.

Similar residues from Indaver's Meath facility are currently being shipped to salt mines in Germany where the residues are solidified and used to back-fill the mine instead of using other raw materials. There are no landfills for hazardous waste or salt mines in Ireland at present. The residues will be collected on the site in sealed silos. The silos are emptied into a tanker via a sealed connection. This will ensure there are no fugitive releases on the site.

It is noted that the accident risk during shipping is low. Van Den Bosch are the preferred international logistic services provider which transports such residues for Indaver. They note that in the 51 years of their history no container has ever fallen overboard and no ship has sank with their containers on board.

The addition of water leads to the residues solidifying. Thus in event of a shipping accident and if the transport container were to loose integrity, the residues would solidify on contact with water and solidified residues will be salvaged from the sea bed.

Given the extremely low risk of an accident, the low risk of leakage from the transport containers, the fact that the residues will solidify on contact with water, the impacts on marine or terrestrial ecology from the disposal of this material are expected to be negligible.

Wastewater will be directed to Irish Water sewer. Any process effluent will be recycled for use in the process and will not be discharged off site. Storm water will be monitored and discharged off site only if monitoring determines that it is uncontaminated. In the unlikely event of a fire, the fire-fighting water will be captured in the storm water drainage system and will be collected in the holding tank, where it can be stored for disposal. The outlet valve from the holding tank will close if there is a fire alarm. If the holding tank has insufficient capacity, the water will overflow to the attenuation tank, in which it can be retained pending testing and disposal. Detailed information on potential impacts from accidents is provided in the HAZID report (**Appendix 6.1 of this EIS**).

The potential impacts on air quality from emissions are specifically addressed in **Chapter 9, *Climate*** of this EIS, which concluded that, based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will be insignificant. Therefore, any impact from the bioaccumulation of potentially toxic compounds in macro-invertebrate and fish populations is predicted to be negligible.

Based on the above information, impacts on the marine environment during operation are predicted to be negligible.

12.6.3 Predicted Impacts on Fauna

12.6.3.1 Otters

A survey by DixonBrosnan in 2014 and 2015 did not record the presence of otter within a radius of 150m from the study area, although some sprainting activity was recorded 300m north of the site. No holts were recorded. It is noted that the upper shore of the beach, which adjoins the site, is extensively used by the general public, and that usage is highest in proximity to the car park that is located immediately adjacent to the proposed development site. These circumstances, particularly where dogs are also present, may reduce usage of the area by otter.

During construction works there will be increased noise and activity associated with the site works. It is noted that this part of Cork Harbour is already subject to high levels of disturbance from traffic and human activity and otters readily habituate in these circumstances. The deposition of material on the upper shore during the beach nourishment process will be short in duration and will occur during daylight hours. Any impact on otter during the construction phase will be negligible.

No significant impacts on water quality in the marine environment or significant impacts on prey availability for otters have been identified. The impacts on air quality from emissions are specifically addressed in Chapter 9 of this EIS which concluded that *based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will be insignificant.* Therefore no impact on otter via air emissions or subsequently via bioaccumulation of potentially toxic compounds is predicted to occur.

12.6.3.2 Seals

Harbour Seal and Grey Seal are listed on Annex II of the Habitats Directive, and both are known to occur within Cork Harbour. Harbour seals have been recorded from within the channel which adjoins the site and small haul out sites have been recorded at Haulbowline Island and at the slipway at the National Maritime College. Although there is nothing to indicate that the particular area in the immediate vicinity the study area is of particular value for seals, it is within the feeding range for local Harbour Seal populations that forage within this general area. Given that the haul out locations are at least 0.5km from the development area and that seals are mobile and can readily move away from short-term disturbance, any impact on seals will be negligible. The impacts on air quality from emissions are specifically addressed in Chapter 9 of this EIS which concluded that *based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will be insignificant.* Therefore no impact on otter via air emissions or subsequently via bioaccumulation of potentially toxic compounds is predicted to occur.

12.6.3.3 Cetaceans

A number of cetacean species have been recorded within the overall harbour. Harbour Porpoise is considered the species most likely to occur in the channel offshore from the site. It is anticipated that no significant vibration will be

generated during the construction phase of the proposed development. Piling is likely to be required. It will utilise methods that will minimise the risk of vibration generation and will only be undertaken in daytime. Rock breaking, if required will use methods that will minimise noise and vibration. Impacts on cetaceans during site works are predicted to be negligible.

No significant impacts on water quality in the marine environment or significant impacts on prey availability for cetaceans have been identified. The impacts on air quality from emissions are specifically addressed in Chapter 8 of this EIS which concluded that *based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will be insignificant.* Therefore, no impact on cetaceans via air emissions or subsequently via bioaccumulation of potentially toxic compounds is predicted to occur.

12.6.3.4 Bats

Bat surveys did detect limited usage of the site of the proposed development by Common and Soprano Pipistrelle within the proposed development area with most activity confined to the external boundaries. No potential roosting sites were identified within the site. The native hedgerow along the southern boundary will be retained. The treeline of Hornbeam and Sycamore along the northern boundary will be removed with replacement planting proposed. Whilst the loss of scrub and small areas of grassland will reduce the net feeding area available for bats, there will be no significant loss of the more important feeding habitat along external boundaries and of linear routes which may provide commuting routes within the wider landscape. It is also noted that it is intended to develop semi-natural grassland habitat within the site boundary which is likely to be of value for feeding bats. Overall the impact is predicted to be permanent and of low significance. However the impact will be localised and is unlikely to significantly impact on overall bat populations as there will no loss of critical resources for bats.

12.6.3.5 Badgers

There is no longer any evidence that the Indaver site is utilised by badgers. Habitats such as scrub and arable land, which will be removed by the development, do not generally provide critical feeding resources for badgers and the areas of semi-natural grassland to be removed are very small in extent. Overall the impact on badgers is predicted to be negligible.

12.6.3.6 Impacts on birds associated with terrestrial habitats

The terrestrial bird species recorded during bird surveys are typical of the types of habitat noted on site and are generally common. No rare or uncommon species or species of high conservation value were recorded. There will be a net loss of semi-natural habitats within the proposed development area (arable land, scrub and grassland) and the loss of scrub in particular will have a localised impact on nesting and feeding resources for these species. However, the scrub habitat is often an ephemeral habitat within the wider agricultural/industrial landscape and the scrub on the site has largely developed because sections of the site have not been utilised. Small areas of this type of scrub are commonly lost or recreated within the wider landscape. Only very small areas of semi-

natural grassland will be lost and the habitat quality of improved agricultural grassland which remains within the site, will be enhanced to provide replacement habitat. Overall, the loss of habitat for breeding birds within the development site is considered a permanent minor impact.

Some disturbance/displacement of terrestrial birds may occur during construction due to increased noise and disturbance. However this will be short in duration. The impact is therefore predicted to be short-term and of low significance. During the operational phase, the levels of activity will stabilise and birds in the surrounding landscape will be expected to habitualise to the volume of activity proposed. The impact on birds in habitats adjoining the proposed development site is therefore predicted to be permanent and negligible during operation.

12.6.3.7 Construction Impacts on birds associated with marine/shoreline habitats

The Cork Harbour Special Protection Area (Site code 004030) is located approximately 0.5km to the south of the proposed development area. The closest Natural Heritage Area/proposed Natural Heritage Area is the Lough Beg proposed Natural Heritage Area (Site code 001066), which is located 0.3km to the south, and which is also designated on the basis of its bird populations.

The schedule for the construction and commissioning of the resource recovery centre is approximately 31 months and thus there will be works taking place during the peak season for wintering birds which runs from October to March inclusive. Deliveries of shingle and the placement of shingle for the coastal protection works will take place over a period of three weeks and will be undertaken outside of the main bird wintering season.

Bird surveys were carried out to determine the degree to which the shoreline/marine habitats in proximity to the proposed development site are utilised by birds and in particular important populations of overwintering waders and waterfowl. A total of 38 bird species were recorded during the winter bird surveys carried out in 2014/2015. Birds species listed in Annex I of the Birds Directive are considered a conservation priority and five such species were recorded. (Mediterranean Gull, Dunlin, Little Egret, Great Northern Diver and Common Tern). Six red listed species were recorded namely Herring Gull, Curlew, Redshank, Black-Headed Gull, Dunlin and Knot. A total of thirteen species listed as qualifying interests for the Cork Harbour SPA were recorded, namely, Cormorant, Oystercatcher, Dunlin, Curlew, Redshank, Greenshank, Great Crested Grebe, Grey Heron, Teal, Blackheaded Gull, Common Gull, Lesser Blackbacked Gull and Common Tern.

As a number of bird species were recorded feeding along the shoreline in proximity to the proposed development or overflying the channel, there is the potential for more localised impacts on birds, including species listed as qualifying interests for the Cork Harbour SPA where they occur outside the SPA site boundaries. Similarly there could potentially be impacts on birds which are otherwise considered of high conservation value.

Impacts on birds in close proximity to the proposed development area could potentially arise during construction when levels of noise will increase. There will be increased activity during works, although only activities in close proximity to the shoreline or at height will be visible to birds along the shoreline. For the

period of the coastal protection works there will be obvious disturbance along the shoreline.

It is noted that the area of shoreline adjoining the proposed development is subject to high levels of disturbance and that, to a degree, any birds which utilise this area will have habitualised to high levels of daytime disturbance. During construction on land the impact on birds is predicted to be short-term and negligible. The coastal protection works will take place outside the main wintering season and will not impact directly on intertidal habitat, thus the impact will be short-term and minor.

No nests for birds such as Ringed Plover were recorded on the upper shore adjoining the development site boundary. A breeding population of Common Tern is known to occur near the entrance to the Port of Cork approximately 750m west of the proposed development area. Given the distance of this colony from the development area, any impacts on this species due to increased noise and disturbance during construction or operation is predicted to be negligible.

An important winter roost of Cormorants is known to occur in trees at Monkstown Creek which is located approximately 1km from the proposed development site. Given the distance of this colony from the development area, any impacts on this species due to increased noise and disturbance during construction or operation is predicted to be negligible.

12.6.3.8 Operational Impacts on birds associated with marine/shoreline habitats

During the operational phase, noise, disturbance and traffic levels will increase in the context of an area where there are already moderate levels of background noise and traffic. Any impacts on birds from disturbance due to increased traffic and noise are predicted to be permanent and minor.

The impacts on air quality from emissions are specifically addressed in Chapter 9 of this EIS which concluded that based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will be insignificant. A literature review, which forms **Appendix 3** of the NIS which accompanies this application, looked at the potential for bioaccumulation in piscivorous birds. Based on the information provided in these assessments including the insignificant levels of potentially toxic substances in emissions and the low background levels in marine sediments any direct impact on birds and mammals via direct emissions or from bioaccumulation are predicted to be negligible.

A literature review was carried out to assess the potential collision risk to birds created by the stack which will be 75m in height. This literature review forms **Appendix 4** of the NIS which accompanies this application. The review notes that, information on the potential collision risk created by such stacks is scarce, however, there is evidence to suggest that towers lower than 60m pose a lower risk to migrating birds. The review notes that a recent radar study was commissioned by the Cork Lower Harbour Energy Group in order to identify nocturnal bird movement and interconnectivity within the Cork Harbour SPA (Simms *et al.* 2011). This study did not reveal any distinct flight patterns over the proposed development site. The literature review indicates that, while any light source has the potential to attract birds and therefore increase collision risk,

flashing lights are involved in significantly fewer collisions than continuous lights. There is also some indication that white lights are less attractive than red lights, although the results to date are inconclusive. While bird vision does differ from human vision on the lower UV end of the spectrum, infra-red light is also invisible to birds. Therefore the proposal for a combination of white flashing and infra-red lights on the stack, is the most favourable choice and does not pose a significant collision risk to birds.

Based on the above, and the bird surveys carried out in relation to this application for permission, a significant collision risk to birds is considered unlikely.

Local ecological impacts could arise due to increased predator activity if species such as rats or gull species were attracted into the area due to the presence of waste. Both species can prey on nests for ground nesting birds such as common tern and ringed plover. However, it is noted that, during the operational phase of the proposed development, trucks with organic waste will discharge their loads within a sealed building and that there will no storage of waste in outside spaces. Trucks are inspected on arrival to ensure that there is no waste adhering to wheels. A standard pest control programme will be implemented at the site, which will include the use of standard bait boxes and ongoing monitoring as part of a annual service contract. The stack does not create suitable perches for predatory birds and thus does not increase the predation risk for nesting birds. It is also noted that the closest nesting colony of high conservation value (Common Terns) is located approximately 750m away. Under these circumstances any impact from increased predator density or increased predator activity is predicted to be negligible.

In relation to the Cork Harbour Special Protection Area, for the reasons set out in detail in the NIS submitted with the application, there will be no adverse effects on the integrity of that designated European site having regard to its conservation interests.

In relation to the pNHA, the impact due to increased noise and disturbance during the operational phase is predicted to be permanent and negligible.

12.6.3.9 Impacts on other fauna

Rabbit, Fox, Field Mouse, Pygmy Shrew and Bank Vole have all been recorded from the site. Mammal species which are protected under the Irish Wildlife Act 1976, as amended, such as Pygmy Shrew, Hedgehog and Stoat could potentially occur within the proposed development site, although no signs of these species were recorded. No habitats suitable for amphibians or reptiles was recorded and a survey in 2008 for butterflies and moths did not record any rare or uncommon species. Given that no rare species were detected in 2008 and the common nature of the habitats to be removed, it was not considered necessary to repeat this survey in 2014/2015. Given that small areas of relatively common habitats that will be affected any impact on these species will be negligible.

12.6.3.10 Climate change and biodiversity

The EU Commission guidance document on integrating climate change and biodiversity into environmental impact assessment (EU Commission, 2013) aims

to improve the way in which climate change and biodiversity are integrated into Environmental Impact Assessment. Key principles specified by the document when considering impacts include the following:

- Consider climate change at the outset
- Analyse the evolving environmental baseline trends
- Taking an integrated approach
- Seek to avoid biodiversity and climate change effects from the start
- For biodiversity, EIA should focus on ensuring 'no net-loss'
- Assess alternatives that make a difference in terms of climate change and biodiversity
- Use ecosystem-based approaches and green infrastructure as part of the project design and/or mitigation measures.
- Assess climate change and biodiversity synergies and cumulative effects which can be significant

The potential impacts from the proposed development on climate have been specifically addressed by **Chapter 9 *Climate*** of this EIS. No significant interactions between the impacts on biodiversity resulting from this development and climate change have been identified.

In relation to biodiversity, it is important to adopt an "ecosystem approach which considers all of the different ecological elements and how they interact with each other. The site of the proposed development consists of a mixture of semi-natural habitats with native hedgerow along the southern boundary forming a connective element within the local landscape. Dense hedgerows can connect different ecological elements within a landscape which allows mammals, birds and invertebrates a means of moving through the landscape under cover. In this instance, the hedgerow connects a small area of woodland and scrub in the east of the Indaver site to coastal habitats. A hedgerow running at right angles from this hedge connects to the additional woodland habitat in proximity to the Lough Beg industrial estate. In addition this boundary hedgerow provides nesting and feeding habitat for birds and other fauna and is of value as feeding habitat for bats. The retention and enhancement of this hedgerow is therefore considered important in maintaining ecological value within the site.

A review of aerial photography and surveys, carried out on the site since 2001, indicates that areas which have not been managed for conventional agriculture have gradually changed over time. In particular, scrub has gradually encroached on grassland habitat within the proposed development area in place of semi-natural grassland. Scrub is now the dominant habitat within the proposed development area, with grassland reduced to small fragments.

It is proposed therefore to enhance the habitat value of an area of improved grassland in the southwest corner of the site, which is approximately 3ha in size (see **Figure 12.2**). This will be achieved by introducing specialist grass seed mixes based on the naturally occurring plant species found in this area, the introduction of species such as the parasitic yellow rattle and of key species such as knapweed that are important attractors for butterflies and other invertebrates.

The species mix will include species found within the site and locality and will take into account prevailing ground conditions and the coastal environment. A specific, long-term management programme that includes a grazing and/or cutting regime to maintain diversity within the sward will be implemented. Fertiliser applications will be discontinued. In line with the “no net loss” principle of the EU commission guidance on integrating climate change and biodiversity into EIA, the long-term aim will be the establishment of a species rich grassland (i.e. a combination of Dry Meadow and Grassy Verge GS2, Wet Grassland GS4 and Neutral Grassland GS1) as a replacement for grassland areas which have become dominated by scrub. It is noted that the creation of a sustainable diverse grassland on high fertility grassland is a long-term process which requires specialist expertise.

It is noted that scrub will be retained within the site to the south west of the Hammond Lane site. Areas of dense bracken within this area will be treated to reduce the dominance of bracken which tends to suppress ground flora. This will also serve to increase biodiversity within the remaining areas of semi-natural habitat which will be retained within the site boundary.

12.7 Potential Cumulative Impacts

Cumulative impacts on fauna chiefly relate to increased noise and activity levels and the possibility of increased collision risk. Although increases in noise/disturbance could occur arise from several different projects in-combination the impact is likely to be most pronounced during construction. This is a short term impact which will be localised. Given the nature of the projects proposed and distances between them, significant impacts during operation are unlikely. Given the distance between the wind turbines, Aghada stack and the proposed Indaver stack the cumulative collision risk or disturbance risk are predicted to be low. The potential cumulative impacts which are considered relevant to this proposal are listed below.

12.7.1 Hammond Lane

The existing Hammond Lane Metal Company is accessed from the L2545 and is surrounded by the Indaver site. Planning permission was granted in 2012 for demolition, new build, upgraded facilities and a new processing plant. Whilst there is some noise and traffic associated with the facility, it is set back by approximately 240m from the coastline and no potential impact on birds, otters or seals utilising coastal habitats has been identified. Impacts on ecology within the Indaver site are predicted to be negligible. Therefore, no impacts have been identified arising from the Hammond Lane development which would cause an effect in-combination with the development of the proposed Resource Recovery Centre (including waste to energy facility).

12.7.2 Wind turbines with Lower Cork Harbour.

Currently in the Cork Lower Harbour there are three existing wind turbines and a further turbine planning permission, with a maximum rotor tip height of 150m. The closest turbine is located approximately 400m south of the proposed stack for the Ringaskiddy Resource Recovery centre at the DePuy facility (Loughbeg). The other constructed wind turbines are located at GlaxoSmithKline

(Curraghbinny) and at Janssen (Barnahely) located 1.7km and 2.5km from the proposed Indaver stack respectively. Another permitted, but unbuilt, wind turbine has been proposed for close to the Novartis pharmaceutical plant at Barnahely, 2.5km from the proposed stack at the Indaver site. De Puy are proposing to construct a new 3MW turbine on their site at Loughbeg, Ringskiddy. The proposed turbine will be similar in appearance to the existing 3MW turbine on the site. The proposed turbine will be located to the south of the existing turbine, and is expected to be at least 1km from the proposed stack on the Indaver site. It is expected that a planning application for the proposed wind turbine will be submitted to Cork County Council in December 2015.

The built turbines themselves are separated from each other by distances ranging from 1.7km to 2.5km and all four turbines are in excess of 5km from the ESB Power Station Stack at Whitegate. When the Novartis Turbine is constructed, it will be approximately 700m from the closest existing turbine at Janssen and in excess of 5km from the ESB Power Station Stack at Whitegate.

Given the distance between the Indaver stack and wind turbines and the ESB Power Station Stack at Whitegate, the limited size of the proposed stack and the limited bird usage of shoreline habitats adjoining the site, there will no, significant in-combination impact on birds. No additional impact is predicted from the new planned turbine at the De Puy site.

12.7.3 Whitegate Power Station Stack

Approximately 5km east of the proposed development is the Aghada ESB Power Station Stack at Whitegate, with a stack height of 152m. As noted this site is considered a considerable distance from the Indaver site and no cumulative disturbance impacts or collision risk in relation to the proposed Indaver Stack have been identified.

12.7.4 The Port of Cork development

The EIS submitted to An Bord Pleanála as part of the application for permission in respect of the Port of Cork development at Ringaskiddy was reviewed during the preparation of this chapter. In the absence of any predicted impact on marine ecology or bird usage of the area from the Indaver development, no potential cumulative impacts have been identified.

12.7.5 Haulbowline Development and Masterplan

Remediation works and the subsequent redevelopment of Haulbowline Island, which is located 870m north of the proposed development, could potentially increase traffic levels along local roads. However increased traffic levels are unlikely to have a significant impact on bird populations and no other cumulative impacts have been identified.

12.7.6 Spike Island Masterplan

Increased boat traffic to Spike Island and increased activity on the island, which is separated from the Indaver site by a 770m marine channel, could potentially impact on bird populations. However, given the distance involved and the lack of

any significant impacts on birds arising from the Indaver development, no likely significant cumulative impacts have been identified.

12.7.7 M28 Cork to Ringaskiddy Motorway Scheme

Increased noise and activity levels could arise due to the proposed N28 scheme particularly during construction. Whilst there may be localised disturbance/displacement of fauna, the cumulative impact is not predicted to be significant.

12.7.8 IMERC Campus Masterplan Area

A Masterplan for the Irish Maritime and Energy Resource Cluster (IMERC) adjacent to the National Maritime College of Ireland (NMCI) aims to deliver research and enterprise campus in Ringaskiddy, Cork. Construction of the Beaufort Building was completed by UCC in 2015. It is proposed to expand the campus and to develop a marine and energy cluster focussing on research, development, commercialisation and innovation. In the absence of any predicted impact on the ecology of the area from the Indaver development, no potential cumulative impacts have been identified.

12.8 Mitigation Measures

The likely success of the proposed mitigation measures is high, either in their current form or as they will be adapted on-site to achieve the desired result. The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage. It is clear in what the mitigation measures are designed to achieve in lowering or reducing the risk of impact to acceptable levels. Whilst the proposed methods of mitigation may be amended and supplemented the risk that the mitigation measures will not function effectively in preventing significant ecological impacts is low. The following mitigation measures will be implemented:

12.8.1 Construction Phase Mitigation Measures

A Construction Environmental Management Plan (CEMP) will implement *all* the construction phase mitigation measures identified in the EIS, NIS.

A construction environmental management plan (CEMP) will be prepared prior to construction commencing. The CEMP will comprise all of the construction mitigation measures, which are set out in this EIS and NIS, and any additional measures which are required by the conditions attached to the Board's decision. The principal measures which will be set out in the CEMP are summarised below:

Protection of habitats

- To prevent incidental damage by machinery or by the deposition of spoil during the site clearance stage, any trees /habitats earmarked for retention will be securely fenced early in the construction phase. The fencing will be clearly visible to machine operators.
- To prevent Japanese Knotweed from outside the site being inadvertently being brought in to the site, the contractor will be required to inspect vehicles

before using them on site, and will pay particular attention to caterpillar tracks and where trucks and dumpers are stowed. The supplier of fill will be required to provide a guarantee that the fill to be imported does not contain knotweed. In addition, the fill will be inspected for signs of knotweed, prior to importation to site. The UK Environmental Agency's publication *Managing Japanese knotweed on development sites - The Knotweed Code of Practice* (EA 2013), states that inspection of topsoil brought into the site, should be carried out using the guidance in appendix I-IV of the code BS 3882:2007 '*The British Standard Specification for topsoil and requirements for use*'. This Standard was replaced subsequently by BS3882:2015 *Specification for Topsoil.* The inspection of fill will be carried out according to this Standard.

Protection of water quality

- A dedicated holding tank for storage of construction foul effluent will be constructed prior to commencement of the main construction activities. The effluent will be regularly disposed of off-site by tanker by a licensed contractor to an approved licensed facility
- Storm water will be managed carefully during construction. In general, storm water will be infiltrated to ground via silt traps and managed soakaways. The laydown areas will be suitably drained and any areas which will involve the storage of fuel and refuelling will be paved and bunded and hydrocarbon interceptors will be installed to ensure that no spillages will get into the surface water or groundwater.

The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. The Construction Industry Research and Information Association (CIR*IA) in the UK has issued a guidance note on the control and management of water pollution f*rom construction sites, *Control of Water Pollution from Construction Sites, guidance for consultants and contractors (Masters-Williams et al 2001). Additional g*uidance is *prov*ided in the CIRIA technical guidance on *Control of Water Pollution from Linear Construction Projects* (Murnane *et al* 2006). Construction mitigation measures are further outlined in **Section 5.8** of the EIS.

Measures, as recommended in the guidance above, that will be implemented to minimise the risk of spills and contamination of soils and waters, include:

- Training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures,
- Careful consideration will be given to the location of any fuel storage facilities. These will be designed in accordance with guidelines produced by CIRIA, and will be fully bunded.
- All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site.
- Where feasible, soil excavation will be completed during dry periods and undertaken with excavators and dump trucks. Topsoil and subsoil will not be mixed together. Specific measures will be implemented, as specified by the Invasive Species Management, Plan to ensure that Japanese Knotweed is not spread within the site or outside the site boundaries.

- Ensure that all areas where liquids are stored or cleaning is carried out are in a designated impermeable area that is isolated from the surrounding area, e.g. by a roll-over bund, raised kerb, ramps or stepped access.
- Use collection systems to prevent any contaminated drainage entering surface water drains, watercourses or groundwater, or draining onto the land.
- Minimise the use of cleaning chemicals.
- Use trigger-operated spray guns, with automatic water-supply cut-off.
- Use settlement lagoons or suitable absorbent material such as flocculent to remove suspended solids such as mud and silt.
- Ensure that all staff are trained and follow vehicle cleaning procedures. Post details of the procedures in the work area for easy reference.

Air quality

Construction activities have the potential to generate dust emissions, particularly during the site clearance and excavation stages. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with ambient conditions, including rainfall, wind speed, wind direction and on the distance to potentially sensitive locations. Most of the dust would be deposited close to the potential source and any impacts from dust deposition would typically be within a hundred metres or so of the construction area. A dust minimisation plan will be prepared and implemented by the building contractor during the construction phase of the project. The following avoidance, remedial or reductive measures will be implemented as part of the dust minimisation plan:

- During very dry periods when dust generation is likely, construction areas will be sprayed with water.
- Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor through regular servicing of machinery.
- Vehicle speeds will be limited in the construction site.
- Surrounding roads used by trucks for access to and egress from the site will be cleaned regularly using an approved mechanical road sweeper. Roads will be cleaned subject to local authority requirements. Site roads will be cleaned on a daily basis.
- During construction wheel-wash facilities will be provided with rumble grids to remove excess mud from wheels. These facilities will be located at the exit from the site and away from sensitive receptors, where possible. Wheel wash run off will be stored in an onsite storage tank and will be disposed of by permitted waste haulage company at a permitted or licensed facility
- Internal haul roads will be paved at the earliest possible opportunity and inspected regularly for cleanliness.
- Materials carried on vehicles to site will be enclosed or covered with tarpaulins.
- Daily visual inspections will be carried out at locations around the site boundary as required. These inspections will monitor the effectiveness of dust mitigation measures.

- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind.

Waste management

- Waste generated during the construction phase will be carefully managed according to the accepted waste hierarchy which gives precedence to prevention, minimisation, reuse and recycling over disposal with energy recovery and finally disposal to landfill.
- All waste removed from the site will be collected only by contractors with valid waste collection permits, under the Waste Management (Collection Permit) Regulations 2007 and 2008. All facilities to which waste will be taken will be audited in advance, to ensure that they have appropriate waste licences or permits, under the Waste Management Act 1996 as amended by the Protection of the Environment Act 2003, and the regulations thereunder, allowing them to accept the type of waste that is to be sent there. Hazardous waste generation will be minimised, and such waste will be recovered where feasible, and only disposed of if recovery is not feasible. Hazardous waste will be managed in accordance with the relevant legislation.

12.8.2 Mitigation - during operation

Woodland and scrub and other areas of semi-natural vegetation outside the proposed development area will be retained.

Where practicable, the boundary landscape planting will be predominantly of Irish native species that reflect the existing vegetation of the area. These will be derived from local native-origin stocks where possible.

The pasture in the south-western corner of the site will be managed to allow semi-natural grassland to develop.

12.8.3 Mitigation - Invasive species

The method for the elimination of Japanese knotweed on the site will be implemented with reference to the relevant codes of practice and guidelines: Best Practice Management Guidelines – Invasive Species Ireland (Maguire *et al*. 2008), NRA (2010) and EA (2007) Managing Japanese Knotweed on Development Sites: The Knotweed Code of Practice. There is an adequate lead in time to accommodate a 3 year spraying and monitoring programme for Japanese Knotweed and it is noted that this species was recorded outside the boundary of the proposed works area. This eradication/control method is more cost effective and poses less risk of causing further spread of the species than other potential methods where time allows. No impediment to the successful eradication of invasive species from the site has been identified.

1. A detailed up to date survey for invasive species will be carried out immediately prior to the commencement of the management programme. The mitigation measures outlined below can then be incorporated into a specific non-invasive species management plan based on the most up to date information prior to the commencement of treatment.

2. Any areas of JKW will be identified and marked to within 7m of each individual stand or plant using hazard tape. It is noted that the proposed works will not impact directly on existing stands of this species.
3. In Ireland, spraying of Japanese Knotweed usually proceeds between mid-August and mid-September, however, the exact timing of spraying a particular infestation is site-specific as it is dependent on temperature and growth stage/physiology of the plant.
4. The entire plant canopy will be treated with a systemic (translocated) herbicide via a backpack cowled knapsack sprayer.
5. A treatment dye will be utilised with the herbicide to ensure that all plants are treated. While the upper surface of the leaves will be easier to treat, it is also important to treat the leaf under surface as Japanese Knotweed possesses many stomata openings on the leaf under surface. A second similar treatment is required in the days following this initial treatment. The timing of the second treatment is also dependent on weather and day and night temperatures. The timing of the first and second spray will be determined on site by an experienced invasive species specialist.
6. Appropriate site hygiene protocols should be deployed throughout the process. Elevated work platforms and a telescopic lance should be deployed to ensure that vehicles and equipment will not come into contact with the plants.
7. If machinery and equipment (including footwear) used during this procedure d come into contact with with the plants they will be power washed prior to leaving the site at the designated wash area.
8. The spraying programme will take into account the following: Presence of ecological receptors i.e. native hedgerows and trees within and adjacent to the infestations, bird nesting season, traffic management in relation to management of roadside infestations, future arable crop harvesting and cultivation, presence of other non-native invasive species, roadside vegetation maintenance on the L2545 Ringaskiddy Road and overhead cables along the L2545 Ringaskiddy Road which may cause hinder treatment of roadside infestations and gaining access to the infestation within the scrub vegetation.

12.8.4 Badger Mitigation Measures

Although badgers have been previously recorded from the site, no active setts were recorded within this area. The sett that was previously located within the study area, but outside the proposed development area, is no longer utilised. As a precautionary measure it is recommended that the site be surveyed for badgers immediately prior to the commencement of site works, so as to confirm the absence of badgers. If badgers are discovered at that time, the mitigation measures outlined in the NRA publication, *Guidelines for the Treatment of Badgers Prior to the Construction of a National Road Scheme* (NRA, 2006c), should be followed. If necessary, the following measures will be employed for all construction works where badger issues arise.

- Badger sett tunnel systems can extend up to *c*. 20m from sett entrances. Therefore, no heavy machinery should be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled

vehicles) should not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance should not take place within 10m of sett entrances.

- During the breeding season (December to June inclusive), none of the above works should be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts.
- Following consultation with the NPWS and badger experts, works closer to any active setts may take place during the breeding season provided appropriate mitigation measures are in place, e.g. sett screening, restricted working hours, etc.
- All affected badger setts will be clearly marked and the extent of bounds prohibited for vehicles clearly marked by fencing and signage. Bunting is an option on a temporary basis. Hazard tape is inadequate as it is prone to deterioration and damage by wind or cattle etc.
- All contractors/operators on site should be made fully aware of the procedures pertaining to each sett on site.
- Construction activities within the vicinity of affected setts may commence once these setts have been evacuated and destroyed under licence from the NPWS. Where affected setts do not require destruction, construction works may commence once recommended alternative mitigation measures to address the badger issues have been complied with.
- Works close to badger setts or removal of badgers from a site may only be carried out under the supervision of a qualified expert under licence from the NPWS.

12.8.5 Bird Mitigation Measures

The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land, or any such growing in any hedge or ditch from the 1st of March to the 31st of August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Nonetheless, it is recommended that vegetation be removed outside of the breeding season.

Retention of the native hedges along the southern boundaries will reduce the loss of breeding and nesting habitat for birds. Some new hedgerow will also be planted along this boundary, a treeline along the northern boundary will be removed, however replacement planting is proposed. NRA guidelines on the protection of trees and hedges prior to and during construction should be followed (NRA, 2006b). Primarily native species will be utilised for new planting at the site. The development of a more species rich sward on grassland in the southwest of the site will in time provide additional feeding resources for birds.

12.8.6 Otter Mitigation Measures

No otter signs or holts were noted within 300m of the proposed development. However, otters do occur within the wider landscape and are common within

Cork Harbour. A detailed pre-construction survey will confirm the absence of otter holts within 300m of the proposed development area.

Any holts found to be present will be subject to monitoring and mitigation as set out in the NRA *Guidelines for the Treatment of Otter prior to the Construction of National Road Schemes (2006b)*. If found to be inactive, exclusion of holts may be carried out during any season. No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence. The prohibited working area associated with otter holts will be fenced and appropriate signage erected. Where breeding females and cubs are present no evacuation procedures of any kind will be undertaken until after the otters have left the holt, as determined by a specialist ecologist. Breeding may take place at any season, so activity at a holt must be adjudged on a case by case basis. The exclusion process, if required, involves the installation of one-way gates on the entrances to the holt and a monitoring period of 21 days to ensure the otters have left the holt prior to removal.

12.8.7 Marine Mitigation Measures

Coastal protection works will take place outside the main wintering season for birds (October to March).

It is anticipated that monitoring of the sacrificial material placed on the beach and of the cliff face will take place every year. If such material is to be replaced in the future, an ecological survey will be carried out in advance to ensure that ecological conditions have not changed in the intervening period.

12.8.8 Residual Impacts

Emissions from the facility are predicted to have a negligible impact on marine ecology or on important bird populations within Cork Harbour. No significant collision risk has been identified. There will be removal of an area of habitat including scrub and remnants of semi-natural grassland, however, hedgerows and areas of semi-natural vegetation outside the proposed development area will be retained and the biodiversity value of intensive grassland in the northwest corner of the site will be significantly increased. Invasive species will be eradicated. No significant long-term impact on mammals will occur. No significant cumulative impacts have been identified. The impact on designated sites is predicted to be negligible.

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