11 Biodiversity

11.1 Introduction

This chapter of the EIAR provides an assessment of the likely effects of the proposed Site Sustainability Project, herein referred to as the proposed development on terrestrial and aquatic biodiversity in the receiving environment. Full details of the proposed development can be found in **Chapter 4** ***Description of Proposed Development***.

This chapter of the EIAR describes the existing flora and fauna within and in the vicinity of the existing Indaver facility, the proposed work sites and the surrounding area. This chapter reviews the likely significant effects and proposes measures for the mitigation of these effects, where appropriate.

The potential impacts on biodiversity in this Chapter should be read in conjunction with the other chapters of the EIAR including **Chapter 4** ***Description of the Proposed Development***, **Chapter 5** ***Construction Activities***, **Chapter 8** ***Air Quality***, **Chapter 9** ***Climate***, **Chapter 10** ***Noise and Vibration***, **Chapter 14** ***Land and Soils***, **Chapter 15** ***Water***, **Chapter 17** ***Major Accidents and Disasters*** and **Appendix 5.1** ***Construction & Environmental Management Plan (CEMP)***.

11.2 Assessment Methodology

11.2.1 Introduction

This appraisal is based on surveys of the entire Indaver site and surrounding area and a review of desktop data. Ecological surveys were carried out on the 30th of September 2019 and 22nd April 2020. A flora and fauna report was prepared previously for the site in February 2019 by the onsite Environmental Specialist. Reports prepared for previous planning applications at the Indaver site were also consulted during the preparation of this chapter of the EIAR.

11.2.2 Relevant Legislation Designated Sites.

Flora and fauna in Ireland are protected at a national level by the Wildlife Acts, 1976 to 2000 and the European Communities (Birds and Natural Habitats) Regulations 2011. They are also protected at a European level by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC.

Under this legislation, sites of nature conservation importance are then designated in order to legally protect faunal and floral species and important/vulnerable habitats. The relevant categories of designation are as follows:

- Special Areas of Conservation (SAC) are designated under the European Communities (Birds and Natural Habitats) Regulations 2011 to comply with the EU Habitats Directive (92/43/EEC);

- Special Protection Areas (SPAs) and designated under the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC; and
- Proposed Natural Heritage Areas (pNHA) are listed under the Wildlife (Amendment) Act, 2000. They have limited legal protection under Local Authority Development Plans.

11.2.3 Desktop Review

A desktop study was carried out to collate the available information on the local ecological environment. The purpose of the desktop study was to identify features of ecological value occurring within the 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 Meath Biodiversity Action Plan (Draft) 2015-2020;
- Bat Conservation Ireland - http://www.batconservationireland.org;
- Birdwatch Ireland - http://www.birdwatchireland.ie/;
- British Trust for Ornithology (BTO)-www.BTO.ie;
- *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);
- National Biodiversity Action Plan 2017-2021;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August, 2018);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft August 2017);
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) European Union, 2017.

11.2.4 Guidance

This Chapter of the EIAR follows the Environmental Protection Agency's Draft *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017). It also takes account of the draft *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Department of Environment, Community and Local Government, July 2012), Chartered Institute of Ecology and Environmental Management *Guidelines on Ecological Impact Assessment in the UK and Ireland, 2nd edition* (CIEEM 2016) and Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Version 1.1 (CIEEM, 2018). Reference was also made to the following key legislation and documents where relevant:

European

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive);
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (codified version of Directive 79/409/EEC as amended) (The Birds Directive);
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (The Water Framework Directive);
- Directive 2006/44/EC of the European Parliament and of the Council of 6 September 2006 on the quality of fresh waters needing protection or improvement in order to support fish life (The Fish Directive (consolidated)).

Republic of Ireland

- The Wildlife Act 1976 as amended by the Wildlife Act 1976 (Protection of Wild Animals) Regulations, 1980, the Wildlife (Amendment) Act 2000, the Wildlife (Amendment) Act 2010, European Communities (Wildlife Act, 1976) (Amendment) Regulations 2017. (The Wildlife Act);
- European Communities (Conservation of Wild Birds) Regulations 1985 (S.I. 291/1985) as amended by S.I. 31/1995;
- European Communities (Natural Habitats) Regulations, S.I. 94/1997 as amended by S.I. 233/1998 & S.I. 378/2005 (The Habitats Regulations);
- Fisheries (Consolidation) Act, 1959 (as amended), hereafter referred to as the Fisheries Act;
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011);
- The Flora (Protection) Order, 1999 (S.I. No. 94/1999).

11.2.5 Surveys Overview

Surveys were carried out at the site in September 2019 and April 2020. The likelihood of additional ecological impacts occurring, which have not been identified in this EIAR, is considered remote. The following surveys were carried out.

- Habitats were mapped according to the classification scheme outlined in the Heritage Council publication *A Guide to Habitats in Ireland (Fossitt, 2000)* and following the guidelines contained in *Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011).* Habitats were cross referenced with Habitats Directive Annex 1 habitats.
- The site was surveyed for invasive species and rare floral species.
- All bird species recorded during habitat surveys were recorded.
- A general mammal survey was carried out in conjunction with the habitat survey.
- All aquatic habitats were visually assessed.

This report was prepared by Carl Dixon MSc. (Ecological Monitoring), Sorcha Sheehy PhD (Ecology) and Ian McDermott MSc. (Ecological Monitoring). Carl Dixon MSc (Ecology) is a senior ecologist who has over 20 years' experience in ecological and water quality assessments with particular expertise in freshwater ecology. He also has experience in mammal surveys, invasive species surveys and ecological supervision of large-scale projects. Projects in recent years include the Indaver Waste to Energy Facility Ringaskiddy, Shannon LNG Project, supervision of the Fermoy Flood Relief Scheme, Skibbereen Flood Relief Scheme, Upgrade of Mallow Waste Water Treatment Plant (WWTP) Scheme, Douglas Flood Relief Scheme, Great Island Gas Pipeline etc.

Ian McDermott MSc (Ecology) is an experienced ecologist with particular expertise in surveying for invasive species, mammal and bird surveys. He carries out ongoing water quality surveys for a range of projects including quarries, WWTPs etc. Likewise, he has carried out ecological surveys for a range of projects including industrial developments, pipelines, quarries, agricultural units etc.

Sorcha Sheehy PhD (ecology/ornithology) is an experienced ecological consultant with over ten years' experience. She has worked on Screening/NIS's for a range of small and large-scale projects with particular expertise in assessing impacts on birds. Recent projects include bird risk assessments for Dublin and Cork Airports, Waste to Energy Facility Ringaskiddy and Water Storage Schemes for Irish Water.

11.3 Receiving Environment

11.3.1 General Landscape

The site is located adjacent to the R152 road which runs along the southern boundary of the site and connects Duleek and Drogheda. Duleek is located approximately 2.7km to the south and the larger town of Drogheda is located approximately 4.5km to the northeast. Approximately 260m north of the facility boundary is the large Platin Irish Cement facility which is a dominant feature in the local landscape.

The north, east and west the facility is surrounded by intensively managed agricultural land. A mix of arable and pastoral farming is the dominant activity and the fields are generally large within a flat to gently undulating landscape. Internal agricultural boundaries are largely absent due to the consolidation of small fields into large units. Hedges are generally of moderate to high quality and mature native trees have a scattered distribution along the external boundaries of fields.

11.3.2 Designated Conservation Areas

11.3.2.1 European (Natura 2000) Sites

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.

In accordance with the European Commission Methodological Guidance (EC2001), a list of Natura 2000 Sites that can be potentially affected by the proposed project has been complied. All candidate SAC's (cSAC) and SPAs sites within a 15km radius of the proposed development have been identified, **Table 11.1** relevant Natura 2000 sites are shown in **Figure 11.1 and Figure 11.2**. It is noted that use of a 15km radius was chosen as a precautionary measure, as impacts at this distance from the proposed development are highly unlikely in the absence of significant aqueous emissions.

Table 11.1. Designated sites and location relative to the proposed development area.

Site	Code	Distance at the closest point (distance downstream) (approx.)
Special Area of Conservation (SAC)		
River Boyne And River Blackwater	002299	Located 3.2km north- northwest (not hydrologically connected)
Boyne Coast and Estuary	001957	Located 7.2km northeast (not hydrologically connected)
Special Protection Area (SPA)		
River Boyne and River Blackwater	004232	Located 3.4km north- northwest (not hydrologically connected)
Boyne Estuary	004080	Located 6.1km northeast (not hydrologically connected)
River Nanny Estuary and Shore	004158	Located 8.1km east (11.3km downstream)

The site is potentially hydrologically connected to one of the Natura 2000 sites listed in **Table 11.1**, i.e. River Nanny Estuary and Shore SPA. The site lies within the Nanny River Catchment and the River Nanny, is located about 2km to the south of the site (Refer to **Figure 1.2** of **Chapter 1** ***Introduction*** and **Figure 14.1** of **Chapter 14** ***Land and Soils***, both of which show the Indaver site and surrounds including the River Nanny to the south). Surface water runoff from the site currently passes through a class 1 interceptor and attenuation pond before discharging to a seasonal ditch which drains to the Cruicerath stream c.130m to the west of the site, which in turn discharges to the River Nanny. It is noted that the Cruicerath Stream was dry during a site survey in April 2020 and thus this stream is seasonal and will not support permanent fish populations.

The River Nanny Estuary and Shore SPA comprises the estuary of the River Nanny and sections of the shoreline to the north and south of the estuary (c.3km in length). The estuarine channel, which extends inland for almost 2km, is narrow and well sheltered. Sediments are muddy in character and edged by saltmarsh and freshwater marsh/wet grassland. The shoreline, which is approximately 500m in width to the low tide mark, comprises beach and intertidal habitats. It is a well-exposed shore, with coarse sand sediments. The well-developed beaches, which are backed in places by clay cliffs, provide high tide roosts for the birds. The village of Laytown occurs in the northern side of the River Nanny estuary. The River Nanny Estuary and Shore SPA is an important east coast site, with nationally important populations of Golden Plover, Oystercatcher, Ringed Plover, Knot, Sanderling and Herring Gull. The population of Knot and Sanderling are of particular note as they represent 4% and 3.8% of the respective all-Ireland totals. A range of other waterfowl species also occur, including Light-bellied Brent Goose, as well as *Larus* gulls. The site is of importance as a roosting area for these bird species and also provides feeding habitat.

The River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA are located approximately 3.2km and 3.4km north-northwest of the proposed development site respectively. Although not hydrologically connected to the proposed development site, consideration was given to the potential presence of qualifying species for these sites namely Otter and

Kingfisher which could potentially forage within the existing pond within the Indaver site.

The Boyne Estuary SPA moderately-sized coastal site is situated west of Drogheda on the border of Counties Louth and Meath. The site comprises most of the estuary of the Boyne River, a substantial river which drains a large catchment. Apart from one section which is over 1 km wide, its width is mostly less than 500 m. The river channel, which is navigable and dredged, is defined by training walls, these being breached in places. Intertidal flats occur along the sides of the channelled river. This SPA is of considerable ornithological importance for wintering waterfowl, with Black-tailed Godwit occurring in internationally important numbers and nine other species having populations of national importance. Of particular significance is that three species that regularly occur, Golden Plover, Bar-tailed Godwit and Little Tern are listed on Annex I of the E.U. Birds Directive. Part of the Boyne Estuary SPA is a Wildfowl Sanctuary.

The Boyne Coast and Estuary SAC is a coastal site which includes most of the tidal sections of the River Boyne, intertidal sand- and mudflats, saltmarshes, marginal grassland, and the stretch of coast from Bettystown to Termonfeckin that includes the Mornington and Baltray sand dune systems. The site is of considerable conservation interest as a coastal complex that supports good examples of eight habitats that are listed on Annex I of the E.U. Habitats Directive, including one which is listed with priority status, and for the important bird populations that it supports.

Potential impacts on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in a Natura Impact Statement (NIS) which has been submitted as part of this application. The NIS notes the following: *"*It has been objectively concluded by Dixon Brosnan Environmental Consultants, following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed development and with the implementation of the mitigation measures proposed, that the proposed development does not pose a risk of adversely affecting (either directly or indirectly) the integrity any European site, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion".

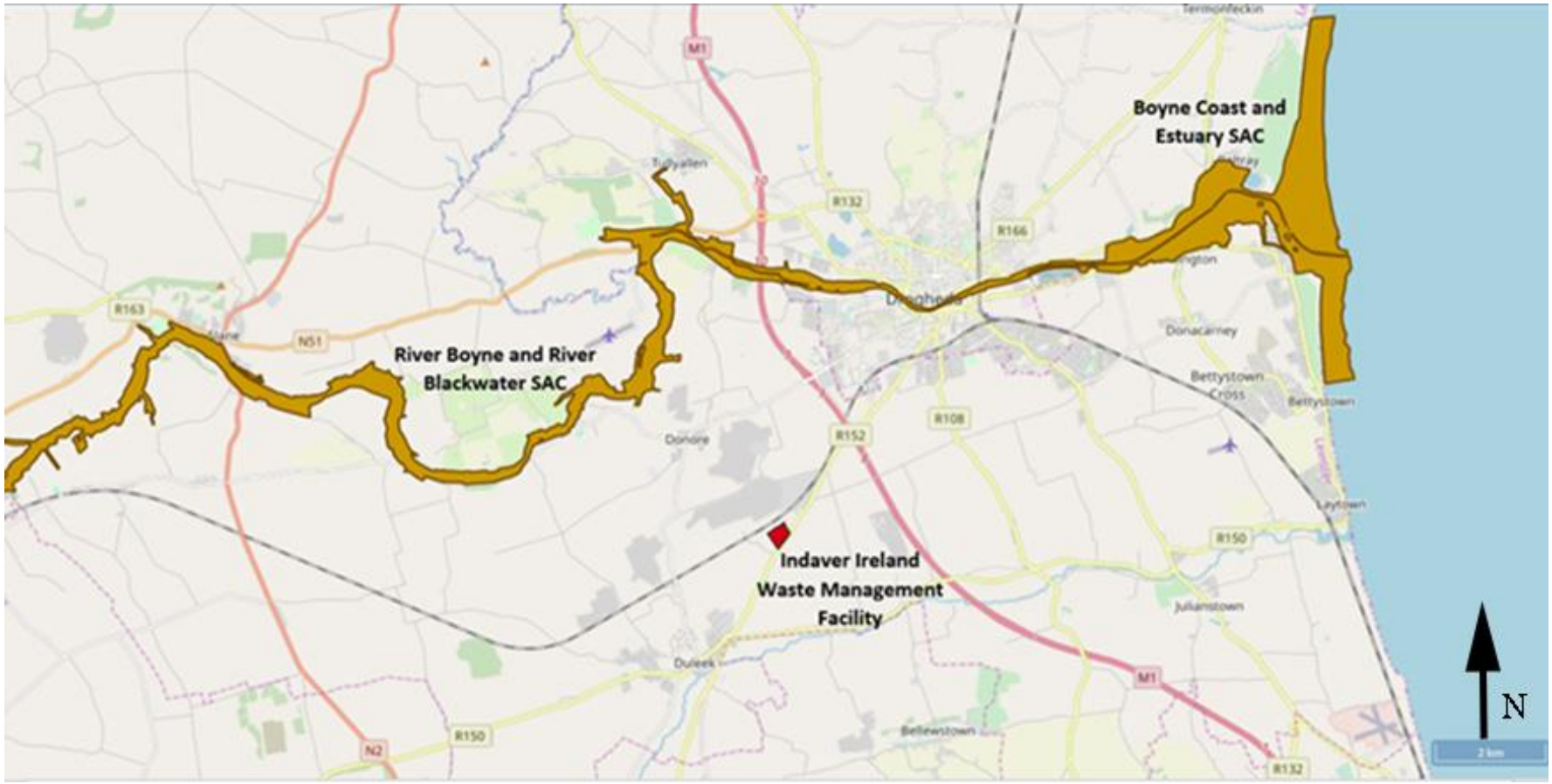

Figure 11.1: Natura 2000 Sites (SACs) in relation to the Indaver Waste Management Facility at Carranstown, Co. Meath. Not to scale. (Source EPA maps 2020)

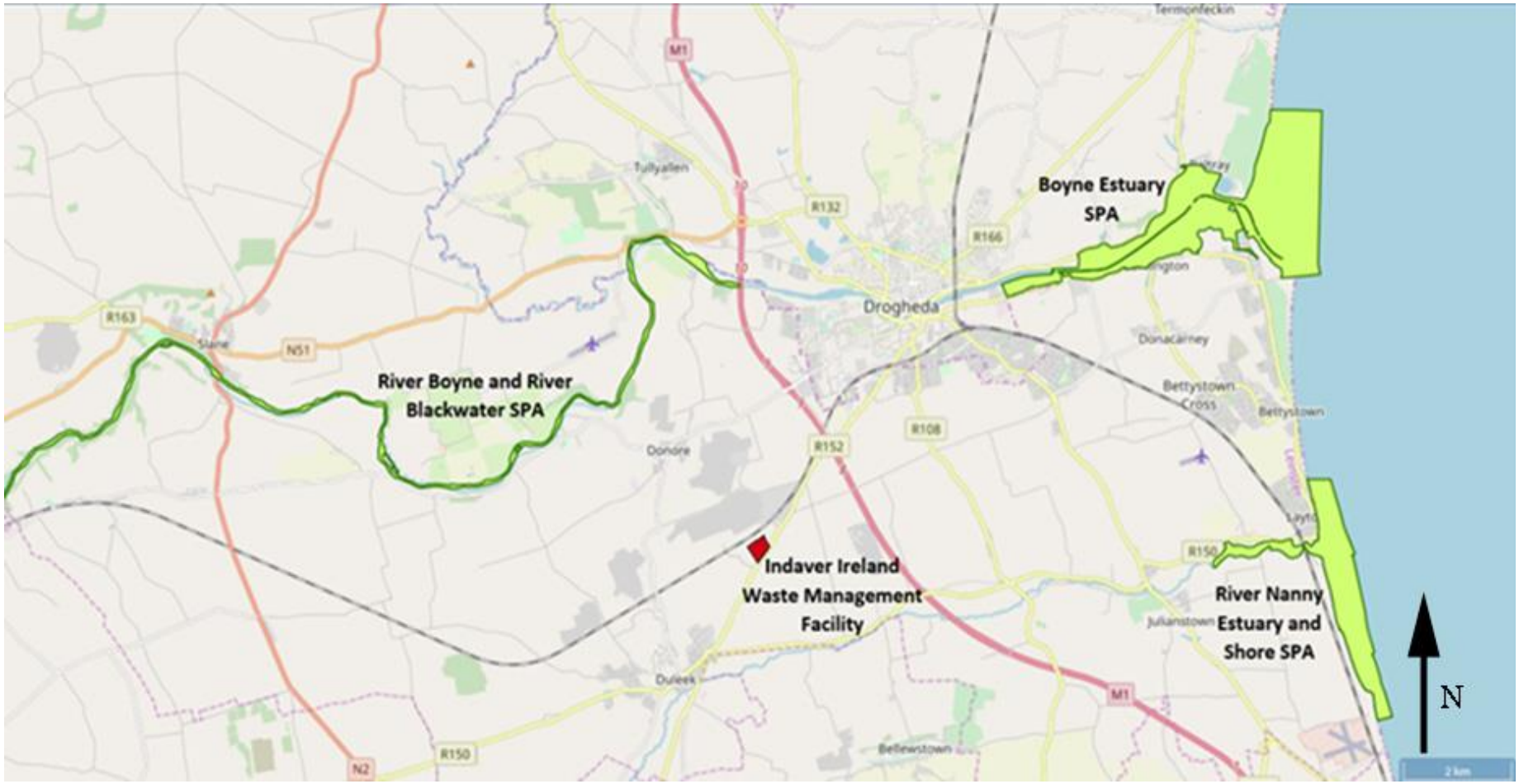

Figure 11.2: Natura 2000 Sites (SPAs)in relation to the Indaver Waste Management Facility at Carranstown, Co. Meath. Not to scale. (Source EPA Maps 2020).

11.3.2.2 Nationally Protected Sites

Natural Heritage Areas (NHAs/pNHAs) are national designations under the Wildlife Act 1976, as amended. A Natural Heritage Area (NHA) is designated for its wildlife value and receives statutory protection. A list of proposed NHAs (pNHAs) was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated.

The following proposed NHAs, as shown in **Figure 11.3**, are located in the vicinity of the proposed development:

- Duleek Commons (Site Code: 001578) located approximately 2.0 km southwest
- Dowth Wetland (Site Code: 001861) located approximately 3.6 km northwest
- Boynes River Islands (Site Code: 001682) located approximately 4.4 km north
- Thomastown Bog (Site Code: 001593) located approximately 5.3 km southwest
- King William's Glen (Site Code: 001804) located approximately 5.6 km northwest
- Rossnaree Riverbank (Site Code: 001589) located approximately 6.1 km west-northwest
- Cromwell's Bush Fen (Site Code: 001576) located approximately 6.7 km southeast
- Crewbane Marsh (Site Code: 000553) located approximately 6.8 km west-northwest
- Laytown Dunes/Nanny Estuary (Site Code: 000554) located approximately 6.9 km east
- Boyne Coast and Estuary (Site Code: 001578) located approximately 7.1 km northeast
- Balrath Woods (Site Code: 001579) located approximately 7.9 km southwest
- Boyne Woods (Site Code: 001592) located approximately 9.6 km west-northwest.

With the exception of a hydrological connection to the Laytown Dunes/Nanny Estuary (Site Code: 000554), there are no other conservation sites with biological connectivity to the subject site that could potentially be affected by the proposed project.

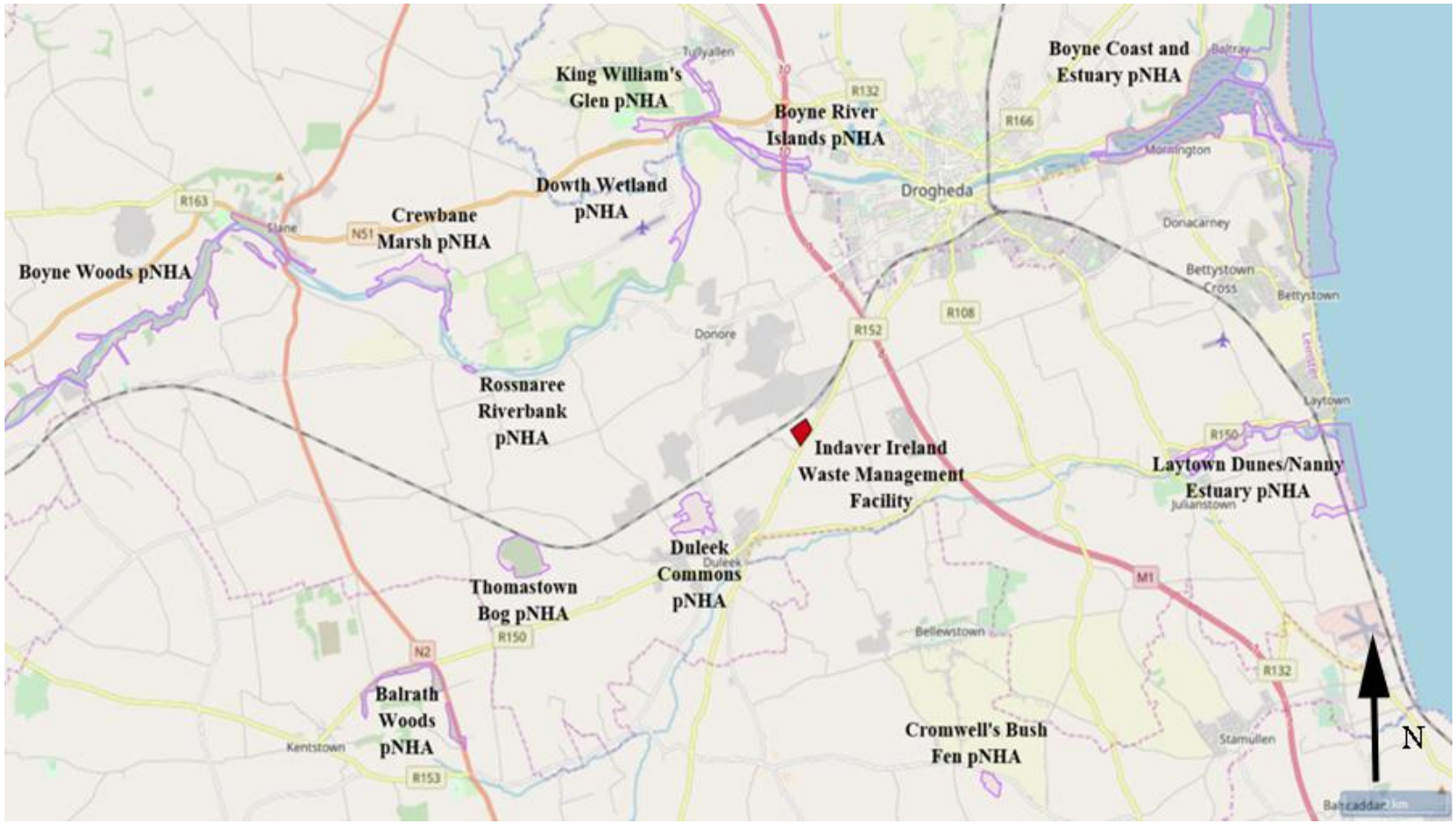

Figure 11.3: Proposed Natural Heritage Areas (pNHAs) in relation to the Indaver Waste Management Facility at Carranstown, Co. Meath. Not to scale. (Source EPA Maps 2020)

11.3.2.3 Important Bird Areas – Nanny estuary and shoreline

Important Bird and Biodiversity Areas (IBAs) are sites selected as important for bird conservation because they regularly hold significant populations of one or more globally or regionally threatened, endemic or congregator bird species or highly representative bird assemblages. The European IBA programme aims to identify, monitor and protect key sites for birds all over the continent. It aims to ensure that the conservation value of IBAs in Europe (now numbering more than 5,000 sites or about 40% of all IBAs identified globally to date) is maintained, and where possible enhanced. The programme aims to guide the implementation of national conservation strategies, through the promotion and development of national protected-area programmes. Through their designation they aim to form a network of sites ensuring that migratory species find suitable breeding, stop-over and wintering places along their respective flyways.

The function of the Important Bird Area (IBA) Programme is to identify, protect and manage a network of sites that are important for the long-term viability of naturally occurring bird populations, across the geographical range of those bird species for which a site-based approach is appropriate. The Indaver site is potentially hydrologically connected to an IBA site via the River Nanny, i.e. the Nanny estuary and shoreline IBA (Site Code: IE118).

The Nanny estuary and shoreline IBA site qualifies for designation due to the population of Red Knot under the following IBA Criteria (2000):

- B2 - The site is one of the most important in the country for a species with an unfavourable conservation status in Europe and for which the site-protection approach is thought to be appropriate.

Table 11.2: Summary of the Nanny estuary and shoreline IBA trigger species.

Species	Current IUCN Red List Category	Season	Year(s) of estimate	Population estimate	IBA Criteria Triggered
Red Knot (*Calidris canutus*)	NT	Winter	1996	800 individuals	B2

11.4 Habitats

Site surveys were carried out on the 30th of September 2019 and 22th of April 2020. 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). The terrestrial and aquatic habitats within or adjacent to the proposed development site was classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex 1 Habitats where required. The survey results are representative of the habitats within the application site and include the dominant and characteristic species of flora.

No rare plant species were recorded within the works area during the site survey and given the modified nature of the habitats within the proposed development area are highly unlikely to occur.

A current overview of habitats recorded within the site is shown in **Figure 11.4** and the habitats recorded on site are described below. Their ecological value is detailed in **Table 11.3.** The ecological value of habitats has been defined using the classification scheme outlined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) which is included in **Appendix 11.1**, **Volume 3** of this EIAR. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Habitats that are considered to be good examples of Annex I and Priority habitats are classed as being of International or National Importance. Semi-natural habitats with high biodiversity in a county context and that are vulnerable, are considered to be of County Importance. Habitats that are semi-natural, or locally important for wildlife, are considered to be of Local Importance (higher value) and sites containing small areas of semi-natural habitat or which maintain connectivity between habitats are considered to be of Local Importance (lower value).

11.4.1 Habitat survey – proposed works area

Habitats within the proposed works area are generally of low ecological value at a local level i.e. amenity grassland (GA2), buildings and artificial surfaces (BL3), ornamental/non-native shrub (WS3), spoil and bare ground (ED2) and recolonising bare ground (ED3). A narrow band of planted immature woodland (WS2) / (Mixed) broadleaved woodland (WD1) will also be impacted by the proposed development.

The northern half of the site is dominated by man-made structures with large areas of hardstanding also present (Buildings and artificial surfaces (BL3)). Amenity grassland (GA2) is also common. These grassland habitats are maintained as short swards and are generally species poor. However, the composition and relative abundance of species varies throughout the site. The overall Indaver facility was originally developed on agricultural fields used for arable crops or intensive pasture. As a result, a number of species derived from these habitats still exist within the proposed works area. Additionally, smaller areas which are less intensively managed are more diverse with species typical of dry meadows and grassy verges (GS2) habitat becoming established.

Species recorded within the grassland habitats include White Clover (*Trifolium repens*), Daisy *(Bellis perennis*), Yorkshire-fog (*Holcus lanatus*), Broad Dock (*Rumex obtusifolius*), Creeping Buttercup (*Ranunculus repens*), Ragwort (*Senecio jacobaea*), Thistles (*Cirsium arvense & C. vulgare*), Silverweed (*Potentilla anserine*), Dandelion (*Taraxacum spp*.), Nettle (*Urtica dioica*), Cock's-foot (*Dactylis glomerata*). Bush Vetch (*Vicia sepium*), Ribwort Plantain (*Plantago lanceolate*), Creeping Cinquefoil (*Potentilla reptans*), Greater Plantain (*Plantago major*), Meadow Buttercup (*Ranunculus acris*), Hard Rush (*Juncus inflexus*) and False Oat-grass (*Arrhenatherum elatius*).

The southern half of the site is dominated by disturbed areas that are used for staff parking, contractor parking and laydown areas (buildings and artificial surfaces (BL3)). These areas are largely unvegetated because they are regularly driven over and weed species are controlled by herbicides.

A large berm in the southeast corner of the site which is to be increased as part of the proposed development has been colonised by a range of ruderals and is classified as recolonising bare ground (ED3). Smaller areas of this habitat have a scattered distribution within the facility. Species noted within the recolonising bare ground (ED3) habitat include; Willowherbs (*Epilobium spp*.), Black Medick (*Medicago lupulina*), Sow-thistle (*Sonchus asper & S. arvensis*), Common Poppy (*Papaver rhoeas*), Common Vetch (*Vicia sativa ssp*.), Creeping Buttercup (*Ranunculus repens*), Thistles (*Cirsium arvense & C. vulgare*), Coltsfoot (*Tussilago farfara*), Red Bartsia (*Odontites vernus*), Selfheal (*Prunella vulgaris*), Creeping Cinquefoil (*Potentilla reptans*), Orache (*Atriplex spp*.), Herb-robert (*Geranium robertianum*), Scarlet Pimpernel (*Anagallis arvensis*), Greater Plantain (*Plantago major*), Butterfly Bush/Buddleja (*Buddleja davidii*), Sun Spurge (*Euphorbia helioscopia*), Speedwell (*Veronica spp*.), Knotgrass (*Polygonum aviculare*), Ragwort (*Senecio jacobaea*), Fleabane (*Conyza spp*.), Groundsel (*Senecio vulgaris*), Cut-leaved Crane's-bill (*Geranium dissectum*), Redshank (*Persicaria maculosa*), Ox-eye Daisy (*Leucanthemum vulgare*) and Daisy (*Bellis perennis*).

As part of the proposed development the screening berm along the southern boundary of the site is to be extended. This will impact on a small portion of a planted band of woodland (immature woodland (WS2) / (mixed) broadleaved woodland (WD1)) growing on the berm. This band of woodland while fragmented from similar habitats within the site and surrounding landscape is of a slightly higher ecological value. Two other woodland bands growing on top of man-made berms within the site were also recorded but will not be affected. Species recorded within these woodlands include; Small leaved lime (*Tilia cordata*), Alder (*Alnus glutinosa*), Silver birch (*Betula pendula*), Hazel (*Corylus avellane*), Hawthorn (*Crataegus monogyna*), Scots pine (*Pinus Sylvestris*), English Oak (*Quercus robur*), Wild cherry (*Prunus avium*), Double flowered wild cherry (*Prunus avium 'Plena'*), Sessile oak (*Quercus petraea*), Ash (*Fraxinus excelsior*) and Rowan (*Sorbus aucuparia*).

11.4.2 Habitat survey – habitats of note outside the proposed development area

Located in the northwest corner of the site is an attenuation pond (Other artificial lakes and ponds habitat (FL8)) that will not to be impacted by the proposed development. This pond, although generally lacking cover or marginal vegetation, is known to hold a population of Smooth Newt (*Lissotriton vulgaris)*, a species protected under the Wildlife Act 1976, as amended.

Situated just east of the proposed berm extension is an area of grassland that has been seeded with a wildflower mix. This area of grassland has similarities to the dry meadows and grassy verge (GS2) habitat. It is dominated by grasses with a high proportion of tussocky grasses noted e.g. Cock’s-foot (*Dactylis glomerata*).

The broadleaved herb component is characterised by a range of species such as Common Knapweed (*Centaurea nigra*), Clovers (*Trifolium spp.*), Birds-foot-trefoil (*Lotus spp*.) and Ribwort Plantain (*Plantago lanceolate*). Other species noted include Cornflower (*Centaurea cyanus*) and Marjoram (*Origanum vulgare*).

There are sections of well-developed mature hedgerow (WL1) habitats, with some smaller sections of recently planted augmented hedgerows within the facility boundary.

Overall, the species composition is similar throughout with spinose species dominating. A section of treeline (WL2) consisting of mature Ash (Fraxinus excelsior) forms the northwest boundary of the facility. Species noted within the hedgerow habitats include; Hawthorn (*Crataegus monogyna*), Gorse (*Ulex europaeus*), Elder (*Sambucus nigra*), Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*), Blackthorn (*Prunus spinosa*), Bramble (*Rubus fruticosus agg.),* Dog-rose (*Rosa canina*), Ivy (*Hedera helix*) and Guelder rose (*Viburnum opulus*).

Drainage ditches (FW4) are associated with some of the hedgerows, primarily concentrated in the northern and western sections of the facility. These piped/buried ditches as well as the open ditches discussed in **Section 11.3.3.1** are illustrated in **Figure 11.5**. These drainage ditches are artificial in origin and have been excavated to enhance drainage and control the flow of water within the site. The north and western ditches have a covering of stone while the internal drainage ditch remains exposed. It is noted that the ditches on site are largely seasonal and dry out during dry periods.

Table 11.3. Habitat types affected within the works areas and their relative ecological value

Habitats	Comments	Ecological value (NRA guidelines)
Buildings and artificial surfaces (BL3)	This is a highly modified habitat with low species diversity and little value for wildlife.	Local importance (Lower value)
Amenity grassland (improved) (GA2)	This is a highly modified habitat with limited value for local wildlife.	Local importance (Lower value)
Ornamental/non-native shrub (WS3)	This category is used for areas that are dominated by ornamental and non-native shrubs.	Local importance (Lower value)
Recolonising bare ground (ED3)	This is a highly modified habitat with low species diversity and limited value for wildlife. However, if left unmanaged recolonising bare ground can be important for wildlife and may support a diverse flora.	Local importance (Lower value)
Spoil and bare ground (ED2)	This is a highly modified habitat with low species diversity and little value for wildlife.	Local importance (Lower value)
Immature woodland (WS2) / (Mixed) broadleaved woodland (WD1)	The woodland habitats on site are generally of low diversity with an underdeveloped ground flora and shrub layer. However, woodland can provide important habitats for local wildlife such as birds, insects, mammals including bats.	Local importance (Higher value)

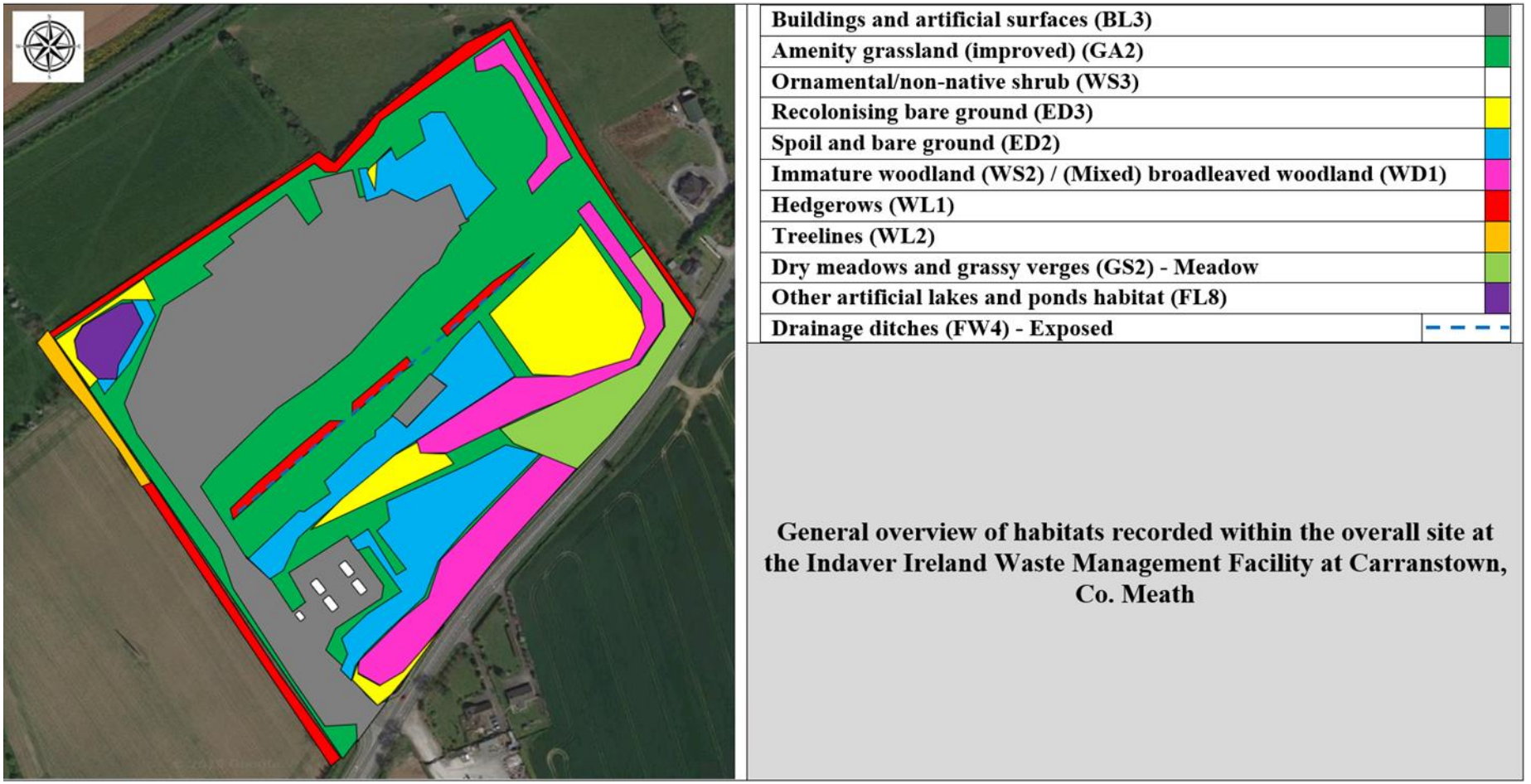

Figure 11.4: General overview of habitats on site (Source Bing Maps. Not to scale).

Figure 11.5. Location of drainage ditches within the site boundary and location of Cruicerath Stream.

11.4.3 Flora

The site of the development lies within Ordnance Survey National Grid 10km square O07. The National Parks and Wildlife Service (NPWS) rare plant database does not list the presence of any protected plant species within O07 (NBDC 21/04/20). In addition, no rare, threatened or legally protected plant species, as listed in the Irish Red Data Book (Curtis & McGough, 1988), were found within the proposed development area.

The National Biodiversity Data Centre (NBDC) online database provides data on the distribution of mammals, birds, and invertebrates within 10km grid squares. Some 363 flowering plants are listed by the NBDC as present in the grid square O07 (NBDC 21/04/20). Of these species listed, only one is listed as a threatened species, namely Marsh Cress (*Rorippa islandica*) which is listed as vulnerable. Marsh Cress is an annual or short-lived perennial herb found in open, muddy habitats such as lake, pond and pool margins, ditch banks, depressions in pasture, in turloughs and rarely on rocks by rivers. There are also records from waste ground and tips. This species was not recorded during site surveys.

No rare species were recorded during the site survey, nor are they expected to occur given that the habitats within the works areas are relatively common.

11.4.4 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 NBDC lists a number of both aquatic and terrestrial high impact invasive species which have been recorded within grid square O07 (**Table 11.4**). It should be noted that this data relates to the entire 10km^2 area and these species will not necessarily occur within the proposed development site.

Table 11.4: NBDC list of high impact invasive species (Source NBDC 21/04/20).

Common Name	Latin Name
Flora	
Japanese Knotweed	*Fallopia japonica*
Cherry Laurel	*Prunus laurocerasus*
Giant Hogweed	*Heracleum mantegazzianum*
Giant Rhubarb	*Gunnera tinctorial*
Indian Balsam	*Impatiens glandulifera*
Rhododendron	*Rhododendron ponticum*
Canadian Waterweed	*Elodea canadensis*
Terrestrial Mammal	
American Mink	*Mustela vison*
Brown Rat	*Rattus norvegicus*
Eastern Grey Squirrel	*Sciurus carolinensis*
House Mouse	*Mus musculus*
Flatworm (Turbellaria)	
New Zealand flatworm	*Arthurdendyus triangulates*

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 make it an offence to plant, disperse, allow dispersal or cause the spread of certain species e.g. Japanese knotweed and Rhododendron, keep the plant in possession for purpose of sale, breeding, reproduction, propagation, distribution, introduction or release, keep anything from which the plant can be reproduced or propagated from the species, without a granted licence and keep any vector material for the purposes of breeding, distribution, introduction or release. 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.

The Wildlife (Amendment) Act 2000 states that anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence. 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.

No high-risk invasive species were recorded during the site surveys. However, the non-native invasive species Butterfly Bush/Buddleja (*Buddleja davidii*) was recorded within the overall site but outside the proposed works area. Butterfly Bush/Buddleja is classified as an Amber Threat species by Invasive Species Ireland which under the right ecological conditions may have a negative impact on native species or habitats. Butterfly Bush is also included in the NRA *Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads* (NRA, 2010) as this species has been shown to have an adverse impact on landscape quality, native biodiversity or infrastructure; and is likely to be encountered during road schemes.

Buddleja or butterfly bush is native to temperate central and south-western China, brought to Europe in the nineteenth century for use as a garden shrub owing to its profusion of flowers which tend to attract a considerable diversity of butterflies.

Buddleja is a medium to large perennial shrub that grows up to 5m tall. It is a very fast-growing species which can reach 2m in its first year, producing flowers and setting seed. It has long arching branches with lilac/purple (sometimes white) flowers, which occur in dense pyramidal shaped panicles during the period June to September. These produce large quantities of nectar. The opposite leaves are lance shaped, deep green above and white-tomentose below.

The seeds produced are very small and numerous with up to 3 million produced per plant. Seeds show lengthy dormancy, remaining in the seed bank for several years. Seeds are adapted for wind dispersal and to a lesser extent dispersal by water. Seeds can be distributed over long distances using wind currents. Additional dispersal can be facilitated by the air currents generated by cars and trains. Stem cuttings can also regenerate new plants and these can be dispersed via waterways. It colonises bare ground very rapidly and can quickly form mono-typic stands. These shrubs also alter the nitrogen and phosphorous amounts in the soil, giving it an advantage that displaces native species, particularly in riparian areas.

Spreading rapidly by windburn seed, butterfly bush displaces native vegetation in disturbed, open areas. It tolerates very poor soils and is capable of growing on walls, rock outcrops or sub-soil. Buddleja can cause structural damage when plants get a foothold in walls, pavements, chimneys etc. Listed and historic buildings can be particularly under threat from the species.

11.5 Fauna

11.5.1 Bats

In Ireland, nine species of bat are currently known to be resident with the residency of the tenth recorded species yet to be proven.

These are classified into two Families: the Rhinolophidae (Horseshoe bats) and the Vespertilionidae (Common bats). The lesser horseshoe bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: common *Pipistrellus pipistrellus*, soprano *P. pygmaeus* and Nathusius' *P. nathusii*, four *Myotids*: Natterer's *Myotis nattereri*, Daubenton's *M. daubentonii*, whiskered *M. mystacinus*, Brandt's *M. brandtii*, the brown long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

Whiskered and Natterer's bats are listed as 'Threatened in Ireland', while the other species are listed as 'Internationally Important' in the Irish Red Data Book 2: Vertebrates (Whilde, 1993). The population status of both Whiskered and Natterer's bats was considered 'indeterminate' because of the small numbers known of each, a few hundred and approximately a thousand respectively. Ireland is considered to be an international stronghold for Leisler's bat, whose global status is described as being at 'low risk, near threatened' (LR; nt) by the IUCN (Hutson, *et al*., 2001).

Near threatened status is applied to those taxa that are close to being listed as vulnerable (facing a high risk of extinction in the wild in the medium-term future on the basis of a range of criteria defined by the IUCN). The Irish population of the Lesser Horseshoe Bat is estimated at 14,000 individuals and is considered of International Importance because it has declined dramatically and become extinct in many other parts of Europe. Data collected shows that the species increased significantly between from the early 1990's to present.

A review of existing bat records within a 10km radius of the study site (sourced from Bat Conservation Ireland's (BCI) National Bat Records Database via the NBDC) indicates that seven of the nine Irish bat species have been listed in **Table 11.5** have been recorded within O07. It is noted that Nathusius's Pipistrelle have not been included within this database, but they could potentially occur in this general area.The closest record for Nathusius's Pipistrelle is approximately 13km northwest of the site (BCI 13/08/2012). Lesser horseshoe bat (*Rhinolophus hipposideros*) is the only species of bat listed on Annex II of the Habitats Directive (Directive 92/43/EEC) and does not occur in the east of the country.

Table 11.5: Presence of Irish bat species within grid squares O07 (Source BCI via NBDC 21/04/20).

Common name	Scientific name	Presence
Lesser Noctule	*Nyctalus leisleri*	Present
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Present
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Present
Daubenton's Bat	*Myotis daubentoniid*	Present

Common name	Scientific name	Presence
Natterer's Bat	*Myotis nattereri*	Present
Brown Long-eared Bat	*Plecotus auratus*	Present
Whiskered Bat	*Myotis mystacinus*	Present
Lesser Horseshoe	*Rhinolophus hipposideros*	Absent
Nathusius's Pipistrelle	*Pipistrellus nathusii*	Absent

All bat species are protected under the Wildlife Acts (1976 & 2000) which make it an offence to wilfully interfere with or destroy the breeding or resting place of all species; however, the Acts permit limited exemptions for certain kinds of development. All species of bats in Ireland are listed in Schedule 5 of the 1976 Act and are therefore subject to the provisions of Section 23 which make it an offence to:

- Intentionally kill, injure or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.

All bats are listed on Annex IV of the EU Habitats Directive. The domestic legislation that implements this Directive gives strict protection to individual bats and their breeding and resting places. It should also be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997, (which transposed the EU Habitats Directive into Irish law) issued by NPWS. The details with regards to appropriate assessments, the strict parameters within which derogation licences may be issued and the procedures by which and the order in relation to the planning and development regulations such licences should be obtained, are set out in Circular Letter NPWS 2/07 *"Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 - strict protection of certain species/applications for derogation licences"* issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16th of May 2007.

Furthermore, on 21st September 2011, the Irish Government published the European Communities (Birds and Natural Habitats) Regulations 2011 which include the protection of the Irish bat fauna and further outline derogation licensing requirements. **Table 11.6** summarises the protection given to bats by national and international legislation and conventions.

Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures. Bats generally make use of large mature trees that contain natural holes, cracks/splits in major limbs, loose bark, hollows/cavities, dense epicormic growth (bats may roost within it) and bird and bat boxes. The importance of trees to bats varies with species, season and foraging behaviour.

Evidence indicating bat presence, includes dark stains running below holes or cracks, bat droppings, odours, or scratch marks.

Table 11.6 Legislative protection for bats in Ireland

Legislation/Convention	Relevance to Irish bats
Irish Wildlife Act (1976) & Irish Wildlife (Amendment) Act 2000.	It is an offence to wilfully interfere with or destroy the breeding or resting place of bats, (with some exemptions for certain kinds of construction development). Provides for the creation of NHAs.
EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Directive 92/43/EEC), commonly known as the 'Habitats Directive	Lists all the vesper bats in Annex IV as in need of strict protection and also encourages Member States to conserve landscape features such as river corridors, field boundaries, ponds and woodlands. It also requests that Member States establish a system to monitor the incidental capture and killing of the animals listed in Annex IV. The lesser horseshoe bat is further listed in Annex II of the EU Habitats Directive The level of protection offered to lesser horseshoe bats effectively means that areas important for this species are designated as Special Areas of Conservation.
The Convention on the Conservation of European Wildlife and Natural Habitats, commonly known as the 'Berne Convention'.	It obliges states to protect and conserve animals and their habitats, especially those listed as endangered or vulnerable. Also obliges parties to promote national policies for the conservation of wild fauna and natural habitats
The Convention on the Conservation of Migratory Species of Wild Animals, commonly known as the 'Bonn Convention'.	This led to the European Bats Agreement (EUROBATS), which lists a wide range of objectives, including promoting research programmes relating to the conservation and management of bats, promoting bat conservation and public awareness of bats, and identifying and protecting important feeding areas of bats from damage and disturbance.

Bats also often use features such as hedgerows, treelines, woodland edges and waterways as commuting pathways between roosts and foraging areas. Sheltering vegetation, such as treelines and woodland, not only acts as cover from potential predators and the weather, but also provides structure for acoustic orientation and navigation. Sheltered areas also allow insects to gather and therefore support bat foraging.

As part of the original application for the development of the existing facility, bat surveys were conducted in 2008. The surveys identified that bats utilised the overall site for feeding, commuting and roosting. Mitigation measures in the form of bat boxes and supervised felling of trees were recommended to minimise the impact to bat species as a result of the original development.

In order to mitigate against the potential loss of bat foraging/roosting sites identified for bat species, six bat boxes were erected at the site in 2008. The main function of bat boxes is to provide alternative safe roosting sites for groups of bats where natural sites become unavailable. Details of the Bat Box scheme were

forwarded to Bat Conservation Ireland to be included in their database for monitoring purposes.

Unpublished reports by Bat Eco Services show that the 2012 results indicated evidence of usage (bat droppings) in four boxes but with no bats present. Results in 2015 again indicated evidence of low usage (bat droppings) in four boxes but with no bats present.

The linear features around the periphery of the site have the potential to link roost sites to foraging areas and facilitate the dispersal of bats into the wider landscape. These linear boundary habitats will be unaffected by the proposed development. It is noted that there are large areas of pasture with high quality hedgerows and treelines in the surrounding area and outside the site boundary, which provide much higher quality potential feeding habitat.

Overall is has been concluded that the proposed development area is of low to negligible value for bats. The grassland areas and planted woodland within the site are considered of low value to local bat populations and the proposed development is unlikely to result in adverse impacts through habitat loss. Overall there may be a minor negative impact on the local bat populations foraging within the overall site.

Bats which use the Indaver site, albeit in small numbers, are currently habituated to existing noise and activity levels and given no significant changes in the management of the facility will occur, bats are likely to continue to use the site during and post construction.

11.5.2 Otter

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Direct which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. 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).

Although rare in parts of Europe they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting placing or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or

in dry drainage pipes or culverts etc. If ground conditions are suitable the holt may consist of a complex tunnel and chamber system.

Otters often lie out above ground especially within reed beds where depressions in the vegetation called “couches” are formed. (NRA, 2005b). Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season.

It is noted that Otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of Otters in the centre of Cork and Limerick City. Thus, they are able to adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower.

Otter is a Qualifying Interest (QI) for the River Boyne and River Blackwater SAC located 3.2 km northwest of the proposed development site. A review of existing records showed that Otter or signs of Otter have been recorded on 17 occasions within grid square O07, the most recent being in September 2018 (NBDC 21/04/20). Otter has been recorded within and is known to occur within the River Nanny, which is located approximately 2km south of the site.

No evidence of Otter was recorded during site surveys. The closest watercourse is the Cruicerath Stream which is located approximately 130m from the Indaver site boundary. The Cruicerath Stream is hydrologically connected to the Indaver site and ultimately discharges to the River Nanny. A survey of this stream in April 2020 indicated that it was dry with no running water recorded from its source to its discharge point. Therefore, this watercourse does not support permanent fish populations which provide a source of prey for Otters. It has been concluded therefore that this stream is of negligible value for Otter.

Otter could potentially forage on Common Frog and Smooth Newt in pond habitat (located within the existing attenuation pond) within the site boundary. It is noted that the existing facility and surrounding landscape are already subject to high levels of disturbance from traffic and human activity and species currently utilising the site will be habituated to ongoing disturbance factors in these circumstances.

The proposed construction activities will result in an increase in noise and disturbance, however it will be of negligible significance in the context of Otter’s largely nocturnal habits, ability to move away from short-term disturbance and the negligible significance of increased noise and disturbance in the context of existing noise levels at the Indaver facility.

11.5.3 Other terrestrial mammals

Thirteen other species of terrestrial mammal have been recorded within grid square O07. Seven of which are protected under the Irish Wildlife Act; namely Hedgehog, Red Deer, Badger, Irish Stoat, Irish Hare, Red Squirrel and Pine Marten. Signs of Fox were noted within the overall site and likewise live sightings of Rabbits were recorded.

11.5.3.1 Badger (*Meles meles*)

Badger (*Meles meles*) 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 protected species.

Badgers are known to occur within the wider landscape (NBDC). Field signs are characteristic and sometimes quite obvious and include tufts of hair caught on barbed wire fences, conspicuous Badger paths, footprints, small excavated pits or latrines in which droppings are deposited, scratch marks on trees, and snuffle holes, which are small scrapes where Badgers have searched for insects and plant tubers. No signs of Badger, were recorded during site surveys.

11.5.3.2 Red Deer *(Cervus nippon)*

Red Deer *(Cervus nippon)* are the largest land mammal found on the island of Ireland. Populations of red deer are found in the west, northwest, east and southwest regions of Ireland, with smaller populations found scattered throughout Northern Ireland and certain parts of the midlands.

The closest records of the species are from approximately 1.5km north of the facility, within agricultural fields (NBDC records). It is noted that deer (species not identified) have been observed in fields in proximity to the facility by Indaver staff. There are no habitats of significant value for deer species within the proposed development site and no signs of deer were recorded during the site surveys.

11.5.3.3 Irish hare (Lepus timidus hibernicus)

Irish Hare (*Lepus timidus hibernicus*) is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book.

The Irish Hare is adaptable and lives in a wide variety of habitats. It typically reaches its highest densities on farmland, particularly where there is a mix of grassland and arable fields along with hedgerows and other cover.

Instead of making use of burrows for protection, hares make shelters known as forms. Forms are usually situated in longer vegetation in which hares make allows using their front legs and head.

A hare form was noted within an area of tall vegetation on top of an existing berm on site. It is noted as of 2018, the site is now home to a stable population of Irish hares (per comms. onsite Environmental Specialist).

Hare populations can respond rapidly to habitat changes. The development of primarily areas of short sward amenity grassland and areas of recolonising bare ground and hard stand will have little to no effect on hare populations within the site. The presence of a meadow and larger areas of grassland under a low intensity management regime provides favourable conditions for the species within the overall site.

11.5.3.4 Hedgehog (*Erinaceus europaeus*),

Hedgehog (*Erinaceus europaeus*), also listed on Appendix III of the Berne Convention can be found throughout Ireland, with male hedgehogs having an annual range of around 56 hectares. A number of factors are thought to influence the distribution of hedgehogs in a habitat, with nest sites, food availability and the presence of predators believed to be major contributory factors. Generally, hedgehogs prefer edge habitat and pasture but in recent years have begun to colonize urban areas. Due to the habitats recorded within the proposed development site and surrounding landscape, hedgehog is likely to occur.

11.5.3.5 Irish Stoat (*Mustela erminea hibernica*)

Irish Stoat (*Mustela erminea hibernica*) is one of the species protected under regulations (Protection of Wild Animals) in 1980 which enabled Ireland to comply with the provisions of the Bern Convention of European Wildlife and Natural Habitats, which was ratified by Ireland in April 1982. Irish stoats occur in most habitats with sufficient cover, including urban areas. It is likely that stoat will occur within the proposed development site given the presence of prey species.

11.5.3.6 Red Squirrel (*Sciurus vulgaris*)

Red Squirrel (*Sciurus vulgaris*) also listed on Appendix III of the Berne Convention can be found throughout Ireland. Red Squirrels feed mainly on tree seeds, although they can utilise fungi, fruit and buds as they become available in the woodland. They are found in all types of habitat but typically are in higher densities in mature mixed broadleaved forests. They can also survive in monoculture coniferous woodland. Red Squirrel is known to occur in the wider area (NBDC records), however it is unlikely that Red Squirrel will occur within the proposed development site. It is noted that the stands of immature woodland within the site may provide limited suitable habitat for this species once mature.

11.5.3.7 Pine Marten (*Martes martes*)

Pine Marten (*Martes martes*) also listed Annex V of the EU Habitats Directive 1992 and Appendix III of the Bern Convention 1979, are habitat specialists, requiring forest or scrub habitat to exist in an area. They are adept at climbing trees as they have powerful non-retractable claws. The species is primarily active at night and individuals live in territories that can vary in size from 50 hectares to 400 hectares.

Numerous records of Pine Marten have been recorded within 4km of the facility (NBDC). However, this species is unlikely to occur within the proposed development site.

11.5.4 Reptiles and Amphibians

Amphibians

According to records held by the NBDC, Common Frog (*Rana temporaria)* and Smooth Newt (*Lissotriton vulgaris*) were recorded within grid square O07.

Common Frog is listed in Annex V of the EU Habitats Directive and is protected under the Wildlife Acts. The species was not recorded during the site survey. This species has been recorded on occasion from an onsite attenuation pond which will not be impacted as part of the proposed development.

Smooth Newt is the only member of the Urodela (the tailed amphibians) found in Ireland. While commonly encountered near water bodies, adult newts are actually terrestrial, only returning to water bodies to breed. They tend to prefer habitats that offer protection from desiccation, such as long grass, woodland and scrubland. Newts will over-winter in refugia such as woodpiles and rotting logs, which offer them some protection from the elements.

In 2018 a Newt survey was carried out jointly by Hibernica Ecology Ltd and Triturus Environmental Consulting at the attenuation pond / fire water retention pond within the Indaver facility. The survey was conducted to determine the significance and viability of the newt population present and to determine newt-friendly management measures for the excessive duckweed (*Lemna sp*.) which is currently covering the pond surface. The newt survey identified a strong population of juvenile newts (efts) principally associated with the presence of pondweed (*Potamogeton berchtoldii*) and concentrated at the southern portion of the pond, i.e. towards the outfall. No adult newts were recorded during the survey; however, the presence of efts confirms successful breeding within the site in 2018. The very warm, dry summer period experienced that year is likely to have triggered adults to leave the pond early to seek more suitable habitat and thus they would have been unrecorded during the survey. It is noted that the attenuation pond is outside the proposed works areas and the habitats to be affected by this proposed development are of minimal value to Smooth Newts.

Reptiles

Common Lizard (*Zootoca vivipara*) been recorded within grid square O07 (NBDC records), Common Lizard is protected under the Wildlife Act. is Ireland's

only native terrestrial reptile and is so protected under the Wildlife Act. Unlike the vast majority of reptiles, it has been found that the Common Lizard often frequents damp habitats, as the humidity has a beneficial effect on growth rate and activity. The species is tolerant, to a degree, of habitat disturbance (it may even use artificial habitats, e.g. railway embankments, hedgerows, and gardens. Due to the habitats recorded within or in proximity to the proposed development site it is possible that Common lizard could occur, however no habitats of significant value for this species will be affected.

11.5.5 Birds

The National Biodiversity Centre online data base lists 118 species of bird recorded within grid square O07. Of these species, a number are listed under Annex I of the Birds Directive and are Red Listed Birds of Conservation Concern in Ireland (Colhoun & Cummins, 2013) (**Table 11.7**).

Table 11.7: Bird species listed under Annex I of the Birds Directive and/or classified as Red Listed Birds of Conservation Concern in Ireland recorded within grid square O07 (NBDC records 21/04/20).

Species	Birds Directive Annex	BOCCI
	I	Red List
Barn Owl		X
Bar-tailed Godwit	X	
Black-headed Gull		X
Common Goldeneye		X
Kingfisher	X	
Pochard		X
Quail		X
Redshank		X
Common Tern	X	
Corn Crake	X	X
Eurasian Curlew		X
Eurasian Wigeon		X
Eurasian Woodcock		X
European Golden Plover	X	X
Grey Partridge		X
Grey Wagtail		X
Hen Harrier	X	
Herring Gull		X
Little Egret	X	
Meadow pipit		X
Merlin	X	
Northern Lapwing		X
Northern Pintail		X
Northern Shoveler		X
Peregrine Falcon	X	
Tufted Duck		X
Whooper Swan	X	
Yellowhammer		X

A general bird survey was carried out in conjunction with habitat survey in September 2019 and a breeding bird survey was carried out in April 2020 which focused on habitats outside the site boundary. During the survey, all birds seen or heard within the development site were recorded. Signs of birds were also noted e.g. nests. The majority of birds utilising the proposed works areas are common in the local landscape.

Birds species listed in Annex I of the Birds Directive are considered a conservation priority. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI).

These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. Birds species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority. Species recorded within the site are shown in **Table 11.8**.

Kingfisher is a Special Conservation Interest (SCI) for the River Boyne and River Blackwater SPA, which is located 3.4 km northwest of the proposed development site. Kingfisher could potentially use the attenuation pond within the facility.

Wading birds which are SCI species for the River Nanny Estuary and Shores SPA may forage inland on terrestrial habitats. Golden Plover were recorded foraging on arable fields at the Knockharley Landfill Site which is located approximately 9.5km west-southwest of the Indaver site and some 16.5km inland of the River Nanny and Estuary Shores SPA (Greenstar 2008). However, no wading birds were recorded on or near the Indaver site during the September 2019 or April 2020 surveys or in any previous surveys carried out at the site. Furthermore, there is no suitable habitat for wading birds within the proposed development site. If wading birds were to use agricultural lands in the vicinity of the proposed development site, these birds would already be habituated to the noise and disturbance of the existing Indaver facility and therefore should continue to use these fields during and after construction of the proposed development.

Table 11.8: Bird Species recorded during site surveys.

Species		Birds Directive Annex			BOCCI	
		I	II	III	Red List	Amber List
Carduelis carduelis	Goldfinch					
Larus fuscus	Lesser black-backed Gull					X
Erithacus rubecula	Robin					X
Larus argentatus	Herring Gull				X	
Turdus merula	Blackbird					
Prunella modularis	Dunnock					
Troglodytes troglodytes	Wren					
Pyrrhula pyrrhula	Bullfinch					
Corvus frugilegus	Rook					
Corvus monedula	Jackdaw					
Pica pica	Magpie					
Delichon urbicum	House Martin					X
Columba palumbus	Woodpigeon		X	X		
Fringilla coelebs	Chaffinch					
Corvus cornix	Hooded Crow					
Parus caeruleus	Blue Tit					
Motacilla cinerea	Grey Wagtail				X	
Motacilla alba yarrellii	Pied Wagtail					
Buteo buteo	Buzzard					
Parus major	Great Tit					
Columba livia f. domestica	Feral Pigeon					
Larus canus	Common gull					X
Hirundo rustica	Swallow					X
Sturnus vulgaris	Starling					X
Regulus regulus	Goldcrest					X
Anthus pratensis	Meadow Pipit					
Emberiza citrinella	Yellow hammer				X	
Symbol	**Description**					
I	Annex 1: species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.					

Species		Birds Directive Annex			BOCCI	
		I	II	III	Red List	Amber List
II	Annex 2: bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.					
III	Annex 3: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for species listed here.					

Overall, the proposed development site is of local value for terrestrial bird species that are relatively common in the Irish countryside. The data in **Table 11.8** includes birds recorded within the overall Indaver site, proposed development area and agricultural land in proximity to the site. In general, the mixture of arable and pastoral lands adjoining the site are of highest value for birds due to the presence of moderate to high quality hedgerows. There are areas of grassland planted trees within the overall site boundary which are of some value for common bird species, and it is noted that the value of woodland for birds will improve as it matures. However, the habitats within the proposed development area are highly modified and are generally of low value for birds.

Three red list species were recorded namely Herring Gull, Yellowhammer and Grey Wagtail. Yellowhammer was recorded within arable land outside the site boundary and there are no habitats of value for this species within the proposed development area. Grey Wagtail is generally associated with aquatic habitats and may utilise the attenuation pond onsite, however there are no habitats suitable for this species within the proposed development site.

Herring Gull, which is also listed as a SCI for the River Nanny Estuary and Shores SPA, was recorded during the bird surveys. However this species, which commonly uses inland sites, was not recorded in significant numbers.

Seven amber listed species were noted namely Lesser Black-backed Gull, Robin, House Martin, Common Gull, Swallow, Starling and Goldcrest.

These are all relatively common constituents of the general countryside bird community and no habitats of significant value for these species will be affected by the proposed development.

There is a rookery within several ash trees along the R152 regional road road close to the site entrance and a second rookery located to the south west of the site. Chaffinch, Blackbird and Robin were also recorded as definite breeding species during the site survey in April 2020. However, these species were recorded as breeding within hedgerow habitat outside the site boundary. The proposed development area consists of modified habitat and recently planted woodland and is considered of low to negligible value for breeding birds.

Kingfishers have been recorded on 18 occasions within the 10km grid square O07 (NPWS 22/04/20) and they are known to occur within the River Nanny main

channel (Irish Birding 2016). No kingfishers were recorded during site surveys within or in proximity to the Indaver site.

The closest watercourse is the Cruicerath Stream which is located approximately 130m from the Indaver site boundary. This is hydrologically connected to the Indaver site and ultimately discharges to the River Nanny. A survey of this stream in April 2020 indicated that this watercourse was dry with no running water recorded from its source to its discharge point. Therefore, this watercourse does not support permanent fish populations which provide a source of prey for kingfisher. Whilst the pond within the site may provide feeding habitat for this species, this is improbable given the absence of significant hydrological pathways or commuting routes linking the Indaver site to the River Nanny. Taking a worst-case scenario, any use of the attenuation pond on site would be sporadic and this pond is unlikely to be a critical resource for this species.

Overall, the study area is of a local value for a range of terrestrial bird species that are relatively common in the Irish countryside and the proposed development area is not of significant value for birds. There may be a short-term impact on feeding patterns during construction but the long-term impact is predicted to be imperceptible.

11.5.6 Other species listed by NBDC as present within grid square O07

Table 11.9 below lists other species recorded within grid square O07, along with any species considered under threat and provided with legal protection. It is noted that Large Red-Tailed Bumble Bee, which is considered threatened, has been recorded onsite by the in-house Environmental Specialist. However, no habitats of significant value for this species will be affected.

Table 11.9: Other species listed by NBDC as present within grid square O07 (Source NBDC 21/04/20)

Species Group	Named species
Alga	None protected
Bony fish (Actinopterygii)	European Eel - Threatened Species: OSPAR Convention & Threatened Species: Critically Endangered
Conifer	None protected.
Crustacean	None protected.
Fern	None protected.
Flatworm (Turbellaria)	None protected.
Fungus	None protected.
Harvestman (Opiliones)	None protected.
Horsetail	None protected.
Beetle (Coleoptera)	*Hydraena rufipes* - Threatened Species: Endangered. *Gyrinus urinator* & *Ochthebius (Ochthebius) marinus* - Threatened Species: Near threatened. *Hygrotus (Coelambus) novemlineatus* & *Laccophilus hyalinus* - Threatened Species: Vulnerable
Butterflies	Wall - Threatened Species: Endangered. Small Heath - Threatened Species: Near threatened.

Species Group	Named species
	It is noted that the Small Heath Butterfly has been recorded onsite by the in-house Environmental Specialist. No habitats of high value for this species will be affected.
Caddis fly (Trichoptera)	None protected.
Dragonfly (Odonata)	None protected
Flea (Siphonaptera)	None protected.
Earwig (Dermaptera)	None protected.
Hymenopteran	*Halictus (Seladonia) tumulorum*, Gipsy Cuckoo Bee, Moss Carder-bee & Large Red-Tailed Bumble Bee - Threatened Species: Near threatened. *Andrena (Melandrena) nigroaenea*, *Lasioglossum (Evylaeus) rufitarse*, & Field Cuckoo Bee - Threatened Species: Vulnerable.
Lacewing (Neuroptera)	None protected.
Louse (Phthiraptera)	None protected.
Mayfly (Ephemeroptera)	*Ephemerella notata* & *Labiobaetis atrebatinus* - Threatened Species: Endangered. *Kageronia fuscogrisea* - Threatened Species: Near threatened. *Procloeon bifidum* - Threatened Species: Vulnerable.
Moths	None protected.
Orthopteran	None protected.
Hemiptera	None protected.
True fly (Diptera)	None protected.
Lichen	None protected.
Liverwort	Cliff Scalewort - Threatened Species: Near threatened
Millipede	None protected.
Mollusc	Desmoulin's Whorl Snail - Protected Species: EU Habitats Directive Annex II & Protected Species: Wildlife Acts - Threatened Species: Endangered. Moss Chrysalis Snail, Smooth Ramshorn & Lesser Bulin - Threatened Species: Endangered. Common Whorl Snail, Striated Whorl Snail & Prickly Snail - Threatened Species: Near threatened. Marsh Whorl Snail, Point Snail, Tree Snail, Blind Snail, *Sphaerium nucleus* & English Chrysalis Snail - Threatened Species: Vulnerable.
Moss	River Bristle-moss, Rose-moss, Wulfsberg's Tamarisk-moss & Showy Feather-moss - Threatened Species: Near threatened. Tufted Thread-moss - Threatened Species: Vulnerable.
Slime Mould	None protected

11.6 Characteristics of the Proposed Development

The proposed development consists of the following main elements:

- Increase in the amount of hazardous waste accepted at the facility for treatment in the waste to energy plant from the current permitted 10,000 tonnes per annum (tpa) up to a maximum of 25,000 tpa;
- It is also proposed to increase the annual total waste accepted at the site for treatment in the waste to energy facility from the currently permitted 235,000 tpa to 250,000 tpa;
- Development of an aqueous waste tank farm and unloading area for the storage and processing of aqueous liquid wastes currently accepted at the facility;
- Development of a 10MW_e hydrogen generation unit for connection to the natural gas distribution network and for mobile hydrogen transport applications and other potential uses;
- Development of a bottom ash storage building for the storage of up to 5,000 tonnes of bottom ash which is currently produced on site;
- Additional waste acceptance capacity and infrastructure to accept up to 30,000 tpa (bringing the site total to 280,000 tpa) of third party boiler ash and flue gas cleaning residues and other similar residues for treatment in the existing ash pre-treatment facility on site;
- Development of a warehouse, workshop and emergency response team (ERT)/office building to support existing maintenance activities on the site;
- Development of a new concrete yard and parking area for up to 10 trucks, tankers or containers on the site;
- Demolition and re-building of an existing single storey modular office building on site with a slightly increased footprint.; and
- Other miscellaneous site upgrades.

The development is described in detail in **Chapter 4** ***Description of Proposed Development*** of this EIAR.

11.7 Likely Significant Effects

Annex III of the amended Directive 2104/52/EU requires that the EIAR should assess:

a) The magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected)

b) The nature of the impact

c) The transboundary nature of the impact

d) The intensity and complexity of the impact

e) The probability of the impact

f) The expected onset, duration, frequency and reversibility of the impact

g) The cumulation of the impact with the impacts of other existing and/or approved projects and

h) The possibility of effectively reducing the impact.

The potential impacts of the proposed development on terrestrial and aquatic biodiversity include:

- Impacts on Habitats
- Impacts from non-native invasive species
- Predicted impacts on water quality and aquatic ecology during construction
- Predicted impacts on water quality and aquatic ecology during operation
- Predicted Impacts on fauna during operation - Air
- Potential impacts on protected mammals – bats and otter during construction and operation
- Potential impacts on birds during construction and operation
- Potential impacts on other fauna during construction and operation.

11.7.1 Impact Appraisal

When describing changes/activities and impacts on ecosystem structure and function, important elements to consider include positive/negative, extent, magnitude, duration, frequency and timing, and reversibility (IEEM, 2018).

Section 3.7 of the *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'*, (EPA 2017) provides standard definitions which have been used to classify the effects in respect of ecology. This classification scheme is outlined below in **Table 11.10.**

Table 11.10. EPA Impact Classification

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment.
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment.
	Imperceptible	An effect capable of measurement but without significant consequences.
	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging trends.

Impact Characteristic	Term	Description
Significance	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound	An effect which obliterates sensitive characteristics.
Duration and Frequency	Momentary Effects	Effects lasting from seconds to minutes.
	Brief Effects	Effects lasting less than a day.
	Temporary Effects	Effects lasting less than a year.
	Short-term	Effects lasting one to seven years.
	Medium-term	Effects lasting seven to fifteen years.
	Long-term	Effects lasting fifteen to sixty years.
	Permanent	Effects lasting over sixty years.
	Reversible Effects	Effects that can be undone.
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost.
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents.
	'Worst Case'	The effects arising from a development in the case where mitigation measures substantially fail.

11.7.2 "Do Nothing" Scenario

Most of the habitats to be affected have been significantly modified from their natural state by human activity. Formally disturbed areas and areas that have been left unmanaged are being recolonised by vegetation. The general pattern of succession from recolonising bare ground to patches of grassland to woodland would be expected to continue. In the absence of development, it is expected that the proposed works areas would largely remain under the same management regimes. No significant changes to the boundary habitats are likely to occur.

11.7.3 Predicted Impacts on Habitats

Impacts on terrestrial habitats are generally restricted to the direct removal of habitats and possible impacts from the spread of invasive species. Based on the criteria outlined by EPA, 2017, as described above, the predicted impacts are detailed in **Table 11.11.**

Table 11.11. Impacts on Habitats

Habitat	Description/ Habitats Directive Annex I Status	Potential Impact
Buildings and artificial surfaces (BL3)	Local importance (Lower value)	Low value habitat of negligible ecological value. Neutral, Not significant, Long term impact
Amenity grassland (improved) (GA2)	Local importance (Lower value)	Loss of small areas of low value habitat. Negative, Not Significant, Long term impact
Ornamental/non-native shrub (WS3)	Local importance (Lower value)	Loss of small areas of low value habitat. Negative, Not Significant, Long term impact
Recolonising bare ground (ED3)	Local importance (Lower value)	Loss of small areas of low value habitat. Negative, Not Significant, Long term impact
Spoil and bare ground (ED2)	Local importance (Lower value)	Loss of small areas of low value habitat. Negative, Not Significant, Long term impact
Immature woodland (WS2) / (Mixed) broadleaved woodland (WD1)	Local importance (Higher value)	The planted woodland habitats on site are generally of low diversity with an under developed ground flora and shrub layer Negative, Not Significant, Long term impact.

As detailed above no significant direct loss of habitat will occur as a result of the proposed development. Construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. As noted in **Chapter 8 *Air Quality*** of this EIAR, following implementation of standard dust minimisation measures construction stage impacts to air quality are predicted to be short-term and not significant.

Given that there are no sensitive or high value habitats within the site or in proximity to it, any impacts from dust generation will be short-term and imperceptible.

11.7.4 Impacts from non-native invasive species

No high-risk invasive species were recorded during the recent site survey. However, the non-native invasive species Butterfly Bush/Buddleja (*Buddleja davidii*) was recorded within the overall site but outside the proposed works area. As the proposed development will not result in the spread of this species outside

of its current distribution and given the relatively low potential impact associated with this species, no impact from the spread of invasive species will occur.

11.7.5 Predicted impacts on water quality and aquatic ecology during construction

Surface water emissions associated with the construction phase of the proposed development could impact on aquatic habitats via increased silt levels in surface water run-off and inadvertent spillages of chemicals such as hydrocarbons from fuel and hydraulic fluid. This is only likely to occur where works take place in proximity to seasonal drainage ditches within the site boundary.

Inadvertent spillages of hydrocarbon and/or other chemical substances during construction could introduce toxic chemicals into the aquatic environment via direct means, surface water run-off or groundwater contamination. Some hydrocarbons exhibit an affinity for sediments and thus become entrapped in deposits from which they are only released by vigorous erosion or turbulence. Oil products may contain various highly toxic substances, such as benzene, toluene, naphthenic acids and xylene which are to some extent soluble in water; these penetrate into the fish and can have a direct toxic effect. The lighter oil fractions (including kerosene, petrol, benzene, toluene and xylene) are much more toxic to fish than the heavy fractions (heavy paraffins and tars). In the case of turbulent waters, the oil becomes dispersed as droplets into the water. In such cases, the gills of fish can become mechanically contaminated and their respiratory capacity reduced.

If of sufficient severity, aquatic invertebrates may be smothered by excessive deposits of silt from suspended solids. In areas of stony substrate, silt deposits may result in a change in the macro-invertebrate species composition, favouring less diverse assemblages and impacting on sensitive species. Cement can also affect fish, plant life and macroinvertebrates by altering pH levels of the water. Aquatic plant communities may also be affected by increased siltation. Submerged plants may be stunted and photosynthesis may be reduced.

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 aquatic 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** ***Construction Activities*** of this EIAR and in the CEMP.

The risk of potential impacts on water quality is low as the drainage ditches within the site boundary are seasonal and will not have running water during dry periods. The closest watercourse is the Cruicerath Stream which is located approximately 130m from the Indaver site boundary and which is hydrologically connected to the Indaver site and ultimately discharges to the River Nanny. A survey of this stream in April 2020 indicated that this watercourse was dry with no running water recorded from its source to its discharge point and therefore it will not support permanent fish populations. Therefore, no habitats of high sensitivity to pollutants or of high conservation value occur in close proximity to the proposed development site.

The Cruicerath Stream joins the River Nanny approximately 2km downstream of the Indaver site. The River Nanny holds a small stock of wild trout and is stocked annually with Brown Trout. It also gets a small run of Sea Trout (Eastern Regional Fisheries Board). One site was electro-fished on the River Nanny as part of the WFD surveillance monitoring programme of rivers 2012. The survey site was located upstream of a bridge in Julianstown, approximately 4km north of Athboy, Co. Meath. A total of eight fish species were recorded in the River Nanny (Julianstown) site. Minnow was the most abundant species followed by Stone Loach, European Eel, Brown Trout, Flounder, Atlantic Salmon, Sea Trout and Three-spined Stickleback (Kelly *et al*, 2013). Atlantic Salmon are listed on Annex II of the Habitats Directive and European Eel are considered endangered. Therefore, the ecological value of the River Nanny is classified as County Importance.

Given the short term nature of construction works, the existing surface water management systems, the implementation of standard mitigation measures (refer to **Section 11.8** below), the limited and seasonal flow in drainage ditches and the Cruicerath Stream and the dilution provided in the River Nanny located approximately 2km south, any indirect impacts on water quality and aquatic ecology will be localised, short term and not significant during construction works and imperceptible in the long term.

There is a hydrological link between the proposed development site and the River Nanny Estuary and Shore SPA and Laytown Dunes/Nanny Estuary pNHA. However, given the low risk of significant effects on water quality, the distance involved and the dilution provided in the estuarine environment the effects on water quality and aquatic ecology will be imperceptible.

11.7.6 Predicted impacts on water quality and aquatic ecology during operation

The main hydrological feature in the vicinity of the site is the River Nanny, which is located approximately 2km to the south of the proposed development site. Surface water runoff from the site currently passes through a class 1 interceptor and attenuation pond before discharging to a semi-dry ditch which drains to the seasonal Cruicerath stream c.130m to the west of the site, which in turn leads to the River Nanny. Details on drainage at the site are provided in **Chapter 4 *Description of the Proposed Development*** and **Chapter 15 *Water*.**

As detailed in these chapters, following attenuation, the existing surface water system has sufficient capacity to adequately deal with any surface water arising from the expanded site during operation. Detailed design protection controls are already in place to deal with sanitary services, prevention of potential accidents and spillages, unloading of aqueous liquid wastes, management of firewater and transport of bottom ash and flue gas residues. These controls have been factored into the design of the proposed development with BAT techniques utilised where relevant to ensure that significant impacts on water quality are prevented. Based on the above it has been concluded that the impact on local water quality and water quality in downstream receptors will be imperceptible during operation.

It is noted this site is currently operational and systems are already in place and functioning effectively in preventing any significant impacts on water quality from occurring. In the absence of any significant impact on water quality the effect on aquatic ecology during operation will be imperceptible.

11.7.7 Effects on Fauna during operation - Air

A full assessment of the potential impacts of the proposed development on air quality, including detailed modelling, is included in **Chapter 8 *Air*** of this EIAR.

It concluded that the Waste to Energy Process (WtE) would be expected to be the dominant source of air emissions associated with the facility. As part of the proposed development it is proposed to increase the annual tonnage of waste accepted from 235,000 to 250,000 tonnes per annum, comprising of up to 15,000 tonnes of additional hazardous wastes. The majority of this increase is intended for the treatment of aqueous wastes which, when evaporated, is converted to water vapour in the flue gas flow. As the flue gas flow is corrected to standard, dry conditions, the total flue gas flowrate will not increase.

In any event, the facility will still be obligated to comply with its licensed emission limit values and maximum flue gas flowrate and thus the increase in waste tonnage proposed will not cause a significant impact to the ambient air quality. A detailed modelling assessment was undertaken as part of earlier applications at the site in the air quality chapters of the 2009 & 2012 EISs. These assessments were based on the maximum volume flow rate and maximum emission concentrations and found that the impact on air quality would not be significant (based on continuous operation 8,760 hours per year).

Based on the up to date modelling the results indicate that the facility will continue to be in compliance with its licence requirements and no significant impacts to ambient air quality are predicted.

Based on the above it has been concluded that in the absence of any significant impacts on air quality, the effect on fauna via direct toxicological impacts or via bioaccumulation will be imperceptible.

11.7.8 Effects on protected mammals including bat species and otter

The habitats on the site are not rare, threatened nor do they require any special protection under existing or pending legislation.

No significant loss of habitat for mammal species is predicted. Although the habitats to be directly affected may form part of the territories of various mammal species, such as Irish Hare which occurs within the overall site, they do not provide critical resources for these species. Overall, the proposed development is predicted to have a slight, short-term impact on mammal populations. The long-term impact is predicted to be not significant to imperceptible.

No potential bat roosting sites were identified within the work areas. The native hedgerow along the external boundaries will be retained. Whilst the loss of small

areas of grassland and a small area of immature woodland will reduce the net potential 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 currently the facility is developing areas of semi-natural grassland habitat within the site boundary, which is likely to be of value for feeding bats. No significant changes in lighting levels are proposed. The impact will be localised and will not significantly impact on overall bat populations as there will no significant loss of critical resources for bats. Overall the impact on feeding habitat for bats is predicted to be permanent and not significant.

Whilst increased noise and disturbance is predicted to occur during construction and to a lesser degree during operation, the impact on local mammal populations is predicted to be slight in the short-term and imperceptible in the long-term. It is noted that the existing facility and surrounding landscape are already subject to high levels of disturbance from traffic and human activity and species currently utilising the site are expected to be habituated to ongoing disturbance factors in these circumstances.

Otter could potentially forage on Common Frog and Smooth Newt in pond habitat within the site boundary. The proposed works will result in an increase in noise and disturbance, however it will be of limited significance in the context of Otter's largely nocturnal habits, ability to move away from short-term disturbance and the negligible significance of increased noise and disturbance in the context of the levels already generated by the existing Indaver facility. The impact on Otter, if they utilise the site, would be not significant in the short term and imperceptible in the long term.

11.7.9 Effects on birds during construction and operation

The majority of terrestrial bird species recorded within the development site during the bird survey are typical of the types of habitats recorded within the study area and are generally common. There will be a minor net loss of semi-natural habitats within the proposed development area (e.g. woodland). It is noted that the hedgerow and treeline habitats along the site boundary, will be preserved as part of the proposed development.

Some displacement of feeding birds may occur during construction due to increased noise and disturbance.

Disturbance can cause sensitive species to deviate from their normal, preferred behaviour, resulting in stress, increased energy expenditure and, in some cases, species mortality. Birds living in the urban & suburban environment are largely habituated to increased levels of human disturbance. However, disturbance is still an important factor that can cause birds to abandon nest sites and breeding attempts and take on less food. However, this will be short-term in duration. The impact is therefore predicted to be a short-term, not significant impact.

In general, the habitats within the development area and in proximity to it are utilised for feeding by a range of common bird species, however the habitats to be

affected are of significantly are generally of lower-value than large areas of habitat in the surrounding countryside.

The presence of gulls within the site and surrounding landscape is largely due to their opportunistic behaviour. Although not an issue within the Indaver Facility, scavenging is an increasingly important feeding strategy for gulls. However, while gulls were recorded foraging in the vicinity, no gulls were noted nesting within the proposed development site.

No wading birds were recorded on or near the Indaver site during site surveys for the current or previous applications and no valuable habitat for these species was recorded within the site boundary. While wading birds could potentially forage in agricultural lands in the vicinity of the proposed development site, these birds would already be habituated to noise and disturbance at the existing facility. Therefore they would continue to use these fields during and after construction of the proposed development.

Whilst the pond within the site may provide feeding habitat for Kingfisher, this is improbable given the absence of significant hydrological pathways or commuting routes linking the Indaver site to the River Nanny. Taking a worst-case scenario, any use of the pond on site would be sporadic and this pond is very unlikely to be a critical resource for this species. This pond is located outside the works area and will not be impacted by the proposed development.

It is noted that the existing facility and area in proximity to the proposed development are subject to high levels of disturbance and that any birds which utilise this area will have habitualised to high levels of daytime disturbance. Whilst works could potentially disrupt feeding patterns, given the availability of similar and better quality habitat in the surrounding area and the ability of birds to move away from disturbance, the impact on the feeding behaviour of these species is predicted to be not significant.

During the operational phase, the levels of activity will stabilise and birds in the surrounding landscape will be expected to habitualise to any increased noise and disturbance levels which will be within current Industrial Emissions Directive (IED) limits. The impact on terrestrial birds, in habitats adjoining the proposed development site is therefore predicted to be permanent and imperceptible to not significant during operation.

The Indaver site is hydrologically connected to the River Nanny Estuary SPA and Shore SPA and Laytown Dunes/Nanny Estuary (Site Code: 000554). Surface water on and in the vicinity of the proposed development site ultimately drains to the River Nanny.

It is noted that due to the dilution provided in the estuarine and marine environment, the naturally fluctuating levels of silt and robust nature of these habitats, impacts during construction are only likely to arise from extremely severe levels of siltation which will not occur. It is also noted that any chemical spills during construction would be minor in the context of the dilution provided in the riverine/estuarine/marine environment.

During operation stormwater management systems have been designed to ensure that there are no significant effects on surface or ground water quality. The impact on surface water quality and on prey availability for birds will be imperceptible during construction and operation.

11.7.10 Effects on other fauna during construction and operation

A number of protected mammal species which are protected under the Irish Wildlife Act 1976, as amended, occur or could potentially occur within the overall site and surrounding area. No habitats of significant value with regard to amphibians (including the existing pond) or reptiles will be affected by the proposed works. One Large Red-Tailed Bumble Bee, which is considered threatened, has been recorded onsite by the in-house Environmental Specialist. However, no habitats of significant value for this species will be affected. The effect on these species will be not significant in the short term and imperceptible in the long term.

11.8 Mitigation Measures and Monitoring

The likely success of the proposed mitigation measures listed below is high, either in their current form or as they will be supplemented 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 and mitigation measures will function effectively in preventing significant ecological impacts. The following mitigation measures will be implemented:

A construction environmental management plan (CEMP) has been prepared (Refer to **Appendix 5.1** in **Volume 3** of this EIAR). The CEMP contains the construction mitigation measures, which are set out in this EIAR.

11.8.1 Protection of habitats during construction

- There will be a defined working area which will be fenced off to prevent inadvertent damage to adjoining habitats.
- To prevent incidental damage by machinery or by the deposition of spoil during site works, any habitats earmarked for retention nearby will be securely fenced or sign posted early in the construction phase. These will be clearly visible to machine operators.
- Habitats that are damaged and disturbed will be left to regenerate naturally or will be rehabilitated and landscaped, as appropriate, once construction is complete. Disturbed areas will be seeded or planted using appropriate native grass or species native to the areas where necessary.
- Any woodland habitat disturbed during construction will be replanted using a suitable mix of native species.
- Tree root systems can be damaged during site clearance and groundworks. No materials will be stored within the root protection area of semi-mature trees.

Materials, especially soil and stones, can prevent air and water circulating to the roots. Retention of the existing woodland areas will provide natural screening and help to maintain biodiversity.

11.8.2 Protection of Water Quality and surface water management during construction

Detailed mitigation and monitoring measures in relation to water quality and preventing effects on aquatic habitats, in particular when working adjacent to or in the vicinity of ditches or streams are specified in **Section 15.6.1** of **Chapter 15 *Water*** and in **Section 14.7.1** of **Chapter 14 *Land and Soils.***

The surface water discharge will continue to be monitored prior to discharge and if an out of specification reading is detected all contaminated runoff will be contained within the storage tank system. No change from the current situation is required.

A Construction Environmental Management Plan (CEMP) is included as **Appendix 5.1**. It will be maintained by the Contractor for the duration of the construction phase. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures.

The employment of good construction management practices will minimise the risk of pollution of storm water run-off, and any deterioration in the quality or quantity of surface water. In particular, the measures detailed in **Section 15.6.1** of **Chapter 15 *Water*** and in **Section 14.7.1** of **Chapter 14 *Land and Soils*** will be implemented when working adjacent to or in the vicinity of ditches or streams to prevent uncontrolled runoff from the site into the watercourses. In particular, the contractor will maintain an incident and emergency response action plan which will cover all foreseeable risks, i.e. fire, flood, collapse etc. An Incident Response Plan (IRP) is located in Section 8 of the CEMP in **Appendix 5.1.**

11.8.3 Noise and Vibration during construction

Mitigation measures in relation to noise and vibration are addressed in **Chapter 10 *Noise and Vibration*** of this EIAR.

11.8.4 General Ecology Protection

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 treelines, hedgerows and woodland along the site boundaries will reduce the loss of breeding and nesting habitat for birds. NRA

guidelines on the protection of trees and hedges prior to and during construction should be followed (NRA, 2006b).

11.8.5 Operational stage

No specific mitigation measures are required for biodiversity at operational stage.

11.9 Cumulative Effects

Chapter 18 *Cumulative Effects, Other Effects and Interactions*, lists a number of planned projects that may potentially have a cumulative impact on the environment. Each project has been reviewed in turn below for the potential cumulative impacts on biodiversity.

11.9.1 Irish Cement Ltd (Ref. LB150375) - Cement silo

The development will consist of the installation of a Flue Dust Portland Cement Silo. This application relates to an activity for which an Industrial Emissions Licence applies under the Environmental Protection Acts 1992 as amended. (IE Licence Register Number P0030). In the absence of significant emissions to air or water no significant cumulative impact on biodiversity has been identified. Therefore, there is no potential for significant negative direct nor indirect cumulative effects on biodiversity.

11.9.2 Irish Cement Ltd (PL17.PA0050) - Alternative fuels and raw materials

10-year permission to facilitate further replacement of fossil fuels and allow for the introduction of alternative raw materials in the manufacturing of cement at Platin Cement Works, Platin, Co. Meath. In the absence of significant emissions to air or water no significant cumulative impact on biodiversity has been identified. Therefore, there is no potential for significant negative direct nor indirect cumulative effects on biodiversity as a result of the proposed and planned development.

11.9.3 SSE Generation Ireland Ltd (PL17.303678) - 110kV transmission substation

Section 6.4.1 of the EIAR[1] (2019) prepared for the SID application stated that '*There will be no discharges to ground or groundwater during the operational phase of the Substation as none of the substation infrastructure will pose a risk to land and soils during the operational phase*.' Therefore, there is no potential for significant negative direct nor indirect cumulative effects on biodiversity as a result of the proposed and planned development.

[1] Available from: http://caulstown-platin-substation.com/downloads/environmental/substation-environmental-report.pdf

11.9.4 Highfield Solar Ltd. (PL17.248146) - Solar Farm

Applicant applied to Meath CC for solar farm on 2 sites (Site 1 and Site 2) and a 110kV substation. Meath CC granted permission (conditional) under Ref. LB160898 on 10/02/17. In the absence of significant emissions to air or water no significant cumulative impact on biodiversity has been identified.

Therefore, there is no potential for significant negative direct nor indirect cumulative effects on biodiversity as a result of the proposed and planned development.

11.9.5 Highfield Solar Ltd. (PL17.303568) - Electrical substation (110kV)

Proposed electrical substation and associated 110kV and MV infrastructure required to connect ground mounted solar PV generation to the electrical transmission system, underground cabling and all associated ancillary site development work. SID application.

In the absence of significant emissions to air or water no significant cumulative impact on ecology has been identified. Therefore, there is no potential for significant negative direct nor indirect cumulative effects on biodiversity as a result of the proposed and planned development.

11.9.6 Conclusion

It has been concluded that should the construction of any of the developments mentioned above occur concurrently, the potential cumulative effects will not be significant, given the distances involved, the implementation of standard construction environmental measures, the limited risk of significant effects, the dilution provided in the nearby watercourses and the distance from Natura 2000 sites. In the absence of significant emissions to water or air during operation or impacts from noise, no significant cumulative impacts on biodiversity during operation have been identified.

When the predicted effects of the proposed development at Indaver are considered cumulatively with each planned project and cumulatively with all planned projects as a whole, it is concluded that there are no significant negative cumulative effects predicted on biodiversity.

11.10 Residual Effects

The proposed development will have effects on habitats that are primarily low value. No adverse effect on designated sites or their conservation objectives will occur. No particular difficulties in the effective implementation of the prescribed environmental mitigation measures have been identified.

The EPA document *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA 2017) provides a standard scheme for classifying effects as detailed in **Table 11.10**. Based on this

classification scheme the residual effects of the proposed development are classified below in **Table 11.12**.

Table 11.12 Residual effects

Impact	Residual effect
Impacts on Habitats	The habitats to be directly affected consist primarily of modified habitats of limited ecological value and are classified as Local importance (Lower value). The exception is a small area of planted woodland which was classified as Local importance (Higher value). The impact on these habitats will be long term and not significant. The ecological effect from dust generation during construction will be short term and imperceptible.
Impacts from non-native invasive species	The only invasive species recorded was Buddleia and this species was recorded outside the proposed development site. There will be no ecological effect from invasive species.
Predicted impacts on water quality and aquatic ecology during construction	No watercourses of high sensitivity to pollutants or high conservation value occur in close proximity to the development site. Significant dilution will occur in aquatic habitats downstream of the construction activity in relation to possible inadvertent minor spills of hydrocarbons or other chemicals. There is a hydrological link between the site and the River Nanny Estuary and Shore SPA and Laytown Dunes/Nanny Estuary pNHA however given the low risk of significant effects on water quality, the distance involved and the dilution provided in the estuarine environment the impacts on water quality will be imperceptible and the effect on aquatic ecology will be imperceptible. ***Chapter 15 Water*** of this EIAR concluded that during construction, with the implementation of mitigation measures there will be no significant residual effect on hydrology, drainage characteristics of the site or water quality during construction. Any indirect impacts on water quality and aquatic ecology will be localised, short term and not significant during construction works and imperceptible in the long term.
Predicted impacts on water quality and aquatic ecology during operation	Following attenuation, the existing surface water system has sufficient capacity to adequately deal with any surface water arising from the expanded site during operation. Detailed controls have already been provided to deal with sanitary services, prevention of potential accidents and spillages, unloading o aqueous liquid wastes, management of firewater and transport of bottom ash and flue gas residues. These measures have been factored into the design of the project with BAT techniques utilised where relevant to ensure that significant impacts on water quality are minimized.

Impact	Residual effect
	In respect of operational impacts, ***Chapter 15 Water*** of this EIAR concluded that the proposed development is predicted to have an overall neutral long-term impact on water and hydrology with the study area. Therefore no mitigation measures are required and as such there will be no significant residual effect on hydrology, drainage characteristics of the site or water quality during operation. Based on the above it has been concluded that the impact on local water quality, water quality in downstream receptors and aquatic ecology will be imperceptible during operation.
Predicted Impacts on Fauna during operation - Air	Based on up to date modelling results indicate that the facility will continue to be in compliance with its licence requirements and no significant impacts to ambient air quality are predicted. Based on the above it has been concluded that in the absences of any significant impacts on air quality the effect on fauna via direct toxicological impacts or via bioaccumulation will be imperceptible.
Potential impacts on protected mammals – bats and otter	The impact on bats will be localised and will not significantly impact on overall bat populations as there will no significant loss of critical resources for bats. Overall, the impact on feeding habitat for bats is predicted to be permanent and not significant. Otter could forage on Common Frog and Smooth Newt in pond habitat within the Indaver site boundary. The proposed works will result in an increase in noise and disturbance, however it will be of limited significance in the context of Otters' largely nocturnal habits, ability to move away from short-term disturbance and the negligible significance of increased noise and disturbance in the context of the levels already generated by the existing Indaver facility. The impact on Otter, if they utilise the site, would be not significant in the short term and imperceptible in the long term.
Potential impacts on birds during construction and operation	It is noted that the existing facility and area in proximity to the proposed development, are subject to high levels of disturbance and that, to a degree, any birds which utilise this area will have habituated to high levels of daytime disturbance. Whilst works could potentially disrupt feeding patterns, given the availability of similar habitat in the surrounding area and the ability of birds to move away from disturbance, the impact on the feeding behaviour of these species would be not significant during construction. Whilst the pond within the site may provide feeding habitat for kingfisher, this is improbable given the absence of significant hydrological pathways or commuting routes linking the Indaver site to the River Nanny. Taking a worst-case scenario, any use of the pond on site would be sporadic and this pond is very unlikely to be a critical resource for this species. No impact on this pond will

Impact	Residual effect
	occur. Any impact on this species would be not significant during construction and imperceptible during operation. During the operational phase, the levels of activity will stabilise and birds in the surrounding landscape will be expected to habituate to any increased noise and disturbance levels. The impact on terrestrial birds, in habitats adjoining the proposed development site is therefore predicted to be permanent and imperceptible during operation. During operation, the existing stormwater management systems have been designed to ensure that there are no significant effects on surface or ground water quality. The impact on surface water quality and on prey availability for birds feeding in aquatic or estuarine habitats downstream of the facility will be imperceptible during construction and operation.
Potential impacts on other fauna during construction and operation	Mammal species which are protected under the Irish Wildlife Act 1976, as amended, occur or could potentially occur within the proposed development site. No habitats of significant value with regard to amphibians (including the existing pond) or reptiles will be affected by the proposed works. The work areas are only likely to support common invertebrate species. The effect on these species will be not significant in the short term and imperceptible in the long term.

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