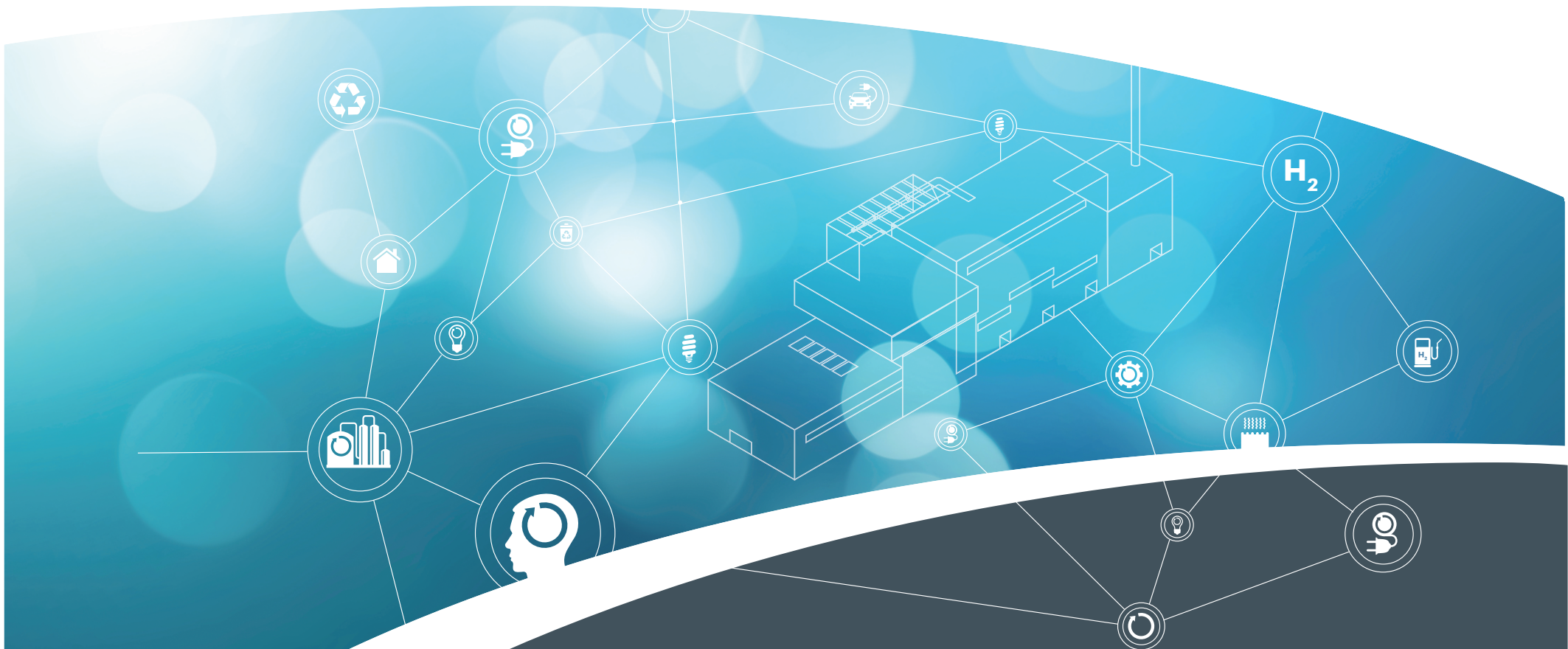


ARUP



Meath Waste-to-Energy

Site Sustainability Project 2020

Natura Impact Statement

Stage 1 Screening Report and Stage 2 Natura Impact Statement (NIS)



Indaver Meath
Site Sustainability Project
May 2020

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1. Introduction

1.1 Background

Indaver Ireland Limited (Indaver) currently operate a Waste to Energy (WtE) facility (waste incinerator) at its site in Carranstown, Duleek, Co Meath. The existing facility has been in operation since August 2011 and is licensed under an Industrial Emissions Licence (No. W0167-03) by the Environmental Protection Agency (EPA).

Indaver proposes to carry out a new development at its existing WtE facility in Carranstown. The proposed development is collectively referred to as a Site Sustainability Project in this Natura Impact Statement (NIS) and in the planning application.

In accordance with Section 37E of the Planning and Development Act, 2000 as amended, Indaver intends to make an application to An Bord Pleanála (ABP) for permission in relation to the proposed development. A 10 year planning permission for the proposed development is sought.

The information in this report has been compiled by DixonBrosnan Environmental Consultants, on behalf of Indaver. It provides information on and assesses the potential for the proposed Site Sustainability Project at the existing Waste to Energy facility in Carranstown, Duleek, Co. Meath to impact on any Natura 2000 sites within its zone of influence. The information in this report forms part of and should be read in conjunction with the planning application documentation being submitted to An Bord Pleanála (ABP) in connection with the proposed development. An Environmental Impact Assessment Report (EIAR) has also been prepared for the proposed development. The EIAR provides detailed assessments of the potential impacts, mitigation measures and residual impacts associated with the proposed project. Relevant chapters from the EIAR (**Chapter 4 Description of the Proposed Development, Chapter 5 Construction Activities, Chapter 7 Traffic & Transportation, Chapter 8 Air Quality, Chapter 10 Noise and Vibration, Chapter 11 Biodiversity, Chapter 14 Land and Soils, Chapter 15 Water**) and **Appendix 5.1 Construction and Environmental Management Plan (CEMP)** and **Appendix 5.2 Drawings** are attached as Appendices to this NIS. Text and details from the EIAR is included in this NIS where relevant.

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) put an obligation on EU Member States to establish the Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SACs, including candidate SACs) and Special Protection Areas (SPAs, including proposed SPAs). SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests of the sites and from these the conservation objectives of the site are derived.

The Birds and Habitats Directives set out various procedures and obligations in relation to nature conservation management in Member States in general, and of the Natura 2000 sites and their habitats and species in particular. A key protection mechanism is the requirement to consider the possible nature conservation implications of any plan or project on the Natura

2000 site network before any decision is made to allow that plan or project to proceed. Not only is every new plan or project captured by this requirement but each plan or project, when being considered for approval at any stage, must take into consideration the possible effects it may have in combination with other plans and projects when going through the process known as Appropriate Assessment (AA).

The obligation to undertake Appropriate Assessment (AA) derives from Article 6(3) and 6(4) of the Habitats Directive, and both involve a number of steps and tests that need to be applied in sequential order. Article 6(3) is concerned with the strict protection of sites, while Article 6(4) is the procedure for allowing derogation from this strict protection in certain restricted circumstances. A screening for appropriate assessment of an application for consent for the proposed development must be carried out by the competent authority to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effect on any European site. Each step in the assessment process precedes and provides a basis for other steps. The results at each step must be documented and recorded carefully so there is full traceability and transparency of the decisions made.

The existing Indaver Meath Waste to Energy (WtE) facility is located within the vicinity of a number of Natura 2000 sites. Therefore, it is necessary that the proposal be subject to the AA process. This document contains information to assist An Bord Pleanála in carrying out Stages 1 and 2 of the Appropriate Assessment process. This Stage One Screening Report and Natura Impact Statement (NIS) for Appropriate Assessment comprises a compilation of the information relevant to the competent authority's assessments relating to the potential significant impacts of the Indaver Site Sustainability Project on Natura 2000 sites within the surrounding area. The screening report and its conclusions are presented in **sections 3-5** of this report and the NIS and its conclusions are presented in **sections 6-11**.

The EIAR which has been prepared for this development and submitted with the application, provides detailed assessments of the potential impacts, mitigation measures and residual impacts associated with the proposed project and it provides much of the detail upon which this Natural Impact Statement (NIS) is based, particularly in relation to the receiving environment and baseline ecology.

Where relevant, reference is also made to the previous reports prepared for this site. Information which was submitted for the planning application (permission granted in 2013 Ref. 17.PA0026) via an Environmental Impact Statement (EIS) has been updated and this NIS gives due regard to additional information which was presented as part of the oral hearing process and to relevant conditions of the planning consent.

1.2 Aims of this report

The purpose of this report is to inform the AA process as required under the Habitats Directive (92/43/EEC) in instances where a plan or project may give rise to significant effects on a Natura 2000 site. This report aims to inform the Appropriate Assessment process in determining whether the development for which planning permission has been sought, both alone and in combination with other plans or projects, is likely to have a significant effect on the Natura 2000 sites in the study area, in the context of their conservation objectives and specifically on the habitats and species for which the sites have been designated.

This NIS considers the implications of the proposed development, on its own and in combination with other plans or projects, for European sites in view of the conservation objectives of those sites. It includes a scientific examination of evidence and data to identify and assess the implications of the proposed development for any European sites in view of the conservation objectives of those sites.

It considers whether the proposed development, by itself and in combination with other plans or projects, would adversely affect the integrity of European sites.

In reaching a conclusion in this regard consideration is given to any mitigation measures necessary to avoid or reduce any potential negative impacts.

The purpose of this NIS is to provide an examination, analysis and evaluation of the potential impacts of the proposed development on European sites and to present findings and conclusions with respect to the proposed development in light of the best scientific knowledge in the field. This NIS will inform and assist the competent authority, An Bord Pleanála, in carrying out its Appropriate Assessment as to whether or not the proposed development will adversely affect the integrity of European sites, either alone or in combination with other plans and projects, taking into account their conservation objectives.

It is the considered view of the authors of this NIS (DixonBrosnan) that, following the implementation of the mitigation measures, the proposed development will not, by itself or in combination with other plans or projects, have any adverse effect on the integrity of any European sites in view of their conservation objectives and there is no reasonable scientific doubt as to that conclusion

Documentation/guidelines of relevance to this NIS include the following:

- European Commission, 2001. *Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC*. Office for Official Publications of the European Communities, Brussels (EC, 2001);
- European Commission, 2000a. *Communication from the Commission on the Precautionary Principle.*, Office for Official Publications of the European Communities, Luxembourg (EC, 2000a);
- *Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (Draft)* Office for Official Publications of the European Communities, Luxembourg (EC, 2018);
- *Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (EC, 2000);
- *Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission* (EC, 2007);

- *Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, Dublin (DEHLG, 2010a);*
- *Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities (DEHLG, 2010b);*
- *Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013).*

1.3 Relevant information

Information on the project (extracted from the EIAR) which was used to assess potential effects is included in the appendices as follows. This information, where relevant, is summarised in the text of this report.

Description of the Proposed Development (Appendix 1).

- This provides an overview of the proposed development and a description of the proposed site and the existing WtE site

Biodiversity (Appendix 2).

- Provides a comprehensive assessment of the impacts on ecology based on desktop studies and field surveys.

Air Quality (Appendix 3)

- Provides a detailed appraisal of potential effects on air which could arise from emissions generated during construction works or from emissions during operation.

Noise and Vibration (Appendix 4)

- Provides an assessment of the potential noise and vibration effects on the surrounding environment associated with the construction and operation of the proposed facility.

Construction & Environmental Management Plan (CEMP) (Appendix 5)

- This appendix outlines the measures to be taken to ensure the impact of the construction activities on the environment is minimised.

Water (Appendix 6)

- This appendix outlines the measures to be taken to ensure the impact of the proposed development on water is minimised

Land and Soils (Appendix 7)

This appendix outlines the measures to be taken to ensure the impact of the proposed development on soils, geology and groundwater is minimised

Construction Activities (Appendix 8)

- This appendix outlines the construction methods to be employed and measures to minimise impacts.

Drawings (Appendix 5.2 of EIAR) (Appendix 9)

- This appendix provides detailed drawings of the proposed development.

Traffic and Transportation (Appendix 10)

- This appendix outlines changes in traffic during the construction and operational phase.

1.4 Authors of Report for Screening and Appropriate Assessment

This report for screening and NIS was prepared by Carl Dixon MSc. (Ecology) and Sorcha Sheehy PhD (Ecology) for DixonBrosnan Environmental Consultants. Both have considerable experience in ecological assessment and the preparation of Natura Impact Statements for a range of large and small scale developments. Additional information was provided by Arup and by Indaver, where required.

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.

Sorcha Sheehy PhD (ecology/ornithology) is an experienced ecological consultant with over ten years' experience. She has worked on AA 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, Shannon and Cork Airports, Waste to Energy Facility Ringaskiddy and Water Storage Schemes for Irish Water.

2. Regulatory Context and the Appropriate Assessment Procedure

2.1 Regulatory context

The Habitats Directive (Council Directive 92/43/EEC on the *Conservation of Natural Habitats and of Wild Fauna and Flora*) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe. The requirements of these directives are transposed into Irish law through the European Communities (Birds and Natural Habitats Regulations; S.I. No. 477 of 2011).

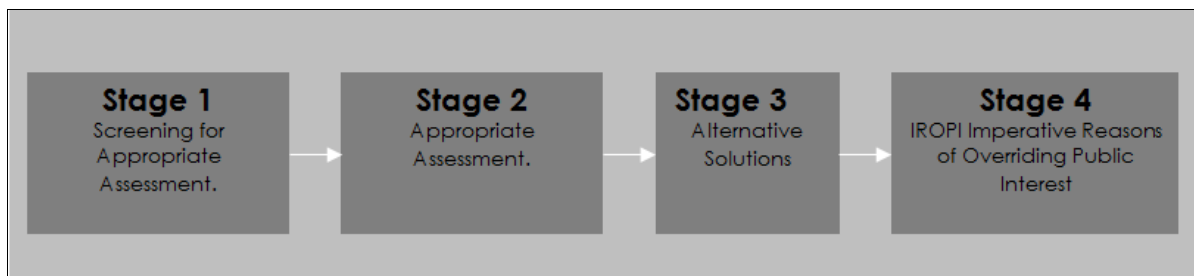
Under the Directive a network of sites of nature conservation importance have been identified by each Member State as containing specified habitats or species requiring to be maintained or returned to favourable conservation status. In Ireland the network consists of SACs and SPAs, and also candidate sites, which form the Natura 2000 network.

Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the *Conservation of Natural Habitats and of Wild Fauna and Flora* (as amended) (hereafter ‘the Habitats Directive’) requires that, any plan or project not directly connected with or necessary to the management of a designated site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. A competent authority (e.g. the EPA or Local Authority) can only agree to a plan or project after having determined that it will not adversely affect the integrity of the site concerned.

The possibility of a significant effect on a designated or “European” site has generated the need for an appropriate assessment to be carried out by the competent authority for the purposes of Article 6(3). A Stage Two Appropriate Assessment is required if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site. The first (Screening) Stage for appropriate assessment operates merely to determine whether a (Stage Two) Appropriate Assessment must be undertaken on the implications of the plan or project for the conservation objectives of relevant European sites.

2.2 Appropriate Assessment Procedure

The assessment requirements of Article 6(3) establish a stage-by-stage approach. This assessment follows the stages outlined in the 2001 European Commission publications “Assessment of plans and projects significantly affecting Natura 2000 sites: methodological guidance on the provisions of Articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC” (2001) and *Managing Natura 2000 Sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC (Draft)* Office for Official Publications of the European Communities, Luxembourg (EC, 2015);



The stages are as follows:

Stage One: Screening — the process which identifies any appreciable impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;

Stage Two: Appropriate assessment — the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site’s structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts;

Stage Three: Assessment of alternative solutions: The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the

integrity of the Natura 2000 site. It is confirmed that no reliance is placed by the developer on Stage Three in the context of this application for development consent;

Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain — an assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed (it is important to note that this guidance does not deal with the assessment of imperative reasons of overriding public interest). Again, for the avoidance of doubt, it is confirmed that no reliance is placed by the developer on Stage Four in the context of this application for development consent.

It is the responsibility of the competent authority, in this instance An Bord Pleanála (ABP), to make a decision on whether or not the proposed development should be approved, taking into consideration any potential impact upon any Natura 2000 site within its zone of influence.

3. Description of the Proposed Development Project

3.1 Description of the project

The existing Waste to Energy (WtE) facility (waste incinerator) located at Carranstown, Duleek, Co. Meath, treats up to 235,000 tonnes per annum of residual household, commercial and industrial non-hazardous and hazardous waste and recovers energy. Of the 235,000 tonnes of waste, up to 10,000 tonnes per annum of suitable hazardous waste is currently treated at the facility. The existing facility extracts and recovers valuable material (in the form of ferrous and non-ferrous metals) and energy (in the form of 21.5 megawatts of electricity MW_e) resources from residual waste. The existing facility has been in operation since August 2011 and is licensed under an Industrial Emissions Licence (No. W0167-03) by the Environmental Protection Agency (EPA).

The proposed Site Sustainability Project (proposed development) will consist of the following main elements:

1. 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;
2. 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;
3. Development of an aqueous waste tank farm and unloading area for the storage and processing of aqueous liquid wastes currently accepted at the facility;
4. Development of a 10MW_e hydrogen generation unit for connection to the natural gas transmission/distribution network and for mobile hydrogen transport applications and other potential uses;
5. 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;
6. 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;

7. Development of a warehouse, workshop and emergency response team (ERT)/office building to support existing maintenance activities on the site;
8. Development of a new concrete yard and parking area for up to 10 trucks, tankers or containers on the site;
9. Demolition and re-building of an existing single storey modular office building on site with a slightly increased footprint; and
10. Other miscellaneous site upgrades.



Figure 1. Location of the existing Indaver Waste-to-Energy Facility in the context of the wider Duleek/Drogheda area. Location indicated by red pin | Not to Scale | Source: Google Maps

The location of the site and details of the proposed development are included in **Figure 1 to Figure 3** within this report, and detailed drawings of the proposed development are provided in **Appendix 9 Drawings**. Further details on the proposed development are provided in **Section 3.5** onwards. **Sections 3.2-3.3** describe the existing waste to energy (WtE) facility at the site. The construction phase of the proposed development is described in **Section 3.4**.

The facility is located 1.8km west of the M1, bound to the south by the R152 regional road and surrounded by greenfield on all other sides. Irish Cement, Platin is located to the immediate north of the site and the rest of the surrounding land is used for industrial, agricultural and residential purposes. The village of Duleek is located approximately 2.7km south west of the site.

The main hydrological feature in the vicinity of the site is the River Nanny, which is located about 2km to the south of the 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 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 as such will not support permanent fish populations.



Figure 2. Approximate site boundary of the Indaver Waste-to-Energy Facility | Not to Scale | Source: EPA Envision mapping (<https://gis.epa.ie/EPAMaps/>)

3.2 Current Site Layout and Facilities

Existing Site Layout

The existing site layout is shown in **Appendix 1 Description of Proposed Development: Figure 4.1**. The existing site consists of the following infrastructure to accommodate the acceptance and treatment of up to 235,000 tonnes of waste per annum and the generation of up to 21.5 MW_e, of which 19 MW of electricity are exported to the national grid:

- Facility entrance, weighbridge, security & staff car park
- Waste to energy process building which includes (dimensions in L x W x H)
 - Waste tipping hall and waste bunker for solid waste acceptance and storage (tipping hall: 32m x 35m x 20m; bunker: 35m x 18m x 35m)
 - Furnace and boiler hall for waste treatment and recovery of energy (33m x 28m x 41m)

- Steam-condensate area with associated steam turbine and electricity generator (18m x 28m x 41m)
- Flue gas cleaning area and 65m high stack complete with emissions monitoring system (79m x 28m x 30m)
- Bottom ash hall for metals removal and storage (45m x 28m x 12m)
- Boiler ash and flue gas cleaning residue tanker loading area (11m x 6.5m x 12m)
- Boiler ash and flue gas cleaning residue pre-treatment area (11m x 8.5m x 12m)
- Control room and office accommodation for Indaver staff (22m x 8m x 21m)
- Air-cooled condenser for re-circulating low pressure steam from the turbine as condensate to the steam-condensate system
- 38kV import/export compound for electricity
- 70m³ mobile tank and associated aqueous waste unloading area
- 44m³ Fuel oil tank for fuelling the burners used for start-up and maintaining the minimum temperature of 850°C in the furnace when required
- 60m³ Aqueous ammonia tank which is used for NO_x reduction in the flue gases

In addition to the infrastructure for the waste to energy process listed above, the following facilities and systems are also in place to support this activity on the site:

- Warehouse for spare parts and workshop for the mechanical maintenance team
- Contractors compound and Indaver site offices for ancillary Indaver staff
- Stormwater drainage network and attenuation pond of 2,887 m³
- Firewater / process water tank and associated firewater pumphouse
- Underground firewater/contaminated water retention tank of 300m³
- Sanitary effluent collection and treatment systems.

The warehouse is required for storage of critical spare parts and to support the routine maintenance of the plant. Safety equipment and personal protective equipment (PPE) is also stored there. The workshop comprises an office area for the mechanical maintenance team, a welding booth and workbenches for maintenance activities.

The contractors compound is primarily used for annual shutdowns for contractor accommodation and welfare facilities. The Indaver modular site office houses some specialist maintenance contractors during these shutdown periods and is also used year round by Indaver support staff that work on the site, attend site for meetings or to work on specific projects.

Existing stormwater control and management

Process Building

All waters produced from wash down etc. within the waste processing building are directed to a spill tank located to the east of the bunker building and underground. The spill tank has a capacity of 100m³. Water from this spill tank is used to supplement process water requirements. There is no process effluent from the facility.

Site Drainage

The site storm water drainage system has been designed in general accordance with Sustainable Drainage Systems (SuDS) principles and collects rainwater from all roofs, hardstands, roads and landscaped areas which fall naturally towards paved areas and that can reasonably be deemed to add to the flow of water through the drainage system. The existing design has been agreed and is in accordance with the requirements of Meath County Council.

Sustainable drainage systems aim to mimic as closely as possible the natural drainage of a site in order to reduce the impact of flooding and water pollution. The site is essentially divided into two parts, firstly the northern 6.5ha 'developed' part of the site, and secondly the southern 3.5ha 'undeveloped' part of the site. The southern 'undeveloped' part of the site, is drained naturally.

Due to the natural south to north slope of the ground, storm waters emanating from the developed part of the site cannot flow naturally to the undeveloped part of the site. Landscaping works have been fully established in the undeveloped part of the site and have the beneficial effect of increasing the "residence time" of the storm flows thereby reducing downstream effects.

The design principle for the northern portion of the site is to largely manage runoff flows and pollutants on the site rather than directing them to the nearest receiving waters. In addition to good housekeeping practices, retention and regular monitoring (i.e. testing) ensure the potential for contamination is minimised.

Good housekeeping measures include reusing waste contaminated water in the process itself in the spill tank provided, as detailed above. Waste contaminated water that is not required in the waste to energy process will be diverted to the spilled water tank and sent for disposal or treatment at an appropriately licensed facility.

It is therefore highly unlikely for such waste contaminated water to pollute any receiving waters. In the eight years of operations to date, no such pollution event has occurred. In accordance with SuDS, consideration was given to surfacing roads and hard standings with pervious paving. However, given the risk of spillage onto these areas from attending refuse lorries, with subsequent possible contaminated runoff, the existing storm water drainage system routes the surface water from roads and hardstanding to a monitoring station and from there to the firewater retention tank if contaminated, or to the natural watercourse via a petrol interceptor if uncontaminated.

In order to prevent flooding of the ditches downstream of the facility a discharge rate from the site based on the Dublin City Council Storm Water Management Policy and by agreement with

Meath County Council of 59.8 litres/second has been incorporated into the existing drainage design. Attenuation for a 1 in 30-year storm will be provided by the storm water attenuation pond which discharges via a pump to an external drainage ditch. Attenuation of 1 in 100 year storm occurrences will also be contained within the attenuation pond. The existing site drainage system is outlined **Appendix 1 Description of Proposed Development: Figure 4.2.**

Existing firefighting and firewater retention systems

Fire suppression is provided by an on-site dual-purpose water storage tank. This tank has an overall capacity of 2,185m³ with an effective fire-fighting storage volume of 1,855m³ and a process water storage capacity of 330m³. The firefighting effort is supported by 3 No. diesel fire pumps connected to a fire main and hydrant system throughout both the site and buildings.

In the event of a fire, the process water requirement will not be needed and potentially all 2,185m³ of process water is available for firefighting.

The facility has achieved compliance with the Building Regulations with particular reference to Part B (Fire), i.e. a Fire Safety Certificate has been obtained; and will continue insofar as practicable follow the recommendations in the Code of Practice for Fire Safety in Buildings – BS5588 which is referred to in Technical Guidance Document B (Fire) to the Building Regulations.

The greatest potential for fire at the facility arises within the waste bunker where localised heating can occur due to decomposition of organic material. If such a fire occurs, the waste is immediately transferred by the grab crane into the hopper and then covered with another grab of fresh waste. In the event of a larger fire where this is not possible, water cannons are used to douse the fire. Up to the level of the tipping hall, the bunker has a capacity of 5,670m³ approximately. If a 50% voidage ratio is assumed for the waste, then there would be a retention capacity of 2,835m³ within the waste bunker. With 2,185m³ of water available for firefighting, this demonstrates that all of the water will be retained within the bunker even in the most extreme fire event.

If a fire occurred in the turbine area, the firefighting water would be collected in the cellar beneath the turbine which has a capacity of circa 1,000 m³. The waste bunker has been designed conservatively with 1.1m thick walls and 800mm base and secondary containment system. It will therefore retain any fire water generated within the bunker.

Existing sanitary effluent collection and treatment systems

All effluent generated from toilets, showers and utility areas (with the exception of the modular offices and portacabins in the contractors compound) is collected in a domestic type effluent collection system. All effluent is passed through a septic tank and secondary treatment system (Puraflo) before being discharged to the percolation area. The wastewater treatment area is located near the northern border of the site. A second smaller effluent collection and discharge system is provided at the gatehouse building. Two effluent holding tanks are also utilised on site, one for the modular offices in the construction area and one for the temporary portacabins which are used during the annual maintenance shutdown. The contents of these holding tanks are transported off site for treatment regularly.

3.3 Description of Current Process

Waste to Energy Process

In 2019, the facility accepted a total of 230,531 tonnes of waste, of which 9,310 tonnes were classified as hazardous. Energy is recovered from the combustion of the waste via a conventional steam boiler and converted to electricity for export to the national grid. In 2019 alone, approximately 141,177 megawatt hours of electricity was exported to the national grid.

The facility operates in strict compliance with an industrial emissions licence issued by the EPA (Industrial Emissions Licence Number: W0167-03).

The facility accepts waste six days per week between the hours outlined below but the installation runs 24 hours per day and for over 8,000 hours per annum.

- Monday – Friday 07:00 to 18:30
- Saturday 08:00 to 14:00.

Waste arriving at the facility must be checked in at the gatehouse and pass over the weighbridge before being directed to the tipping hall (solid waste deliveries) or to the tanker unloading area (aqueous waste deliveries). Acceptance checks are performed at both acceptance points to ensure that the waste delivered meets the required specifications. Additional controls for the acceptance of hazardous waste are included the EPA licence for the facility (W0163-03).

Solid waste is unloaded from trucks to the waste bunker from the tipping hall where two waste cranes mix the waste prior to feeding towards the waste hopper and feeding chute prior to introduction to the furnace. Aqueous waste is unloaded to the temporary storage tank (70m³ capacity) on site and either pumped from the tank or directly from an incoming tanker for treatment in the furnace. This activity is also licensed by the EPA under W0167-03.

Energy is recovered from the resulting flue gases in the furnace using a conventional steam boiler. The resulting steam is fed to a turbine and up to 21.5 MW of electricity is generated. Approximately 2.5 MW_e is consumed by the equipment in the plant and the other 19 MW_e is then available for export to the national grid.

Reduction of the oxides of Nitrogen (NO_x) in the flue gases is achieved via injection of aqueous ammonia into the flue gases in the boiler in a process called selective non-catalytic reduction or SNCR.

Bottom ash is produced as a residue of the combustion process in the furnace. Once extracted from the furnace via a water quench bath, the bottom ash is transported by conveyor to the bottom ash hall for metal recovery and storage. Ferrous and non-ferrous metals are recovered from the bottom ash using overband magnets and an eddy current separator. The metals and the residual bottom ash are stored in the bottom ash hall prior to sending off-site for recovery.

The bottom ash is sent to landfill for use as daily cover for the landfill cells and also for road construction on the landfill itself. Three landfills are currently utilised for this process, Knockharley Landfill Limited, Drehid Landfill and Ballynagran Landfill. Ferrous metals are sent

for recovery in Ireland and non-ferrous metals are exported to mainland Europe for recovery. A summary of the quantities produced of each residue is provided in **Table 1**.

Table 1. Summary of residues from furnace produced/recovered on site in 2019.

Residue	Tonnage Produced	As % of waste input
Bottom Ash	35,124	15%
Metals-ferrous	2,760	1.2%
Metals-non-ferrous	437	0.2%

An overview of the complete waste to energy process is provided in **Appendix 1 Description of Proposed Development: Figure 4.3**.

Flue Gas Cleaning Process

After leaving the boiler, the flue gases must be cleaned before they can be discharged through the stack. This is done by the injection of lime and a mixture of activated carbon and expanded clay.

Lime is introduced to the process in two forms, as a slurry mixed with water and also in dry form to control the acid gas concentration in the flue gases to the levels required in the EPA licence for the site. Separate silos for the storage of quick lime and hydrated lime are provided in the flue gas cleaning part of the main process building.

A mixture of activated carbon and clay are used in the process to control the heavy metals and dioxins. This is also stored in a silo in the same area as the lime silos.

Additional water may be injected to control the temperature of the flue gases entering the baghouse filter. Water for use in the process is abstracted from a groundwater well on site and pumped to the combined firewater and process water tank which is 2,185m³ in capacity. The top 330m³ of this tank is reserved for process water.

Residues are also created as a by-product of the flue gas cleaning process. Boiler ash is collected from the on-line cleaning of the boiler and flue gas cleaning residues are generated by the introduction of lime milk, dry lime, activated carbon and clay to clean the resultant flue gases. **Appendix 1 Description of Proposed Development: Figure 4.3** shows the flue gas cleaning process and the various inputs and outputs involved.

A baghouse filter is utilised to remove the carbon, clay and lime that has reacted to form the flue gas cleaning residues. The residues are trapped on the surface of the individual sleeves (approximately 2,000 in total) of the baghouse filter and collected in six hoppers underneath each of the six modules that comprise the baghouse filter unit. Compressed air is used to remove the residues from the sleeves and from the hoppers the residues are transported in enclosed conveyors to one of two residue silos (each of 210m³ capacity). The residues are either discharged into road tankers for export to recovery at saltmines in Germany or are transferred by enclosed conveyors to the pre-treatment plant on site as outlined in below under *Pre-treatment plant for boiler ash and flue gas cleaning residues*. Residues that undergo pre-

treatment on-site are sent to a saltmine in Northern Ireland for recovery, as discussed in *Pre-treatment plant for boiler ash and flue gas cleaning residues* below.

Raw materials usage

In addition to lime, activated carbon/clay and water for flue gas cleaning, water is also used on site for boiler water, general site cleaning, and firefighting activities. Fuel oil is consumed in the burners primarily for start-up and shutdown activities. Aqueous ammonia is used in the SNCR process for the reduction of nitrogen oxides.

Pre-treatment plant for boiler ash and flue gas cleaning residues

Since October 2018, a new pre-treatment plant for treating boiler ash and flue gas cleaning residues has been commissioned on site. Boiler ash, flue gas cleaning residues and water are mixed together and discharged into 1m³ flexible intermediate bulk container (FIBC) bags. The FIBC bags are then loaded onto curtain-sided trailers and sent to a saltmine in Northern Ireland for recovery. This process avoids the need to export these residues in bulk powder form to saltmines in Germany where the same pre-treatment process is applied prior to recovery in the mine. For operational reasons, the ability to use both routes for export is maintained.

Emissions monitoring and Control

Continuous sampling and monitoring of the flue gases is performed to give real time information to the operators of the plant on the performance of the flue gas cleaning systems relative to the strict emission limit values specified in the EPA licence. The dosing of rate of the re-agents is controlled automatically by the plants computerised control system.

3.4 Construction activities

Overview

Proposed construction activities will be carried out in two phases. Full details of these phases and all construction activities are included in **Appendix 8 Construction**. The schedule for the construction and commissioning of the Phase 1 elements, which includes the construction of the aqueous waste tank, bottom ash storage building and warehouses is approximately 16 months. The schedule for the construction and commissioning of the Phase 2 elements, which includes the construction of the HGU and new office block is approximately 12 months.

A full set of planning drawings accompany the planning application and a summary set of drawings in A3 format included in **Appendix 9 Drawings**. A Construction Environmental Management Plan (CEMP) is included in **Appendix 5 (CEMP)** of this report.

Site preparation works

Site preparation will commence with the establishment of safe access and site haul roads. A perimeter fence will be erected around each of the construction site areas for each phase. Re-grading work will be required. Where feasible, excavated material will be retained on site, for re-use as bulk fill or for landscaping. Otherwise, excavated material will be loaded directly in trucks for export off-site for re-use, recovery or. There will be no significant stockpiling of excavated material on site.

All traffic movements associated with the import and export of materials have been included in the construction traffic impact assessment. Refer to **Appendix 10 Traffic & Transportation** for further details. It is anticipated that the bulk excavation will take approximately 6 to 8 weeks in the case of the Phase 1 works. The peak construction traffic flow of 50 HGV's per day will be experienced at this stage of the Phase 1 works. Bulk excavation for Phase 2 will take 4 to 6 weeks and the peak traffic flow will be 40 HGV's per day.

Once site levels have been established by the initial bulk excavation works and construction of the retaining structures, the construction of the individual structures can begin. This will be followed on by the erection of superstructures, building envelopes, floors, services and finishes as appropriate. Where large pieces of plant or equipment are to be installed, these will be coordinated with the main construction works.

Main construction works

Once site levels have been established by the initial bulk excavation works and construction of the retaining structures, the construction of the individual structures can begin. This will be followed on by the erection of superstructures, building envelopes, floors, services and finishes as appropriate.

Construction methods

The proposed development will be constructed employing best practice in safety and efficiency. The scale of each stage of the works are relatively small and such that all of the construction can be executed using common building methods and materials.

In-situ reinforced concrete will be used to form foundations. In the parts of the site where the ground levels are raised, or where the bearing strata does not have the required geotechnical properties, foundations will be piled. Continuous flight auger (CFA) piling or augered piles 250mm diameter x 12.0m long on a 3.0m grid will be used for the tank farm foundations only. This piling activity will take 3 weeks to complete.

In-situ reinforced concrete will be used to form ground bearing floor slabs, upper floor suspended slabs and earth retaining structures. Underground tanks, chambers and process areas will be constructed of in-situ concrete and will be designed as water retaining structures to the relevant codes. It is likely that all concrete will be brought to site ready-mixed in trucks. The concrete may be placed directly from the trucks, or it may be pumped or be placed by skips hoisted by a crane. It is envisaged that some of the minor structural elements (e.g. non-load bearing walls) may be constructed in concrete block work.

Material Imports and exports

The construction of the proposed development will require considerable movements of materials to and from the site. Construction materials will be transported from the suppliers via the local road network. Approximately 2,300m³ of engineering fill and crushed stone will be imported onto the site for the construction works. In order to minimise the environmental effects, materials required from quarries will be sourced from quarries which are located in close proximity to the site where possible and only from quarries listed on the register maintained by the local authority. The environmental effects associated with the registered

quarry will have already been assessed by the local authority under Section 261 of the Planning and Development Act 2000, as amended.

All traffic movements associated with the import of materials have been included in the construction traffic impact assessment. Further details on construction traffic is included in **Appendix 10 Traffic & Transportation**.

Where possible, excavated materials will be reused on site for backfilling purposes, re-grading and landscaping. However, it is expected that a significant volume of the excavated material will not be suitable for reuse on site. It is estimated that up to 31,000m³ of surplus material will be removed from the site. The clean and inert surplus excavated material, which is integral to the construction phase, may be reused as a by-product on other sites subject to Article 27 under the Waste Directive Regulations 2011 and notification to the EPA. Where a re-use for the material cannot be found, the material may be sent to suitably permitted waste facilities or licensed soil recovery facilities in accordance with relevant waste legislation or disposed at suitable authorised waste facilities.

Demolition works

Demolition works proposed on site will be during the Phase 2 construction works where the existing office building will be removed to make way for construction of its replacement. These demolition works will be limited in both time and scale due to the size of the existing building. It is anticipated that these works will be completed within 1 week and that the waste materials (20 tonnes approx.) will be recovered or disposed of using permitted collectors to appropriately licensed or permitted sites.

Further detail on construction methods are included in **Appendix 8 Construction** of this report.

3.5 Main features of proposed development

Overview

The main elements of the proposed development have been listed in Section 3.1 above. **Figure 3** shows the proposed elements in the different areas of the site. Each element is outlined in turn below.

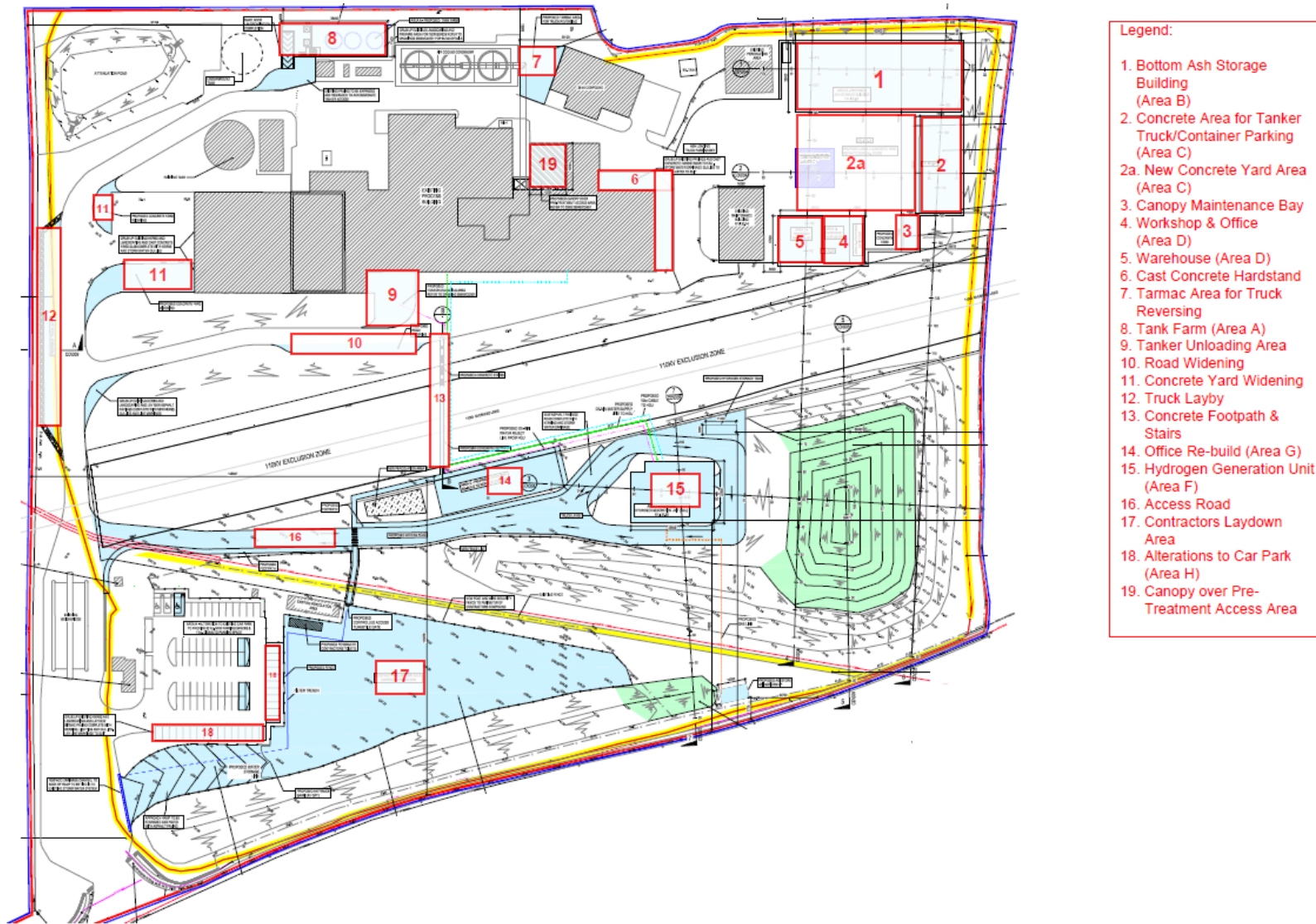


Figure 3. Existing Site Layout with Proposed Elements

Increase in overall annual total waste accepted at the site for treatment, including increase in hazardous waste

It is proposed to increase 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 up to a maximum of 25,000 tonnes per annum. This will result in an increase in the annual total waste accepted at the site for treatment in the waste to energy facility from the currently permitted 235,000 tonnes per annum to 250,000 tonnes per annum.

The proposed increase to 250,000 tpa from 235,000 tpa is to allow for the acceptance of additional (15,000 tpa) hazardous wastes (and hazardous aqueous wastes in particular) but is also intended to reflect the changing nature of the average calorific value of the solid industrial and municipal non-hazardous wastes accepted at the plant. When the average calorific value (CV) of the overall blend of solid wastes decreases, then more waste can be processed per annum and when the CV increases, then less waste can be processed. Based on the experience of the past 8 years of operation, the average CV changes from year to year. As Indaver cannot control or influence these changes, the plant must be flexible to absorb these fluctuations. Based on the amount of suitable hazardous waste available in any given year and the average CV of the non-hazardous waste, the additional 15,000 tonnes of capacity requested could also be utilised for non-hazardous waste.

A conservative approach has been taken when estimating the associated increase in raw materials required and residues produced and assumes that all of the additional proposed tonnage would be from solid waste.

It is proposed to construct a tank farm and tanker unloading area for the acceptance of aqueous wastes. In 2019, approximately 7,200 tonnes of aqueous hazardous waste were accepted and treated at the facility. By the development of this infrastructure and the installation of a second lance in the furnace for liquid injection, the annual treatment capacity of hazardous aqueous waste can be increased up to a maximum of 20,000 tonnes per annum. The waste will predominately be delivered in bulk tankers (22 to 24 tonnes per load), as it is currently the practice.

The provision of this infrastructure will ensure that up to 20,000 tonnes of hazardous aqueous wastes can be diverted from the current export to Europe route and instead be directed to Indaver's WtE plant in Ireland. The proposed increase in hazardous waste tonnage accepted from 10,000 tpa to 25,000 tpa will also allow for further growth of the hazardous solid waste accepted on site. From past experience, it is not easy to predict what volumes of particular hazardous wastes will be suitable and available for treatment, but an outline of both the existing and proposed split between solid and aqueous hazardous waste (based on a theoretical maximum for aqueous hazardous waste) is shown in **Table 2** below.

This in turn increases Ireland's self-sufficiency for the treatment of waste on the island. The proposed development also supports the proximity principle and is also more sustainable as it reduces the distance travelled by these waste streams dramatically.

Table 2. Example of a typical breakdown of the existing and proposed waste to be accepted.

	Existing (tpa)	Proposed (tpa)	Increase (tpa)
Hazardous aqueous waste	8,000	20,000	+ 12,000
Other hazardous waste (solid)	2,000	5,000	+ 3,000
Non-hazardous waste	225,000	225,000	0
Total waste accepted	235,000	250,000	+ 15,000

Aqueous Waste Tank Farm & Unloading Area

It is proposed to develop a tank farm for the storage and processing of aqueous liquid wastes currently accepted at the facility.

There will be a total of three tanks each with an operational capacity of 300m³ which are 23.5m in height (+53.6m OD) and 4.5m in diameter. Only two of these tanks will be dedicated to the acceptance and storage of aqueous hazardous waste. The third tank will be utilised for the storage of boiler water during maintenance activities. There will be a further tank of 20m³ operational capacity which will be used to ensure that any fine solids are constantly kept in suspension before being pumped to the furnace. All tanks will be single-walled but with an additional jetting prevention shield where necessary and will be fabricated from mild steel and contained within a concrete bund. The bund will be 28.7m by 41m in plan and with a 1.2m high bund wall (north facing bund wall 2.2m). It will be designed to the required standards for water-tightness and retention capacity. Further details on the aqueous waste tank farm and unloading area are included in **Appendix 1 Description of proposed development.**

Hydrogen Generation Unit (HGU)

It is proposed to develop a 10MWe hydrogen generation unit (HGU) for connection to the natural gas transmission/distribution network for mobile hydrogen transport and other potential applications.

The proposed HGU has been designed as an alternative means of generating energy during times of curtailment for export to the national electricity grid. On average, the existing facility is curtailed or prevented from exporting power generated from the steam turbine on site for approximately one thousand hours per year (or 12.5% of the operational time of the plant) due to lack of demand or excess wind generation capacity. As is currently the case, instead of “dumping” or destroying the steam generated from the combustion of waste over the steam turbine by-pass station and air-cooled condensers, it is proposed to generate electricity in the turbine and divert it to a hydrogen generation unit on site. The hydrogen generated can then be either fed into the natural gas grid or stored on site for fuelling trucks, buses and other vehicles that have been either designed or retrofitted to run on hydrogen fuel cells. Hydrogen can also be tankered off-site for industrial use or to fuel distribution centres. When used as a

fuel, hydrogen combusts to produce water vapour and hence is a clean fuel. Further details are provided in **Appendix 1 Description of proposed development**.

Bottom Ash Storage Building

It is proposed to develop a bottom ash storage building for the storage of up to 5,000 tonnes of bottom ash which is produced on site. This facility will provide the flexibility to export bottom ash to continental Europe for recovery in the event that there are no bottom ash recycling plants developed in the next five to ten years. It will have the capacity to store up to 5,000 tonnes of bottom ash at a time and can facilitate the export of all of the ash produced in approximately 12 shipments per year out of the Port of Drogheda.

The bottom ash storage building will be located in the north-western corner of the site. The building is for bottom ash produced by the plant which will be transported by truck from the bottom ash hall on site on a daily basis. The storage on site is to facilitate export of the bottom ash for recovery to mainland Europe in the event that there are no bottom ash recovery plants developed within the state. Bottom ash would be exported via ship out of Drogheda Port approximately 12 times per year, each with a capacity of 3,000 tonnes.

Trucks carrying the bottom ash from the ash hall on site will reverse into one of the four doorways and tip the ash onto the concrete floor of the storage building. A front loader will then move the ash into the ash pile and clear the tipping area for the next truck to arrive. This process will be repeated until the area is full.

When an export shipment is planned, trucks will be loaded by the loading shovel and sent off site to Drogheda Port where a vessel will be loaded with 3,000 tonnes of bottom ash over a two-day period. All trucks leaving the site for the port will be weighed on the weighbridge. When there are no truck movements in or out of the building, the four access doors will remain shut.

Although the bottom ash is wet when extracted from the furnace, storage of this material for periods of weeks or months will result in the remaining water evaporating, i.e. drying. Therefore, the entire building will be ventilated by air extraction through a particle filtration system at the southern end and outside the building. Fresh air will enter through vents at the northern end of the building and will be extracted via ducting on the southern end. Any residual water from the storage of the wet bottom ash will remain on the concrete floor of the storage building where it will be contained until evaporated.

Inputs to the building will be bottom ash. Outputs will be air from the filtered air extraction system and bottom ash for export. The design this storage and handling building is considered BAT under the BREF for Emissions from Storage.

Rainwater collected from the roof area will be drained directly to the existing storm water system on site. Paved areas outside the building will be drained via a forecourt interceptor and silt trap prior to being discharged to the existing storm water system on the site.

This building may also be used for annual waste surveys and detailed waste audits and inspections on incoming deliveries. Waste surveys involve the sampling and sorting of municipal waste and are carried out over a 3-5-day period. Detailed inspections may be carried out during an intensified period (1-2 weeks) of audits for conformity with incoming municipal

waste deliveries. This activity involves tipping a waste load onto the ground and checking for oversized material or non-conforming waste prior to re-loading the truck with a loading shovel or telescopic forklift.

Residue Acceptance & Storage for Pre-Treatment

It is proposed to increase the capacity of the existing ash pre-treatment facility (for boiler ash and flue gas cleaning residues) by 30,000 tonnes per annum. Acceptance of such residues would be conditional on an analysis to check that the licence or permit requirements at the saltmine in Northern Ireland can be complied with.

The additional infrastructure proposed for the acceptance of this material and other similar residues from other thermal treatment plants on the island of Ireland will comprise three silos housed within the main process building and an unloading area for tankers delivering this material outside the main process building. The residues will then be processed in the existing pre-treatment plant on site for export for recovery to a saltmine in Northern Ireland.

Currently, 25,000 tpa of third-party residues similar to those produced at the Meath facility are exported to Germany and Norway. This proposal would reduce the transport distances for the sustainable treatment of these residues.

Boiler ash, flue gas cleaning residues and similar residues from thermal treatment processes (e.g. kiln dust if available in the market) will be accepted and unloaded to one of three new silos located within the process building (refer to **Appendix 1 Description of Proposed Development: Figure 4.1**). Two silos will be dedicated for FGCR acceptance (approx. 200m³ each) and one for boiler ash (BA) and other residues (approx. 100m³). The ash will be delivered in enclosed tankers and are offloaded to the silos pneumatically. The same method is currently used for unloading consumables. Filtration systems on the silos will mitigate against dust emissions during the unloading operation. A new concrete area will be provided for these unloading operations at the northern end of the main process building as shown in **Appendix 9 Drawings**. Rainwater from this area will be contained and, if deemed clean, will be released into the internal water collection system within the main process building, which drains to the spilled water tank on site for re-use in the process.

From the silos, the residues will be transported in enclosed conveyors to the solidification plant and mixed with water in specific proportions in the solidification plant (as described in Section *Pre-treatment plant for boiler ash and flue gas cleaning residues* above), which has been permitted previously under PL17.PM0007. Once mixed, the cement-like product is discharged into 1m³ flexible intermediate bulk container (FIBC) bags. The bags are then sent to a saltmine in Carrickfergus, Northern Ireland for recovery (Permit No. P0547/16A).

It is anticipated that a maximum of 30,000 tonnes per annum of residues will be accepted on site for treatment in the solidification plant.

Inputs to the storage silos will be residues and compressed air. Outputs will be clean air from the dust filtrations unit on each silo and residues to the pre-treatment plant on site. The design of these silos is considered BAT under the BREF for Emissions from Storage.

Full details on this and other elements of the proposed development including New concrete yard area and container/trailer/tanker parking area and Modular Office Re-construction & Car Park Extension are also included in **Appendix 1 Description of Proposed Development**.

3.6 Stormwater & Firewater Management

Stormwater Management

Runoff during the construction phases will be directed towards temporary soak pits lined with geotextile for filtration purposes prior to its discharge to the stormwater drainage network. This is described in more detail in **Appendix 1 Description of Proposed Development**. Details for the operational phase of the proposed development are outlined below.

Site Drainage

The storm water drainage system for the proposed development will collect rainwater from all roofs, hardstands, roads and grassed areas which fall naturally towards hardstand areas. These areas will amount to approximately 4.9Ha. Approximately 5.1Ha of the site will continue to drain naturally and have not been catered for under the proposed storm water drainage system (all of this area is landscaped).

The storm water runoff from the new areas will discharge into the existing storm water system on site. The current system is attenuated at the point of discharge to the watercourse located at the north west corner of the site.

The proposed stormwater drainage system is outlined in **Figure 4** with the new elements highlighted in green.

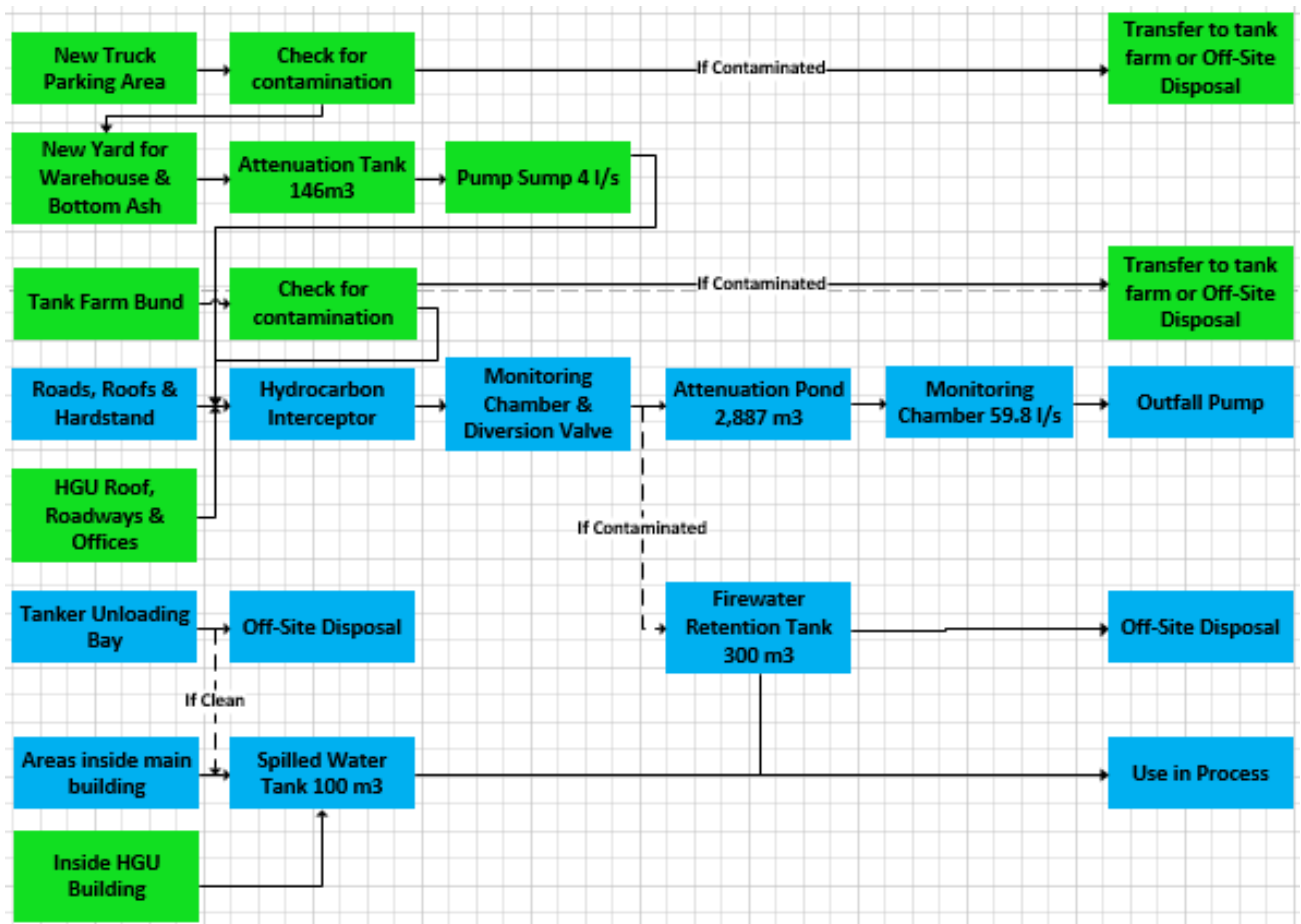


Figure 4. Proposed Stormwater Drainage System Flow Diagram.

New Concrete Yard Area

The existing stormwater drainage network was evaluated with a view to extend the network to the new concrete yard area. It was determined that due to the existing levels and the need to control the rate of discharge from this area that this was not possible. The design solution is to attenuate the surface run-off to a tank with a pumping chamber located under the slab area from where it will be pumped to the nearest existing manhole chamber.

Fire water management

The greatest potential for fire for the proposed development arises within the tank farm bund. This bund has been sized to cater for a number of scenarios as follows:

- Tank rupture – the bund volume has been sized to meet the EPA requirements of 110% of the largest tank volume or 25% of the total storage volumes.
- Fire in the bund – the bund volume has been sized to cater for the rupture of the largest tank plus a 150m³ fire water volume. Excess fire water run-off will be directed to the 300m³ retention tank as outlined below.

Whilst the risk of fire occurring elsewhere in the process building or other buildings on site is low, contaminated run-off resulting from all other firefighting operations will be contained by

collection in the storm water drainage system and draining to both the contaminated water tank (approx. 300m³) and by overflow when full to the attenuation tank (approx. 2,887m³).

This is achieved by the provision of an actuated valve which automatically diverts contaminated firewater to the 300m³ tank. This water will be stored for removal from site for disposal or for transfer to the tank farm for treatment in the furnace. The volume provided will provide adequate capacity to store both the firefighting water and rainfall that may occur during a fire.

Sanitary Services

Current foul effluent management systems on site consist of effluent discharge via the foul drainage system to the on-site effluent treatment systems which will then pass through percolation areas to ground. It is proposed to extend this system to deal with the proposed development.

Process Effluent

Any process effluent generated by the materials handling in the new facilities will be retained within the facilities and collected for treatment in the waste to energy plant. There will be no discharge of process effluent to the site drainage network.

3.7 Additional site services requirements

The additional utility requirements to support the proposed developments on site include water, electricity, gas, telecoms, commissioning, installation compliance checks, commissioning tests, performance demonstration tests. Full details on these are included in **Appendix 1 Description of Proposed Development**.

3.8 Health, Safety and Environmental Aspects

Operational Safety and Environmental Management

Indaver have an integrated Quality, Environmental and Safety & Health (QESH) management system. The Quality, Environmental or the Health & Safety Management Systems for the facility were certified by NSAI to the Quality Standard, ISO 9001:2015, the Environmental Standard ISO 14001:2015 and Occupational Health and Safety Standards OHSAS 1801:2007 in August 2017. All three Standards remain valid until August 2020.

The objectives and targets for the facility are set out in the Indaver Goals and Plan Book Action (part of Indaver's Environmental Management Programme agreed with the Agency in 2012). Actions are added and closed on an ongoing basis and further details of these are included in the AER for the facility. Full details on this and all emergency response procedures are included in **Appendix 1 Description of Proposed Development**.

3.9 Regulatory Control of the Facility

Industrial Emissions Licence

The Indaver site is subject to Industrial Emissions (IE) licensing under licence number W0167-03.

The IE licence requires Indaver to take various actions to meet its environmental obligations, particularly by monitoring emissions and reporting the results to the EPA, the maintenance of the site environmental management programme and the continuation of efforts at waste minimisation and utilisation of clean technology. The existing facility is a highly regulated operation and the EPA licence contains over 200 individual conditions governing all aspects of the operation and control of the facility including opening hours, waste acceptance procedures, acceptable waste types, emissions monitoring and limits on such emissions, emergency response procedures, the keeping of records and reporting requirements. The facility has a very good compliance record and submits annual environmental reports to the EPA each year outlining the overall environmental performance of the facility. The facility has maintained the status of a Recovery Facility (R1) as defined in Annex II of the Waste Framework Directive.

The facility is licensed to carry out the following activities:

Disposal or recovery of waste in waste incineration plants or in waste co-incineration plants

(a) for non-hazardous waste with a capacity exceeding 3 tonnes per hour, and

(b) for hazardous waste with a capacity exceeding 10 tonnes per day.

Full details of the conditions of this licence are available on the EPA website, www.epa.ie. The proposed Site Sustainability Project falls within the same category of licensable activity under IE licensing. Indaver has consulted with the EPA regarding the proposed development. An IE licence review application will be submitted to the Agency if and when planning permission for the proposed development is obtained.

Other existing Licences/consents

The facility also has a number of other existing consents in place, namely:

- Licence to generate electricity from the Commission for Regulation of Utilities (CRU).
- Licence L2890-04 from the EPA for the use of ionising radiation sources on site.

Future Licences/consents

There are several aspects that were considered for any additional licences or consents associated with the proposed development. These are:

- Consents for generation of hydrogen gas and injection to the natural gas grid from the CRU.
- EPA Licensing requirements for new activities and increased capacity by means of a review application to the EPA of the existing IE Licence W0163-03.
- Inventory calculations assessment for applicability of the COMAH Regulations.
- SI No. 631 of 2019, Dangerous Substances (Flammable Liquids and Fuels Distribution and Commercial Supply Stores) Regulations 2019 which came into force on April 1st 2020 will apply to the storage of hydrogen on site.

Consultation with the CRU on the consents/licences required for the project is underway. The following consents/licences have been discussed with the CRU:

- Section 39A to construct a Gas Pipeline;
- Gas Shipping Licence; and
- Gas Supply Licence..

Applications will be made at the appropriate time when planning permission is received and the CRU has confirmed that all are applicable.

An application for a review of the existing IE licence for the facility will also be made to the EPA once planning permission is received. From initial consultations with the EPA, an additional activity under the Industrial Emissions Directive (IED) will be required for the operation of the HGU. This activity is 4.2(a) from Annex I of the IED:

4.2 Production of inorganic chemicals, such as:

(a) gases, such as ammonia, chlorine or hydrogen chloride, fluorine or hydrogen fluoride, carbon oxides, sulphur compounds, nitrogen oxides, hydrogen, sulphur dioxide, carbonyl chloride;

Following a detailed assessment of the existing and proposed inventory of substances stored on site under the COMAH Regulations, the proposed development will not require a Notification to the HSA as the site will be sub-threshold for the lower tier requirements of the Regulations.

The storage of up to two tonnes of Hydrogen on site will require a licence from Meath County Council as the licensing authority under SI No. 631 of 2019.

3.10 Best Available Techniques (BAT)

BAT is applicable to the proposed development in the context of the BREF's for Waste Treatment (2018) and the Emissions from Storage (2006). There is no BREF document on the production of Hydrogen from electrolysis. The BREF for Waste Incineration is also relevant but only in the context of the existing operations on site to which no changes are proposed in the context of the proposed development. The revised BREF for waste incineration has been formally adopted at EU level in December 2019 and the existing facility will have 4 years from that date to implement any additional requirements. This will be formalised in this period as part of a licence review process by the EPA for the existing waste to energy activity on site.

BAT techniques for waste treatment and emissions from storage are applicable to the aqueous waste tank farm, bottom ash storage building and the silos for acceptance of third-party residues. Full details are included in **Appendix 1 Description of Proposed Development**.

3.11 Provisions for Site Decommissioning

In the event of decommissioning, measures will be undertaken by Indaver to ensure that there will be no environmental effects from the closed facility. A closure, remediation and aftercare management plan (CRAMP) and an associated financial provision is currently in place as part of a licensing requirement under W0167-03 to provide for decommissioning activities at the site should this arise. As part of the licence review process this closure plan will be updated

and submitted for approval to the EPA. Full details on decommissioning are included in **Appendix 1 *Description of Proposed Development***.

4. Natura 2000 sites

4.1 Designated sites within a 15km radius

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 compiled. All candidate SAC's (cSAC) and SPAs sites within a 15 km radius of the proposed development have been identified. These are listed in **Table 3** and illustrated in **Figure 5 and Figure 6**. It is noted that use of a 15 km radius is a precautionary measure, as impacts at this distance from the proposed development are highly unlikely in the absence of significant emissions with the potential to have an adverse impact on the qualifying interests and conservation objectives for Natura 2000 sites.

The proposed development is located in relative proximity to a number of Natura 2000 sites (**Figure 5 and Figure 6, Table 3**). The site is potentially hydrologically connected to one of the Natura 2000 sites listed in **Table 3** i.e. River Nanny Estuary and Shore SPA. Surface water on and in the vicinity of the proposed development site drains through land drains and ditches towards the local streams (Cruicerath stream) that flow to the River Nanny. Further investigation is required to determine if increased silt and hydrocarbons in surface water run-off during the construction could impact on the River Nanny Estuary and Shore SPA.

The River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA and Boyne Estuary SPA are located approximately 3.2km, 3.4km and 6.1km from the proposed development site respectively. Although not hydrologically connected to the proposed development site, qualifying species from these sites could potentially use lands within the proposed works area for foraging. Therefore, further assessment is provided in this report to determine if the proposed development could impact on the conservation objectives of the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA and Boyne Estuary SPA.

Therefore, a source-pathway-receptor link exists between the source (proposed development) and the receptors (River Nanny Estuary and Shore SPA, River Boyne and River Blackwater SAC, Boyne Estuary SPA and River Boyne and River Blackwater SPA) via potential pathways (surface water run-off and increased noise and activity respectively).

Overall, these Natura 2000 sites are of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and bird species that are listed on Annexes I and II of the E.U. Habitats and Bird Directives. Further information on these sites is provided below. Full site synopses are included **Appendix 11 Natura 2000 sites' synopses**.

Table 3. Designated sites and their location relative to the proposed works area

Site	Code	Distance at the closest point (approx.).
Special Area of Conservation (SAC)		
River Boyne And River Blackwater	002299	Located 3.2km north- northwest. A source-pathway-receptor link exists between the source (proposed development) and the receptors (River Boyne and River Blackwater SAC) via a potential pathway (disturbance to qualifying species during construction or operation).
Boyne Coast and Estuary	001957	Located 7.2km northeast. No potential impact pathway exists.
Special Protection Area (SPA)		
River Boyne and River Blackwater	004232	Located 3.4km north- northwest. A source-pathway-receptor link exists between the source (proposed development) and the receptors (River Boyne and River Blackwater SPA) via a potential pathway (disturbance to qualifying species during construction or operation).
Boyne Estuary	004080	Located 6.1km northeast. No potential impact pathway exists. A source-pathway-receptor link exists between the source (proposed development) and the receptors (Boyne Estuary SPA) via a potential pathway (disturbance to qualifying species during construction or operation).
River Nanny Estuary and Shore	004158	Located 8.1km east. A source-pathway-receptor link exists between the source (proposed development) and the receptor (River Nanny Estuary and Shore SPA) via a potential pathway (surface water run-off during construction or operation & disturbance to qualifying species during construction or operation).

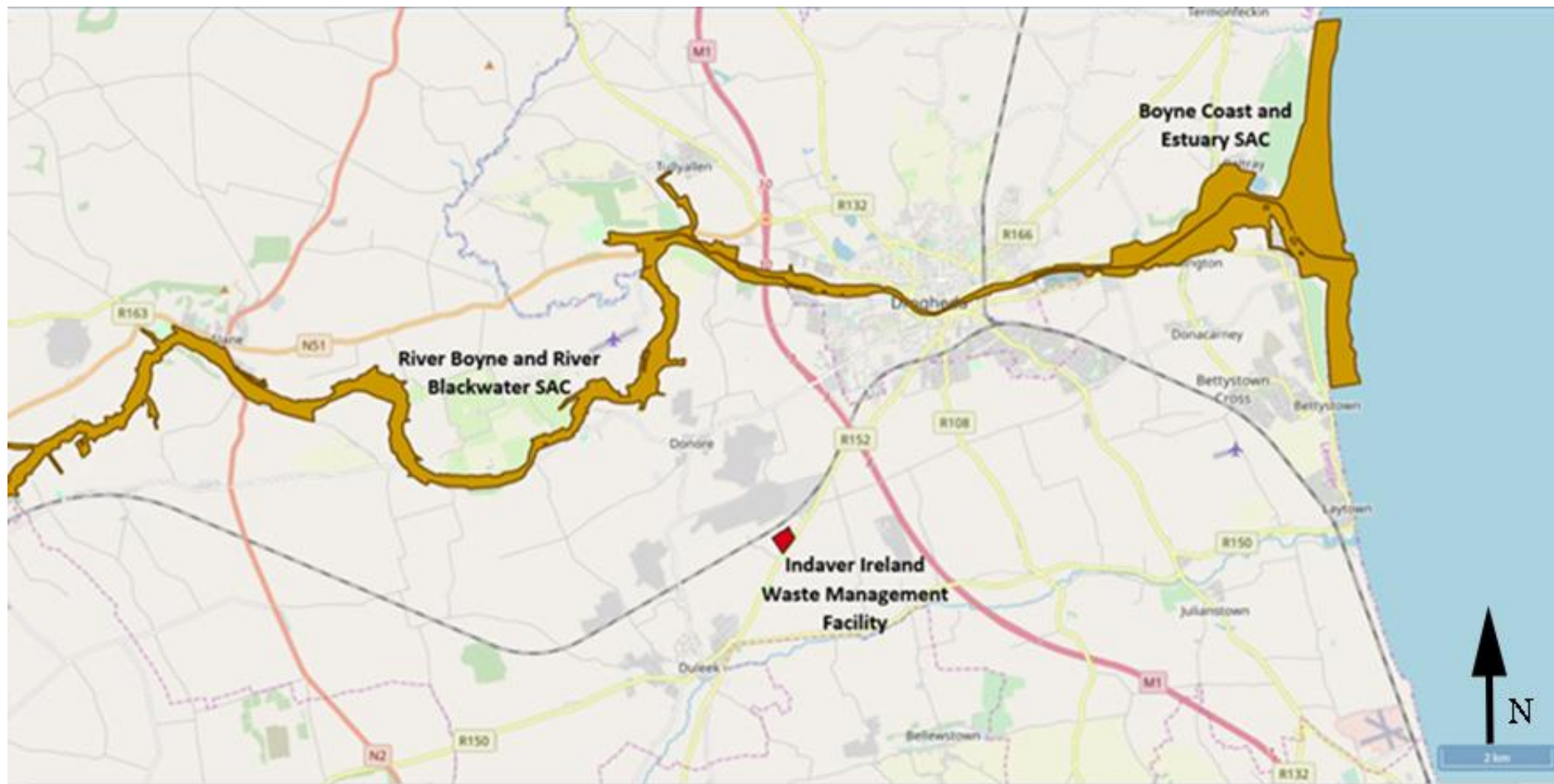


Figure 5. Location of SACs relative to the proposed development site. Not to scale. (Source EPA maps 2020)

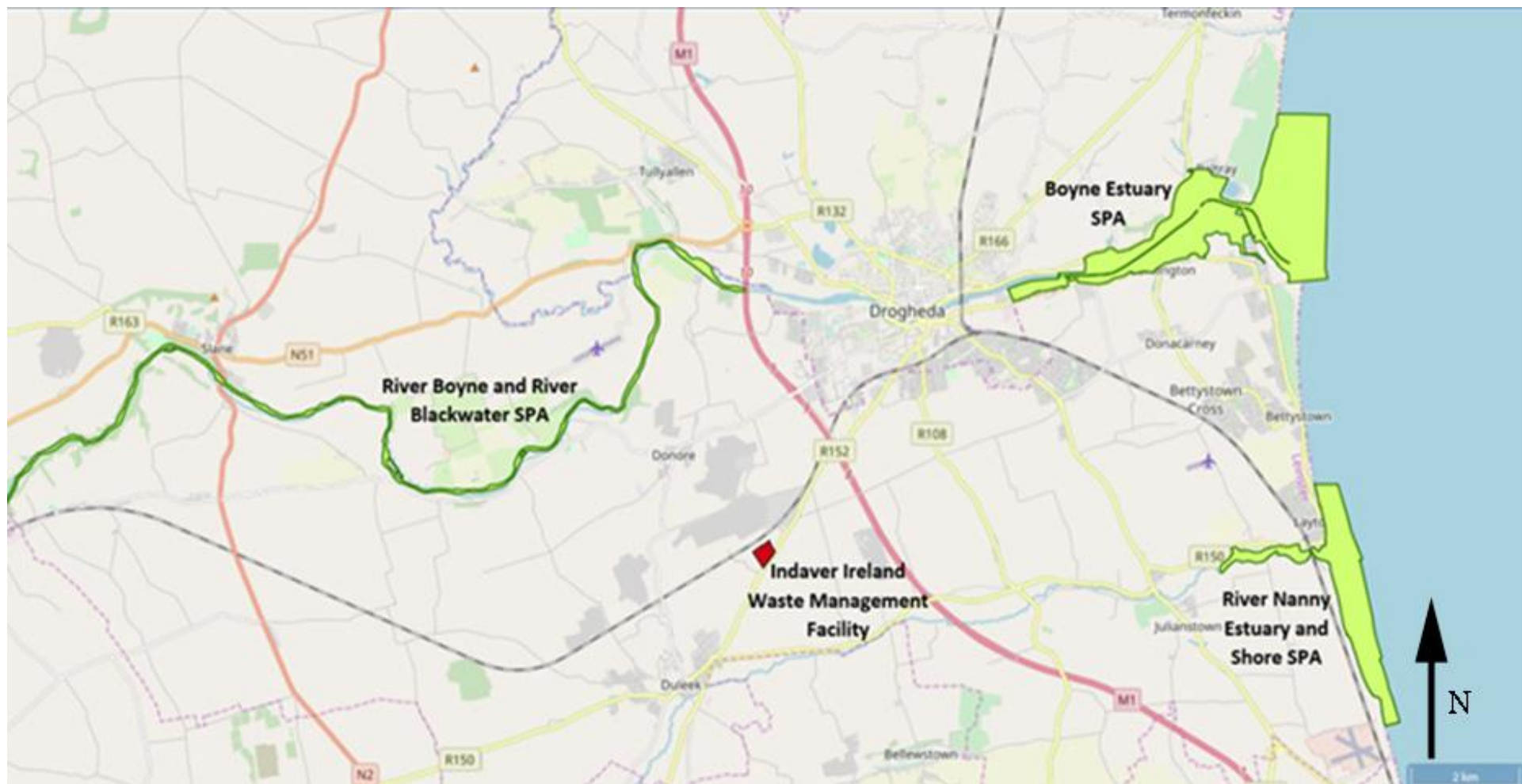


Figure 6. Location of SPAs relative to the proposed development site. Not to scale. (Source EPA maps 2020)

4.2 Natura 2000 Site – Site Synopses, qualifying interests and conservation objectives

As noted above the River Boyne and River Blackwater SAC (site code 002299), River Boyne and River Blackwater SPA (004232) and River Nanny Estuary and Shore SPA (site code 004158) are considered directly relevant to this project. The full site synopses for these Natura 2000 sites are included in **Appendix 11 Natura 2000 site synopses**.

4.2.1 River Boyne and River Blackwater SAC

This site comprises the freshwater element of the River Boyne as far as the Boyne Aqueduct, the Blackwater as far as Lough Ramor and the Boyne tributaries including the Deel, Stoneyford and Tremblestown Rivers.

The site supports populations of several species listed on Annex II of the E.U. Habitats Directive, and habitats listed on Annex I of this Directive, as well as examples of other important habitat types. Although the wet woodland areas appear small there are few similar examples of this type of alluvial wet woodland remaining in the country, particularly in the north-east. The semi-natural habitats, particularly the strips of woodland which extend along the river banks, and the marsh and wet grasslands, increase the overall habitat diversity and add to the ecological value of the site, as does the presence of a range of Red Data Book plant and animal species and the presence of nationally rare plant species.

The main areas of alkaline fen in this site are concentrated in the vicinity of Lough Shesk, Freehan Lough and Newtown Lough. The hummocky nature of the local terrain produces frequent springs and seepages which are rich in lime. A series of base-rich marshes have developed in the poorly-drained hollows, generally linked with these three lakes. Wet woodland fringes many stretches of the Boyne. The Boyne River Islands are a small chain of three islands situated 2.5 km west of Drogheda. The islands were formed by the build-up of alluvial sediment in this part of the river where water movement is sluggish. The dominant habitat along the edges of the river is freshwater marsh, and the following plant species occur commonly in these areas: Yellow Iris, Creeping Bent (*Agrostis stolonifera*), Canary Reed-grass (*Phalaris arundinacea*), Marsh Bedstraw (*Galium palustre*), Water Mint (*Mentha aquatica*) and Water Forget-me-not (*Myosotis scorpioides*).

Along much of the Boyne and along tributary stretches are found areas of mature deciduous woodland on the steeper slopes above the floodplain marsh or wet woodland vegetation. Other habitats present along the Boyne and Blackwater include lowland dry grassland, improved grassland, reedswamp, weedy waste ground, scrub, hedge, drainage ditch and canal.

The Boyne and its tributaries form one of Ireland's premier game fisheries and the area offers a wide range of angling, from fishing for spring salmon and grilse to seatrout fishing and extensive brown trout fishing. Atlantic Salmon (*Salmo salar*) use the tributaries and headwaters as spawning grounds.

This site is also important for the populations of two other species listed on Annex II of the E.U. Habitats Directive which it supports, namely River Lamprey (*Lampetra fluviatilis*), which is present in the lower reaches of the Boyne River, and Otter (*Lutra lutra*), which can be found throughout the site. In addition, the site also supports many more of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten,

Badger and Irish Hare. Common Frog, another Red Data Book species, also occurs within the site. All of these animals, with the addition of the Stoat and Red Squirrel, which also occur within the site, are protected under the Wildlife Act, 1976.

4.2.2 River Boyne and River Blackwater SPA

The River Boyne and River Blackwater SPA is a long, linear site that comprises stretches of the River Boyne and several of its tributaries; most of the site is in Co. Meath, but it extends also into Cos Cavan, Louth and Westmeath. It includes the following river sections: the River Boyne from the M1 motorway bridge, west of Drogheda, to the junction with the Royal Canal, west of Longwood, Co Meath; the River Blackwater from its junction with the River Boyne in Navan to the junction with Lough Ramor in Co. Cavan; the Tremblestown River/Athboy River from the junction with the River Boyne at Kilnagross Bridge west of Trim to the bridge in Athboy, Co. Meath; the Stoneyford River from its junction with the River Boyne to Stonestown Bridge in Co. Westmeath; the River Deel from its junction with the River Boyne to Cummer Bridge, Co. Westmeath. The site includes the river channel and marginal vegetation.

The River Boyne and River Blackwater Special Protection Area is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive.

4.2.3 River Nanny Estuary and Shore SPA

The site comprises the estuary of the River Nanny and sections of the shoreline to the north and south of the estuary (c. 3 km in length), in Co. Meath. The estuarine channel, which extends inland for almost 2 km, is narrow and well sheltered. Sediments are muddy in character and edged by saltmarsh and freshwater marsh/wet grassland. The well developed beaches, which are backed in places by clay cliffs, provide high tide roosts for the birds.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Oystercatcher, Ringed Plover, Golden Plover, Knot, Sanderling and Herring Gull. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

This is an important site for wintering waders, with nationally important populations of Golden Plover (1,759), Oystercatcher (1,014), Ringed Plover (185), Knot (1,140) and Sanderling (240) present (all figures are mean peaks for the 5 year period 1995/96-1999/2000). The populations of Knot and Sanderling are of particular note as they represent approximately 4% of their respective national totals. Herring Gull (609) also occurs here in nationally important numbers. A range of other waterbirds also occurs, including Cormorant (35), Light-bellied Brent Goose (145), Mallard (76), Grey Plover (55), Lapwing (1,087), Dunlin (721), Bar-tailed Godwit (59), Curlew (107), Redshank (150), Turnstone (59), Blackheaded Gull (926), Common Gull (66) and Great Black-backed Gull (70). The site is of most importance as a roost area for the birds but the intertidal flats also provide feeding habitat.

4.2.4 Boyne Coast and Estuary SAC

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 a Special Area of Conservation (SAC) selected for the following habitats: [1130] Estuaries [1140] Tidal Mudflats and Sandflats [1210] Annual vegetation of drift lines [1310] Salicornia Mud [1330] Atlantic Salt Meadows [2110] Embryonic Shifting Dunes [2120] Marram Dunes (White Dunes) [2130] Fixed Dunes (Grey Dunes)*

The Boyne is the second most important estuary for wintering birds on the Louth/Meath coastline. From a recent wetland survey carried out over 4 seasons (1994/95- 97/98), it is known that this site supports nationally important numbers of Shelduck (176 individuals), Golden Plover (5,338), Lapwing (4,755), Knot (1,559), Black-tailed Godwit (414), Redshank (539), Turnstone (104), Oystercatcher (922), Grey Plover (112) and Sanderling (93).

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.

4.2.4 Boyne Estuary SPA

This 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. The sediments vary from fine muds in the sheltered areas to sandy muds or sands towards the river mouth. The linear stretches of intertidal flats to the north and south of the river mouth are mainly composed of sand. One or more species of Eelgrass (*Zostera* spp.) occur in the estuary. Parts of the intertidal areas are fringed by salt marshes, most of which are of the Atlantic type, and dominated by Sea-purslane (*Halimione portulacoides*). Other species present include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea-lavender (*Limonium humile*) and Glasswort (*Salicornia* spp.). Common Cord-grass (*Spartina anglica*) occurs frequently on the flats and salt marshes. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Shelduck, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone and Little Tern. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site 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.

4.3 Natura 2000 sites: conservation objectives and features of interest

The EU Habitats Directive contains a list of habitats (Annex I) and species (Annex II) for which SACs must be established by Member States. Similarly, the EU Birds Directive contains lists of important bird species (Annex I) and other migratory bird species for which SPAs must be established. Those that are known to occur at a site are referred to as 'qualifying interests' and are listed in the Natura 2000 forms which are lodged with the EU Commission by each Member State. A 'qualifying interest' is one of the factors (such as the species or habitat that is present) for which the site merits designation. The National Parks and Wildlife Service (NPWS) are responsible for the designation of SACs and SPAs in Ireland.

The conservation objectives for the sites are detailed in the following publications:

NPWS (2018) *Conservation objectives for River Boyne and River Blackwater SAC [002299]. Generic Version 6.0.* Department of Culture, Heritage and the Gaeltacht.

NPWS (2018) *Conservation objectives for River Boyne and River Blackwater SPA [004232]. Generic Version 6.0.* Department of Culture, Heritage and the Gaeltacht.

NPWS (2012) *Conservation Objectives: River Nanny Estuary and Shore SPA 004158. Version 1.0.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2012) *Conservation Objectives: Boyne Coast and Estuary SAC 001957. Version 1.0.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) *Conservation Objectives: Boyne Estuary SPA 004080. Version 1.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network. European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status sites designated as Special Areas of Conservation and Special Protection Areas. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Favourable conservation status of a habitat is achieved when its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will

probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis. The species and/or habitats listed as qualifying interests (QIs) or Special Conservation Interests (SCIs) for River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, River Nanny Estuary and Shore SPA, Boyne Coast and Estuary SAC and Boyne Estuary SPA are included in **Tables 4-8**.

Table 4. Qualifying interests (QIs) for the River Boyne and River Blackwater SAC (site code 002299)

Habitat Code	Habitat	Conservation objective
7230	Alkaline fens	Maintain/restore
91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)	Maintain/restore
1099	<i>Lampetra fluviatilis</i> (River Lamprey)	Maintain/restore
1106	<i>Salmo salar</i> (Salmon)	Maintain/restore
1355	<i>Lutra lutra</i> (Otter)	Maintain/restore

Restore = Restore favourable conservation condition, Maintain = Restore favourable conservation condition

Table 5. Special Conservation Interests (SCIs) for the River Boyne and River Blackwater SPA (site code 004232)

Habitat Code	Habitat	Conservation objective
A229	Kingfisher (<i>Alcedo atthis</i>)	Maintain/restore

Restore = Restore favourable conservation condition, Maintain = Restore favourable conservation condition

Table 6. Special Conservation Interests (SCIs) for the River Nanny Estuary and Shores SPA (site code 004158)

Species code	Species	Scientific name	Conservation objective
A130	Oystercatcher	<i>Haematopus ostralegus</i>	Maintain
A137	Ringed Plover	<i>Charadrius hiaticula</i>	Maintain
A140	Golden Plover	<i>Pluvialis apricaria</i>	Maintain
A143	Knot	<i>Calidris canutus</i>	Maintain
A144	Sanderling	<i>Calidris alba</i>	Maintain
A184	Herring Gull	<i>Larus argentatus</i>	Maintain
A999	Wetlands and Waterbirds		To maintain the favourable conservation condition of the wetland habitat at River Nanny Estuary and Shore SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Restore = Restore favourable conservation condition, Maintain = Restore favourable conservation condition

Table 7. Special Conservation Interests (SCIs) for the Boyne Estuary SPA (Site code 004080)

Species code	Species	Scientific name	Conservation objective
A048	Shelduck	<i>Tadorna tadorna</i>	Maintain
A130	Oystercatcher	<i>Haematopus ostralegus</i>	Maintain
A140	Golden Plover	<i>Pluvialis apricaria</i>	Maintain
A141	Grey Plover	<i>Pluvialis squatarola</i>	Maintain
A142	Lapwing	<i>Vanellus vanellus</i>	Maintain
A143	Knot	<i>Calidris canutus</i>	Maintain
A144	Sanderling	<i>Calidris alba</i>	Maintain
A156	Black-tailed Godwit	<i>Limosa limosa</i>	Maintain
A162	Redshank	<i>Tringa tetanus</i>	Maintain
A169	Turnstone	<i>Arenaria interpres</i>	Maintain
A195	Little Tern	<i>Sterna albifrons</i>	Maintain
A999	Wetlands		To maintain the favourable conservation condition of the wetland habitat in Boyne Estuary SPA as a resource for the regularly-occurring migratory waterbirds that utilise it

Restore = Restore favourable conservation condition, Maintain = Restore favourable conservation condition

Table 8. Qualifying interests (QIs) for the Boyne Coast and Estuary SAC (Site code 001957)

Habitat Code	Habitat	Conservation objective
1130	Estuaries	Maintain
1140	Mudflats and sandflats not covered by seawater at low tide	Maintain
1310	Salicornia and other annuals colonising mud and sand	Restore
1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	Maintain
1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	Under review
2110	Embryonic shifting dunes	Maintain
2120	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)	Restore
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)	Restore

Restore = Restore favourable conservation condition, Maintain = Restore favourable conservation condition

5. Potential Impacts of the Proposed Development on Natura 2000 sites.

The ecological baseline for proposed development site was based on a desktop review and direct surveys of the relevant works area and areas proximate to same. Surveys focused on habitats and species that are listed as Qualifying Interests (QI) (in the case of SACs) and Special Conservation Interests (SCI) (in the case of SPAs) which inform the designations for the European sites. Further detail is provided in Chapter 11 of the EIAR which is attached to this report as **Appendix 2 Biodiversity**.

5.1 Direct habitat loss or habitat fragmentation during construction

Any habitat loss or fragmentation of Natura 2000 sites could potentially reduce the extent of habitat and the habitat available for QI/SCI species.

The proposed works area is located approximately 3.2km from the closest Natura 2000 site. There will be no direct impacts and no habitat fragmentation in the Natura 2000 sites as a result of the proposed development. Therefore, no effect on Natura 2000 sites via habitat loss or fragmentation will occur.

5.2 Disturbance or displacement of qualifying species during construction

Construction works will generate additional noise and activity which could lead to the short-term disturbance/displacement of qualifying species. There could also be in-combination effects due to the presence of other developments.

Given the distance of the proposed works area from Natura 2000 sites, direct disturbance of qualifying species within the SAC/SPAs will not occur. However, mobile QI/SCI species within the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA i.e. Otter and Kingfisher, could potentially use freshwater habitats on or in the vicinity of the proposed development site. This potential impact on QIs/SCI's for the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA is addressed below in this report.

Although located a considerable distance from the proposed development site, wading birds which are SCI species for the River Nanny Estuary and Shores SPA (distance of 8.1km) and Boyne Estuary SPA (distance of 6.1km) could potentially forage inland on terrestrial habitats near the proposed development. Golden Plover were recorded on arable fields near the Knockarley Landfill site which is located approximately 10km west-southwest of the Indaver site and some 17.4km inland of the River Nanny and Estuary Shores SPA (Greenstar 2008). Although surveys were conducted outside the winter season, 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.

There is no suitable habitat for wading birds within the proposed development site. The land surrounding the Indaver site is dominated by a mixture of intensive pasture and arable fields and there are no features which differentiate these fields from extensive areas of similar habitat in the surrounding area. 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 associated with the existing Indaver facility and therefore would continue to use these fields during and after construction of the proposed development.

Some limited usage of the site by Herring Gull which is listed as an SCI for the River Nanny Estuary and Shores SPA was recorded, however this species is highly tolerant of noise and disturbance, habitually forages inland and would not be impacted by any changes in noise or activity patterns. Therefore, no potential effects from visual or noise disturbances during the construction phase to SCIs or the conservation objectives for the River Nanny Estuary and Shores SPA and Boyne Estuary SPA will occur.

5.3 Disturbance or displacement of qualifying species during operation

Once operational, the potential noise sources associated with the proposed development will result from: Mechanical and electrical equipment, vehicle movements / activities on site, and additional vehicular traffic to and from the site. In order to assess the potential impacts from the proposed development, a 3D noise model of the facility was developed to include for the proposed development, using information provided by the design team including site drawings and topographical information. Full details of this modelling are included in **Appendix 4 Noise and Vibration**.

This model concluded that the change in traffic noise level during both assessment years is calculated between 0 to 0.1dB. A change of this magnitude will not result in any notable change in noise level over existing road traffic noise levels. The result of the assessment also confirmed that cumulative noise levels associated with existing and proposed operational noise sources are within the noise emission limits for the facility during day, evening and night-time periods.

Given that the proposed development is located within an operational WtE facility, QI/SCI species which currently use the area are already habituated to the levels of noise and activity generated by the existing facility and adjoining road. Furthermore, noise modelling confirms that there will be little change from existing noise levels once the proposed development is operational. It is noted that the facility is operated under EPA IED licence and meets all of its emission limits and will continue to do so following construction of the proposed development.

Therefore, no effects on the QIs/SCIs for the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, Boyne Estuary SPA and River Nanny Estuary and Shore SPA will occur due to noise and disturbance during the operational phase.

5.4 Emissions to water during the construction phase

River Nanny Estuary and Shores SPA

Surface water emissions associated with the construction phase could potentially impact on estuarine habitats via increased silt levels in surface water run-off and inadvertent hydrocarbon contamination from spillages of fuel and hydraulic fluid. The proposed development is hydrologically connected to the River Nanny and surface water run-off could potentially impact on the SCI species within the River Nanny and Shores SPA. Therefore, further investigation is required to determine if emissions to water during the construction phase of the proposed development will impact on the conservation objectives of the River

Nanny Estuary and Shores SPA. It is noted that during operation water discharges occur and will continue to occur via the attenuation pond and in line with EPA licence limits and no impact from the operational discharges of surface water will occur (see **Section 5.5**).

River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA

The proposed development site is not hydrologically connected to the River Boyne and River Blackwater SAC, Boyne Coast and River SAC, Boyne Estuary SPA and River Boyne and River Blackwater SPA. Therefore, no hydrological effects on conservation objectives of these Natura 2000 sites will occur.

5.5 Emissions to water during operation

River Nanny Estuary and Shores SPA

In respect of the possible effects from emissions to water from the facility, it is noted there are no process effluent emissions associated with the proposed development. Any process effluent will be retained within the facilities and collected for treatment in the waste to energy plant. As is currently the case under EPA licence requirements, storm water will be managed in a contained drainage system and storm water collected in these areas will only be released into the main drainage network after local assessment confirms that there is no contamination present. Given the operational design measures and given that the discharge will continue to meet the existing licenced discharge limits, no potential effects from emissions to water during the operational phase have been identified.

River Boyne and River Blackwater SAC, Boyne Coast and River SAC, Boyne Estuary SPA and River Boyne and River Blackwater SPA

The proposed development site is not hydrologically connected to the River Boyne and River Blackwater SAC, Boyne Coast and River SAC, Boyne Estuary SPA and River Boyne and River Blackwater SPA. No potential effects via ground water impacts have been identified. Therefore, no potential effects on conservation objectives of these Natura 2000 sites have been identified from emissions to water during the operational phase.

5.6 Emissions to air

The effects on air quality from emissions are specifically addressed in **Appendix 5 Air Quality**. The Waste to Energy Process (WtE) will 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.

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 and 2012 EISs. This assessment was 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).

The revised assessment shows a very minor variation in results. 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. Therefore, no potential impacts from air emissions has been identified and no significant effects on the conservation objectives for the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA and River Nanny Estuary and Shore SPA , Boyne Coast and River SAC and Boyne Estuary SPA will occur.

5.7 Spread of invasive species

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.

The River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA are not hydrologically connected to the proposed development site and therefore there is no pathway with which invasive species from the proposed development site could spread to these sites. The River Nanny Estuary and Shores SPA is hydrologically connected to the proposed development site but is located 8.1km from the proposed development site as the crow flies and 11km downstream. Qualifying interests for this SPA are wading bird species. Given the distances involved, the robust nature of estuarine habitats and the low threat posed by Buddleja to these habitats, no effects on the River Nanny Estuary and Shores SPA or other Natura 2000 sites from the spread of invasive species will occur.

5.8 Boiler ash & Flue Gas Cleaning Residues

Increase due to Waste to Energy Plant

Circa 105 tonnes of additional boiler ash and 600 tonnes of additional flue gas cleaning residues will be produced annually from the waste-to-energy plant operations as part of the proposed development. When pre-treated (after mixing with water) these residues will amount to a total of approximately 917 tonnes per annum.

Increase due to acceptance of 3rd Party residues for pre-treatment plant

More significantly, an additional 39,000 tonnes per annum of pre-treated residues will be produced by the existing on-site pre-treatment facility.

It is expected that the 30,000 tonnes of boiler ash, flue gas cleaning residues and similar material from third party facilities that is accepted as part of the proposed development for pre-treatment will be similar in composition to the boiler ash and flue gas cleaning residues from the existing facility.

The total amount of additional pre-treated residues from both waste to energy plant and that accepted from third parties will be sent for recovery to salt mines licensed to accept this type of waste.

Transport Regulations for Exporting Waste

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

Export of Boiler Ash and Flue Gas Cleaning Residues

Salt mines are suitable environments for containing boiler ash and flue gas cleaning residues. The impervious nature of salt rock offers a long-term geological barrier and a geo-technically stable environment to guarantee that the residues are permanently isolated from the environment. The absence of water in the underground salt mine's environment removes any risk of leaching of, for example, heavy metals from residues. Hence the recovery of this material by backfilling in the saltmines is not likely to have significant negative effect on the environment.

Boiler ash and flue gas cleaning residues from the existing facility are currently shipped (un-treated) to the Hattorf and Wintershall Reutilisation Facility, which is an underground salt mine in Germany. The facility has been approved for the reutilisation by the relevant authorities in Germany.

In 2017 a similar salt mine facility in Northern Ireland attained planning consent and an environmental permit to operate as a recovery facility for hazardous residues from waste to energy facilities. This facility in Carrickfergus, Co. Antrim has been accepting pre-treated boiler ash and flue gas cleaning residues from the existing waste-to-energy facility since October 2018 and the facility is also suitable for receiving the additional residues from the proposed development. It is intended that the boiler ash and flue gas cleaning residues from the proposed development will be sent to this facility, which has capacity to accommodate the material.

As the material is already pre-treated and is in a solid monolithic form, the transport of the pre-treated material will not have a significant negative effect on the environment.

At times when this recovery facility may not be available, for example, during a maintenance outage, un-treated flue gas cleaning residues will be exported for treatment and final recovery to German salt mines in specialised road tankers

The salt mines in Germany and Northern Ireland are required to comply with the requirements of the EIA Directive and therefore were subject to the EIA process prior to the acceptance of any waste material. This Directive on Environmental Assessment aims to provide a high level of protection of the environment and to contribute to the integration of environmental considerations into the development of projects such as salt mines accepting hazardous waste with a view to reducing their environmental impact.

Similarly, the existing licensing process which all of these salt mines are subject to, requires compliance with an ongoing environmental monitoring regime in the form of stringent licence conditions. The issuing of such licences by competent authorities pursuant to the requirements laid down in the Waste Framework Directive stipulate that all necessary safety and precautionary measures, monitoring and control operations and closure and after-care provisions must be included in the granting of all such licences.

Such conditions set out the legal constraints under which salt mines must operate in order to ensure that all operations are conducted in compliance with the requirements of the Waste Framework and Landfill Directives and do not cause environmental pollution.

Shipping to German Saltmines

Van Den Bosch is an international logistics services provider which transports boiler ash and the flue gas cleaning residues for Indaver. Van Den Bosch confirmed that in the 51 years of its history none of its containers has ever fallen overboard and no ship has sunk with its containers on board.

If the boiler ash and flue gas cleaning residues come in contact with water, they will solidify. Thus, if there was a shipping accident, and the container entered the sea and was holed, the boiler ash and flue gas residues would solidify on contact with water. The solidified boiler ash and flue gas residues could then be removed from the seabed along with the tanker.

Effects on Natura 2000 sites

As the material will be pre-treated prior to export from the facility and is in a solid monolithic form, the risk to the environment from transport of this material including trans-boundary impacts is minimal. Given the extremely low risk of an accident, the low risk of leakage from the tankers and the fact that the residues will solidify on contact with water, no impacts on Natura 2000 sites will occur.

5.9 Bottom Ash Residues

Bottom ash is currently sent to three main landfill outlets for recovery as daily cover or as a road construction material on the landfill itself. This will continue for the additional bottom ash produced as a result of the proposed development. In the alternative, bottom ash (including the additional bottom ash produced) may be exported to outlets in Europe which are already able to recover aggregates from bottom ash. To provide for this alternative, the bottom ash storage building has been proposed and is described in **Appendix 1 Description of the Proposed Development**.

The manner in which this material may be treated and transported is dependent upon how this material is classified and characterised which may be hazardous or non-hazardous, and accordingly an assessment of each finding is outlined below. Commission Regulation (EU) No. 1357/2014 and Commission Decision 2014/955/EU is utilised to determine the manner in which bottom ash may be characterised as non-hazardous or hazardous. The bottom ash residues from the plant are currently characterised as non-hazardous. Further details on the classification of bottom ash are discussed in **Appendix 1 Description of the Proposed Development**.

All outlets, both within Ireland and the EU have also been subject to the requirements of the Waste Framework and EIA Directives and the EIA process of the relevant jurisdiction. As referred to above in the context of landfills, these outlets are also subject to a separate national licensing regime on an ongoing basis which is a constituent part of the European law framework as laid down in the Waste Framework Directive.

Should material be exported this would involve movement to another EU country, the requirements of Regulation (EC) No 1013/2006 of 2006 on shipments of waste would also need to be adhered to.

Should this option be availed of, the bottom ash would be stored on site in the bottom ash storage building until there is enough for export in a bulk consignment. Covered trucks would bring the bottom ash from the site to Drogheda Port for loading into a vessel, typically over a two or three-day period in the same vehicles that would transport the material to a national treatment facility if it were available. This scenario has been modelled in **Appendix 10 Traffic & Transportation** and no significant effects are envisaged.

Effects on Natura 2000 sites

The bottom ash that is generated as a result of the incineration process is reused in many EU countries for use in road construction. Indeed, export of bottom ash for processing to other EU countries may be a route to achieve this if no facility is available in Ireland. Landfilling of these solid residues will only take place, if no viable market can be found. If these residues can be successfully used, it will have a positive effect in that it will reduce the requirement for the use of virgin materials. A comprehensive monitoring regime at the receiving sites will ensure that bottom ash when sent to landfill for recovery or disposal will not have a material environmental impact.

Given the extremely low risk of an accident due to standard forms of transport on the Irish road network, the low risk of a shipping accident, the inert nature of bottom ash (which is classified as non-toxic) and comprehensive monitoring regimes at the receptor sites no significant effects on Natura 2000 sites from the transport and disposal of bottom ash will occur.

5.10 Stage One Appropriate Assessment Conclusions

5.10.1 Screening of Relevant Natura 2000 Sites and Qualifying Interests/Special Conservation Interests

Potential impacts, although improbable, have been identified for the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA and the River Nanny Estuary and Shore SPA. Screening conclusions with regard to the qualifying species and habitats for these Natura 2000 sites is provided in **Table 7**. No significant effects on the conservation objectives for the Boyne Coast and Estuary SAC and Boyne Estuary SPA will occur.

Table 7. Screening conclusions

Natura 2000 Site	Qualifying Interest	Potential Impacts	Screened In/Out
River Boyne and Blackwater SAC	<ul style="list-style-type: none"> Alkaline fens Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) 	No potential impacts from air emissions have been identified. There is no hydrological connection between the SAC and the proposed development site and no potential ground water impacts which could impact on fens have been identified. These habitats do not occur within or in proximity to the development footprint. Therefore, no potential impacts or in combination impacts have been identified.	Screened Out
	<ul style="list-style-type: none"> <i>Lampetra fluviatilis</i> (River Lamprey) <i>Salmo salar</i> (Salmon) 	No potential impacts from air emissions have been identified. There is no hydrological connection between the SAC and the proposed development site. Therefore, no potential impacts or in-combination impacts on these species have been identified.	Screened Out
	<ul style="list-style-type: none"> <i>Lutra lutra</i> (Otter) 	There is no hydrological connection between the SAC and the proposed development site. No potential impacts from air emissions have been identified. This species could potentially use habitats near the proposed development site and increased noise and disturbance during construction could impact on this species.	Screened In
River Boyne and Blackwater SPA	<ul style="list-style-type: none"> Kingfisher (<i>Alcedo atthis</i>) 	No potential impacts from air emissions have been identified. There is no hydrological connection between the SPA and the proposed development site. No potential impacts from air emissions have been identified. This species could potentially use habitats near the proposed development site and increased noise and disturbance during construction could impact on this species.	Screened In

Natura 2000 Site	Qualifying Interest	Potential Impacts	Screened In/Out
River Nanny Estuary and Shores SPA	<ul style="list-style-type: none"> • Oystercatcher <i>Haematopus ostralegus</i>) • Ringed Plover <i>Charadrius hiaticula</i> • Golden Plover <i>Pluvialis apricaria</i> • Knot <i>Calidris canutus</i> • Sanderling <i>Calidris alba</i> • Herring Gull <i>Larus argentatus</i> • Wetlands and Waterbirds 	<p>No potential impacts from air emissions have been identified.</p> <p>There is no suitable habitat for wading birds within the proposed development site. The land surrounding the Indaver site is dominated by a mixture of intensive pasture and arable fields and there are no features which differentiate these fields from extensive areas of similar habitat in the surrounding area. 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 associated with existing Indaver facility and therefore would continue to use these fields during and after construction of the proposed development.</p> <p>Given that the proposed development is located within an operational WtE facility, SCI species which currently use the area are already habituated to the levels of noise and activity generated by the existing facility and adjoining road. Furthermore, noise modelling confirms that there will be little change from existing noise levels once the proposed development is operational. It is noted that the facility is operates under EPA IED licence and meets all of its emission limits and will continue to do so post construction of the proposed development.</p> <p>Surface water emissions associated with the construction phase could potentially impact on estuarine habitats via increased silt levels in surface water run-off and inadvertent hydrocarbon contamination from spillages of fuel and hydraulic fluid.</p>	Screened In
Boyne Estuary SPA	<ul style="list-style-type: none"> • Shelduck • Oystercatcher • Golden Plover • Grey Plover • Lapwing • Knot • Sanderling • Black-tailed Godwit • Redshank 	<p>No potential impacts from air emissions have been identified.</p> <p>There is no hydrological connection between the SPA and the proposed development site. No potential impacts from air emissions have been identified</p>	Screened Out

Natura 2000 Site	Qualifying Interest	Potential Impacts	Screened In/Out
	<ul style="list-style-type: none"> • Turnstone • Little Tern • Wetlands 	<p>There is no suitable habitat for wading birds within the proposed development site. The land surrounding the Indaver site is dominated by a mixture of intensive pasture and arable fields and there are no features which differentiate these fields from extensive areas of similar habitat in the surrounding area. 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 associated with existing Indaver facility and therefore would continue to use these fields during and after construction of the proposed development.</p> <p>Given that the proposed development is located within an operational WtE facility, QI/SCI species which currently use the area are already habituated to the levels of noise and activity generated by the existing facility and adjoining road. Furthermore, noise modelling confirms that there will be little change from existing noise levels once the proposed development is operational. It is noted that the facility is operates under EPA IED licence and meets all of its emission limits and will continue to do so post construction of the proposed development.</p> <p>Therefore, no potential impacts or in-combination impacts on this SPA have been identified</p>	
Boyne Coast and River SAC	<ul style="list-style-type: none"> • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Salicornia and other annuals colonising mud and sand • Atlantic salt meadows (Glauco-Puccinellietalia maritima) • Mediterranean salt meadows (Juncetalia maritimi) • Embryonic shifting dunes • Shifting dunes along the shoreline with Ammophila arenaria (white dunes) 	<p>No potential impacts from air emissions have been identified.</p> <p>There is no hydrological connection between the SAC and the proposed development site. No potential impacts from air emissions have been identified.</p> <p>Therefore no potential impacts or in-combination impacts on these habitats have been identified</p>	Screened Out

Natura Site	2000	Qualifying Interest	Potential Impacts	Screened In/Out
		<ul style="list-style-type: none"> Fixed coastal dunes with herbaceous vegetation (grey dunes) 		

6. Natura Impacts Statement (NIS)

6.1 Status of qualifying species and habitats potentially affected by the proposed development - River Boyne and River Blackwater SAC

6.1.1 Otters

No specific targets for otter as a QI for the River Boyne and River Blackwater SAC have been outlined. The following objective is noted in *Conservation objectives for River Boyne and River Blackwater SAC [002299]* (NPWS 2018).

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected

A review of existing records showed that Otter or signs of Otter have been recorded on 17 occasions within grid square O07, the 10km grid square in which the proposed development site is located (NBDC 22/04/20). The most recent record was September 2018. The proposed development site is not hydrologically connected to the River Boyne or River Blackwater and is located within the River Nanny catchment. Otter has been recorded within and are known to occur within the River Nanny. However, no signs of otter were noted during site surveys within or in proximity to the Indaver site.

Otter territories can range between 20 and 30km. 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 this watercourse does not support permanent fish populations which could 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 (within the site attenuation pond) within the site boundary although 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 very unlikely to be a critical resource for this species.

6.2 Status of qualifying species and habitats potentially affected by the proposed development - River Boyne and River Blackwater SPA

6.2.1 Kingfisher

The Eurasian kingfisher is a small kingfisher with seven subspecies recognised within its wide distribution across Eurasia and North Africa. It is resident in much of its range but migrates from areas where rivers freeze in winter. Kingfishers are important members of ecosystems

and good indicators of freshwater community health. The highest densities of breeding birds are found in habitats with clear water, which permits optimal prey visibility, and trees or shrubs on the banks. These habitats have also the highest quality of water, so the presence of this bird confirms the standard of the water. Measures to improve water flow can disrupt Kingfisher habitat, and in particular, the replacement of natural banks by artificial confinement greatly reduces the populations of fish, amphibians and aquatic reptiles, and waterside birds are lost. Kingfisher can tolerate a certain degree of urbanisation, provided the water remains clean.

Kingfishers are highly territorial. During the breeding season, they typically maintain territories 1 km in length (Fry *et al.* 1999). They are solitary for most of the year, roosting alone in heavy cover. Breeding pairs form in the autumn but each bird retains a separate territory, generally at least 1 km long, but up to 3.5 km and territories are not merged until the spring.

One of the most limiting factors with regards the presence or absence of Kingfishers is the availability of suitable nesting banks (Boag 1982). However Cummins *et al.* (2010) found the River Boyne, which also had reasonably high numbers of Kingfisher territories per kilometre, had fewer suitable banks than some rivers with lower numbers. Obviously other factors such as water quality, availability of suitable perches and adequate fish populations are also important in the overall suitability of river systems for Kingfisher. In the same study the River Boyne recorded the highest numbers per kilometre of the six rivers surveyed, with 15-19 territories (densities of 0.09-0.12 territories/km). Kingfishers have been recorded on 18 occasions within O07 (NPWS 22/04/20) and they are known to occur within the River Nanny main channel (Irish Birding 2016). No kingfisher 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 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 this watercourse does will not support permanent fish populations which provide a source of prey for kingfisher. Whilst the attenuation 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 very unlikely to be a critical resource for this species,

6.3 Status of qualifying species and habitats potentially affected by the proposed development - River Nanny Estuary and Shores SPA

The special conservation interests for the River Nanny Estuary and Shores SPA are the following: Oystercatcher, Ringed Plover, Golden Plover, Knot, Sanderling and Herring Gull. The Selection Species and Additional Special Conservation Interests for River Nanny Estuary and Shore SPA are as follows (NPWS 2012):

1. During winter the site regularly supports 1% or more of the all-Ireland population of Ringed Plover (*Charadrius hiaticula*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 185 individuals.

2. During winter the site regularly supports 1% or more of the all-Ireland population of Knot (*Calidris canutus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,140 individuals.

3. During winter the site regularly supports 1% or more of the all-Ireland population of Sanderling (*Calidris alba*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 240 individuals.

Additional Special Conservation Interests for River Nanny Estuary and Shore SPA are as follows:

4. During winter the site regularly supports 1% or more of the all-Ireland population of Oystercatcher (*Haematopus ostralegus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,014 individuals.

5. During winter the site regularly supports 1% or more of the all-Ireland population of Golden Plover (*Pluvialis apricaria*). The mean peak number of this Annex I species within the SPA during the baseline period (1995/96 – 1999/00) was 1,759 individuals.

6. During winter the site regularly supports 1% or more of the all-Ireland population of Herring Gull (*Larus argentatus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 609 individuals.

7. The wetland habitats contained within River Nanny Estuary and Shore SPA are identified of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore, the wetland habitats are considered to be an additional Special Conservation Interest.

Targets and attributes for SCIs are detailed in **Table 8**.

Table 8. QI species for which a potential impact has been identified – specific targets (Source NPWS 2012)

Species/Habitats	Attribute	Measure	Target
Oystercatcher Ringed Plover Golden Plover Knot	Population trend	Percentage change	Long term population trend stable or increasing
Sanderling Herring Gull	Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by each species, other than that occurring from natural patterns of variation
Wetlands	Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,364ha, other than that occurring from natural patterns of variation

7. Water Quality data

7.1 EPA Water Quality Data

Water quality is a key supporting element for aquatic habitats and therefore any impacts on water quality has the potential to negatively impact on Natura 2000 sites where a hydrological connection is present.

The Environmental Protection Agency carries out a biological assessment of most river channels in the country on a regular basis. The assessments are used to derive Q values, indicators of the biological quality of the water. The biological health of a watercourse provides an indication of long-term water quality. The EPA Q value scheme is summarised in **Table 9**. The relationship between the Q-rating system and the Water Framework Directive classification as defined by the Surface Waters Regulations 2009 (S.I. 272 of 2009) is shown in **Table 10**.

Table 9: EPA Biotic Index Scheme

Q value	Water quality	Pollution	Condition
5	Good	Unpolluted	Satisfactory
4	Fair	Unpolluted	Satisfactory
3	Doubtful	Moderately polluted	Unsatisfactory
2	Poor	Seriously polluted	Unsatisfactory
1	Bad	Seriously polluted	Unsatisfactory

Source: EPA

The Q Value system which is used by the Environmental Protection Agency describes the relationship between water quality and the macro-invertebrate community in numerical terms. The presence of pollution causes changes in flora and fauna of rivers. Well documented changes occur in the macro-invertebrate community in the presence of organic pollution: sensitive species are progressively replaced by more tolerant forms as pollution increases. Q5 waters have a high diversity of macro-invertebrates and good water quality, while Q1 have little or no macro-invertebrate diversity and unsatisfactory water quality.

The intermediate ratings Q1-2, Q2-3, Q3-4 and Q4-5 are used to denote transitional conditions, while ratings within parenthesis indicate borderline values. Great importance is attached to the EPA biotic indices, and consequently it is these data that are generally used to form the basis of water quality management plans for river catchments. EPA biological monitoring data for the monitoring locations near the proposed development site are shown in **Table 11** and **Figure 7**. The 2018 biological monitoring results from the River Nanny indicate that water quality was moderate to poor at all relevant monitoring stations.

Table 10: Correlation Between the WFD Classification and Q Values

Ecological status WFD	Q Values
High	Q5, Q4-5
Good	Q4
Moderate	Q3-4
Poor	Q3, Q2-3
Bad	Q2, Q1



Figure 7: Location of EPA Water Quality Monitoring Stations and River Network.
(Source EPA Maps 2020)

Table 11: Q-Values and Locations

Q-Value location	Distance from development	Q-Value Score	Water Framework Directive Status
River Nanny			
Br NE of Bellewstown Ho	1.76km SE and downstream of proposed development site	Q3-4 (2018)	Moderate
Nanny (Meath) - Br u/s Beaumont Br	2.19km SE and downstream of proposed development site	Q3 (2018)	Poor
Nanny (Meath) Beaumont Br	2.43km SE and downstream of proposed development site	Q3 (2018)	Poor

Q-Value location	Distance from development	Q-Value Score	Water Framework Directive Status
Dardistown Bridge	4.7km SE and downstream of proposed development site	Q3 (2018)	Poor
Bridge at Julianstown	7.03km SE and downstream of proposed development site	Q3 (2018)	Poor

7.2 River Basin Management Plan for Ireland 2018 – 2021 (2nd Cycle)

The Water Framework Directive (WFD) sets out the environmental objectives which are required to be met through the process of river basin planning and implementation of those plans. Specific objectives are set out for surface water, groundwater and protected areas. The challenges that must be overcome in order to achieve those objectives are very significant. Therefore, a key purpose of the River Basin Management Plan (RBMP) is to set out priorities and ensure that implementation is guided by these priorities.

The second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). The former measure has resulted in significant progress in terms both of compliance levels and of the impact of urban waste-water on water quality. The latter provides a considerable environmental baseline which all Irish farmers must achieve and has resulted in improving trends in the level of nitrates and phosphates in rivers and groundwater. It is acknowledged, however, that sufficient progress has not been made in developing and implementing supporting measures during the first cycle.

Overall, RBMP assesses the quality of water in Ireland and presents detailed scientific characterisation of our water bodies. The characterisation process also takes into account wider water quality considerations, such as the special water-quality requirements of protected areas. The characterisation process identifies those water bodies that are *At Risk* of not meeting the objectives of the WFD, and the process also identifies the significant pressures causing this risk. Based on an assessment of risk and pressures, a programme of measures has been developed to address the identified pressures and work towards achieving the required objectives for water quality and protected areas. Data relating to the watercourses within the study area is provided in **Table 12** and their locations illustrated in **Figure 8**. The proposed development site falls within the Nanny-Delvin catchment.

Table 12: Water Framework Directive Data – Relevant data

Catchment: Nanny-Delvin – 2nd Cycle			
<p>This catchment includes the area drained by the Rivers Nanny and Delvin and by all streams entering tidal water between Mornington Point and Sea Mount, Co. Dublin, draining a total area of 711km². The largest urban centre in the catchment is Swords. The other main urban centres in this catchment are Donabate, Lusk, Skerries, Balbriggan, Stamullin, Laytown, Bettystown, Duleek, Ashbourne, Ratoath and Dunshaughlin. The total population of the catchment is approximately 159,230 with a population density of 224 people per km².</p>			
<p>This catchment is characterised by an undulating landscape, underlain for the most part by impure limestones and shales with metamorphic bedrock underlying the northern part of the catchment. There are no significant sand or gravel aquifers in the catchment.</p>			
<p>The proposed development site is located within the Nanny(Meath)_SC_020 subcatchment. Three out of four river water bodies in this subcatchment are classified as At-Risk, including Nanny (Meath)_040 due to Moderate biological status and elevated phosphate and ammonia and Nanny (Meath)_050 due to Poor biological status (driven by invertebrate status but fish status is also Moderate) and elevated phosphate</p>			
<p>Agricultural activities (diffuse, sediment issues related to tillage) and channelisation are also significant pressures within the subcatchment. Septic tanks, diffuse urban run off (notably related to roads) were also identified within Mosney_010, along with sheep dip issues in the past.</p>			
River Waterbodies relevant to the proposed project			
Waterbody	Status	Risk	Objective
Nanny (Meath)_040	Poor	At risk	2027
Nanny (Meath)_050	Moderate	At risk	2027

Source: wfdireland map system & www.catchments.ie



Figure 8: WFD waterbodies in the vicinity of the proposed development site (Source EPA Maps 2020)

8. Ecological surveys

Site surveys were carried out on 30th September 2019 and 22th April 2020 to identify the habitats, flora and fauna present at the site. The survey consisted of walking systematically through the site and recording habitats. The terrestrial and aquatic habitats within or adjacent to the proposed development site were classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex I Habitats where required. No rare floral species were noted.

A detailed description of the habitats found within the proposed development site and an assessment of their ecological value, is provided in **Appendix 2 Biodiversity**.

8.1 Habitats

Terrestrial habitat mapping was carried out in line with the methodology outlined in the Heritage Council publication *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). All habitats within the proposed development site were classified to level 3 of the classification scheme outlined in *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross-referenced with habitats listed under Annex I of the Habitats Directive. A habitat map for the proposed development site is provided as **Figure 9**. An overview of aquatic habitats is provided in **Figure 10**. Habitats noted within the proposed development area are shown below in **Table 13**.

Table 13: Habitat types affected within the proposed development site

Habitats	Comments
Buildings and artificial surfaces (BL3)	This is a highly modified habitat with low species diversity and little value for wildlife.
Amenity grassland (improved) (GA2)	This is a highly modified habitat with limited value for local wildlife.
Ornamental/non-native shrub (WS3)	This category is used for areas that are dominated by ornamental and non-native shrubs.
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.
Spoil and bare ground (ED2)	This is a highly modified habitat with low species diversity and little value for wildlife.
Immature woodland (WS2) / (Mixed) broadleaved woodland (WD1)	The woodland habitats on site are generally of low diversity with an under developed ground flora and shrub layer. However, woodland can provide important habitats for local wildlife such as birds, insects, mammals including bats.

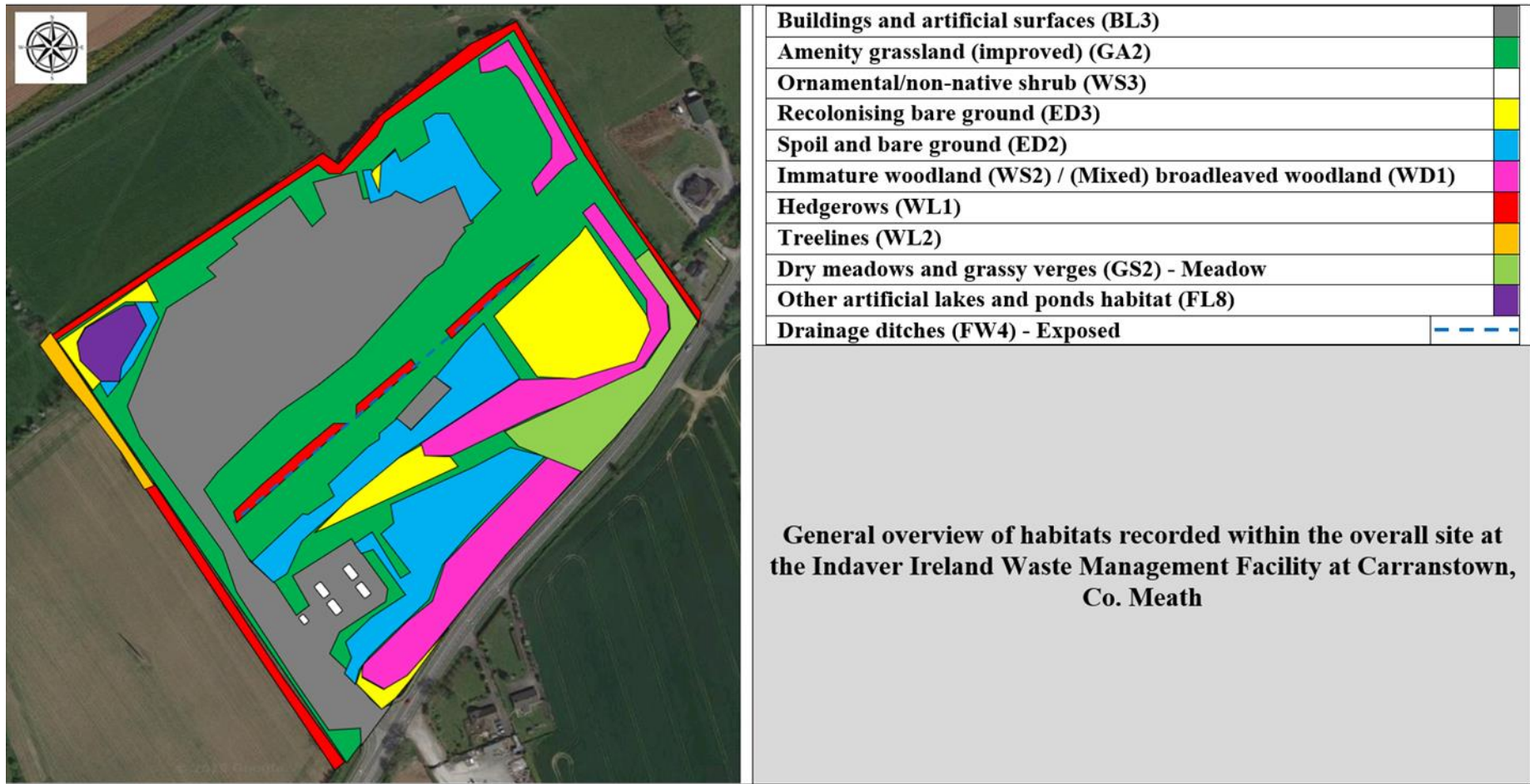


Figure 9: General overview of habitats within proposed development site



Figure 10: Location of drainage ditches on site

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 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.

Piped and open drainage ditches (FW4) are mainly associated with hedgerows. Their locations are illustrated in **Figure 10**. These drainage ditches are artificial in origin and have been excavated to enhance drainage and control the flow of water within the site. It is noted that the ditches on site are largely seasonal and dry out 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. This stream was found to be dry during a site survey in April 2020.

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 habitat dry meadows and grassy verges (GS2) habitat becoming established. These habitats are considered of are of low ecological value and do not correspond to Annex I habitats or qualifying habitats for Natura 2000 sites.

8.2 Mammals

Further detail on mammal surveys are provided in **Appendix 2 Biodiversity**. The main focus of the mammal survey was to establish if otter, which is listed as qualifying species for the River Boyne and River Blackwater SAC, utilise the proposed works areas or areas in immediate proximity to them.

8.2.1 Otters

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. This species is a qualifying interest for the River Boyne and River Blackwater SAC.

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. 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 Irish cities. Thus, Otters are able to adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower.

No evidence of Otter were recorded during site surveys. 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. 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 within the site boundary (Parry *et al.* 2015). The proposed works will result in an increase in noise and disturbance during construction. 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 the levels already generated by the existing Indaver facility.

8.3 Birds

A detailed bird survey report is included as **Appendix 2 Biodiversity**. Information on birds recorded at the site is summarised below.

A bird survey was carried out in conjunction with habitat survey on the 30th of September 2019 and 22th April 2020. 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. During the survey, all birds seen or heard within the development site were recorded. 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 14**.

Table 14: Bird Species recorded site surveys.

Species		Birds Directive Annex			BOCCI*	
		I	II	III	Red List	Amber List
<i>Carduelis carduelis</i>	Goldfinch					
<i>Larus fuscus</i>	Lesser black-backed Gull					X
<i>Erithacus rubecula</i>	Robin					X
<i>Larus argentatus</i>	Herring Gull				X	

Species		Birds Directive Annex			BOCCI*	
		I	II	III	Red List	Amber List
<i>Turdus merula</i>	Blackbird					
<i>Prunella modularis</i>	Dunnock					
<i>Troglodytes troglodytes</i>	Wren					
<i>Pyrrhula pyrrhula</i>	Bullfinch					
<i>Corvus frugilegus</i>	Rook					
<i>Corvus monedula</i>	Jackdaw					
<i>Pica pica</i>	Magpie					
<i>Delichon urbicum</i>	House Martin					X
<i>Columba palumbus</i>	Woodpigeon		X	X		
<i>Fringilla coelebs</i>	Chaffinch					
<i>Corvus cornix</i>	Hooded Crow					
<i>Parus caeruleus</i>	Blue Tit					
<i>Motacilla cinerea</i>	Grey Wagtail				X	
<i>Motacilla alba yarrellii</i>	Pied Wagtail					
<i>Buteo buteo</i>	Buzzard					
<i>Parus major</i>	Great Tit					
<i>Columba livia f. domestica</i>	Feral Pigeon					
<i>Larus canus</i>	Common gull					X
<i>Hirundo rustica</i>	Swallow					X
<i>Sturnus vulgaris</i>	Starling					X
<i>Regulus regulus</i>	Goldcrest					X
<i>Anthus pratensis</i>	Meadow Pipit					
<i>Emberiza citrinella</i>	Yellow hammer				X	
Symbol	Description					

Species	Birds Directive Annex			BOCCI*	
	I	II	III	Red List	Amber List
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.				
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.				

*Colhoun K. & Cummins, S. 2013 Birds of Conservation Concern in Ireland 2014-19. *Irish Birds* 9:523-544

Overall, the proposed development site is of local value for terrestrial bird species that are relatively common in the Irish countryside. The drains within the Indaver site and the nearest downgradient watercourse (Cruicerath Stream) do will not support permanent fish populations which could potentially 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. Herring Gull which is listed as a special conservation interest for the River Nanny Estuary and Shores SPA was recorded during bird survey however this species, which commonly uses inland sites, was not recorded in significant numbers. There may be a short-term impact on feeding patterns during construction but the long-term impact on birds will be minimal.

8.4 Invasive species

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 *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.

9. Assessment of Potential Impacts

Based on the EC Article 6 Guidance Document (2001) and IEEM guidelines '*Guidelines for Ecological Impact Assessment*' (IEEM, 2018) impacts are assessed, using a combination of professional judgement and criteria or standards where available. As the Natura 2000 sites are of International importance, any significant adverse impacts would be significant at an 'International' level. However, where impacts are expected not to have a significant impact on the integrity of these habitats at an International level but are likely to have National or Local level impacts, this has been stated.

The potential impacts associated with the proposed development are discussed in the following section with respect to their likelihood to have significant impacts on Natura 2000 sites.

As part of the assessment direct, indirect and cumulative impacts were considered. Direct impacts refer to habitat loss or fragmentation arising from land-take requirements for development. Indirect and secondary impacts do not have a straight-line route between cause and effect, and it is potentially more challenging to ensure that all the possible indirect impacts of the project/plan - in combination with other plans and projects have been established.

As part of the assessment the potential for impacts associated with the development were reviewed as outlined below:

- Impacts from noise and disturbance on qualifying species during construction
- Impacts on water quality and aquatic ecology during construction phase
- Cumulative Impacts

9.1 Potential noise/disturbance impacts during construction

Potentially increased noise and disturbance associated with the site works could cause disturbance/displacement of fauna. If of sufficient severity, there could be impacts on reproductive success. The River Boyne and River Blackwater SAC and SPA are located 3.2km and 3.4km respectively from the proposed development site. Given the distance involved noise during the construction phase will not impact on foraging Otters or Kingfisher within the SAC/SPA boundary. Theoretically impacts on these species feeding outside of the SAC/SPA boundary could potentially occur.

Best practice measures will ensure that there will be no significant increases in noise or activity during the operational phase. These measures are specified below and further details are provided in **Appendix 4 Noise and Vibration**.

9.1.1 Otter

Potential impacts could arise due to disturbance of Otter as a result of increased noise and activity during the construction works. This could potentially lead to changes in feeding behaviour which if of sufficient severity could impact on reproductive success. Disturbance of otter could theoretically have an impact on overall populations within the River Boyne and River Blackwater SAC.

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, Otters are able to adapt to increased noise and activity levels and breeding holts are generally located in areas where disturbance levels are low.

Although no specific targets have been outlined by the NPWS for the River Boyne and River Blackwater SAC with respect to Otter, targets for similar SAC sites relate to distribution, extent of terrestrial habitats, extent of freshwater (river) habitat, couching sites and holts and fish biomass available.

As noted previously in **Section 8.2.1**, Otter have been recorded feeding on Smooth Newt (Parry *et al*, 2015). Otter could potentially forage on Common Frog and Smooth Newt in pond habitat (within the attenuation point) within the site boundary although 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 will not be a critical resource for this species.

The construction phase of the proposed development will involve site clearance, demolition of existing structures, excavation, foundations, construction of new structures, connections to on-site utility services and new car parking areas. The various items of construction plant required to undertake these works have the potential to generate high levels of noise at the nearest noise sensitive locations in addition to construction traffic to and from the site. Vibration impacts during this phase will be limited to ground excavation and building foundations. It is noted that the proposed development site is located adjacent to an active WtE facility and any Otters which currently use the site are already subject to a relatively high level of noise and visual disturbance. Furthermore, a range of mitigation measures have been specified in **Section 10** of this NIS to minimise noise levels during the construction phase.

Given the absence of any signs of Otter usage, the negligible value of the small tributaries as feeding resources, the likelihood that any usage of pond habitat will be sporadic if it occurs, the ability of this species to habituate to noise and disturbance, the limited increase in noise and disturbance associated with the development and the distance from Natura 2000 sites, no significant adverse effects on Otter as a conservation interest for Natura 2000 sites will occur.

9.1.2 Kingfisher

The potential effects and impacts of disturbance have been widely recognised in wildlife conservation legislation, as has the need to develop conservation measures for birds whilst taking human activities into account. Article 4.4 of the Bird's Directive (79/409/EEC) requires member states to *"take appropriate steps to avoid... any disturbances affecting the birds, in*

so far as these would be significant having regard to the objectives of this Article". This specifically relates to conservation measures concerning Annex I species.

Theoretically disturbance of important qualifying bird species feeding outside the SPA boundary could potentially occur during the construction phase of the project. However, predicting potential impacts on birds from disturbance can be problematic. Although there are many instances where Kingfishers and people appear to co-exist along rivers, there are widespread examples where effects and impacts of varying severity have been described.

Optimal foraging theory is a useful basis from which to understand likely effects of disturbance on feeding. Many studies have shown that birds concentrate where feeding is best. If birds are forced temporarily or permanently to leave these places, then there is an increased risk that their foraging ability will suffer. However, the severity of this type of situation and the way in which birds respond; vary in a very complex way. The multiplicity of variables underlying the observed interactions between birds and people makes it difficult to assess the cause and implications of a particular instance of disturbance. The magnitude of disturbance to birds may arise from synergistic effects of more than one activity.

Wintering Kingfishers are particularly prone to disturbance as they are required to fish more - or-less constantly to provide the energy need to survive during the winter, particularly during cold spells. Boag (1982) noted disturbance factors could also impact on numbers of breeding pairs, as Kingfishers will often not nest in an area if there is ongoing disturbance nearby. Cummins *et al.* (2010) examined pressures and disturbance on Kingfishers at several Irish rivers. The Barrow, which had amongst the lowest numbers of Kingfishers per kilometre had the highest percentage of 'paths & tracks', 'roads' and 'human trampling' suggesting that such disturbances could be having a negative effect on populations there. However, anecdotal reports from local fishermen indicated that fish numbers on this river were low and the study concluded that any assumptions on the severity of these threats would be tenuous given the short term nature of the study.

During the construction stage, there will be short-term increases in disturbance, but it will not be significant in the context of existing noise levels (which are within current IED limits). In general studies show that most bird species can habituate to regular and continual sources of noise and visual disturbances providing there is no large 'startling' component.

Newts have been recorded in the diet of Kingfisher (Cech 2015) and could potentially use the attenuation pond in the existing Indaver site which holds a population of Smooth Newt (see **Appendix 2 Biodiversity**). However, with the exception of manmade drainage ditches, there are no freshwater habitats within the proposed development site. It is noted that the onsite drainage ditches are seasonal, as is the nearest downgradient watercourse (Cruicerath stream) and therefore these habitats will not support permanent fish populations which could provide a source of prey for Kingfisher.

The area around the proposed works site at the Indaver facility, is already subject to moderate to high levels of disturbance by truck movements and day to day operations. In the unlikely event that Kingfisher were to use the attenuation pond within the site this is very unlikely to be a critical feeding resource and there is there would be only temporary displacement/disturbance impacts. Furthermore, a range of mitigation measures have been specified in **Section 10** of this NIS to minimise levels of noise during the construction phase.

The construction phase of the project will increase noise and visual disturbance, however given the lack of high value habitat within the proposed development site, the availability of alternative habitat, the short-term nature of the works and the mitigation measures specified, no significant impact on Kingfisher will occur. It has been concluded therefore that the proposed development will have no impact on the conservation objectives of the River Boyne and River Blackwater SPA.

9.2 Potential impacts on water quality 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 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. It is noted that the potential for significant impacts on water quality within the River Nanny Estuary and Shores SPA during construction is very low given that the Cruicerath Stream dries up completely during dry periods and given that the River Nanny Estuary and Shores SPA is located over 11km downstream. However, taking the precautionary principle into consideration possible impacts on water quality are assessed below.

Inadvertent spillages of hydrocarbon and/or other chemical substances during construction could introduce toxic chemicals into the aquatic environment via direct means or surface water run-off. 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. However, any such spills, in the unlikely event of their occurrence, would be minor in the context of the available dilution in the Nanny Estuary and Irish Sea.

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. Qualifying species for the River Nanny Estuary and Shores SPA i.e. wading/estuarine birds, which forage on plants and invertebrates could be negatively impacted by a reduction in prey availability.

Estuarine habitats (i.e. estuaries, mudflats and sandflats) are robust in nature and unlikely to be affected by small fluctuation in silt levels. Furthermore, a range of mitigation measures have been specified in **section 10** to minimise the risk of such impacts occurring and measures have been specified to effectively deal with spills were they to occur.

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 are only likely to arise from extremely severe levels of siltation. The risk of significant silt levels being generated

is very low given the limited scope of the proposed development, the existing surface water management systems, the mitigation measures to be implemented and the distance from Natura 2000 sites, no adverse effects on prey availability for birds listed as special conservation interests the River Nanny Estuary and Shore SPA will 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. Therefore, no significant impact on water quality from hydrocarbons or other chemical spills during construction will occur and no significant effect on the qualifying interests and conservation objectives for the River Nanny Estuary and Shores SPA will occur.

9.3 In combination Effects

In-combination effects (Cumulative impacts) refer to a series of individual impacts that may, in combination, produce a significant impact. The underlying intention of this in combination provision is to take account of cumulative impacts from existing or proposed plans and projects and these will often only occur over time. The proposed works could theoretically create a cumulative impact. Other developments relevant to the proposed development and potential cumulative impacts are:

The proposed development may also give rise to cumulative effects with regard to other proposed developments, either consented or currently under construction. Other developments relevant to the proposed development and potential cumulative impacts are listed in **Table 15**.

Table 15. Potential in combination effects

Plans and Projects Key Policies/Issues/Objectives Directly Related to the Conservation of the European Network		
River Basin Management Plan 2018-2021	<p>The project should comply with the environmental objectives of the Irish RBMP which are to be achieved generally by 2021.</p> <ul style="list-style-type: none"> • Ensure full compliance with relevant EU legislation • Prevent deterioration • Meeting the objectives for designated protected areas • Protect high status waters • Implement targeted actions and pilot schemes in focus sub-catchments aimed at: targeting water bodies close to meeting their objective and addressing more complex issues which will 	<p>The implementation and compliance with key environmental policies, issues and objectives of this management plan will result in positive in-combination effects to European sites. The implementation of this plan will have a positive impact for the biodiversity. It will not contribute to in-combination or cumulative impacts with the proposed development.</p>

Plans and Projects Key Policies/Issues/Objectives Directly Related to the Conservation of the European Network

	build knowledge for the third cycle.	
<p>Inland Fisheries Ireland Corporate Plan 2016 -2020</p> <p>The Inland Fisheries Act 2010.</p>	<p>To ensure that Ireland’s fish populations are managed and protected to ensure their conservation status remains favourable. That they provide a basis for a sustainable world class recreational angling product, and that pristine aquatic habitats are also enjoyed for other recreational uses.</p> <p>To develop and improve fish habitats and ensure that the conditions required for fish populations to thrive are sustained and protected.</p> <p>To grow the number of anglers and ensure the needs of IFI’s other key stakeholders are being met in a sustainable conservation focused manner.</p> <p>EU (Quality of Salmonid Waters) Regulations 1988. All works during development and operation of the project must aim to conserve fish and other species of fauna and flora habitat; biodiversity of inland fisheries and ecosystems and protect spawning salmon and trout.</p>	<p>The implementation and compliance with key environmental issues and objectives of this corporate plan will result in positive on-combination effects to European sites. The implementation of this corporate plan will have a positive impact for biodiversity of inland fisheries and ecosystems. It will not contribute to in-combination or cumulative impacts with the proposed development.</p>
Irish Water Capital Investment Plan 2014-2016	Proposals to upgrade and secure water services and water treatment services countrywide.	Likely net positive impact due to water conservation and more effective treatment of water.
Water Services Strategic Plan (WSSP, 2015)	Irish Water has prepared a Water Services Strategic Plan (WSSP, 2015), under Section 33 of the Water Service No. 2 Act of 2013 to address the delivery of strategic objectives which will contribute	The WSSP forms the highest tier of asset management plans (Tier 1) which Irish Water prepare and it sets the overarching framework for subsequent detailed

Plans and Projects Key Policies/Issues/Objectives Directly Related to the Conservation of the European Network

	<p>towards improved water quality and biodiversity requirements through reducing:</p> <ul style="list-style-type: none"> • Habitat loss and disturbance from new / upgraded infrastructure; • Species disturbance; • Changes to water quality or quantity; and • Nutrient enrichment /eutrophication. 	<p>implementation plans (Tier 2) and water services projects (Tier 3). The WSSP sets out the challenges we face as a country in relation to the provision of water services and identifies strategic national priorities. It includes Irish Water’s short, medium and long-term objectives and identifies strategies to achieve these objectives. As such, the plan provides the context for subsequent detailed implementation plans (Tier 2) which will document the approach to be used for key water service areas such as water resource management, wastewater compliance and sludge management. The WSSP also sets out the strategic objectives against which the Irish Water Capital Investment Programme is developed. The current version of the CAP outlines the proposals for capital expenditure in terms of upgrades and new builds within the Irish Water owned assets.</p> <p>The overarching strategy was subject to AA and highlighted the need for additional plan/project environmental assessments to be carried out at the tier 2 and tier 3 level. Therefore, no likely significant in-combination effects are envisaged.</p>
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Plans and Projects Key Policies/Issues/Objectives Directly Related to the Conservation of the European Network

<p>Meath County Development Plan 2013-2019</p>	<p>Objective <i>NH OBJ 2</i> To ensure an Appropriate Assessment in accordance with Article 6(3) and Article 6(4) of the Habitats Directive, and in accordance with the Department of Environment, Heritage and Local Government Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 and relevant EPA and European Commission guidance documents, is carried out in respect of any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect on a Natura 2000 site(s), either individually or in-combination with other plans or projects, in view of the site’s conservation objectives.</p> <p><i>Objective NH OBJ 3</i> To protect and conserve the conservation value of candidate Special Areas of Conservation and Special Protection Areas as identified by the Minister for the Department of Arts, Heritage and the Gaeltacht and any other sites that may be proposed for designation during the lifetime of this Plan.</p>	<p>Meath County Council and all planning authorities are required to ensure that an Appropriate Assessment of the implications of proposals on designated nature conservation sites (Natura 2000) is undertaken. This assessment is required for all planning applications that have shown to pose likely significant effects on these sites through a screening process. Screening for Appropriate Assessment applies to all development proposals, either within or outside a Natura 2000</p>
<p>Relevant Applications Under consideration</p>	<p>Irish Cement Ltd. (LB150375) - 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).</p> <p>Irish Cement Ltd. (PL17 .PA0050) - 10-year permission to facilitate further replacement of fossil fuels and allow for the introduction of alternative raw materials in the</p>	<p>Future developments will only be granted permission where discharges from same meet with relevant water quality standards.</p> <p>In the absence of significant emissions to air or water from this proposed Indaver project no significant cumulative impact on ecology has been identified between the proposed development and any other projects or plans.</p>

Plans and Projects Key Policies/Issues/Objectives Directly Related to the Conservation of the European Network

	<p>manufacturing of cement at Platin Cement Works, Platin, Co. Meath.</p> <p>SSE Generation Ireland Ltd (PL17. 303678) - Application to ABP (Electricity Development Application) for the Air insulated switchgear 110kV transmission substation.</p> <p>Highfield Solar Ltd. (PL17. 248146) - 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.</p> <p>Highfield Solar Ltd (PL17 .303568) - 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.</p>	
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It is noted these projects will have assessed the risks and specified mitigation measures to prevent any significant effects on Natura 2000 sites from occurring. Likewise mitigation measures have been specified within this NIS to prevent significant impacts on Natura 2000 sites from occurring. In the absence of significant emissions to air or water from this proposed Indaver project, no significant cumulative impact on ecology has been identified between the proposed development and any other projects or plans. It has been concluded that should the construction of any of the developments mentioned above occur concurrently, the potential in-combination effects will not be significant, given the implementation of standard construction environmental/mitigation measures, the limited risk of significant effects and the distance from Natura 2000 sites. Therefore, there will be no in-combination impacts on the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA or the River Nanny Estuary and Shores SPA as a result of the proposed development.

10. Mitigation

The likely success of the proposed mitigation measures 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 Construction Environmental Management Plan (CEMP)**). The CEMP contains the construction mitigation measures, which are set out in this EIAR.

Mitigation measures (of relevance in respect of any potential ecological effects) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

- *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*. National Roads Authority, Dublin.
- Environmental Protection Agency (EPA) *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA, 2017).
- Environmental Protection Agency (EPA) *Draft Revised Guidelines on Information to be contained in Environmental Impact Statements* (EPA, 2015).
- Environmental Protection Agency (EPA) *Draft Advice Notes for Preparing Environmental Impact Statements* (EPA, 2015).
- Environmental Protection Agency (EPA) *Guidelines on the information to be contained in Environmental Impact Statements* (EPA, 2002).
- Environmental Protection Agency (EPA) *Advice Notes on current practice in the preparation of EISs* (EPA 2003).

Waste Related

- *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (Department of Environment, Heritage and Local Government, July 2006).

Earthworks

- TII (2013) *Notes for Guidance on the Specification for Road Works Series NG600 – Earthworks (including NG601 Classification, Definition and Uses of Earthworks Materials and Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements)*; and
- ICE (2015) *Earthworks, A Guide* (2nd Edition). Silt and Pollution Control Related

- CIRIA (C793) *The SUDS Manual*;
- CIRIA (C624) *Development and flood risk – guidance for the construction industry*;
- CIRIA (C532) *Control of water pollution from construction sites, guidance for consultants and contractors* (2001);
- CIRIA (C741) *Environmental good practice on site guide* (fourth edition) (2015).
- *Control of water pollution from construction sites. Guidance for consultants and contractors (C532)*. CIRIA. H. Masters-Williams et al (2001)

10.1 Protection of habitats

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.

10.2 Protection of watercourses during construction phase

Full details on construction mitigation are included in **Appendix 5 Construction Environmental Management Plan (CEMP)** and **Appendix 8 Construction Activities**. The CEMP 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 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 **Appendix 5 CEMP**.

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.

Appendix 6 Water and **Appendix 7 Land and Soils** set out a number of mitigation measures and monitoring measures to minimise the risk of effects on land, soils and water (including groundwater) during construction. They are as follows:

Excavation Works

- Where possible, excavated materials will be reused on site for backfilling purposes, re-grading and landscaping.
- All earthworks will be monitored by suitably qualified and experienced geotechnical personnel.
- Earthworks will be programmed so as not to be carried out during extreme weather events.
- There is no evidence that contaminated soil should be encountered during the site works, however if any is encountered it will be disposed of as required to a suitable authorised waste facility.

Storm water and foul water management

- In general, storm water generated on site (e.g. from excavations) will be channelled away from the watercourse and infiltrated to ground via silt traps and managed soakaways.
- Drainage from the bunded and designated storage areas will be diverted for collection and safe disposal.
- All construction foul effluent will be stored in the temporary holding tank and will be regularly disposed of off-site.
- Laydown areas will be suitably drained.
- Temporary interceptors (soak pits lined with geotextile) will be constructed as necessary during the early stages of construction mitigating against silt laden run off to the existing drainage network.

Material Storage

- Storage tanks/drums of fuel, oil, chemicals and all other materials that pose a risk to waters if spilled, will be stored in designated storage areas which will be locked when not in use.
- Bunded pallets will be used for storage of drums.
- Storage areas will be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded areas.
- Secure valves will be provided on oil and fuel storage facilities.
- Filling and draw-off points will be located entirely within the bunded areas.
- Any areas which will involve the storage of fuel and refuelling will be paved and bunded and hydrocarbon interceptors will be installed to ensure that no spillages will get into the surface water or groundwater.
- Appropriate staff will be trained in environmental issues and spill response procedures.
- 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 **Appendix 5 CEMP**.

Site Hygiene

- Vehicles exiting the site from excavation areas will be required to pass through wheel wash facilities to remove mud and organic material before entering main site or public roads. The discharge from the wheel wash (equipped with a filtering system) will be directed to a temporary storage tank on site and will be collected periodically for off-site treatment.

Waste Management

- All waste produced on site will be transported to licensed waste disposal facilities to avoid potential soil contamination. Refer to the Construction Waste Management Plan in **Appendix 5 CEMP**.

Monitoring

- Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water runoff is draining from the site and is not exposed to any contaminants.
- The contractor will be required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials.
- Any excavation shall be monitored during earthworks to ensure the stability of side slopes and to ensure that the material excavated for disposal or re-use is consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations.
- Movement monitoring shall be carried out during any activities which may result in ground movements. It is anticipated that the works will be monitored by a Resident Engineer.
- In relation to potential contamination, a suitably experienced environmental consultant will be required to oversee the excavation works for the proposed development so that potential contamination can be segregated, classified and suitably disposed.

The following measures shall also be implemented when working adjacent to or in the vicinity of ditches or streams to prevent uncontrolled runoff from the site into the watercourses:

- The perimeter of the construction area adjacent to the watercourse will be bermed to create a physical barrier between the site and the watercourse. Where there is insufficient space for a berm, a barrier will be created using trench sheeting along the boundary with the watercourse.
- Where cast-in-place concrete is required, all work must be carried out in the dry and effectively isolated from any flowing water (or water that may enter streams and rivers) for a period sufficient to ensure no leachate from the concrete.
- Waterproofing and other chemical treatment to structures in close proximity to watercourses shall be applied by hand.

10.3 Protection of Water Quality and surface water management during operation

No mitigation measures are required to protect water quality or minimise any flood risk. No additional water monitoring is proposed. The current monitoring carried out on site is sufficient. As described in **Section 4.9 of Appendix 1 Description of the Proposed Development**, there are a number of existing monitoring measures on site to prevent any accidental emissions or spills and ensure fire water retention to minimise the risk to water quality.

Under the current EPA IE licence (W0167-03) surface water monitoring is carried out, as outlined in Section 15.3.2.2, and this monitoring will continue with the proposed development.

10.4 Noise and Vibration

Mitigation measures in relation to noise and vibration are addressed in **Appendix 4 Noise and Vibration**. Various mitigation measures shall be considered and applied during the construction phase and specific examples of such measures are:

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise;
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- Any plant, such as generators or pumps that is required to operate outside of normal permitted working hours will be surrounded by an acoustic enclosure or portable screen. Typical working hours during the construction phase will be: 07:00 and 18:30hrs Monday to Friday and between 08:00 and 14:00hrs on Saturdays.

10.5 Ecology

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. NIS Conclusions

Three Natura 2000 sites for which potential significant impacts could occur have been identified i.e. River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA and River Nanny Estuary and Shores SPA.

A range of mitigation measures have been incorporated into the project design, and other mitigation measures have been developed and proposed, with the purpose of avoiding impacts on the qualifying interests and conservation objectives for River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA and River Nanny Estuary and Shores SPA. The likely success of these measures was also considered and no difficulties in their effective implementation were identified.

The provisions of Article 6 of the 'Habitats' Directive 92/43/EC (2000) defines 'integrity' as the 'coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and / or population of species for which the site is or will be classified'. The European Commission publication *Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (EC, 2018), states that the integrity of the site can be usefully defined as the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated"

Following a comprehensive evaluation of the potential direct, indirect and cumulative impacts on the qualifying interests and conservation objectives for the River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA and River Nanny Estuary and Shores SPA, it has been concluded that the proposed development will not have an adverse effect on the integrity of these sites or any other Natura 2000 sites.

This NIS has examined and analysed, in light of the best scientific knowledge, with respect to those European sites within the Zol of the proposed development, the potential impact sources and pathways, how these could impact on the Sites QI habitats and QI/SCI species and whether the predicted impacts would adversely affect the integrity of the European sites.

Mitigation measures are set out within this report and its appendices and they ensure that any impacts on the conservation objectives of European sites will be avoided during the construction and operation of the proposed development such that there will be no risk of adverse effects on these European sites.

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

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Appendices

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Appendix 2 Biodiversity (Ch 11 of EIAR)

Appendix 3 Air Quality (Ch 8 of EIAR)

Appendix 4 Noise and Vibration (Ch 10 of EIAR)

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Appendix 11 Site Synopses

Appendix 11. Natura 2000 site synopses

BOYNE ESTUARY SPA SITE CODE: 004080

This 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. The sediments vary from fine muds in the sheltered areas to sandy muds or sands towards the river mouth. The linear stretches of intertidal flats to the north and south of the river mouth are mainly composed of sand. One or more species of Eelgrass (*Zostera* spp.) occur in the estuary. Parts of the intertidal areas are fringed by salt marshes, most of which are of the Atlantic type, and dominated by Sea-purslane (*Halimione portulacoides*). Other species present include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea-lavender (*Limonium humile*) and Glasswort (*Salicornia* spp.). Common Cord-grass (*Spartina anglica*) occurs frequently on the flats and salt marshes.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Shelduck, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone and Little Tern. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. The Boyne Estuary is the second most important estuary for wintering birds on the Louth-Meath coastline. Black-tailed Godwit occurs here in internationally important numbers (471). A further nine species of wintering waterbirds have populations of national importance, i.e. Shelduck (218), Oystercatcher (1,179), Golden Plover (6,070), Grey Plover (146), Lapwing (4,771), Knot (1,944), Sanderling (81), Redshank (583) and Turnstone (221) - all figures are mean peaks for the 5 year period 1995/96-1999/2000. Of particular note is that the site supports 6.8% of the all-Ireland population of Knot and almost 3% of the total for Golden Plover. Other species which occur include Bar-tailed Godwit (86), Cormorant (97), Brent Goose (172), Wigeon (454), Teal (230), Dunlin (498), Curlew (395), Mallard (197), Red-breasted Merganser (14), Greenshank (6), Ringed Plover (80) and Mute Swan (13). The site provides both feeding and high-tide roost areas for the birds. The estuary also attracts large numbers of gulls in winter, including Black-headed Gull (593), Common Gull (145), Herring Gull (403) and Great Black-backed Gull (160). Little Tern have bred here since at least 1984 and a nationally important population was recorded in 1995 (14 pairs). In the intervening years breeding numbers and fledgling success has varied significantly. In 1996 approximately 20 pairs fledged 15 - 20 chicks but in 1998 and 1999 part of the shingle bank where the birds nested was washed away by storms. In 2008 35 pairs of Little Tern were recorded.

The site 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. 30.5.2015

RIVER NANNY ESTUARY AND SHORE SPA SITE CODE: 004158

The site comprises the estuary of the River Nanny and sections of the shoreline to the north and south of the estuary (c. 3 km in length), in Co. Meath. The estuarine channel, which extends inland for almost 2 km, is narrow and well sheltered. Sediments are muddy in character and edged by saltmarsh and freshwater marsh/wet grassland. The saltmarsh is best developed in the eastern portion of the estuarine channel, with species such as Sea Plantain (*Plantago maritima*), Sea Aster (*Aster tripolium*), Red Fescue (*Festuca rubra*) and Sea Purslane (*Halimione portulacoides*) occurring. Further up the estuary, the marsh habitats support species such as Bulrush (*Typha latifolia*) and Yellow Flag (*Iris pseudacorus*). The shoreline, which is approximately 500 m in width to the low tide mark, comprises beach and intertidal habitats. It is a well-exposed shore, with coarse sand sediments. The welldeveloped 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 site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Oystercatcher, Ringed Plover, Golden Plover, Knot, Sanderling and Herring Gull. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. This is an important site for wintering waders, with nationally important populations of Golden Plover (1,759), Oystercatcher (1,014), Ringed Plover (185), Knot (1,140) and Sanderling (240) present (all figures are mean peaks for the 5 year period 1995/96- 1999/2000). The populations of Knot and Sanderling are of particular note as they represent approximately 4% of their respective national totals. Herring Gull (609) also occurs here in nationally important numbers. A range of other waterbirds also occurs, including Cormorant (35), Light-bellied Brent Goose (145), Mallard (76), Grey Plover (55), Lapwing (1,087), Dunlin (721), Bar-tailed Godwit (59), Curlew (107), Redshank (150), Turnstone (59), Blackheaded Gull (926), Common Gull (66) and Great Black-backed Gull (70). The site is of most importance as a roost area for the birds but the intertidal flats also provide feeding habitat.

The River Nanny Estuary and Shore SPA is of ornithological importance as it supports five species of wintering waterbirds and one gull species in numbers of national importance. The regular occurrence of two species listed on Annex I of the E.U. Birds Directive, i.e. Golden Plover and Bar-tailed Godwit, is of note. 20.1.2015

River Boyne and River Blackwater SAC Site Code: 002299

This site comprises the freshwater element of the River Boyne as far as the Boyne Aqueduct, the Blackwater as far as Lough Ramor and the Boyne tributaries including the Deel, Stoneyford and Tremblestown Rivers. These riverine stretches drain a considerable area of Meath and Westmeath, and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part, with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. There are many large towns adjacent to but not within the site, including Slane, Navan, Kells, Trim, Athboy and Ballivor.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [7230] Alkaline Fens [91E0] Alluvial Forests* [1099] River Lamprey (*Lampetra fluviatilis*) [1106] Atlantic Salmon (*Salmo salar*) [1355] Otter (*Lutra lutra*)

The main areas of alkaline fen in this site are concentrated in the vicinity of Lough Shesk, Freehan Lough and Newtown Lough. The hummocky nature of the local terrain produces frequent springs and seepages which are rich in lime. A series of base-rich marshes have developed in the poorly-drained hollows, generally linked with these three lakes. Open water is usually fringed by Bulrush (*Typha latifolia*), Common Club-rush (*Scirpus lacustris*) or Common Reed (*Phragmites australis*), and this last species also extends shorewards where a dense stand of Great Fen-sedge (*Cladium mariscus*) frequently occurs. This in turn grades into a sedge and grass community (*Carex* spp. and Purple Moor-grass, *Molinia caerulea*), or one dominated by Black Bog-rush (*Schoenus nigricans*). An alternative aquatic/terrestrial transition is a floating layer of vegetation. This is normally based on Bogbean (*Menyanthes trifoliata*) and Marsh Cinquefoil (*Potentilla palustris*). Other species gradually become established on this cover, especially plants tolerant of low nutrient status e.g. bog mosses (*Sphagnum* spp.). Diversity of plant and animal life is high in the fen and the flora includes many rarities. Plants of interest include Narrow-leaved Marsh-orchid (*Dactylorhiza traunsteineri*), Fen Bedstraw (*Galium uliginosum*), Cowbane (*Cicuta virosa*), Frogbit (*Hydrocharis morsus-ranae*) and Least Bur-reed (*Sparganium minimum*). These species tend to be restricted in their distribution in Ireland. Also notable is the abundance of aquatic stoneworts (*Chara* spp.) which are characteristic of calcareous wetlands. The rare plant Round-leaved Wintergreen (*Pyrola rotundifolia*) occurs around Newtown Lough. This species is listed in the Red Data Book and this site represents its only occurrence in Co. Meath. Wet woodland fringes many stretches of the Boyne.

The Boyne River Islands are a small chain of three islands situated 2.5 km west of Drogheda. The islands were formed by the build-up of alluvial sediment in this part of the river where water movement is sluggish. All of the islands are covered by dense thickets of wet, willow (*Salix* spp.) woodland, with the following species occurring: Osier (*S. viminalis*), Crack Willow (*S. fragilis*), White Willow (*S. alba*), Purple Willow (*Salix purpurea*) and Rusty Willow (*S. cinerea* subsp. *oleifolia*). A small area of Alder (*Alnus glutinosa*) woodland is found on soft ground at the edge of the canal in the north-western section of the islands. Along other stretches of the rivers of the site Rusty Willow scrub and pockets of wet woodland dominated by Alder have become established, particularly at the river edge of mature deciduous woodland. Ash (*Fraxinus excelsior*) and Downy Birch (*Betula pubescens*) are common in the latter, and the ground flora is typical of wet woodland with Meadowsweet (*Filipendula ulmaria*),

Wild Angelica (*Angelica sylvestris*), Yellow Iris (*Iris pseudacorus*), horsetails (*Equisetum* spp.) and occasional tussocks of Greater Tussock-sedge (*Carex paniculata*). The dominant habitat along the edges of the river is freshwater marsh, and the following plant species occur commonly in these areas: Yellow Iris, Creeping Bent (*Agrostis stolonifera*), Canary Reed-grass (*Phalaris arundinacea*), Marsh Bedstraw (*Galium palustre*), Water Mint (*Mentha aquatica*) and Water Forget-me-not (*Myosotis scorpioides*). In the wetter areas Common Meadow-rue (*Thalictrum flavum*) is found. In the vicinity of Dowth, Fen Bedstraw (*Galium uliginosum*), a scarce species mainly confined to marshy areas in the midlands, is common in this vegetation. Swamp Meadow-grass (*Poa palustris*) is an introduced plant which has spread into the wild (naturalised) along the Boyne approximately 5 km south-west of Slane. It is a rare species which is listed in the Red Data Book and has been recorded among freshwater marsh vegetation on the banks of the Boyne in this site. The only other record for this species in the Republic of Ireland is from a site in Co. Monaghan. The secondary habitat associated with the marsh is wet grassland and species such as Tall Fescue (*Festuca arundinacea*), Silverweed (*Potentilla anserina*), Creeping Buttercup (*Ranunculus repens*), Meadowsweet and Meadow Vetchling (*Lathyrus pratensis*) are well represented. Strawberry Clover (*Trifolium fragiferum*), a plant generally restricted to coastal locations in Ireland, has been recorded from wet grassland vegetation at Trim. At Rossnaree river bank on the River Boyne, Round-Fruited Rush (*Juncus compressus*) is found in alluvial pasture, which is generally periodically flooded during the winter months. This rare plant is only found in three counties in Ireland.

Along much of the Boyne and along tributary stretches are found areas of mature deciduous woodland on the steeper slopes above the floodplain marsh or wet woodland vegetation. Many of these are planted in origin. However the steeper areas of King Williams Glen and Townley Hall wood have been left unmanaged and now have a more natural character. East of Curley Hole the woodland has a natural appearance with few conifers. Broadleaved species include oaks (*Quercus* spp.), Ash, willows, Hazel (*Corylus avellana*), Sycamore (*Acer pseudoplatanus*), Holly (*Ilex aquifolium*), Horse-chestnut (*Aesculus hippocastanum*) and the shrubs Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Elder (*Sambucus nigra*). Southwest of Slane and in Dowth, some more exotic tree species such as Beech (*Fagus sylvatica*), and occasionally Lime (*Tilia cordata*), are seen. The coniferous trees Larch (*Larix* sp.) and Scots Pine (*Pinus sylvestris*) also occur. The woodland ground flora includes Barren Strawberry (*Potentilla sterilis*), Enchanter's-nightshade (*Circaea lutetiana*) and Ground-ivy (*Glechoma hederacea*), along with a range of ferns. Variation occurs in the composition of the canopy - for example, in wet patches alongside the river, White Willow and Alder form the canopy. Other habitats present along the Boyne and Blackwater include lowland dry grassland, improved grassland, reedswamp, weedy waste ground, scrub, hedge, drainage ditch and canal. In the vicinity of Lough Shesk, the dry slopes of the morainic hummocks support grassland vegetation which, in some places, is partially colonised by Gorse (*Ulex europaeus*) scrub. Those grasslands which remain unimproved for pasture are species-rich, with Common Knapweed (*Centaurea nigra*), Creeping Thistle (*Cirsium arvense*) and Ribwort Plantain (*Plantago lanceolata*) commonly present. Fringing the canal alongside the Boyne south-west of Slane are areas with Reed Sweet-grass (*Glyceria maxima*), Great Willowherb (*Epilobium hirsutum*) and Meadowsweet.

The Boyne and its tributaries form one of Ireland's premier game fisheries and the area offers a wide range of angling, from fishing for spring salmon and grilse to seatrout fishing and extensive brown trout fishing. Atlantic Salmon (*Salmo salar*) use the tributaries and headwaters as spawning grounds. Although this species is still fished commercially in Ireland,

it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the Habitats Directive. Atlantic Salmon run the Boyne almost every month of the year. The Boyne is most important as it represents an eastern river which holds large three-sea-winter fish from 20-30 lb. These fish generally arrive in February, with smaller spring fish (10 lb) arriving in April/May. The grilse come in July, water permitting. The river gets a further run of fish in late August and this run would appear to last well after the fishing season. The salmon fishing season lasts from 1st March to 30th September. The Blackwater is a medium sized limestone river which is still recovering from the effects of the arterial drainage scheme of the 1970s. Salmon stocks have not recovered to the numbers that existed pre-drainage. The Deel, Riverstown, Stoneyford and Tremblestown Rivers are all spring-fed, with a continuous high volume of water. They are difficult to fish because some areas are overgrown, while others have been affected by drainage with resultant high banks.

This site is also important for the populations of two other species listed on Annex II of the E.U. Habitats Directive which it supports, namely River Lamprey (*Lampetra fluviatilis*), which is present in the lower reaches of the Boyne River, and Otter (*Lutra lutra*), which can be found throughout the site. In addition, the site also supports many more of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger and Irish Hare. Common Frog, another Red Data Book species, also occurs within the site. All of these animals, with the addition of the Stoat and Red Squirrel, which also occur within the site, are protected under the Wildlife Act, 1976. Whooper Swans winter regularly at several locations along the Boyne and Blackwater Rivers. Known sites are at Newgrange (approx. 20 in recent winters), near Slane (20+ in recent winters), Wilkinstown (several records of 100+) and River Blackwater from Kells to Navan (104 at Kells in winter 1996/97, 182 at Headfort in winter 1997/98, 200-300 in winter 1999/00). The available information indicates that there is a regular wintering population of Whooper Swans based along the Boyne and Blackwater River valleys. The birds use a range of feeding sites but roosting sites are not well known. The population is substantial, certainly of national, and at times international, importance. Numbers are probably in the low hundreds. Intensive agriculture is the main land use along the site. Much of the grassland is in very large fields and is improved. Silage harvesting is carried out. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the lakes. In the more extensive agricultural areas sheep grazing is carried out. Fishing is a main tourist attraction on the Boyne and Blackwater and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. The Eastern Regional Fishery Board have erected fencing along selected stretches of the river as part of their salmonid enhancement programme. Parts of the river system have been arterially dredged. In 1969 an arterial dredging scheme commenced and disrupted angling for 18 years. The dredging altered the character of the river completely and resulted in many areas in very high banks. The main channel from Drogheda upstream to Navan was left untouched, as were a few stretches on the Blackwater. Ongoing maintenance dredging is carried out along stretches of the river system where the gradient is low. This is extremely destructive to salmonid habitat in the area. Drainage of the adjacent river systems also impacts on the many small wetland areas throughout the site. The River Boyne is a designated Salmonid Water under the E.U. Freshwater Fish Directive. The site supports populations of several species listed on Annex II of the E.U. Habitats Directive, and habitats listed on Annex I of this Directive, as well as examples of other important habitat types. Although the wet woodland areas appear small there are few similar examples of this type of alluvial wet woodland remaining in the country, particularly in the north-east. The semi-

natural habitats, particularly the strips of woodland which extend along the river banks, and the marsh and wet grasslands, increase the overall habitat diversity and add to the ecological value of the site, as does the presence of a range of Red Data Book plant and animal species and the presence of nationally rare plant species.

BOYNE AND RIVER BLACKWATER SPA SITE CODE: 004232

The River Boyne and River Blackwater SPA is a long, linear site that comprises stretches of the River Boyne and several of its tributaries; most of the site is in Co. Meath, but it extends also into Cos Cavan, Louth and Westmeath. It includes the following river sections: the River Boyne from the M1 motorway bridge, west of Drogheda, to the junction with the Royal Canal, west of Longwood, Co Meath; the River Blackwater from its junction with the River Boyne in Navan to the junction with Lough Ramor in Co. Cavan; the Tremblestown River/Athboy River from the junction with the River Boyne at Kilnagross Bridge west of Trim to the bridge in Athboy, Co. Meath; the Stoneyford River from its junction with the River Boyne to Stonestown Bridge in Co. Westmeath; the River Deel from its junction with the River Boyne to Cumber Bridge, Co. Westmeath. The site includes the river channel and marginal vegetation. Most of the site is underlain by Carboniferous limestone but Silurian quartzite also occurs in the vicinity of Kells and Carboniferous shales and sandstones close to Trim.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive of special conservation interest for the following species: Kingfisher. A survey in 2010 recorded 19 pairs of Kingfisher (based on 15 probable and 4 possible territories) in the River Boyne and River Blackwater SPA. A survey conducted in 2008 recorded 20-22 Kingfisher territories within the SPA. Other species which occur within the site include Mute Swan (90), Teal (166), Mallard (219), Cormorant (36), Grey Heron (44), Moorhen (84), Snipe (32) and Sand Martin (553) – all figures are peak counts recorded during the 2010 survey. The River Boyne and River Blackwater Special Protection Area is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive. 25.11.2010

Boyne Coast and Estuary SAC Site Code: 001957

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 a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [1130] Estuaries [1140] Tidal Mudflats and Sandflats [1210] Annual vegetation of drift lines [1310] Salicornia Mud [1330] Atlantic Salt Meadows [2110] Embryonic Shifting Dunes [2120] Marram Dunes (White Dunes) [2130] Fixed Dunes (Grey Dunes)*

The Boyne River channel, which is navigable and dredged, is defined by training walls, these being breached in places. Intertidal flats occur on the sides of the channelled river. The sediments vary from fine muds in the sheltered areas to sandy muds or sands towards the river mouth. The linear stretches of intertidal flats to the north and south of the river mouth are

mainly composed of sand. One or more species of eelgrass (*Zostera* spp.) occur in the estuary. Parts of the intertidal areas are fringed by saltmarshes, most of which are of the Atlantic type, and dominated by Sea-purslane (*Halimione portulacoides*). Other species present include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea-lavender (*Limonium humile*) and glassworts (*Salicornia* spp.). Common Cord-grass (*Spartina anglica*) occurs frequently on the flats and saltmarshes. The two sand dune systems in the site, at Baltray and Mornington, are of conservation value, despite the restricted distribution of the intact areas and the high recreational pressure to which they are subjected. A gradient from embryonic dunes to Marram (*Ammophila arenaria*) dunes and then fixed dunes is shown at both systems.

The largest area of annual vegetation of drift lines within this SAC is located at Baltray, north of the estuary. The vegetation is highly representative of the habitat type, which is limited to a small number of highly specialised species that are capable of coping with harsh environmental conditions including high salinity, wind exposure, and unstable substrate and lack of soil moisture. Species present include oraches (*Atriplex* spp.), Sea Rocket (*Cakile maritima*), Prickly Saltwort (*Salsola kali*) and Sea Sandwort (*Honkenya peploides*). Embryonic dunes are particularly well-developed at Baltray where there is active accretion. Species present include Sand Couch (*Elymus farctus*), Lyme-grass (*Leymus arenarius*), Marram, Sea Sandwort and Prickly Saltwort. The embryonic dunes grade into a narrow band of shifting Marram dunes. Marram is dominant, though there are also such species as Cat's-ear (*Hypochoeris radicata*), Mouse-ear Hawkweed (*Hieracium pilosella*) and Dandelion (*Taraxacum* agg.). The areas of fixed dunes on the site have a typical diversity of species, including Marram, Red Fescue (*Festuca rubra*), Wild Carrot (*Daucus carota*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Common Restharrow (*Ononis repens*), Wild Thyme (*Thymus praecox*), Lady's Bedstraw (*Galium verum*) and Wild Pansy (*Viola tricolor*). Vegetation dominated by bryophytes and lichens is limited, though such species as *Brachythecium albicans*, *Hypnum cupressiforme*, *Peltigera canina* and *Cladonia* spp. occur. Some dune slacks may still occur at the site. A number of scarce plants such as Viper's-bugloss (*Echium vulgare*), Adder's-tongue (*Ophioglossum vulgatum*), Variegated Horsetail (*Equisetum variegatum*) and Wild Clary/Sage (*Salvia verbenaca*) have been recorded from the site in the past. The last-named species is of particular note as it is a Red Data Book species at its most northerly known Irish station.

The Boyne is the second most important estuary for wintering birds on the LouthMeath coastline. From a recent wetland survey carried out over 4 seasons (1994/95- 97/98), it is known that this site supports nationally important numbers of Shelduck (176 individuals), Golden Plover (5,338), Lapwing (4,755), Knot (1,559), Black-tailed Godwit (414), Redshank (539), Turnstone (104), Oystercatcher (922), Grey Plover (112) and Sanderling (93). Other species of regional or local importance include Brent Goose (142), Wigeon (485), Teal (185), Mallard (160), Dunlin (627), Curlew (352) and Ringed Plover (approx. 100). An area of shingle at Baltray Dunes is also an important breeding site for Little Tern, with 14 pairs recorded in 1995. Little Tern is the rarest Irish tern species, and is listed on Annex I of the E.U. Birds Directive. Part of the estuary is a Wildfowl Sanctuary and has been designated a Special Protection Area under the E.U. Birds Directive. This site has been somewhat modified by human activities. The river is regularly dredged to accommodate cargo ships, which causes disturbance to the bird, fish and invertebrate communities in the estuary. Several factories operate upstream from the estuary and pollution and disturbance associated with them has

had an impact on the ecology of the area. There is a proposal to create a deep water facility at the north end of Mornington Dunes on the mouth of the Boyne estuary.

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.