Appendix 13.7

Water Framework Directive (WFD) Compliance

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1. Introduction

1.1 Overview

Indaver proposes to develop a resource recovery centre (including waste-to-energy facility) in Ringaskiddy in County Cork.

The proposed development will consist principally of a waste-to-energy facility (waste incinerator) for the treatment of up to 240,000 tonnes per annum of residual, household, commercial and industrial non-hazardous and hazardous waste which is currently landfilled or exported. Of the 240,000 tonnes of waste, up to 24,000 tonnes per annum of suitable hazardous waste will be treated at the facility.

In line with European Union and national policy, this residual waste will be diverted away from landfill and exports, moving the management of waste up the waste hierarchy, allowing Ireland to become more self-sufficient in the treatment of waste and reducing the environmental impact of residual waste management. The proposed development will maximise the extraction and recovery of valuable material (in the form of ferrous and non-ferrous metals) and energy (in the form of 21 megawatts of electricity) resources from residual waste.

1.2 Water Framework Directive (WFD) Compliance

The purpose of this report is to assess compliance of the proposed development against the objectives of the WFD. The assessment can demonstrate WFD compliance by establishing that the proposed activities during construction and operation do not result in adverse effects on WFD sensitive areas. The report demonstrates that the proposed development will not jeopardise the potential for WFD water bodies to achieve good chemical or ecological status, whether already achieved or as a future objective, and is therefore considered to be compliant with the WFD.

2. WFD Assessment Methodology

This compliance assessment has been informed by the following legislation, policies and published guidance:

Assessments of relevance to this proposed scheme are as follows:

- The environmental impact assessment (EIS) updated in 2025
- Appropriate Assessment under Article 6(3) of the Habitats Directive 92/43/EEC.

2.1 Legislation, Planning Policy and Guidance

This WFD compliance assessment has been informed by the following legislation, policies, and published guidance:

2.1.1 Legislation

- Water Framework Directive (WFD) (2000/60/EC) (as amended)
- Groundwater Directive (2006/118/EC) (as amended)
- Habitats and Wild Fauna and Flora Directive (92/43/EEC) (as amended)
- Bathing Water Directive (rBWD) (2006/7/EC) (as amended)
- Nitrates Directive (91/676/EEC) (as amended)
- Environmental Quality Standards (EQS) Directive (2008/105/EC) (as amended)
- Priority Substances Directive (2008/105/EC) (as amended)

- European Communities (Water Policy) Regulation 2003 (S.I. 722 of 2003) (as amended)
- Schedule 5 of the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009), as amended
- EU Groundwater Regulations (S.I. 9/2010 (as amended)
- Arterial Drainage Act (1945) (as amended)
- Planning and Development Act (2000) (as amended); and
- Planning and Development (Amendment) (No.2) Regulations 2011 (S.I. No. 454 of 2011).

2.1.2 Planning Policies

Cycle 3 River Basin Management Plan (DHLG, 2024)

The WFD requires all Member States to protect and improve water quality in all waters so that we achieve good ecological status by 2027. It applies to rivers, lakes, groundwater, and transitional coastal waters. The Directive requires that management plans be prepared on a river basin basis and specifies a structured method for developing these plans. Ireland's river basin management planning process is based on a single national River Basin District, which is broken into 46 catchment management units (CMUs). The CMUs have been further broken down into 583 sub-catchments with waterbodies[1] within. Substantial background information for the plan and the most up to date information for the status of a waterbody is provided at www.catchments.ie. Information about the use and pressures on a waterbody is provided through specific Catchment and Sub-Catchment Assessments. The current condition of water resources is assessed against the standards and environmental objectives set out in the WFD.

The EU Habitats Directive places strict legal obligations on Ireland to ensure the protection, conservation and management of the habitats and species of conservation in all European Sites. An 'Appropriate Assessment' (AA) is necessary for a project which may have a likely significant effect on any European Site. The Habitats Directive has clear links to the WFD through the Register of Protected Areas, which includes Special Areas of Conservation (SAC) designated under the Habitats Directive, and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (Directive 79/409/EEC as codified by Directive 2009/147/EC), collectively referred to as 'European Sites'. Many of the habitats and species listed for protection in both the Birds and Habitats Directives are water dependent. While maintenance and restoration of these features to favourable conservation status is the responsibility of the National Parks and Wildlife Service (NPWS), the EPA monitors the supporting water quality requirements for habitats and species using their assessed status under the third cycle River Basin Management Plan (RBMP).

The EPA has identified that diffuse emissions from the agricultural sector are the primary source of the upward trend in excess levels of nutrients in water in Ireland. In addition, land and river channel alterations arising from agricultural activities are a significant pressure on the physical condition/hydromorphology of river channels. Irelands Common Agricultural Policy and the Nitrates Action Programme promote a sustainable agriculture model and the Good Agricultural Practice Regulations provide stricter requirements.

4th National Biodiversity Action Plan 2023-2030 (NPWS, 2023)

The National Biodiversity Action Plan outlines multiple actions meant to support the resilience and health of water ecosystems throughout Ireland. Outcome 2D: "*Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored*" has the most relevance for protection of water quality and ecosystems within the proposed scheme. Under this outcome are several targets and actions intended to achieve the outcome:

- By 2027, protection and restoration measures detailed in Ireland's third RBMP are implemented to ensure that our natural waters are sustainably managed, that freshwater resources are protected so that

[1] A waterbody is an individual unit of a water feature used for monitoring and planning purposes.

there is no further deterioration; and where required, Ireland's rivers, lakes and coastal water bodies are restored to at least good ecological status

- By 2027, optimised benefits in flood risk management planning and drainage schemes are in place
- By 2026, Ireland is meeting all requirements for its transitional, coastal, and marine environment under the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD), thereby achieving and maintaining High or Good Ecological Status and Good Environmental Status, respectively; and
- By 2030, 300km of rivers are restored to a free-flowing state.

National Planning Framework (Project Ireland 2040)
Objective 57 of the National Planning Framework (NPF) (Project Ireland 2040) outlines ways to enhance water quality and resource management by:

- Ensuring flood risk management informs plan-making decisions by avoiding inappropriate development in areas at risk of flooding in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities (DEHLG and OPW 2009)
- Ensuring that River Basin Management Plan objectives are fully considered throughout the physical planning process; and
- Integrating sustainable water management solutions, such as Sustainable Urban Drainage (SuDS) principles, porous surfacing and green roofs, to create safe places.

Climate Action Plan 2024 (GoI, 2024)
The Climate Action Plan mentions that Ireland has observed significant impacts of climate change, including a consistent temperature rise over the past 120 years, reduced frost days, and shorter frost seasons. Sea levels have risen steadily since the early 1990s, and projections suggest decreased spring and summer rainfall alongside more frequent heavy precipitation events in winter and autumn. These shifts are anticipated to result in widespread direct and indirect adverse effects on Ireland. Foreseen impacts encompass heightened risks of groundwater, river, and coastal flooding, elevated coastal erosion, amplified strain on water resources and water purity, and alterations in wind velocities and storm pathways.

Although the Climate Action Plan lacks a designated water section, the measures affecting the water sector will be integrated within various related sections, including agriculture, land use, and adaptation. Under the policy measures for Ireland the anticipated climate change effects on Ireland's environment, society, and economic growth are projected to be extensive. These impacts encompass managed and natural ecosystems, water resources, agriculture and food security, the built environment, human health, and coastal areas. The most pressing risks Ireland faces from climate change predominantly revolve around alterations in extremes, such as floods, droughts, and storms. Policy measures are needed to address these risks.

According to the Climate Action Plan (CAP), the Water Resource and Flood Risk Management Sector is one of the Adaptation Sectors at the National Level and entails the following Sector Levels: Flood Risk Management, Water Quality, and Water Services Infrastructure.

2.1.3 Guidance

Water Framework Directive: Project Assessment Checklist Tool (JASPERS, 2024)
Published methodologies for the assessment of plans or projects in relation to the WFD in Ireland are currently not available. This document provides background to the WFD and its implementation in EU Member States as well as summarising some of the relevant contents of CIS Guidance Document 36.

Irish Wetland Types – an identification guide and field survey manual (Irish Ramsar Wetlands Committee, 2018)

This is produced by the Irish Ramsar Wetlands Committee under the principles of the Ramsar Convention that predates European legislation under an international treaty. The Ramsar convention has an underlying

focus on the biodiversity value of wetlands on a global scale, whilst recognising the livelihood and economic wellbeing benefits at a local scale. Subsequent to this the ecological importance of wetlands was recognised by the European Union under the EU Habitats and Birds Directives. The Irish Ramsar Wetlands Committee (IRWC) was set up by the Irish Government in 2010 and is co-hosted by the NPWS and the EPA.

Guidelines on procedures and treatment of geology, hydrology, and hydrogeology for National Road Schemes (NRA, 2009)

The primary objective of the Guidelines is to provide guidance on the assessment of geological, hydrological, and hydrogeological impacts during the planning and design of national road schemes in Ireland. The Guidelines are not mandatory but serve as a supplement to the National Roads Project Management Guidelines (NRPMG). The document includes a list of relevant impacts and constraints to be considered as well as maps to be included when determining the impact rating for geology, hydrology, and hydrogeology. Additionally, a matrix including criteria for rating impact significance at the EIA stage is included for each subject.

The Planning System and Flood Risk Management Guidelines for Planning Authorities (OPW and DEHLG, 2009)

In November 2009, the DEHLG and the OPW jointly published a Guidance Document for Planning Authorities entitled 'The Planning System and Flood Risk Management'. The Guidelines are issued under Section 28 of the Planning and Development Act 2000; and Planning Authorities and An Bord Pleanála (now An Coimisiún Pleanála) are therefore required to implement these Guidelines in carrying out their functions under the Planning Acts.

The aim of the Guidelines is to ensure that flood risk is neither created nor increased by inappropriate development. The Guidelines require the planning system to avoid development in areas at risk of flooding, unless they can be justified on wider sustainability grounds, where the risk can be reduced or managed to an acceptable level. They require the adoption of a Sequential Approach (to Flood Risk Management) of Avoidance, Reduction, Justification and Mitigation and they require the incorporation of a Flood Risk Assessment into the process of making decisions on planning applications and planning appeals.

Fundamental to the Guidelines is the introduction of flood risk zoning and the classification of different types of development having regard to their vulnerability. The management of flood risk is now a key element of any development proposal in an area of potential flood risk and should therefore be addressed as early as possible in the site master planning stage.

Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016)

Inland Fisheries Ireland (IFI) provides guidance on the organisation of construction activities and crossing structures to prevent damage to aquatic and riparian habitats, pollution of waters, and interference with upstream and downstream movement of aquatic life during construction activities. These include guidance around the type of culverts and structures that should be used to reduce impact on the aquatic environment and proper planning to avoid discharge of construction materials into surface waters.

Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas (DHLGH, 2022)

The Best Practice Interim Guidance Document a high-level guidance document demonstrating how urban areas can be planned and designed to address impacts related to the environment, climate change and flood risk through nature-based solutions for the management of rainwater and surface water runoff. The document has a distinct focus on planning and identifying opportunities where SuDS and nature-based solutions should be employed.

3. The Proposed Development

3.1 Site

The site for the Ringaskiddy Resource Recovery Centre is located approximately 15km to the south-east of Cork City, in the townland of Ringaskiddy on the Ringaskiddy Peninsula in the lower part of Cork harbour. The site covers an area of approximately 13.55 hectares and is situated on a north-facing slope. It is currently covered in scrub with some pockets of trees and open grass areas.

The L2545, the main road from Ringaskiddy village to Haulbowline Island forms the northern boundary of the site. The eastern boundary of the site extends to the foreshore of Cork harbour along Gobby Beach. The lands to the immediate south are in agricultural use. The single carriageway from Barnahely to Ringaskiddy element of the M28 Cork to Ringaskiddy project (known as the 'Protected Scheme') is currently being constructed within the northwestern boundary of the proposed development site. The site surrounds the Hammond Lane Metal Recycling Co Ltd facility.

The Hammond Lane Metal Recycling Co Ltd facility processes waste steel. There is also an ESB Networks compound (referred to as Loughbeg substation) located adjacent to the eastern boundary of the Hammond Lane facility. Other neighbouring land uses include the National Maritime College of Ireland (NMCI), the UCC ERI Beaufort Building and some warehouses that are all located across the L2545 to the north of the site. The site is located approximately 800m east of the village of Ringaskiddy. Just beyond the southern boundary, the site is further visually defined by a high voltage electricity line. Refer to **Figure 4.4** in **Volume 3** of this EIS.

The Ringaskiddy peninsula is industrial in character, with a number of pharmaceutical companies having large manufacturing facilities in the area, in addition to the Port of Cork facilities. There are currently four 100 metre hub-height 3MW wind turbines in operation on industrial sites in Ringaskiddy. The two DePuy wind turbines are located 290m south and 1.2km southwest of the Indaver site boundary on two separate sites in Loughbeg.

3.2 Main Elements of the Waste-to-Energy Facility

The main elements of the waste-to-energy facility are described below and include:

- Main process building, with a stack extending to 75mOD
- Turbine hall and aero-condenser structure
- Security building/gate house and weighbridges
- Administration building
- Firewater storage tank and pump house
- Surface water attenuation tank and firewater retention tank
- Light fuel oil storage tank, aqueous ammonia storage tank and unloading area
- Aqueous waste storage tank and tanker unloading area
- Electricity substation, compound and grid connection
- Emergency access
- Site lighting.

Waste-to-Energy Process

The proposed facility includes the most up-to-date emissions control and flue gas cleaning technology. There are five main elements of the waste-to-energy process: waste acceptance, intake and storage; combustion; energy recovery; flue gas cleaning.

Waste Acceptance, Intake, and Storage

All waste trucks will be weighed when entering and leaving the facility. Drivers will present their documentation, relating to the waste load, to the staff in the security gatehouse. Solid non-hazardous and suitable hazardous waste will arrive at the site in covered trucks.

Following completion of the waste acceptance procedures, the trucks carrying waste will proceed via the site road to the enclosed tipping hall. They will enter the supervised tipping hall and will be directed towards discharge chutes. The trucks will discharge the waste into the bunker through chutes in the wall of the tipping hall.

Aqueous wastes will also be accepted which include liquid wastes such as water waste streams with mixed solvents and/or inks, contaminated water from firefighting and clean-up operations, storm water and leachate from landfill sites etc. Solvents in this context are solvent streams with a high water content. Aqueous wastes will be delivered by road tanker and will be sampled and analysed prior to offloading. This sampling may be done before or after arrival on site. Key parameters will be analysed to ensure conformity with the specified waste acceptance criteria and with the parameters agreed with customers. In the event that the specification for the aqueous waste load is not met, the waste will not be accepted, and arrangements will be made for the dispatch of the road tanker to the most suitable facility either in Ireland or abroad. If the aqueous waste load meets the acceptance criteria, the waste will be offloaded either into the aqueous waste storage tank or, directly, by injection to the furnace.

To prevent the emission of odours, the tipping hall will be maintained under negative pressure, i.e. air will be drawn in through any openings rather than escaping out. Air for combustion will be drawn from the tipping hall through the waste bunker. As the tipping hall will be an enclosed area, windborne litter will not be generated.

The waste bunker will be of sufficient capacity to allow the facility to accept waste during periods when the furnace is undergoing maintenance, and to continue operating over prolonged periods, such as long weekends, without deliveries.

Combustion

A moving grate furnace is proposed for the facility. Grate furnaces are used to treat a wide variety of waste streams and are a well-recognised, robust and established technology for these purposes. The moving grate furnace is considered to be a ‘Best Available Technique’ for the treatment of the types of waste proposed.

The moving grate furnace operates in a similar fashion to an escalator, pushing waste slowly from the top of the furnace to the bottom to ensure complete combustion. The rate at which the waste will travel through the furnace will be controlled to optimise the combustion. The waste will be in the furnace for approximately one hour. In the furnace, the organic material contained in the municipal solid waste is typically broken down into hydrogen, carbon monoxide, methane and ethane. These gases and vapours will ignite immediately, as the temperature in the furnace will be within the range of 850˚C and 1,000˚C. These temperatures ensure destruction of organics and other flue gas components.

The final section of the grate will be the burnout section where the ash, the solid residue, will be held for long enough to ensure sufficient burnout. The grate will discharge the resultant bottom ash into a water bath/wet de-slaggers, and then via a conveyor to the ash hall.

The inputs to the moving grate furnace will be mixed solid wastes, aqueous wastes, fuel and combustion air. The outputs will be combustion gases and bottom ash.

Energy Recovery

The hot flue gases from the moving grate furnace will be directed through a steam boiler. In the boiler, heat will be transferred from the hot flue gases in the boiler to water to generate steam. The steam from the boiler will drive a turbine, which will drive an electricity generator. Approximately 21MW of electricity will be generated, of which approximately 18.5MW will be exported to the national electricity grid. The inputs into the boiler will be hot flue gases and boiler feed water. The outputs will be cooler flue gases, boiler ash and superheated steam.

Emission Reduction

The facility will be designed to minimise the formation of dioxins and furans (the term 'dioxin' is taken to include dioxins and furans) in the furnace by maintaining the flue gases at a high temperature of over 850˚C for over 2 seconds. In order to minimise the reformation of dioxins in the boiler, it has been designed to include automatic controlled cleaning and rapid cooling. Oxides of nitrogen will be controlled through combustion and through the injection of ammonia solution or urea. The flue gas cleaning equipment, described below, will further reduce dioxin concentrations in the flue gas to well below the EU emission limits.

Flue Gas Cleaning

The flue gas cleaning equipment will reduce dioxin concentrations in the flue gas to levels well below the limits set in the EU Industrial Emissions Directive 2010/75/EC, the Waste Incineration BAT Conclusions 2019/2010, and the Waste Incineration BAT reference document JRC118637 2019. Typical dioxin emissions from a facility with this equipment are one tenth of the concentration limit in the EU Industrial Emissions Directive.

A fixed amount of activated carbon or a carbon/clay mixture will be injected into the flue gases in the cooling stage and also into the flue gas either in the dry reactor or just after it. Activated carbon consists of small, porous carbon particles, which due to their porosity have a large surface area. Dioxins, furans, other trace organic compounds and heavy metals in the flue gases will be adsorbed onto the activated carbon particles. Lime will also be injected into the flue gases in the dry reactor for the removal of acid gases. The flue gases will then pass through a baghouse filter which will remove the dust, salts and the carbon particles from the gases. The dust cake forming in the baghouse filter will be removed and collected in hoppers located below it.

The flue gases will then be discharged through the stack, the top of which will be at a level of 75mOD. The stack emissions will be monitored as required by the EU Industrial Emissions Directive and in compliance with industrial emission licence.

The inputs from this stage of the process will be the activated carbon/clay/lime. The outputs will be flue gases and flue gas cleaning residues.

Process Inputs

The average consumption of water in the proposed facility will be 5.4 cubic metres per hour. Circa 240 tonnes of light fuel oil will be used per annum to raise the temperature of the furnace at start up and to maintain the temperature as required. Other materials will include sodium hydroxide, hydrogen chloride, ammonium hydroxide, sodium phosphate, lime, activated carbon and clay and urea/ammonia.

Process Outputs: Solid Residues

There will be three solid residues from the waste-to-energy facility in Ringaskiddy: bottom ash, boiler ash, and flue gas cleaning residues. The category 'flue gas cleaning residues' includes filter ash from the baghouse filters.

The Indaver Meath Waste-to-Energy Facility is in operation and treats wastes similar to those proposed for the Ringaskiddy facility, in other words, residual household, commercial, industrial, non-hazardous and suitable hazardous waste. It is expected that the bottom ash, boiler ash and flue gas cleaning residues from the Ringaskiddy facility will be similar in composition to the bottom ash, boiler ash and flue gas cleaning residues from the Meath facility.

Circa 52,700 tonnes per annum of bottom ash will be produced in the facility. The bottom ash will be recovered or disposed to landfill, sent to another EU member state for treatment and subsequent recovery, or if appropriate facilities are developed, will be recycled following treatment in Ireland.

Circa 2,000 tonnes per annum of boiler ash and circa 9,100 tonnes per annum of flue gas cleaning residues will be produced in the facility. The boiler ash and flue gas cleaning residues will be in the form of fine particles and will contain heavy metals. The boiler ash and flue gas cleaning residues will be suitable, after

solidification, for use to backfill the void space in an underground salt mine, which can receive a recovery code, or in a hazardous waste landfill.

There is one salt mine in Northern Ireland accepting boiler ash and flue gas cleaning residues for recovery and backfilling of the mine. The boiler ash and flue gas cleaning residues from Indaver's Meath facility are currently shipped to both this salt mine in Northern Ireland and to underground salt mines in Germany. It is proposed that, depending on the availability of outlets, the boiler ash and flue gas cleaning residues from the proposed Ringaskiddy facility will also be shipped to both facilities.

An annual average of 2,400 tonnes of ferrous metals, such as steel and 240 tonnes of non-ferrous metals will be recovered from the bottom ash for recycling.

3.3 Secondary Elements of the Proposed Development

L2545 Road Upgrade

In order to improve surface water drainage and alleviate local flooding issues, Indaver proposes to upgrade a section of the L2545 local road, which is the road that forms the northern boundary of the site. The proposed works will consist of raising the level of a 190m length of the road between the public car park at Gobby Beach and the eastern end of the Hammond Lane Metal Company premises. In addition, the surface water drainage beneath the L2545 along the entire northern boundary of the Indaver site will be upgraded. All of the above works will be within Indaver's ownership, apart from a small area in Hammond Lane's ownership and a regraded entrance area on lands owned by the Port of Cork. Both companies have been consulted in relation to these upgrade works.

Increase in Levels on the Indaver Site

The ground levels of the Indaver site vary considerably in both the north-south and the east-west directions. There is a risk of pluvial flooding along the northern boundary with the L2545.

The levels of the low-lying parts of the site will be raised to 4.55m above Ordnance Datum in order to create a very high standard of flood protection to the site. The minimum site flood defence level was calculated at 4.42m above Ordnance Datum. This level allows for 2.87m (1 in 200-year tidal level) plus 1.0m (a conservative climate change allowance) plus 0.5m (freeboard) plus a 0.05m tolerance for land movement. The 4.55m flood defence level is the same as that adopted by a number of recent developments close to the site in Ringaskiddy including the Beaufort Research Laboratory.

Coastal Protection Measures

The coastline along the eastern boundary of the Indaver site consists of a glacial till face adjoining Gobby Beach. The glacial till face is very shallow near the public car park to the north and steepens to the south to a maximum of 10-12m high. Issues in relation to coastal erosion were raised by An Bord Pleanála during the course of the 2008 planning application process. In response to the issues raised by the Board, a coastal study was carried out by Arup in order to better understand the coastal processes in the vicinity of the site, the rate of erosion of the glacial till face and the specific coastal protection measures required.

As part of the study, a conservative rate of erosion was applied to the site in order to assess whether the proposed development could be impacted over the 30-year design life of the facility. The study found that the waste to energy facility section of the proposed development has been located far enough away from the edge of the cliff to ensure that the waste to energy facility will not be impacted by the predicted retreat rates over the design life of the planning permission. However, the study found that there could be a risk of an impact on a small section of the proposed development after 40 years, but this would be confined to the amenity walkway and viewing platform outside of the security fence line. This is in the absence of any mitigation measures.

The study found that the proposed development would not increase the current rate of erosion of the glacial till face.

Coastal protection mitigation measures are not required for the waste-to-energy facility element of the development. However, given the concerns raised by An Bord Pleanála and given the low risk that the

amenity walkway and viewing platform could be impacted in 40 years' time, coastal protection measures have been included in the proposed development as a precautionary measure so as to reduce the rate of erosion of the glacial till face. Both the shingle and the glacial till face will be monitored and the shingle will be replenished as required.

The addition of sacrificial material such as shingle, is well-recognised worldwide as a coastal engineering solution. The net coastal sediment transport will go from south to north according to wind conditions and swell, therefore the material is likely to move towards the north in the medium and long term. The Cork Harbour Special Protection Area (SPA) is located to the south west of the site therefore the sacrificial material will not impact on the SPA.

Public Amenity Footpath

A public amenity footpath and viewing gallery, located outside the facility's security fence, will be provided along part of the southern and eastern site boundaries to allow public access between the Martello tower and Gobby Beach car park.

Grid Connection

The waste-to-energy facility will be connected to the national electrical grid either via the 38kV electrical substation (known as Loughbeg substation) adjacent to the eastern boundary of the Hammond Lane facility or via the 110kV pylon directly south of the site. Both options require connection to ESBN infrastructure at the 38kV voltage level. Refer to Proposed Site Layout Plan 1434-104 for the indicative location of the proposed grid connection points and routing options.

Diversion of Services

L2545 Local Road

A number of underground services are located in the L2545 road, including a water main, high voltage electricity cables, a gas transmission main, and public lighting and telecommunications cables. An overhead electricity line crosses the road. Some of these services will be diverted as part of the road upgrade works. All of the services providers have been consulted in relation to the proposed diversions.

Gas Main

An existing underground gas transmission main is located within the site which has been recently decommissioned by Gas Networks Ireland (GNI). GNI have decommissioned the gas pipeline by degassing it and filling it with grout. The pipeline has therefore been made safe and has been left in situ in the ground. Due to the nature of the proposed works, sections of the in-situ grouted gas main will require removal. No consultation with GNI is required for these works as the wayleave on the gas pipeline route through the site will be extinguished in due course. The section of pipe to be removed within the site is shown on the revised planning drawings.

Overhead Power Lines

There are a number of overhead power lines traversing the site. Due to the nature of the proposed works, one overhead 10kV power line will need to be diverted underground within the site. ESB Networks has been consulted in relation to the proposed diversion and has agreed the indicative underground diversion through the centre of the site.

3.4 Construction Activities

This section summarises the construction activities and sequencing for the proposed Ringaskiddy Resource Recovery Centre and outlines the mitigation measures which will be implemented to ensure the potential effects of the construction activities on the environment are avoided, prevented or reduced.

It is anticipated that, with the proper implementation and management of the construction activities described in this chapter the construction phase of the development will have no significant or long-term impact.

The schedule for the construction and commissioning of the Resource Recovery Centre is approximately 31 months. The road upgrade, associated road drainage and diversions of services will take circa ten weeks to complete. The diversion to the 220kV underground cables, if required would take circa four additional weeks. It is anticipated that the road upgrade, associated road drainage and diversions of services will proceed in advance of the main construction of the Resource Recovery Centre. The placement of the sacrificial beach material (shingle) required for the coastal protection works will take approximately three weeks to complete. It is envisaged that the coastal protection works will be undertaken towards the end of the construction phase.

A maximum of 320 construction workers will be employed on site at any one time with around 250 workers working a daytime shift and 70 working a night shift. Temporary office accommodation, welfare facilities, and laydown areas will be established in the western field for the construction phase.

The site start time will ensure that construction workers arrive in the Ringaskiddy area prior to the morning peak hour for traffic on the local network. No construction vehicles will arrive or depart the proposed development site during the morning and evening peak periods (07:00-09:00 and 16:00-18:00) during the construction phase. Typical working hours during the construction phase will be:

Start	Finish	
0600	2000	Monday – Friday
0700	1300	Saturday

It will be necessary to work overtime (including at weekends) and night shifts at certain critical stages during the project. Consideration of safety, weather or sub-contractor availability is likely to necessitate working outside normal hours. Over the 31-month construction phase there will be up to eight weeks of nighttime working. Heavy or noisy construction activities will be avoided outside normal hours and the amount of work outside normal hours will be strictly controlled.

Construction Methods

Construction methods will be typical for a large industrial project. The proposed development will be constructed employing best practice in safety and efficiency.

The construction of the proposed development will require movement of materials to and from the site. All traffic movements associated with the import and export of materials have been included in the construction traffic impact assessment. It is envisaged that various crane systems will be used for lifting materials in to place. Following the completion of construction and installation of equipment, and prior to commencement of operation, there will be a testing and commissioning phase. This phase will comprise of installation compliance checks, commissioning tests, and performance demonstration tests.

Prior to commencement of normal operations, it is also likely that the industrial emissions licence will require a test programme to demonstrate performance, followed by the submission of a report to the EPA.

Potential Effects and Mitigation

Indaver will appoint a construction management team for the duration of the construction phase. The team will supervise the construction of the project and will monitor the performance of the contractors to ensure that the proposed construction phase mitigation measures are implemented and that construction effects and nuisance are minimised. Indaver will liaise with neighbours and the general community during the construction phase to ensure that any disturbance is kept to a minimum. Environmental management of the site will specify measures to ensure that all works on site will be carried out in such a manner as to minimise adverse environmental effects and prevent nuisance.

3.5 Decommissioning

The facility is expected to have a design life of 30 years, but this could be extended by maintenance, equipment replacement and upgrades. As part of the application for an Industrial Emissions Licence for the facility, a closure restoration and aftercare management plan (CRAMP), including a detailed decommissioning plan, has been submitted to the EPA for their approval.

4. WFD Baseline

4.1.1 Groundwater Waterbodies

The EPA maintains a register of groundwater abstractions more than 25m^3/d under the Water Environment (Abstractions and Associated Impoundments) Act 2022 and its associated Regulations transpose the Water Framework Directive (2000/60/EC) (Government of Ireland, 2022; European Parliament and Council, 2000). The exact location is not provided for public water supplies, only the townland. The EPA register indicates there are three groundwater abstractions within the study area.

According to the GSI and the EPA, there are 19 groundwater related features located within 2 km of the proposed development: 18 approximately 1km to the south of the proposed development and one approximately 1.6km to the south of the proposed development. The 18 groundwater features are categorised as "*other use*" and were drilled during site investigations undertaken by Pettits in 1997 and 1998; located in a cluster within the current Hovione Loughbeg manufacturing facility. The additional groundwater feature is an industrial use well and is located in the vicinity of the current Thermo Fisher site in Curraghbinny. Based on the identification and available information, it is likely that these features correspond to ground investigations boreholes rather than active water abstractions. As such, they will not be considered any further.

4.1.2 Surface Waterbodies

The proposed development occurs within the Lee, Cork Harbour and Youghal Bay WFD Catchment. The catchment area of 2 153 km^2 discharges to the River Lee and all streams entering tidal water in Cork Harbour and Youghal Bay and between Knockaverry and Templebreedy Battery. The largest urban centre in the catchment is Cork City. According to the cycle three catchment assessment (assessment period of 2016-2021: EPA, 2024[2]) a total of 49% of surface waterbodies were not achieving a '*good*' or '*high*' ecological status. A total of 33% of all waterbodies are '*at risk*' of not meeting their environmental objective in the catchment, with 24% being under '*review*' and 43% are '*not at risk'*. The Cork Harbour and Lough Mahon are two of the five heavily modified waterbodies in the catchment.

4.2 Current Pressures on Waterbodies

The proposed development has an indirect hydrological connection with the Cork Harbour, Outer Cork Harbour, and Western Celtic Sea Coastal WFD waterbody; and the Lough Mahon, North Channel and Owenboy Estuary Transitional WFD waterbodies (**Table 1**). All the WFD coastal and transitional waterbodies connected to Cork Harbour, except the Western Celtic Sea, are '*at risk'* of not reaching their goal of '*good*' status by 2027 or earlier. The Cork Harbour and Lough Mahon WFD waterbodies have a goal of reaching '*Good Ecological Potential*'.

Table 1 Waterbody WFD Status

WFD waterbody type	WFD waterbody	Code	Risk	Status	Pressures	Distance from proposed development
River	Hilltown_010	IE_SW_19H050470	Under Review	Good		0km
Coastal	Cork Harbour*	IE_SW_060_0000	At risk	Moderate	Urban Run-off Urban Wastewater	0km
Coastal	Outer Cork Harbour	IE_SW_050_0000	At risk	Moderate	Agriculture	3.3km

[2] EPA, 2024. Cycle 3 HA 19 Lee, Cork Harbour and Youghal Bay Catchment Report.

[2] Heavily modified waterbodies have different environmental objectives applied (Good Ecological Potential) which recognise that the modifications may prevent Good Ecological Status from being achieved. However, all Water Framework Directive standards for other elements such as nutrients and chemicals must still be met, and the modifications must be mitigated as far as possible (EPA, 2022)

Transitional	Lough Beg/Curraghbinny	IE_SW_060_1100	Under Review	Good		2km
Transitional	Lough Mahon*	IE_SW_060_0750	At risk	Moderate	Urban Wastewater	2.5km
Transitional	Owenboy Estuary	IE_SW_060_1200	At risk	Moderate	Agriculture	2km
Groundwater	Ringaskiddy	IE_SW_G_072	Not at risk	Good		0km

The catchment assessment indicated that all the surface WFD waterbodies have a '*moderate*' ecological status, with the exception of the Western Celtic Sea coast WFD waterbody, Lough Beg/Curraghbinny transitional WFD waterbody and Hilltown_010 river WFD waterbody. The proposed development has an indirect hydrological connection with the Ringaskiddy Groundwater WFD waterbody. The Groundwater WFD waterbody is '*not at risk*' and is in a '*good*' status. Current pressures on surface water bodies are mainly through urban wastewater, urban runoff and nutrient inputs from agriculture.

A number of waterbodies have been prioritised through the selection of Areas for Action. There were seven Priority Areas for Action identified for the second river basin management planning cycle in the Lee, Cork Harbour and Youghal Bay Catchment. The report identified agriculture and hydromorphology as the significant pressures in the PAA. Regarding nutrients, high nitrate levels are a cause for concern, diffuse phosphorus is a possible issue, point sources are likely present as indicated by spikes in orthophosphate and ammonium concentration and domestic wastewater treatment plants may be a pressure in the lower reaches of Owenboy (Cork)_010.

Within the Cork Harbour there are additional measures under the Urban Waste Water Treatment Directive to minimise the impact of urban wastewater discharges on receiving waters. Additional investment is targeted to upgrade infrastructure, both treatment plants and collection networks with the objectives of Ireland's National Recovery and Resilience Plan[6] including the Enhanced Ambition Programme to advance priority wastewater treatment plant projects whose discharges have been identified as being significant pressures on water bodies and impacting on WFD objectives. Uisce Éireann identified at least 10 Water Treatment plant upgrades works for inclusion in this programme by Q3 2022. The completion of the upgrades to the selected small wastewater treatment plants will be completed by Uisce Éireann by Q3 2025. The treatment plant for the Ringaskiddy Agglomeration (D0057-01) has an estimated completion date of 2028. The treatment plant for Cobh Agglomeration (D0054-001) has been completed.

Management of urban drainage is closely related and will integrate the urban wastewater drainage in both separate and combined collection systems. The summary of Actions from the third cycle River Basin Management Plan to mitigate urban runoff pressures includes[3] Urban Runoff 5: Additional resources will be provided to Local Authority Waters Programme (LAWPRO) to provide specialist support to local authorities in adopting international best practice on nature-based surface water management within planning and infrastructure project delivery (Two staff members by 2025. Cross reference to action under '*Governance/Implementation*' measures on local authority resources).

4.3 Water Quality

The EPA dataset was referred to for assessing ecological and chemical water quality for the nearest hydrologically connected to the proposed development (i.e. Cork Harbour coastal WFD waterbody). Under the third catchment assessment the Cork Harbour WFD waterbody had a '*moderate*' ecological status or potential and was failing to achieve '*good*' status for chemical surface water status due to Polybrominated diphenyl ethers (PBDE) - unspecified isomers. Trends from the EPA monitoring indicate that:

- Chlorophyll for winter and summer have a high indicative quality
- Dissolved Inorganic Nitrogen (as N) for winter was of moderate and in summer was high indicative quality.
- Orthophosphate (as P) – unspecified for winter was of good and in summer was high indicative quality.

Table 2 Ecological Status or Potential for Cork Harbour Coastal WFD Waterbody

Status	Value		
Ecological Status or Potential	Moderate		
Biological status or potential	Good	Phytoplankton status or potential	Good
		Invertebrate status or potential	Good
Hydromorphological conditions	Moderate		
Supporting chemistry conditions	Moderate		
General conditions	Moderate		
Oxygenation conditions	Moderate		
Dissolved oxygen (%sat)	Moderate		
Nutrient conditions	Good		
Nitrogen conditions	Good		
Specific pollutant conditions	Pass		

Two coastal EPA stations CW05003150LE8004 (data from 2012 to 2018 and 2021) and CW05003150LE8001 (data from 2013 to 2021) are in the vicinity of the proposed development. Only Site CW05003150LE8001 is part of the WFD monitoring program.

Table 3 Water Quality Summary CW05003150LE8001

CW05003150LE8001 - Water Quality Summary							
Water Quality Parameter	Unit	Max	Min	Average	95%ile	Count	Date Ranges
Ammonia-Total (as N)	mg/l	0.65	0.01	0.077	0.1595	111	2013-2025
BOD - 5 days (Total)	mg/l	3.6	1	1.567	3.335	34	2013,2014,2016-2024
Salinity	PSU	35.4	16.8	31.13	34.19	98	2014-2025
ortho-Phosphate (as P)	mg/l	0.5	0.005	0.025	0.04	59	2013-2025
pH	pH units	8.4	7.8	8.059	8.245	112	2013-2025
Temperature	ºC	19.6	5.9	13.146	17.58	98	2013, 2015-2025

4.4 Summary of the Importance of WFD Features

As part of the appraisal of the receiving environment, the importance of the following WFD features has been ranked, based on NRA 2008 criteria.

Table 4: Summary of the importance of features

Category	Feature	Description	Location	Importance	Justification for Importance Rating
River WFD waterbody	Hilltown_010	Glounatouig Stream is within the catchment of Hilltown_010, which is classed as being at risk of reaching a goal of Good ecological status by 2027.	Within the proposed development	High	The proposed development is within the catchment of the Hilltown_010 river WFD waterbody. The waterbody has a 'good' status. The waterbody

					discharges into the Cork Harbour SPA. Fluvial and pluvial flood risk.
Groundwater WFD waterbody	Ringaskiddy	Ringaskiddy is classed as not being at risk of reaching a goal of Good ecological status by 2027. Drinking water area.	Within the proposed development	High	Hydrologically connected to Ringaskiddy Drinking Water Area
Coastal WFD waterbody	Cork Harbour	Cork Harbour is a heavily modified waterbody. It is classed as being at risk of not reaching a goal of Good ecological potential by 2027. Cork Harbour SPA.	Adjacent to the proposed development	High	Hydrologically connected to Cork Harbour SPA. Coastal flood risk.
	Outer Cork Harbour	Outer Cork Harbour is classed as being at risk of reaching a goal of Good ecological status by 2027	Hydrologically connected to the proposed development	High	Hydrologically connected to Cork Harbour, Cork Harbour SPA
Transitional WFD waterbody	Lough Beg/Curraghbinny	Lough Beg/Curraghbinny is classed as not being at risk of reaching a goal of Good ecological status by 2027	Hydrologically connected to the proposed development	High	Hydrologically connected to Cork Harbour, Cork Harbour SPA
	Lough Mahon	Lough Mahon is classed is a heavily modified waterbody. It is classed as being at risk of not reaching a goal of Good ecological potential by 2027. Is a nutrient sensitive area	Hydrologically connected to the proposed development	High	Hydrologically connected to Cork Harbour, Owennacurra Estuary / North Channel Nutrient Sensitive Area, Great Island Channel SAC, Cork Harbour SPA, Lee Estuary / Lough Mahon Nutrient sensitive area
	Owenboy Estuary	Owenboy Estuary is classed as being at risk of reaching a goal of Good ecological status by 2027	Hydrologically connected to the proposed development	High	Hydrologically connected to Cork Harbour, Cork Harbour SPA

5. Potential Effects on WFD Status – Construction Phase

5.1 Groundwater

The quality of groundwater is potentially at-risk during construction and activities on site are managed in accordance with guidelines to ensure that this potential risk achieved appropriately. Risk to groundwater quality is associated with any accidental spills or contamination from materials used during construction, such as fuels or chemicals.

Based on previous ground investigations, the overburden thickness ranges from 0.2 to 9.3m. Therefore, the groundwater vulnerability within the proposed development is classified as High, due to this shallow thickness of overburden over the bedrock in a few areas of the proposed development. The removal of overburden during excavation works increases the vulnerability.

The quality of groundwater is potentially at-risk during construction, if activities on site are not managed in accordance with guidelines and best practices.

There is a possible causal mechanism for an indirect effect on Ringaskiddy Groundwater body in terms of chemical status. This effect is temporary, insignificant in the context of the waterbody and there are no potential cumulative effects.

5.2 Surface Water

Surface water could potentially become polluted by spillages such as hydrocarbon leaks from construction machinery or by siltation as a result of runoff, during construction.

The construction phase of the proposed development will have an overall slight short-term effect on the hydrology.

There is a possible causal mechanism for an indirect effect on six surface water bodies in terms of physio-chemical supporting elements and chemical status. This effect is temporary, insignificant in the context of the waterbody and there are no potential cumulative effects.

Table 5 Summary of Potential Effects on WFD Status - Construction Stage

Feature	Description	Location	WFD element				Effect is temporary	Significance at scale of water body	Cumulative effects	
Hilltown_010	Glounatouig Stream is within the catchment of Hilltown_010, which is classed as being at risk of reaching a goal of Good ecological status by 2027.	Within the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	
Ringaskiddy	Ringaskiddy is classed as not being at risk of reaching a goal of Good ecological status by 2027. Drinking water area.	Within the proposed development	Chemical status				Yes	Insignificant	No	
Cork Harbour	Cork Harbour is a heavily modified waterbody. It is classed as being at risk of not reaching a goal of Good ecological potential by 2027. Cork Harbour SPA.	Adjacent to the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	
Outer Cork Harbour	Outer Cork Harbour is classed as being at risk of reaching a goal of Good ecological status by 2027	Hydrologically connected to the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	
Lough Beg/Curraghbinny	Lough Beg/Curraghbinny is classed as not	Hydrologically connected to	Physio-chemical supporting				Yes	Insignificant	No	

	being at risk of reaching a goal of Good ecological status by 2027	the proposed development	elements and chemical status							
Lough Mahon	Lough Mahon is classed is a heavily modified waterbody. It is classed as being at risk of not reaching a goal of Good ecological potential by 2027. Is a nutrient sensitive area	Hydrologically connected to the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	
Owenboy Estuary	Owenboy Estuary is classed as being at risk of reaching a goal of Good ecological status by 2027	Hydrologically connected to the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	

6. Potential Effects on WFD Status – Operational Phase

6.1 Groundwater

The operational phase has the potential for accidental spillage of fuel, oils, paints, incoming wastes, raw materials such as lime, hydrochloric acid, caustic soda or ammonia/urea, activated carbon or clay and residues. While the likelihood of an accidental spillage may increase in comparison to the Do-Nothing Scenario, the magnitude of the effect is negligible.

In terms of predicted specific effects during site operation the following points are of note:

- There is no likely effect on any sensitive groundwater receptors or groundwater supplies in the vicinity of the proposed development.
- There will be no direct discharges to groundwater or soil environment during the operational phase.
- The operational phase of the proposed development will have an overall imperceptible long-term effect on the groundwater.

There is a possible causal mechanism for an indirect effect on Ringaskiddy Groundwater body in terms of chemical status. This effect is temporary, insignificant in the context of the waterbody and there are no potential cumulative effects.

6.2 Surface Water

There will be no discharges of process effluent from the site to surface water. Potential sources of pollution during the operational phase of the proposed development would be the accidental spillage or leakage of process materials or wastes, particularly during unloading or loading operations, which could then enter the surface water drainage system. Other potential sources of pollution that may have an effect on surface water during the operational phase could be oil/fuel leaks from parked cars, trucks and service vehicles.

A fire on site during operations could cause water use for fire-fighting to become contaminated, with the potential for this contaminated water to be discharged to the surface water system. During operation, untreated sanitary (foul) water will be pumped directly to the Irish Water sewer located east of Ringaskiddy Village, which will then be pumped to the Lower Harbour wastewater treatment facility at Shanbally.

There is a possible causal mechanism for an indirect effect on six surface water bodies in terms of physio-chemical supporting elements and chemical status. This effect is temporary, insignificant in the context of the waterbody and there are no potential cumulative effects.

Table 6 Summary of Potential Effects on WFD Status - Operational Stage

Feature	Description	Location	WFD element				Effect is temporary	Significance at scale of water body	Cumulative effects	
Hilltown_010	Glounatouig Stream is within the catchment of Hilltown_010, which is classed as being at risk of reaching a goal of Good ecological status by 2027.	Within the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	
Ringaskiddy	Ringaskiddy is classed as not being at risk of reaching a goal of Good ecological status by 2027. Drinking water area.	Within the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	
Cork Harbour*	Cork Harbour is a heavily modified waterbody. It is classed as being at risk of not reaching a goal of Good ecological potential by 2027. Cork Harbour SPA.	Adjacent to the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	
Outer Cork Harbour	Outer Cork Harbour is classed as being at risk of reaching a goal of Good ecological status by 2027	Hydrologically connected to the proposed development	Physio-chemical supporting elements and chemic				Yes	Insignificant	No	

			al status							
Lough Beg/Curraghbinny	Lough Beg/Curraghbinny is classed as not being at risk of reaching a goal of Good ecological status by 2027	Hydrologically connected to the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	
Lough Mahon*	Lough Mahon is classed is a heavily modified waterbody. It is classed as being at risk of not reaching a goal of Good ecological potential by 2027. Is a nutrient sensitive area	Hydrologically connected to the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	
Owenboy Estuary	Owenboy Estuary is classed as being at risk of reaching a goal of Good ecological status by 2027	Hydrologically connected to the proposed development	Physio-chemical supporting elements and chemical status				Yes	Insignificant	No	

7. Conclusions

Seven WFD waterbodies surrounding the proposed development were identified as having a possible causal mechanism for an indirect effect . Having regard to the nature of the of the proposed development in both construction and operation, the effect on the elements of the waterbodies are temporary and will not lead to water body status deterioration, the effect on the elements is insignificant in the context of the water body and there are no cumulative effects. It can be concluded that the proposed development is compliant with the Water Framework Directive.

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