Natura Impact Statement

Anaerobic Digestor

Barryshall, Timoleague, Co. Cork

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Doherty Environmental

August 2016

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Natura Impact Statement

Anaerobic Digester

Barryshall

Timoleague

Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

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1.0 INTRODUCTION

Doherty environmental has been commissioned by NRGE Ltd to undertake an appropriate assessment, under article 6 of the eu habitats directive, of a proposed anaerobic digester at Barryshall, Timoleague, Co. Cork. The aim of this assessment is to identify whether a proposed anaerobic digester will result in likely significant effects to European Sites.

1.1 DESCRIPTION OF THE PROJECT

The development will consist/consists of a Biogas Plant consisting of 2 no digester tanks, 2 no validation tanks, 1 no Homogenising tank, 3 no geo-membrane lined manure storage basins, 1 no fibre store, 1 No Feed Tank, Reception Building, Plant Building, Pasteurisation Tanks, Weighbridge and associated site works including an Integrated Constructed Wetlands to produce renewable energy and fertilizer at Barry's Hall, Timoleague, Co. Cork.

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An Integrated Constructed Wetland (ICW) system is proposed as part of the planned development at the Timoleague Agri Gen facility at Barry's Hall, Timoleague. The proposed ICW is designed for the treatment of surface water runoff from trafficked areas and internal roads at the at Timoleague Agri Gen facility. The treatment system proposed for the site at Timoleague Agri Gen will consist of treatment wetland ponds, with supporting embankments and access. A land drain will lead from the final wetland pond to an existing drainage ditch that discharges into the East Cruary River Estuary, which forms part of the Courtmacsherry Estuary & Bay SAC.

Figure 1.1 shows the proposed site plan (refer to drawing no. 001 Site Plan of the Planning Application for the full site plan), while Figure 1.2 shows the project site with respect to the wider area. The boundary of the project site will be situated approximately 450m from the boundary of Courtmacsherry Estuary & Bay SAC (see Figure 1.3 below).

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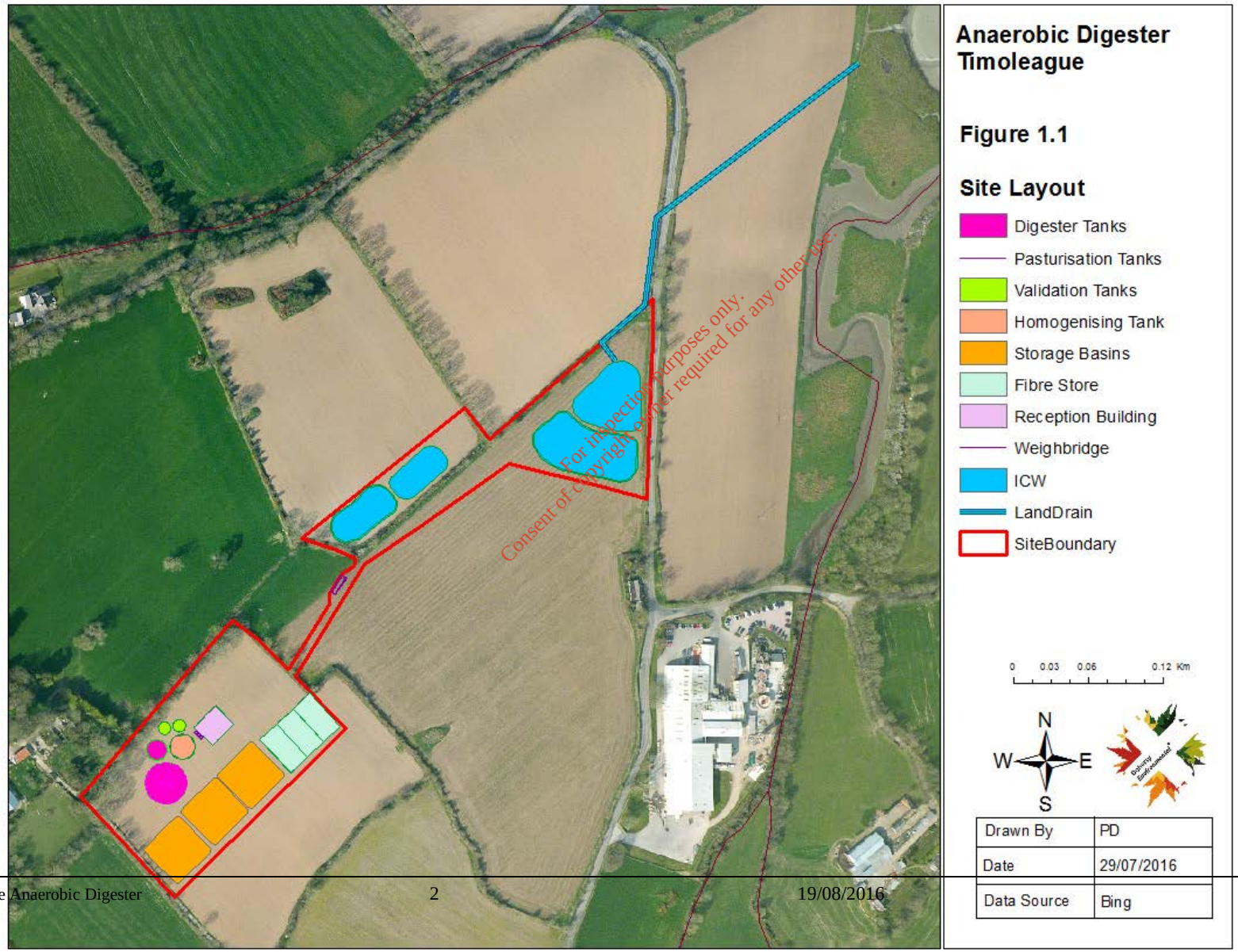

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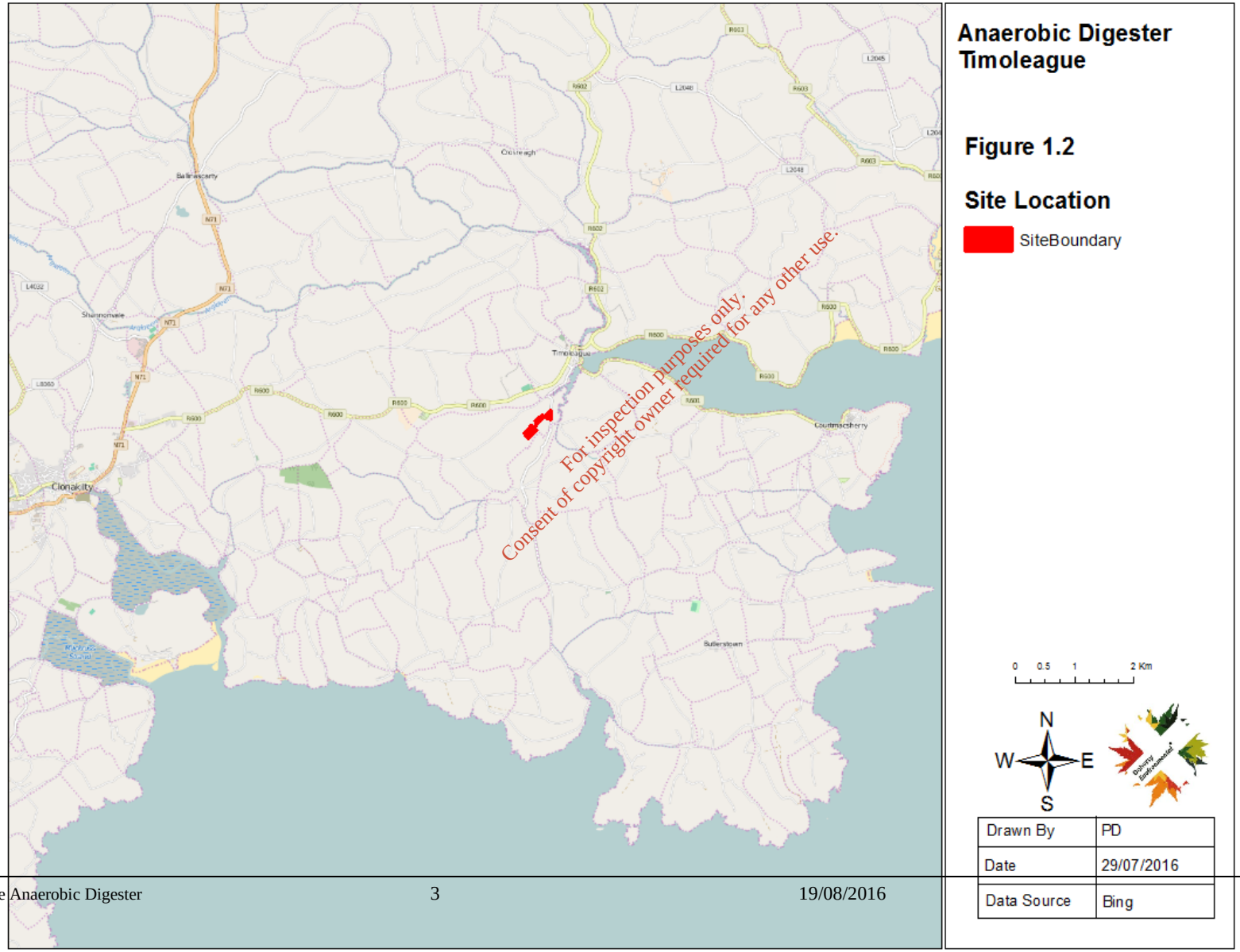

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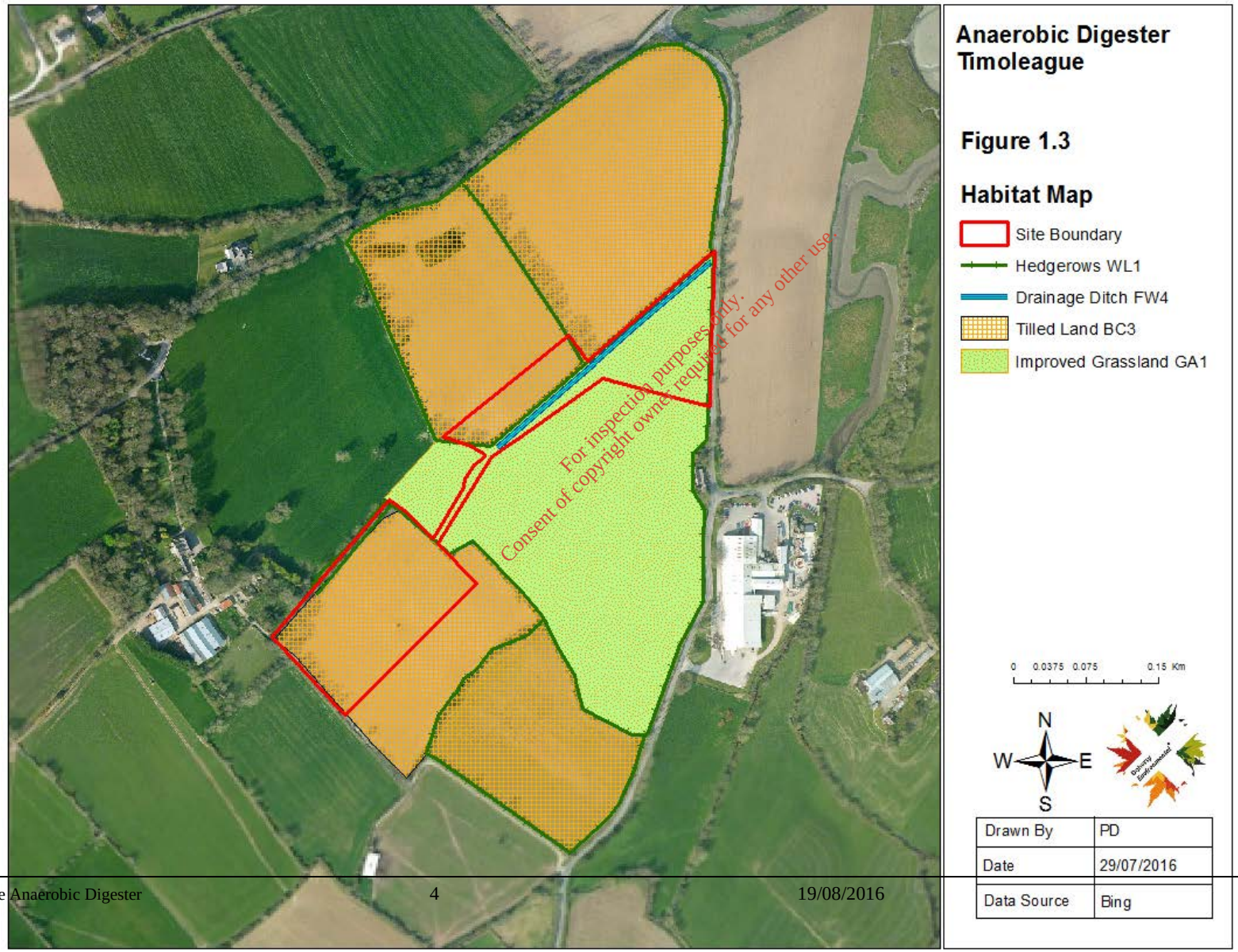

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1.2 PROJECT SITE DESCRIPTION

A site walkover survey was undertaken on the 13th June, 2016. The proposed site is approximately 4.2 ha in size. The area concerned is flat to undulating without any majorly elevated areas. The site is located in a low-lying area and is approximately 450 metres West of the Courtmacsherry Estuary SAC/ Courtmacsherry SPA. The soil present at this site is a free-draining brown podzolic type soil in parts thus this site has mainly been used for tillage crops. Grassland fields adjacent to the site of the proposed development are used for sheep/cattle grazing. The dominant land use on the north and west is grassland and to the south and east is mainly used as tillage ground. The nearest European Sites are the aforementioned Courtmacsherry Bay SPA/Courtmacsherry Estuary SAC which are approximately 450 metres from the site of the proposed development.

The habitats occurring within the site are shown on Figure 1.3 and include improved agricultural grassland (GA1), cultivated land, hedgerows (WL1), treelines (WL2) and drainage ditches. The drainage ditches occurring along field boundaries were all dry during the field survey. The drainage ditch running west to east through the proposed site currently terminates at the west boundary of the proposed site in a field corner where water drains to ground.

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1.3 SUMMARY OF SCREENING FOR APPROPRIATE ASSESSMENT

A Screening Statement for Appropriate Assessment was completed by the Environmental Protection Agency on 3rd June, 2016 and the EPA determined that an Appropriate Assessment of the proposed development is required.

While the EPA did not outline the European Sites that could be at risk from the development, it is considered that the only European Sites likely to occur within the sphere of influence of the project are the Courtmacsherry Estuary SAC and the Courtmacsherry Bay SPA (to be referred to collectively as the Courtmacsherry European Sites).

These sites are considered to occur within the sphere of influence of the project due to the proximity of the project site to the Courtmacsherry European Sites and the presence of a hydrological pathway linking the project site to these European Sites.

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All other European Sites occurring in the wider surrounding area are shown on Figure 1.4 and 1.5 below. The nearest of these other European Sites, Seven Heads SPA, is located over 4.5km to the south of the project site.

The project site does not have the potential to support breeding chough, which is the special conservation interest listed for Seven Heads SPA and Galley Head to Duneen Head SPA.

Clonakilty Bay SPA supports a range of winter bird species reliant on wetland habitats. The project site does not provide optimum habitat for these species. Furthermore this site is located approximately 6km to the west of the project site.

There is no relationship or potential impact pathways linking the project site to the Clonakilty Bay SAC or Kilkeran Lake and Castlefreake Dunes SAC.

As such this Appropriate Assessment focuses on the potential for the project to result in likely significant effects to the Courtmacsherry European Sites.

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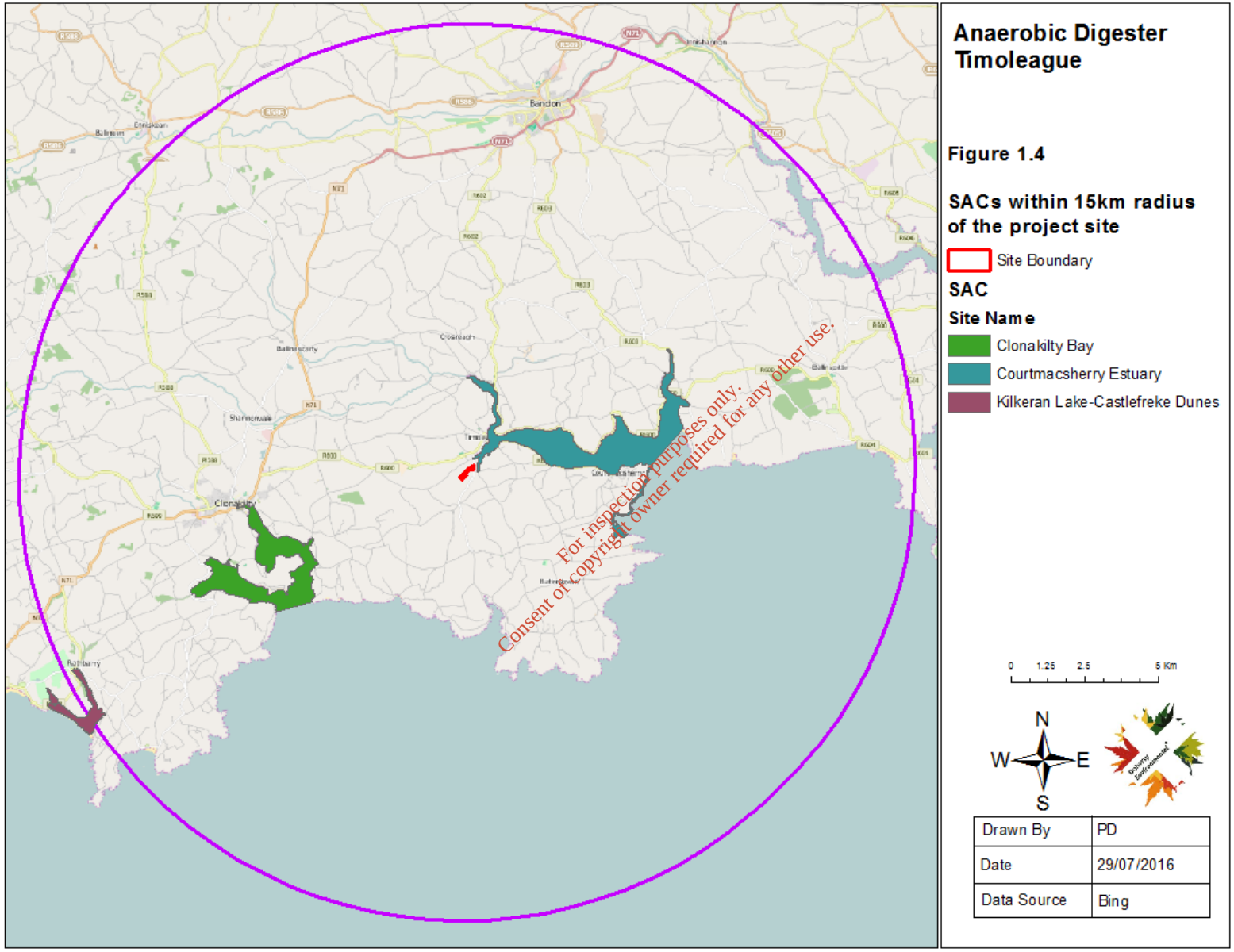

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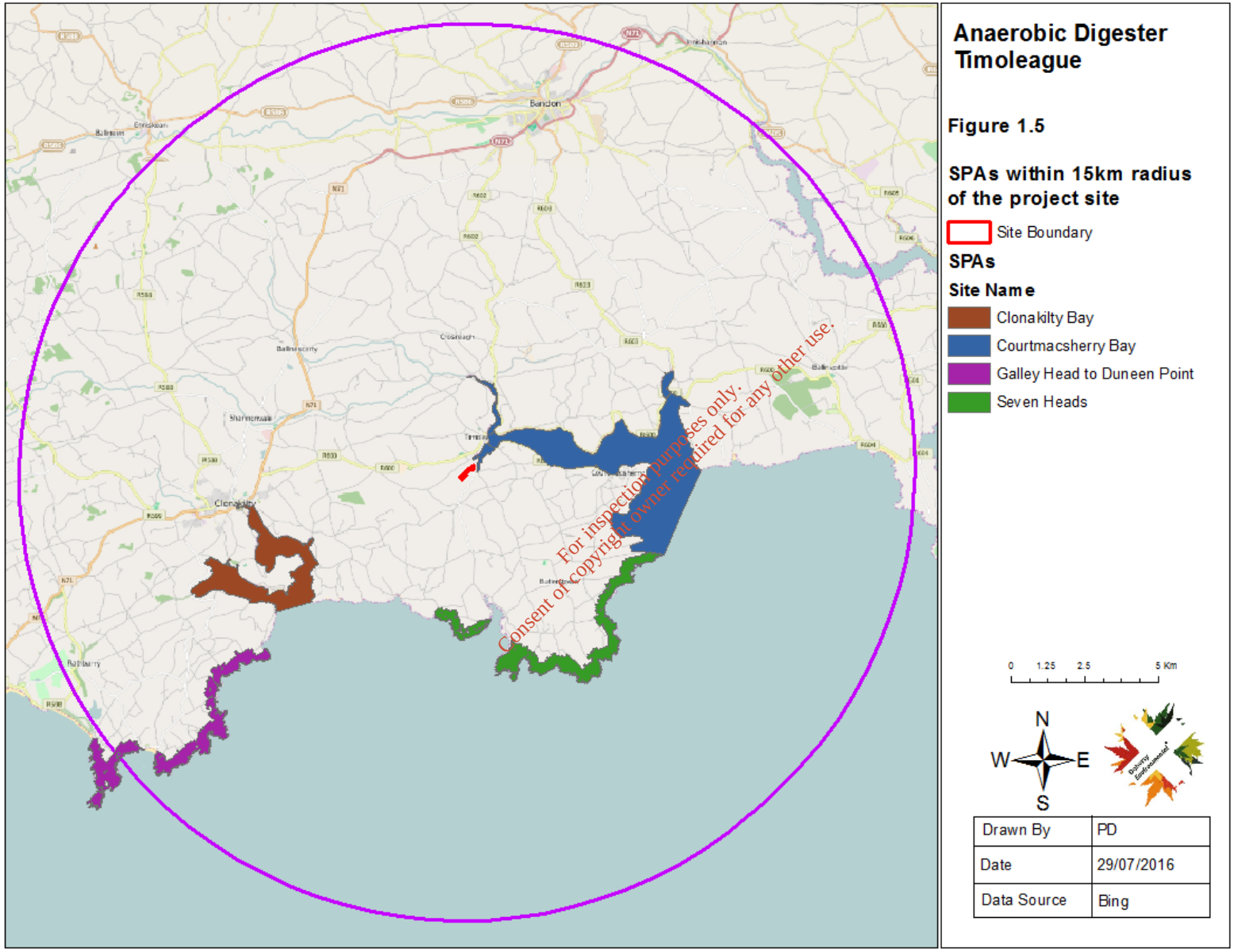

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2.0 APPROPRIATE ASSESSMENT METHODOLOGY

The EC Guidance Assessment Criteria for a Stage Two Appropriate Assessment seeks the following information:

1. A description of the elements of the project that are likely to give rise to significant effects to the Courtmacsherry European Sites.
2. Identification of the key species and habitats occurring within the sphere of influence of the project.
3. The Setting out the Conservation Objectives of the Site.
4. A description of how the project will affect key species and/or key habitats.
5. A description of how the integrity of the site (determined by structure and function and conservation objectives) is likely to be affected by the project (e.g. loss of habitat, disturbance, disruption, chemical changes, hydrological changes etc.).
6. A description of the mitigation measures that are to be introduced to avoid, reduce or remedy the adverse effects on the integrity of European Sites.

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3.0 ELEMENTS OF THE PROJECT LIKELY TO GIVE RISE TO SIGNIFICANT EFFECTS

The element of the project that have the potential to give rise to significant effects relate to those with the potential to perturb the wetland habitats of the Courtmacsherry Estuary SAC or disturb special conservation interest bird species of the Courtmacsherry Bay SPA. The following elements have been identified as having the potential to pose risks to the conservation status and integrity of the Courtmacsherry European Sites:

Construction activity will generate noise that will have the potential to disturb over-wintering bird species of the Courtmacsherry Bay SPA.

Surface water discharges from the project site during the operation phase, if not adequately treated, will have the potential to negatively affect wetland habitats of the Courtmacsherry European Sites.

Onsite operations could have potential to result in disturbance to bird species associated with Courtmacsherry Bay SPA.

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4.0 IDENTIFICATION OF KEY SPECIES & HABITATS OCCURRING WITHIN THE SPHERE OF INFLUENCE OF THE PROJECT

The key species and habitats of the Courtmacsherry European Sites are the special conservation interests of the Courtmacsherry Bay SPA and the qualifying features of interest of the Courtmacsherry Estuary SAC. In order to determine the potential effects to key species and habitats it is first necessary to establish which of these species/habitats are at risk from the project. Sub-section 4.1 and 4.2 list the special conservation interests of the Courtmacsherry Bay SPA and the qualifying features of interest of Courtmacsherry Estuary SAC respectively and determines whether or not these features occur within the sphere of influence of the project.

4.1 COURTMACSHERRY BAY SPA: SPECIAL CONSERVATION INTERESTS OCCURRING WITHIN THE SPHERE OF INFLUENCE OF THE PROJECT

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The special conservation interests of this SPA are listed in Table 4.1. The special conservation interests occurring within the sphere of influence of the project are also identified in Table 4.1. To establish which special conservation interest bird species occur within the sphere of influence of the project, the location of all roosting/foraging sites for each species was reviewed. Roosting and foraging locations for the special conservation interest bird species of the SPA were identified during detailed bird count surveys over the winter of 2010/2011. Each of the waterbird sub-sites making up the Courtmacsherry Bay SPA were surveyed. The location of each subsite and species foraging/roosting sites are identified within the detailed Conservation Objectives (NPWS, 2014a) for the SPA. In order to identify which species occur within the sphere of influence of the project, a zone of impact limited to 750m from the project site boundary was selected. This distance is based on guidance issued by Scottish Natural Heritage (SNH, 2016) and the results of a review of disturbance distances to birds undertaken by Ruddock & Whitfield (2006). Only one sub-site (Sub-site OL-445) occurs within a 750m buffer distance of the project site. Any species with roost/foraging sites occurring within 750m of the project (i.e. within Subsite OL-445) are considered to occur within the sphere of influence of the project.

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Table 4.1: Special Conservation Interests of the Courtmacsherry Bay SPA occurring within the Sphere Of Influence of the Project

Special conservation interests	Does the interest features occur within the sphere of influence of the project
Great Northern Diver (Gavia immer)	No. No roosting or foraging sites for this species occur within 750m of the project site.
Shelduck (Tadorna tadorna)	No. No roosting or foraging sites for this species occur within 750m of the project site.
Wigeon (Anas penelope)	Yes. Foraging sites for this species occur within 750m of the project site.
Red-breasted Merganser (Mergus serrator)	No. No roosting or foraging sites for this species occur within 750m of the project site.
Golden Plover (Pluvialis apricaria)	No. No roosting or foraging sites for this species occur within 750m of the project site.
Lapwing (Vanellus vanellus)	Yes. Roosting and foraging site for this species occur within 750m of the project site.
Dunlin (Calidris alpina)	Yes. Foraging sites for this species occur within 750m of the project site.
Black-tailed Godwit (Limosa limosa)	Yes. Roosting and foraging sites for this species occur within 750m of the project site.
Bar-tailed Godwit (Limosa lapponica)	No. No roosting or foraging sites for this species occur within 750m of the project site.
Curlew (Numenius arquata)	Yes. Roosting and foraging sites for this species occur within 750m of the project site.
Black-headed Gull (Chroicocephalus ridibundus)	Yes. Roosting sites for this species occur within 750m of the project site.
Common Gull (Larus canus)	Yes. Roosting sites for this species occur within 750m of the project site.
Wetlands	See Table 4.2 below.

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4.2 COURTMACSHERRY ESTUARY SAC: QUALIFYING FEATURES OF INTEREST OCCURRING WITHIN THE SPHERE OF INFLUENCE OF THE PROJECT

The qualifying features of interest of this SAC are listed in Table 4.2. The qualifying features of interest occurring within the sphere of influence of the project are also identified in Table 4.2. The criteria used to establish which qualifying habitats occur within the sphere of influence of the project are the presence of impact pathways linking the project to qualifying habitats as well as the spatial relationship between the project site and the qualifying habitats of the SAC. The detailed Conservation Objectives for Courtmacsherry Estuary SAC (NPWS, 2014b) includes maps showing the distribution of the SAC qualifying habitats and these maps

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have been used to identify which qualifying habitats occur within the sphere of influence of the project.

Table 4.2: Qualifying Features of Interest of the Courtmacsherry Estuary SAC occurring within the Sphere Of Influence of the Project

Special conservation interests	Does the interest features occur within the sphere of influence of the project
Estuaries [1130]	Yes. The proposed land drain, that will be used to discharge treated surface water from the project, will connect the project to this feature of the SAC, which occurring in the East Cruary River Estuary.
Mudflats and sandflats not covered by seawater at low tide [1140]	Yes. The proposed land drain, that will be used to discharge treated surface water from the project, will connect the project to this feature of the SAC, which occurs in the East Cruary River Estuary.
Annual vegetation of drift lines [1210]	No. No examples of this habitat occur within the East Cruary River Estuary area of the SAC. The only example of this habitat within the SAC is located at Harbour View, approximately 8km from the land drain outfall at East Cruary River estuary. The qualifying habitats is sufficiently buffered from the project site and the land drain outfall to ensure no risks of significant effects are posed by the project to its future conservation status.
Perennial vegetation of stony banks [1220]	No. No examples of this habitat occur within the East Cruary River Estuary area of the SAC. The only example of this habitat within the SAC is located at Broadstrand Bay in the outer estuary, approximately 9km from the land drain outfall at East Cruary River estuary. The qualifying habitats is sufficiently buffered from the project site and the land drain outfall to ensure no risks of significant effects are posed by the project to its future conservation status.
Salicornia and other annuals colonising mud and sand [1310]	No. No examples of this habitat occur within the East Cruary River Estuary area of the SAC. The only example of this habitat within the SAC is located at Harbour View, approximately 8km from the land drain outfall at East Cruary River estuary. The qualifying habitats is sufficiently buffered from the project site and the land drain outfall to ensure no risks of significant effects are posed by the project to its future conservation status.
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Yes. The proposed land drain, that will be used to discharge treated surface water from the project, will connect the project to this feature of the SAC, which occurs in the East Cruary River Estuary.
Mediterranean salt meadows (Juncetalia maritimi) [1410]	No. No examples of this habitat occur within the East Cruary River Estuary area of the SAC. The only example of this habitat within the SAC is located at Harbour View, approximately 8km from the land drain outfall at East Cruary River estuary. The qualifying habitats is sufficiently buffered from the project site and the land drain outfall to ensure no risks of significant

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	effects are posed by the project to its future conservation status.
Embryonic shifting dunes [2110]	No. No examples of this habitat occur within the East Cruary River Estuary area of the SAC. The only example of this habitat within the SAC is located at Harbour View, approximately 8km from the land drain outfall at East Cruary River estuary. The qualifying habitats is sufficiently buffered from the project site and the land drain outfall to ensure no risks of significant effects are posed by the project to its future conservation status.
Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]	No. No examples of this habitat occur within the East Cruary River Estuary area of the SAC. The only example of this habitat within the SAC is located at Harbour View, approximately 8km from the land drain outfall at East Cruary River estuary. The qualifying habitats is sufficiently buffered from the project site and the land drain outfall to ensure no risks of significant effects are posed by the project to its future conservation status.
Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	No. No examples of this habitat occur within the East Cruary River Estuary area of the SAC. The only example of this habitat within the SAC is located at Harbour View, approximately 8km from the land drain outfall at East Cruary River estuary. The qualifying habitats is sufficiently buffered from the project site and the land drain outfall to ensure no risks of significant effects are posed by the project to its future conservation status.

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4.3 SUMMARY OF KEY SPECIES & HABITATS OCCURRING WITHIN THE SPHERE OF INFLUENCE OF THE PROJECT

The special conservation interest bird species of the Courtmacsherry Bay SPA occurring in the sphere of influence of the project are:

- Wigeon
- Lapwing
- Dunlin
- Curlew
- Black-tailed godwit
- Common gull
- Black-headed gull

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The qualifying habitats of the Courtmacsherry Estuary SAC occurring in the sphere of influence of the project are:

- Estuaries;
- Mudflats; and
- Atlantic salt meadows.

5.0 CONSERVATION OBJECTIVES OF THE COURTMACSHERRY EUROPEAN SITES

Detailed conservation objectives have been published by the National Parks and Wildlife Service (NPWS) for both Courtmacsherry Bay SPA and Courtmacsherry Estuary SAC. Sub-section 5.1 and 5.2 below outline the Conservation Objectives for the special conservation interest bird species of the SPA and qualifying habitats of the SAC occurring within the sphere of influence of the project.

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5.1 CONSERVATION OBJECTIVES FOR THE SPECIAL CONSERVATION INTERESTS OCCURRING WITHIN THE SPHERE OF INFLUENCE OF THE PROJECT

Detailed conservation objectives have been prepared for special conservation interest bird species occurring within the sphere of influence of the project. These conservation objectives are defined by a range of attributes and associated attribute targets that are based on parameters, namely population trends and natural range/distribution of the species, set out in the Habitats Directive and Birds Directive for defining favourable status.

The Conservation Objectives for wigeon, lapwing, dunlin, curlew, black-tailed godwit, black-headed gull and common gull are:

To maintain the favourable conservation condition of these listed species in the Courtmacsherry Bay SPA. The favourable conservation status of these species is defined by the list of attributes and targets outlined in Table 5.1 below.

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Table 5.1: Conservation Objectives for Special Conservation Interest Bird Species occurring within the Sphere of Influence of the Project

Attribute	Measure	Target
Population trend	Percentage change	Long-term population trend stable or increasing
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by special conservation interest bird species, other than that occurring from natural patterns of variation

5.2 CONSERVATION OBJECTIVES FOR THE QUALIFYING HABITATS OCCURRING WITHIN THE SPHERE OF INFLUENCE OF THE PROJECT

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Detailed conservation objectives have been prepared for the qualifying habitats of Courtmacsherry Estuary SAC occurring within the sphere of influence of the project (NPWS, 2014a). These conservation objectives are defined by a range of attributes and associated attribute targets that are based on parameters, namely area, range, structure and function, set out in the Habitats Directive for defining favourable status.

The attributes and associated targets for these qualifying habitats are outlined in Table 5.2 below.

Table 5.2: Conservation Objectives for Qualifying Habitats occurring within the Sphere of Influence of the Project

Estuaries		
Attribute	Measure	Target
Habitat area	hectares	The permanent habitat area is stable or increasing, subject to natural processes.
Community distribution	hectares	Conserve the following community types in a natural condition: Sandy mud to mixed sediments with *Tubificoides benedii* and

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		Hediste diversicolor community complex; Sand to mixed sediment with oligochaetes community complex; Sand with *Nephtys cirrosa* community complex.
Mudflats		
Attribute	Measure	Target
Habitat area	hectares	The permanent habitat area is stable or increasing, subject to natural
Community distribution	hectares	Conserve the following community types in a natural condition: Sandy mud to mixed sediments with *Tubificoides benedii* and *Hediste diversicolor* community complex; Sand to mixed sediment with oligochaetes community complex; Sand with *Nephtys cirrosa* community complex.
Atlantic Salt Meadows		
Attribute	Measure	Target
Habitat area	hectare	Area stable or increasing, subject to natural processes, including erosion and succession. A total of 32.38 ha within the SAC.
Habitat distribution	occurrence	No decline or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/absence physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	occurrence	Maintain creek and pan structure, subject to natural

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		processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded: frequency	Maintain natural tidal regime
Vegetation structure: zonation	occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: height	centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species-Spartina anglica	hectares	No significant expansion of common cordgrass (Spartina anglica), with an annual spread of less than 1% where it is known to occur

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6.0 DESCRIPTION OF HOW THE PROJECT WILL AFFECT KEY SPECIES AND HABITATS

6.1 POTENTIAL EFFECTS TO SPECIAL CONSERVATION INTEREST BIRD SPECIES

The potential effects of the project to bird species relate to potential disturbance effects to over-wintering waterbirds arising from noise and visual disturbance associated with construction and operation activities. While the hearing range of birds is similar to that of humans, between 20 and 20,000Hz, the levels of sound which cause disturbance to birds varying between species, with cited values ranging from 42dBA to 117dBA. However, the evidence suggests that birds rapidly and successfully habituate to new noise sources but are most affected by high incidental noise resulting in a startle and flight response. For instance it has been asserted by the UK Environment Agency (see Terence O'Rourke, 2005) that "*sudden (incidental) noise in the region of 80dB appears to elicit a flight response in waders up to 250m from the source, with levels below this to approximately 70dB causing flight or anxiety behaviour in some species*". Cutts, Phelps & Bourdon (2009), who investigated the impacts of construction noise on waterbirds, noted that species were seen to accept a wide range of steady state noise levels from between 55dB(A) to 85db(A).

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Wright, Goodman and Cameron (2010) investigated the behavioral response of waders to incidental noise and found no observable response between a range 54.9 – 71.5dB(A). Cutts, Phelps & Burdon (2009) also reviewed the effects of aircraft noise on waterbirds and reported that a minimum response (head turning, scanning behaviour) from birds was noted at levels of noise exposure above 65dB(A).

Following their review of waterbird sensitivities to construction impacts Cutts, Phelps & Bourdon (2009) noted that in order to avoid impacts to birds ambient construction noise levels should be restricted to below 70dB(A). They stated that waterbirds will habituate to regular noise below this level.

To aid in the assessment of the potential noise disturbance effects of construction and operation activities, the Waterbird Disturbance Mitigation Toolkit (Cutts, Hemmingway & Spencer, 2013) has been used to evaluate the potential noise disturbance effect associated

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with the project. Table 6.1 below lists the elements of the project that could result in negative effects to the special conservation interests of birds occurring in the sphere of influence of the project and provides an evaluation of the significance of these effects.

Table 6.1: Potential Waterbird Responses to Elements of the Project

Project Element	Generic Waterbird Disturbance Responses
Presence of construction machinery and staff adjacent to/in close proximity to mudflat habitats, within Sub-site OL445, during the construction of the proposed land drain. Seven special conservation interest bird species of the SPA are known to roost/forage in this sub-site	High
Construction activity within the project site (i.e. behind the coastal area – inland)	Low
Operation activity at the project site (i.e. behind the coastal area – inland)	Low

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The Waterbird Disturbance Mitigation Toolkit also provides an overview table (reproduced as Table 6.2 below) which facilitates the calculation of the likely disturbance effect for a noise level and distance of receptor from the noise source e.g. plant generating 100dB(A) at/adjacent to the noise source will provide a likely receptor dose of 70dB(A) at c. 20m distance. Acceptable 'dose' levels are shaded green in Table 6.2 with dark green unlikely to have any affect whilst the pale green might occasionally induce a low level behavioral response such as a heads-up; yellow to orange shading is where a response is likely but mitigation may be effective in reducing the disturbance risk; pale red where mitigation is necessary and might be of value, but with a remaining risk of effect; dark red where a flight response is almost certain to occur and would be increasingly difficult to mitigate.

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Table 6.2: Noise Disturbance Calculation Table (Source: Cutts, Hemmingway & Spencer, 2013)

Metres from Source	dB(A)										
0.67	120	110	100	95	90	85	80	75	70	65	60
1.33	114	104	94	89	84	79	74	69	64	59	54
2.67	108	98	88	83	78	73	68	63	58	53	48
5.33	102	92	82	77	72	67	62	57	52	47	42
10.67	96	86	76	71	66	61	56	51	46	41	36
20.67	90	80	70	65	60	55	50	45	40	35	30
42.67	84	74	64	59	54	49	44	39	34	29	24
85.33	78	68	58	53	48	43	38	33	28	23	
170.67	72	62	52	47	42	37	32	27	22		
341.33	66	56	46	41	36	31	26	21			
682.66	60	50	40	35	30	25	20				
1365.32	54	44	34	49	24						

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The construction phase of the project is expected to generate the highest level of noise. Using Table 6.2 the likely "dose" levels associated with the construction phase of the project are outlined in Table 6.3. Typical noise levels associated with construction plant (as outlined in BS 5228: Part 1) range from 72 dB (e.g. from concrete mixers) to 102 dB (e.g. from pneumatic concrete breaker, rock drills and tools).

Construction Element	Nearest Distance from SPA (Sub-site OL-445)	Typical Noise Level at Source (dB)	Likely Noise Level at Receptor (Sub-site OL-445) (dB)
Pneumatic concrete breaker, rock drills and tools	Such activity, should it be required, will be restricted to the anaerobic site compound, the nearest point of which is approximately **420m**	102	<56
Hammer drive piling equipment	Such activity, should it be required, will be restricted to the anaerobic site	100	<46

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	compound, the nearest point of which is approximately **420m**.		
Earth-moving plant: ± bulldozer ± compactor ± crane ± dump truck ± dumper ± excavator ± grader ± loader ± scraper	The nearest point of earth-moving plant to Sub-site OL-445 will be associated with the reinstatement of the land drain. An excavator will be required to this element of the project. This element will be located within **10m** of Sub-site OL-445 for a short-term period	72 – 92	51 – 90
	An excavator will also be required for the construction of the ICW. This element will be located **120m** of Sub-site OL-445	72 – 92	<33 – 53
	Earth moving plant will be required for the construction of the anaerobic digester compound, the nearest point of which is approximately **420m**	72 - 92	<21 – 41
Compressors and generators	Such activity, should it be required, will be restricted to the anaerobic site compound, the nearest point of which is approximately **420m**	82	<31
Riveters	Such activity, should it be required, will be restricted to the anaerobic site compound, the nearest point of which is approximately **420m**	95	<41

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Pumps	Pumps will be used for the construction of the ICW. This element will be located **120m** of Sub-site OL-445	75	<33
	Pumps will be used for the construction of the anaerobic digester compound, the nearest point of which is approximately **420m**	75	<21
Materials handling	Materials will be handled for the construction of the ICW. This element will be located **120m** of Sub-site OL-445	80	<43
	Materials will be handled for the construction of the anaerobic digester compound, the nearest point of which is approximately **420m.**	80	<26
Concrete mixers	Such activity, should it be required, will be restricted to the anaerobic site compound, the nearest point of which is approximately **420m**	72	<21

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A likely worst case scenario source of 110 dB at the anaerobic digester site compound during construction will result in a likely receptor dose of less than 56 dB at the nearest roosting/foraging locations within the SPA. This represents an acceptable dose level, with noise generated at the anaerobic digester compound or the ICW during construction or operations unlikely to have a negative effect on special conservation interests of bird species occurring within the sphere of influence of the project. However, as outlined in Table 6.3 above, it is considered that the construction of the land drain to an existing drainage ditch at the East Cruary River Estuary (within the SPA and Sub-site OL-445) will have the potential

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to result in significant disturbance effects to special conservation interests bird species. It is noted that the construction of this land drain will be completed over a short time-frame (less than 3 days) and as such the disturbance associated with this element of the project will be short-term. Nevertheless mitigation measures to reduce the potential for this element to result in disturbance to special conservation interest bird species are outlined in Section 8 below.

The response of waterbirds to visual disturbance varies between species and the nature of the visual stimuli. For roost sites, a generic response threshold radius of c. 300m has been derived, based around the approach distance for the most sensitive species (such as curlew). Visual stimuli reach high levels of disturbance in cases where construction staff are undertaking activities outside of equipment; where fast movements are associated with construction plant or staff; or where large plant is operating at close proximity (i.e. less than 300m) to roost/foraging sites. Works out of sight of waterbirds and roost/foraging areas are generally classed as being of low visual disturbance.

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All works within the anaerobic digester compound will be located over 300m from Sub-site OL-445 and will be screened from the Sub-Site by existing hedgerows and treelines. Works at this location are not predicted to have the potential to result in visual disturbance to waterbirds roosting/foraging at Sub-site OL-445.

All works associated with the ICW will be located over 120m from Sub-site OL-445. While works at this location will be located within the 300m sensitivity radius of Sub-site OL-445, works associated with the construction of the ICW are not predicted to have the potential to result in visual disturbance to waterbirds roosting/foraging at Sub-site OL-445 due to the presence of existing hedgerows and treelines screening this area of the project site from Sub-site OL-445.

The works associated with the reinstatement of the land drain will be located adjacent to Sub-site OL-445 and will have the potential to result in visual disturbance to waterbirds. As with the noise disturbance associated with the reinstatement of the land drain this potential visual disturbance will be of a short-term nature.

The combined effects of noise and visual disturbance associated with the reinstatement of the land drain will, if undertaken during the over-wintering period, have the potential to result in

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significant, but short-term disturbance to special conservation interest bird species known to roost/forage at Sub-site OL-445.

6.2 POTENTIAL EFFECTS TO QUALIFYING HABITATS

The element of the project identified as having the potential to negatively effect the qualifying habitats occurring in the East Cruary River relate to the discharge of surface water from the project site during operations. It is proposed to reinstate a previously existing land drain so that the surface water generated at the project site is eventually discharged to the East Cruary River estuary. Considering the nature of the site and the material to be held on site it is possible, without the implementation of appropriate measures, that surface water generated on site will contain elevated concentrations of nutrients such as nitrates and phosphates. The discharge of high-nutrient surface water to the East Cruary River estuary will have the potential to result in nutrient inputs to the estuary which could affect the *Tubificoides benedii* and *Hediste diversicolor* community complex of the associated mudflats. Elevated nutrient inputs could also result in effects to the vegetation communities supported by Atlantic salt marsh habitats occurring in the estuary.

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In addition, in the absence of appropriate management, inputs of freshwater to the estuary could potentially affect salinity and adverse effect the status of mudflats and their infaunal community as well as salt marsh and it associated vegetation communities.

7.0 DESCRIPTION OF HOW THE INTEGRITY OF THE SITE IS LIKELY TO BE AFFECTED BY THE PROJECT

EU Guidelines (2001) recommend as part of a Stage 2 Appropriate Assessment that a checklist of site integrity is carried out. This aids in establishing the nature of potential adverse effects to the integrity of the Courtmacsherry European Sites as defined by the conservation objectives of features occurring within the sphere of influence of the project as set out in Section 5 above.

Conservation Objectives	
Does the Project have the potential to:	
Cause delays in progress towards achieving the conservation objectives of the site	Yes, any changes in nutrient concentrations and salinity at East Cruary River estuary will, in the absence of an appropriate design and mitigation

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	measures, have the potential to undermine the favourable conservation status of: Estuaries; Mudflats; and Atlantic salt meadows.
Interrupt progress towards achieving the conservation objectives of the site	Yes, as above.
Disrupt those factors that help to maintain the favourable conditions of the site	Yes, as above. The continued use of known roosting and foraging habitat at Sub-site OL-445 by special conservation interest bird species helps to maintain the favourable conservation status of the Courtmacsherry Estuary SAC. Potential noise and visual disturbance associated with the reinstatement of the land drain will have the potential to temporarily disrupt the distribution of roosting and foraging habitat for these species at Sub-site OL-445.
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site.	Yes, changes to nutrient concentrations or salinity will have the potential to negatively effect the infaunal communities of mudflats and the vegetation communities of saltmarsh habitats occurring at the East Cruary River estuary. Noise and visual disturbance will have the potential to interfere with the distribution of special conservation interest bird species roosting and foraging site over a short-term basis.
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	Yes, the presence of typical *Tubificoides benedii* and *Hediste diversicolor* infauna community complex is a defining aspect of the mudflat habitat at East Cruary River estuary, while the presence of a typical Atlantic saltmarsh vegetation community is a defining aspect of this habitat at the East Cruary River estuary. Potential changes to these communities as a result of changes to nutrient levels or salinity will have the potential to alter these defining aspects of these qualifying habitats.
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	Yes – changes to the infaunal community of mudflats and vegetation community of saltmarshes at Sub-site OL-445 will have the potential to change the nature of the foraging resource provided by these habitats to special conservation interest bird species.
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	Yes – inputs of elevated nutrient concentrations or freshwater will have the potential to interfere with the predicted natural change to mudflat and saltmarsh habitats at the East Cruary River estuary.
Reduce the area of key habitats?	Yes – changes in nutrient and salinity could over time result in losses of Atlantic saltmarsh habitat. For instance elevated nutrient inputs to saltmarsh habitats

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	along the east coast of north America have been shown to result in the alteration and eventual loss of saltmarsh habitat (Pennings, Stanton & Brewer, 2002)
Reduce the population of key species?	Yes – nutrient and freshwater inputs could reduce the populations of key infauna and vegetation species associated with mudflat and saltmarsh habitats.
Change the balance between key species?	Yes. Changes to infauna and vegetation communities will have the potential to result in changes at high trophic levels such as special conservation interest bird species that prey on infauna species and graze on Atlantic saltmarsh vegetation.
Reduce diversity of the site?	Yes. Changes to infauna and vegetation communities as a result of elevated nutrient concentrations and/or freshwater inputs could result in a reduction in diversity at the East Cruary River estuary.
Result in fragmentation?	No.
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?	Yes – see above.

8.0 DESCRIPTION OF MITIGATION MEASURES

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As likely significant effects to special conservation interest bird species of the Courtmacsherry Bay SPA and qualifying habitats of the Courtmacsherry Estuary SAC have been identified during the Appropriate Assessment, the project can only proceed where mitigation measures can be effectively implemented to ensure all adverse effects are avoided.

For this project mitigation measures will be required to provide safeguards against potential negative impacts associated with noise and visual disturbance to special conservation interest bird species and estuaries, mudflats and Atlantic saltmarsh qualifying habitats during the construction and operation phase of the development.

The measures to be implemented to protect special conservation interest bird species and qualifying habitats are outlined below.

8.1 MEASURES TO AVOID NOISE AND VISUAL DISTURBANCE TO SPECIAL CONSERVATION INTEREST BIRD SPECIES

The reinstatement of the proposed land drain connecting the ICW to the River Cruary East estuary has been identified has having the potential to result in significant short term impacts to the special conservation interest bird species of the Courtmacsherry Bay SPA occurring within the sphere of influence of the project. In order to avoid such short term effects arising

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the reinstatement of the land drain will only take place outside the over-wintering period of wigeon, dunlin, lapwing, curlew, black-tailed godwit, black-headed gull and common gull. As such the reinstatement of the land drain will be restricted to the months of May to August inclusive.

8.2 MEASURES TO AVOID ELEVATED NUTRIENT OR FRESHWATER INPUTS TO THE RIVER CRUARY ESTUARY

As outlined in Section 2 above it is proposed to treat surface water runoff arising from the anaerobic digester compound with the installation of an ICW. A detailed report, titled Integrated Constructed Wetland: Timoleague Agri Gen (VESI Environmental Ltd, 2012) provides details on the design and performance of the ICW. Table 3 of the VESI Environmental Ltd report provides treatment standards for BOD (10 – 5 mg/l), suspended solids (10 – 5 mg/l), total phosphorous (<1 mg/l) and Ammonia (<1 mg/l). Each of these standards are within the acceptable environmental quality standards as outlined in the Surface Water Regulations 2009.

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The discharge of freshwater from the ICW to the East Cruary River estuary will be restricted to greenfield runoff rates, thus ensuring no localised increases of freshwater inputs in this river estuary.

8.3 BEST PRACTICE CONSTRUCTION METHODS

The construction phase of the project will adhere to best practice guidance, particularly the CIRIA guidance document C532 Control of water pollution from construction sites. The construction approach will also adhere to the requirements set out in the Eastern Regional Fisheries Board (now Inland Fisheries Ireland, IFI) guidance document *Requirements for the Protection of Fisheries Habitat during Construction and Development Works and Development Sites.*

8.4 BUNDING

All digester, homogenisation, pasteurisation and storage tanks associated with anaerobic digester compound will be roofed and double-bunded to eliminate the risk of spills and leaks.

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8.4.1 Pollution Prevention during Construction – Chemical Substances

During construction key requirements for control of chemical pollution risk will include:

- Storage – all equipment, materials and chemicals will be stored away from any watercourse. Chemical, fuel and oil stores will be sited on impervious bases and within a secured bund of 110% of the storage capacity, within the lay down area;

- The integrity and water tightness of all the bunding structures and their resistance to penetration by water or other materials stored therein shall also be tested and demonstrated. All fuel oil fill areas will have an appropriate spill apron.

- Vehicles and refuelling – standing machinery will have drip trays placed underneath to prevent oil and fuel leaks causing pollution. Where practicable, refuelling of vehicles and machinery will be carried out on an impermeable surface in designated areas, well away from any surface watercourse;

- Maintenance – maintenance to construction plant will not be permitted on site, unless vehicles have broken down necessitating maintenance at the point of breakdown. All necessary pollution prevention measures will be put in place prior to commencement of maintenance in this instance;

- Concrete - Wet concrete operations would not be carried out adjacent to the mill-race. Runoff from wastewaters or contaminated storm water will be directed towards the centre of the site;

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8.4.2 Pollution Prevention – Suspended solids/Silt

The prevention of siltation will be achieved through the interception and management of surface water runoff. Surface water swales will be installed inside the concrete sill around the perimeter of the construction footprint. All surface water collected in swales will be directed, via interceptors to attenuation ponds where it is allowed to settle prior to discharge. This will allow for the control and management of all surface water runoff within the site during the construction phase.

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All spoil generated during the construction phase will be stored towards the eastern end of the site. The spoil will be spread on the site to assist with the re-contouring of the site.

8.4.3 Pollution Prevention Plan

A Pollution Prevention Plan (PPP) will be implemented and monitored by the site manager as part of a full Construction Method Statement for the project to be approved by the Planning Authority and relevant consultees. Although this will be of particular importance during construction, it will apply to potentially polluting activities during all phases of the project.

As a minimum, the PPP will comply with best practice as advocated by CIRIA. The PPP will identify site-specific measures, and incorporate a Pollution Incident Plan, which will include emergency contact details, details of spill kits on site, and instructions on actions in case of spillage/emergency.

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8.5 OPERATION PHASE

8.5.1 Surface Water Management System

All runoff will be collected into surface water swales and directed to the ICW. Water will be discharged to the drainage ditch at greenfield rates. Surface water runoff will be treated to ensure low concentrations of nutrients in surface waters discharges from the ICW.

8.5.2 Wastewater

No wastewater will be generated as result of the project.

8.5.3 Evaluation of Mitigation Measures

The mitigation measures outlined above are taken from established best practice guidelines that have been successfully implemented for a wide range of developments similar to the proposed development site. These measures have undergone extensive and rigorous monitoring for their effectiveness at development sites where they have previously been applied to ensure adverse environmental impacts are avoided.

The results of this monitoring and the recommendation of these measures as standard best practice construction and operation guidelines at development sites is based upon their high

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degree of success in ensuring negative environmental impacts to the aquatic environment are avoided.

9.0 CONCLUSION

Stage 2 Appropriate Assessment of the project has been carried out. In the absence of environmental safeguards the project will have the potential to result in short term but significant disturbance to special conservation interest bird species occurring within the sphere of influence of the project. The project will also have the potential to result in changes to estuaries, mudflats and Atlantic saltmarsh habitats, all of which are qualifying habitats of the Courtmacsherry Estuary SAC.

In order to eliminate the risk of these potential adverse effects occurring a range of safeguard measures have been incorporated into the design, construction approach and operational management of the project. These measures have been incorporated to ensure the project does not interfere with the conservation objectives of the Courtmacsherry European Sites as set out in Section 5 of this NIS.

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It is predicted that the mitigation measures outlined in Section 8 will be sufficient to protect the Courtmacsherry European Sites from likely significant effects from construction and operation phase activities associated with the project.

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