PANTHER

ENVIRONMENTAL SOLUTIONS LTD

Environmental Impact Assessment Report

AD Plant – Environmental Consultancy
Collinstown,
Lusk,
Co. Dublin

2024

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Declaration

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GENERAL

This Environmental Impact Assessment Report (EIAR) document has been prepared on behalf of and for the exclusive use of Country Crest ULC. by Panther Environmental Solutions Ltd., with respect to an application for planning permission to Fingal County Council for the development of an Anaerobic Digestion (AD) Facility to produce a renewable biomethane gas for direct injection into the national gas grid on a site of circa 7.28 hectares at the townland of Collinstown, Lusk, Co Dublin. The development comprises of AD tanks and processing equipment, feedstock storage facilities and equipment, silage storage clamps, digestate management and storage facilities. Carbon dioxide from the production of this biomethane will be captured for reuse in the Irish food industry.

The proposed supporting infrastructure to be developed includes *inter alia*, 1 no. 45m diameter combined primary and secondary digestion tank (8.5m high, 7,947m^3 & 3,981m^3 respectively) & attached pumping unit, 1 no reception tank (5m high, 250 m^3) & attached pumping unit, 1 no. 32m diameter power digest tank & attached gas sphere (12m high, 4.825m^3 & 3130 m^3 respectively) & attached pumping unit, 1 no digestate separator building (119.5 m^2), 1 no. pasteurization unit & hygenization buffer tank, 1 no. gas upgrading unit, 1 no. gas pre-treatment unit, 1 no. gas valve chamber, 1 no. gas flare (9m high), 1 no. GNI gas injection unit (25.1 m^2) with an underground gas pipeline to the gas grid connection adjacent the site to the west, 1 no. combined heat and power unit, 2 no. boiler containers, 1 no oxygen compound, 1 no heat distribution container, 1 no switchboard container, 1 no carbon dioxide liquefaction unit, 2 no weighbridges & integrated lever arms & access control & attached bio security units, 1 no single-storey office and administration building (123 m^2), 1 no ESB sub-station (66 m^2), 1 no enclosed feedstock reception building (1527 m^2),1 no odour abatement machinery (with 14m high chimney), Silage clamps (8m high), 1 no machinery shed (309.4 m^2), 1 no services building (288.6 m^2), 1 no solid digestate storage building (484.1 m^2), 2 no covered digestate lagoons, attached pumping building (30 m^2) and attached digestate loading-unloading areas, roof mounted solar arrays / photovoltaic panels, all associated car and bicycle parking, internal road layouts, earthen berms, site retaining walls, palisade fencing and boundary treatments, hard surface and bunded areas for housing supporting plant, processing and storage facilities and all associated site works. All accessed by the existing Country Crest internal road network which uses as public roadway access point to the L1155 Man o War Road. The proposed site layout is included in Attachment 2.2.

The site is located in a rural area. Residential development in the area is predominantly aligned along the existing road network. The closest dwelling to the site is located approximately 130m to the south of the site. The anaerobic digestion activity on the site would be appropriate to the rural area.

The site is located approximately 1.5 km north of Lusk town, c. 3.8 km south-west of Skerries, c. 3.8 km west of Loughshinny, c. 3.8 km south of Balrothery, c. 4.0 km north-west of Rush and c. 5.2 km south of Balbriggan. The site is accessed by local road L1155, which connects to the R132 regional road, to the L1165 local road north of the site and to the R127 regional road to the east. The nearest motorway is the M1, which is accessed by R132. The proposed site location is included in Attachment 2.1.

The main activities on the site are summarised as follows:

- Silage;
- Feedstock reception and pre-treatment;
- Anaerobic Digestion and Post-Digestion;
- Digestate Pasteurisation;
- Digestate segregation;
- Solid and Liquid digestate storage and removal;
- Biogas Pre-treatment and upgrade to biomethane;
- Biomethane injection to the national grid;
- CO_2 Liquefaction;
- Occasional excess biogas combustion using emergency flare;

The principal inputs would be poultry litter, cattle manure, vegetable and food processing byproducts, draff grains, whole crop and grass silage, slurry, WWTP sludge, water and energy (electricity and biogas) for the multiple components of the AD plant. The outputs would be biomethane (primary product), biogas, carbon dioxide, solid digestate, liquid digestate and soiled water. The waste products would be domestic refuse and recyclable packaging waste from staff facilities.

The process will generate methane and carbon dioxide. It is estimated that every year approximately 8.794.070 Nm^3 of biogas, 4.778.951 Nm^3 of methane and 59,387 tonnes of raw digestate will be produced. Biomethane would be injected into the national grid. Digestate would be collected by an appointed contractor and applied within the applicant's and partner farmer's lands, as detailed within the Nutrient Management Plan.

HUMAN BEINGS

The farm is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along the existing road network. A number of farmsteads and agricultural facilities are located in the surrounding area of the site. The area also supports a commercial development (IT product retailer).

The proposal would have a positive impact upon the local economy. The development of an AD Plant would utilise the production capacity of the existing Country Crest site, therefore increasing the profitability of the agri-food hub. The proposal would support the continued employment of current Country Crest ULC. staff, improving the cost/profit of this employment, and create new jobs at the AD plant during the operational phase. The provision of employment would further contribute to the economy of the area through direct spending of goods and services in the Lusk area and surrounds.

No significant additional noise impact on local residences would be anticipated during the operation of the AD Plant. It is recommended that all collections and deliveries from the site are conducted during normal working hours. During the normal operation of the AD Plant, noise is predicted not have a significant impact at the nearest noise sensitive locations.

The proposed development has the potential to impact upon traffic volumes in the area, which may subsequently impact upon the generation of noise and dust emissions. There is predicted to be no significant increase in traffic volumes during the operation of the AD Plant. The Transportation Assessment has determined that no significant impacts upon the local road network are anticipated due to the increase in traffic associated with the operation of the proposed development. It is estimated that the proposed development would result in a daily increase of approximately 44 Passenger Car Units (PCUs).

The proposed development would result in agricultural land changing to artificial surfaces, corresponding to a moderate change in land use given the nature and scale of the site. The proposed buildings would be an addition to the already existing Country Crest's agri-food hub. Therefore, it is not anticipated that a significant impact would arise due to the land use change associated with the development.

There would be no impact upon the visual or landscape sensitivities of the area due to the proposed operation of the AD Plant. The undulating topography and intervening local field boundaries would effectively screen the site, with no elements anticipated to be visible from nearby viewpoints. The proposed use of gradiated colours would help the development blend into the skyline. Additionally, it is also recommended that any lighting should be minimised where possible and not exceed requirements.

There would be no adverse impacts to human beings due to a deterioration in water quality. There would be no process effluent emissions from the site, clean storm-water would be directed through a suitably designed drainage system before discharging to an existing ditch and soiled waters would be further used within the anaerobic digestion process. Liquid digestate would be landspread in accordance with the Nitrates Regulations as a matter of good environmental practice.

Therefore, there are anticipated to be no significant negative impacts to human beings as a result of the proposed operation of the AD Plant.

AIR / CLIMATE

Effects from the construction phase on ecological receptors will be negligible, negative and temporary. The impact of construction on air quality can be described in terms of dust soiling as negative, imperceptible and temporary effects. The impact of construction on air quality can be described in terms of health impacts as negative, imperceptible and temporary effects. Mitigation will not be required to reduce potential impacts of construction activities to levels that can be described as not significant.

The main potential sources of air pollutants from the operation of the farm would be the combustion processes, handling or feedstocks and from the storage of de-watered digestate. Emissions from the operational phase of the AD Plant include primarily ammonia, nitrogen oxides and carbon monoxide. Airborne dust and particulate matter can arise construction activities.

The impact of the proposed development on sensitive ecological receptors in isolation was determined to be insignificant, negative and long-term. Considering the proximity of the proposed development to adjacent facilities, which emit the same air contaminants, cumulative impact assessment was required to determine the potential for adverse air quality impacts in the study area. The impact of the proposed development on air quality in the study area was described as negligible, negative and long-term.

The construction phase of the proposed development will result in emission of GHG to the atmosphere from construction traffic, the use of fossil fuels to power onsite equipment and the generation of onsite waste. The potential impact of the construction phase of the proposed develop on climate was found to be imperceptible, negative and temporary. Emissions from the construction phase may be minimised through the optimisation of schedules/routes for delivery/removal of construction materials, the efficient use of equipment/resources and through waste minimisation. The level of impact of the construction phase of the proposed development will be insignificant, negative and long-term.

The operational phase of the proposed development will generate greenhouse gas emissions, but it will also lead to offsets. The net impact of the proposed development has been determined as the greenhouse gas emissions generated minus the emissions offset. The potential impact of the operational phase of the proposed develop on climate was found to be imperceptible, positive and long-term. Greenhouse gas emissions may be reduced through the use of renewable biomass in place of combustion of fossil fuels and the reuse of wastewater produced as part of the adjacent food production process. The level of impact of the operational phase of the proposed development on climate change will be imperceptible, positive and long-term.

ODOUR

During the operation of the AD Plant, there would be potential for odour generation from the OCU Stack and dewatered digestate storage area at the site. Odour dispersion modelling, undertaken as part of this EIAR and included as Attachment 4.1, concluded that receptors in the vicinity of the AD Plant are not anticipated to perceive an odour level greater than the Irish EPA and UK EA guidance guideline odour limit of less than 1.5 Ou_E/m^3 for the 98^{th} percentile of hourly averages.

Country Crest's adjacent food processing facility and cattle yard would be considered other sources of odour emissions and were included in the odour dispersion model. Significant odours would generally be present during the slurry-spreading season associated with the agricultural industry in the area. The odour dispersion modelling concluded that the odour plume spread from the facility would be considered small, with the plume generally oriented away from the nearest sensitive receptors. Due to the predicted odour levels, and no history of complaints from the adjacent operations of Country Crest, it was concluded that odour nuisance complaints were unlikely.

As there would be no exceedances of the EPA guidance limit, it is considered that the proposed AD Plant would not have a significant risk of causing nuisance odour impacts at nearby residences.

It is therefore considered that the proposed operation of the AD Plant would not have a significant impact upon human beings with respect to odour.

NOISE

The baseline noise assessment conducted for the site provides a predictive analysis of the impact of the operation of the AD Plant on noise sensitive locations (NSL). The Predictive Noise Assessment assessed the potential impact of the proposed operation of the AD Plant at these locations, in accordance with the methodologies prescribed in ISO 9613-2:1996 "*Attenuation of Sound during Propagation Outdoors,*" and in BS 4142:2014 "*Methods for Rating and Assessing Industrial and Commercial Sound*".

Construction noise levels were determined using distance calculations from the closest noise sensitive location to the closest boundary point. The calculated potential construction noise levels at the closest NSL's would be below the 75dB threshold established in BS 5228 *'ABC Method'*.

The closest noise sensitive location is 130m to the south of the proposed operation. It was determined that, during the operational phase, the calculated combined noise level at the closest noise sensitive receptors were in excess of the 45 dB EPA Night-time noise limit. The main noise sources would be enclosed within the Feeding System building, which would include insulation panels in its design. Therefore, it is predicted that facility operational noise would not have a significant impact upon noise sensitive locations.

During the operational phase of the proposed development, noise would also be generated by vehicles delivering materials to and from the AD Plant. Noise from agricultural vehicles is a normal part of rural life and thus, the subjective impact of noise from this source would not normally be expected to result in nuisance. Maximum noise levels at the site are expected to be equivalent to noise levels experienced during the operation of large agricultural machinery within the existing surrounding farmland and farmyard, or other adjacent agricultural lands. Maximum noise levels within the site would not be increased above current maximum noise levels in the area, due to agricultural machinery being commonplace.

Appropriate timing of potentially high noise emission operation activities, such as feedstock deliveries, has been recommended.

There would be no significant impact on noise sensitive locations as a result of the construction and operational phases of the AD Plant at Collinstown, Lusk, Co. Dublin.

VISUAL IMPACT

The site is located within a rural agricultural landscape, dominated by fields of varying sizes, bordered by mature hedgerows, treelines, drainage ditches and fences. Residential property is generally dispersed along local roads. A number of one-off residences and farmyard complexes exist in the area and are the dominantly visible man-made structures in the landscape. Small to medium-sized farmyard complexes are common in the area and are generally composed of barrel or A-shaped sheds with green or dark finish, many including feed type silos either of unfinished stainless steel or green/dark finish.

The proposal site is located at an approximate elevation of 45-55m above sea level on an area that is gently sloped down to the south-east. Topography is characterised by low-lying agricultural land. The proposed site is located within the "Low Lying" Landscape Character Type. The Fingal Development Plan 2023-2029 notes that Low Lying Landscapes have low sensitivity to change.

The site would include a number of tall structures including the power digest tank and attached gas sphere, the primary and secondary digestion tank, the silage clamps and gas flare. The Visual Impact Assessment (VIA) determined that the undulating nature of the topography of the area and the local field boundaries would screen the proposed structures and buildings at the site. There would be retention and enhancement of existing field boundaries at the site, as per the proposed landscape plan. This will further increase the level of screening of the proposed development and would have a positive impact upon the local landscape.

There would be an imperceptible impact upon the visual or landscape sensitivities of the area due to the proposed operation of the AD Plant.

DIGESTATE AND SOILED WATER MANAGEMENT

The main byproduct expected at the site from the biogas production via anaerobic digestion will be digestate. The site will store liquid and dewatered digestate to be used as organic fertiliser. It is estimated 49,045 tonnes of liquid digestate and 9,342 tonnes of solid digestate will be generated per year. The solid fraction of the digestate will be stored in a bunker, which will be roofed over. The liquid fraction of the digestate will be stored within sealed lagoons. The site will also generate soiled water from feedstock feeding locations, the solid digestate bunker and the silage clamps. This will be collected by two buried tanks and may be further used as feedstock for the anaerobic digestion process.

Digestate would be collected by registered contractors / farmers. All digestate collections from the site would be recorded in a log by the applicant for application to lands owned by the applicant and delivered to partner farmers, as per Nitrates Regulations (S.I. No. 113 of 2022) and the Nutrient Management Plan.

WASTE MATERIAL

All waste material would be stored as per the BREF Document on Emissions from Storage (July, 2006) and removed from site by a licensed waste contractor as necessary. Removal of waste materials would be documented as appropriate.

WATER SUPPLY

Water will be supplied to the site from two sources: via a new connection to the existing firefighting main adjacent to the site boundary in the northeast corner of the site and also from an onsite well. It is estimated that water abstraction from the existing well will be approximately $0.5m^3$/day.

The estimated amount of water to be used at the site as feedstock would be c. 8,000 m^3/year. Minor volumes of water would be used at the site for other purposes, such as washing activities and staff facilities.

The site is located within a locally productive aquifer which is moderately productive and it is anticipated that it would be able to accommodate the increased water abstraction associated with the proposed development. It is not anticipated that there would be any impact to other wells in the area.

BIODIVERSITY

A Natura Impact Assessment (NIS) has been prepared in support of this application and is presented in Attachment 9.1 of the EIAR.

The closest Natura 2000 sites to the farm are the Rogerstown Estuary SAC (Site Code: 000208) and Rogerstown Estuary SPA (Site Code: 004015), located 4.2km south from the site. Skerries Islands NHA (Site Code: 001218) are the only NHA sites within 15km of the AD Plant.

The air quality assessment was conducted in accordance with recognised techniques for dispersion modelling specified in EPA's Air Dispersion Modelling Guidance Note (AG4) and is included in Attachment 4.1 of the EIAR. There is anticipated to be no significant impacts to protected habitats as a result of deposition of atmospheric nitrogen. Predicted ground-level concentrations of air contaminants comply with the 1% threshold of significance at all sensitive ecological locations for the operation of sources of emissions at the proposed development in isolation. Critical load limits of nitrogen for protected habitats, which may be located close to the site, are not predicted to be exceeded, and contributions from the AD Plant are anticipated to be minor.

It is not anticipated that the proposed operation of the AD Plant, by itself or in combination with other developments, would impact negatively upon the Natura 2000 network.

The site is not anticipated to have a significant negative ecological impact upon the biodiversity of the area, given that there would be no process effluent discharge from the site and that mitigation measures will be put in place for the protection of habitats and species during the construction and operational phases. There would be no removal of hedgerows as part of the proposal.

No rare or protected flora were recorded within the site during the field assessment. No invasive flora species of concern were noted as present during the site assessment. Given the nature of the proposal, it is considered that there would be no risk of introducing invasive species during the operation of the proposed development.

Noise from proposed operations is not anticipated to have a significant impact in the vicinity of the site. Additionally, maximum noise levels from the operation of the AD Plant are anticipated to be similar to those experienced during the operation of large agricultural machinery within the existing surrounding farmland and farmyard, or other adjacent agricultural lands. Maximum noise levels within the site would not be increased above current maximum noise levels in the area, due to agricultural machinery being commonplace. Therefore, there would be no significant potential disturbance upon fauna due to noise from the farm.

There would be no significant impact upon biodiversity due to the generation of digestate onsite. Digestate arising from the site would be collected by an appointed contractor for use as a fertiliser in lands owned by the applicant and delivered to partner farmers as detailed within the Nutrient Management Plan. The collection and spreading of fertiliser would be undertaken in compliance with the requirements of the Nitrates Regulations, S.I. No. 113 of 2022.

SURFACE WATER

It is not anticipated that there would be any potential significant impacts upon water quality during the operation of the farm, as only clean, surface water run-off would be discharged from the site.

There would be no process effluent associated with the operation of the facility. Therefore, there would be no effluent emissions to surface or groundwaters.

All storm-water from roofs and hardstanding areas of the site would be collected and discharged to the existing ditch to the south via a suitably designed drainage system. This water would be uncontaminated and therefore should have no impact on the watercourse. The stormwater system would include two detention basins, a flow control device and a petrol interceptor at the pond. The outfall will be protected using a precast concrete headwall.

According to the Preliminary Flood Risk Assessment (PFRA) indicative flood mapping website, the site is not located within fluvial, pluvial or groundwater flood zones.

The site will store liquid and dewatered digestate to be used as organic fertiliser, which could pose a spill risk to the aquatic environment. It is estimated 49,045 tonnes of liquid digestate and 9,342 tonnes of solid digestate will be generated per year. The solid fraction of the digestate will be stored in a bunker, which will be roofed over to prevent emissions and contamination. The liquid fraction of the digestate will be stored within sealed lagoons and underground collection chambers will be installed to collect any spillage of digestate that might occur. The site will also generate soiled water, which will be collected by buried tanks and may be further used as feedstock for the anaerobic digestion process.

The concrete yard where the anaerobic digestion will take place will be fully bunded and spill clean-up materials would be available onsite in the event of a spill. All drainage basins to this bunded area will be equipped with automatic shutoff valves to stop any liquid transfer outside. All drainage basins to this bunded area will be equipped with automatic shutoff valves to stop any liquid transfer outside. Surface water will pass through a hydrocarbon interceptor before discharging to the existing ditch via the proposed headwall. Therefore, the risk of a spillage of a potential contaminant is deemed to be low. The organic fertiliser would be spread on lands owned by the applicant and by partner farmers, subject to setback distances outlined in the Nitrates Regulations and according to the Nutrient Management Plan.

SOILS, GEOLOGY AND HYDROLOGY

Soils underlying the AD site are primarily composed of "Mineral poorly drained mainly acidic soils" AminPD. The subsoil at the site is classed as Shales and sandstones till (Namurian). Subsoils beneath the proposed site are mapped as till derived from Namurian sandstones and shales.

Trial hole excavations indicate that the subsoils of the site ranged from gravelly clay/silt and gravel with high clay content. The bedrock underlying the site is classed as Dinantian Upper Impure Limestones.

Groundwater vulnerability at the farm is classed as Low. According to the GSI, the nearest record for a spring from which drinking water is abstracted is located in an agricultural field approximately 265m from the site. There are 2 existing water sources on site – a dedicated firefighting ring main and a well supply of potable water.

There are no Groundwater Source Protection Areas (SPAs) mapped by the GSI in the immediate vicinity of the site. The nearest SPA is for the Bog of the Ring Public Water Scheme located approximately 1.4 km north-west of the site, which would be considered upstream.

A Site Characterisation Report indicated that the proposed septic tank system which will serve staff facilities at the site is appropriate for development.

During the operation of the AD Plant, the main potential impacts to soils, geology and water would include the storage and recovery of digestate, the storage and spreading of organic fertiliser and accidental leakage or spillage of potential contaminants, including soiled water and slurry. Mitigation measures would include the controlled removal of digestate, the storage of soiled water within two appropriate soiled water storage tanks, the spreading of fertiliser in accordance with the E.U. (Good Agricultural Practice for the Protection of Waters) Regulations 2022 and the appropriate storage of potentially polluting materials.

MATERIAL ASSETS: UTILITIES & TRAFFIC

The potential for noise to impact upon residential, commercial and other non-agricultural facilities would be considered low as there would be no significant alteration to the current noise environment in the area.

A Transportation Assessment Report was prepared by ACSU for the proposed AD Plant at Collinstown and is included as Attachment 4.2. The report assesses the potential impact of the AD Plant upon the local road network in addition to the existing site access junction.

There would be no significant increase in traffic volumes using the local road infrastructure, as a result of the proposed operation at the site. It is estimated that the proposed development would result in a traffic increase of approximately 44 PCUs per day. The road network and the proposed access junction arrangement is more than adequate to accommodate the worst case traffic associated with the proposed development either alone or in combination with other developments.

MATERIAL ASSETS: NATURAL & OTHER RESOURCES

There would be no significant impacts upon agricultural properties or non-agricultural properties (including residential, commercial, recreational and non-agricultural land) due to the proposed operation of the AD Plant.

There would be loss of agricultural land due to the proposal. As the operation of the AD Plant would occur on an existing arable land (owned by the applicant), the site would change from being used for agricultural activities to artificial surfaces. Therefore, there would be land use change at the proposal site. The proposed buildings would be an addition to the already existing Country Crest's agri-food hub and the proposed activities to be carried out at the site would be aligned with the rural nature of the region. Therefore, it is not anticipated that land use change at the site would result in a significant negative effect.

There are no significant negative effects expected in relation to the use of natural resources.

Operations carried out on-site would lead to the consumption of water, biogas, electricity, crops and food byproducts. The main resource to be consumed would be silage, which is classifiable as a natural resource that is a renewable resource.

The estimated amount of water to be used at the site as feedstock would be c. 8,000 m^3/year. Minor volumes of water would be used at the site for other purposes, such as washing activities and staff facilities.

The proposed development would be connected to the electrical mains supply. Electricity would also be supplied to buildings by roof mounted solar arrays / photovoltaic panels. Additionally, the biogas produced will be used to supply electricity and heat energy to the site.

ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

Following a desk study and site inspection by ACSU, it was concluded that there are no protected archaeological, architectural or cultural heritage sites within the proposal site or within its immediate environs. Therefore, it is not anticipated that the proposal would have any impacts on any elements of the protected resource.

There are five known archaeological sites within 1km of the site, the nearest of which are located approximately 240m from the site with no visible remains left. The known archaeological sites within 1km of the site are as follows:

- Castle - unclassified (DU008-001)
- Enclosure (DU005-180)
- Enclosure (DU008-114)
- Enclosure (DU008-002)
- Ring-ditch (DU008-113)

There are no topographical files listed for the townlands of Collinstown or Ballymaguire.

There are no protected structures within or in the immediate vicinity of the site. There is one building in the area which is included in the National Inventory of Architectural Heritage, the Rose Cottage in the townland of Greatcommon, which was built c.1860, located approximately 735m from the site.

No adverse physical or visual impacts on the known Cultural Heritage of the area have been identified as a result of the proposed operation of the AD Plant, given the distance between the nearest recorded monument and the absence of any protected structures within 500m of the site.

SUMMARY

The potential for the proposed AD Plant to cause adverse environmental impacts, considering the proposed mitigation measures, is anticipated to be not significant.

This is due to the nature, scale, high specification, management and location of the site, due to all digestate being used as organic fertiliser for landspreading, the absence of effluent emissions from the anaerobic digestion process and due to the capture of CO_2 from treated biogas for reuse in the Irish food industry.

1.0 INTRODUCTION, BRIEF FOR CONSULTANCY & SCOPE OF EIAR

1.1 INTRODUCTION

Panther Environmental Solutions Limited (PES Ltd.) has been commissioned by the applicant, Country Crest ULC., to prepare an Environmental Impact Assessment Report (EIAR) for the proposed construction of an anaerobic digester and all ancillary site works and services at Collinstown, Lusk, County Dublin.

The proposed development will be located in the townland of Collinstown, Lusk, Co Dublin. The proposed biogas plant is located c. 2.3 km north of Lusk town centre, c. 5.0 km south-west of Skerries town centre and c. 5.3 km north-west of Rush town centre. The site is located in a rural, farming area predominantly comprised of pastureland and hedgerows. Access for the site is taken from an access road off the L1155 local road, which connects to the R132 regional road.

A full description of the existing and proposed development is provided in Section 2 of this EIAR document.

This EIAR is to be submitted to Fingal County Council in support of an application for planning permission for the proposed development, as described above, under the Planning and Development Regulations 2001 (S.1.No 600 of 2001).

1.2 ENVIRONMENTAL IMPACT ASSESSMENT & PLANNING LEGISLATION

This Environmental Impact Assessment Report has been prepared in accordance with:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018);
- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003);
- Environmental Impact Assessment of Projects – Guidance on Screening (Directive 2011/92/EU as amended by 2014/52/EU). (European Union 2017);
- Environmental Impact Assessment of Projects – Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU). (European Union 2017);
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). (European Union 2017);

- Environmental Impact Assessment (EIA) Guidance for Consent Authorities Regarding Sub-Threshold Development (Department of the Environment, Heritage and Local Government, 2003).

Some of the feedstocks for the proposed development are classified as wastes and/or Category 2 animal by-products. The Anaerobic Digestion Facility will be a 'Type 1' plant under the European Union (Animal Byproducts (ABP)) Regulations (S.I. No. 187 of 2014). Therefore, the proposed development will be subject to an Industrial Emissions (IE) licence granted by the Environmental Protection Agency (EPA) and a Category 2 animal by-products permit granted by the Department of Agriculture, Food and the Marine (DAFM).

The proposed development was assessed to determine if it would fall under the remit of the Seveso Directive.

Schedule 5, of the Planning and Development Regulations refers to development for the purposes of Part 10 (Environmental Impact Assessment Report) of the planning regulations.

"An EIAR is required to accompany a planning application for development of a class set out in Schedule 5 of the Planning and Development Regulations which exceeds a limit, quantity or threshold set for that class of development. An EIAR will also be required by the planning authority in respect of sub-threshold development where the authority considers that the development would be likely to have significant effects on the environment (article 103)".

The schedule sets out the prescribed classes of development that require an EIAR document. The following sections of schedule 5 are applicable to the proposed development.

- *Schedule 5, Part 2:*
  11. Other Projects:
  (b) Installations for the disposal of waste with an annual intake greater than 25,000 tonnes not included in Part 1 of this Schedule.

The proposed development is estimated to process up to 43,700 tonnes of feedstock annually, thus exceeding the threshold of Schedule 5, Part 2, Item 11(b) of the Planning and Development Regulations. Therefore, a mandatory EIAR was required for the project.

This EIAR is drafted with particular regard to Article 94 and Schedule 6 in the 2018 Planning Regulations, and is submitted to provide information that may assist the planning authority in making its decision on this application for planning permission.

The EIA Directive, 2014/52/EU, amending the EIA Directive 2011/92/EU, was transposed into Irish law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). Circular letters issued by the Department of Housing, Planning, Community and Local Government on the 15th of May 2017 (Ref. PL1/2017) and 27th August 2018 (Ref. PL05/2018) have also been consulted in preparation of this report, advising planning authorities and An Bord Pleanála of the procedures and information necessary to comply with the EIA Directive required under the new regulations:

"The new Regulations transpose the requirements of Directive 2014/52/EU, amending previous Directive 2011/52/EU, on the assessment of the effects of certain public and private

projects on the environment (the EIA Directive) into planning law with effect from 1 September 2018."

The guidelines state that in preparing an EIAR, the Developer will carry out an analysis of the likely effects of the project (positive or negative) on the environment. The Environmental Impact Assessment procedure commences at the project design stage when the scope of the study is determined. Studies are then carried out to investigate in detail, any potential environmental impacts. Where significant adverse impacts are identified, measures are recommended to mitigate or avoid the impact of the proposed development.

This Environmental Impact Assessment Report examines the potential significant impacts of the proposed development, comprising of the construction of an anaerobic digester and all ancillary site works and services at Collinstown, Lusk, County Dublin.

The extent of the proposed facility is described in detail in Section 2 – Description of the Proposed Development. The potential environmental impacts of the proposed facility are addressed in Sections 4 – 14 of this volume of the report under the headings Population and Human Health, Natural Environment, Material Assets, Cultural Heritage, and Interactions and Inter-relationships.

1.3 EIA PROCESS OVERVIEW

Environmental Impact Assessment (EIA) is the process by which the anticipated effects on the environment due to a project are assessed or measured. The Environmental Impact Assessment Report (EIAR) summarises the environmental information collected during the impact assessment of the proposed development.

The steps of the EIA process can be described as follows:

(i) Screening;
(ii) Scoping;
(iii) Preparation of the EIAR;
- Consideration of Alternatives,
- Project Description,
- Description of Receiving Environment,
- Identification and Assessment of Impacts,
- Monitoring and Mitigation Proposals.

(iv) Completion of EIA,
- Scrutiny and Consent,
- Enforcement and Monitoring.

1.3.1 SCREENING

In order to determine if an EIA is required for the proposed development, it is necessary to determine whether the project is listed in one of the Annexes of Directive 2011/92/EU, as amended by Directive 2014/52/EU. These annexes have been transposed into Irish Law, with the prescribed classes of development requiring an EIAR outlined in Schedule 5 of the Planning and Development Regulations, 2001 (S.I. No. 600 of 2001), as amended.

Schedule 5, Part 1, of the above mentioned regulations, prescribes the mandatory thresholds in respect to Annex I projects.

Annex II of the EIA Directive, transposed by Schedule 5, Part 2, of the Planning and Development Regulations, provides E.U. Member States discretion in determining the need for an EIA on a case-by-case basis for certain classes of projects, having regard to the overriding consideration that projects likely to have significant effects on the environment should be subject to EIA.

The proposed development exceeds the given thresholds for an Annex II class activity described in the EU Directive 2011/92/EU. Therefore, a mandatory EIAR was required for the project.

1.3.2 SCOPING OF THE EIAR

Scoping is an essential part of the preparation of an EIAR as it ensures that all potential and important significant impacts on the receiving environment are taken into account at the earliest possible time.

Scoping provides relevant information on the most important potential impacts of the project, which will have to be addressed in the EIAR.

With regard to EPA criteria for scoping, the environmental areas that may be impacted by the proposed scheme were identified and are as follows:

Human Beings

During scoping, particular regard was given to the potential impact of the proposed construction of an anaerobic digester and all ancillary site works and services on human beings. In particular, potential impacts which may occur due to noise and odour during operation.

Natural Environment

The nearest sites of ecological importance are the Rogerstown Estuary Special Area of Conservation (SAC) (Site Code: 000208) and Special Protection Area (SPA) (Site Code: 004015) which is 4.19 km south of the site; North-West Irish Sea SPA which is c. 4.39 km north-east of the site (Site Code 004236) and the Skerries Islands SPA (Site Code: 004122) which is 5.30 km north-east of the site. One Natural Heritage Area (NHA), Skerries Islands NHA (Site Code: 001218), is located within 15km of the development and is designated for its habitats which support protected bird species.

The proposed development site is located on an aquifer categorised as a “Locally Important Aquifer – Bedrock which is generally moderately productive”. Groundwater vulnerability across the site is mapped as “high” to “extreme” due to areas of exposed bedrock or shallow soils.

The potential impacts on land, waters and biodiversity must be assessed with care to ensure that all impacts are clearly identified and where possible removed, reduced or minimised to a satisfactory level.

Material Assets

This involves assessing impact of the proposal on land take, the availability of resources such as soils, utilities and natural resources and waste management in the area. The development would construct an anaerobic digester adjacent to an existing food processing facility, operated by the applicant. Given the location of the proposed development site in an agricultural area, the development's potential impact upon agriculture must also be assessed.

Architecture, Archaeology & Culture Heritage

A number of monuments are present within the wider vicinity of the site, with five designated monuments within c. 1 km of the site boundary. Rose Cottage is the only site of Architectural Heritage that is within 1 km of the proposed development site.

1.3.3 SCENARIOS INVESTIGATED

A number of different scenarios have been examined when determining likely significant impacts.

The *"do nothing"* scenario which compares the quality of the existing receiving environment with that of the likely environment should the proposed scheme not be permitted.

The *"do something"* scenario which compares the quality of the existing receiving environment with that of the likely environment should the proposed scheme be permitted.

1.4 INFORMATION TO BE CONTAINED IN AN EIAR

Schedule 6 of the Planning and Development Regulations, 2001, as amended, specifies the information to be contained within an EIAR, including:

1. (a) A description of the proposed development comprising information on the site, design, size and other relevant features of the proposed development.
   (b) A description of the likely significant effects on the environment of the proposed development.
   (c) A description of the features, if any, of the proposed development and the measures, if any, envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment of the development.
   (d) A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.

2. Additional information, relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, on the following matters, by way of explanation or amplification of the information referred to in paragraph 1:

   (a) a description of the proposed development, including, in particular—
      i) a description of the location of the proposed development

ii) a description of the physical characteristics of the whole proposed development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases,
iii) a description of the main characteristics of the operational phase of the proposed development (in particular, any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used, and
iv) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases;

(b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects;

(c) a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge;

(d) a description of the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act likely to be significantly affected by the proposed development:
- population,
- human health,
- biodiversity (for example fauna and flora),
- land (for example land take),
- soil (for example organic matter, erosion, compaction, sealing),
- water (for example hydromorphological changes, quantity and quality),
- air,
- climate (for example greenhouse gas emissions, impacts relevant to adaptation),
- material assets,
- cultural heritage, including architectural and archaeological aspects, and
- landscape.

(e) (i) a description of the likely significant effects on the environment of the proposed development resulting from, among other things—

(I) the construction and existence of the proposed development, including, where relevant, demolition works,
(II) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources,
(III) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste,
(IV) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters),

(V) the cumulation of effects with other existing or approved developments, or both, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources,

(VI) the impact of the proposed development on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the proposed development to climate change, and

(VII) the technologies and the substances used, and

(ii) the description of the likely significant effects on the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act should cover the direct effects and any indirect, secondary, cumulative, transboundary, short term, medium-term and long-term, permanent and temporary, positive and negative effects of the proposed development, taking into account the environmental protection objectives established at European Union level or by a Member State of the European Union which are relevant to the proposed development;

(f) a description of the forecasting methods or evidence used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information, and the main uncertainties involved;

(g) a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of an analysis after completion of the development), explaining the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset during both the construction and operational phases of the development;

(h) a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events.

1.5 IDENTIFICATION OF LIKELY SIGNIFICANT IMPACTS

Schedule 6 of the Planning and Development Regulations details the information to be contained in EIAR. The EPA's "*Guidelines on the information to be contained in Environmental Impact Assessment Report, 2022*" states that "*the EIAR should be focused on the likely, significant effects*" and defines effect / impact as "*A change resulting from the implementation of a project*".

The assessment of the effects outlined in the chapters which follow, take into account the guidelines given by the EPA and those scales used in other EIAR documents for significant developments in this country. A broad outline of the description of effects is given in **Table 1.1** to **Table 1.5**.

The following factors have been considered for this EIAR when determining the significance of the effects, both positive and negative, of the proposed development on the various aspects of the receiving environment:

- The quality and sensitivity of the existing/baseline receiving environment.
- The relative importance of the environment in terms of national, regional, or local importance.
- The degree to which the quality of the environment is enhanced or impaired.
- The scale of effect, for example in terms of land area, number of people effected, number and population of species effected including the scale of change resulting from all types of effects.
- The consequence of that effect occurring.
- The likelihood/risk of the effect occurring.
- The duration of the effect from momentary to permanent.
- The degree of mitigation that can be achieved.

Where mitigation in the form of design measures have been suggested throughout the evolution of the EIAR, these have been incorporated into the scheme design in so far as is possible.

Table 1.1: General EIAR Criteria (Quality of Effects)	
Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral.	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).

Table 1.2: General EIAR Criteria (Significance of Effects)	
Describing the Significance of Effects 'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not Significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects

(also see Determining Significance).	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics.

Table 1.3: General EIAR Criteria (Probability of Effects)	
Describing the Probability of Effects Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Table 1.4: General EIAR Criteria (Duration and Frequency of Effects)	
Describing the Duration and Frequency of Effects 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects** Effects lasting from seconds to minutes.
	Brief Effects Effects lasting less than a day.
	Temporary Effects Effects lasting less than a year.
	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years.
	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of Effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

Table 1.5: General EIAR Criteria (Types of Effects)	
Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary or Off-site Effects)** Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	'Do-nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	'Worst-case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

1.6 REPORT STRUCTURE

The main EIAR document is comprised of the following:

<u>Non-Technical Summary:</u>

A summary of the findings of the EIAR, in non-technical language.

<u>Part I: Proposed Development:</u>

Part I describes the existing and proposed development at the site, previous planning applicants and consents and a summary of consultations with the relevant statutory bodies and competent authorities. Part I includes the following chapters:

Chapter 1: Introduction, Brief for Consultancy and Scope of EIAR
Chapter 2: Description of the Proposed Development, Planning and Development Context
Chapter 3: Alternatives

<u>Part II: Environmental Impacts:</u>

Part II describes the likely significant environmental impacts arising from the proposed development. Where possible, design measures have been included to reduce or eliminate potential impacts. Where this has not been possible, mitigation measures have been suggested to reduce or eliminate the identified impacts of the proposed development.

Part II has been divided into five main sections, as per the table below.

Table 1.6: EIAR Sections and Sub-Sections	
Main Section	**Chapters**
Section A Human Environment	4. Population and Human Health
	5. Air Quality, Odour & Climate
	6. Noise
	7. Landscape and Visual Environment
Section B The Natural Environment	8. Biodiversity
	9. Land – Soils, Geology, Hydrology And Hydrology
Section C Material Assets	10. Material Assets – Traffic
	11. Material Assets – Waste
Section D Cultural Heritage	12. Archaeological, Architectural and Cultural Heritage
Section E Interactions and Inter-relationships	13. Interactions and Inter-relationships

1.7 COMPETENT EXPERTISE

Directive 2014/52/EU states that the preparation of EIAR documents should be undertaken by "*competent experts*", ensuring that the information provided is of high quality.

Panther Environmental Solutions Ltd (PES Ltd) is a leading Environmental Consulting Firm based in Carlow, Ireland. PES Ltd was formed in 2005 by Environmental Consultant Mike Fraher who has over two decades of experience working in the Environmental Consultancy Industry, both in Ireland and in the UK. The PES Ltd. team are experienced in preparing EIS / EIAR documents, having completed a number of these reports for a range of industries including the intensive agriculture sector.

This EIAR has been prepared by experienced environmental consultants with PES Ltd. Mr. Mike Fraher has over 25 years of consultancy experience and has a B.Sc. Degree in Environmental Sciences from the University of Glamorgan, Cardiff in Wales and a Diploma in Food Sciences from Cork Institute of Technology.

Mr. Martin O'Looney has over ten years consultancy experience and has a B.Sc. Degree in Environmental Science and Technology from Sligo Institute of Technology.

Mr. Nial Ryan has over seven years' consultancy experience and has a B.Sc. (Hons) in Applied Physics from Dublin City University and a M.Sc. in Medical Device Regulatory Affairs, a Level 6 Cert in CAD and 3D Modelling, Level 7 Cert in Health, Safety and Environmental

Management all from South Eastern Technical University (formerly Institute of Technology Carlow).

Mr. Luis Soares has a BSc. in Aquatic Sciences and a MSc. in Environmental Sciences and Technology from University of Porto.

Additional expertise was obtained for Sections 5, 6, 8 and 13 of the EIAR, as discussed below. The following table outlines the contributor of each section of the EIAR.

Table 1.7: Contributors to the EIAR

Ref	EIAR Topic	Responsibility	Notes
1	Introduction, Brief for Consultancy and Scope of EIAR	PES	-
2	Description of the Proposed Development, Planning and Development Context	PES	Information to be provided by PES, project architect and client, as applicable
3	Alternatives	PES	Information to be provided by PES, project architect and client, as applicable
4	Human Beings	PES	Desk study and risk assessment based on information in EIAR Sections
5	Air Quality & Odour	Katestone	Modelling and desk study.
6	Climate	Katestone	Desk study
7	Noise	PES	PES to undertake a Noise Impact Assessment report, the findings of which will be used to complete this section
8	Landscape and Visual Environment	Griffin Landscape Architects / ACSU / PES	PES to summarise the design of the project, landscape design and the findings of Visual Impact Assessment.
9	Biodiversity	PES	Risk assessment based on potential for species presence, informed by site surveys.
10	Land – Soils, Geology, Hydrology And Hydrology	PES	Desk study and risk assessment based on information in EIAR Sections
11	Material Assets – Utilities & Traffic	NRB Ltd / PES	Desk study and risk assessment based on information in EIAR Sections
12	Material Assets – Natural & Other Resrouces	PES	PES to summarise the findings of the Transportation Assessment Report and Preliminary Mobility Management Plan.
13	Archaeological, Architectural and Cultural Heritage	ACSU / PES	PES to summarise the findings of the design of the Geophysical Survey Report.
14	Interactions and Inter-relationships	PES	Desk study based on information provided in EIAR sections

Katestone: Sections 5 and 6 were completed by Dr. Micheal Fogarty and Simon Welchman of Katestone. Micheal is a Director of Katestone with 15 years of experience in Ireland and Australia. He holds a B.Eng, M.Eng and PhD from the UCD College of Engineering and Architecture. He specialises in the areas of air quality and odour impact assessment. Simon has been a director of Katestone since 2004 with more than twenty-nine years of experience working as an air quality expert in the private sector and for the environmental regulator in New South Wales.

NRB: Eoin Reynolds is a Chartered Engineer with over 35 years experience in a wide range of civil engineering projects. Eoin specialises in the field of Traffic & Transportation and Roads Design - assessing the infrastructure needs of development. Eoin provides advice to both private sector and public sector clients on all aspects of roads, traffic and transportation, and mobility management. Eoin is expert in the use of Traffic Engineering Modelling Software (TRICS, ARCADY, PICADY, LINSIG, TRANSYT and Micro-Simulation Techniques). He has given expert evidence at planning appeals, oral hearings and public enquiries. Eoin was previously Director of the Irish Office of Waterman Boreham Transport Planning and prior to that was Manager of the Belfast office of JMP Consultants Ltd (owners and managers of the TRICS Database). He is a noted Professional/Expert Witness in the field of Traffic/Roads & Road Safety.

ACSU: Ian Russell is a licenced Senior Archaeologist with Archaeological Consultancy Services Unit Ltd having joined the company in 1998. He holds a B.A. (1996) and an M.A. (1998) from University College Dublin and is currently engaged on Phd research in the Institute of Irish Studies in the University of Liverpool (2022-2028) studying Viking Winter Camps with a particular emphasis on Woodstown, Co. Waterford, a site Ian discovered, partially excavated and co published in 2014. Ian is an expert landscape archaeologist, photographer, 3D artist, visual impact and built heritage specialist and has conducted numerous visual and landscape impact assessments all over Ireland, including many in the World Heritage Site at Bru na Boinne.

Griffin LA: GLA has experience in a wide range of projects within the realm of landscape architecture, landscape planning, landscape consultancy and landscape project management for both private and public sectors across Ireland and the UK. Seán O'Malley has over 7 years of consultancy experience and has a B.Sc. Degree in Landscape Architecture from the University College Dublin (UCD). Ms. Nora Tombor has over 4 years consultancy experience and has a B.Sc. Degree in Landscape Architecture from Szent Istvan University, Budapest (MATE), and a M.Sc. Degree in Landscape Architecture from University of Copenhagen (KU) Both Seán and Nora are registered members of the Irish Landscape Institute (ILI).

DFK: Emmet Finegan is a director of DFK engineers. He has Diploma in Structural Engineering with Distinction from Bolton Street DIT and B.Sc. (Eng) from TCD. He has Post Graduate Diploma in Construction Law and Construction Administration. He is a Registered Fellow & Consulting Professional Engineer of The Association of Engineers of Ireland & Chartered member of the Institution of Structural Engineers. He has Certificate to undertake the role of PSDP through ACEI/IEI. He is an expert in residential, industrial, and commercial projects as a structural and civil engineer with over 25 years of experience. Robert Bagnall is a director of DFK engineers. He has B.Sc., Building Surveying (DKIT), He is a Chartered Member of The Society of Chartered Surveyors Ireland and a Chartered Member of The Royal Institution of Chartered Surveyors, and he has Certificate to undertake the role of PSDP. Robert joined DFK in 2011 as a Building Surveyor, since then he has been working in Commercial, Retail, Industrial and Residential areas. Seán Gibbons is an associate and the lead civil engineer of DFK Engineers. He has his Bachelor of Engineering in Civil Engineering, Edinburgh Napier University, Edinburgh & Bachelor of Engineering in Civil Engineering, GMIT, Galway. He has extensive experience working on the design of various residential, industrial, and commercial projects. Keith Brennan is an associate of DFK Engineers, and he is a Senior AutoCAD Technician. He has his education from City & Guilds Drafting and Design, Pearse College of Further Education, Dublin and City & Guilds AutoCAD, Dun Laoghaire Further Education Institute, Co. Dublin. He has 30 years of experience in many civil and structural engineering projects. Engin Ege Yormaz is a Structural Engineer / BIM Operator. He has Civil Engineering B.Sc. and M.Sc. from Middle East Technical University. He has 6 years of experience in civil and structural engineering having worked on various residential, commercial, industrial, data centre projects. Anna Ligia Leocadio Domingues has Bachelor's Degree in Civil Engineering from University Center of the Octávio Bastos Teaching Foundation and Bachelor's Degree in Environmental Engineering from Federal University of Triângulo Mineiro, Brazil. She has 3 years of experience in wide variety of projects including residential & industrial sectors including several warehouse & logistic units.

1.8 LINKS BETWEEN EIA AND APPROPRIATE ASSESSMENT

The EU Habitats Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora, as amended by council directive 97/62/EC, 2006/105/EC, and Regulation EC1882/2003 of September 2003, as transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477/11), provides the framework for legal protection for habitats and species of European importance.

Article 6(3) and 6(4) of the Habitats Directive lays down the procedure to be followed when planning new developments that might affect a European site (Natura 2000 site). Article 6(3) of the Habitats Directive states;

"*Any plan or project not directly connected with, or necessary to the management of the 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. In the light of the conclusions of the assessment of the implications for the site, and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.*"

Article 6(4) would come into force following a determination that a plan or project may adversely affect the integrity of a European site.

In accordance with these requirements, the proposed development has been assessed to determine whether any likely significant effects would arise due to the proposed development upon European sites. The resulting Stage 2 Appropriate Assessment Report forms part of this application (Report Ref. PES_NIS_10228).

PART I – PROPOSED DEVELOPMENT

This section of the EIAR describes the proposed construction of an anaerobic digester and all ancillary site works and services at Collinstown, Lusk, County Dublin.

In this section is also described all associated site alterations and development works that would take place at the proposed development site.

2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT, PLANNING & SCOPE OF EIAR

The proposed development will be located in the townland of Collinstown, Lusk, Co Dublin. The proposed biogas plant is located c. 2.3 km north of Lusk town centre, c. 5.0 km south-west of Skerries town centre and c. 5.3 km north-west of Rush town centre. The site is located in a rural, farming area predominantly comprised of pastureland and hedgerows. Access for the site is taken from an access road off the L1155 local road, which connects to the R132 regional road. The proposed site location is included in Attachment 2.1.

The setting is predominantly rural and in a farming area with intermittent housing along the local road network. The nearest residential property to the proposed site not owned by the applicant, Country Crest, is located approximately 130m to the south. **Figure 2.1** below shows the location of the proposed development in a regional context.

Figure 2.1: Site Regional Location Map (EPA Maps)

The proposed development will comprise the following primary components:

- Office;
- Services Building;
- Double Weighbridge;
- Staff / Visitor Car Parks;
- Enclosed Feedstock Reception Building;
- 1 No. Primary Digester
- 1 No. Secondary Digester
- Odour Treatment Pad;
- Switchboards Container;
- O2 Generator Compound;
- Loading Bunker;
- Pasteurisation Plant;
- GNI Gas Injection Area;
- ESB Substation;
- Silage Clamps;

- Post Digester & Gas Sphere;
- Separation Unit;
- Hygenization Buffer Tank;
- Gas Pre-Treatment
- Gas Upgrading Unit;
- 1 No. CHP Engine;
- Boiler container;
- Heat distribution container;
- Secondary boiler container;
- 2 No. Detention Basins
- 1 No. Gas Flare;
- 2 No. Covered Digestate Lagoons;
- Underground Silage Effluent Tank;
- Wastewater Treatment System;
- Machinery Shed;
- Underground Rainwater Attenuation Tank;
- Underground Firewater Tank;
- Reception Tank Feeding Area
- Wheelwash
- Landscape Works.

Figure 2.2 shows the layout of the proposed buildings and structures at the site. Production processes and management are detailed in the following section. The proposed site layout and is included in Attachment 2.2.

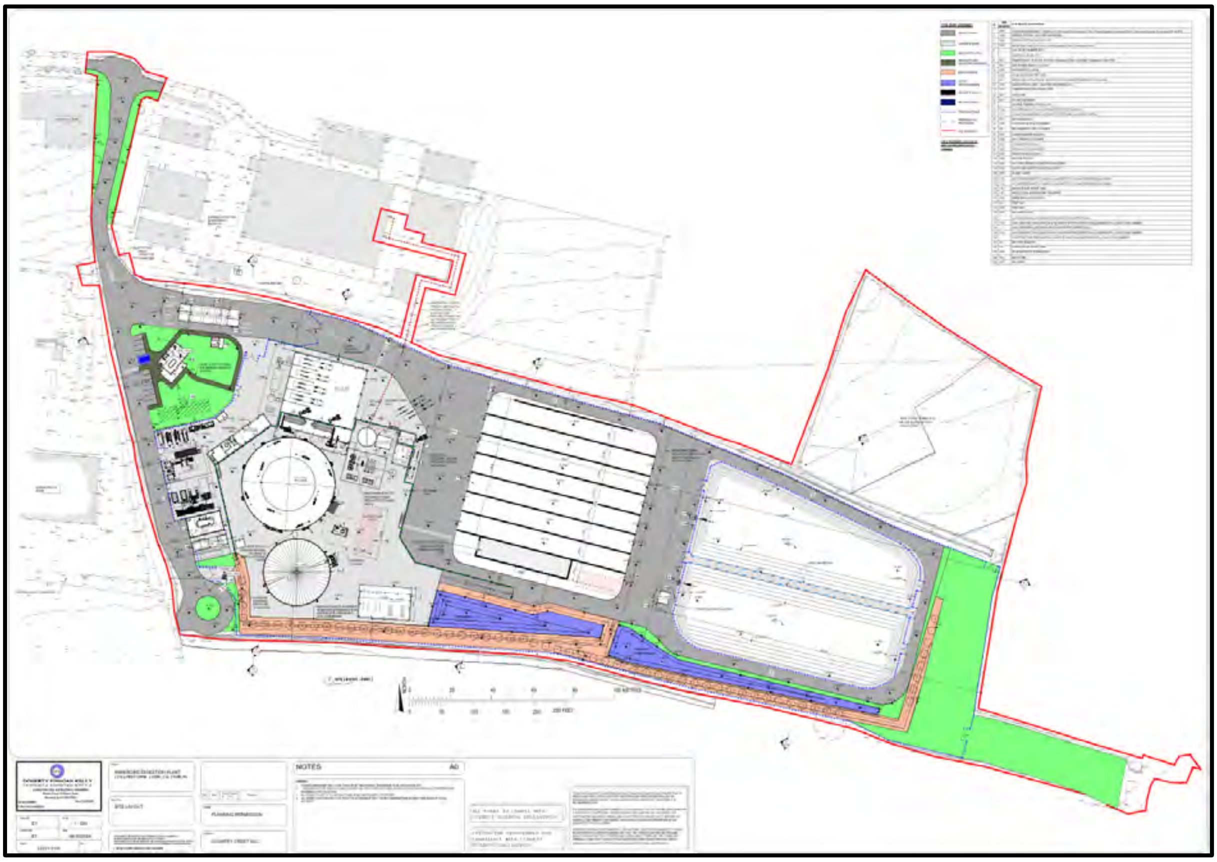

Figure 2.2: Proposed Site Layout (red boundary)

2.1 PRODUCTION PROCESSES AND MANAGEMENT

The main area of day-to-day operations at the proposed AD Plant would be located in the western section of the site near the existing Country Crest site.

The main office / admin building will be located on a landscaped area to the north-west of the site, near the main entrance. The main building will have the dimensions 12.6m X 8.0m and 5.0m at ridge height. It will include an office area, meeting room, kitchen area, and male and female toilet facilities. An external balcony area will adjoin the building. The office will be serviced by car parking spaces for staff, including accessible parking and EV charging bay, as well as cycle parking. A walkway will connect the office building area to the concrete yard where other site structures will be located, including the services building. Foul water generated by staff facilities will be directed to an underground septic tank south of the office building, which will allow treated water to percolate through the soil. No connection to the public sewer will be required.

The weighbridges will also be located in the north-west of the site near the feedstock reception building. HGV’s will be weighed two times: once upon entrance to the site and a second time before leaving the site. Weighing results will be registered and recorded. HGV’s will undergo a wheelwash immediately following the weighbridge.

The feedstock reception building will be located to the north of the Digester Power Ring. Access to HGV will be granted by high-speed roller shutter doors, which will promptly close prior to the offload of feedstock. Feedstock will be safely stored in silos while liquid feedstock, which will be imported and also sourced via an underground slurry feeding line from the existing cattle building to the north of the site, will be stored in a $500m^3$ tank located within the bunded area of the site. An odour control system will be installed within the odour treatment pad that services the reception building. A pedestrian door is included in the north side of the building for ingress and egress of personnel. The list of feedstock inputs which will be used at the proposed development are listed in **Table 2.1** below.

Table 2.1: Proposed Feedstock Inputs

Substrate	Quantity (tonnes/annum)	Quantity (tonnes/day)	Dry Matter Content (%)
Poultry litter	7,000	19,18	40
Cattle manure	1,080	2,96	25
Vegetable processing byproducts	650	1,78	18
Food processing byproduct	100	0,27	38
Draff Grains	400	1,10	21
Whole crop silage	10,000	27,40	32
Grass silage	24,500	67,12	35
Slurry	17,080	46,79	10
Water	8,000	21,92	-
WWTP sludge	1,300	3,56	10

As can be seen from the table above, grass silage will be the main feedstock component of the proposed AD Plant. Silage clamps will be located in the middle section of the site between the main concrete yard and the lagoons where, through compaction and fermentation, soiled water will be generated. This effluent will be collected by buried tanks and may be further used as feedstock for the anaerobic digestion process. The soiled water tanks will also collect rainwater from feedstock feeding locations and the solid digestate bunker. During dry months, when soiled water supply is expected to be insufficient to meet the needs of the anaerobic digestion process, complementary clean rainwater will be added to the system. During months of intense rainfall when soiled water supply is expected to exceed the needs of the AD process, soiled water tanks will store water to be used during dry periods.

1200 m^3 soiled water tank capacity (accounting for 20% safety margin) will be provided to the site. There will be control valves installed to direct the clean water system as required to complement the water demand in the dry months. Although the system would not overflow in the normal operating conditions, in the case of an emergency, the upper soiled water tank is to be let discharged into the bunded area. The connection of lower tank and upper tank to be provided with a non-return valve so that it stops filling the lower tank when it is full, preventing the surcharge.

Water will be supplied to the site from two sources: via a new connection to the existing firefighting main adjacent to the site boundary in the northeast corner of the site and also from an onsite well. There will be no Irish Water water supply on site. It is estimated that water abstraction from the existing well will be approximately 0.5m^3/day. The firefighting main within the Country Crest complex is served by a static water pond and pumped around the complex.

Slurries to be used as feedstock will be mostly imported but also sourced via an underground slurry feeding line from the existing cattle building to the north of the site. The liquid feedstock feeding line will be twin walled to prevent leakage. Liquid feedstock will be stored in a 500m^3 tank located within the bunded area of the site.

Solid feedstock will go through two Solid Feeding Systems 100 m^3 each. One of the solid feeding systems will be equipped with HPZ and the other with a hammermill to break biomass into smaller particles. Liquid feedstock within the liquid tank will be directed to a biomix pump unit.

Feedstock is then directed to BIOGEST® PowerRing located to the south of the reception building, which consists of a modular tank-in-tank system with the 7,947 m^3 primary digester on the outer ring and a 3,981 m^3 secondary digester on the inner ring of the structure. Agitators will be installed within the primary digester to ensure thorough mixing of the feedstock. A paddle agitator will further promote the soft mixing of fermentation substrates and slurry in the secondary digester. A highly efficient fermentation will be achieved through the slow and steady stirring.

The resulting raw digestate will then be directed south to the 4,825 m^3 Biogest® PowerDigest tank via above ground pipework. The PowerDigest consists of a concrete or steel tank with a gasholder on top that boosts homogenization of the digestate using long-shaft mixers. The process will generate methane and carbon dioxide. It is estimated that every year approximately 8,794,070 Nm^3 of biogas, 4,778,951 Nm^3 of methane and 59,387 tonnes of raw digestate will be produced. A detailed description of the anaerobic process is provided in **Section 2.2**. From this post digestion process, biogas will be directed to a treatment unit while digestate will be sent to a pasteurisation system.

The pasteurisation unit will be located to the west of the PowerRing digester. This process will ensure the neutralisation of harmful pathogens that may be present in the digestate. Three pasteurisation tanks will allow for a more streamlined process with one tank filling, one processing and one emptying. Overhead ducts and pipeworks have been designed to minimise the occurrence of fugitive odours.

A screw separator will then segregate the solid from the liquid fraction of the digestate. This process is anticipated to generate approximately 49,045 tonnes of liquid digestate and 9,342 tonnes of solid digester per year.

The concrete yard where the anaerobic digestion will take place will be fully bunded with a retaining concrete wall as well as with an earth berm to the south. All drainage basins to this bunded area will be equipped with automatic shutoff valves to stop any liquid transfer outside. A berm capacity of approximately 10,293m^3 will be provided in response to an estimated leakage demand of approximately 6,868m^3.

Following the digestate separation, the liquid fraction will be stored in two digestate lagoons in the eastern section of the site. The lagoons will be 4.5m deep with 300mm freeboard allowance, fenced and covered. The southernmost clamp adjacent to the silage clamps in the middle section of the site will be used to store the solid fraction of the digestate. This clamp will be roofed over to prevent emissions and contamination. Both fractions can then be used as a nutrient-rich fertiliser.

The biogas is then partially converted in the CHP to electricity and heat and the other part will be sent to be upgraded within the Gas Upgrading Unit (GUU). The proposed development includes 2 no. 460 kW dual fuel boiler (gas and diesel) which will be used to maintain optimal temperatures within the digester tanks and pasteurisation unit for periods when the CHP is unavailable.

Within the GUU, there will be removal of impurities and the biogas will be pressurised and transformed in a form suitable to be injected into the GNI gas grid. First, the biogas is pre-dried, scrubbed and desulphurised with active carbon, followed by compression to 8-15 bar. Then, CO_2 and water vapour are separated from methane by forcing the raw gas through a micro-porous membrane three consecutive times, effectively reducing methane slip. The upstream compression avoids the need to recompress upgraded methane to be sent to the grid. **See Figure 2.3**.

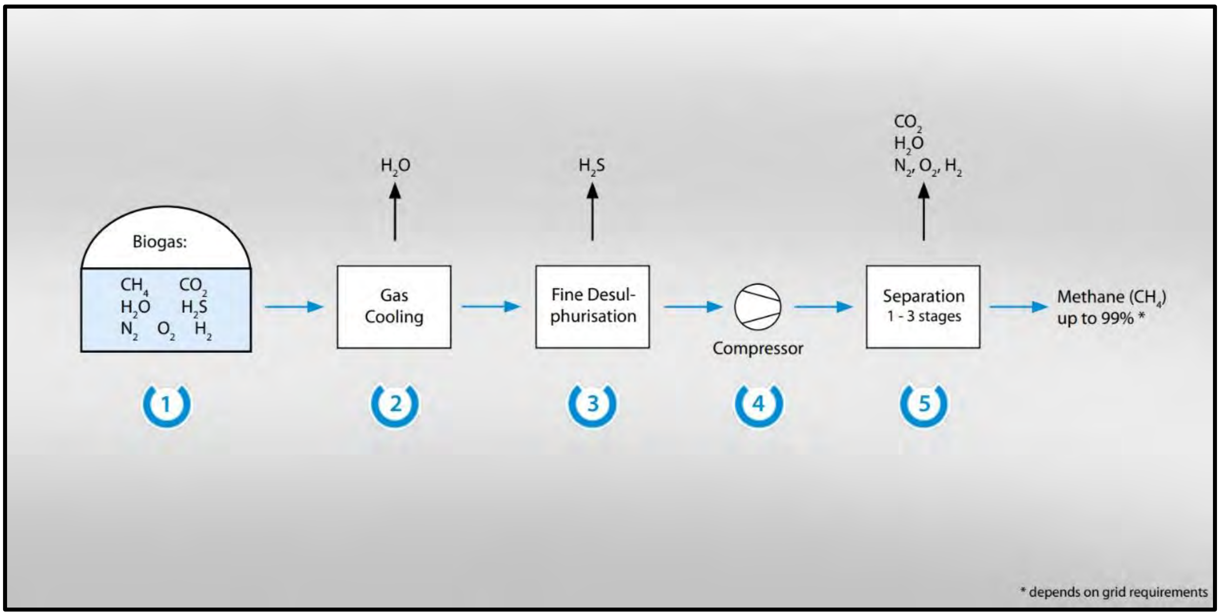

Figure 2.3: Gas Upgrading

Captured CO_2 is then liquefied and stored for reuse in the Irish food industry. A flare located south of the gas treatment system will serve to burn off biogas that fails to meet minimum requirements to be exported to the GNI grid or, potentially, to burn any excess gas. This will be considered exceptional circumstances and it is not anticipated that the gas flare will be used during the vast majority of the lifetime of the proposed development.

The surface water network system will be split into two catchments (Attachment 2.3). Catchment 1 will include the west of the site until Basin C, which consists of the digestate lagoons. Catchment 2 will include the eastern section of the site. In Catchment 1, stormwater run-off from roofs and hardstanding areas will be directed to an impermeable detention basin (basin 1) to the south and ultimately discharge into the existing drainage ditch, which runs along the southern boundary of the site. The detention basin will be equipped with an alarm which will sound in the event of a leak and the shutoff valves in the bunded area will automatically close to prevent any contaminated surface water from reaching the drainage ditch. In Catchment 2, stormwater run-off from hardstanding areas, roads, footpaths and from the covered digestate lagoons will be directed to an impermeable detention basin (basin 2) to the south and ultimately discharge into the existing ditch.

The detention basin on both catchments will be connected to a manhole before discharging to the existing ditch at the south. It is proposed a flow control device and a petrol interceptor at the pond. The outfall will be protected using a precast concrete headwall. Outflow from the site will be restricted to Qbar rates. The detention basins have been designed to accommodate rainfall events corresponding to a 30-year return period. The total attenuation volumes required for a rainfall event corresponding to a 100-year return period for Catchment 1 and Catchment 2 have been estimated to be approximately 1,825.4m^3 and 614.5m^3, respectively. Detention basin 1 and detention basin 2 will provide a total storage volume of 1,841.12m^3 and 612.5m^3, respectively.

2.2 ANAEROBIC DIGESTION

2.2.1 LEGISLATIVE BACKGROUND

Drivers such as climate change, energy security, carbon foot-printing and waste recycling are to the forefront of the European Union's (EU) legislative agenda. The long-term goal for the EU is to become a zero-waste society that seeks to use waste as a resource. This section highlights the main legislative and policy drivers with regard to Anaerobic Digestion (AD).

Other EU legislations such as the Waste Framework Directive (2008/98/EC) and the Landfill Directive (1999/31/EC) are also driving Europe towards a resource efficient, low carbon economy that encourages the use of the AD process of organic materials. These were transposed into Irish legislation by the European Union (Landfill) Regulations 2020 (S.I No. 321 of 2020).

In Ireland, the current national waste management guidance document takes the form of the "Waste Action Plan for a Circular Economy (2020)" work. This document underpins the previous "A Resource Opportunity – Waste management policy in Ireland (2012)".

The AD process can contribute towards Irelands waste management policy by utilizing waste as a resource. There is a new growing demand for AD infrastructure in Ireland that will facilitate the country's successful implementation of a low carbon economy. The EU Commission have highlighted Ireland as one of the best States for Biogas potential.

The EU Directive Promotion of the Use of Energy From Renewable Sources (2018/2001) set a target to achieve a share of at least 32% of energy from renewable sources in the Union's gross final consumption of energy by 2030. Ireland was required under the previous Directive (2009/28/EC) to ensure that 16% of total final energy consumption came from renewable sources by 2020 as set out in the National Renewable Energy Action Plan. A report from the Sustainable Energy Authority of Ireland (SEAI) determined that Ireland did not meet the defined target, reaching a share of 13.5% that year. That meant that Ireland was obligated to acquire statistical transfers of renewable energy from other Member States to compensate for that shortfall. According to the National Energy and Climate Plan (NECP) 2021-2030, Ireland has set an overall renewable energy target of 34.1% by 2030 going beyond the 32% target. Ireland is well-positioned to meet and possibly exceed this target, however, continued efforts and investments in renewable energies are required.

The proliferation of AD technology throughout the country would greatly assist with this challenge. Biogas is a sustainable indigenous energy source that can reduce our emissions and will create jobs in rural Ireland. An AD Biogas industry could provide a diverse and long-term revenue stream for the Irish farming community.

Ireland's Transition to a low Carbon Energy Future 2015 – 2030 (Ireland's Energy White Paper 2015) document sets out Irelands ambition to transition to a low carbon economy by 2050 and acknowledges AD as a possible technology to assist in the delivery of this objective.

Ireland's agricultural sector is by far the largest contributor of the country's Green House Gas (GHG) emissions, accounting for c. 38% of the total. If AD technology was supported in Ireland, the GHGs emitted from Irelands agricultural sector would be significantly reduced.

According to Eurostat data, there were 73.7 million cattle in the 27 EU countries in 2023, with Ireland having the third largest herd. In 2022, cattle and calves represented the largest livestock category in Ireland, responsible for 24.6% of gross output. Cattle manure is rich in nitrogen, typically containing 1-2%, and is therefore an excellent fertiliser for grass and other crops and has traditionally been landspread for this purpose.

Environmental legislation, such as the EU Nitrates Directive, has placed constraints on the land application of cattle manure. The AD of cattle slurry sufficiently stabilises the nutrient content of the slurry meaning that it may be landspread and abide by the criteria set out in the EU Nitrates Directive.

2.2.2 ANIMAL BY-PRODUCT LEGISLATION

In order to use animal-based products in an AD plant, the process must comply with the European Communities Animal By-Products (ABP) Regulations 2014 (S.I. No. 187 of 2014) and in accordance with Regulation (EC) No. 1069/2009 and Regulation (EU) No. 142/2011.

This regulation was put into place by the EU because of outbreaks of diseases such as Bovine Spongiform Encephalopathy (BSE) and Foot and Mouth disease. The regulations ensure that all animal products going to an AD plant meet specific treatment standards to destroy potential pathogens.

The ABP legislation classifies ABPs under three categories. Category 1 – very high risk, category 2 – high risk and category 3 – low risk. Category 1 ABPs such as BSC infected carcasses cannot be used in AD plants.

The Regulation (EC) No. 1069/2009 and its implementing Regulation (EU) No. 142/2011 set out the parameters that an AD plant using category 3 ABPs needs to follow. There are three minimum requirements:

1. Maximum particle size before entering the pasteurization tank – 12 mm.
2. Minimum temperature of all material in the reactor - 70°C.
3. Minimum time in reactor at 70°C – 60 mins.

The most common type of AD plant in Ireland today (type - 1) takes a mixture of category 2 (animal slurry) and category 3 (catering waste) ABPs as feedstock using the three above requirements. The digestate product from a type – 1 plant may be used anywhere within the EU.

2.2.3 ANAEROBIC DIGESTER PLANT LICENCING AND PERMITTING

An AD plant requires either a permit from the Local Authority or a licence from the Irish EPA to operate (although there are some exemptions).

An AD facility that can only accept up to 10,000 tonnes of feedstock per annum, requires a Waste Facility Permit from the relevant Local Authority under the Waste Management Act 1996 as amended, and the Waste Management (Facility Permit and Registration) Regulations 2007 as amended.

If the AD facility is designed to accept more than 100 tonnes of feedstock per annum, then the facility requires an Industrial Emissions Licence from the EPA under the EPA Act 1992 and the EPA (Industrial Emissions) (Licencing) Regulations 2013 as amended. If the AD facility is designed to accept more than 10,000 tonnes per annum, then the facility requires a Waste Licence issued by the EPA under the Waste Management Act.

The class of activity licenced by the EPA is as follows:

11.4 (b) 'Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities, (other than activities to which the Urban Waste Water Treatment Regulations 2001 (S.I. No. 254 of 2001) apply): (i) biological treatment;'

The regulations also state:

11.4 (c) 'Notwithstanding clause (b), when the only waste treatment activity carried out is anaerobic digestion, the capacity threshold for that activity shall be 100 tonnes per day.'

AD plants that produce between 1 and 50 Megawatts thermal, under the Medium Combustion Plants Directive EU 2015/2193 require emission limit values to be set in accordance with the legislation.

The EU Environmental Impact Assessment Directive 2014/52/EU sets out thresholds for AD plants which if exceeded mean that the process requires an EIAR. The proposed development would require an EIAR.

2.2.4 SEVESO III DIRECTIVE / CONTROL OF MAJOR ACCIDENT HAZARDS (COMAH) REGULATIONS

The Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S. L No. 209 of 2015) transposes Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC ("the SEVESO III Directive").

The purpose of the COMAH Regulations is to lay down rules for the prevention of major accidents involving dangerous substances, and to seek to limit as far as possible the consequences for human health and the environment of such accidents when they occur, with the overall objective of providing a high level of protection in a consistent and effective manner.

The COMAH Regulations place an obligation on operators of establishments that store, handle, or process dangerous substances above certain thresholds to take all necessary measures to prevent major accidents and to limit the consequences for human health and the environment. Under the Regulations, an establishment may qualify as upper tier or lower tier, depending on the inventory of dangerous substances; sites that store, handle or process dangerous substances below a certain threshold do not qualify as establishments under the Regulations.

SEVESO/COMAH Assessment of the Proposed Development

Methane, the combustible component of biogas is classified as a P2 flammable gas in accordance with Regulation (EC) No. 1272/2008 on the classification, labelling and packaging of substances and mixtures. Under COMAH, P2 Flammable gases are subject to a threshold quantity of 10 tonnes meaning that any biogas facility storing less than 10 tonnes of methane will fall outside of the COMAH Regulations. At its full capacity, the proposed gasholder attached to the PowerDigest tank will store approximately 6.032 tonnes of biogas, and is, therefore not a COMAH regulated site.

2.2.5 THE ANAEROBIC DIGESTION PROCESS

AD is the natural process that uses microorganisms to break down biodegradable organic material in the absence of oxygen (anaerobic). Basically "organic" means coming from or made of plants or animals. AD occurs naturally in soils and in lake and oceanic sediments, where there are anoxic (without oxygen) conditions.

The AD process produces three main products liquid and fibrous digestate and biogas. Biogas is mostly composed of the gases methane (50-80%) and carbon dioxide (20-50%) (plus other contaminants like ammonia, hydrogen, hydrogen sulphides and nitrogen). Digestate is the material remaining after the AD process has taken place.

The liquid digestate is separated from the fibrous digestate using a centrifuge system. The remaining liquid digestate is used as a nutrient rich fertiliser by landowners in the region and by Country Crest itself, in accordance with a nutrient management plan (Attachment 2.4). The application of cattle manure to land can result in nuisance odours. However, the application of digestate to the land has been shown to have significantly less odour that when spreading straight cattle manure. Animal manure contains many volatile organic compounds (e.g. iso-butonic acid, butonic acid, iso-valeric acid and valeric acid) that are responsible for producing unpleasant odours. Studies have shown that the AD process significantly reduces the concentrations of these compounds such that their potential for giving rise to offensive and lingering odours during storage and landspreading was significantly reduced (Lukehurst *et al.*, 2010) (**Figure 2.4**).

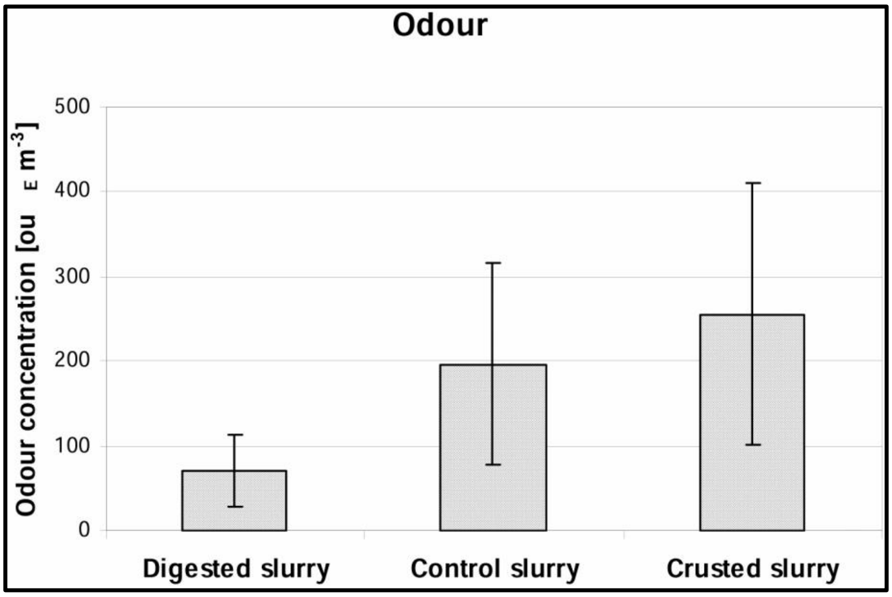

Figure 2.4: Odour concentrations in the different measurement sessions for each slurry Type (Immovilli *et al.*, 2008) .

Fibrous digestate is a high-quality fibrous by-product which has the potential to generate an income stream. Digestate is often applied directly to land as a soil amendment. It improves the characteristics of the soil and facilitates plant growth. The AD process mineralises organically bound nutrients making them more available to plants. In some cases, dewatered digestate material has been used as a livestock bedding material or to generate products like flower pots. There are other emerging technologies that use digestate to produce concentrated nutrient products.

The biogas from AD systems is often cleaned to remove carbon dioxide, water vapour and other trace contaminants to increase its energy value. Biogas is often burned to create electricity or heat on site. Biogas is a renewable energy source that can be used in a variety of ways. Biogas cleaned of trace contaminants can be used in internal combustion engines and biogas treated to meet pipeline quality standards can be distributed through Irish gas network pipeline network to be used in homes and businesses. The biogas may be refined to a quality fit for use as a fuel for specialist vehicles in the future.

It is the intention of the applicant to use the generated biogas to supply electricity and heat to the AD system, offsetting the use of some fossil fuels. It is envisaged that the biogas produced by the plant be collected and stored and subsequently used to create electricity and/or heat energy using a gas engine generator. Heat generated is often used to speed up the AD processes and can also be used for heating buildings. Any excess electricity produced by the system would be sold to the national grid.

A 560 KW capacity duel-fuel boiler (gas and diesel) would be installed to provide heat for the process when the system is initially started and to maintain the heat on occasions when the CHP unit is out of service.

Basically, the AD process begins by the breaking down of organic materials like cattle slurry by bacteria into more soluble by-products (like sugars and amino acids). These by-products are easily broken down by other bacteria into by-products like carbon dioxide, hydrogen, ammonia, and organic acids. The organic acids are broken down into acetic acid, along with additional ammonia, hydrogen, and carbon dioxide. Finally, methanogens (bacteria that produce methane as a by-product) convert these products to methane and carbon dioxide. **Figure 2.5** below illustrates a more detailed description of the process.

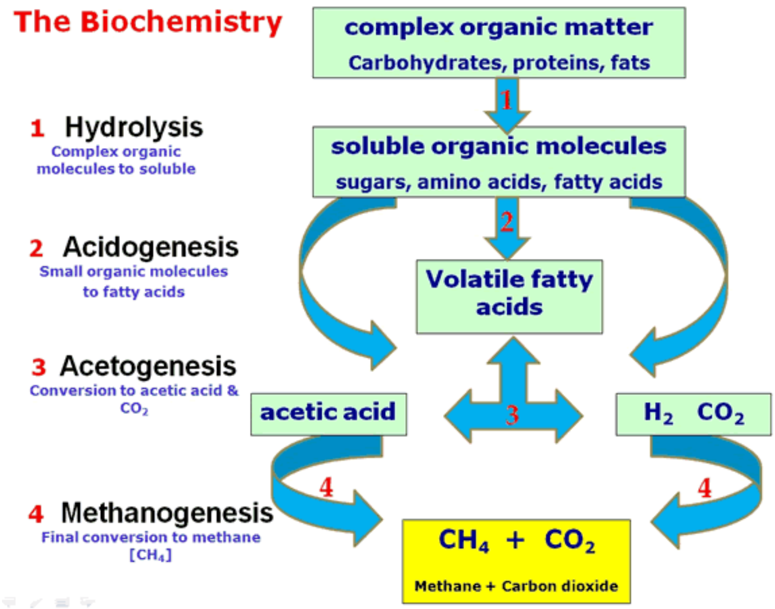

Figure 2.5: Anaerobic Digestion flow process (Amaya *et al*., 2013).

Anaerobic digestion has been shown to be effective in allowing the reduction of odour emission from digestates, so that when they were dosed on soil, odours emitted were much lower than those from soils on which untreated slurries were used (Orzi et al., 2018).

Not just slurry is added to an AD. Co-digestion of animal manure with various biomass substrates increases the biogas yield. The material that is used in an AD is called the feedstock. Apart from animal waste, feedstock can contain biodegradable materials like grass/silage and food waste. Other types of offsite (not on the farm) feedstock include, slaughterhouse waste, fats, oils, grease from restaurants and organic household waste.

The length of time required for AD depends on the chemical complexity of the feedstock. Essentially, the more digestible the feedstock added to the AD, the faster the process will be and the more biogas that will be produced. Herbaceous (woody) feedstock like straw is not normally added to ADs because it contains lignin which most bacteria cannot break down, thus the process is slowed down. Slurry-only AD systems are common and cheaper to run, but do not generate as much biogas as co-digester systems. A report from 2011 estimated that 1 tonne of dairy cow slurry at 69g/kg dry matter produced 15.2 cubic meters of biogas, whereas 1 tonne of organic matter in slurry produced 280 cubic meters of biogas (Frost & Gilkinson, 2011). Co-digesting other organic materials along with slurry can greatly increase biogas yield per unit volume of digester. The economics of an AD plant are dependent on the size and design of the plant and the quality (digestibility) of the feedstock added.

The Composting and Anaerobic Digestion Association of Ireland (Cré) have categorised three different types of AD plants: On-farm AD, Agri-food AD and Industrial scale food waste AD (McDonnell *et al*., 2018). On-farm AD systems typically process energy crops such as grass and maize silage along with animal slurries. Industrial scale AD facilities are designed to process primarily municipal, domestic and commercial organic waste. Agri-food AD plants normally process a mixture of agricultural wastes and energy crops, as well as industrial sector organic wastes. **Figure 2.6** below shows a typical on-farm AD process.

Figure 2.6: Typical Industrial Scale and On-Farm scale AD plant (McDonnell et al., 2018).

The proposed AD system would be classed as an Agri-food AD system. Growth and expansion is a common occurrence in the cattle production industry in Ireland, an intensification in production means an increase in slurry. Approximately, 63 million tonnes of cattle manure were produced in Ireland annually in the period of 2016-2019 (Köninger *et al*., 2021). Cattle slurry has been used for centuries as a fertiliser and is an excellent source of nutrients like nitrogen, phosphorus and potassium. Intensive cattle production processes require suitable manure management practices and nowadays the industry is looking towards the AD process. AD of manure offers several benefits like improving the fertilizer qualities, reducing odours and pathogens and producing a renewable fuel – the biogas (Massé *et al*., 2011). Some of the pathogens reduced during the AD process include: *Salmonella*, Coliform bacteria, *Staphilococcus aureus*, *Mycobacterium Para* (TB), *Strep faecalis* (FS) and Group D *Streptococci* (Lukehurst *et al*., 2010).

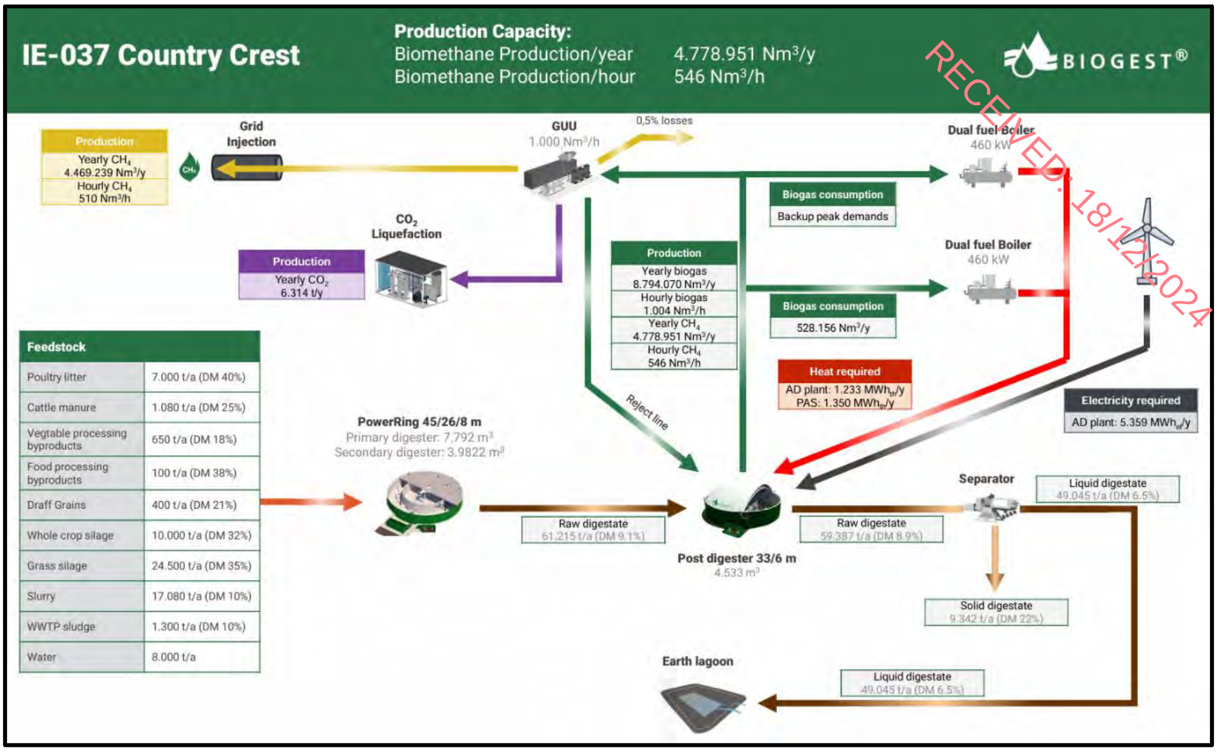

Figure 2.7: The Agri-Food Anaerobic Digestion process.

Ireland's National Renewable Energy Action Plan (Submitted under Article 4 of Directive 2009/28/EC) established the basis for the achievement of the EU's 16% renewable energy target by the year 2020. Currently, the National Energy & Climate Plan sets the basis for the EU's 32% renewable energy target by the year 2030. A major part of the renewable energy could originate from AD plants on Irish farms. On a European scale at least 25% of all bioenergy in the future could originate from biogas, produced from wet organic materials such as pig slurry.

Cattle slurry can be a major source of air pollution. An AD system can reduce greenhouse gas (GHG) emissions because it captures the methane from slurry that might otherwise be released into the atmosphere as a potent GHG. Methane has 27 times more the global warming potential than carbon dioxide. Studies have shown that the total GHG emissions offset on pig farms using AD technology were c. 125.6 mg of carbon dioxide equivalent (a term for describing different GHGs) per year, through replaced fossil fuel consumption, reduced chemical fertiliser use and manure management (Kaparaju and Rintala 2011). Another study found that GHG emissions at a farm level could be reduced by up to 24 % if cattle slurry was used for the co-digestion and grass silage was grown for the AD plant (Tisocco et al., 2024).

In 2017, the EU-28 agricultural sector produced 10% of the region's total GHG emissions. Once emissions related to the production, transport and processing of feed are included, the livestock sector is responsible for 81-86% of total agricultural GHG emissions (E. Peyraud et al., 2020). According to the EPAs report, "Ireland's Provisional Greenhouse Gas Emissions 1990-2023" of July 2024, the agriculture sector is the largest contributor to the overall emissions in the country. Ireland's National Policy Position on Climate change has set a target of an aggregate reduction in GHG emissions by 2050 (Holm-Nielsen *et al.*, 2009). It is now accepted within the EU that farming and life in general must become more sustainable with regard to care taking the environment, and maintaining rural life. The AD of cattle manure is just one process that may go a long way toward helping Ireland meet its commitments.

A biogas industry in Ireland is on the horizon, the future industry could sustain rural economies into the future and reduce Ireland's agricultural carbon footprint. Gas Networks Ireland recognises biogas as a renewable fuel which can significantly improve the sustainability of the natural gas network. Their strategic plan to achieve 20% Renewable Gas on the network by 2030 means that they are focused on supporting AD in the agriculture sector.

AD plants can play an important role in helping Ireland to meet its waste and energy targets as set out in EU Directives and national legislation. The technology is proven and efficient and can deliver multiple energy, climate, environmental, social and economic benefits (McDonnell *et al.*, 2018).

2.3 RECENT PLANNING HISTORY OF THE SITE

This is a new application and is separate to any previous applications for planning permission. The applicant is County Crest Ltd. It is for a proposed construction of an anaerobic digester and all ancillary site works and services at Collinstown, Lusk, County Dublin.

There are four previous planning applications relating to the proposed site. There are also seven recently granted and one registered planning applications submitted by Country Crest Ltd. and Ballymaguire Foods Ltd. in the vicinity of the proposed site. See **Table 2.2**. Planning information was sourced from the Fingal County Council ePlan Online Inquiry system available at:
https://fingalcoco.maps.arcgis.com/apps/webappviewer/index.html?id=3fa7d9df584c4d93aab202638db9dd1a

Table 2.2: Planning History of the Proposed Site.

Fingal Co. Co. Planning Ref	Applicant	Development Description	Status
F08A/1140	Mr. Gabriel Hoey	Construct a single storey Agri-Business Facility (2191sqm), incorporating two storey internal ancillary office/staff accommodation (573 sqm), plant/switch/tool rooms (54sqm), (total floor area 2819 sqm), with all associated site works to include new access road, visitor/staff car parking, truck parking, marshalling area, covered loading bay, and new biocycle waste water treatment plant.	Grant
F08A/0036	Country Crest Ltd.	The erection of ESB Substation, with adjoining switch room and associated site works to include new hard standing access road.	Grant
F06A/1198	Country Crest Ltd.	New single storey extension (27.5 sq.m.) to side of existing premises, consisting of new staff canteen kitchen, changing room and cleaners store and all associated site works.	Grant
F06A/1167	Country Crest (Ireland), Ltd.	New Onion storage facility within a new 3,000 sq.m. single storey agricultural building with a 100 sq.m. adjoining plant room and all associated site works.	Grant
F24A/0797	Ballymaguire Foods Ltd	Retention Planning Permission for amendments made to Planning reference F22A-0077. The development will consist of 1. Retention of front	Registered

Fingal Co. Co. Planning Ref	Applicant	Development Description	Status
		Porch 2. Retention of Compressor room 3. Retention of charger shed 4. Retention of external canopies to loading bay 5. Retention of extension to client electrical switchroom 6. Retention of amendments made to car parking layout and all associated site works.	
F23A/0326	Country Crest Ltd	The development will consist of 1 no. 2.3MW Wind Turbine, Service Road, and Associated Ancillary Works and Services.	Grant
F22A/0625	County Crest Ltd.	Planning permission for an Integrated Constructed Wetland ICW providing tertiary treatment to wastewater generated on site and all associated site works. A Natura Impact Statement (NIS) has been prepared in respect of the proposed development.	Grant
F22A/0077	Ballymaguire Foods Ltd.	1. A total of 2520sqm part single storey, part two storey agri-business facility including 2. 2160sqm Ground Floor works area, staff amenities and storage 3. 360sqm First floor offices and associated amenities 4. Enlarged percolation area serving the existing WWTU 5. New Internal roadway with car parking, service yard, roof mounted PV panels and all associated works.	Grant
F21A/0148	Country Crest Ltd.	The development consists of continuation of use previously granted under Planning Reference number F07A/0929 of 1 no. existing 1MW Wind Turbine, Service Road and associated ancillary works and services.	Grant
F20A/0631	County Crest Ltd.	New side extension to existing Agri-Food Business including: (a) 490.6sqm ground floor extension to production area. (b) 130.9sqm first floor extension to existing offices. (c) New access road around development for site traffic management. (d) Stormwater attenuation system. (e) All associated site works. Natura Impact Statement submitted with this application.	Grant
F20A/0188	Country Crest Ltd.	Permission for a new 145.7sq.m boiler shed ancillary to existing Agri-Food facility and all associated site works.	Grant
F19A/0365	Country Crest Ltd.	Permission for a 1.414sq.m. side extension to Potato Storage Shed including all associated site works.	Grant

2.4 CONSTRUCTION PHASE

The construction phase would extend over a period of approximately 18 months. All of the construction materials and equipment required would be acquired from local sources, where possible and transported into the site by road. Access and egress during construction will be via the proposed operational entrance and exit located to the north-west of the site connecting to the existing Country Crest site.

All work on the site would be conducted in accordance with the duty of safe working environment under the Safety, Health, and Welfare at Work Act 2005. Construction works would be carried out in normal business hours 07:00-19:00 Monday to Friday and 07:00-13:00 on Saturday.

The Cut and Fill Analysis carried out by Doherty Finegan Kelly has determined that an estimated 33,692 cubic meters of soil would need to be excavated to accommodate the proposed development. It is planned that all of the soil that would be moved during the laying of services and site preparation works would be stockpiled onsite and used within the site for land levelling and landscaping. It is not intended to remove any soil/earth from the site.

The proposed landscape strategy aims to create a semi-natural landscape that promotes biodiversity and requires limited maintenance. A screening strategy has been proposed through the use of topography, tree planting and hedge planting. Excess soil from construction works will be used to construct the proposed earth berm to the south that is to be planted with meadows and trees.

The planting design includes significant native specimen tree planting and woodland tree planting throughout the site area. Specific tree planting is proposed along the site boundaries in order to screen the development from the neighbouring lands as well as settle the site into its context. A woodland belt is proposed in the southeastern corner of the development and will incorporate a diverse selection of native trees and shrub species. The planting strategy will also be pollinator-friendly by incorporating a mix of flower forms. Other biodiversity enhancement measures will include the installation of bird and bat boxes as well as log piles, which will provide shelter, habitat and food sources for local wildlife.

The detention basins to the south will be planted with a low-maintenance Irish native wetland wildflower meadow, featuring species that are tolerant of intermittent water inundation.

Boundary treatments to the site will also include the enhancement and infilling of existing hedgerows along the boundaries of the site as well as a new proposed native hedgerow along the access road near the main entrance.

Impacts and mitigation measures attributable to the construction phase will be discussed in appropriate sections within this EIAR.

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3.0 ALTERNATIVES

3.1 EXAMINATION OF POSSIBLE ALTERNATIVES

Schedule 6, Article 94 of the Planning and Development Regulations 2001 requires that: Information to be contained in an Environmental Impact Statement shall include –

(1d) an outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.

This section investigates the following alternatives to the proposed development:

- Alternative Site;
- Alternative Layouts and Designs;
- Design Selection;
- "Do-Nothing" Alternative

3.2 ALTERNATIVE SITE

A review of available lands within the applicant's holding reveals that the proposed site location is the most appropriate site for the development.

The proposed buildings are intended to produce renewable biomethane gas, while also transforming cattle manure and slurry in a value-added fertiliser.

Acquiring property further away from the proposed site has been ruled out as an option by the applicant for several reasons, including the following:

- Additional costs associated with purchasing and developing a new site.
- Proximity to feedstock suppliers (cattle manure/slurry, crops and food processing byproducts to be supplied from adjacent land owned by the applicant).
- Proximity to existing gas network in Gormanston.

The proposed location is considered the best economically viable option for the applicant and would ensure the future productivity of the company. The chosen site allows for direct transfer of feedstock from Country Crest facilities and adjacent lands to the AD plant, allowing for a more holistic, efficient and sustainable way of managing both businesses. These benefits would be lost, should the AD plant be separated from the Country Crest site.

3.3 ALTERNATIVE LAYOUTS AND DESIGNS

The layout and design of the proposed buildings have been based upon feasibility, environmental impacts and the efficiency of the anaerobic digestion process. The minimising of operational costs was also a key factor in deciding the layout and design of the proposed buildings.

There were no other buildings on site which could be used to accommodate the proposed development (i.e. modernise office, welfare facilities, feedstock storage tanks, etc.). The layout and design proposed takes into consideration the required connections with existing infrastructure and utilities.

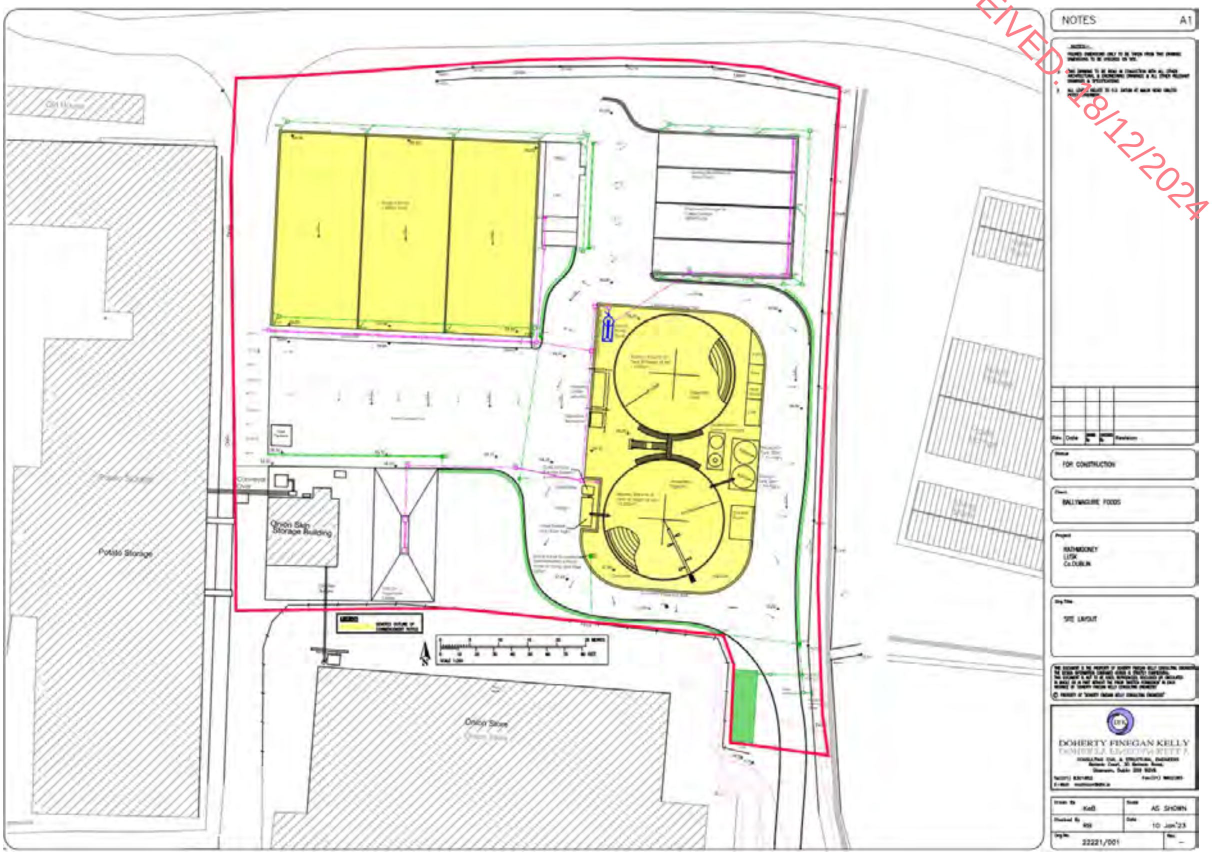

Figure 3.1: Alternative Site Layout 1

Alternative locations, layouts and designs, such as the ones depicted in **Figure 3.1** and **Figure 3.2** were considered, but it was decided that the one represented in **Figure 2.2** was the most practical design.

The proposed design of the new buildings and structures incorporates the most up-to-date concepts in modern anaerobic digester plants in relation to environmental control. The design of the proposed development incorporates design elements that aim to minimise the potential for significant environmental impacts at the site.

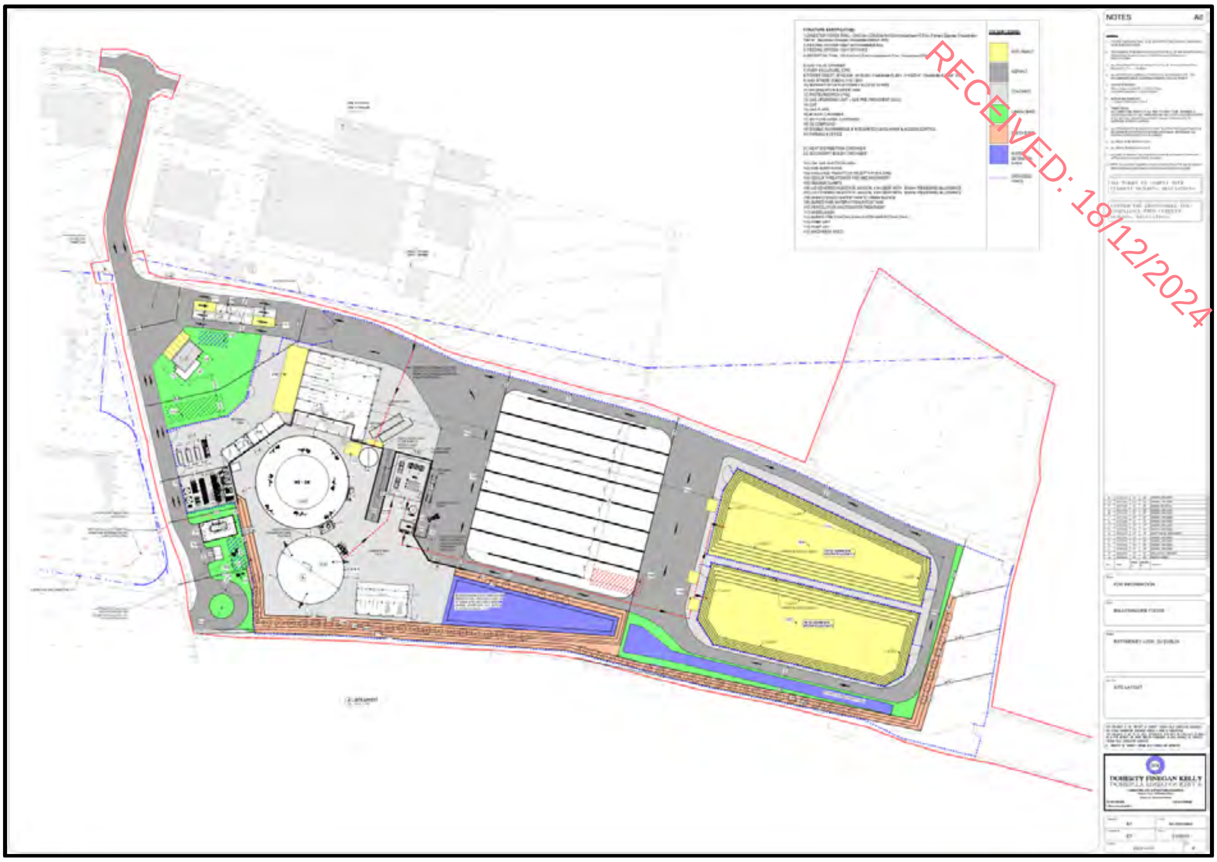

Figure 3.2: Alternative Site Layout 2

3.4 "DO-NOTHING" ALTERNATIVE

The "do-nothing" alternative would result in no new buildings or structures of the proposed anaerobic digester plant on the site in the townland of Collinstown, Lusk, Co Dublin. The land proposed for development would remain as an existing grassland in ownership of the applicant.

As discussed in further detail in the following sections of this report, the level of risk to the environment would not increase significantly as a result of the proposed development, given existing environmental controls and proposed mitigation measures.

The "do-nothing" alternative would deny the state the opportunity to gain from the economic benefits associated with the biomethane production at the facility. It would also have a local impact upon employment both at operational and construction phases.

The proposed development will add to the economic activity on the adjacent facility, with consequent positive effect in the region and the local community.

The "do-nothing" alternative would also deny local farmers access to increased amounts of readily available high-quality organic fertiliser for land spreading purposes. The former legal definition of organic fertilisers as a 'waste' requiring disposal has changed and has been redefined as a by-product, indicating that this product is recognised as an economically valuable resource.

Due to increasing costs for chemical fertilisers, digestate is becoming an essential part of the agricultural industry in Ireland. Higher transportation costs in the future will make the availability of local organic fertiliser by-product producers an asset to local agri-business.

Phosphorous loading is a common problem caused by the application of untreated cattle slurry to land because it tends to be rich in phosphorous (**Figure 3.3**). Most of the phosphorous is contained in the fibrous portion of the digestate, hence the liquid digestate contains ideal phosphorous concentrations for land application. The AD process breaks down complex organic materials into simpler substances, consequently this increases the proportion of nutrients available for plant uptake. Mineralised nutrients such as phosphorous and nitrogen in solution are easier for plants to absorb. All the liquid digestate produced would be exported to customer farmers operating in the area to apply to their lands and by Country Crest itself, in accordance with (S.I. No 101 of 2009).

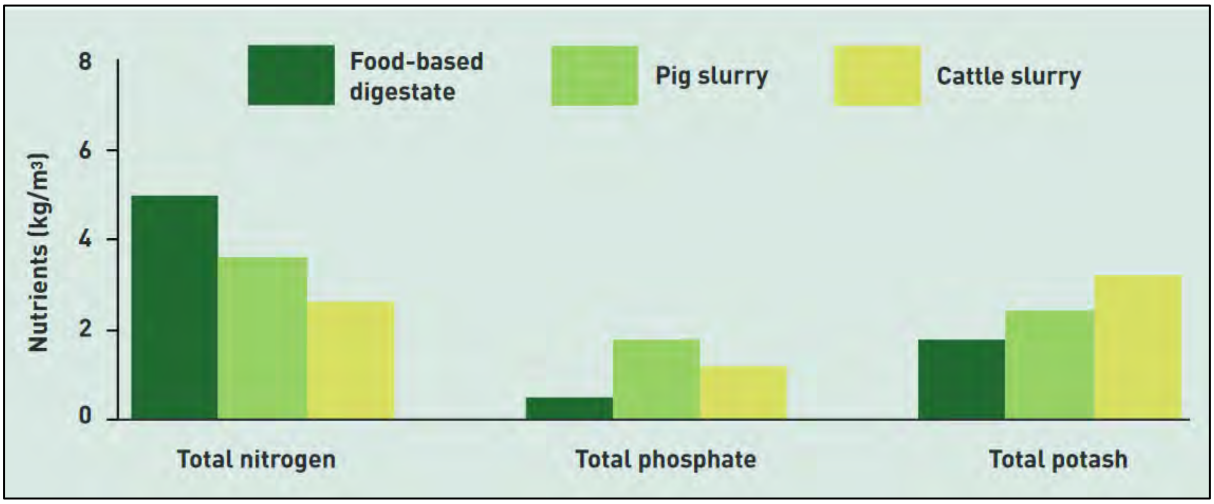

Figure 3.3: Digestate fertiliser values: average nutrient content of food-based digestate, compared with livestock slurries (WRAP 2012).

The biogas produced would be collected and used in a purpose-built combined heat and power plant (CHP) to provide heat to maintain the temperature of the thermophilic anaerobic digestion vessel and to provide heat and electricity. Before storage, the biogas would pass through a purifying step with an aim of reducing the hydrogen sulphide and sulphur dioxide content of the biogas. Before the biogas is purified, the hydrogen sulphide concentration can be as high as 2,500 ppm. The purifying system relies on microbial activity to break down these gases.

Benefits of the proposal:
AD has the potential to deliver several environmental benefits:

- Like reducing the potential of slurry to pollute waters. Data from an anaerobic digestion plant suggests a reduction of the BOD of cattle slurry by c. 82% (Clemens & Huschka, 2001).

- The collection of biogas from the process would lower GHG emissions and reducing nuisance odours from cattle manure/slurry.

- A portion of cattle manure (c. 600 t/a) and slurries (c. 2,000 t/a) used as feedstock would be sourced from Country Crest ULC.

- The biogas produced will be used to supply electricity and heat energy to the site, reducing the use of other fossil fuels. Electricity would also be supplied to buildings by roof mounted solar arrays / photovoltaic panels.

- The liquid digestate produced, if applied to lands, would be odourless and the fibrous digestate would be rich in phosphorous.

- The proposed mesophilic AD process would require significantly less energy to operate than a thermophilic alternative.

Should the proposed development proceed, it would support the following planning objectives outlined in the Fingal Development Plan 2023 – 2029:

<u>Policy CAP4 – Sustainable Environmental Infrastructure</u>
Ensure that the County's need for sustainable environmental infrastructure is addressed in a way which contributes to wider climate action goals and targets.

<u>Policy CAP13 – Energy from Renewable Sources</u>
Actively support the production of energy from renewable sources and associated electricity grid infrastructure, such as from solar energy, hydro energy, wave/tidal energy, geothermal, wind energy, combined heat and power (CHP), heat energy distribution such as district heating/cooling systems, and any other renewable energy sources, subject to normal planning and environmental considerations.

<u>Objective EEO30 – The Green Economy</u>
Support the growth of the 'green economy' including renewable energy, retrofitting, and electric vehicles and charging infrastructure, supporting the transition towards a circular economy in compliance with national policy and legislation.

<u>Policy EEP23 – Rural Economy</u>
Support and protect existing rural economies such as valuable agricultural lands to ensure sustainable food supply, to protect the value and character of open countryside and to support the diversification of rural economies to create additional jobs and maximise opportunities in emerging sectors, such as agri-business, renewable energy, tourism and forestry.

<u>Objective EEO70 – Renewable and Alternative Energy</u>
Facilitate and encourage the development of the alternative energy sector, in line with a Local Renewable Energy Strategy, and work with the relevant agencies to support the development of alternative forms of energy where such developments do not negatively impact upon the environmental quality, and visual, residential or rural amenity of the area.

<u>Objective EEO86 – Farm Diversification</u>
Promote farm diversification where:

- the proposal is related directly either to the agricultural operation engaged upon on the farm or the rural nature of the area.
- the use is compatible with the existing road infrastructure in the area.
- it does not unacceptably impact on the landscape, environment and character of the area.

<u>Policy IUP27 – Energy Networks and ICT Infrastructure</u>

Facilitate and promote the development of energy networks and ICT infrastructure where necessary to facilitate sustainable growth and economic development and support the provision of critical energy utilities and the transition to alternative, renewable, decarbonised, and decentralised energy sources, technologies, and infrastructure

Policy IUP29 – Enhancement and Upgrading of Existing Infrastructure And Networks
Work in partnership with existing service providers, businesses and local community groups to facilitate required enhancement and upgrading of existing infrastructure and networks and support the development of new energy systems, local community sustainable energy generation projects and transmission grids, which will be necessary for a more distributed, renewables-focused energy generation system, harnessing both the considerable on-shore and off-shore potential from energy sources such as wind, wave, and solar energy.

Policy IUP31 – Enhancement and Upgrading of Existing Infrastructure And Networks
Support EirGrid's Grid Development Strategy – Your Grid, Your Tomorrow 2017, Implementation Plan 2017–2022, Shaping our Electricity Future-A Roadmap to achieve our Renewable Ambition 2021 and Transmission Development Plan (TDP) 2020-2029, and the Government's Policy Statement on Security of Electricity Supply November 2021 and any subsequent plans prepared during the lifetime of this Plan, to provide for the safe, secure, and reliable supply of electricity.

Objective IUO44 – Energy Utilities
Support the development of enhanced electricity and gas supplies, and associated transmission and distribution networks, to serve the existing and future needs of the County, and to facilitate new transmission infrastructure projects and technologies.

3.5 REFERENCES

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PART II - ENVIRONMENTAL IMPACTS

This section of the EIAR describes the likely significant environmental impacts arising from the proposed construction of an anaerobic digester and all ancillary site works and services at Collinstown, Lusk, County Dublin.

Where possible, design measures have been included to reduce or eliminate possible impacts. Where this has not been possible, mitigation measures have been suggested to reduce or eliminate the identified impacts of the proposed development.

SECTION A – HUMAN ENVIRONMENT

This section of the Environmental Impact Assessment Report deals with the potential effects of the proposed scheme on human beings.

These effects have been grouped into:

Air Quality, Odour and Climate Impacts

The impact of:

- emissions to air generated by the proposed development,
- odours generated by the proposed development on nuisance odour in the general vicinity, and
- on climate.

Noise Impacts

The impact of noise generated by the proposed development on noise levels in the general vicinity has been assessed.

Landscape and Visual Impacts

The impact of the proposed development on the visual amenity of the landscape has been assessed.

While human beings interact in some way with every aspect of the environment, the above interactions are considered the most significant in this case. The impacts of the proposed development on human beings in relation to effects on the natural environment are further considered in **Section B**, while the impacts of effects on material assets and archaeology, architecture and cultural heritage are considered in **Sections C and D** respectively.

4.0 POPULATION & HUMAN HEALTH

4.1 INTRODUCTION

Any development that alters the existing environment has the potential to impact upon human beings at a local and/or regional scale, through impacts upon socio-economic factors including demographics, land use, economic development and employment.

This section of the EIAR provides an overview of the receiving social-economic environment of the area and briefly outlines the main potential impacts of the proposed development, at both the construction and operational phases, on human beings. The following sections of this EIAR provide detailed assessments of potential impacts on human beings and detail proposed mitigation measures to address the identified impacts.

4.2 METHODOLOGY

A desk-based study was undertaken to assess the potential impact of the proposed development on the receiving socio-economic environment. This study comprised a review of available information with regards to population and dynamics, economic activity, employment, land use and residential amenity. Information was obtained from the Central Statistics Office (CSO) and the Fingal Development Plan 2023 – 2029.

4.3 RECEIVING ENVIRONMENT

4.3.1 Population and Dynamics

According to the 2022 Census, County Fingal had a population of 330,506, comprising 167,974 females and 162,532 females, growing from 296,020 in 2016. This represents a population increase of approximately 11.6% since the previous Census in 2016.

Table 4.1 shows the changes in population by age group in County Fingal between the 2016 and 2022 Census. Considerable increases are noted for the middle aged and older age groups, with an increase of 24.1% for the 40 to 59 age group, 21.2% for the 60 to 84 age group and an increase of 46.9% in the 85+ age group. A modest population decrease was noted in the 20 to 39 age group at -2.9%. The youngest age group, 0 to 19 showed only an increase in population at 7.2%

Table 4.1: Population Change Between 2016 Census and 2022 Census/Age Group.

AGE GROUP	2016 POPULATION	2022 POPULATION	% CHANGE
0 – 19	90,363	96,924	7.2
20-39	89,105	86,478	-2.9
40-59	77,521	96,225	24.1
60-84	36,872	44,707	21.2
85+	2,159	3,172	46.9

Lusk Town is the closest town to the proposed site. The population of Lusk Town during the 2016 census was 7,786 which increased to 8,806 in 2022 comprising of 4,489 females and 4,317 males. The proposed development is located within the Balbriggan local electoral area which had a total population of 40,476 during the 2022 Census.

The nearest urban areas to the proposed site include Lusk c. 1.5 km south, Skerries c. 3.8 km north-east, Loughshinny c. 3.8 km east, Balrothery c. 3.8 km north, Rush c. 4.0 km south-east and Balbriggan 5.2 km north. **Table 4.2** details the population change within these areas between the 2016 Census and 2022 Census.

Table 4.2: Population Changes in Towns within the Purlieu of the Proposed Site 2016 – 2022.

AREA	2016 POPULATION	2022 POPULATION	% CHANGE
Lusk	7,786	8,806	13.1
Rush	9,943	10,875	9.4
Skerries	10,044	10,743	7.0
Loughshinny	666	741	11.3
Balrothery	2,017	2,282	13.1
Balbriggan	21,723	24,322	15.7

All of these urban areas within the vicinity of the facility experienced population increases since the previous 2016 Census.

4.3.2 Economic Activity

The Department of Agriculture, Food and the Marine (DAFM) reports that the agri-food sector is Ireland's oldest and largest indigenous industry. In 2020, the sector accounted for almost 7% of modified Gross National Income, 10% of exports in value terms and represented 7.1% of total employment. The DAFM's report, "Food Vision 2030", identifies further growth opportunities for the sector, with the aim to position Ireland as an international leader in Sustainable Food Systems (SFSs).

The largest towns with associated businesses and industry and located within 5 km of the site include Lusk c. 1.5 km south, Skerries c. 3.8 km north-east and Rush c. 4.0 km south-east.
The proposed development is located in the Collinstown townland in the north of Co. Dublin, c. 1.5 km north of Lusk town (Eastings 321484 Northings 256810). The pre-eminent land use and economic activity in the local area is agriculture. There were 45 holdings, 549 livestock units and 1,823.7 hectares of farmed land within the Holmpatrick Electoral Division where the proposed site is located, as per the Census 2022 statistics.

Beyond 1 km of the site, the main land use in the area continues to be crop and animal production, and also complex cultivation patterns. There is also a small number of commercial activities along the R127, including an IT product retailer approximately 395m east of the site within Collinstown townland.

There are thirteen EPA licenced facilities within 15 km of the proposed development.

The closest licenced site is c. 3.41km north-west of the proposed site, which is a timber treatment plant, operated by Brooks Group Ltd. The main activity at the site is the treatment or protection of wood, involving the use of preservatives, with a capacity exceeding 10 tonnes of wood per day. Further details of EPA licenced sites are provided in section 9 of this EIAR. These EPA licenced sites are listed below in **Table 4.3**.

Table 4.3: EPA Licenced Facilities Within 15km of the Proposed Development.

LICENCE NO.	LICENCE NAME	LICENCE TYPE (FIRST SCHEDULE OF EPA ACT, 1992, AS AMENDED)	APPROX. DISTANCE FROM DEVELOPMENT SITE
P0780-01	Brooks Group Ltd.	8.3 Wood, Paper, Textiles and Leather	3.41 km NW
W0231-01	Fingal County Council	11.5 Waste	3.44 km W
W0009-03	Fingal County Council	11.5: Waste	4.24 km S
W0222-01	Bord Na Móna Recycling Ltd.	11.4 (b)(ii): Waste	4.94 km S
P1175-01	Woodburn Farms Ltd.	6.1 (a): Intensive Agriculture	5.71 km E
P1014-01	Pacon Waste & Recycling Ltd	11.4 (b)(ii): Waste	5.81 km N
P0014-04	Sk Biotek Ireland Ltd.	5.16: Chemicals	9.72 km S
P0060-01	Arch Chemicals BV	5.12 (g): Chemicals	10.1 km S
P1106-01	MSD International GmbH t/a MSD Ireland (Biotech Dublin)	5.16: Chemicals	10.9 km S
P1091-01	Mr. Pat Rooney	6.1 (a): Intensive Agriculture	11.1 km SW
P0189-01	Anglo Beef Processors Ireland Unlimited Company	-	13.1 km S
P0921-01	International Aerospace Coatings Ltd.	12.2.2: Surface Coatings	13.7 km S
P0480-02	Dublin Aerospace Ltd.	12.3: Surface Coatings	13.8 km S

Figure 4.1 below shows the locations of all EPA Licenced Facilities in the surrounding area of the proposed development, which is listed in **Table 4.3** above.

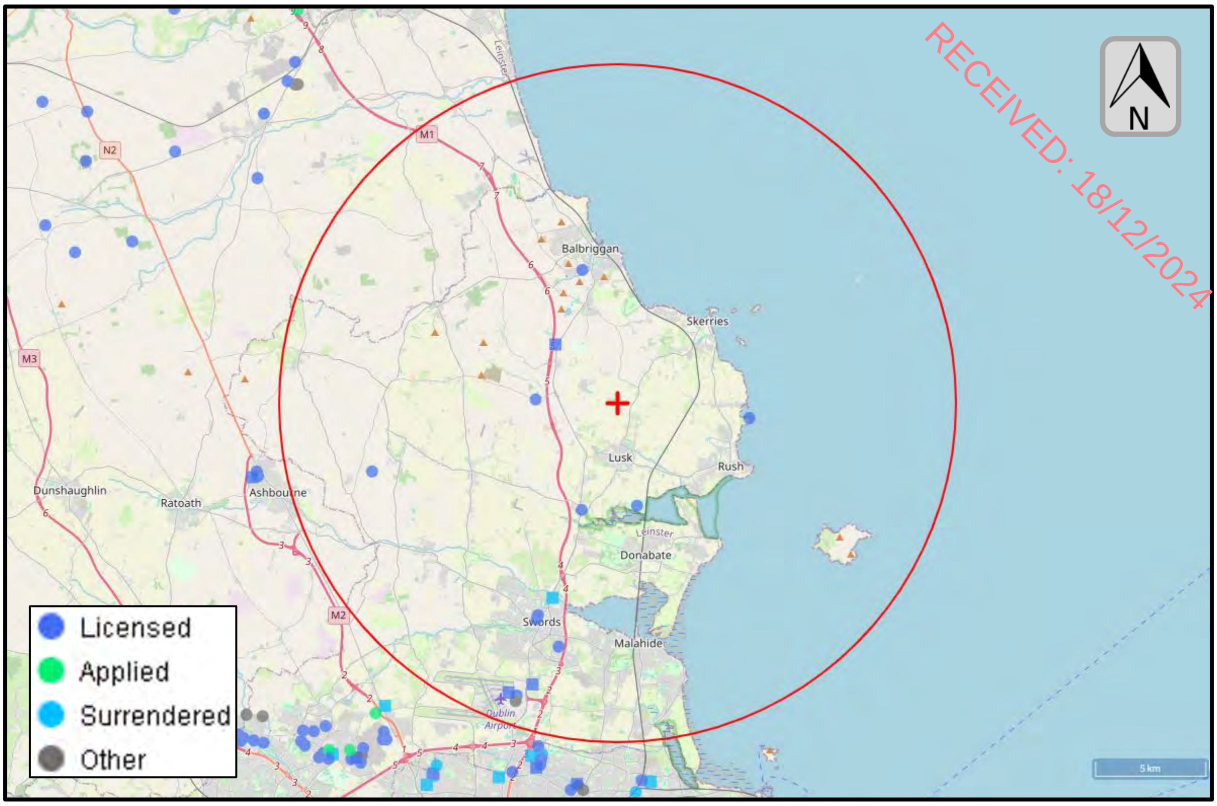

Figure 4.1: EPA Licenced Facilities within 15km of the Proposed Development.

4.3.3 Employment

The total potential labour force for 2022 in County Fingal was 168,113 individuals, which represents 50.8% of the total population. In the 2022 Census, the labour force participation rate for 2022 was 65.6% with an unemployment rate of 7.8%.

The labour force participation rate was calculated by expressing the labour force, aged 15 years and over who are at work, looking for their first regular job or unemployed, as a percentage of the total population aged 15 years and over.

Table 4.4 below provides a summary of the working population for County Fingal.

Table 4.4: Summary of the Working Population in Co. Fingal, 2022.

Area	Persons	% of Total Potential Labour Force
Total at work	155,063	92.2
Unemployed looking for the first job	2,299	1.4
Unemployed, having lost or given up the previous job	10,751	6.4

Table 4.5 below provides a synopsis of the total workforce in Fingal by their broad industrial group.

Table 4.5: Persons at Work by Broad Industrial Group 2022.

Occupation (Industrial Group)	**Persons at Work**	**% of Total Potential Labour Force**
Agriculture, forestry and fishing (A)	1,092	0.65
Mining and quarrying (B)	70	0.04
Manufacturing (C)	9,605	5.71
Electricity, gas, steam and air conditioning supply (D)	963	0.57
Water supply; sewerage, waste management and remediation activities (E)	551	0.33
Construction (F)	8,258	4.91
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	18,939	11.27
Transportation and storage (H)	10,844	6.45
Accommodation and food service activities (I)	7,650	4.55
Information and communication (J)	11,404	6.78
Financial and insurance activities (K)	11,232	6.68
Real estate activities (L)	1,109	0.66
Professional, scientific and technical activities (M)	11,319	6.73
Administrative and support service activities (N)	7,412	4.41
Public administration and defence; compulsory social security (O)	9,264	5.51
Education (P)	12,251	7.29
Human health and social work activities (Q)	17,386	10.34
Arts, entertainment and recreation (R)	2,582	1.54
Other service activities (S)	3,399	2.02
Activities of households as employers producing activities of households for own use (T)	99	0.06
Activities of extraterritorial organisations and bodies (U)	106	0.06
Industry not stated	9,528	5.67
Unemployed looking for first regular job	2,299	1.37
Unemployed, having lost or given up the previous job	10,751	6.40

At 11.27 %, the wholesale and retail trade sector employs the largest number of Fingal's total labour force. This sector includes the repair of motor vehicles and motorcycles and wholesaling and retailing which is the final steps in the distribution of merchandise. At a similar percentage, 10.34% of the human health and social work activities sector also employs a similar number of Fingal's total labour force.

At 0.57% of the 2022 workforce, the electricity, gas, steam and air conditioning supply was the fifth smallest employment sector in the county.

Table 4.6 below provides a summary of the working population of Fingal, given by principal economic status in County Fingal.

Table 4.6: Working Population Aged 15 Years and Over by Principal Economic Status 2022.

Economic Status	Persons	% of Total Potential Labour Force
Professional workers	14,404	8.6
Managerial and technical	56,151	33.4
Non-manual	30,467	18.1
Skilled manual	20,372	12.1
Semi-skilled	17,920	10.7
Unskilled	4,680	2.8
All other gainfully occupied and unknown	11,069	6.6
All social classes	155,063	92.2

4.3.4 Land Use and Settlement Patterns

The proposed development would be located in the Electoral Division of Holmpatrick within the townland of Collinstown, Lusk, Co Dublin. The nearest settlement to the proposed development site is the town of Lusk, located c. 1.5 km south of the site. The next closest populated area is the town of Skerries c. 3.8 km north-east of the site.

The townland is bordered by several townlands including: Rathmooney to the west; Palmerstown, Heathtown and Balcunnin to the north; Greatcommon and Rallekaystown to the east; and Causestown and Lusk to the south. The Rathmooney stream and the Palmerstown 08 stream are the two watercourses that cross the townland.

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along with the existing road network. The primary land uses of the area are arable and pasture land. A number of farmsteads, as well as a commercial development (IT product retailer) are also located within the area.

4.3.5 Community and Social Infrastructure

Community infrastructure within the vicinity of the proposed development would be primarily located within the nearby town of Lusk, located c. 1.5 km south of the site and the town of Skerries c. 3.8 km north-east of the site.

Lusk has a population of c. 8,806 as of 2022. The town is served by the R127 and R128 regional roads in the east of Co. Fingal. Community and social infrastructure within Lusk include schools, creches, day care centres, the local GAA club, sports facilities, church, pharmacies, a healthcare centre, pubs, restaurants, retail stores and other services.

The town of Skerries has a population of c. 10,743 as of 2022 and is served by the R127 and R128 regional roads in the north-east of Co. Fingal. Community and social infrastructure within Skerries include schools, creches, day care centres, the local GAA club, sports facilities, churches, pharmacies, a healthcare centre, pubs, restaurants, retail stores and other services.

Hospitals in Dublin, such as the Beaumont Hospital, cater to the healthcare needs of residents in Fingal.

4.3.6 Amenities and Tourism

The proposed development is located in the Dublin Region of Ireland. According to Fáilte Ireland's (2021) profile of tourism in Ireland in 2019, approximately 2.1 million overseas tourists spent over €749 million in the Mid East / Midlands region of Ireland.

According to the Eastern and Midland Region Regional Spatial & Economic Strategy (RSES), the Region is also home to areas of rich heritage and immense natural beauty that support a varied tourism and recreation offering. Lusk is a Self-Sustaining Town located 1.5 km south of the proposed site in Co. Fingal. Dublin Airport is located approximately 15 minutes from Lusk.

Lusk has a rich architectural heritage with a designated Architectural Conservation Area formed by several inter-related elements. According to the Lusk Town Centre First Plan *Lusk for Life*, the tourism product in Lusk is modest having limited visitor profile, accommodation stock, attraction and amenities. There are no destinations or attractions locally featured in itineraries or trip proposals marketed by Failte Ireland under the Ireland's Ancient East Tourism destination brand.

4.4 IMPACTS

A brief overview of the potential impacts on human beings during the construction and operational phases is provided below. More detailed assessments are discussed in the following sections of this EIAR.

4.4.1 Economy and employment

In the Regional Planning Guidelines for the Greater Dublin Area (2010 – 2022) the Greater Dublin Area (GDA) is described as containing large tracts of valuable agricultural land. These key resources should be carefully managed and that the region is well placed to continue to capitalise on the resurgence of interest in fresh local produce. The GDA, as the economic engine for the country, has significant demand but is not an area with the greatest renewable generation potential. Renewable energy provision within the GDA will continue to become a more central issue in terms of environmental concerns, economic viability and development, and employment creation in green technologies.

The proposed development would have a positive impact upon the local economy by providing temporary employment for people for the duration of the construction phase (approximately 18 months). It would also support the continued employment of current Country Crest ULC. staff and create new jobs at the AD plant during the operational phase.

The creation of jobs during the construction phase would further contribute to the economy of the area through direct spending of goods and services in the area. The proposed development would result in the creation of 2 full time positions at the site.

The proposed development would also provide a proportional increase in indirect employment during the operational phase, for example, via haulier contractors and other services required. Agriculture and the manufacture of natural gas are not the predominant enterprises in the region, however, are considered to be key sectors to the region.

4.4.2 Amenities and Tourism

There may be greater use of local amenities and tourism facilities during the construction phase by contractors, but the construction of the proposed development would not affect the tourism profile of the area.

There are no predicted negative impacts on local amenities and tourism arising from the operational phase. Any persons directly employed during the operational phase of the project would have the opportunity to avail of the local amenities and tourism.

Their potential use, both personal and business-related, of local amenities and tourism facilities may positively benefit the business community in the area, including amenity providers.

4.4.3 Air, Dust and Odour

The main potential nuisance impact upon human beings during the construction phase would be that with regards to dust generation. Excavations and earth moving operations may generate quantities of construction dust, particularly in drier weather conditions. The extent of any construction dust generation depends on the nature of the construction dust (soils, sands, gravels, silts etc.) and the construction activity. The potential for construction dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

The issue of construction dust dispersion may be exaggerated with vehicles transporting sand/gravel/concrete/etc. to and from the site, having the potential to cause an environmental nuisance to use of the local road.

The potential for dust generation during construction works is unlikely to impact upon third party residences in the locality, as the closest property is over 130m from the site boundary. There would also be a low risk of fouling roads outside the construction site. Any potential impact of dust would be short term, given the transient nature of construction works. Dust control measures would be implemented throughout the construction phase to reduce the potential impact.

There would be a potential nuisance impact upon human beings with regards to the odours and emissions to air generated during the operational phase of the proposed development. An assessment of the potential air quality impacts arising from the proposed development is discussed in detail in **Section 5** of this EIAR.

The potential for odour impacting upon human beings during the construction phase would be considered to be low, given that there are not expected to be any new sources of odour at the site during construction that would reach nuisance levels, nor would construction works impact upon any existing odour generation.

Anaerobic digestion plants have a history of creating nuisance odours. However, newly constructed state of the art structures like the ones proposed for this site are designed in such a way as to significantly reduce nuisance odours.

During the operational phase of the proposed development, as outlined in further detail in **Section 5**, it is anticipated that odour from the anaerobic digestion plant would not cause a significant environmental impact in the region or nuisance to sensitive locations. Site odour at odour sensitive locations does not appear to constitute a nuisance, as odours are and will be controlled at the site through good design and housekeeping.

According to the Air Quality Assessment report by Katestone Environmental Ireland Ltd. (Attachment 4.1), the primary sources of odour from the proposed development will be the feedstock reception building, the digestate dewatering building and the storage of dewatered digestate in one of the onsite clamps. The feedstock reception building and the digestate dewatering building will be maintained under negative pressure with odorous emissions exhausted to an onsite odour control unit (OCU). The dewatered digestate will be stored under a roofed structure however it will not be enclosed from the atmosphere. The AD tanks and liquid digestate storage lagoons are sealed and will therefore not be a source of odorous emissions at the site.

The nearest residential property to the proposed development not in the possession of the company is c. 130m from the site. There has been no history of odour complaints at the site.

The sources of combustion emissions at the site are the onsite biogas boilers, the CHP unit and an emergency flare. The emergency flare will be used for the combustion of biogas if combustion equipment and the GUU are offline (e.g. due to maintenance). This is likely to be a highly infrequent occurrence.

4.4.4 Noise

Noise generated during the construction and operational phases of the proposed development has the potential to impact human beings within the vicinity of the site. An assessment of potential impacts upon human beings due to noise associated with the proposed development is discussed in **Section 7**.

During the construction phase, it would not be anticipated that there would be a significant impact on local residences within close proximity to the proposed development. Control and mitigation measures to reduce the potential for noise are outlined in **Section 7.8**. Given the transient nature of construction works and the provided control and mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings.

No significant additional noise impact would be anticipated during the operational phase of the proposed development in combination with existing operations from the Country Crest site. Maximum noise levels at the site are expected to be equivalent to noise levels experienced during the operation of large agricultural machinery within the existing surrounding farmland and farmyard, or other adjacent agricultural lands. The site would comply with the recommended EPA noise limit during daytime, evening and night-time periods. During the normal operation of the AD Plant, noise levels at the nearest noise sensitive locations would have no significant impact.

The proposed development is unlikely to generate noise levels that will significantly impair amenity beyond the site boundary.

No piling or blasting is proposed for the construction of the development, therefore, vibration impacts are considered unlikely. Vibration impacts associated with the operation of the proposed development are also considered unlikely.

4.4.5 TRAFFIC

The site is accessed by a private road (speed limit set at 30 km/hr) c. 1.2 km to the west off the L1155 local road. The L1155 local road connects to the R132 regional road, to the L1165 local road to the north of the site and to the R127 regional road to the east. The site is c. 45-55m above sea level on an area that is gently sloped down to the south-east. The private road to the west is relatively straight for c. 280m. When accessing the L1155 from the private road, there is a visibility of 90m to the left and 90m to the right at the intersection.

Traffic on these roads is composed of staff car traffic, HGV's and the local haulier enterprise associated with the applicant Country Crest ULC. and Ballymaguire Foods Ltd.

The proposed development has the potential to impact upon traffic volumes in the area, which may subsequently impact the generation of noise and dust emissions. While there would be increased vehicle movements during the construction phase of the development, this would be for a limited period of time only and would be minimal. Traffic movements during construction would be expected to consist of deliveries of building materials / plant equipment and vehicle movements from sub-contractors.

During the operational phase of the project, traffic movements to and from the site are anticipated to increase due to scheduled feedstock deliveries, fertiliser output traffic and staff movement.

A Transportation Assessment Report (Attachment 4.2) has been compiled by NRB Consulting Engineers to address Traffic and Transportation issues associated with the operation of the proposed development, the capacity of the existing road network and the impact of the development locally. The analysis included the effects of the existing, committed and now-proposed traffic on the local roads and assessed the impact during the traditional peak commuter periods in accordance with Traffic & Transport Assessment Guidelines. According to the report, the estimated traffic movements would result in a negligible and unnoticeable impact upon the operation of the adjacent road network.

NRB Consulting Engineers have also prepared a Planning Stage Travel Plan (TP), or Mobility Management Plan (MMP), for the proposed development. The plan contains measures to promote sustainable travel modes and to reduce private car borne journeys to and from the site.

4.4.6 LAND-USE

The proposed buildings would be erected on an arable land area within site's boundaries, thus turning additional land from agricultural land to artificial surfaces. The proposed development would result in a moderate change in land use at the site.

The proposed buildings would be an addition to the already existing Country Crest's agri-food hub. There are no third-party properties immediately adjacent to the site. The proposed activities to be carried out at the site would be aligned with the rural nature of the region and it is not anticipated that land use change would result in a significant negative impact.

4.4.7 Visual Amenity

The tallest structure within the site would be the power digest tank and attached gas sphere at 12m in height. Other tall structures within the site would include the primary and secondary digestion tank, the silage clamps and gas flare. Tall structures such as these would have the potential to impair the local landscape by altering the visual extent of the site. However, the Visual Impact Assessment (VIA) carried out by ACSU determined that changes in the undulating nature of the local topography, local mature field boundaries or local woodland would screen the proposed development from any selected viewpoints. A detailed assessment of the potential impacts upon visual amenity arising from the proposed development is discussed in detail in **Section 8** of this EIAR.

The VIA has concluded that, in terms of the general overall landscape and considering the scale, size, design and finish of the plant, the visual effect of the proposed development on the overall landscape, categorised as having a modest value, should be considered as Imperceptible. The proposed development is not expected to have a significant impact on the visual landscape of the region. The design and site layout of the proposed buildings would take into consideration the need to minimise the associated visual impact.

4.4.8 Water

The proposed development is located within the Water Framework Directive (WFD) Nanny-Delvin 08 Catchment, the Palmerstown 010 Sub Catchment and the Palmerstown 010 River Sub Basin. The proposed development is hydrologically linked to the Palmerstown 08 stream and to the Rogerstown estuary.

A deterioration in the water quality of the Palmerstown 08 stream has the potential to impact upon human beings by adversely affecting its own and downstream waster bodies' water quality. A detailed assessment of potential impacts to water quality is included in **Section 10** of this EIAR.

Three water springs are found downstream of the proposed site in proximity to the Palmerstown 08 stream. There are 2 existing water sources on site – a dedicated firefighting ring main and a well supply of potable water.

The closest point downstream of the proposed site from which drinking water is abstracted is a spring located near the Palmerstown 08 stream in an agricultural field approximately 265m from the site.

The proposed site is positioned in the Lusk-Bog of the Ring groundwater body (GWB). The GWB covers an area c. 233 km^2 and achieved a WFD status of Good during the period 2016-2021. The higher elevations within the GWB are in the order of 160 m OD, falling off from the hills along the centre of the body to the north and south and also towards the coast. Rivers flows are predominantly southwards and eastwards, to the Northwestern Irish Sea.

During the construction phase of the proposed development, there would be a potential for impacts upon water in the event of contamination of underlying groundwater and potential contamination of surface water.

Groundwater at the site could be contaminated due to potential "spills" at the site, especially during excavation works where the overburden is removed. A deterioration in surface water quality could arise through the release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils) in the run-off to surface waters.

Water quality at the site would be protected by the implementation of mitigation measures (outlined in **Section 10.5** of this EIAR) and through the implementation of a responsible working environment (e.g. the appropriate handling and storage of potentially polluting substances and the regular inspection and maintenance of construction plant).

Stormwater from the site would be attenuated by two detention basins to the south of the site. Effluent from silage clamps will be collected by a buried tank and may be further used as feedstock for the anaerobic digestion process. Foul water generated by staff facilities will be directed to an underground septic tank south of the office building, which will allow treated water to percolate through the soil. No connection to the public sewer will be required.

There would be no process effluent emissions from the site. The surface water collected by the proposed stormwater system should be uncontaminated and therefore have no impact on either the surface or groundwater in the area.

It is not anticipated that the proposed development would have the potential to adversely impact water quality during the operational phase.

4.5 MAJOR ACCIDENTS AND NATURAL DISASTERS

As noted in Directive 2014/52/EU, precautionary actions need to be put in place for certain projects which, '*due to their vulnerability to major accidents and/or natural disasters (such as flooding, sea level rise or earthquakes) are likely to have significant adverse effects on the environment*'.

As referenced in Section 2.2.4, under the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S. I. No. 209 of 2015) or COMAH, P2 Flammable gases are subject to a threshold quantity of 10 tonnes meaning that any biogas facility storing less than 10 tonnes of methane will fall outside of the COMAH Regulations. Biogas would be produced and held within the PowerDigest tank and attached gas sphere. Assuming the gasholder is filled to its maximum capacity, which would be considered a worst-case scenario, approximately 6.032 tonnes of biogas would be stored onsite. Biogas would then be directed to a treatment unit to generate biomethane, while a portion of biogas would be converted to electricity and heat. No biomethane would be stored onsite. Therefore, the proposed development would not fall within the Seveso III Regulations or COMAH Regulations, as the amount of stored biogas would be under the threshold. More details are provided in Section 2.1 of this report.

During the construction phase of the proposed development, the risk of spills to the environment would be minimised through the implementation of measures, such as the appropriate storage of potentially polluting substances (e.g. oils, fuels), the regular maintenance and inspection of construction plant, the implementation of good housekeeping practices and the provision of spill kits.

It is considered that the most likely natural disaster to which the proposed development may be vulnerable to and could have significant adverse effects on the environment, is fluvial flooding.

According to the Commissioners of Public Works in Ireland responsible for developing flood maps for the Republic of Ireland website (www.floodinfo.ie), as part of the Catchment Flood Risk Assessment and Management (CFRAM) Programme, the site is not located within any fluvial, pluvial or groundwater flood zones. Further details are provided in **Sections 10.3 and 10.4** of this EIAR.

The proposed site is c. 80m of the Palmerstown 08 stream at its closest, which poses no flood risk. It is also a significant distance away from the nearest recorded flooding event (c. 2.13 km).

4.6 MITIGATION MEASURES

The following sections of this EIAR provide further information on the potential impacts on human beings as a result of the proposed development. Mitigation measures have been proposed to address the potential impacts and are detailed under the following sections:

- Air Quality, Odour & Climate
- Noise
- Landscape and Visual
- Biodiversity
- Land - Soils, Geology and Hydrology
- Material Assets
- Architectural, Archaeological and Cultural Heritage

4.7 REFERENCES

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5.0 AIR QUALITY & ODOUR

Katestone Environmental Ireland completed the air quality chapter of the EIAR to examine the potential effects of the proposed development on air quality in the study area.

The nature of the proposed development has the potential to impact on air quality in the vicinity of the site as:

- The construction phase of the proposed development will involve earthworks, construction and trackout which will result of emissions of dust to the atmosphere.
- The operational phase of the proposed development will involve increased emissions to air associated with:
    - Transport and haulage on local roads
    - The handling and processing of feedstock materials at the site.

A comprehensive assessment was conducted that:

- Quantified baseline air quality in the study area
- Considered the impact of the construction phase on air quality using a qualitative approach
- Considered the impact of the operational phase of the proposed development on air quality using a dispersion modelling approach for:
    - Emissions of odour
    - Emissions of air contaminants
- Adopted a screening approach to consider the potential impact of emissions from additional traffic
- Considered mitigation strategies that will be used to minimise the generation of odorous emissions at the operational phases of the proposed development

The impact of the operational phase of the proposed development in terms of:

- Air contaminants on sensitive human receptors was determined to be **negligible, negative and long-term**.
- Air contaminants on sensitive ecological receptors was determined to be **insignificant, negative and long-term**.
- Odour was determined to be **not significant, negative and long-term**, with the operation of mitigation in the form of an odour control unit.

5.1 INTRODUCTION

This chapter was prepared by Katestone Environmental Ireland Ltd on behalf of Country Crest ULC. It describes the ambient air quality of the receiving environment in the vicinity of the proposed development and the impacts of the proposed development on air quality in the receiving environment within and outside the site boundary, including a 'baseline' scenario. It focuses on the local environment in the vicinity of the proposed development, referred to in this chapter as the study area. It identifies the prevention and mitigation measures that are and will be implemented to reduce the significance of the potential impacts and assesses the residual potential impacts.

5.2 AUTHOR INFORMATION AND COMPETENCY

The assessment was completed by Dr. Micheal Fogarty and Simon Welchman of Katestone. Micheal is a Director of Katestone with 15 years of experience in Ireland and Australia. He holds a B.Eng, M.Eng and PhD from the UCD College of Engineering and Architecture. He specialises in the areas of air quality and odour impact assessment. Simon has been a director of Katestone since 2004 with more than twenty-nine years of experience working as an air quality expert in the private sector and for the environmental regulator in New South Wales.

5.3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is defined in Chapter 1 Introduction of Volume 2 of this EIAR and a detailed description of the proposed development is set out in Chapter 3 of Volume 2 of this EIAR.

The proposed development will involve the construction and operation of an anaerobic digestion plant. The anaerobic digestion process (AD Process) will involve the acceptance of a range of process input materials including:

- 7,000 tonnes per annum of poultry litter
- 1,080 tonnes per annum of cattle manure
- 650 tonnes per annum of vegetable processing byproducts
- 100 tonnes per annum of food processing byproducts
- 400 tonnes per annum of draff Grains
- 10,000 tonnes per annum of whole crop silage
- 24,500 tonnes per annum of grass silage
- 17,080 tonnes per annum of slurry
- 1,300 tonnes per annum of WWTP sludge

Feedstocks delivered to the site will either be stored or processed immediately. Whole crop silage and grass silage will be stored in a structure that will be built as part of the proposed development. The structure is a series of eight sileage clamps each separated by a concrete wall. The seven northernmost clamps will be used for the storage of whole crop silage and grass silage. All other materials will be accepted in an enclosed feedstock reception building on a 'just-in-time' basis for immediate use in the AD Process.

To start the AD Process, all feedstocks will be accepted, unloaded, temporarily stored and mixed before being fed into a sealed digester tank (called the Digester Power Ring). Primary digestion and secondary digestion will occur within the sealed Digester Power Ring. Digestion is the breakdown of biodegradable materials in the absence of oxygen, which results in the formation of biogas, liquid digestate and solid digestate. Feedstock from the Digester Power Ring will be fed into a second AD Tank (called the Power Digest) for further secondary digestion.

Biogas is a mixture of methane, carbon dioxide and trace quantities of other gaseous contaminants such as sulphides, amines, ammonia and mercaptans. The biogas will be extracted from the AD tanks and processed to remove gaseous contaminants. A portion of the biogas will be fed to onsite combustion units including a combined heat and power (CHP) plant and two dual fuel boilers. The heat and electrical energy generated from these installations will be used to meet the energy requirements of the anaerobic digestion process. The remainder of the biogas will be fed to a gas upgrade unit (GUU) that will:

- Separate the biogas into pure methane and carbon dioxide gas streams
- Process the methane gas stream to a sufficient standard for injection into Ireland's gas network grid.

The carbon dioxide stream will be transferred to a unit for liquefaction. Liquefied CO2 has a wide range of uses in industries including food processing and pharmaceutical production.

Digestate will be pasteurised before it is dewatered in an enclosed building resulting in a dewatered digestate solid fraction and a liquid digestate fraction.
The southernmost silage clamp will be used for the storage of the solid fraction of the dewatered digestate. The liquid digestate fraction be transferred to sealed lagoons for storage in the easternmost part of the Site.

Emissions to air from aerobic digestion plants with the highest potential for adverse impacts are odour and products of combustion of biogas.
The primary sources of odour from the proposed development will be the feedstock reception building, the digestate dewatering building and the storage of dewatered digestate in one of the onsite clamps. The feedstock reception building and the digestate dewatering building will be maintained under negative pressure with odorous emissions exhausted to an onsite odour control unit (OCU). The dewatered digestate is not a significant source of odour emissions and will be stored under a roof. The AD tanks and liquid digestate storage lagoons are sealed and will, therefore, not be a source of odorous emissions at the site.
The sources of combustion emissions at the site are the onsite biogas boilers, the CHP unit and an emergency flare. The emergency flare will be used for the combustion of biogas if combustion equipment and the GUU are offline (e.g., due to maintenance), which is likely to occur infrequently.
The layout of the proposed development including the buildings and the site boundary are presented in Figure 5.1. The red line represents the boundary of the proposed development.

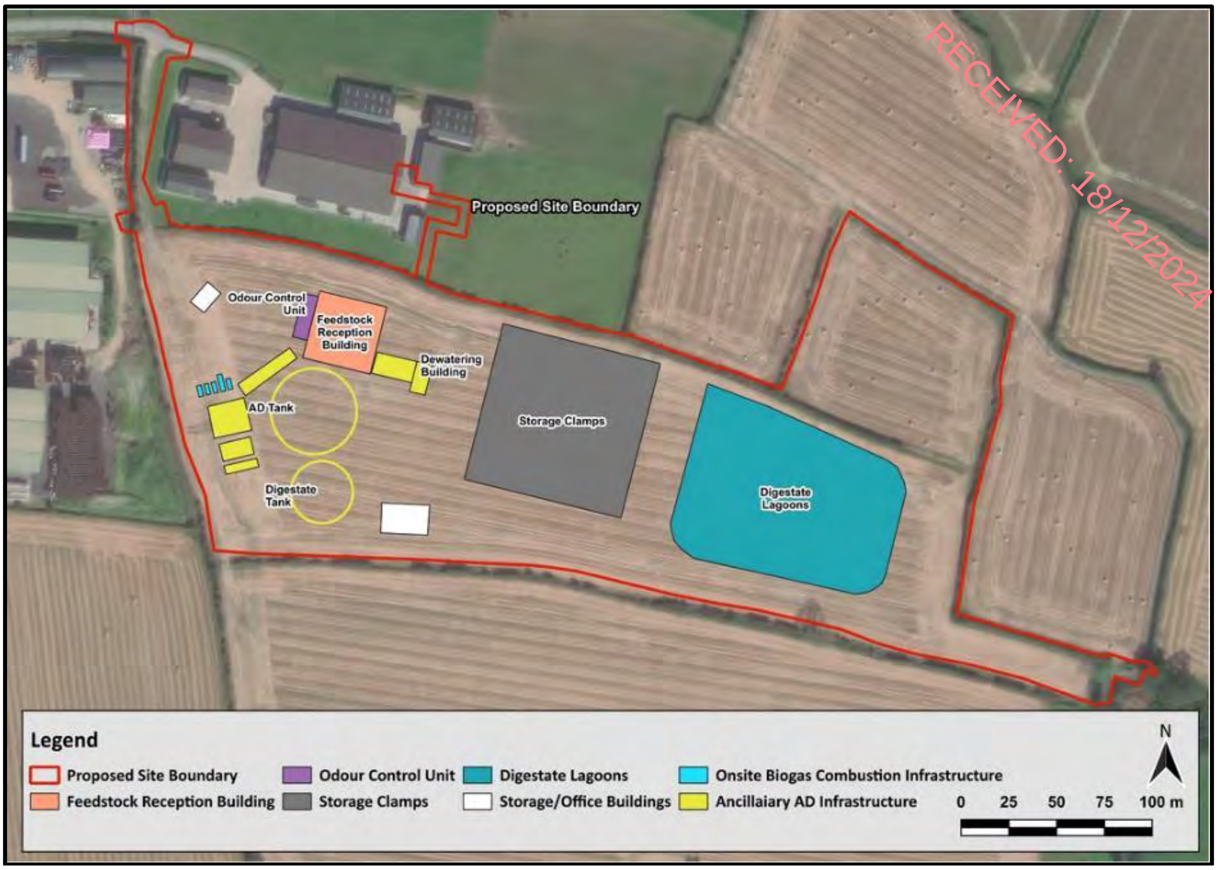

Figure 5.1: Layout of the proposed development within the Site boundary

5.4 METHODOLOGY

5.4.1 Relevant Guidelines

The following sections describe the legislation and guidance that are relevant to the assessment of emissions to air from the proposed development, and the methodology that underpins the assessment.

In order to assess the potential impacts from activities on site the following legislation and guidance are relevant:

- Air Pollution Act 1987, as amended
- Environmental Protection Agency Acts 1992, as amended
- Air Quality Standards Regulations 2011 (S.I. No. 180 / 2011), as amended
- Ambient Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022)
- The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC)
- The fourth Daughter Directive (2004/107/EC)
- EPA (2020) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4).
- NRA (2011) Treatment of Air Quality During the Planning and Construction of National Road Schemes
- UK Highways Agency (2019) Design Manual for Roads and Bridges - Sustainability & Environment Appraisal- Air quality - LA 105
- NRA (2008) Environmental Impact Assessment of National Road Schemes – A Practical Guide.
- Institute of Air Quality Management (IAQM) (2024) Guidance on the assessment of dust from demolition and construction
- DEHLG (2004) Quarries and Ancillary Activities Guidelines for Planning Authorities
- EPA (2020) Air dispersion modelling from Industrial Installations guidance note (AG4)
- EPA (2019) Odour emissions guidance note (Air Guidance Note (AG9)
- TII Road Emissions Model (REM): Model Development Report, December 2022;
- TII Air Quality Assessment of Proposed National Roads, December 2022;
- TII Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document, December 2022;

The following is a list of publications and data that were used in the preparation of this air quality assessment:

- EPA (2024) Air Quality in Ireland 2023 – Indicators of Air Quality
- EPA (2023) Air Quality in Ireland 2022 – Indicators of Air Quality
- EPA (2022) Air Quality in Ireland 2021 – Indicators of Air Quality
- EPA (2021) Air Quality in Ireland 2020 – Indicators of Air Quality
- EPA (2020) Air Quality in Ireland 2019 – Indicators of Air Quality
- Met Éireann (2024) meteorological monitoring data

5.4.2 RELEVANT LEGISLATION

The Air Pollution Act 1987, as amended (AP Act) is the primary legislation related to air quality in Ireland. It is an Act to provide for the control of air pollution and other matters connected with air pollution.

Section 4 of the AP Act defines air pollution:

> "Air pollution" in this Act means a condition of the atmosphere in which a pollutant is present in such a quantity as to be liable to —
>
> (i) be injurious to public health, or
> (ii) have a deleterious effect on flora or fauna or damage property, or
> (iii) impair or interfere with amenities or with the environment."

Section 24 of the AP Act specifies expectations to control emissions and to not cause nuisance:

1. The occupier of any premises, other than a private dwelling, shall use the best practicable means to limit and, if possible, to prevent an emission from such premises.
2. The occupier of any premises shall not cause or permit an emission from such premises in such a quantity, or in such a manner, as to be a nuisance.
3. In any prosecution for a contravention of this section, it shall be a good defence to establish that—
    a) the best practicable means have been used to prevent or limit the emission concerned, or
    b) the emission concerned was in accordance with a licence under this Act, or
    c) the emission concerned was in accordance with an emission limit value, or
    d) the emission concerned was in accordance with a special control area order in operation in relation to the area concerned, or
    e) in the case of an emission of smoke, the emission concerned was in accordance with regulations under section 25, or
    f) the emission did not cause air pollution.

In order to protect our health, vegetation and ecosystems, the requirements of EU Directives are set down in air quality standards that are implemented in the legislation of member states. These rules include how we should monitor, assess and manage the emissions of a wide variety of air pollutants in order to protect ambient air quality.

The European Commission set down the principles to this approach in 1996 with its Air Quality Framework Directive. Four "daughter" directives lay down limits for specific air pollutants, namely:

- 1st Daughter Directive: Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead
- 2nd Daughter Directive: Carbon monoxide and benzene
- 3rd Daughter Directive: Ozone
- 4th Daughter Directive: Polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air

The Air Quality Framework Directive and four "daughter" directives were repealed and replaced by the Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC), which was published in May 2008. It replaced the Air Quality Framework Directive and the first, second and third Daughter Directives. The fourth Daughter Directive (2004/107/EC) will be included in CAFE at a later stage. The limit and target values for both Directives are outlined below in Table 5.1.

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011), as amended (DEHLG, 2011). It replaces the following regulations that have been revoked:

- Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002)
- Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004)
- Environmental Protection Agency Act, 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 (S.I. No. 33 of 1999)

The Air Quality Standards Regulations 2011 (S.I. No 180/2011), as amended, make provisions necessary for the implementation of Directive 2008/50/EC on ambient air quality and cleaner air for Europe; establish limit values; and as appropriate, alert thresholds for concentrations of certain pollutants in ambient air intended to avoid, prevent or reduce harmful effects on human health and the environment as a whole. The Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) were revoked by the Ambient Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) (Irish Statute Book, 2023).

The limit values of the CAFE Directive as implemented by the Ambient Air Quality Standards Regulations 2022 in Ireland that were applied in this assessment are presented in Table 5.1.

Table 5.1: Ambient Air Quality Standards Regulations 2022 – Limit Values (based on EU Council Directive 2008/50/EC)

Pollutant	Limit Value Objective	Averaging Period	Limit Value ug/m^3	Limit Value ppb	Basis of Application of the Limit Value
SO_2	Protection of human health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year
SO_2	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year
SO_2	Protection of vegetation	Calendar year	20	7.5	Annual mean
SO_2	Protection of vegetation	1 Oct to 31 Mar	20	7.5	Winter mean
NO_2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year
NO_2	Protection of human health	Calendar year	40	21	Annual mean
$NO + NO_2$	Protection of ecosystems	Calendar year	30	16	Annual mean
PM_{10}	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year
PM_{10}	Protection of human health	Calendar year	40	-	Annual mean
$PM_{2.5}$ - Stage 1	Protection of human health	Calendar year	25	-	Annual mean
$PM_{2.5}$ - Stage 2	Protection of human health	Calendar year	20	-	Annual mean
Carbon Monoxide	Protection of human health	8 hours	10,000	8620	Not to be exceeded
Lead	Protection of human health	Calendar Year	0.5		Annual mean
Benzene	Protection of human health	Calendar Year	5	1.5	Annual mean

5.4.3 Assessment of Construction Impact

The following section describes the methodology that was adopted to assess the potential impacts of air contaminants from the construction phase of the proposed development. The National Roads Authority's guidance document titled Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA, 2011) deals with the potential impacts of construction activities on local air quality, which states:

> *The potential impact of both dust and vehicle emissions during the construction phase should be considered within the EIS. Dust emissions can lead to elevated PM_{10} and $PM_{2.5}$ concentrations and may also cause dust soiling.*

The predominant emission of concern from the construction phase of the proposed development will be the generation of dust.

The Department of the Environment, Heritage and Local Government's (DEHLG) guidance document for quarries titled Quarries and Ancillary Activities Guidelines for Planning Authorities, states the following in relation to potential impacts:

> *Residents living in proximity to quarries can potentially be affected by dust up to 0.5km from the source, although continual or severe concerns about dust are most likely to be experienced within about 100m of the dust source.*

The Institute of Air Quality Management (IAQM) in the UK published Guidance on the assessment of dust from demolition and construction (IAQM, 2024). It aims to provide guidance for developers, their consultants and environmental health practitioners on how to undertake a construction impact assessment (including demolition and earthworks as appropriate). It describes a comprehensive assessment procedure to consider potential impacts from construction activities. Katestone considers the approach described in IAQM (2024) to be the most comprehensive and robust regulatory guidance for the assessment of impacts during the construction phase of a proposed development. The potential impacts on air quality of the construction phase of the proposed development were therefore assessed using the approach described in the IAQM's Guidance (IAQM, 2024).

Step 1 of the IAQM assessment procedure is a screening approach that is used to determine the likelihood of significant impacts during the construction phase of a project. It stipulates that no further assessment is required if there are no receptors (human or ecological) within a certain distance of the works. If there are receptors within the distances stipulated in Step 1 a more detailed assessment described in Step 2 of the of the IAQM assessment procedure can be used to determine in the risk of adverse impacts from the construction phase of the project.

The steps of the approach described in IAQM (2024) are summarised here:

- Step 1 is to screen the requirement for a more detailed assessment. No further assessment is required if there are no receptors within a certain distance of the works.
- Step 2 is to assess the risk of dust impacts. This is done separately for each of the four activities (demolition; earthworks; construction; and trackout) and takes account of:
    - the scale and nature of the works, which determines the potential dust emission magnitude (Step 2A); and

    - the sensitivity of the area (Step 2B).
- These factors are combined in Step 2C to give the risk of dust impacts.
- Step 3 is to determine the site-specific mitigation for each of the four potential activities listed in Step 2. This will be based on the risk of dust impacts identified in Step 2. Where a local authority has issued guidance on measures to be adopted at demolition/construction sites, these should also be taken into account.
- Step 4 is to examine the residual effects and to determine whether or not these are significant.
- Step 5 is to prepare the dust assessment report.

The screening criteria that underpin Step 1 are described here. An assessment will normally be required where there is:

- a 'human receptor' within:
    - 350 m of the boundary of the site; or
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s)
- an 'ecological receptor' within: - 50 m of the boundary of the site; or
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high risk. A site is allocated to a risk category based on two factors:

- The scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (Step 2A); and
- The sensitivity of the area to dust impacts (Step 2B), which is defined as low, medium or high sensitivity.

The two factors are combined in Step 2C to determine the risk of dust impacts with no mitigation applied.

The scale and nature of the works (Step 2A) is determined for construction activities including demolition, earthworks, construction and trackout. The parameter used to characterise each construction activity and the limits used to define the extent of the activity for the purpose of the IAQM (2024) risk assessment of dust impacts are presented in Table 5-1.

The sensitivity of an area to dust impacts (Step 2B) is dependent on:

- The type of receptors (human health and dust soiling impacts)
- The number of receptors in a potentially affected area (human health and dust soiling impacts)
- The distance of the receptors from the source of emissions or if known, from the dust generating activities (human health and dust soiling impacts)
- Background levels of PM_{10} (human health impacts only).

Indicative examples listed in IAQM (2024) can be used to determine the type of receptors in an area. The classification of areas with high sensitivity, medium sensitivity and low sensitivity based on the type of receptors is presented in the following tables:

Table 5.2 for dust soiling effects
Table 5.3 for the health effects of PM_{10}

Once the type of receptors has been determined, the sensitivity of an area to dust impacts (Step 2B) can then be determined by combining this information with the number of receptors in a potentially affected area, the distance of the receptors from the source of emissions or if known, from the dust generating activities and background levels of PM_{10} (human health impacts only) using the frameworks described in the following tables:

- Table 5.4 for dust soiling effects on people and property
- Table 5.5 human health impacts from emissions of PM_{10}

In the current assessment, the distance of receptors from the boundary of the site has been considered.

Step 2C combines the sensitivity of an area and the magnitude of dust emissions to determine the risk of dust impacts, which is determined separately for demolition, earthworks, construction and trackout. The frameworks used to determine the risk of dust impacts is presented in:

- Table 5.5 for demolition activities
- Table 5.6 for earthwork and construction activities
- Table 5.7 for trackout activities

Step 3 is to determine the site-specific mitigation of dust from construction activities. The dust risk categories for each of the four activities determined in Step 2C should be used to define the appropriate, site-specific, mitigation measures to be adopted (IAQM, 2024). IAQM (2014) lists and describes general mitigation measures applicable to all site and measures applicable specifically to demolition, earthworks, construction and trackout, for high, medium and low risk sites. This approach allows for consistency with the assessment methodology (IAQM, 2024).

Once the risk of dust impacts has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3, the final step (Step 4) is to determine whether there are significant effects arising from the construction phase of a proposed development. IAQM recommends that significance is only assigned to the effect after considering the construction activity with the application of mitigation.

Table 5.2: The parameter used to characterise each construction activity and the limits used to define the extent of the activity in IAQM (2024) guidance

Activity	Parameter	Parameter unit	Categories - Scale of activity		
			Small	**Medium**	**Large**
Demolition	Total building volume	m^3	<12,000	12,000 - 75,000	>75,000
Earthworks	Total site area	m^2	<18,000	18,000 – 110,000	>110,000
Construction	Total building volume	m^3	<12,000	12,000 – 75,000	>75,000
Trackout	HDV (>3.5t) outward movements	movements/day	<20	20 - 50	>50

Table 5.3: Indicative examples listed in IAQM (2024) used to characterise location sensitivity to dust soiling effects

Receptor sensitivity	Indicative examples listed in IAQM (2014)
High sensitivity receptor	dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms
Medium sensitivity receptor	parks and places of work
Low sensitivity receptor	playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads.

Table 5.4: Indicative examples listed in IAQM (2024) used to characterise location sensitivity to the health effects of PM_{10}

Receptor sensitivity	Indicative examples listed in IAQM (2024)
High sensitivity receptor	residential properties. hospitals, schools and residential care homes
Medium sensitivity receptor	office and shop workers
Low sensitivity receptor	public footpaths, playing fields, parks and shopping streets

Table 5.5: Framework used to determine the sensitivity of an area to dust soiling effects

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10 -100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 5.6: Framework used to determine the sensitivity of a location to human health impacts from emissions of PM_{10}

Receptor Sensitivity	Annual Mean PM10 concentration	Number of Receptors	Distance from the Source (m)				
			<20	**<50**	**<100**	**<200**	**<350**
High	>32 µg/m³	>100	High	High	High	Medium	Low
		10 -100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28-32 µg/m³	>100	High	High	Low	Low	Low
		10 -100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24-28 µg/m³	>100	High	Medium	Low	Low	Low
		10 -100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	<24 µg/m³	>100	Medium	Low	Low	Low	Low
		10 -100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1 - 10	Medium	Low	Low	Low	Low
Low	-	>10	Low	Low	Low	Low	Low

5.4.4 Assessment of Operational Impacts

5.4.4.1 Odour and Air Contaminants

The sources of emissions from the operational phase of the proposed development will include emissions of odour from the exhaust stack of the OCU and the de-watered sludge storage area and emissions of air contaminants from combustion equipment, the OCU, the de-watered sludge storage area and road transport associated with hauling material to and from the proposed development.

A comprehensive assessment of impacts of odour and air contaminants has been undertaken and is presented in Appendix 4.1.

The odour and air quality impact assessment was undertaken using a dispersion modelling approach in accordance with recognised techniques for dispersion modelling specified in EPA's Air Dispersion Modelling Guidance Note (AG4). AERMOD was used to predict ground-level concentrations of odour and air contaminants across the model domain due to sources at the proposed development. The dispersion modelling assessment included a cumulative assessment that involved modelling sources of odour and air contaminant emissions from adjacent facilities and considering the potential impact of local sources on air quality in combination with baseline levels of air contaminants that are conservatively representative of air quality in the study area.

5.4.4.2 Traffic

This section describes the modelling methodology that was adopted to assess the potential impacts of emissions to air associated with traffic from the proposed development.

Road transport associated with a development can include emissions of several air pollutants, which are also produced by a wide range of industrial, commercial and domestic processes. The air pollutants of most concern near roads are nitrogen dioxide (NO_2) and particles (PM_{10}) in relation to human health and oxides of nitrogen (NO_x) in relation to vegetation and ecosystems.

The assessment of potential transport related air quality impacts from the proposed development was conducted using the screening method set out in the Design Manual for Roads and Bridges (DMRB) (Highways England, 2021).

The DMRB provides a framework for assessing, mitigating and reporting the effects of motorway and all-purpose trunk road projects on air quality by determining whether the impacts of a project on human health or designated habitats can trigger a significant air quality effect. The DMRB describes a methodology for the assessment of air quality from road schemes. Part LA105 sets out the requirements for assessing and reporting the effects of highway projects on air quality (Highways England, 2019). It includes assessment methodologies to consider the impact of traffic emissions from a proposed development on a range of sensitive interests including human health and ecological health including the health of protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.

The methodology includes a scoping approach that can be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the do something traffic (with the project) compared to the do minimum traffic (without the project) in the opening year. If a project triggers the traffic scoping criteria, either a simple or detailed assessment shall be required. The DMBR provides a methodology to determine whether a simple or detailed air quality assessment is required and the level of assessment is determined by the level of risk and the stage of assessment for a project.

The scoping assessment methodology described in Highways England (2019) utilises the following traffic scoping criteria that shall be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the do something traffic (with the project) compared to the do minimum traffic (without the project) in the opening year:

1) annual average daily traffic (AADT) >=1,000; or
2) heavy duty vehicle (HDV) AADT >=200; or
3) a change in speed band; or
4) a change in carriageway alignment by >=5m

The network of all roads that trigger the traffic screening criteria and adjoining roads within 200m is defined as the affected road network (ARN) (Highways England, 2019).

The proposed development will increase volumes of traffic associated with:

- The transportation of waste streams that will be delivered to and processed at the site and ultimately hauled from the site for further processing
- Staff and service vehicles attending the site.

In relation to selecting sensitive receptors to consider potential human health impacts, Highways England (2019) states:

> *Sensitive receptors shall be chosen within 200m of the ARN and include residential properties, schools and hospitals for the assessment of annual mean air quality thresholds. Where there is a risk of the short-term air quality thresholds being exceeded.*

In relation to selecting sensitive receptors to consider potential ecological impacts, Highways England (2019) states:

> *Internationally, nationally and locally designated sites of ecological conservation importance on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity (known as designated habitats) within 200m of the ARN shall be included in the air quality assessment.*

If the scoping assessment indicates that an assessment is required, Highways England (2019) provides a risk-based mechanism to determine whether a simple or detailed air quality assessment is required. The level of assessment is determined by the level of risk and the stage of assessment for a project.

A simple assessment provides sufficient information to confirm that the project does not result in any exceedances of the air quality thresholds. A detailed level of assessment is more likely where there is a risk of exceeding air quality thresholds and for the detailed design stage of the project lifecycle.

RECEIVED: 18/12/2024

5.4.5 Evaluation Criteria

5.4.5.1 Air Quality

The significance of potential air quality impacts from the operational phase of the proposed development was determined based on compliance with the limit values of the *Ambient Air Quality Standards Regulations 2022*.

The limit values of the *Ambient Air Quality Standards Regulations 2022* (S.I No. 739/2022), as amended are presented in Table 5.7. The annual average limit values for SO_2 and NO_x are for the protection of vegetation and ecosystems, respectively. All other limit values specified in Table 5.7 are for the protection of human health.

Table 5.7: Limit values of the Air Quality Standards Regulations 2011 (S.I. No. 180/2011), as amended (Based on the CAFE Directive 2008/50/EC)

Air contaminant	Averaging period	Limit value (µg/m³)	Basis of application of limit value
CO	8-hour	10000	Maximum
NO_2	1-hour	200	Not to be exceeded more than 18 times in a calendar year
	annual	40	Average
PM_{10}	24-hour	50	35th Highest
	annual	40	Average
$PM_{2.5}$	annual	25	Average
SO_2	1-hour	350	Not to be exceeded more than 24 times in a calendar year
	24-hour	125	Not to be exceeded more than 3 times in a calendar year
	annual	20	Average
NO_x	annual	30	Average

The criteria described in NRA (2011) were used to determine the significance of air quality impacts from traffic during the operational phase of the proposed development. The methodology to determine the significance of air quality impacts in NRA (2011) involves categorising the magnitude of change in concentrations of air contaminants. NRA (2011) includes definitions of impact magnitude for changes in the number of days with PM_{10} concentration greater than 50 µg/m³ and for changes in annual mean $PM_{2.5}$.

The relationship between the annual average and 1-hour average concentration is discussed in NRA (2011) which states:

The standards for nitrogen dioxide are expressed in terms of both the annual mean and the number of hours above 200 µg/m³. It is not straightforward to predict exceedances of the 1-hour standard and all models are inevitably poorer at predicting short-term peaks than they are at predicting annual mean concentrations. However, empirical data suggest that the hourly mean standard is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m³.

The relationship between the annual average and the number of exceedances of the 24-hour average concentration standard for PM_{10} is also discussed in NRA (2011) which states:

The standards for PM_{10} are expressed as the annual mean and the number of days above 50 µg/m³. Dispersion models are inherently less accurate at predicting exceedances of the 24-hour mean PM_{10} standard than for the annual mean standard. An empirical relationship between the annual mean concentration and the number of days >50 µg/m³ PM_{10} has been derived in LAQM.TG(09) and takes the form:

No. 24-hour mean exceedances = -18.5 + 0.00145 x annual mean³ + (206/annual mean)

This relationship has been adopted to determine if the impact of traffic emissions on air quality is likely to result in exceedances of the 24-hour average concentration standard for PM_{10}.

This relationship has been adopted to determine if the impact of traffic emissions on air quality is likely to result in exceedances of the 24-hour average concentration standard for PM10.

The descriptors used to define the magnitude of change in NRA (2011) are presented in Table 5.8. The air quality impact descriptors adopted from NRA (2011) to define the significance of air quality impacts is presented in Table 5.9.

Table 5.8: Definition of impact magnitude for changes in ambient pollutant concentrations (NRA, 2011)

Magnitude of Change	Annual Mean NO_2/PM_{10}
Large	Increase/decrease ≥4 µg/m³
Medium	Increase/decrease 2 - <4 µg/m³
Small	Increase/decrease 0.4 - <2 µg/m³
Imperceptible	Increase/decrease <0.4 µg/m³

Table 5.9: Air quality impact descriptors for changes to annual mean nitrogen dioxide and PM_{10} concentrations at a receptor

Absolute Concentration in Relation to Objective/Limit Value	**Change in Concentration a**		
	Small	**Medium**	**Large**
Above Objective/Limit Value With Scheme (≥40 µg/m³ of NO_2 or PM_{10})	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value With Scheme (36-<40 µg/m³ of NO_2 or PM_{10})	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value With Scheme (30-<36 µg/m³ of NO_2 or PM_{10})	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value With Scheme (<30 µg/m³ of NO_2 or PM_{10})	Negligible	Negligible	Slight Adverse

5.4.5.2 Odour

In 2020, the EPA issued its updated guidance document air quality impact assessment (known as AG4). Appendix H of this document provides guidance that is specific to the assessment of odour impacts using dispersion modelling techniques.

In relation to the odour assessment criteria, AG4 states:

> *Currently there is no general statutory odour standard in Ireland relating to industrial installations.*
>
> ....
>
> *Guidance from the UK (EA, 2011, and adapted for Irish EPA use) recommends that odour standards should vary from 1.5 – 6.0 OUE/m3 as a 98th%ile of one hour averaging periods at the worst-case sensitive receptor based on the offensiveness of the odour and with adjustments for local factors such as population density...*

Table A4 of AG4 contains indicative odour standards based on offensiveness of odour that have been adapted for use in Ireland. Relevant aspects are reproduced as follows:

- The most offensive odours should be assessed against an Indicative Criterion of 1.5 OU_E/m^3 as a 98^{th}%ile of hourly averages at the worst-case sensitive receptor
- Moderately offensive odours should be assessed against an Indicative Criterion of 3.0 OU_E/m^3 as a 98^{th}%ile of hourly averages at the worst-case sensitive receptor

- Less offensive odours should be assessed against an Indicative Criterion of 6.0 OU_E/m^3 as a 98th%ile of hourly averages at the worst-case sensitive receptor.

The industrial sectors that fit into each category are described as follows:

- Most offensive:
    - Processes involving decaying animal or fish remains.
    - Processes involving septic effluent or sludge waste sites including landfills, waste transfer stations and non-green waste composting facilities.
- Moderately offensive
    - Intensive Livestock Rearing
    - Fat Frying / Meat Cooking (Food Processing)
    - Animal Feed
    - Sugar Beet Processing
    - Well aerated green waste composting.
- Less offensive
    - Brewery / Grain / Oats Production
    - Coffee Roasting
    - Bakery
    - Confectionery.

Baseline odours, considered in this assessment are predominantly from the cattle lairage area immediately north of the site. These odours fall into the moderately offensive category. A small fraction of odours generated at the adjacent food processing facility fall into the most offensive category (e.g., from the balance tank and the sludge handling area of the wastewater treatment plant at the adjacent food processing facility).

The sources of odour at the proposed development predominantly fall into the moderately offensive category as the majority of feedstock at the site is silage, poultry manure and cattle manure. A small fraction of feedstock will result in odours that fall into the most offensive category.

Odour emissions from this feedstock will be treated in the OCU, which in addition to reducing the concentration of odour in the air exhausted, will also change the character of the odour making it less offensive. Odours generated from digestate also have the potential to fall into the most offensive category, however, the dewatering process will have the effect of reducing the odour generating potential of digestate.

The assessment adopted a highly conservative approach with the combined effect of all odours generated at the site being considered in the context of the criteria for the most offensive odours of C_{98}, 1-hour $\leq 1.5\ ou_E/m^3$.

5.4.5.3 Significance of Impacts

The assessment of impact will be based on the EPA guidance as detailed in the following table.

Table 5.10: Descriptors adopted to describe the significance of impacts

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	Positive Effects A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects ''Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).	Imperceptible An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics

Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	Extent Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.	
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it	

5.4.6 DIFFICULTIES ENCOUNTERED

There were no difficulties encountered in compiling the required information.

5.5 RECEIVING ENVIRONMENT

5.5.1 OVERVIEW

The site is located in a rural area of north Co. Dublin. The closest town to the proposed development is Lusk, which is approximately 2 km south of the site. The village of Balrothery is approximately 4 km north of the site, with the town of Balbriggan approximately 6 km north of the site. The urban areas of Skerries and Rush are each approximately 4.5 km northeast and southeast of the site, respectively. The northern most suburbs of Dublin City including Swords and Malahide are approximately 9 km south of the site. The location of the site in relation to nearby regional and urban areas is presented in Figure 5.2.

The site's western boundary is adjacent to the eastern boundary of the Country Crest Food Processing Facility. There is a cattle lairage area immediately north of the site. The site and its immediate surrounds are presented in Figure 5.3.

The terrain of the site and surrounding area is rolling rural with gently undulating areas or relatively flat land. The site has an elevation of approximately 55 metres (m) above sea level.

Figure 5.2: The site and its regional surrounds

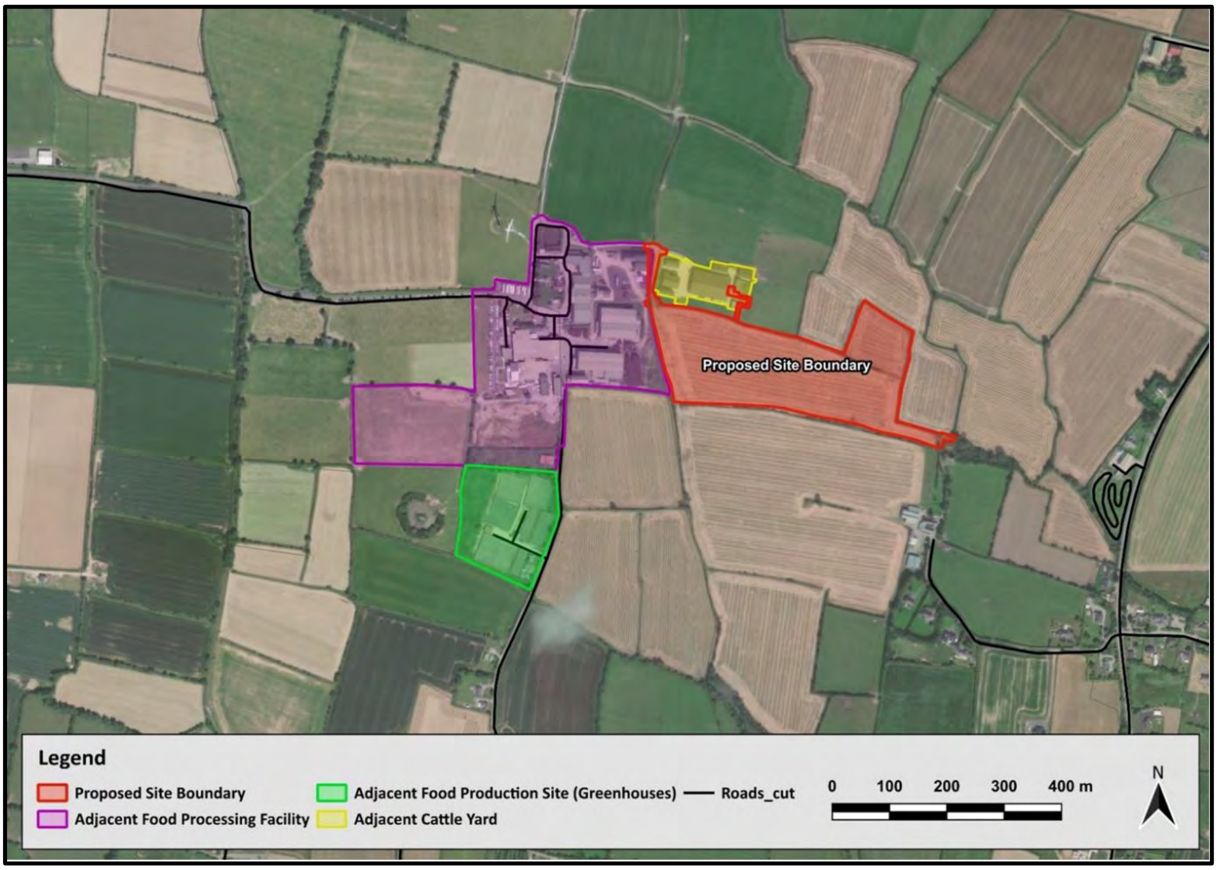

Figure 5.3: The site and its immediate surrounds

5.5.2 Local Climate and Meteorological Conditions

The dominant influence on Ireland's climate is the Atlantic Ocean. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude. The warm North Atlantic Drift has a marked influence on sea temperatures. This maritime influence is strongest near the Atlantic coasts and decreases with distance inland. The hills and mountains, many of which are near the coasts, provide shelter from strong winds and from the direct oceanic influence. Winters tend to be cool and windy, while summers, when the depression track is further north and depressions less deep, are mostly mild and less windy (Met Eireann https://www.met.ie/climate/climate-of-ireland).

The site is located in Co. Dublin, 5.5 km from the east coast of Ireland. Meteorological conditions at the site are therefore potentially affected by coastal influences, which generally occur within 10 km of the coast (EPA, 2020). Land use in the vicinity of the site can be described as agricultural and industrial land. The terrain is flat.

The nearest meteorological station operated by Met Eireann is at Dublin Airport, which is approximately 13 km southwest of the site. Dublin Airport is located approximately 9 km from the eastern coastline of Ireland. It is in a relatively flat part of Ireland with terrain that gently slopes from the higher ground to the west down to the Irish Sea to the east. The general climate (in terms of temperature, relative humidity and rainfall) and local meteorological conditions that affect dispersion (predominantly wind speed and direction) at Dublin Airport are likely to be representative of the site due to:

- The close proximity of the observation station to the Site
- The similar nature of the terrain at both locations
- The similar nature of land use at both locations
- The absence of major terrain features in the vicinity of the observation station and the Site

The climate and local meteorological conditions of the site have, therefore, been characterised using the parameters observed at Dublin Airport.

The observation station at Dublin Airport has recorded long term data that represents regional climate characteristics. Long term meteorological data reported between 1981 and 2020 at Dublin Airport is summarised in Table 5.11.

Table 5.11: Long-term average meteorological parameters from Dublin Airport between 1981 and 2010

Parameter	30-year average
Mean Temperature (°C)	9.8
Mean Relative Humidity (9 AM UTC) (%)	83.0
Mean Daily Sunshine Duration (Hours)1	3.9
Annual Rainfall (mm)	758.0
Averaged total rainfall (mm) (Summer)	196.2
Averaged total rainfall (mm) (Winter)	184.1
Average Windspeed (m/s)	5.3

Parameter	30-year average
Monthly average windspeed (m/s) (Summer)	4.46
Monthly average windspeed (m/s) (Winter)	6.1

Wind speed and wind direction are important parameters for the transport and dispersion of air pollutants from a source. A wind rose representing the annual distribution of 1-hour average winds at Dublin Airport is presented in Figure 5.4. Diurnal and seasonal windroses for Dublin Airport are presented in Figure 5.5 and Figure 5.6. The prevailing wind at Dublin Airport is from the west and southwest. Winds from the north and northeast are infrequent. The winter months are windier than the summer months. Summer months are wetter than winter months.

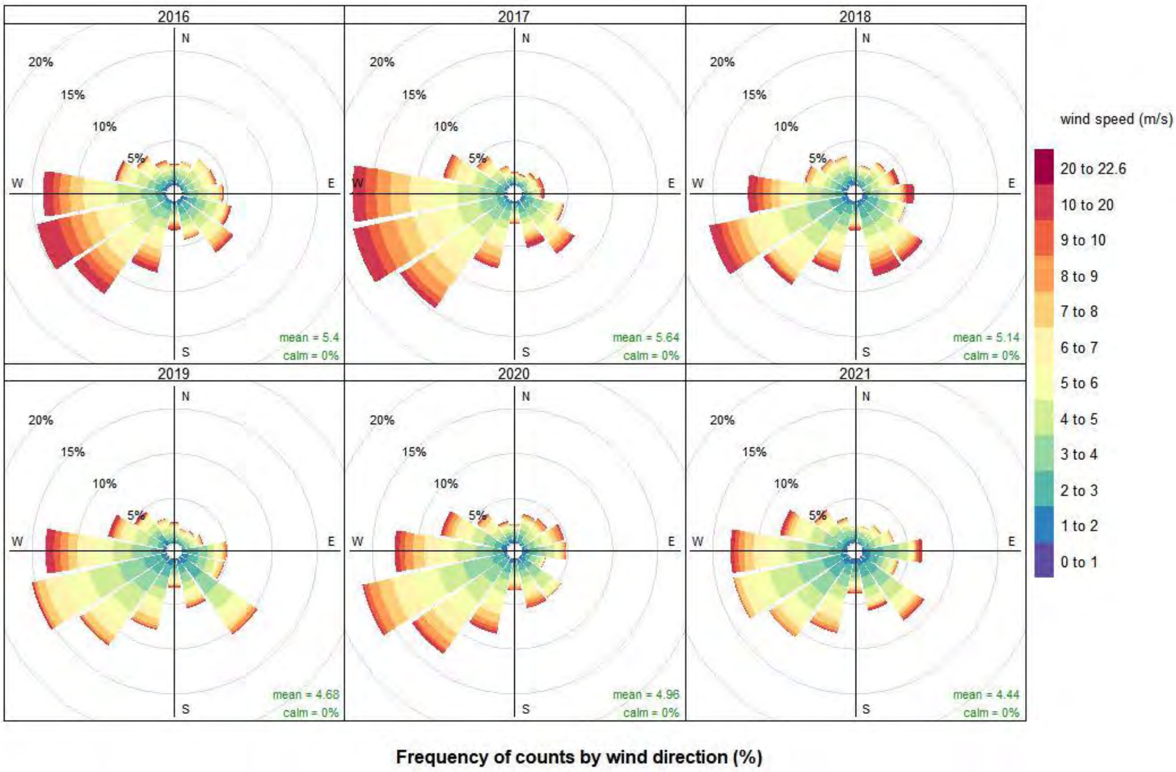

Figure 5.4: Annual windrose for Dublin Airport (Source of data: Met Eireann)

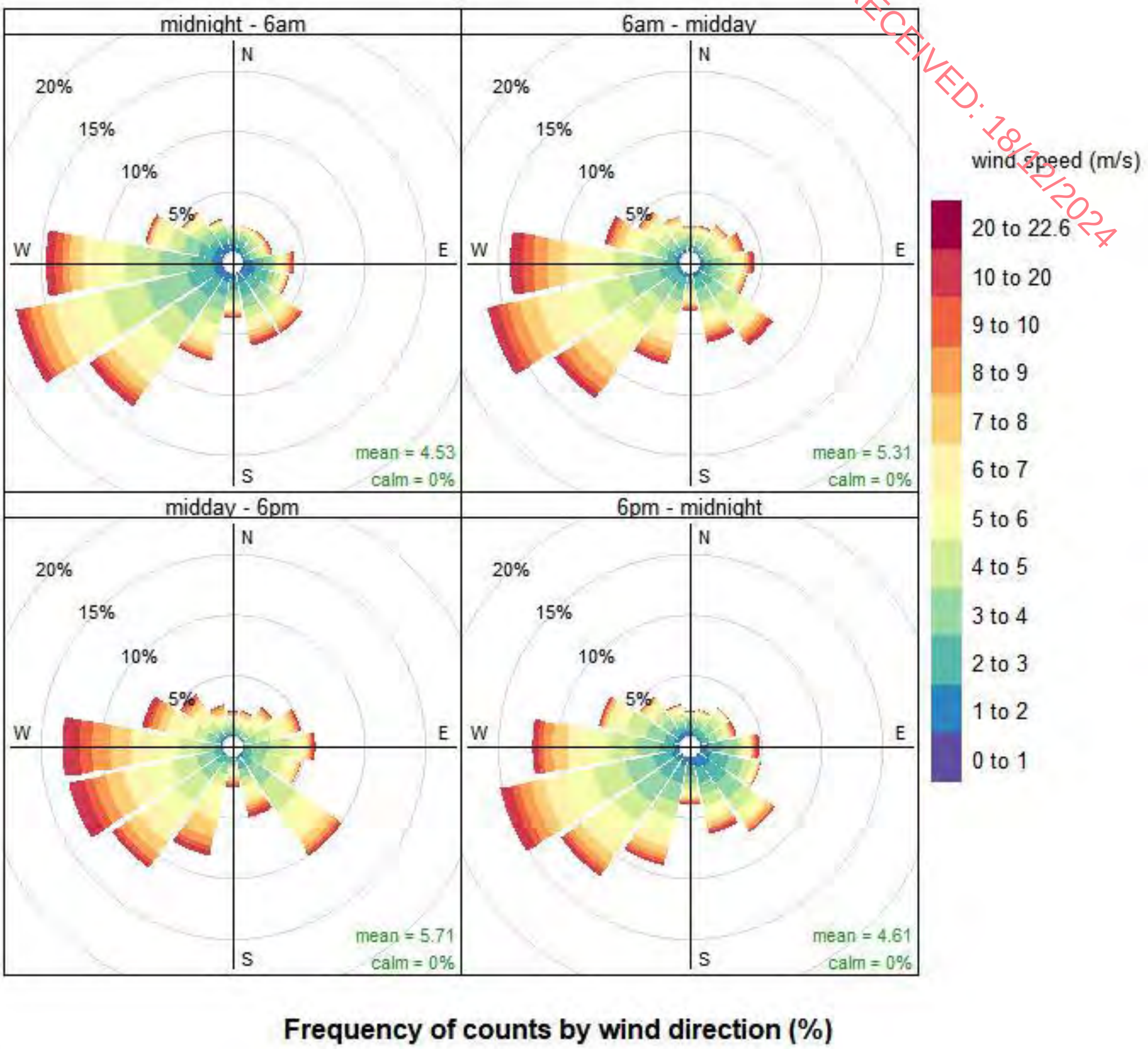

Figure 5.5: Diurnal windroses for Dublin Airport (Source of data: Met Eireann)

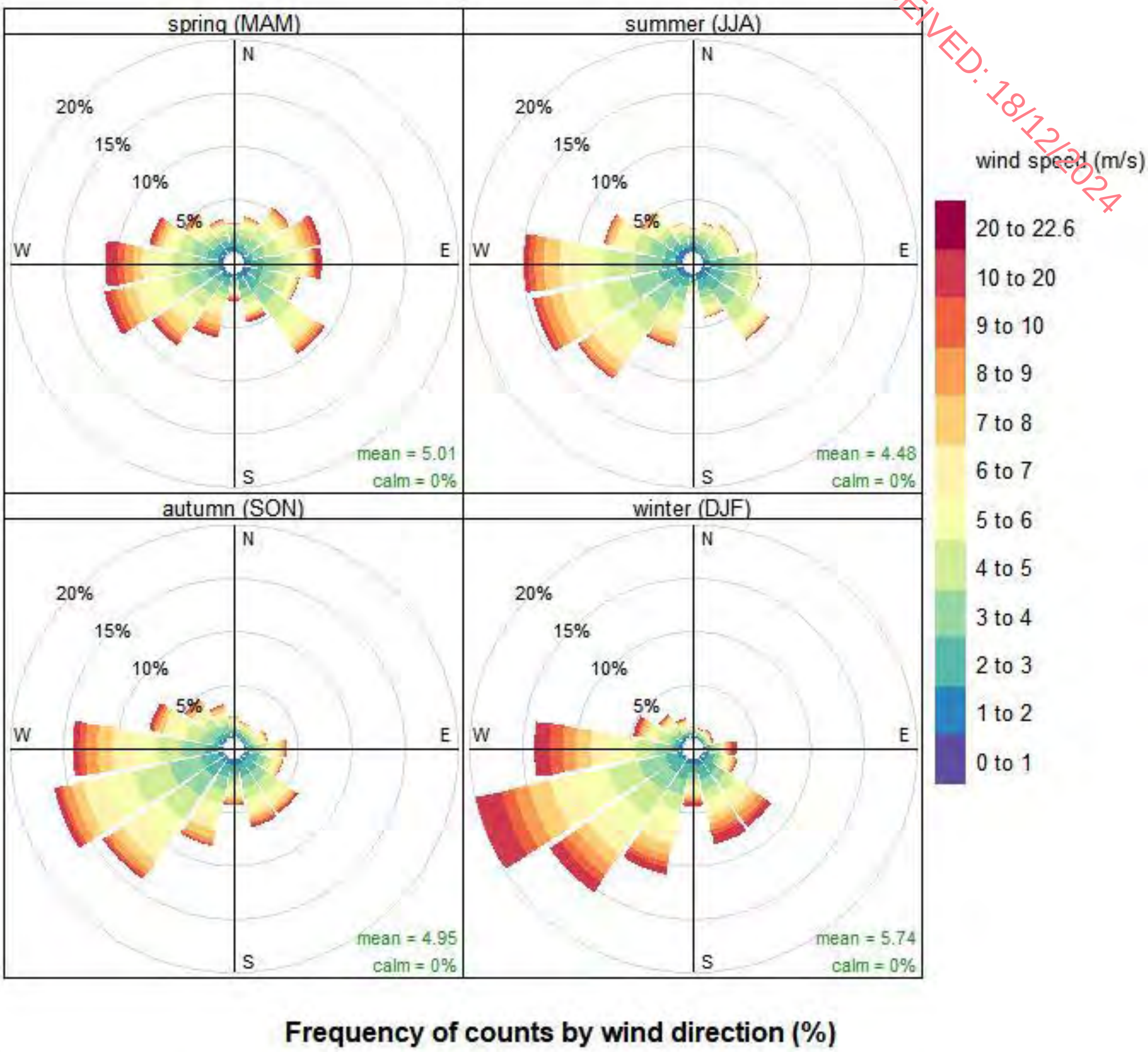

Figure 5.6: Seasonal windroses for Dublin Airport (Source of data: Met Eireann)

5.5.3 Baseline Air Quality

Under the Clean Air for Europe Directive, EU member states must designate "Zones" for the purpose of managing air quality. In Ireland, four zones are defined in the Ambient Air Quality Standards Regulations 2022 (Irish Statute Book, 2023).

Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

The proposed development is in a rural area of Zone D. It is located within 300 m of the Zone C Area surrounding Balbriggan and Balrothery; however, the closest built up residential areas of Zone C at Balrothery are 4 km north of the site. The residential areas of the Zone D town of Lusk are approximately 2 km south of the site. The Zone A area of Swords is approximately 9 km south of the site.

Urban monitoring at locations in Zone D towns shows significantly higher baseline levels of air contaminants compared with monitoring locations in Zone D rural areas. Research published by the EPA demonstrates that baseline air quality levels outside of Zone D towns fall with distance, dropping to levels that are typical of Zone D rural areas within 2 km of residential areas of these towns (Donnelly, 2019).

Considering the proximity of the study area to residential areas of Zone A, Zone C and Zone D, baseline air quality in the study area has been based on monitoring data from Zone D and the closest air monitoring stations on EPA's Air Monitoring Network to the study area in Zone A, namely:

- EPA's Air monitoring Station at Swords (10 km South of the site)
- EPA's Air monitoring Station at Dublin Airport (13 km South of the site)

This provides a conservative representation of baseline air quality in the study area.

A comprehensive description of the development of baseline air quality in the study area is presented in Appendix 4.1. A summary of the background data that is relevant to the study area for the proposed development is provided in Table 5.12.

Table 5.12: Summary Statistics for baseline air quality adopted in the air quality impact assessment (for details see Appendix 4.1)

Pollutant	**Averaging period**	**Value (µg/m3)**	**Source**
Nitrogen dioxide	1-hour	111.7	2nd highest 1-hour average observed concentration of NO2 from any Zone D Location between 2019 and 2023
	Annual	17	The maximum annual average concentration of NO2 from any Zone D Location between 2019 and 2023
PM_{10}	24-hour	41.21	Third highest value from Carrick-on-Shannon, Askeaton, Claremorris, Kilkitt and Malin Head between 2019 and 2023
	Annual	12.8	Maximum from Carrick-on-Shannon, Askeaton, Claremorris, Kilkitt and Malin Head between 2019 and 2023
$PM_{2.5}$	Annual	7.0	Maximum from Carrick-on-Shannon, Askeaton, Shannon Estuary or Malin Head between 2019 and 2023
Sulphur Dioxide	1-hour	103.2	Maximum from Zone D (excluding Letterkenny

Pollutant	Averaging period	Value (µg/m3)	Source
			observations) between 2019 and 2023
	24-hour	27.8	Maximum from Zone D (excluding Letterkenny observations) between 2019 and 2023
	Annual	6.3	Maximum from Zone D (excluding Letterkenny observations) between 2019 and 2023
Carbon Monoxide	8-hour	3,700	Maximum concentration measured at any Zone A, Zone B, Zone C or Zone D location between 2019 and 2023
Note: 1 UK DEFRA and EPA advise that the 36th high 24-hour mean process contribution can be added to the annual mean background PM10 for modelling purposes			

5.5.4 SENSITIVE RECEPTORS

The sensitive human receptors that are of greatest interest are residential and commercial locations in close proximity to construction and operational activities at the site and ecologically sensitive locations that are potentially impacted by emissions from the proposed development.

The sensitive residential and commercial receptors included in the assessment are presented in Figure 5.7.

The ecologically sensitive receptors included in the assessment are presented in Figure 5.8.

Further details of the sensitive receptor locations are presented in Appendix 4.1.

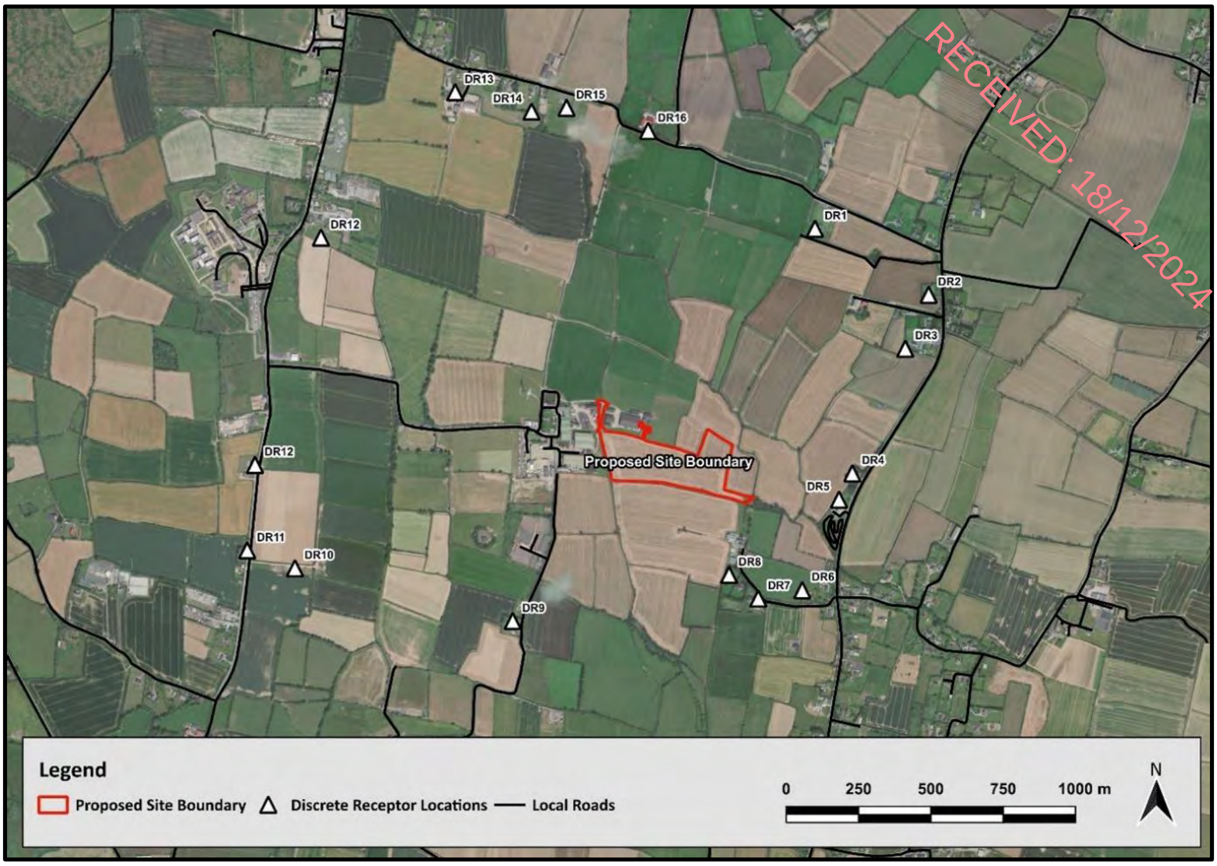

Figure 5.7: Modelled residential/commercial discrete receptor locations

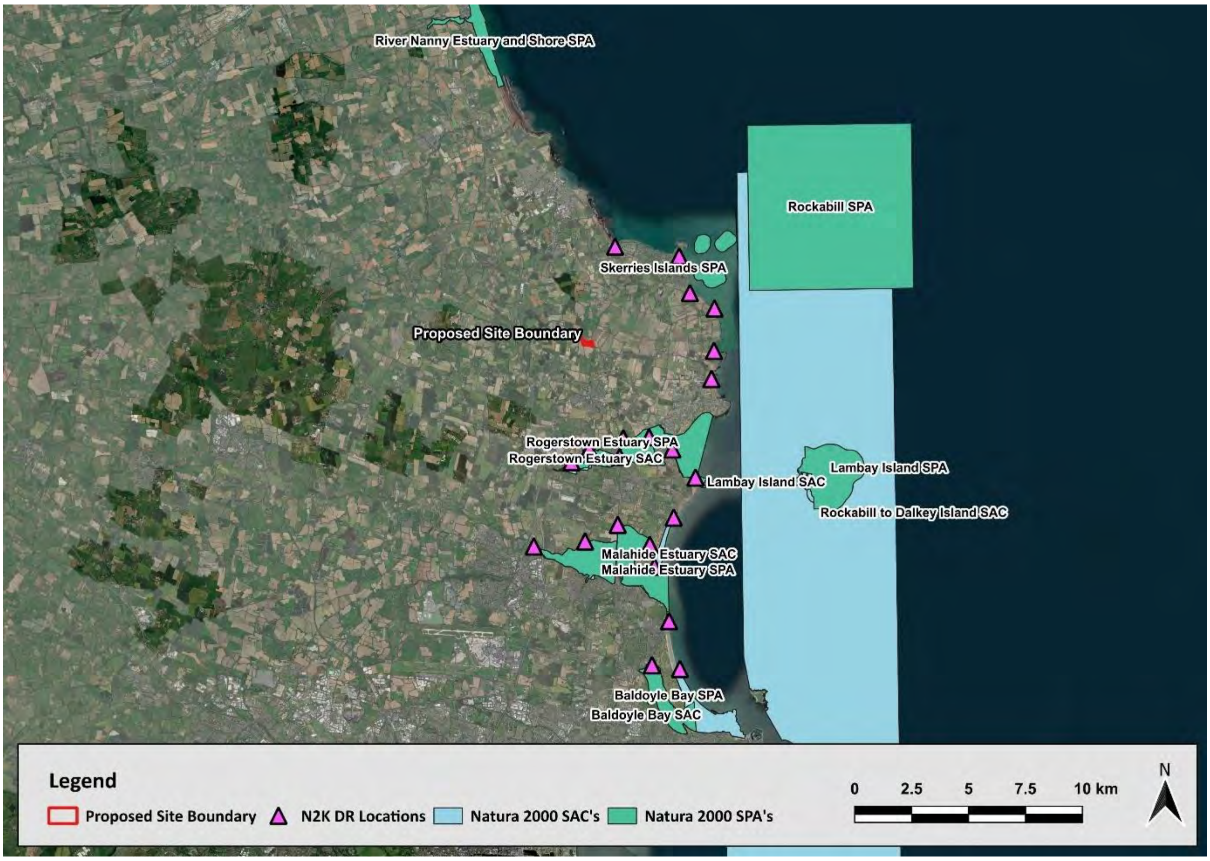

Figure 5.8: Modelled ecological receptors and discrete receptor locations representing these ecological receptors

5.6 PREDICTED IMPACTS

5.6.1 DO-NOTHING

In the do-nothing scenario, no development of the site will take place. Air quality at the site will remain at baseline levels. Baseline air quality levels at the site will change with time in line with general trends in air quality for the site and the wider surrounding area.

5.6.2 CONSTRUCTION PHASE – DO-SOMETHING

The potential impact of both dust and vehicle emissions during the construction phase of the proposed development have been considered. Dust emissions can lead to elevated PM_{10} and $PM_{2.5}$ concentrations and may also cause dust soiling. The predominant emission of concern from the construction phase of the proposed development will be from the generation of dust. Potential temporary impacts on air quality associated with the construction stage are dusts and vehicle exhaust emissions. Dusts are likely to arise from the following activities (IAQM, 2024):

- Earthworks
- Wind blow from temporary stockpiles
- Handling of construction materials
- Landscaping
- Construction traffic movements (Trackout)

The screening assessment, conducted in accordance with in IAQM (2024), indicates that a more detailed assessment is required as there are human receptors within 350 m of the boundary of the site and within 50 m of the routes used by construction traffic.

There are no ecological receptors within 50 m of the boundary of the site or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

The effect of the construction phase of the proposed development on ecological receptors can, therefore, be screened out meaning that the effects are **negligible, negative and temporary**.

The air quality assessment of the construction phase of the proposed development on senstive human locations was conducted for the following phases of construction:

- Demolition
- Earthworks
- Construction
- Trackout.

There will be no demolition activities associated with the construction phase of the proposed development.

Earthworks are required to facilitate the levelling of the site, the installation of a drainage network and installation of foundations and piles. The maximum land area on which earthworks will take place is greater than 18,000 m² but less than 110,000 m². According to IAQM (2024) size categories, earthwork activities are classified as medium.

The construction phase will involve the various site infrastructure. The volume of buildings that will be constructed is over 75,000 m³. According to IAQM (2024) size categories, the construction phase of the proposed development is classified as large.

Earthworks and construction will involve the removal of topsoil and excavated inert material and delivery of construction materials using heavy duty vehicles (HDVs). The maximum number of HDVs on any one day will be between 10 and 50. According to IAQM (2024) size categories, trackout is classified as medium.

A summary of the size of each construction activity for the purpose of adopting IAQM (2024) guidance is presented in Table 5.13.

Table 5.13: Summary of the size of each construction activity

Activity	Size	Magnitude Of Activity	Unit of Activity
Demolition	Not applicable		m³ of structures demolished
Earthworks	Large	>18,000	m² of earthworks area
Construction	Medium	>75,000	m³ of construction buildings
Trackout	Medium	10 to 50	maximum number of vehicles per day

Earthworks, construction and trackout will not take place in close proximity to sensitive locations. The closest residential receptors are over 250 m from the site boundary. There are no sensitive residential locations within 100 m of the site boundary. According to IAQM (2024) residential locations are classified as "highly sensitive receptor" in terms of potential dust soiling effects and to health effects on people.

Considering the baseline level of PM_{10} and the number of receptors affected, the sensitivity of the area to adverse impacts of PM_{10} at the construction phase of the proposed development is low. In terms of dust soiling, the area would also be considered to be of low sensitivity as there no sensitive receptors within 100 m of the site boundary.

According to IAQM (2024) the sensitivity of the area to dust soiling and human health impacts is low due to earthworks and construction activities due to:

- The significant distance between earthworks and construction activities and sensitive locations
- The low number of sensitive locations in proximity to the site
- Baseline PM_{10} levels are below 24 µg/m³.

Considering the magnitude of dust emissions and sensitivity of the area to dust impacts from earthwork activities, the unmitigated risk of dust impacts is classified as:

- A low risk for dust soiling impacts
- A low risk for health effects of PM_{10}

Considering the dust emissions magnitude and sensitivity of the area to dust impacts from construction activities, the unmitigated risk of dust impacts is classified as:

- A low risk for dust soiling impacts
- A low risk for health effects of PM_{10}

Trackout activities will take place along a private road link that provides access to adjacent facilities and the site. There are no sensitive locations along this road link. Consequently, the impact of trackout is negligible and requires no further consideration.

A summary of the unmitigated risk of dust impacts from various construction activities is presented in Table 5.14.

Table 5.14: Summary of the unmitigated risk of dust impacts from various construction activities

Construction Activity	Dust Soiling	Health Effect PM_{10}
Demolition	n/a	
Earthworks	Low Risk	Low Risk
Construction	Low Risk	Low Risk
Trackout	Low Risk	Low Risk

The unmitigated impact of construction on air quality can be described in terms of dust soiling as **negative, imperceptible and temporary** effects. The unmitigated impact of construction on air quality can be described in terms of health impacts as **negative, imperceptible and temporary** effects.

Mitigation will not be required to reduce potential impacts of construction activities to levels that can be described as not significant.

5.6.3 OPERATIONAL PHASE – DO SOMETHING

5.6.3.1 Traffic

Traffic also has the potential to impact air quality. The UK DMRB guidance (UK Highways Agency, 2019a) states that the road links meeting one or more of the following criteria can be defined as ‘affected’ by a proposed development and should be included in a local air quality assessment.

- Annual average daily traffic (AADT) changes by 1,000 or more
- Heavy duty vehicle (HDV) AADT changes by 200 or more
- A change in speed band
- A change in carriageway alignment by 5m or greater.

The operational phase traffic will not increase by 1,000 AADT or 200 HDV AADT and, therefore, the proposed development does not meet the above scoping criteria. As a result, a detailed air assessment of operational stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality from traffic emissions.

The potential impact of the operational phase of the proposed develop on air quality due to changes in traffic is, therefore, found to be **imperceptible, negative and long-term**.

5.6.3.2 Air Quality

The activities at the site involving the combustion of biogas are associated with the generation of emissions to air in two onsite biogas boilers and an onsite CHP unit. There will also be emissions to air from the handling or feedstocks in the feedstock reception building and from the storage of de-watered digestate in the de-watered digestate storage area.

The impact of these sources at the proposed development was considered using dispersion modelling techniques configured in accordance with regulatory guidance (see appendix xx).

The impact of emissions of combustion gases from the proposed development in isolation on sensitive residential and commercial receptors and across the study area were determined to be within the guidance limits for air contaminants. The greatest increase in annual average concentrations of NO_2 at any of the modelled nearby sensitive receptors was 0.55 $\mu g/m^3$. According to the NRA, 2011 guidance the magnitude of the change in air quality impacts of the proposed development is therefore small. The annual average concentrations of NO_2 across the study area resulting from the proposed development in isolation are less than 1 $\mu g/m^3$, which is well below the annual average limit for NO_2 of 40 $\mu g/m^3$. The overall impact is, therefore, negligible.

The impact of the proposed development in isolation on sensitive ecological receptors was therefore determined to be **insignificant, negative and long-term.**

Considering the proximity of the proposed development to adjacent facilities, which emit the same air contaminants, cumulative impact assessment is required to determine the potential for adverse air quality impacts on the modelling domain.

The impact of emisssions of ammonia from the proposed development in isolation (including sources of combustion, the odour control unit and the de-watered sludge holding area) were determined to be less than the de-minimis threshold of 1% of the applicable guidance level for ammonia at sensitive ecological receptors included in the dispersion modelling assessment and are, therefore, considered to be insignificant.

The impact of nitrogen deposition resulting from deposition of oxides of nitrogen (NO_x) exhausted from combustion sources plus the deposition of ammonia (NH_3) from the sources of combustion, the odour control unit and the de-watered sludge holding area were determined to be less than the de-minimis threshold of 1% of the applicable guidance level for ammonia and are, therefore, considered to be insignificant.

The impact of the proposed development on sensitive ecological receptors was, therefore, determined to be **insignificant, negative and long-term.**

In summary:

- A cumulative impact assessment is required to determine the potential for adverse effects of emissions of combustion from the proposed development on sensitive residential and commercial receptors and and across the study area
- The impact of the proposed development on sensitive ecological receptors was, therefore, determined to be **insignificant, negative and long-term.**

5.6.3.3 Odour

The activities at the site that are associated with the generation of odorous emissions involve the handling and temporary storage of feedstocks and the storage of de-watered digestate.
The unmitigated impact of the proposed development was considered to have the potential to result in odorous emissions that could results in adverse impacts that could be described as **significant, negative and long-term**.

5.6.4 Cumulative Impacts

The proposed development is adjacent to a food processing facility and a cattle yard. Emissions from these facilities have the potential to result in adverse impacts on air quality in the study area and were therefore directly included in the dispersion modelling assessment.
Cumulative impacts were considered for all sources of NO_2 and odour that may impact sensitive locations in combination with sources of odour at the proposed development and for all sources of commercial/industrial combustion at the proposed development and adjacent facilities.

5.6.4.1 Air Quality

The greatest increase in annual average concentrations of NO_2 at any of the modelled nearby sensitive receptors was 0.55 µg/m³. According to the NRA, 2011 guidance the magnitude of the change in air quality impacts of the proposed development is therefore small. The annual average concentrations of NO_2 across the study area resulting from the proposed development in combination with emissions from adjacent facilities and a baseline NO_2 levels that representative of the study area are well below the annual average limit for NO_2 being between 17 µg/m³ and 18 µg/m³ (limit is 40 µg/m³). Combining the magnitude of impact with the predicted concentration of NO_2, which is well below the criteria level, the overall impact is descriptor is negligible.

The impact of the proposed development on air quality in the study area is, therefore, described as **negligible, negative and long-term**.

5.6.4.2 Odour

The unmitigated impact of the proposed development was considered to have the potential to result in odorous emissions that could results in adverse impacts that could be described as significant, negative and long-term. The cumulative impact of unmitigated odour emissions from the proposed development in combination with sources of odour from adjacent facilities, therefore, could also result in adverse odour impacts that could be described as **significant, negative and long-term**.

An odour abatement unit will be installed as part of the proposed development to mitigate potential effects of odorous emissions.

5.7 MITIGATION MEASURES

5.7.1 CONSTRUCTION PHASE MITIGATION

The unmitigated impact of construction on air quality can be described in terms of health impacts as **negative, negligible and temporary** effects. The unmitigated impact of construction on air quality can be described in terms of nuisance impacts as **negative, negligible and temporary** effects. Therefore, no additional mitigation is required to further reduce operational impacts on air quality.

5.7.2 OPERATIONAL PHASE MITIGATION

Odour mitigation will be required as part of the proposed development. Odour mitigation will include the full enclosure of the feedstock reception building and the digestate dewatering building with emissions exhausted to an odour control unit. Emissions of odour from the odour control unit will be exhausted through an OCU and stack at a height of 14.2 m to increase the dispersion of the exhausted plume and to reduce the potential impact of the exhausted emissions at ground level.

5.8 RESIDUAL IMPACTS

5.8.2.1 Air Quality

No mitigation is required to reduce the impact of air contaminaints on air quality. The residual impact of the proposed development on air quality in the study been determined to be **negligible, negative and long-term**.

The impact of the proposed development on sensitive ecological receptors was determined to be **insignificant, negative and long-term.**

5.8.2.2 Odour

The mitigated impact of emissions of odour from the proposed development in combination with sources of emissions at adjacent facilities was assessed using dispersion modelling techniques (Appendix 4.1). A number of conservative assumptions were adopted in the cumulative odour impact assessment (see Appendix 4.1)

The predicted concentrations of odour resulting from the cumulative impact of mitigated odour emissions from the proposed development in combination with sources of odour from adjacent facilities was **comply** with the most stringent odour criterion recommended by EPA of $1.5\ ou_E/m^3$ at all sensitive receptors included in the modelling assessment.

The results show that operation of the OCU and its associated stack will ensure that levels of impact identified in the assessment in terms of odour will be minimised to levels that are **not significant, negative and long-term.**

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6.0 CLIMATE

Katestone Environmental Ireland completed the climate chapter of the EIAR to examine the potential effects of the proposed development on climate and the vulnerability of the proposed development to potential effects of climate change.

The nature of the proposed development has the potential to offset greenhouse gas emissions in numerous ways including the generation of biogas to replace an equivalent amount of natural gas derived from fossil fuels and the generation of digestate that replaces mineral fertilisers. The proposed development will also result in the generation of greenhouse gas emissions from activities such as combustion of biogas and the haulage and transport of feedstocks.

An assessment was conducted that:

- Quantified the baseline climate for the study area
- Considered the impact of the construction phase on climate using a qualitative approach
- Considered the impact of the operational phase of the proposed development on climate by calculating net greenhouse gas emissions (greenhouse gas emissions offset and generated as a result of the proposed development) as a proportion of Ireland's predicted national greenhouse gas emissions in the opening and design year.

The level of impact of the construction phase of the proposed development will be **insignificant, negative and long-term.**

The level of impact of the operational phase of the proposed development on climate change will be **imperceptible, positive and long-term.**

The level of impact of climate change on the proposed development will be **imperceptible, negative and long-term.**

6.1 INTRODUCTION

This chapter was prepared by Katestone Environmental Ireland Ltd on behalf of Country Crest ULC.
This chapter has been prepared to examine the potential effects of the proposed development on climate and the vulnerability of the proposed development to potential effects of climate change.
It identifies the prevention and mitigation measures that are and will be implemented to reduce the significance of the potential impacts and assesses the residual potential impacts.

6.2 AUTHOR INFORMATION AND COMPETENCY

The assessment was completed by Dr. Micheal Fogarty and Simon Welchman of Katestone. Micheal is a Director of Katestone with 15 years of experience in Ireland and Australia. He holds a B.Eng, M.Eng and PhD from the UCD College of Engineering and Architecture. He specialises in the areas of air quality and odour impact assessment. Simon has been a director of Katestone since 2004 with more than twenty-nine years of experience working as an air quality expert in the private sector and for the environmental regulator in New South Wales.

6.3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is defined in Chapter 1 Introduction of Volume 2 of this EIAR and a detailed description of the proposed development is set out in Chapter 3 of Volume 2 of this EIAR.

The proposed development will involve the construction and operation of an anaerobic digestion plant. The anaerobic digestion process (AD Process) will involve the acceptance of a range of process input materials including:

- 7,000 tonnes per annum of poultry litter
- 1,080 tonnes per annum of cattle manure
- 650 tonnes per annum of vegetable processing byproducts
- 100 tonnes per annum of food processing byproducts
- 400 tonnes per annum of draff Grains
- 10,000 tonnes per annum of whole crop silage
- 24,500 tonnes per annum of grass silage
- 17,080 tonnes per annum of slurry
- 1,300 tonnes per annum of WWTP sludge

Feedstocks that are delivered to the site will either be stored or processed immediately. Whole crop silage and grass silage will be stored in a structure that will be built as part of the proposed development. The structure is a series of eight sileage clamps each separated by a concrete wall. The seven northernmost clamps will be used for the storage of whole crop silage and grass silage. All other materials will be accepted in an enclosed feedstock reception building on a 'just-in-time' basis for immediate use in the AD Process.

The European Union's Renewable Energy Directive III (2023/2413) referred to here as RED III renewable energy policy aims to contribute to achieving the Union's climate change mitigation objectives in terms of the reduction of greenhouse gas emissions. In the pursuit of that goal, it is essential to also contribute to wider environmental objectives and in particular the prevention of biodiversity loss, on which the indirect land use change associated with the production of certain biofuels, bioliquids and biomass fuels has a negative impact. The silage component of the feedstock will be subject to the sustainability criteria of RED III. Adhering to the sustainability criteria of RED III ensures that the biogas generated as part of the proposed development is considered renewable.

To start the AD Process, all feedstocks will be accepted, unloaded, temporarily stored and mixed before being fed into a sealed digester tank (called the Digester Power Ring). Primary digestion and secondary digestion will occur within the sealed Digester Power Ring. Digestion is the breakdown of biodegradable materials in the absence of oxygen, which results in the formation of biogas, liquid digestate and solid digestate. Feedstock from the Digester Power Ring will be fed into a second AD Tank (called the Power Digest) for further secondary digestion.

Biogas is a mixture of methane, carbon dioxide and trace quantities of other gaseous contaminants such as sulphides, amines, ammonia and mercaptans. The biogas will be extracted from the AD tanks and processed to remove gaseous contaminants. A portion of the biogas will be fed to onsite combustion units including a combined heat and power (CHP) plant and two dual fuel boilers. The heat and electrical energy generated from these installations will be used to meet the energy requirements of the anaerobic digestion process. The remainder of the biogas will be fed to a gas upgrade unit (GUU) that will:

- Separate the biogas into pure methane and carbon dioxide gas streams
- Process the methane gas stream to a sufficient standard for injection into Ireland's gas network grid.

The carbon dioxide stream will be transferred to a unit for liquefaction. Liquefied CO_2 has a wide range of uses in industries including food processing and pharmaceutical production.

Digestate will be pasteurised before it is dewatered in an enclosed building resulting in a dewatered digestate solid fraction and a liquid digestate fraction.

The southernmost silage clamp will be used for the storage of the solid fraction of the dewatered digestate. The liquid digestate fraction be transferred to sealed lagoons for storage in the easternmost part of the Site.

6.4 METHODOLOGY

6.4.1 RELEVANT GUIDELINES

The general EIA guidelines and legislation are listed in Chapter 1. All specific legislation and guidelines relevant to climate that were taken into account in the preparation of this chapter are discussed in this section. These legislation and guidance documents provide the general principles and suitable methods to complete the climate assessment including:

- European Commission (2019) 2030 climate & energy framework.
- European Commission (2013) The EU Strategy on adaptation to climate change.
- European Commission (2021) Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change.
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- European Commission (2009a) Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
- EPA (2019) Integrating climatic factors into the strategic environmental assessment process in Ireland - A Guidance Note.

The following is a list of publications and data that were used in the preparation of this climate assessment:

- Biosurf - S. Majer, K. Oehmichen and F. Kirchmeyr (2016) D5.3 Calculation of GHG Emission Caused by Biomethane.
- EPA, (2022) Ireland's Provisional Greenhouse Gas Emissions
- EPA, (2024) Ireland's Greenhouse Gas Emissions ProjectionsRelevant Legislation

6.5 RECEIVING ENVIRONMENT

6.5.1 GREENHOUSE GAS EMISSIONS

Ireland's Final Greenhouse Gas Emissions 1990-2023 (EPA, 2024) presents a detailed summary of national emissions for 1990 together with an overview of national emissions from 1990 until 2023. Ireland's national GHG emissions for 2023 were estimated to be 55,010 ktCO2-e (excluding Land Use, Land-use Change and Forestry or LULUCF).

EPA published a report titled *Ireland's Greenhouse Gas Emissions Projections 2023-2050 in 2024* (EPA, 2024). This report provides an assessment of Ireland's total projected greenhouse gas emissions from 2023 to 2050, updated using the latest inventory data for 2023. The report also provides an assessment of Ireland's progress towards achieving its emission reduction targets for 2020 and 2030 as set out under the EU Effort Sharing Decision (ESD)[1] and Effort Sharing Regulation (ESR)[2]. Ireland's Greenhouse Gas Emissions Projections 2023-2050 data are presented in EPA (2024).

EPA (2024) sets out Ireland's National Policy Position on GHG emissions. In order to achieve Ireland's commitment to realising a climate neutral economy by 2050, the Climate Action and Low Carbon Development (Amendment) Act 2021 provides for the establishment of carbon budgets as interim milestones on this trajectory. The 51% target is the primary constraint on carbon budgets over the course of the first two budget periods ending on 31 December 2030, relative to 2018 emissions.

Ireland's Climate Act ambition of a 51% emissions reduction by 2030, including LULUCF (compared to 2018) is not projected to be achieved. The projections show that implemented policies and measures in the With Existing Measures (WEM) scenario can only deliver an 11% reduction in greenhouse gas emissions by 2030 compared to the 2018 level. The WEM scenario, including policies and measures from the 2024 Climate Action Plan, is projected to deliver a 29% emissions reduction over the same period (EPA, 2024).

As well as defining legally binding emission reduction commitments, the Climate Action and Low Carbon Development (Amendment) Act (DECC, 2021) will support Ireland's transition to net-zero and the achievement of a climate neutral economy no later than 2050. It also establishes a legally binding framework with clear targets and commitments, to ensure the necessary structures and processes are in place to deliver our national, EU and international climate goals and obligations in the near and long term.

In light of the increase in ambition under the Climate Action Plan, significant additional measures have been introduced, to be undertaken across the whole of Irish society and across the economy, in order to achieve the level of change required to meet the 2030 target. The Climate Action Plan also assumes full implementation of the 2019 plan. In the medium term, Ireland is not projected to meet its 2030 target under the Climate Action and Low Carbon Development (Amendment) Act.

The binding annual greenhouse gas emission target for Ireland under the EU Effort Sharing Regulation (ESR) EU/2018/842 for non-ETS sectors is a reduction of 30% in emissions by 2030 compared to 2005 levels. This target will be amended following the European Council's decision to increase ambition from its existing EU-wide 2030 target of a 40% reduction to at least 55%, compared to 1990 levels. Annual greenhouse gas emissions for non-ETS sectors were 47,869 kt CO_2 eq in 2005 (SEAI, 2021). According to Ireland's obligation under the ESR, Ireland's greenhouse gas emission target for non-ETS sections is 33,508 kt CO_2 eq in 2030.

The binding annual greenhouse gas emission target for Ireland under the Climate Action and Low Carbon Development (Amendment) Act is a reduction of 51% in emissions by 2030 compared to 2018 levels. Annual greenhouse gas emissions for Ireland were 60,242 kt CO_2-e in 2018 (comprised of 13,441 kt CO_2-e of ETS emissions and 46,801 kt CO_2-e of non-ETS emissions). According to Ireland's obligation under the Climate Action and Low Carbon Development (Amendment) Act Ireland's greenhouse gas emission target is 29,886 kt CO_2-e in 2030.

The baseline greenhouse gas emissions for the assessment were taken from EPA (2024) and are presented in Table 5.1. The data reported in 2024, with additional measures, includes measures from the Climate Action and Low Carbon Development (Amendment) Act.

[1] Decision No 406/2009/EC of 23 April 2009 (EC, 2009)
[2] Regulation (EU) 2018/842 (EC, 2018)

Table 6.1: Baseline greenhouse gas emissions adopted in the assessment

Projected GHG emissions	Year	non-ETS emissions (kt CO_2-e)	Total emissions (kt CO_2-e)
Projected GHG emissions (with existing measures)	2025	45,466	57,394
Projected GHG emissions (with additional measures)	2025	45,031	56,959
Projected GHG emissions (with existing measures)	2043	35,832	43,679
Projected GHG emissions (with additional measures)	2043	27,374	33,075

6.5.2 CLIMATE VULNERABILITY

In addition to the potential impact of the proposed development on climate change as a result of GHG emissions, the potential vulnerability of the proposed development to the impacts of climate change is considered in this chapter.

The baseline climate of the receiving environment is described the Air Quality Chapter. The identification of future climate impacts, vulnerabilities and risks are identified in Fingal County Council's Climate Action Plan 2024 – 2029 (Fingal County Council, 2024) and include:

Increased frequency and intensity of:

- Extreme rainfall
- Wind speeds
- Heat waves
- Dry spells
- Cold snaps
- Intense storms

Changes to:

- Fluvial processes
- Pluvial processes
- Coastal flooding and erosion

6.6 POTENTIAL EFFECTS

6.6.1 DO NOTHING

In the do-nothing scenario, no development of the site will take place. Greenhouse gas emissions:

- From the proposed development would not occur
- Offset due to anaerobic digestion at the proposed development would not occur without:
    - Alternative feedstock treatment processes
    - Alternative sources of natural gas

6.6.2 CONSTRUCTION

The construction phase of the proposed development will result in emission of GHG to the atmosphere associated with:

- The combustion of fossil fuels in onsite machinery and equipment
- Embodied emissions in construction materials

The construction phase will take place over a relatively short period of time. The scale and extent of the proposed development will not result in the generation of significant quantities of GHG emissions. The potential impact of the construction phase of the proposed develop on climate is found to be **imperceptible, negative and temporary.**

6.6.3 OPERATIONAL PHASE

The operational stage of the proposed development will result in greenhouse gas emission:

- Offsets
- Generation

The operational stage of the proposed development will result in greenhouse gas emission:

- Offsets
- Generation

The net impact of the proposed development will be determined as the greenhouse gas emissions generated minus the emissions offset. The quantity of emissions generated and offset was determined based on data presented in the BIOSURF (BIOmethane as SUstainable and Renewable Fuel) Project.
BIOSURF is an EU-funded project under the Horizon 2020 programme for research, technological development and demonstration. The objective of BIOSURF is to increase the production and use of biomethane (from animal waste, other waste materials and sustainable biomass), for grid injection and as transport fuel, by removing non-technical barriers and by paving the way towards a European biomethane market (BIOSURF, 2016).

BIOSURF provides guidance on calculation of GHG emissions caused by biomethane. BIOSURF states that GHG emissions caused by biomethane will be:

- Generated as a result of the use of grass silage and whole crop silage as feedstock in the AD Process.
- Offset as a result of the use of poultry litter, manure, slurry food by-products and sludge in the AD Process

The emission factors adopted from BIOSURF for the sources and offsets of GHG emissions associated with the use of slurry in the AD process are presented in Table 6.2. This emission factor was adopted for all slurry, poultry litter, manure food by-products and sludge that will be used as feedstock in the AD Process at the proposed development.

Table 6.2: Emission factors adopted from BIOSURF for the sources and offsets of emissions GHG associated with the use of slurry in the AD

Source/Offset	Emission factor gCO_2-eq.*MJ^{-1} biomethane
Electricity demand	8.98
Heat demand	0.04
Methane losses	4.74
Transport of substrates	0.51
Avoided emissions from untreated slurry storage[1]	-68.81
Credit digestate	-
Net emission factor	-54.54
1 The 'avoided emissions from untreated slurry storage' was presented as a minimum and maximum range in BIOSURF (2016). The average of the range was adopted as the emission factor in this assessment	

The emission factors adopted from BIOSURF for the sources and offsets of GHG emissions associated with the use of silage in the AD process are presented in Table 6.3.

Table 6.3: Emission factors adopted from BIOSURF for the sources and offsets of emissions GHG associated with the use of silage (wholecrop and grass) in the AD process

Source/Offset	Emission factor gCO_2-eq.*MJ^{-1} biomethane
Electricity demand	9.37
Heat demand	0.03
Methane losses	6.42
Transport of substrates	1.08
Substrate production	24.1
Credit digestate	-5.37
net emission factor	35.63

It has been assumed that the biomethane will be generated in the same proportion to the input rates of feedstocks. Feedstocks were, therefore, allocated to the emission factor that was applied to that feedstock. Based in this assumption, 55.5% of biomethane generated is attributed to sileage (grass and whope crop) and 44.5% of biomethane is generation is attributed to slurry, litter, by-products and sludge.

The parameters used to determine the total GHG emissions generation at the site from the generation of biomethane from sileage and slurry, manure, food by-product and sludge are presented in Table 6.4.

Table 6.4: Parameters used to determine the total GHG emissions generation/offsite at the site from the generation of biomethane from sileage and slurry/manure/food by-product/sludge

Parameter	**Value**	**Unit**
Methane Produced per annum[1]	4,778,951	Nm^3/annum
Methane Produced per annum - Slurry/Manure/sludge	2,124,406	Nm^3/annum
Methane Produced per annum - Crops	2,654,545	Nm^3/annum
Natural Gas NCV	35.67	MJ/m^3
Methane Produced per annum - Slurry/Manure/sludge	75,777,551	MJ/annum
Methane Produced per annum - Crops	94,687,631	MJ/annum
Total Emissions Offset - Slurry/FYM/Waste	-54.54	gCO_2-eq.*MJ-1 biomethane
Total Emissions - Sileage	35.63	gCO_2-eq.*MJ-1 biomethane
Total Emissions Offset - Slurry/FYM/Waste	-4133	tCO_2-eq.
Total Emissions Generated - Sileage	3374	tCO_2-eq.
Net GHG Emissions	-759	tCO_2-eq.

[1] Supplied by Country Crest ULC

The GHG emissions associated with the biomethane injected onto the national grid (thereby offsetting the use of fossil fuel generated natural gas) is not accounted for in the GHG emissions generated/offset at the site. The emission factor adopted to determine the GHG offset was published by the Sustainable Energy Authority of Ireland for GHG emissions from the combustion of natural gas in Ireland (SEAI, 2024). The emissions of GHG offset from biomethane injected onto the national grid is presented in Table 6.5.

Table 6.5: Emissions of GHG offset from biomethane injected onto the national grid

Parameter	**Value**	**Unit**
Methane Produced per annum	4,469,239	Nm^3/annum
Natural Gas EF (GHG)	2.021	$kgCO_2$/m3
Net GHG emission due to Natural Gas Offset	-9032.3	tCO_2/Annum

[1] SEAI (2024) Ireland's Energy Statistics – Conversion Factors https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors

Emissions of greenhouse gasses at the operational phase of the proposed development and the proportion of these emissions as a percentage of Ireland's GHG emissions projections are presented in Table 6.6.

Table 6.6: Emissions of greenhouse gasses at the operational phase of the proposed development and the proportion of these emissions as a percentage of Ireland's GHG emissions projections

Parameter	**Opening Year (2025)**	**Design Year (2043)**
	kt/Year - CO2e	
Operational Emissions (NET)	-9.8	-9.8
Projected non-ETS GHG emissions (with additional measures)[1]	45,031	27,374
GHG emissions from the proposed development as a percentage of projected non-ETS emissions (with additional measures)	-0.02%	-0.04%
[1] From EPA (2024) Ireland's Greenhouse Gas Emissions Projections. 2023 - 2050		

The quantity of operational GHG emissions from the proposed development were estimated and found to be imperceptible and positive in the opening year and the design year in the context of Ireland's projected non-ETS emissions for the opening and design years. The potential impact of the operational phase of the proposed develop on climate is found to be **imperceptible, positive and long-term**.

6.6.4 Climate Vulnerability

The potential effects of climate change on the proposed development are discussed in this section. The processes will require a considerable amount of water. Water availability is likely to have the most significant impact on operation of the proposed development in terms of:

- Anaerobic digestion
- Cleaning operations – water relied upon for the majority of cleaning operations

It is highly unlikely that changes in windspeed, rainfall intensity and temperature caused by climate change will have a significant effect on the operational stage of the proposed development.

The level of impact of climate change on the proposed development will be **imperceptible, negative and long-term.**

6.7 PREVENTION & MITIGATION MEASURES

6.7.1 Construction Stage

The impact of GHG emissions resulting from the construction stage of the proposed development on climate was determined to be insignificant. Therefore, no additional mitigation is required to further reduce operational impacts on climate; however, practices should still be put in place to minimise GHG emissions, where possible. GHG emissions at the construction phase of the proposed development will result from construction traffic, the use of fossil fuels to power onsite equipment and the generation of onsite waste. Emissions from these activities can be minimised through:

- Planning to optimise schedules and haul routes for the delivery and removal of construction related materials
- Efficient use of construction equipment and resources
- Minimisation of waste generated from construction activities

6.7.2 Operational Stage

The impact of GHG emissions resulting from the operational stage of the proposed development on climate was determined to be imperceptible and positive as many of the operational processes offset greenhouse gas emission production in other sectors. Therefore, no additional mitigation is required to further reduce operational impacts on climate. The proposed development does incorporate a number of measures that will minimise emissions of greenhouse gasses such as:

- The use of renewable biomass in place of the combustion of fossil fuels for the generation of onsite heat for the yeast production process
- The reuse of wastewater produced generated as part of the adjacent food production process

6.8 RESIDUAL IMPACTS

6.8.1 Construction Stage

The level of impact of the construction phase of the proposed development will be **insignificant, negative and long-term.**

6.8.2 Operational Stage

The level of impact of the operational phase of the proposed development on climate change will be **imperceptible, positive and long-term.**

The level of impact of climate change on the proposed development will be **imperceptible, negative and long-term.**

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7.0 NOISE

7.1 INTRODUCTION

Country Crest ULC. proposes to construct an anaerobic digester and all ancillary site works and services at Collinstown, Lusk, County Dublin. The proposed development would occur within a greenfield site currently in the ownership of the applicant.

Panther Environmental Solutions Ltd was commissioned by Country Crest ULC. to carry out a Noise Impact Assessment in support of an Environmental Impact Assessment Report (EIAR).

The study identifies, describes and assesses the impact of the proposed development in terms of noise, in particular, the potential noise impacts on residential locations (noise sensitive receptors) in the vicinity of the proposed development.

7.2 LEGISLATIVE CONTEXT

Planning and Development Act 2000 (S.I. No. 30 of 2000), as amended

Local authorities are responsible for the planning and environmental regulation of any proposed developments. The current planning and environmental regulatory framework requires these developments to comply with the Planning and Development Act (2000) and related regulations.

The local authorities and An Bord Pleanala attach conditions relating to environmental management of these developments to planning permissions granted. Local authorities consider the land use and planning issues associated with the proposed developments in their County Development Plans.

The EPA Act (Noise) Regulations 1994 (S.I. No. 179 of 1994)

The relevant part of the Environmental Protection Agency Act 1992 dealing with noise is Part VI, Sections 106 to 108. These Sections deal with the control of noise, the power of local authorities to prevent or limit noise and the issue of noise as a nuisance.

The 1994 Regulations came into effect in July 1994 and outline the procedures for dealing with noise nuisance. The Regulations allow affected individuals, local authorities or the EPA to take action against an activity causing a noise nuisance.

These Regulations replaced the procedures for noise complaints contained in the Local Government (Planning & Development) Act 1963. Companies must show that reasonable care was taken to prevent or limit the noise from their activities.

If the courts decide that a company is responsible for causing a noise nuisance, they can order the company to take measures to reduce, prevent or limit it.

EPA 'Guidance Note on Noise (NG4)' (2016)

It deals in general terms with the approach to be taken in the measurement and control of noise and provides advice in relation to the settling of noise Emission Limit Values (ELVs) and compliance monitoring. In relation to production facilities and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELV's at the nearest noise-sensitive receptor:

Table 7.1: EPA (NG4) Recommended Standard Noise Limits for Industry

Period	Times	Standard dB(A)
Day	(07:00 to 19:00hrs)	55dB $L_{Ar,T}$
Evening	(19:00 to 23:00hrs)	50dB $L_{Ar,T}$
Night	(23:00 to 07:00hrs)	45dB $L_{Aeq,T}$

Other EPA general EIA guidelines such as Guidelines on the Information to be Contained in Environmental Impact Assessment Reports [2022] and Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements) [2003] have been considered in the preparation of this Noise and Vibration Chapter.

EPA Licencing

The existing site is not licensed by the Environmental Protection Agency, but the applicant intends to apply for an Industrial Emissions Licence, which would set environmental noise emission limits for the site.

BS5228:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise

There is currently no statutory guidance in Ireland relating to the maximum permissible noise level for a project's construction phase. Current guidance on permissible noise levels is therefore considered somewhat limited. In the absence of any statutory guidance or other specific limits prescribed by relevant authorities, an appropriate best practice measure has been adopted as the standard for this project.

Best practice guidelines are taken from the British Standard BS 5228 – 1: 2009 (+A1 2014): *'Code of Practice for Noise And Vibration Control On Construction And Open Sites – Noise'*. BS 5228 sets out an approach for setting appropriate construction noise limits for residential dwellings, but it does not provide guidance for commercial or office buildings.

The BS 5228 *'ABC Method'* calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded, indicates that a potential noise impact is associated with the construction activities.

Table 7.2: Threshold of Potential Significant Effect

Assessment category and threshold value period	Threshold value, in decibels (LAeq, T)		
	Category A[(a)]	Category B[(b)]	Category C[(c)]
Night-time (23.00−07.00)	45	50	55
Evenings and weekends[(d)]	55	60	65
Daytime (07.00−19.00) and Saturdays (07.00−13.00)	65	70	75
NOTE 1: A potential significant effect is indicated if the LAeq, T noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.			

NOTE 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total LAeq, T noise level for the period increases by more than 3 dB due to site noise.
NOTE 3: Applied to residential receptors only.

a) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.
b) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.
c) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.
d) 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

7.3 NOISE ASSESSMENT METHODS

7.3.2 Baseline Noise Assessment Methodology

Baseline noise monitoring was carried out in general accordance with the EPA, 2016 "*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (*NG4*)".

7.3.2.1 Monitoring Locations

The baseline environmental noise levels at NM1 – NM4 locations were determined by instrumented monitoring of existing noise levels. This was determined by taking 30-minute broadband noise measurements at these four noise monitoring locations.

It is considered that noise levels measured at each of the NM locations would be representative of existing noise levels at nearest residential property or Noise Sensitive Locations (NSL).

Table 7.3: Noise Monitoring Locations

Ref. No.	Grid Ref	Location Type	Location
NM1	O 20939 56269	Noise Monitoring Location	585m SW of the site
NM2	O 21717 56528	Noise Monitoring Location	160m S of the site
NM3	O 22110 56741	Noise Monitoring Location	395m E of the site
NM4	O 21977 57756	Noise Monitoring Location	900m NE of the site

- Grid Ref Source: http://irish.gridreferencefinder.com

These monitoring points are mapped in *Attachment 7.2*.

All measurements were taken at:

- 1.2 – 1.5 metres height above local ground level
- 1.0 – 5.0 metres away from reflective surfaces

7.3.2.2 Instrumentation

The equipment used for the noise monitoring was a Cirrus CR:171B Sound Level Meter (serial no: G071199), a Cirrus CR:831C Sound Level Meter (serial no: D21509FF), two MK:224 Microphones (serial no: 216368A & 203215A) and a CR:515 Acoustic Calibrator (serial no: 54060).

The CR:171B and its corresponding MK:224 were calibrated externally on the 4th of June 2024 & 23rd of May 2024, respectively.

The CR:831C and its corresponding MK:224 were calibrated externally on the 9th & 8th of August 2023, respectively.

The CR:515 was calibrated externally on the 4th of June 2024.

A calibration check of 94 dB(A) at 1kHz was carried out on the instrument before and after measurement. The calibrator is a Class 1 grade, which conforms to IEC 60942:2003.

For the CR:171B Sound Level Meter the calibration offset before the assessment was noted to be -0.34 dB, while the calibration offset after the assessment was noted to be -0.87 dB. This equates to a drift of 0.53 dB.

For the CR:831C Sound Level Meter the calibration offset before and after the assessment was noted to be 0.20 dB, which equates to a drift of 0 dB.

The difference between the initial calibration value, any subsequent calibration check, and a final calibration checks on completion of measurements did not exceed 0.53 dB, and the instrument calibration was found to be satisfactory.

Certifications of calibration are provided in *Attachment 7.1*.

7.3.3 Noise Prediction Methodology

ISO 9613-2:1996

The noise prediction methodology used in this report is based upon the international standard ISO 9613-2 "*Attenuation of Sound during Propagation Outdoors*".

This standard outlines a method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources.

The central formula for this calculation is as follows:

$$\mathbf{A = A_{div} + A_{gr} + A_{bar} + A_{misc}}$$

Where:

A is the attenuation due to site conditions
A_{div} is the attenuation due to the geometrical divergence (distance from source)
A_{gr} is the attenuation due to the ground effect
A_{bar} is the attenuation due to a barrier
A_{misc} is the attenuation due to miscellaneous other effects as appropriate

This attenuation factor is then subtracted from the predicted park activity noise at the proposed activity. The resultant figure is the predicted noise from the proposed activity at a given noise monitoring location.

This figure may then be added logarithmically to the existing background noise at the noise monitoring location to attain the predicted noise level if the proposed activity were to begin.

Relevant Formulae

In order to carry out this predictive analysis, the following attenuation characteristics have been taken into account:

Divergence – A_{div}

The geometrical divergence accounts for the spherical spreading in the free field from the point sound source, causing attenuation due to the inverse square law. Divergence is calculated as follows:

$$A_{div} = 20.\mathbf{Log}\left(\frac{\mathbf{d}}{\mathbf{do}}\right)$$

Where:

d is the distance from the source to the receiver (meters)

d_o is the reference distance (1-meter) or distance from source to monitoring point (meters)

Predictive Assessment Locations

Using the outline formula above, predictive analysis was carried out for the following closest noise sensitive receptors (NSR's) in the vicinity of the proposed development site:

Table 7.4: Noise Sensitive Receptors

Ref.	Grid Ref X	Grid Ref Y	Location Type	Location
NSR1	321703	256555	Noise Sensitive Receptors	Residential property located 130m south of the site boundary.
NSR2	322058	256688		Residential property located 330m east of the site boundary.
NSR3	322111	256782		Residential & commercial property located 395m east of the site boundary.
NSR4	321667	256418		Residential property located 270m south of the site boundary.
NSR5	321697	256392		Residential property located 290m south of the site boundary.
NSR6	321735	256354		Residential property located 325m south of the site boundary.
NSR7	321762	256325		Residential property located 360m south of the site boundary.
NSR8	321937	256357		Residential property located 395m southeast of the site boundary.
NSR9	322013	256463		Residential property located 370m southeast of the site boundary.

NSR10	322011	256444		Residential property located 375m southeast of the site boundary.
NSR11	322015	256420		Residential property located 395m southeast of the site boundary.
NSR12	321996	256385		Residential property located 400m southeast of the site boundary.

Grid Ref Source: https://irish.gridreferencefinder.com/

These NSR's are mapped in Attachment 7.3.

7.3.4 Source Noise Specifications

7.3.4.1 Construction Phase

A typical construction programme for such a development would take approximately 18 months.

Delivery movements and on-site machinery noise would likely occur during Phases 2-4, with peak movements during Phase 3. The following table contains a breakdown of the likely construction phases.

Table 7.5: Construction Phases

Phase	Likely Noise Sources
Phase 1 – Site Preparation	• Stripping of topsoil for concrete extension. • Cut and fill activities.
Phase 2 – Foundation Works	• The import and rolling of hardcore material. • The import, screeding and planning/ finishing of concrete.
Phase 3 – Framework Construction	• Installation of main structure I-beam/girder framework. • Installation of pre-cast concrete walls;
Phase 4 – Walls & Roofs	• Installation of steel purlins, girts and bracing framework. • Installation of insulated wall and roof cladded sheets.
Phase 5 – Finishing and Commissioning	• Installation of rooftop ventilation. • Installation of internal lighting and electrical system;

Depending upon the ground conditions encountered during construction and the contractor appointed, the methodology for the construction programme may vary. A review of standard noise values for various construction plant and equipment from the British Standard 5228-1:2009+A1:2014 has therefore been undertaken.

The construction plant and machinery will change as the project develops, with plant and equipment only operating within any particular section of the site for a relatively short period of time.

Table 7.6 contains typical noise levels from various construction plant that would be used during the construction phase. These standard noise emission data, recalculated from 10m to 1m, will be used for the purposes of the worst-case noise assessment of the proposed works.

Table 7.6: Noise Levels from Construction Phase (Ref: BS5228:2009)

Phase	Activity/Equipment	Sound Pressure at 1m LAeq	Combined Sound Pressure at 1m, LAeq
1	C2.7 Tracked Excavator (14t)	90	101 dB
	C2.28 Wheeled Loader (loading lorries)	96	
	C2.37 Roller (rolling fill)	99	
2	C2.37 Roller (rolling fill)	99	**102 dB**
	C4.4 Dumper (9T)	96	
	C4.14 Wheeled backhoe loader (9T)	87	
	C4.18 Cement Mixer Truck (discharging) (Mixing Concrete)	95	
3	C2.35 Telescopic Handler (10T)	91	101 dB
	C4.23 Small cement mixer	81	
	C4.46 Mobile telescopic crane (50T)	87	
	C4.93 Angle grinder (grinding steel)	100	
4	C2.8 Wheeled Backhoe Loader (8t)	88	99 dB
	C2.35 Telescopic Handler	91	
	C4.59 Diesel Scissors Lift	98	
5	C2.35 Telescopic Handler	91	99 dB
	C4.59 Diesel Scissors Lift	98	

$$\text{Combined} = 10.\text{Log}\sum_{i=1}^{n} 10^{L/10}$$

7.3.4.2 Operational Noise

The facility will operate 24 hours per day, 7 days a week, as Anaerobic Digestion is a continuous biological process. However, feedstock will only be accepted between the hours of 0700 and 1900 Monday to Friday, and 0700 to 1600 on Saturday. The most stringent noise impact assessment is for the Night-time period due to the significantly lower guidance noise level of 45dB compared with the Daytime level of 55dB.

Each of the potential operational noise sources were identified and reference sound power data assigned. The data has been sourced from manufacturers datasheets, noise source databases, and library data from operating units. A drawing of noise source location and specifications is provided in Attachment 7.4.

Several noise sources will be installed inside tanks, enclosures and buildings, however, as a worst case scenario and to identify key noise sources, the acoustic performance of these enclosures has not been estimated. Recommendations for the acoustic performance of these structures to attenuate the noise within, based on manufacturers datasheets and published data, will be included in this assessment.

The Flare Stack and associated Biogas Blower operate only in an emergency or for testing purposes. Their operation is expected only in exceptional circumstances and it is therefore appropriate not to include these sources in the noise impact assessment.

7.4 NOISE IMPACT ASSESSMENT

7.4.1 BASELINE NOISE MONITORING RESULTS

The table below show the daytime measurement results taken at the four noise monitoring locations (NM's) outlined in Section 7.3.1. These points are mapped in Attachment 7.2.

Associated particulars such as a description of the noise environment, dominant noise sources and any interferences/background noise recorded are also provided in the table.

Baseline monitoring was carried out by Mr. Martin O'Looney and Mr. Luis Soares of PES Ltd. For this assessment, evening monitoring was carried out between 20:50 – 22:27 on Monday 4th of November 2024, night-time monitoring was carried out between 23:19 – 01:47 Monday/Tuesday 4th/5th of November 2024, and daytime monitoring was carried out between 09:44 and 13:35 Tuesday 5th of November 2024.

Table 7.7: Baseline Noise Monitoring Summary

Ref	Time	Leq	L_{10}	L_{90}	Equipment Operational	Tonal Element
Daytime						
NM1	11:48	56.5	53.1	39.2	None	Traffic
	10:34	46.2	47.5	41.2	None	None
	11:04	52.4	52.8	42.2	None	Traffic
NM2	12:29	45.9	47.4	42.4	None	None
	09:46	47.9	49.8	43.7	None	None
	13:00	47.4	49.4	42.9	None	None
NM3	09:44	74.9	80.1	51.5	None	Traffic
	12:25	72.7	77.6	55.7	None	Traffic
	13:05	75.3	80.7	56.7	None	Traffic
NM4	10:34	63.5	57.8	42.4	None	Traffic
	11:06	64.0	59.9	42.9	None	Traffic
	11:48	55.2	59.2	43.5	None	Traffic

Table 7.7: Baseline Noise Monitoring Summary

Ref	Time	Leq	L_{10}	L_{90}	Equipment Operational	Tonal Element
Evening						
NM1	20:51	37.8	38.1	34.9	None	None
NM2	21:57	44.3	44.2	32.5	None	None
NM3	20:50	72.9	76.4	44.5	None	Traffic
NM4	21:27	57.6	51.1	34.8	None	Traffic
Night-time						
NM1	23:45	34.8	36.4	34.5	None	None
	00:16	33.3	35.1	30.6	None	None
NM2	23:00	40.2	43.2	28.3	None	None
	01:01	35.1	39.1	23.4	None	None
NM3	23:55	69.4	66.7	26.5	None	Traffic
	00:32	38.5	41.2	27.4	None	None
NM4	23:19	53.3	43.5	32.2	None	Traffic
	01:17	34.5	34.3	28.8	None	None

7.4.2 EPA (NG4) Screening - Results

7.4.2.1 Quiet Area Screening

The location of the development has been screened in order to determine if it is located in an area that could be considered a *'Quiet Area'* according to the EPA NG4 Guidance, which states: *The location of the proposed development should be screened in order to determine if it is to be located in or near an area that could be considered a 'Quiet Area' in open country according to the Agency publication Environmental Quality Objectives - Noise in Quiet Areas.*

This is achieved using the following checklist:

Table 7.8: Quiet Area Screening Checklist

Screening Question	Answer	
	Yes	No
Is the site >3km away from urban areas with a population >1,000 people?		✓
Is the site >10km away from urban areas with a population >5,000 people?		✓
Is the site >15km away from urban areas with a population >10,000 people?		✓
Is the site >3km away from any local industry?	✓	

Is the site >10km away from any major industry centre?		✓
Is the site >5km away from any national primary route?	✓	
Is the site >7.5km away from any motorway or dual carriageway?		✓
QUIET AREA?		✓
Other Relevant Comments	Multiple Local Industry: Country Crest – Adjacent west, Swords Food Park – 8.9km S, North Dublin Corporate Park – 9.6km S. M1 motorway – 2.9km west.	

7.4.2.2 Areas of Low Background Noise Screening

When an area is not identified as being *a 'Quiet Area'*, the existing background noise levels measured during the environmental noise survey should be examined to determine if they satisfy the following criteria:

- Average Daytime Background Noise Level ≤ 40dB L_{AF90}
- Average Evening Background Noise Level ≤ 35dB L_{AF90}
- Average Night-time Background Noise Level ≤ 30dB L_{AF90}

As per the levels outlined in Step 3, Chapter 4.4.2 of the EPA *Guidance Note on Noise from Scheduled Activities* (NG4), noise monitoring indicated the following during the monitoring periods:

- Average daytime background L_{AF90} noise levels did not fall below guideline levels on all monitoring points;
- Average evening background L_{AF90} noise levels did not fall below guideline levels on NM3, while all other monitoring points satisfied the set criteria;
- Average night-time background L_{AF90} noise levels did not fall below guideline levels on NM1 and NM4, while NM2 and NM3 levels satisfied the set criteria.

Table 7.9: Low Background Noise Screening Table

Reference	Period	LAeq dB(A)	L_{A90} dB(A)
NM1	Daytime	53	41
NM2		47	43
NM3		74	55
NM4		62	43
NM1	Evening	38	35
NM2		44	33
NM3		73	45
NM4		58	35

Reference	Period	LAeq dB(A)	LA_{90} dB(A)
NM1	Night-time	34	33
NM2		38	27
NM3		66	27
NM4		50	31

$\text{Average} = 10.\text{Log}\frac{1}{n}\sum_{i=1}^{n}10^{LA90/10}$ When L = Noise Level Recorded

7.4.3 Predictive Analysis – Results

7.4.3.1 Construction Phase

In order to determine the potential impact of noise from the proposed development during the construction phase, the resultant noise levels at the twelve defined noise sensitive receptors have been calculated, based on distance from the NSR to the closest boundary point. A source noise level of 102 dB has been utilized to represent *Phases 2&3* of construction, as outlined in Section 7.3.3.1 above.

Table 7.10: Construction Noise Attenuation Calculations

Receptor			Construction Source				Divergence		LAeq (dB)
Ref_R	X_R	Y_R	Ref_S	X_S	Y_S	L_S (dB)	Dist (m)	A_{div} (dB)	
NSR1	321703	256555	B1	321719	256682	102	130	42	60
NSR2	322058	256688	B2	321724	256706	102	330	50	52
NSR3	322111	256782	B2	321724	256706	102	395	52	50
NSR4	321667	256418	B1	321719	256682	102	270	49	53
NSR5	321697	256392	B1	321719	256682	102	290	49	53
NSR6	321735	256354	B1	321719	256682	102	325	50	52
NSR7	321762	256325	B1	321719	256682	102	360	51	51
NSR8	321937	256357	B1	321719	256682	102	395	52	50
NSR9	322013	256463	B1	321719	256682	102	370	51	51
NSR10	322011	256444	B1	321719	256682	102	375	51	51
NSR11	322015	256420	B1	321719	256682	102	395	52	50
NSR12	321996	256385	B1	321719	256682	102	400	52	50

$\text{Dist} = \sqrt{(X_R - X_S)^2 + (Y_R - Y_S)^2}$ when S = source & R = receptor

$A_{div} = 20.\text{Log}\left(\frac{\text{dist}}{\text{do}}\right)$ when d_o = 1m

$LAeq = L_S - A_{div}$ when L_S = source noise level

7.4.3.2 Operational Phase

In order to determine the potential impact of noise from the proposed development during the operational phase, the resultant noise levels at the twelve defined noise sensitive receptors have been calculated, based on distance from the NSR's to each of the individual noise sources as per section 7.3.3.2. *Table 7.11* provides this calculation for NSR1 only.

Table 7.11: Operational Noise Attenuation Calculation at NSR1

Source				Receptor NSR1		Divergence		L_R (dB)
Ref.	X_S	Y_S	L_S (dB)	X_R	Y_R	**Dist (m)**	A_{div} **(dB)**	
A1	321304	256861	74	321703	256555	503	54.03	19.97
A2	321292	256854	74	321703	256555	508	54.12	19.88
A3	321278	256846	74	321703	256555	515	54.23	19.77
A4	321271	256858	74	321703	256555	528	54.45	19.55
A5	321263	256872	74	321703	256555	542	54.68	19.32
A6	321275	256879	74	321703	256555	537	54.60	19.40
A7	321289	256887	74	321703	256555	531	54.49	19.51
A8	321296	256875	74	321703	256555	517	54.28	19.72
B1	321284	256863	82	321703	256555	520	54.32	27.68
B2	321283	256870	82	321703	256555	525	54.40	27.60
C1	321317	256864	78	321703	256555	495	53.89	24.11
C2	321310	256889	78	321703	256555	515	54.24	23.76
D1	321304	256886	100.3	321703	256555	518	54.29	46.01
E1	321310	256865	101	321703	256555	501	53.99	47.01
F1	321051	256885	75	321703	256555	731	57.28	17.72
F2	321255	256861	75	321703	256555	542	54.68	20.32
F3	321231	256856	75	321703	256555	560	54.96	20.04
F4	321226	256880	75	321703	256555	577	55.23	19.77
G1	321277	256825	95	321703	256555	504	54.05	40.95

Total LAeq at NSR1	**50.2**

$\text{Dist} = \sqrt{(X_R - X_S)^2 + (Y_R - Y_S)^2}$ when S = source & R = receptor

$A_{div} = 20.\text{Log}\left(\frac{\text{dist}}{\text{do}}\right)$ when d_o = 1m

$L_R = L_S - A_{div}$ when L_S = source noise level & L_R = individual noise level at receptor

$\text{Total LAeq} = 10.\text{Log} \sum_{i=1}^{n} 10^{LR/10}$ when L_R = individual noise level at receptor

Table 7.12 below provides a summary of the calculated potential impact of noise from the proposed development during the operational phase at the twelve defined noise sensitive receptors, using the methodology outlined in *Table 7.11* above. Based on this assessment, it was determined that a minimum noise reduction of 8dB on the key "D" and "E" would be required to achieve the EPA recommended night-time limit of 45 dB.

Table 7.12: Operational Noise Attenuation Calculation – Summary

Ref. Receptors	Operational Phase LAeq (dB) at Receptor	Mitigated Noise LAeq (dB) at Receptor
NSR1	50.2	44.7
NSR2	46.5	40.9
NSR3	46.2	40.5
NSR4	49.1	43.6
NSR5	48.5	43.1
NSR6	47.8	42.3
NSR7	47.3	41.8
NSR8	46.1	40.6
NSR9	46.1	40.5
NSR10	46.0	40.5
NSR11	45.8	40.3
NSR12	45.8	40.3

7.5 EVALUATION OF THE RESULTS

7.5.1 EPA (NG4) SCREENING – DISCUSSION

7.5.1.1 Quiet Area Screening

The proposed development location does not comply with all criteria, as per the checklist outlined in Table 7.8 above.

Therefore, it is considered that the development would not be located within a '*Quiet Area*', as per EPA NG4 Guidance.

7.5.1.2 Areas of Low Background Noise Screening

Noise monitoring has indicated that the average background LA_{90} noise level is above the daytime threshold level outlined in Step 3, Chapter 4.4.2 of the EPA document *Guidance Note on Noise (NG4),* as per Table 7.1 above.

Given the noise monitoring results obtained and the character of the area, it is unlikely that this area would be considered a '*Low Background Noise Area'*.

Therefore, low background recommended noise level limits would not be applicable to the site during the operational phase.

Table 7.13: Recommended Noise Limits

Period	Time Period	Limit
Daytime	07:00 to 19:00 hrs	55 dB(A)
Evening	19:00 to 23:00 hrs	50 dB(A)
Night-time	23:00 to 07:00 hrs	45 dB(A)

7.5.2 BASELINE NOISE ASSESSMENT – DISCUSSION

NM1

- This monitoring location was chosen to give a representation of the existing noise environment in the vicinity of the residential property located 600m to the south-west.
- The daytime LAeq noise level at this location was determined to be 53 dB.
- The LA_{90} noise level was determined to be 41dB, while intermittent noise levels (LA_{10}) were determined to be 52 dB.
- The elevated LAeq noise level is likely as a result of passing local traffic.

NM2

- This monitoring location was chosen to give a representation of the existing noise environment in the vicinity of NSR1 and NSR4 – NSR7.
- The daytime LAeq noise level at this location was determined to be 47 dB.
- The LA_{90} noise level was determined to be 43 dB, while intermittent noise levels (LA_{10}) were determined to be 49 dB.

NM3

- This monitoring location was chosen to give a representation of the existing noise environment in the vicinity of NSR2 – NSR3 and NSR9 – NSR12.
- The daytime LAeq noise level at this location was determined to be 74 dB.
- The LA_{90} noise level was determined to be 55 dB, while intermittent noise levels (LA_{10}) were determined to be 80 dB.
- The elevated LAeq noise level is a result of the continuous traffic along the R127 road.

NM4

- This monitoring location was chosen to give a representation of the existing noise environment in the vicinity of the residential property located 785m to the north-east.
- The daytime LAeq noise level at this location was determined to be 62 dB.
- The LA_{90} noise level was determined to be 43 dB, while intermittent noise levels (LA_{10}) were determined to be 59 dB.
- The elevated LAeq noise level is likely a result of passing local traffic along the L1165 local road.

7.5.3 PREDICTIVE NOISE ASSESSMENT – DISCUSSION

The proposed site is rural in character with residences in the area predominantly linearly aligned along the existing road network.

The principal factor influencing the mitigation of noise from the proposed development is its distance from noise sensitive receptors. Increasing distance from a noise source significantly increases the attenuation of noise as sound energy reduces by the inverse of the square of distance travelled (inverse square law).

The terrain between the closest noise sensitive receptors (NSR) and the proposed development is mainly composed of mature hedgerows and areas of grassland. For the purposes of noise attenuation, these surfaces are considered *'porous'*.

Existing made ground, such as concrete block walls, would be considered *'reflective'*. These would contribute somewhat to the mitigation of noise from on-site activities; however, most are at an insufficient height.

7.5.3.1 Construction Phase

The table below show the average ambient noise monitoring results taken at the four noise monitoring locations outlined above, rounded to the nearest 5 dB as per the BS5228 *'ABC Method'*.

Table 7.14*:* Ambient Noise Monitoring Results

Ref.	LAeq (dB)	Rounded to nearest 5 (dB)
NM1	53	55
NM2	47	50
NM3	74	75
NM4	62	60
Average	**68**	**70**

Table 7.14 shows that, when rounded to the nearest 5 dB, the daytime ambient noise levels taken at NM locations in the vicinity of the proposed site range between 50 – 75 dB, with an overall average of 70 dB.

Therefore, the site would be designated as *'Category C'* as defined in Table 7.2 and a noise *threshold* of 75 dB would apply to the construction phase of the development at the closet noise sensitive receptors.

It is anticipated that peak construction noise would be a dominant source of noise in the vicinity of the site, with the character of construction type noise being more clearly audible during intermittent impulsive noise events.

Table 7.15 below shows the difference between the calculated potential noise impact at the NSR's, taken from Table 7.11 & Table 7.12, compared to the calculated *ABC threshold* determined in above.

Table 7.15: Predicted Noise Impact at Noise Sensitive Receptors – C&D

Ref.	LAeq (dB) at NSR	ABC Limit (dB)	Difference (dB)
		Construction	
NSR1	60	75	-15
NSR2	52		-23
NSR3	50		-25
NSR4	53		-22
NSR5	53		-22
NSR6	52		-23
NSR7	51		-24
NSR8	50		-25
NSR9	51		-24
NSR10	51		-24
NSR11	50		-25
NSR12	50		-25

Similarly, Using the *Phase 2* construction source noise level of 102 dB outlined in Table 7.6 and the reduction of noise as a result of distance outlined in Table 7.10, it was possible to calculate the potential noise impact at the closest noise sensitive receptors.

As can be seen from Table 7.15 above, the calculated potential construction noise levels at the closest NSR's would range between -15 & -25 dB below the 75 dB threshold. Note that, even when applying a more conservative noise threshold of 65dB as defined to *Category A* sites, the predicted construction noise levels at all NSR's would still be below the threshold.

Construction noise levels were determined using distance calculations from the closest noise sensitive location to the closest boundary point. It is anticipated that the above calculations are an over-estimate as they do not take into consideration existing *reflective* noise barriers in the vicinity of the site.

Additionally, sound attenuating effects such as sound degradation from ground absorption, air absorption, reflections and attenuation by surfaces, foliage and topography have not been considered.

It should also be noted that these noise levels are considered a worst-case scenario, as it assumes that the construction activity of each phase are carried out simultaneously at a single boundary location (i.e. dumping and rolling of material would occur before cement mixer trucks would discharge). It is not anticipated that such an event would occur.

7.5.3.2 Operational Phase

Using the *operational* source noise levels outlined in Section 7.3.3.2, it was determined that the calculated combined noise level at the closest noise sensitive receptors were in excess of the 45 dB EPA Night-time noise limit, based on the reduction of noise as a result of distance alone, outlined in *Table 7.12*.

The key items of equipment were identified as D1 – Feeding system hammer mill and E1 – Feeding system HPZ. It was determined that a minimum 8 dB reduction in these noise sources would achieve the criteria noise level at receptor locations.

These units would be enclosed in the Feeding System building, which would be of standard industrial unit construction; steel frame and insulated panel wall and roofs. It is recommended that selected insulated panels exhibit a minimum Sound Reduction Index (Rw) of 15 dB. This is well within the range of standard insulated panel roof and wall constructions, which can achieve Rw values in the range of 20 – 30 Rw without additional noise dampening layers.

Provided appropriate materials are selected, it has been determined that the combined source noise from the operation of the site would comply with recommended environmental noise limits.

Therefore, it is predicted that facility operational noise would not have a significant impact upon noise sensitive locations.

7.5.3.3 Vehicle Operations - Discussion

Large vehicles, such as tractors and lorries, typically generate noise levels of 75 – 95 dBA, depending on their size. Noise from deliveries would likely be of the similar noise intensity and character.

It should be noted that noise from agricultural vehicles is a normal part of rural life and thus, the subjective impact of noise from this source would not normally be expected to result in nuisance. Agricultural vehicle / HGV noise would be expected to result in disturbance where the engine noise is abnormal, particularly loud, occurring over a long period of time or very frequently, occurring at unsociable hours or the activity being conducted is perceived by the neighbour to be unnecessary.

Maximum noise levels at the site are expected to be equivalent to noise levels experienced during the operation of large agricultural machinery within the existing surrounding farmland and farmyard, or other adjacent agricultural lands. Maximum noise levels within the site would not be increased above current maximum noise levels in the area, due to agricultural machinery being commonplace.

Noise from the operation of large plant or delivery vehicles would occur for short periods of the normal workday (i.e. engine noise while manoeuvring on-site). Therefore, these noise levels would occur only during short periods of operation.

It is recommended that deliveries and collections be limited to normal working hours so as not to significantly alter the noise environment during more sensitive periods. Deliveries and collections should be limited to 0700 and 1900 Monday to Friday, and 0700 to 1600 on Saturday.

It is recommended that all vehicle operators be informed of site noise controls, to keep high revs to a minimum and to comply with on-site speed limits.

7.6 NOISE ASSESSMENT CONCLUSIONS

As a result of this baseline noise survey and predictive analysis on the potential impact of the proposed development on noise at sensitive receptors, the following conclusions have been made:

- The proposed development location does not comply with all criteria, as per the checklist outlined in Table 7.8. Therefore, it is considered that the development would not be located within a '*Quiet Area*'.

- The baseline assessment indicates that daytime, evening and night-time monitored background noise levels (LA_{90}) at the four monitoring locations exceeded the low background noise criteria outlined in EPA (NG4) guidance.

  Given the noise monitoring results obtained and the character of the area, this area would not be considered a '*Low Background Noise Area*'.

- When rounded to the nearest 5 dB, the daytime ambient noise levels taken at NM locations in the vicinity of the proposed site range between 50 – 75 dB, with an overall average of 70 dB.

  Therefore, the site would be designated as *'Category C'* as per the BS 5228 *'ABC Method'* and a noise *threshold* of 75 dB would apply to the construction phase of the development.

- Similarly, using the *Phase 2* construction source noise level of 102 dB, the calculated potential construction noise levels at the closest noise sensitive receptors would range between -15 & -25 dB below the 75 dB threshold.

- During the operational phase of the development, operating noise levels would comply with the EPA recommended night-time noise limit of 45 dBA. Provided recommendations are implemented, there would be no significant alteration to the existing noise environment at noise sensitive receptors.

7.7 MITIGATION MEASURES

7.7.1 MITIGATION – CONSTRUCTION

No noise impacts would be anticipated during the construction phase of the proposed development. However, the following good practice noise control measures should be implemented by the construction works contractor for the duration of construction works:

- Plant and machinery used on-site would comply with the EC (Construction Plant and Equipment) Permissible Noise Levels Regulations, 1988 (S.I. No. 320 of 1988). All noise producing equipment would comply with S.I. No 632 of 2001 European Communities (Noise Emission by Equipment for Use Outdoors) Regulations 2001;
- All construction activities would take place between 7:00am and 19:00pm, Monday to Friday, and 7:00am to 13:00pm on Saturdays. Any works which, by necessity, are

required to be carried out outside of these times would be notified to the relevant bodies and any potentially effected local residents in good time and prior to specified works commencing;

- No plant used on site would be permitted to cause an ongoing public nuisance due to noise;
- Where required, screens or barriers would be installed to shield particularly noisy activities;
- Deliveries would be organised to arrive during daytime hours (between 7:00am and 19:00pm, Monday to Friday, and 7:00am to 13:00pm on Saturdays);
- Care would be taken when unloading vehicles to minimise noise disturbance. Materials should be lowered, not dropped, insofar as practicable and safe;
- Regular maintenance would be carried out on all construction equipment, machinery and vehicles;
- Construction plant would be operated in accordance with the operator's instructions;
- Engine and machinery covers would be maintained in good working order and would remain closed whenever machinery is in use;
- Where practicable, all mechanical plant would be fitted with effective exhaust silences and pneumatic tools fitted with mufflers or silencers;
- Any generators required would be silenced or of sound reduced models fitted with acoustic enclosures;
- Construction plant would be selected, where possible, with low inherent potential for the generation of noise;
- Construction plant would be switched off or throttled back to a minimum when not in use;
- Staff personnel would be instructed to avoid unnecessary revving of machinery;
- All contractor vehicles will use existing site access roads and surfaces of hard standing.
- Site roads will be maintained in a clean condition and the site speed limit of 15 km/hr will be strictly adhered to.
- Site personnel would notify the Project Manager in the event equipment or plant becomes defective, resulting in high noise emissions. Any defective plant would be kept out of service until the necessary repairs are undertaken.

Cognisance should be taken of the National Roads Authority's "*Guidelines for the Treatment of Noise and Vibration in National Road Schemes*", the British Standard 5228: Part 1 "*Code of practice for Noise Control on Construction and Open Sites*" and the CIRIA 2015 "*Environmental Good Practice on Site*".

Temporary acoustic screening should be employed by the contractor where excessive noise is foreseen over extended duration.

Noise monitoring should be undertaken in the event of a complaint or during critical periods of construction works, including rock breaking during foundation excavation (should it arise).

The noise levels should be compiled in a technical report available for inspection, along with comment on applicable noise limits. and contractors working on-site.

All noise mitigation measure should be included in the site induction for all workers and contractors.

7.7.2 MITIGATION – OPERATIONAL

No noise impacts are anticipated during the operational phase of the proposed development. However, the following good practice measures should be followed for the operational phase:

- Insulated panel construction for the Feeding System building should comply with a minimum Sound Reduction Index (Rw) of 15 dB.

- Deliveries and collections, should be restricted to normal working hours (7:00am and 19:00pm, weekdays, 07:00am to 16:00pm, Saturday). Any operations which, by necessity, are required to be carried out outside of these times should be notified to any potentially affected local residents in good time and prior to specified works commencing;

- Regular maintenance would be carried out on all equipment, machinery and vehicles to ensure that potential noise disturbance from such sources would be kept to a minimum;

- All onsite workers, hauliers and contractors be informed of site noise controls, to keep high revs to a minimum and to comply with on-site speed limits.

7.8 RESIDUAL NOISE

Following implementation of the recommended noise mitigation measures, there would be no significant impact to the noise environment at noise sensitive receptor locations.

7.9 REFERENCES

- ISO 9613-2:1996 *Attenuation of Sound during Propagation Outdoors*.

- BS 4142:2014 *Methods for Rating and Assessing Industrial and Commercial Sound*.

- National Roads Authority, (2004). *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*.

- EPA (2016) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).*

- BREF Document for Intensive Rearing of Poultry or Pigs (2017) Reference Document for the Intensive Rearing of Poultry or Pigs.

- EN BS 5228-1:2009 *Code of practice for noise and vibration control on construction and open sites*.

- Grant S. Anderson and Ulrich J. Kurze, "*Outdoor Sound Propagation*," Chpt. 5 in Noise and Vibration Control Engineering – Principals and Applications, edited by L.L. Beranek and I.L. Vér, (John Wiley & Sons, NY, NY 1992).

- Joint Research Centre "*Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry and Pigs*" Draft 2, European IPPC Bureau, August 2013.

8.0 LANDSCAPE & VISUAL

8.1 INTRODUCTION

This section of the EIAR provides an assessment of the likely landscape and visual impacts of the proposed development at Collinstown, Lusk, Co Dublin. This desk-based assessment involved a detailed review of all plans, sections and elevations of the proposed scheme and various publications and reports.

A Visual Impact Assessment (VIA) was also undertaken by ACSU, which assessed the visual obstruction and intrusion of the proposed development in order to measure the impacts on the landscape and visual amenity. The VIA involved a desktop study as well as fieldwork.

8.2 METHODOLOGY

This assessment is made with regard to the vulnerability of the landscape to change and to the location of visual receptors relative to the proposed development. The methodology used in the assessment is based on the EPA's "*Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2022*", "*Advice Notes on Current Practice in the preparation of Environmental Impact Statements (Draft), 2015*" and on the Landscape Institute and the Institute of Environmental Management and Assessment publication *Guidelines for Landscape and Visual Impact Assessment, 2013*.

8.2.1 BASELINE STUDY METHODOLOGY

The desktop study established a study area from which to examine the landscape and visual effects of the proposed development and selected viewpoints from which the development would be potentially visible. A total of ten viewpoints within the surrounding landscape were selected. It also involved a review of NHA and pNHA held by the NPWS.

The field survey included the recording of the description of the landscape and characteristics within the study area from selected viewpoints. It also included the capture of panoramic photography from a refined set of viewpoints to prepare a photomontage.

A number of parameters were considered in order to describe the effects of the proposed development and included: quality, significance, character, magnitude, duration, probability and degree of effect significance.

Desktop and fieldwork were supported by online mapping tools from EPA, GeoHive, Google maps, Geological Survey Ireland, Myplan web map portal, Ordnance Survey Ireland and the Fingal Development Plan 2023-2029.

Photographs illustrating views from viewpoints were taken using a Sony D90 Digital SLR Camera.

8.2.2 LANDSCAPE ASSESSMENT CRITERIA

With regard to landscape assessment, there are two separate but closely related aspects. The first aspect is a visual impact, i.e. the extent to which a new structure in the landscape can be seen. Visual impacts may be categorised under "Visual intrusion" and "Visual Obstruction", where:

> **Visual intrusion** is impacting on a view without blocking;
> and
> **Visual obstruction** is impacting on a view involving blocking thereof.

In assessing visual impact, various aspects and stages are considered in detail including, impact during phasing, impact on completion and longer-term established impact.

The second aspect is **impacting on landscape character,** i.e. responses that are felt towards the landscape and drawn on the appearance of the land, including aspect, land-use topography, vegetative cover etc. and their interaction to create specific patterns and landscape units distinctive to particular localities. The character of the existing landscape setting is considered taking account of the various natural and man-made features, such as topography, landform, vegetation, land-use, built environment together with the visibility of and the views to and from the landscape.

The significance criteria used in the assessment are based on the impact levels suggested in the EPA Guidelines on the information to be contained in the afore mentioned EPA reports, which are set out in this volume of the EIAR.

8.2.3 LANDSCAPE PLANNING

The Fingal Development Plan 2023 - 2029, is the statutory development control and forward planning document pertaining to the project area. The Landscape Character Assessment (LCA) for Fingal (Fingal Development Plan 2023-2029) defines 6 Landscape Character Types within the County as follows:

County Fingal has been divided into six distinct Landscape Character Types:

- Rolling Hills Type;
- High Lying Type;
- Low Lying Type;
- Estuary Type;
- Coastal Type;
- River Valley and Canal Type.

8.3 EXISTING ENVIRONMENT

The County Development Plan identifies highly sensitive landscape character types as of the High Lying, Estuary, Coastal and River Valley and Canal types. The Development Plan also establishes views and prospects, which represent vantage points from which views and prospects of great natural beauty may be obtained over both seascape and rural landscape. Additionally, Special Amenity Areas are in place for Howth and the Liffey Valley to ensure that these areas are protected and enhanced, and that enjoyment by the public is facilitated. The proposed development site is located within a Low Lying area, categorised as having a modest value and low sensitivity by the Local Authority and contains pockets of important value areas requiring particular attention, such as important archaeological monuments and demesnes and also the Feltrim Hill and Santry Demesne proposed Natural Heritage Areas. A High Amenity zoning (HA) has been applied to areas of the County of high landscape value and it would not be applicable to the area where the proposed site is located.

The nearest listed Preserved View identified in the Green Infrastructure Map of the Development Plan is along the R127 regional road to the east, which is located approximately 350m at its closest (**Figure 8.1**).

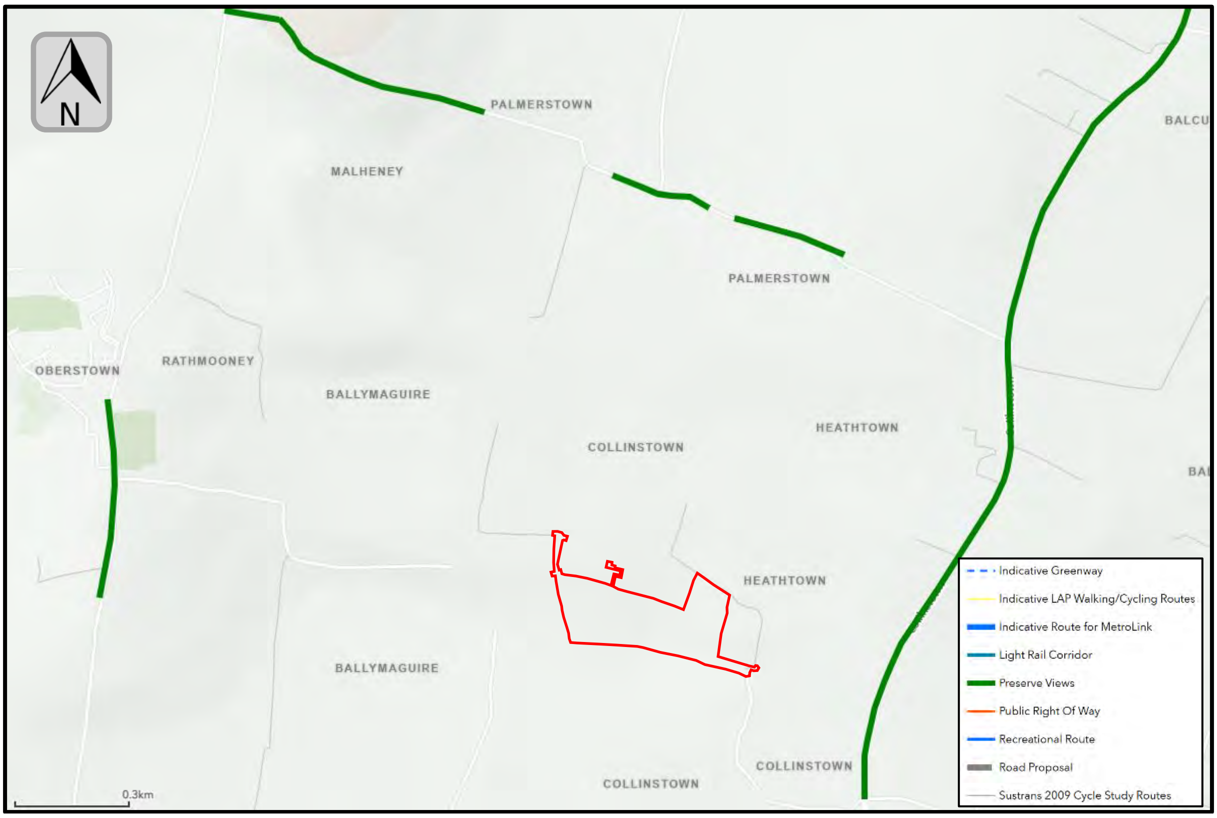

Figure 8.1: Views and Prospects

8.3.1 HOLMPATRICK, COLLINSTOWN TOWNLAND LANDSCAPE

The proposed development site is located in the townland of Collinstown, which is positioned in the 'Low Lying' landscape character type (LCT), according to the LCA of County Fingal (**Figure 8.2**). This LCT is described in Fingal Development Plan as an area of upland, rising to a high point of 176 metres at Hillfort Mound, to the southeast of the Naul. These hills afford panoramic views of the Mourne Mountains to the north, the coastline to the east and the Wicklow Mountains to the south. There are a number of important visual ridges on these uplands, that can be seen from wide areas of Fingal and Meath. Almost the whole County can be viewed from the more elevated roads. It also has an important ecological value with strong hedgerows and the presence of the 'Bog of the Ring' proposed Natural Heritage Area here. There is little obtrusive or inappropriate development in the area and there is a pronounced absence of any substantial coniferous woodland.

As mentioned above, the proposed site is located within an LCT classified as having a high sensitivity. However, Fingal Development Plan also determined that the proposed site is not within any area of High Sensitivity. The nearest Highly Sensitive Landscape areas are the Courtlough area and the coastal area, which are c. 420m to the north-west and 430m to the north-east, respectively (See **Figure 8.2**).

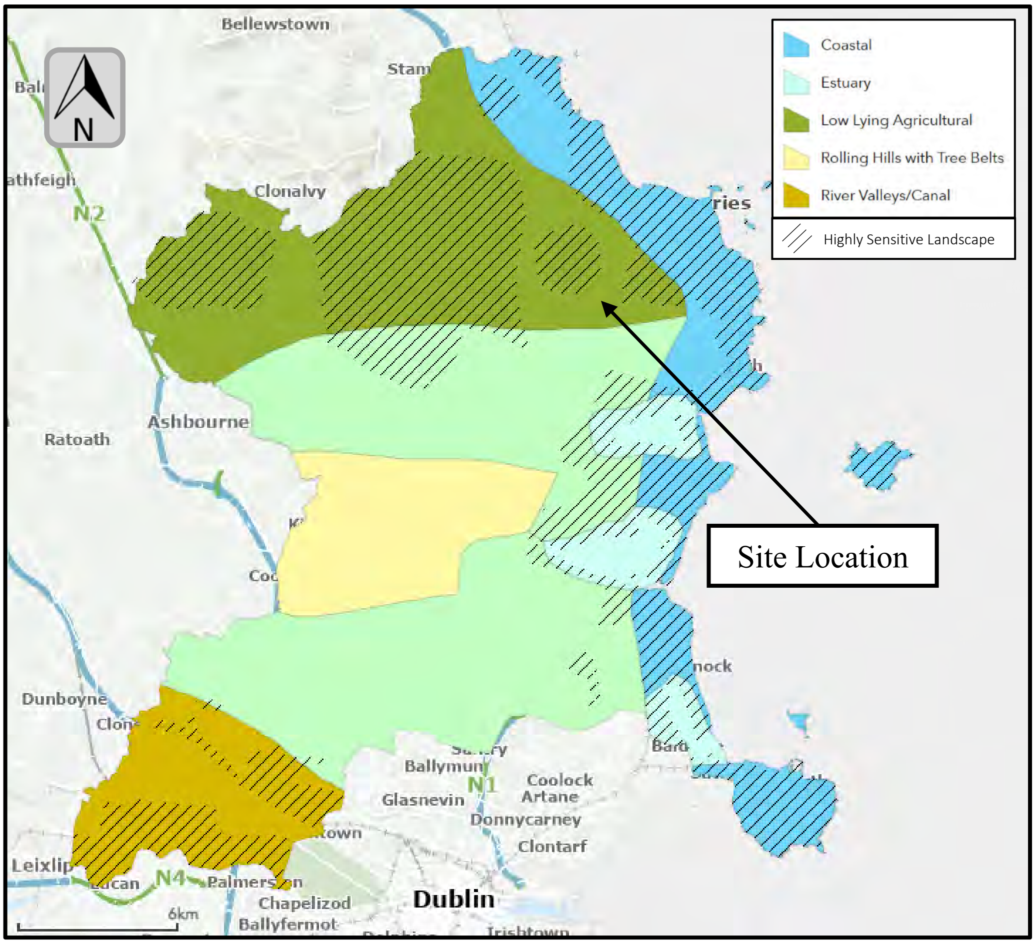

Figure 8.2: The Landscape Character Assessment.

8.3.2 LANDSCAPE SETTING OF THE PROPOSED SITE

The proposed AD Plant is located on gently sloped ground at an elevation of c. 45-55m above sea level. The immediate area around the proposed site is characterised by pastures and arable lands. The topographic features of the region consist of high-lying agricultural lands. In the wider region, areas of elevation include a number of hills, the closest being located in the townland of Palmerstown (1.5 km NW) which rises to 105m, and also the Knockbrack Mountain (6.3 km NW) which rises to 176m.

The main mapped surface water features in the vicinity of the site are the Palmerstown 08 stream and the Rathmooney stream, which are located approximately 80m north and 415m south-west of the site, respectively. The site is bordered by hedgerows, treelines and drainage ditches in all directions, dividing the site from adjacent lands, with a number of gaps in between.

Throughout the area, the land is farmed with fields enclosed with a varied mix of hedges, banks, and fences. Arable land is the primary agriculture type in the area. Residential property is generally dispersed along local roads. A number of one-off residences and farmyard complexes exist in the area and are the dominantly visible man-made structures in the landscape. The land around the site is owned by the developer and is mainly for agriculture, with the existing Country Crest site located to the west of the proposed AD Plant site.

8.4 IMPACTS

The assessment of potential visual amenity impacts involved examining the locations of domestic dwellings, views from public roads and the location of the proposed development. In assessing the impact, potential impacts associated with both the construction and operational phases were considered.

As part of this EIAR a visual assessment was carried out by ACSU personnel at locations where the proposed development would have the potential to create a visual impact. The locations of each selected viewpoint are represented in the VIA report as well as the photomontages.

8.4.1 "DO-NOTHING" SCENARIO

Should the proposed development not proceed, the existing use of the site as an agricultural field would remain unchanged. There would be no impact on the visual amenity of the area.

8.4.2 CONSTRUCTION PHASE

The proposed development is to construct an anaerobic digester and all ancillary site works and services.

The construction phase would have a relatively low landscape and visual impact. The construction phase is expected to have a duration of approximately 18 months. Aspects which pertain to the construction phase proper include:

- (i) The general site works;
- (ii) Excavating foundations;
- (iii) The construction of the new buildings and structures.

The main visible impact would be predominantly construction vehicles and plant machinery, such as excavators and delivery vehicles, however, as stated, these would be screened from view.

The topography and existing local field boundaries and woodland would effectively screen construction works in all areas of the site and ensure no associated significant visual impact would be observable from any public road. It is anticipated that the visual impact of the construction phase in all areas of the site would be insignificant due to intervening topography and vegetation.

8.4.3 OPERATIONAL PHASE

A number of tall structures would be part of the proposed development, including the power digest tank and attached gas sphere, which would be the tallest structure within the site at 12m in height. Other tall structures within the site would include the primary and secondary digestion tank, the silage clamps and gas flare. Tall structures such as these would have the potential to impair the local landscape by altering the visual extent of the site. Light pollution may arise during the operational phase of the development.

Given the local topography, these proposed structures are not anticipated to be visible from any viewpoint selected for the VIA. Additionally, as part of the landscape plan by Griffin Landscape Architects, there would be retention and enhancement of existing field boundaries at the site. This will further increase the level of screening of the proposed development and would have a positive impact upon the local landscape. Given that no element of the proposed development would be visible from any selected viewpoint during its operational phase, it is anticipated that there would be an imperceptible impact on the landscape. The proposed development would not result in an alteration to the landscape sensitivity.

8.4.4 LANDSCAPE PLANNING IMPACT

The European Landscape Convention Florence of October 2000 aimed to encourage member States to adopt policies and measures at local, regional, national and international level for protecting, managing and planning landscapes throughout Europe. The convention set out a range of different solutions which States could apply, according to their specific needs.

Ireland signed and ratified the Council of Europe's European Landscape Convention which came into effect on the 1st of March 2004. The Convention obliges Ireland to implement policy changes and objectives concerning the management, protection and planning of the landscape. In Ireland the National Landscape Strategy (2015 – 2030) is used to ensure compliance with the convention and to establish principles for protecting and enhancing it while positively managing its change.

The objectives of Irelands National Landscape Strategy are to:

- Implement the European Landscape Convention by integrating landscape into Ireland's approach to sustainable development;
- Establish and embed a public process of gathering, sharing and interpreting scientific, technical and cultural information in order to carry out evidence-based identification and description of the character, resources and processes of the landscape;
- Provide a policy framework, which will put in place measures at national, sectoral - including agriculture, tourism, energy, transport and marine - and local level, together with civil society, to protect, manage and properly plan through high quality design for the sustainable stewardship of Ireland's landscape;
- Ensure that Ireland takes advantage of opportunities to implement policies relating to landscape use that are complementary and mutually reinforcing and that conflicting policy objectives are avoided in as far as possible;

Fingal County Council has implemented its Landscape Character Assessment as part of its commitment to the European Landscape convention. The council's planning policy in assessing developments, has regard to the guidance contained in the Landscape Character

Assessment. Proposed developments should seek to minimise the visual impact, particularly in areas designated as Sensitive Landscapes.

Fingal County Council encourages the development of sustainable alternative agricultural enterprises and non-agricultural enterprises as a means of supporting a viable rural community subject to the retention of the holding's primarily agricultural use and the proper planning and sustainable development of the area.

Fingal County Council has implemented a series of actions and policies aimed at understanding, protecting, managing and planning the landscape of the county while also facilitating development. Policies such as GINHP10 (Green Infrastructure and Development) state: '*Seek a net gain in green infrastructure through the protection and enhancement of existing assets, through the provision of new green infrastructure as an integral part of the planning process, and by taking forward priority projects including those indicated on the Development Plan Green Infrastructure maps during the lifetime of the Development Plan*'.

The following table lists some of the more applicable landscape management policies from the Fingal Development Plan 2023 – 2029.

Table 8.1: Policy Objectives for Landscape Character Areas, Fingal Development Plan (2023-2029).

POLICY / OBJECTIVE REF	**POLICY / OBJECTIVE / RECOMMENDATION**
GINHP25	Ensure the preservation of the uniqueness of a landscape character type by having regard to the character, value and sensitivity of a landscape when determining a planning application.
GINHO55	Protect skylines and ridgelines from development.
GINHO56	Require any necessary assessments, including visual impact assessments, to be prepared prior to approving development in highly sensitive areas.
GINHO57	Ensure development reflects and, where possible, reinforces the distinctiveness and sense of place of the landscape character types, including the retention of important features or characteristics, taking into account the various elements which contribute to their distinctiveness such as geology and landform, habitats, scenic quality, settlement pattern, historic heritage, local vernacular heritage, land-use and tranquillity.
GINHO58	Resist development such as houses, forestry, masts, extractive operations, landfills, caravan parks, and campsites, and large agricultural/horticulture units which would interfere with the character of highly sensitive areas or with a view or prospect of special amenity value, which it is necessary to preserve.

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION
GINHO59	Ensure that new development does not impinge in any significant way on the character, integrity and distinctiveness of highly sensitive areas and does not detract from the scenic value of the area. New development in highly sensitive areas shall not be permitted if it: • Causes unacceptable visual harm. • Introduces incongruous landscape elements. • Causes the disturbance or loss of (i) landscape elements that contribute to local distinctiveness, (ii) historic elements that contribute significantly to landscape character and quality such as field or road patterns, (iii) vegetation which is a characteristic of that landscape type and (iv) the visual condition of landscape elements.

Other relevant policy objectives to the proposed development are related to the general landscape and green infrastructure, as listed in **Table 8.2** below.

Table 8.2: Policy Objectives for Green Infrastructure, Fingal Development Plan (2023-2029).

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION
GINHP26	Preserve views and prospects and the amenities of places and features of natural beauty or interest including those located within and outside the County.
GINHO60	Protect views and prospects that contribute to the character of the landscape, particularly those identified in the Development Plan, from inappropriate development.
GINHO61	Require a Landscape/Visual Assessment to accompany all planning applications for significant proposals that are likely to affect views and prospects.
GINHO63	Prioritise Rogerstown, Malahide and Baldoyle Estuaries for Special Amenity Area Orders.
GINHP28	Protect High Amenity areas from inappropriate development and reinforce their character, distinctiveness and sense of place.
GINHO67	Ensure that development reflects and reinforces the distinctiveness and sense of place of High Amenity areas, including the retention of important features or characteristics, taking into account the various elements which contribute to its distinctiveness such as geology and landform, habitats, scenic quality, settlement pattern, historic heritage, local vernacular heritage, land-use and tranquillity.

8.4.5 LANDSCAPE AND VISUAL IMPACT ASSESSMENT SUMMARY

The following methodology for assessing the visual impact of the development has been derived in accordance with the following guidance documents:

- Environmental Protection Agency, EPA (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Ireland;

- Landscape Institute, LI, and Institute of Environmental Management and Assessment, IEMA, (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition, UK, Routledge;
- Landscape Institute, LI, Advice Note 01/11 (2011). Photography and Photomontage in Landscape and Visual Impact Assessment, UK;
- Countryside Agency in conjunction with Scottish Natural Heritage (2002). Landscape Character Assessment: Guidance for England and Scotland, UK;

Sensitivity

Given the nature, location and design features of the proposed development, it is considered that the landscape sensitivity of the area is "low". The visual sensitivity of the area would be considered "negligible", given that only a small area could potentially be impacted by the proposed development.

Magnitude of Change

The magnitude of landscape change may be considered "negligible" due to the fact that the site is completely screened from view from publicly accessible areas.

The proposed development is a sustainable energy installation and would be incorporated within an existing food processing enterprise. There are no properties within a c. 100 m radius of the site that are not owned by the applicant. The nearest privately owned residence is c. 130 m south of the site, from which only a portion of the site would potentially be visible.

Table 8.3: Significance of Landscape Effects Matrix

Significance Of Effects		Sensitivity		
		High	Moderate	Low
Magnitude Of Change	High	Major	Moderate-Major	Moderate
	Medium-High	Moderate-Major	Moderate	Minor-Moderate
	Medium	Moderate	Moderate	Minor
	Low-Medium	Moderate	Minor-Moderate	Minor-Negligible
	Low	Minor-Moderate	Minor	Negligible
	Low - Negligible	Minor-Moderate	Minor-Moderate	Negligible
	Negligible	Negligible	Negligible	Negligible

(effects rated moderate and above are considered significant).

According to the LCA, Fingal low lying areas constitute a landscape with low sensitivity. The region in which the proposed site is positioned comprises a topography generally sloped to the south-east. The landscape is considered to be less at risk from change, and it would have the capacity to absorb suitable developments, provided that consideration is given to the minimisation of landscape and visual impacts.

The topography of the landscape in the immediate vicinity of the proposed site is characterised by low lying area. Undulating topography, as represented in much of the surrounding landscape, has the ability to both shelter and absorb the visual impact of developments. The abundance of hills in the area serve to screen the proposed development site from the majority of surrounding residences and public roads. In addition, the majority of the surrounding field boundaries comprising of hedgerows and trees are well-established, are high and thick, providing good screening.

The proposed site is currently an arable field with no existing structures or buildings within. No elements of the proposed development, including structures and buildings, would be visible from any of the viewpoints selected for the VIA. The proposed development's scale is designed to minimise any significant impact on the landscape and horizon. The use of gradiated colours would help the development blend into the skyline, particularly given its proximity to the existing Country Crest structures, warehouses and sheds.

The VIA concluded that the visual effect of this development on the overall landscape should be considered as negligible and that the significance of the effect would generally be considered as Imperceptible. It is also not anticipated that the proposed development could act in combination with other projects to generate significant effects.

8.5 MITIGATION MEASURES

All existing hedgerows should be retained in so far as is practical. There is an appropriate amount of greenery in the form of mature trees and hedgerows currently at the site to screen the development site from several directions. Any gaps in the hedgerows, where necessary, would be filled with native treelines and hedgerows.

The proposed use of gradiated colours would help the development blend into the skyline. Additionally, it is also recommended that any lighting should be minimised where possible and not exceed requirements. Light fixtures should be unidirectional or have shields to minimise light pollution and should preferably incorporate energy-efficient lamps.

8.6 RESIDUAL IMPACTS

The completed development, on its own or in combination with other developments, would result in no significant residual impact to the visual amenity of the landscape, given that the proposed development would effectively be screened from view.

According to the VIA, overall, the additional effect of the proposed development is viewed as imperceptible, given its topographic location within an existing commercial and agricultural landscape with well designed visual characteristics that integrate it into the horizon and skyline.

8.7 REFERENCES

Countryside Agency in conjunction with Scottish Natural Heritage (2002). Landscape Character Assessment: Guidance for England and Scotland, UK.

Natural England (2014). An Approach to Landscape Character Assessment. Available online: https://assets.publishing.service.gov.uk/media/5aabd31340f0b64ab4b7576e/landscape-character-assessment.pdf Accessed November 2024.

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SECTION B - THE NATURAL ENVIRONMENT

This Section of the Environmental Impact Assessment Report deals with the potential effects of the proposed development on the natural environment. The effects have been grouped as follows:

Impacts on Biodiversity
Impacts on Land – Soils, Geology, Hydrogeology and Hydrogeology

The various aspects of the natural environment interact to some degree with each other so that assessing one aspect in isolation can be misleading. For example, the survival of terrestrial fauna can be dependent on floral composition, which is in turn dependent on soil composition and groundwater levels. Similarly, the diversity of aquatic flora and fauna would be impacted by both hydrology and the quality of waters receiving drainage from the proposed scheme.

Human Beings also interact with the natural environment, often by altering land-use and landscape patterns for the purpose of agriculture and settlement.

9.0 BIODIVERSITY

9.1 INTRODUCTION

This section outlines the biodiversity currently present in the area of the proposed development and assesses the impact of the proposal on the habitats and species identified. This section should be read in conjunction with the site layout plans for the proposed development and project description sections of the EIAR. Mitigation measures have been proposed where required.

The ecological assessment involved a desktop review and the undertaking of a field assessment of the site to identify habitats and species of flora and fauna present in order to determine the ecological diversity of this area. A Stage 2 Appropriate Assessment Report has been prepared for the proposed development and accompanies the planning application (Report Ref: PE_NIS_ 10228).

The objectives of the ecological assessment were as follows:

- To undertake a comprehensive desktop review to identify European sites (Natura 2000 sites) within the vicinity of the proposed development and to determine previously recorded fauna for the area;
- To undertake a field assessment of the proposed development site and surroundings;
- To evaluate the biodiversity value of the proposed development and surroundings;
- To determine and assess the potential impacts of the proposed development on biodiversity;
- To propose mitigation measures for both the construction and operational phases of the development, where required, to reduce potential impacts upon biodiversity.

9.2 LEGISLATIVE FRAMEWORK & PLANNING POLICY

9.2.1 LEGISLATIVE CONTEXT

The main legislation pertaining to biodiversity and nature conservation in Ireland is outlined below.

The Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000

The Wildlife Act is the primary piece of Irish legislation providing for the protection and conservation of wildlife and provides for the control of specific activities which could adversely affect wildlife, for example the regulation of hunting and wildlife trading. Under the Wildlife Act, all bird species, 22 other fauna species and 86 flora species in Ireland are afforded protected status. The Wildlife Act, 1976 allows for the designation of specific areas of ecological value such as Statutory Nature Reserves and Refuges for Fauna. The Wildlife (Amendment) Act, 2000 provides for greater protection and conservation of wildlife and also provides for the designation and statutory protection of Natural Heritage Areas (NHA).

The Flora (Protection) Order, 2022 (S.I. 235 of 2022)

This order provides statutory protection to flora listed in Section 21 of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000. Under the Order, it is illegal to wilfully cut, uproot or damage the listed species or interfere in any way with their habitats.

European Communities (Birds and Natural Habitats) Regulations, 2021 (S.I. 293 of 2021)

These regulations transpose the European Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (known as the "Habitats Directive") and the European Council Directive 2009/147/EC on the Conservation of Wild Birds (known as the "Birds Directive") into Irish Law. The regulations provide for the designation and protection of Natura 2000 sites comprising of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The regulations safeguard the SAC and SPA sites from developments with the potential to significantly impact upon them. The EC (Birds and Natural Habitats) Regulations also address invasive species, making it an offence without a licence to plant, allow to disperse, escape or spread, to reproduce or propagate, to transport, to sell or advertise invasive species specified in the regulations.

The Local Government (Water Pollution) Act, 1977, as Amended

This Act provides for the control of water pollution, by prohibiting the discharge of un-licenced polluting matter into waters.

European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. 272 of 2009)

The regulations give statutory effect to Directive 2008/105/EC and provide legal status to quality objectives for all surface waters and environmental quality standards for pollutants. The regulations allow for the classification of surface waters by the Environmental Protection Agency (EPA) in accordance with the ecological objectives approach of the Water Framework Directive. The regulations also provide for the establishment of inventories of priority substances by the EPA and the preparation of pollution reduction plans.

Water Framework Directive (2000/60/EC)

The Water Framework Directive (WFD) aims to improve the water environment (including groundwater, rivers, lakes, estuaries and coastal waters) of E.U. Member States. The aim of the WFD is for Member States to achieve and maintain "good status" in all water bodies.

The Fisheries (Consolidation) Act, 1959, as Amended

The Act prohibits the entry of polluting substances into waters, which have the potential to adversely impact upon fish, prohibits the obstruction of passage of certain fish species and provides legal protection to the spawn/fry of eels, salmon and trout, in addition to their spawning or nursey grounds.

Fisheries (Amendment) Act, 1999

This Act outlines the responsibilities of the Regional Fisheries Board to ensure the protection and conservation of fish and their habitats within its area of jurisdiction.

European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. 293 of 1988)

These regulations give statutory effect to Directive 78/659/EEC. The regulations designate salmonid waters, specify the quality standards for designated salmonid waters and outline the monitoring requirements.

Planning and Development Regulations, 2001 to 2018

These regulations transpose the requirements of Directive 2014/52/EU (and previous Directive 2011/52/EU) on the assessment of the effects of certain projects on the environment into planning law. Under these regulations, development plans must include mandatory objectives for the conservation of natural heritage and for the conservation of European sites.

9.2.2 PLANNING POLICIES

National Policies

A number of documents have been published in relation to the Government's commitment to sustainable development, including the National Planning Framework 2040, Ireland's Second National Implementation Plan for the Sustainable Development Goals 2022-2024 and Our Sustainable Future A Framework for sustainable development in Ireland.

Regional Policies

The Regional Spatial & Economic Strategy (RSES) of the Eastern & Midland Regional Assembly, which includes the counties of Dublin, Kildare, Laois, Longford, Louth, Meath, Offaly, Westmeath and Wicklow, outlines the long-term spatial planning strategy for the area. A number of policies relate to biodiversity and are relevant to the proposed development, as per **Table 9.1** below.

Table 9.1: Regional Policies Relevant to Biodiversity and the Proposed Development

REFERENCE	POLICY
RPO 6.24	Support the Departments of Agriculture, Food and the Marine, and Communications, Climate Action and Environment to enhance the competitiveness of the agriculture sector with an urgent need for mitigation as well as real and effective and adaptation mechanisms for the long-term sustainability of the agri-sector.
RPO 7.16	Support the implementation of the Habitats Directives in achieving an improvement in the conservation status of protected species and habitats in the Region and to ensure alignment between the core objectives of the EU Birds and Habitats Directives and local authority development plans.
RPO 7.17	Facilitate cross boundary co-ordination between local authorities and the relevant agencies in the Region to provide clear governance arrangements and coordination mechanisms to support the development of ecological networks and enhanced connectivity between protected sites whilst also addressing the need for management of alien invasive species and the conservation of native species.
RPO 10.6	Delivery and phasing of services shall be subject to the required appraisal, planning and environmental assessment processes and shall avoid adverse impacts on the integrity of the Natura 2000 network.
RPO 10.7	Local authority core strategies shall demonstrate compliance with DHPLG Water Services Guidelines for local authorities and demonstrate phased infrastructure – led growth that is commensurate with the carrying capacity of water services and prevent adverse impacts on the integrity of water dependent habitats and species within the Natura 2000 network.

Local Policies

Local planning policies are detailed in the Fingal County Development Plan, 2023 – 2029 (as varied). A number of policies relate to biodiversity and are relevant to the proposed development, summarised as follows:

Table 9.2: Summary of Local Policies Relevant to Biodiversity and the Proposed Development

POLICY REFERENCE	AREA
GINHP1	Promote an awareness of the benefits of resilient design and the multi-functional nature of green infrastructure. Apply multi-functional principles of green infrastructure to inform the Development Management process in terms of design and layout of new residential areas, business/industrial development and other significant projects while maximising the multi-functional nature of green infrastructure by ensuring the development of synergies between Public Open Space, Biodiversity, SuDS/Water Sensitive Design, Climate Change and Active Travel objectives.
GINHP3	Encourage measures for the 'greening' of new developments including the use of green roofs, brown roofs, green walls and water harvesting. Where feasible require new developments to incorporate greening elements such as green roofs, brown roofs, green walls, green car parking and SuDs (e.g. clean water ponds fed by rainwater via downpipes).
GINHO6	Identify and map the important agricultural and horticultural lands in the County for future food security purposes and protect these lands from development.
GINHP7	Protect and enhance the natural, historical, amenity and biodiversity value of the County's watercourses, flood plains, riparian corridors, wetlands and coastal area though long-term and liaison with relevant Prescribed Bodies where appropriate.
GINHO15	Limit surface water run-off from new developments through the use of appropriate Sustainable Urban Drainage Systems (SuDS) using nature-based solutions and ensure that SuDS is integrated into all new development in the County.
GINHP12	Protect areas designated or proposed to be designated as Natura 2000 sites (i.e. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Statutory Nature Reserves, and Refuges for Fauna.
GINHO27	Support the National Parks and Wildlife Service, in the maintenance and achievement of favourable conservation status for the habitats and species in Fingal by taking full account of the requirements of the Habitats and Birds Directives, in the performance of its functions.
GINHO28	Ensure that development does not have a significant adverse impact on proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Statutory Nature Reserves, Refuges for Fauna, Habitat Directive Annex I sites and Annex II species contained therein, and on rare and threatened species including those protected by law and their habitats.
GINHO32	Ensure that proposals for development do not lead to the spread or introduction of invasive species. If developments are proposed on sites where invasive species are or were previously present, the applications will be required to submit a control and management program for the particular invasive species as part of the planning process and to comply with the provisions of European Communities (Birds and Natural Habitats) Regulations 2011 and EU Regulations 1143/2014.
GINHP17	Strictly protect areas designated or proposed to be designated as Natura 2000 sites (i.e. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs); also known as European sites) including any areas that may be proposed for designation or designated during the lifetime of this Plan.
GINHP18	The Council will seek to protect rare and threatened species, including species protected by law and their habitats by requiring planning applicants to demonstrate that proposals will not have a significant adverse impact on such species and their habitats.
GINHO33	Ensure that development does not have a significant adverse impact on proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Statutory Nature Reserves, Refuges for Fauna, Habitat Directive Annex I sites and Annex II species contained therein, and on rare and threatened species including those protected by law and their habitats.
GINHO35	In accordance with Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities 2010, any plans or projects that are likely to have a significant effect

POLICY REFERENCE	AREA
	on a Natura 2000 site, either individually or in combination with other plans or projects, are subject to a screening for Appropriate Assessment unless they are directly connected with or necessary to the management of a Natura 2000 site.
GINHP21	Protect existing woodlands, trees and hedgerows which are of amenity or biodiversity value and/ or contribute to landscape character and ensure that proper provision is made for their protection and management in line with the adopted Forest of Fingal: A Tree Strategy for Fingal.

Biodiversity Plans

Following on from Ireland's third National Biodiversity Plan 2017–2021, Ireland's fourth National Biodiversity Action Plan 2023-2027 has been drafted for public consultation and "*is set against a backdrop of unprecedented challenges for nature in Ireland and globally*". It aims to build on from the successes of previous NBAP's. It sets out 6 objectives which include for a whole government approach to biodiversity, to meet conservation and restoration needs, to secure nature's contribution to people, embed biodiversity at the heart of climate action, enhance the evidence base for action on biodiversity and to strengthen Ireland's contribution to international biodiversity initiatives. The new plan also includes a set of targets and actions for each objective.

All-Ireland Pollinator Plan

In 2015, Ireland joined a number of other European countries in developing a strategy to address pollinator decline and protect pollination services. 68 governmental and non-governmental organisations agreed a shared plan, the "*All-Ireland Pollinator Plan 2015-2020*". The new version "*All-Ireland Pollinator Plan 2021-2025*" seeks to build on from the success of the previous plan and identifies 186 actions to make Ireland pollinator friendly. The plan provides a total of 37 targets for six different objectives which include, farmland, public land, private land, All-Ireland Honeybee Strategy, conserving rare pollinators and strategic coordination of the plan.

9.3 METHODOLOGY

9.3.1 RELEVANT GUIDELINES

The following guidance documents have been consulted for this assessment, with a full list of consulted documentation and guidelines included within **Section 9.8**:

- *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018);
- *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022);
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009);
- *A Guide to Habitats in Ireland* (Fossitt, 2000);
- *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al*., 2011);
- *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA, 2009);

- *Expedition Field Techniques: Bird Surveys* (Bibby *et al.*, 2000);
- *Bird census and survey techniques* (Gregory *et al.*, 2004);
- *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins 2016);
- *Bat Mitigation Guidelines for Ireland* (Kelleher and Marnell, 2006);
- *Bats and artificial lighting in the UK* (Bat Conservation Trust, 2018);
- *Bats & Lighting: Guidance Notes for Planners, Engineers, Architects and Developers* (Bat Conservation Ireland, 2010).

9.3.2 STUDY AREA / ZONE OF INFLUENCE

Following guidance set out by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) and the National Roads Authority (2009), a Zone of Influence should be determined, which identifies the area in which the development could potentially impact upon ecological receptors and aquatic environments. The zone of influence takes into consideration the assigned ecological value of the receptors, which ranges from international, national, county to local, and potential pathways for impacts to occur. The zone of influence also takes into consideration the watercourse surrounding the proposed development. Taking into consideration best practice guidance and the nature of the development, the study area for the assessment ranges from the site boundary for habitats, to buffers of 100m for specific species. However, it should be noted that these buffers were extended where required.

9.3.3 DESKTOP RESEARCH

Desktop research comprised of gathering information on designated sites within the zone of influence of the proposed development, reviewing mapping sites to provisionally identify any potential ecologically important features prior to the site assessment and reviewing online resources to determine what notable species, including protected, rare or invasive, had previously been recorded for the proposed development area and environs. The following online resources were consulted as part of this process:

- National Parks and Wildlife Service (NPWS) website: mapping of designated sites and information on designated sites within the vicinity of the development;
- NPWS Wildlife Manuals for certain habitats and species;
- National Biodiversity Data Centre (NBDC) website: data on notable species (protected, rare or invasive) within the 2km square (O25D) and 10km square (O25) in which the proposed development is located;
- NPWS reports on "*The Status of Protected EU Habitats and Species in Ireland*";
- NPWS Ireland Red Lists for species;
- Botanical Society of Britain and Ireland website: flora distribution maps;
- Data on the status of bird species from "*Birds of Conservation Concern in Ireland 2021-2026*", (Gilbert, Stanbury and Lewis, 2021);
- Various mapping websites, including EPA Envision, Google Maps, Myplan and OSI.

- Protected Mammals Survey by Wildlife Surveys Ireland.

In addition to the above, the NPWS was contacted on the 19th of November 2024 in relation to records for sensitive, rare, threatened and protected species within 10km of the development location. No response was obtained as of the writing of this report.

Water quality data from the EPA was reviewed for the assessment of biological and environmental data collected on waterbodies in Ireland (Accessed November 2024).

9.3.4 FIELD SURVEYS METHODOLOGY

A site assessment was undertaken on the 28th of August 2024 to examine the ecological context of the proposed development, as outlined in **Table 9.3** below. Surveys had due consideration for the relevant best practice guidelines as referenced in **Section 9.3.1**.

Table 9.3: Ecological Surveys Informing the EIAR

SURVEY	STUDY AREA	SURVEY DATES
Habitat Survey	Complete site boundary	28th August 2024
Fauna Survey	Complete site boundary	28th August 2024
Daytime Assessment of Bat Roost Potential	Complete site boundary	28th August 2024
Bird Survey (General)	Complete site boundary	28th August 2024

Habitats and Flora Survey

This assessment involved determining the habitats and flora present within the proposed development. The habitat survey was undertaken in accordance with the standard methodology outlined in Fossitt's "*A Guide to Habitats in Ireland*", (Fossitt, 2000), a hierarchical classification scheme based upon the characteristics of vegetation present. The Fossitt system also indicates when there are potential links with Annex I habitats of the E.U. Habitats Directive (92/43/EEC). Cognisance was also taken of the Heritage Council guidelines, "*Best Practice Guidance for Habitat Survey and Mapping*", (Smith *et al.,* 2011). The relative abundances of flora was determined using the DAFOR Scale, an acronym for the abundance levels – Dominant, Abundant, Frequent, Occasional and Rare.

During the site walkover, any notable flora species were recorded, with an emphasis on statutorily protected or rare species, species of conservation significance and invasive species.

Fauna Survey (Excluding Bats)

A fauna survey was undertaken during bright and dry weather conditions. Cloud cover varied between 40-100% with a temperature of 17ºC and a windspeed of 2-3 on the Beaufort scale. Direct observation methods were used for the survey of fauna, however, these methods may not be suitable for shy and nocturnal species. Therefore, indirect methods were also employed, focusing on evidence of fauna including tracks, burrows/setts/nests, droppings, food items and hair. The habitats on site were assessed for signs of usage by fauna and the potential to support protected or red-listed species.

Bat Survey – Assessment of Bat Roost Potential

The proposed development would not necessitate the removal of any other mature trees, hedgerows or treelines at the site.

A daytime assessment of the trees and hedgerows was undertaken on the 28th of August 2024. The assessment comprised of an external inspection of the buildings and tree to identify potential roost features (PRFs) and evidence of bat activity, using close focusing binoculars. The criteria used to categorise the PRFs or suitability of trees and buildings as a potential roost are summarised in the table below, based upon the guidelines by Collins (2016) and Hundt (2012).

Table 9.4: Bat Roost Potential Categories

CATEGORY	DESCRIPTION
High Trees / buildings that are suitable for use by large numbers of bats on a regular basis	Features include holes, cracks or crevices that extend or appear to extend back to cavities suitable for bats. In buildings, examples include eaves, barge boards, gable ends and corners of adjoining beams, ridge and hanging tiles, behind roofing felt or within cavity walls. In trees, examples include hollows and cavities, rot holes, cracks/splits and flaking or raised bark which could provide roosting opportunities. Any ivy cover is sufficiently well-established and matted so as to create potential crevices beneath. **Further survey work would be required to determine whether or not bats are present, and if so, the species present. Appropriate mitigation and potential licencing requirements may then be determined.**
Moderate Moderate potential is assigned to trees / structures with potential to support bat roosts but supports fewer features than a high potential building / tree and is unlikely to support a roost of high conservation value.	From the ground, building / tree appears to have features (e.g. holes, cavities, cracks or dense ivy cover) that may extend back into a cavity. However, owing to the characteristics of the feature, they are deemed to be sub-optimal for roosting bats. **Further survey work would be required to determine whether or not bats are present, and if so, the species present. Appropriate mitigation and potential licencing requirements may then be determined.**
Low Low potential is assigned to structures and trees with features that could support individual bats opportunistically.	If no features are visible, but owing to the size, age and/or structure, hidden features, sub-optimal for roosting bats, may occur that only an elevated inspection may reveal. In respect of ivy cover, this is not dense (i.e. providing PRF in itself) but may mask presence of PRF features. **Further survey work may be required for buildings only or works may proceed using reasonable precautions (e.g. controlled working methods, under license or supervision of a bat worker).**

Bird Survey

General bird usage of the development site was assessed on the 28th of August 2024. While walking the development site, stops were undertaken on a regular basis during which time the area was scanned as far as the terrain or weather conditions allowed. Birds were identified by visual sightings and auditory identification of songs and calls. Birds flying overhead were also included as part of the survey.

Surveys Scoped Out

The following ecological features were scoped out:

Invertebrate (aquatic) / Fish surveys: Drainage ditches occur along the perimeter of the proposed development. Some of the existing drainage ditches were dry, while others held stagnant water. The drainage ditches are unlikely to support fish or protected invertebrates given that the drains begin onsite and many of them are heavily vegetated. No fish were observed within. These drainage ditches could potentially support protected amphibians such as the Common Frog or the Smooth Newt. These species were not recorded during the site assessment. Amphibians require a freshwater habitat during the breeding season, however outside of this, they are typically found within areas of tall vegetation. Amphibians are commonly found throughout Ireland. Given the limited works in the drainage ditch, and unsuitability of a majority of the habitats onsite, and the results of the walkover assessment, further assessment for amphibians is not required..

There are no mapped watercourses within the boundary of the site. The drainage ditch to the south is hydrologically connected to the Palmerstown watercourse. The nearest mapped watercourse is the Palmerstown 08 stream, located approximately 80m north of the development site at its closest.

It is considered that the assessment of the potential impacts of the development upon water quality (discussed further in this section and within **Section 10**) is sufficient in assessing the potential impact of the development upon water quality and aquatic habitats and species.

Bat Activity Survey: No significant vegetation removal works are required as part of the proposed development. The proposed development seeks to retain all existing hedgerows. No mature trees are to be removed. There is currently no artificial lighting within the boundary of the proposed development. New lighting will be required and will be positioned along the perimeter of the buildings and roads. It is not envisaged that this would have a significant impact on bat populations as the existing hedgerows are considered as having negligible bat roost potential. It is therefore considered that a bat activity survey is not required and that the potential impact upon bat species can be determined based upon the fauna survey and assessment of bat roost potential undertaken as discussed in the sections above.

Reptile Surveys: Areas of the study area may provide suitable basking and refuge habitat for protected viviparous lizard (*Zootoca vivipara)*. The numbers of viviparous lizard, if present at the site, are likely to be low and unlikely to be picked up in survey. No reptiles were recroed during the site assessment survey.

Survey Limitations

Every effort has been made to provide an accurate assessment of the situation pertaining to the site. However, an ecological survey can only assess a site at a particular time and is limited by various factors such as the season, timing of the survey, climatic conditions and species behaviour. Ecological surveys are therefore snapshots in time and should not be regarded as a complete study. Direct observations or evidence of protected species is not always recorded during ecological surveys. However, this does not indicate that the species is absent from the site.

To ensure any limitations encountered did not significantly impact upon the findings of the ecological assessments, the ecological surveys undertaken also assessed the potential of the habitats to support protected species, and cognisance has been taken of available online baseline data (e.g. flora and fauna records from the NBDC, consultation with NPWS regarding protected / threatened species, consultation with BCI regarding bat roost records, previous surveys undertaken by Wildlife Surveys) and a precautionary approach taken.

RECEIVED: 18/12/2024

9.3.5 ECOLOGICAL VALUATION CRITERIA

The ecological value of the habitats and species identified at the development site have been assessed following the criteria outlined in the 2009 NRA guidelines and is consistent with the *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (CIEEM, 2018).

9.4 DESCRIPTION OF EXISTING ENVIRONMENT

The proposed development is for the construction of an anaerobic digester and all ancillary site works and services at Collinstown, Lusk, Co. Dublin.

The closest Natura 2000 sites are the Rogerstown Estuary SAC (Site Code: 000208) and Rogerstown Estuary SPA (Site Code: 004015), located approximately 4.4km to the south-east of the proposed development. The North-west Irish Sea SPA (Site Code: 004269) is also located approximately 4.9km to the south-east. There is a direct hydrological connection to these Natura 2000 sites via an onsite drainage ditch (see Attachment 9.1 for Natura Impact Statement).

Hedgerows and drainage ditches delineate the site boundaries. The hedgerows are evidently managed and kept short. All hedgerows will be retained as part of this development. In addition, the landscape plan includes new planting of hedgerows, trees, pollinator friendly meadows and woodland. The planting scheme will also be incorporated within SuDS features onsite. The land drains to the north, south and west contain stagnant water while all remaining drains were dry during the site assessment. The land drains would be not expected to support protected species however, given their direct hydrological connection, they are significant to assessing any potential impacts to a protected site.

The land use of the area surrounding the proposed development is mainly rural. The existing Country Crest Food Processing Facility is located to the west while agricultural sheds are location to the north and north-west.

Six IEL licensed facilities are in operation within 10 km from the site at a minimum distance of 3km away from the site. Agricultural lands are located within the wider environment and is the dominant land use of the area.

The expected construction timeframe of the proposed development is approximately 18 months, with hours of operation from 7am to 7pm Monday to Friday, and 7am to 1pm on Saturdays in Summer months. However, when daylight hours are limited (October – March) construction works would be commence one hour after sunrise (dawn) and stop one hour before sunset (dusk).

9.4.1 DESIGNATED SITES

The proposed development does not directly impinge on any designated site. In total, there are 19 designated sites located within the Zone of Influence (ZoI) of the proposed development. This includes: 8 Special Protection Area (SPA) sites, 5 Special Area of Conservation (SAC) sites and 1 Natural Heritage Area (NHA) site. There are also 13 proposed Natural Heritage Area (pNHA) sites within the Zone of Influence (ZoI). There are three RAMSAR sites (Rogerstown Estuary, Broadmeadow Estuary (Malahide) and Baldoyle Bay) and two Nature Reserves (Rogerstown Estuary and Baldoyle Estuary) located within 15km of the development site, but no National Parks.

Maps detailing these designated sites in relation to the proposed development are included in **Attachment 9.2**.

The following tables detail the SAC, SPA, NHA and pNHA sites located within the Zone of Influence (ZoI) of the proposed development.

Table 9.5: SAC Sites within Zone of Influence of the Proposed Development

SITE NAME	SITE CODE	APPROX. DISTANCE TO DEVELOPMENT	QUALIFYING INTERESTS
Rogerstown Estuary SAC	000208	4.19 km S	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
Rockabill to Dalkey Island SAC	003000	6.39 km E	Reefs [1170] *Phocoena phocoena* (Harbour Porpoise) [1351]
Malahide Estuary SAC	000205	7.82 km S	Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
Lambay Island SAC	000204	10.4 km SE	Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] *Phocoena phocoena* (Harbour Porpoise) [1351] *Halichoerus grypus* (Grey Seal) [1364] *Phoca vitulina* (Harbour Seal) [1365]
Baldoyle Bay SAC	000199	14.1 km S	Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410]

**Denotes a priority habitat under the Habitats Directive*

Table 9.6: SPA Sites within Zone of Influence of the Proposed Development

SITE NAME	SITE CODE	DISTANCE TO PROPOSED DEVELOPMENT	SPECIAL CONSERVATION INTEREST
Rogerstown Estuary SPA	004015	4.19 km S	Greylag Goose (*Anser anser*) [A043] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Shoveler (*Anas clypeata*) [A056] Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]
North-West Irish Sea SPA	004236	4.39 km NE	Red-throated Diver (*Gavia stellata*) [A001] Great Northern Diver (*Gavia immer*) [A003] Fulmar (*Fulmarus glacialis*) [A009] Manx Shearwater (*Puffinus puffinus*) [A013] Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Common Scoter (*Melanitta nigra*) [A065] Little Gull (*Larus minutus*) [A177] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Great Black-backed Gull (*Larus marinus*) [A187] Kittiwake (*Rissa tridactyla*) [A188] Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194]

SITE NAME	SITE CODE	DISTANCE TO PROPOSED DEVELOPMENT	SPECIAL CONSERVATION INTEREST
			Little Tern (*Sterna albifrons*) [A195] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]
Skerries Islands SPA	004122	5.30 km NE	Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Purple Sandpiper (*Calidris maritima*) [A148] Turnstone (*Arenaria interpres*) [A169] Herring Gull (*Larus argentatus*) [A184]
Rockabill SPA	004014	7.26 km NE	Purple Sandpiper (*Calidris maritima*) [A148] Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194]
Malahide Estuary SPA	004025	7.82 km S	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Pintail (*Anas acuta*) [A054] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]
Lambay Island SPA	004069	10.3 km SE	Fulmar (*Fulmarus glacialis*) [A009] Cormorant (*Phalacrocorax carbo*) [A017]

SITE NAME	SITE CODE	DISTANCE TO PROPOSED DEVELOPMENT	SPECIAL CONSERVATION INTEREST
			Shag (*Phalacrocorax aristotelis*) [A018] Greylag Goose (*Anser anser*) [A043] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Rissa tridactyla*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]
River Nanny Estuary and Shore SPA	004158	11.7 km NW	Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Herring Gull (*Larus argentatus*) [A184] Wetland and Waterbirds [A999]
Baldoyle Bay SPA	004016	14.2 km S	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Bar-tailed Godwit (*Limosa lapponica*) [A157] Wetland and Waterbirds [A999]

Table 9.7: NHA Sites within Zone of Influence of the Proposed Development

SITE NAME	SITE CODE	APPROX. DISTANCE TO PROPOSED DEVELOPMENT
Skerries Islands NHA	001218	5.30 km NE

Table 9.8: pNHA Sites within 15km of the Proposed Development

SITE NAME	SITE CODE	APPROX. DISTANCE TO PROPOSED DEVELOPMENT
Bog of The Ring pNHA	001204	3.87 km NW
Rogerstown Estuary pNHA	000208	4.19 km S
Knock Lake pNHA	001203	4.24 km NW
Loughshinny Coast pNHA	002000	5.25 km NE
Portraine Shore pNHA	001215	7.01 km SE
Malahide Estuary pNHA	000205	7.82 km S
Lambay Island pNHA	000204	10.4 km SE
Rockabill Island pNHA	000207	11.8 km NE
Feltrim Hill pNHA	001208	12.0 km S
Cromwell's Bush Fen pNHA	001576	13.4 km NW
Sluice River Marsh pNHA	001763	13.4 km S
Laytown Dunes/Nanny Estuary pNHA	000554	13.5km N
Baldoyle Bay pNHA	000199	14.1 km S

For this assessment, the sites considered to be within the zone of influence of the proposed development are the Rogerstown Estuary SAC and pNHA (Site Code: 000208), the Rogerstown Estuary SPA (Site Code: 004015) and the North-west Irish Sea SPA (Site Code: 004236), due to hydrological connectivity with the proposed development.

The proposed development is located approximately 6.4km from the Rockabill to Dalkey Island SAC (Site Code: 003000). This SPA is located a significant distance from where the Rathmooney and Palmerstown watercourses enter the Irish Sea. The proposed development would not support the qualifying interest (Harbour Porpoise) of this SAC given that the habitats within the development boundary are terrestrial. The habitat Reefs [1170] for which this SAC has been designated is not located within the red line boundary. Given the distance, proposed drainage network and absence of suitable habitats, nature and scale of the works, the Rockabill to Dalkey Island SAC has been screened out.

Some of following Natura 2000 sites and Natural Heritage Areas are not located within the same river catchment as the development site and therefore are not hydrologically connected with the development while others have a weak/remote hydrological connection via the Irish Sea: Malahide Estuary SAC and pNHA (Site Code: 000205); Malahide Estuary SPA (Site Code: 004025); Lambay Island SAC and pNHA (Site Code: 000204), Lambay Island SPA (Site Code: 004069); Baldoyle Bay SAC (Site Code: 000199); Baldoyle Bay SPA (Site Code: 004016); Skerries Islands SPA (Site Code: 004122); Skerries Islands NHA (Site Code: 001218); Rockabill SPA (Site Code: 004014); Rockabill Island pNHA (Site Code: 000207); River Nanny Estuary and Shore SPA (Site Code: 004158); Laytown Dunes/Nanny Estuary pNHA (Site Code: 000554); Portraine Shore pNHA (Site Code: 001215); Cromwell's Bush Fen pNHA (Site Code: 001576); Feltrim Hill pNHA (Site Code: 001208); Sluice River Marsh pNHA (Site Code: 001763) and Baldoyle Bay (Site Code: 000199). Therefore, in the absence of a source-pathway-receptor relationship, these sites have been screened out.

Bog of The Ring pNHA (Site Code: 001204), Knock Lake pNHA (Site Code: 001203), Loughshinny Coast pNHA (Site Code: 002000) are located within the same sub-catchment as the proposed site, however, are not considered to be directly downstream of the site via surface or groundwater due to their relative location and topography. Therefore, in the absence of a source-pathway-receptor relationship, these sites have been screened out.

Rogerstown Estuary SAC and pNHA (Site Code: 000208)

The conservation objectives for the SAC site are to maintain or restore the favourable conservation condition of the qualifying interests. An excerpt from the Site Synopsis for the Rogerstown Estuary SAC is included below (NPWS, 2013).

"Rogerstown Estuary is situated about 2 km north of Donabate in Co. Dublin. It is a relatively small, narrow estuary separated from the sea by a sand and shingle bar. The estuary is divided by a causeway and narrow bridge, built in the 1840s to carry the Dublin-Belfast railway line.

The estuary drains almost completely at low tide. The intertidal flats of the outer estuary are mainly of sands, with soft muds in the north-west sector and along the southern shore. Associated with these muds are stands of Common Cordgrass (*Spartina anglica*). Green algae (mainly *Enteromorpha* spp. and *Ulva lactuca*) are widespread and form dense mats in the more sheltered areas. The intertidal angiosperm Beaked Tasselweed (*Ruppia maritima*) grows profusely in places beneath the algal mats. The Lugworm (*Arenicola marina*) is common in the outer estuary and large Mussel beds (*Mytilus edulis*) occur at the outlet to the sea.

The area of intertidal flats in the inner estuary is reduced as a result of the local authority refuse tip on the north shore. The sediments are mostly muds, which are very soft in places. Common Cordgrass is widespread in parts, and in summer, dense green algal mats grow on the muds. In the extreme inner part, the estuary narrows to a tidal river. The habitat '*Salicornia* mud' occurs in both the outer and inner estuaries, and *S. dolichostachya* is the main glasswort species found. Other species include *S. ramosissima*, *S. europaea* and Annual Sea-blite (*Suaeda maritima*). Saltmarsh fringes parts of the estuary, especially the southern shores and parts of the outer sand spit. Common plant species of the saltmarsh include Sea Rush (*Juncus maritimus*), Sea-purslane (*Halimione portulacoides*) and Common Saltmarsh-grass (*Puccinellia maritima*). Salt meadows and wet brackish fields occur along the tidal river. Low sand hills occur on the outer spit, including some small areas of fixed dunes and Marram Grass (*Ammophila arenaria*) dunes. Fine sandy beaches and intertidal sandflats occur at the outer part of the estuary.

Two plant species which are legally protected under the Flora (Protection) Order, 2022, occur within the site: Hairy Violet (*Viola hirta*) occurs on the sand spit and Meadow Barley (*Hordeum secalinum*) occurs in the saline fields of the inner estuary. This species has declined, apparently due to reclamation and embankment of lands fringing estuaries. Another rare species, Green-winged Orchid (*Orchis morio*), occurs in the sandy areas of the outer estuary.

Rogerstown Estuary is an important waterfowl site, with Brent Goose having a population of international importance (1176). A further 16 species have populations of national importance: Greylag Goose (186), Shelduck (785), Teal (584), Pintail (30), Shoveler (69), Oystercatcher (1028), Ringed Plover (152), Golden Plover (1813), Grey Plover (245), Lapwing (4056), Knot (2076), Dunlin (2625), Sanderling (57), Black tailed Godwit (272), Curlew (1549), Redshank (732) and Greenshank (22) (All counts are average peaks over four winters 1994/95 - 1997/98). The presence of a significant population of Golden Plover is of note and this species is listed on Annex I of the E.U. Birds Directive. The estuary is a regular staging post for autumn migrants, especially Green Sandpiper, Ruff, Little Stint, Curlew Sandpiper and Spotted Redshank.

Little Tern has bred at the outer sand spit, but much of the nesting area has now been washed away as a result of erosion. The maximum number of pairs recorded was 17 in 1991. Ringed Plover breed in the same area. The outer part of the estuary has been designated a Statutory Nature Reserve and a Special Protection Area under the E.U. Birds Directive. The inner estuary has been damaged by the refuse tip which covers 40 ha of mudflat.

This site is a good example of an estuarine system, with all typical habitats represented, including several listed on Annex I of the E.U. Habitats Directive. Rogerstown is an internationally important waterfowl site and has been a breeding site for Little Terns. The presence within the site of three rare plant species adds to its importance."

The main site vulnerabilities, including any key pressures or threats within and around Rogerstown Estuary SAC that have been identified as impacting upon the site, may be summarised as:

- Residential or recreational activities and structures generating marine pollution (excl. marine macro- and micro- particular pollution;
- Conversion from one type of agricultural land use to another (excluding drainage and burning);
- Intensive grazing or overgrazing by livestock;
- Extensive grazing or undergrazing by livestock;
- Agricultural activities generation marine pollution;
- Modification of hydrological flow or physical alternation of water bodies for agriculture (excluding development and operation of dams);
- Agriculture activities not referred to above;
- Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels);
- (Shipping lanes, ferry lanes and anchorage infrastructure e.g. canalisation, dredging);
- Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions);
- Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning;
- Sports, tourism and leisure activities;
- Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures);
- Marine aquaculture generating marine pollution;
- Other invasive alien species (other than species of Union concern);
- Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization);
- Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices);
- Unknown pressure;

Rogerstown Estuary SPA (Site Code: 004015)

The conservation objectives for the SPA site are to maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. An excerpt from the Site Synopsis for the Rogerstown Estuary SPA is included below (NPWS, 2014).

"Rogerstown Estuary is situated about 2 km north of Donabate in north County Dublin. It is a relatively small, funnel shaped estuary separated from the sea by a sand and shingle peninsula; the site extends eastwards to include an area of shallow marine water. The estuary receives the waters of the Ballyboghil and Ballough rivers and has a wide salinity range, from near full seawater to near full freshwater. The estuary is divided by a causeway and narrow bridge, built in the 1840s to carry the Dublin Belfast railway line. At low tide extensive intertidal sand and mud flats are exposed and these provide the main food resource for the wintering waterfowl that use the site. The intertidal flats of the estuary are mainly of sands, with soft muds in the north west sector and along the southern shore. Associated with these muds are stands of Common Cord-grass (*Spartina anglica*). Green algae (mainly *Ulva* spp.) are widespread and form dense mats in the more sheltered areas. The intertidal vascular plant Beaked Tasselweed (*Ruppia maritima*) grows profusely in places beneath the algal mats and is grazed by herbivorous waterfowl (notably Light-bellied Brent Goose and Wigeon). Salt marsh fringes parts of the estuary, especially its southern shores. Common plant species of the saltmarsh include Sea Rush (*Juncus maritimus*), Sea Purslane (*Halimione portulacoides*) and Common Saltmarsh-grass (*Puccinellia maritima*).

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greylag Goose, Light-bellied Brent Goose, Shelduck, Shoveler, Oystercatcher, Ringed Plover, Grey Plover, Knot, Dunlin, Black-tailed Godwit and Redshank. 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.

Rogerstown Estuary is an important winter waterfowl site and supports a population of Light-bellied Brent Goose of international importance (1,069) - all counts are mean peaks over the five winters 1995/96 – 1999/2000. A further 10 species have populations of national importance as follows: Greylag Goose (160), Shelduck (773), Shoveler (59), Oystercatcher (1,345), Ringed Plover (188), Grey Plover (229), Knot (2,454), Dunlin (2,745), Black-tailed Godwit (195) and Redshank (490). The Greylag Geese are part of a larger population which spends most of the winter on Lambay Island. Other species which occur regularly include Wigeon (358), Teal (346), Mallard (214), Red-breasted Merganser (30), Golden Plover (1,059) Lapwing (2,129), Sanderling (50), Curlew (505) and Turnstone (77). Large numbers of gulls including Herring Gull, Great Black-backed Gull and Black-headed Gull are attracted to the area, partly due to the presence of an adjacent local authority landfill site. Little Egret, a species which has recently colonised Ireland, also occurs at this site.

Some of the wader species also occur on passage, notably Black-tailed Godwit with numbers often exceeding 300 in April. The estuary is a regular staging post for scarce migrants, especially in autumn when Green Sandpiper, Ruff, Little Stint, Curlew Sandpiper and Spotted Redshank may be seen. Shelduck breed within the site.

Rogerstown Estuary SPA is an important link in the chain of estuaries on the east coast. It supports an internationally important population of Light-bellied Brent Goose and nationally important populations of a further 10 species. The presence of Little Egret and Golden Plover is of note as these species are listed on Annex I of the E.U. Birds Directive. Rogerstown Estuary is also a Ramsar Convention site, and part of Rogerstown Estuary SPA is designated as a Statutory Nature Reserve and a Wildfowl Sanctuary."

The main site vulnerabilities, including any key pressures or threats within and around the Rogerstown Estuary SPA that have been identified as impacting upon the site, may be summarised as follows:

- Hunting & predation;
- Destruction and degradation of habitats;
- Urban and industrial development;
- Disturbance from vehicles or over-flying aircraft;
- Recreational activities;
- Power transmission lines;
- Reductions in food availability;
- Invasive species;

- Avian influenza and avian botulism;
- Bioaccumulation of hazardous elements in the food chain;
- Climate change;
- Pollution;

North-west Irish Sea SPA (Site Code: 004236)

The conservation objectives for the SPA site are to maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. An excerpt from the Site Synopsis for the North-west Irish Sea SPA is included below (NPWS, 2023).

"Informed by two surveys of the western Irish Sea region in 2016 an estimated 120,232 and 34,626 individual marine birds occurred in this SPA during autumn and winter respectively. Those marine bird species whose estimated abundances equalled or exceeded 1% of the total estimated size of the winter assemblage are: Red-throated Diver (538), Fulmar (506), Little Gull (391), Kittiwake (944), Black-headed Gull (508), Common Gull (2,866), Herring Gull (6,893), Great Black-backed Gull (2,096), Razorbill (4,638) and Guillemot (13,914). The estimated 2016 summer abundance of Manx Shearwater in the North West Irish Sea SPA is 13,010 and is of international importance. The estimated 2016 autumn and winter abundances of Great Northern Diver in the North West Irish Sea SPA is 248 and 230 respectively and are of international importance. The estimated abundances of Common Scoter over parts of this SPA can reach significant numbers (e.g. 14,567 in December 2018) which is also of international importance".

The main site vulnerabilities, including any key pressures or threats within and around the North-west Irish Sea SPA that have been identified as impacting upon the site, may be summarised as follows:

- Hunting & predation;
- Destruction and degradation of habitats;
- Urban and industrial development;
- Disturbance from vehicles or over-flying aircraft;
- Recreational activities;
- Power transmission lines;
- Reductions in food availability;
- Invasive species;
- Avian influenza and avian botulism;
- Bioaccumulation of hazardous elements in the food chain;
- Climate change;
- Pollution;

9.4.2 FLORA & HABITATS

The development site is located within a rural area, in an area primarily dominated by pasture, arable land and other heterogeneous agricultural areas. The nearest watercourse to the development site is the is the Palmerstown 08 stream, located approximately 80m north. A number of one-off residences and farmyard complexes exist in the area.

The proposed development is to construct an anaerobic digester and all ancillary site works and services.

The development site is located within a rural area, primarily dominated by pasture, arable land and other heterogeneous agricultural areas. The nearest mapped watercourse to the development site is the Palmerstown stream, located approximately 80m north. A number of one-off residences and farmyard complexes exist in the area.

The proposed development is to construct an anaerobic digester and all ancillary site works and services.

During the site walkover, seven main habitats were identified. The dominant habitat onsite was identified as arable crops (BC1) habitat, with hedgerows and drainage ditches located along the perimeter.

Arable Crops (BC1) is the dominant habitat onsite. It is comprised of Maize (Zea) with come agricultural herbs interspersed. This includes Shepherd's Purse (*Capsella bursa-pastoris*), Redshank (*Persicaria maculosa*), Fat-hen (*Chenopodium album*), Groundsel (*Senecio vulgaris*), Red-dead Nettle (*Urtica* spp.), Knotgrass (*Polygonum aviculare*), Chamomile (*Chamaemelum nobile*), Speedwell (*Veronica* spp.), Prickly Sowthistle (*Sonchus asper*), Rape (*Brassica napus*) and Ramping Fumitory (*Fumaria muralis*).

Recolonising bare ground (ED3) occurs along the boundaries of the site. Plant species recorded include Nettle (*Urtica dioica*), Fat-hen (*Chenopodium album*), Rape (*Brassica napus*), Ramping Fumitory (*Fumaria muralis*), Horsetail (*Equisetum* spp.), Speedwell (*Veronica* spp.), Ivy (*Hedera* spp.), Thistle (*Cirsium* spp.), Wild-oat (*Avena fatua*), Willowherb (*Epilobium* spp.), Bush Vetch (*Vicia sepium*) and Hedge Woundwort (*Stachys sylvatica*).

Hedgerows (WL1) occur along the site boundaries. They are managed as part of the agricultural land management. They are comprised of Hawthorn (*Crataegus monogyna*), Willow Species (*Salix* spp.), Gorse (*Ulex* spp.), Bramble (*Rubus fruticosus* agg.) and Nettle (*Urtica* spp.).

Dry meadows and grassy verges (GS2) are found along some areas of the margins of the arable crops habitat, particularly to the north. The species composition is comprised of False Oat-grass (*Arrhenatherum elatius*), Cocksfoot Grass (*Dactylis glomerata*), Couch Grass (*Elymus repens*), Common Hogweed (*Heracleum sphondylium*), Creeping Thistle (*Cirsium arvense*), Dock (*Rumex* spp.), Bramble (*Rubus fruticosus* agg.), Nettle (*Urtica* spp.), Fat-hen (*Chenopodium album*), Willowherb (*Epilobium* spp.) and Rape (*Brassica napus*). This habitat has links to the Lowland Hay Meadows (*Alcopecurus pratensis, Sanquisorba officinalis*) [6510] however, it is absent of the characteristic high quality and positive indicator species.

Drainage ditches (FW4) are found to the north, south, west and around the perimeter of the small field to the north. Some drains were completely dry while others held stagnant water. The drains to the north were approximately 0.5m in width and the substrate was muddy. Scrub and a steep bank obscured much of the northern drain however, intermittent sections revealed stagnant water within. Water was also heard which likely due to an outflow discharge pipe from the farm to the north. The drain to the south was dry within the western portion however, the southern portion contained stagnant water. Thick vegetation potentially concealed any outflow pipe. Local landowner knowledge notes that this drain would typically flow to the east and connect with other existing drains until they reach the Palmerstown watercourse. This drain measures approximately 1-2m in width. This drainage ditch was heavily vegetated. The drain along the west boundary contained stagnant water. The depth was unclear given that the water was slightly turbid with steep and vegetated banks. There was no flow however, local knowledge confirms that this drainage ditch would typically flow in a southern direction and then west, around the existing constructive wetlands and eventually into the Rathmooney watercourse. Species recorded within the drainage ditches include a mix of dry and aquatic species such as Great Willowherb (*Epilobium hirsutum*), Nettle (*Urtica dioica*), Horsetail (*Equisetum* spp.), Creeping Thistle (*Cirsium arvense*), Nightshade (*Solanum* spp.), False Oat-grass (*Arrhenatherum elatius*), Duckweed (*Lemna* spp.), Reed Canary-grass (*Phalaris arundinaceae*) and Watercress (*Nasturtium officinale*). The drainage ditches onsite provide a direct hydrological connection to the Rogerstown Estuary SAC and SPA.

Spoil and bare ground (ED2) is mainly located at the proposed site entrance. Species recorded include Groundsel (*Senecio vulgaris*), Knotgrass (*Polygonum aviculare*), Sheperd's Purse (*Capsella bursa-pastoris)*, Broadleaved Plantain (*Plantago major*), Thistle (*Cirsium* spp.), Dandelion (*Taraxacum* agg.) and Ryegrasses (*Lolium* spp.).

Other habitats of note outside the red line boundary include **buildings and artificial surfaces (BL3).** This comprises the road network, hardcore areas and agricultural sheds in proximity to the proposed development.

The seven habitats identified as per the Fossitt habitat classification scheme for the proposed development are summarised in **Table 9.9**, and are shown on a habitat map included as **Figure 9.1**.

A photo log and full list of flora recorded are included in **Attachments 9.3** and **9.4** respectively.

Table 9.9: Summary of Habitats Identified at the Proposed Development Site

HABITAT CLASSIFICATION HIERARCHY		
LEVEL 1	**LEVEL 2**	**LEVEL 3**
B – Cultivated and built land	**BL** – Built Land	**BL3** – Buildings and artificial surfaces
E – Exposed rock and disturbed ground	**ER** – Exposed rock	**ED2** – Spoil and bare ground
		ED3 – Recolonising bare ground
F – Freshwater	**FW** – Watercourses	**FW4** – Drainage Ditches
W – Woodland and scrub	**WL** – Linear woodland / scrub	**WL1** – Hedgerows
B – Cultivated and built land	**BC** – Cultivated land	**BC1** – Arable crops
G – Grassland and marsh	**GS** – Semi-natural grassland	**GS2** – Dry meadows and grassy verges

The majority of the site, comprising of arable land, can be considered to be modified and of low ecological value. The remainder of the habitats at the site, including hedgerows, treelines, woodland, scrub and wet grassland, can be considered to be of moderate to high ecological value.

No plant species of conservation significance or third schedule invasive plant species were noted during the site assessment.

Figure 9.1: Habitat Map of Encountered Habitats at the Proposed Development Site, Collinstown, Lusk, Co. Dublin

9.4.3 FAUNA (EXCLUDING BATS)

Terrestrial Fauna

During the site walkover, no evidence of mammal, or evidence of mammals protected, was observed.

There was no evidence of badger, including setts or latrines, at the development site. According to the Badger Setts of Ireland Database, there are no sett records within the site or in its immediate vicinity. However, it is possible that areas of the development site may be used by badgers for foraging.

The proposed development is unlikely to support protected mammals given that a majority of the site is modified. Protected species may forage along the hedgerows. The existing hedgerows will not be removed, retaining a wildlife corridor for any protected species in the area. In addition, the landscape plan seeks to increase biodiversity with additional hedgerow, trees, wildflower and woodland planting. This will offer new foraging opportunities and nesting opportunities to protected species.

Areas of the proposed development site may provide suitable basking and refuge habitat for Viviparous Lizard (*Zootoca vivipara*). No reptiles were recorded onsite.

The following invertebrates were recorded onsite; Cranefly (Tipuloidea), Flies (Diptera), Green-veined White (*Pieris napi*), Speckled Wood (*Pararge aegeria*), Large White (*Pieris brassicae*), Common Carder Bee (*Bombus pascuorum*) and Hoverflies (Syrphidae). None of the invertebrates recorded are protected. All species are commonly found throughout and not listed on any of the red lists for Ireland.

No Marsh Fritillary (*Eurodryas aurinia*) were recorded onsite. The proposed development does not contain suitable habitat to support the larval foodplant, Devil's-Bit Scabious (*Succisa pratensis*). The study area does not contain suitable habitat for protected whorl snail species (*Vertigo* spp.). There are no records of Whorl snail within the 10km tetrad O25.

Mammals, typical of that found throughout the rest of Ireland, which would be expected to be found in the general area include Badger (*Meles meles*), Fox (*Vulpes vulpes*), Otter (*Lutra lutra*), Pine Marten (*Martes martes*), Stoat (*Mustela erminea hibernica*), American Mink (*Mustela vison*), Irish Hare (*Lepus timidus hibernicus*), Rabbit (*Oryctolagus cuniculus*), Hedgehog (*Erinus europaeus*), Red Squirrel (*Sciurus vulgaris*), Wood Mouse (*Apodemus sylvaticus*), Pygmy Shrew (*Sorex minutus*), Greater White-toothed Shrew (*Crocidura russula*), Brown Rat (*Rattus norvegicus*), Bank Vole (*Myodes glareolus*), and Fallow Deer (*Dama dama*).

Aquatic Fauna

A number of drainage ditches containing stagnant water occur along the perimeter of the proposed development. The drainage ditches would have limited potential in supporting protected species given that they rise at the site and the volume of water within in dependant of land drainage and surface water run-off from rainfall. As discussed further in **Section 9.4.7** below, the Palmerstown stream and Rathmooney are located approximately 80m north and 415m south-west of the site respectively. They are the closest mapped watercourses. The drainage ditch to the south is hydrologically connected to the Palmerstown watercourse while the drainage ditch to the west is hydrologically connected to the Rathmooney watercourse.

The development site is located within the current distribution, current range and favourable reference range of otter (*Lutra lutra*) (NPWS, 2019c), while the NBDC has records for otter approximately 4.5km from the development site. However, it is unlikely that the development site would be of significance to otter given the absence of suitable habitats and given that no evidence of otter, including spraints, tracks or holts, at the development site. Watercourses further downstream are more likely to offer suitable habitat for freshwater species, such as Otter.

The proposed development could support the protected amphibians, Common Frog (*Rana temporaria*) and Smooth Newt (*Lissotriton vulgaris*). The hedgerows, dry meadows and recolonising vegetation could offer suitable commuting and hibernation habitat for amphibians. The boundary vegetation will be retained. In addition, the landscape plan includes new habitats. The proposed development will require minor in-stream works within the drainage ditch to the south. This drain was mostly dry. The eastern end held stagnant water however, it was heavily vegetated. There is potential that the proposed in-stream works could have a significant impact on amphibians, should they use the freshwater habitats onsite.

The development site is located outside the current distribution, current range and favourable reference range of Freshwater Pearl Mussel (*Margaritifera margaritifera*) (NPWS, 2019c) and is not located within a river catchment identified as supporting Freshwater Pearl Mussel populations (DoEHLG, 2010). The habitats onsite would not support this species.

The development is located outside the current distribution, current range and favourable reference range of White-clawed Crayfish (*Austropotamobius pallipes*) (NPWS, 2019c). The NBDC has no records of Crayfish within the Nanny-Delvin catchment. The habitats onsite would not support this species.

The development site is located outside the current distribution and current range of Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*) and River Lamprey (*Lampetra fluviatilis*) (NPWS, 2019c). The development site is located within the current distribution, current range and favourable reference range of Atlantic Salmon (*Salmo salar*), but outside the current distribution, current range and favourable reference range of Twaite Shad (*Alosa fallax*), Killarney Shad (*Alosa fallax killarnensis*) and Pollan (*Coregonus pollan*) (NPWS, 2019c). The habitats onsite would not support these species.

9.4.4 FAUNA - BATS

<u>Desk Based Review</u>

The development site is located outside of the current distribution, current range and favourable reference range of Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303] and Natterer's Bat

(*Myotis nattereri*) [1322] but within the current distribution, current range and favourable reference range of Nathusius' Pipistrelle (*Pipistrellus nathusii*) [1317] , Soprano Pipistrelle (*Pipistrellus pygmaeus*) [5009], Leisler's Bat (*Nyctalus leisleri*) [1331], Common pipistrelle (*Pipistrellus pipistrellus*) [1309], Whiskered Bat (*Myotis mystacinus*) [1330] and Brown long-eared Bat (*Plecotus auratus*) [1326]. The development site is located outside the current distribution but within the current range and favourable reference range of Daubenton's Bat (*Myotis daubentonii*) [1314] (NPWS, 2019c).

The NPWS's National Lesser Horseshoe Bat Roost Database was also consulted with regards any roost records for Lesser Horseshoe Bat (*Rhinolophus hipposideros*). The Lesser Horseshoe Bat is mainly confined to the west of Ireland, with the NPWS database indicating that the nearest record for this bat is located a considerable distance from the development site – approximately 173km to the west.

Bat records within the 10km tetrad (O25) and the 2km tetrad (O25D) in which the proposed development is located within are below.

Table 9.10: NBDC bat records within the 10km square (Tetrads O25) of the development site.

NBDC RECORDS FOR BATS	
SPECIES	**TETRAD (10KM)**
Common Pipistrelle (*Pipistrellus pipistrellus*)	O25
Brown Long-eared Bat (*Plecotus auritus*)	O25
Daubenton's Bat (*Myotis daubentonii*)	O25
Lesser Noctule (*Nyctalus leisleri*)	O25
Nathusius's Pipistrelle (*Pipistrellus nathusii*)	O25
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	O25

There are no NBDC bat records within the 2km square (Tetrads O25D) of the development site.

In addition, Bat Conservation Ireland's habitat suitability index available to view on the NBDC online mapping portal, classifies the landscape, within which the site is located, as having a medium habitat suitability for bats, with a score of 31 for the development site and surrounding landscape. The maps are a visualisation of the results of the analyses based on a 'habitat suitability' index. The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The maps are constructed using spatial units of the OSI National Grid. The index presented is for all species combined, in addition to the individual species' indices (Lundy et al., 2011).

Table 9.11: Bat habitat suitability index for the proposed development site

BAT HABITAT SUITABILITY INDEX	
SPECIES	**INDEX**
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	45
Brown long-eared Bat (*Plecotus auritus*)	39
Common pipistrelle (*Pipistrellus pipistrellus*)	43

Lesser Horseshoe Bat (*Rhinolophus hipposideros*)	0
Lesser Noctule (*Nyctalus leisleri*)	44
Whiskered Bat (*Myotis mystacinus*)	39
Daubenton's Bat (*Myotis daubentoniid*)	27
Nathusius's Pipistrelle (*Pipistrellus nathusii*)	6
Natterer's Bat (*Myotis nattereri*)	36

Assessment of Bat Roost Potential – Hedgerows

Hedgerows occur along the perimeter of the existing arable habitat onsite. The hedgerows are managed and kept short. They are classified as having negligible bat roost potential however, they could be used by commuting bats if in the area. One mature tree was identified to the north. This tree was considered as having low bat roost potential given the presence of Ivy and criteria outlined within the PRF's. No crevices or hollows were identified. All hedgerows and trees will be retained as part of this development.

Figure 9.2: Hedgerows and trees with negligible to low bat roost potential. All are to be retained.

9.4.5 AVIFAUNA

Given the agricultural land use of the surrounding area, it would be expected that common grassland and hedgerow species would be present in the area. The following table details the bird species recorded during the site walkover on the 28th of August 2024 and their protection and conservation concern statuses.

Table 9.12: Protection and Conservation Concern Statuses for Recorded Birds

COMMON NAME	SCIENTIFIC NAME	E.U. BIRDS DIRECTIVE	BOCCI* RED LIST	BOCCI* AMBER LIST
Blackbird	*Turdus merula*	-	-	-
Buzzard	*Buteo Buteo*	-	-	-
Robin	*Erithacus rubecula*	-	-	-
Rook	*Corvus frugilegus*	-	-	-
Swallow	*Hirundo rustica*	-	-	✓
Woodpigeon	*Columba palumbus*	-	-	-

**The BoCCI (Birds of Conservation Concern in Ireland) List classifies bird species into one of three lists (Red, Amber or Green) based on their conservation status and conservation priority.*

Records for birds during the site assessment were low. A total of only 6 bird species were recorded during the site walkover. No bird species is red listed while Swallow are amber listed under the BoCCI classification. None of the bird species recorded are listed under Annex I of the E.U. Birds Directive.

9.4.6 RECORDS OF PROTECTED, RARE & INVASIVE SPECIES

National Biodiversity Data Centre Records

Flora and fauna records were reviewed on the National Biodiversity Data Centre (NBDC) website for the proposed development site and the vicinity.

One protected flora species under the Flora (Protection) Order, 2022 (S.I. No. 235 of 2022) was recorded for the previous thirty years for the 10km square (O25) in which the proposed development site is located: Meadow Barley (*Hordeum secalinum*). There are no records of this species within or in proximity of the red line boundary of the site. This is a species associated with damp grassland which does not occur onsite.

Six invasive plant species listed in the Third Schedule of the European Communities Birds and Natural Habitats) Amendment (S.I. No. 355 of 2015) of Regulations 2011-2015 were recorded within the 10km square (Tetrad – O25); Rhododendron ponticum, and Indian Balsam (*Impatiens glandulifera*), Wireweed (*Sargassum muticum*), Water Fern (*Azolla filiculoides*), Sea-buckthorn (*Hippophae rhamnoides*) and Three-cornered Garlic (*Allium triquetrum*).

Endangered flora species of note include Meadow Barley (*Hordeum secalinum*), Round-leaved Crane's-bill (*Geranium rotundifolium*) and Green-winged Orchid (*Orchis morio*).

Fauna records for the previous thirty years were reviewed on the NBDC website for the 10km square (Tetrad – O25) in which the proposed development is located. Bird species of note include Arctic Tern (*Sterna paradisaea*), Barn Owl (*Tyto alba*), Swallow (*Hirundo rustica*), Barnacle Goose (*Branta leucopsis*), Black Guillemot (*Cepphus grylle*), Bar-tailed Godwit (*Limosa lapponica*), Black-headed Gull (*Larus ridibundus*), Black-legged Kittiwake (*Rissa tridactyla*), Black-tailed Godwit (*Limosa limosa*), Brent Goose (*Branta bernicla*), Coot (*Fulica atra*), Goldeneye (*Bucephala clangula*), Grasshopper Warbler (Locustella naevia), Greenshank (*Tringa nebularia*), Guillemot (*Uria aalge*), Kestrel (*Falco tinnunculus*), Kingfisher (*Alcedo* atthis), Linnet (*Carduelis cannabina*), Pochard (*Aythya ferina*), Quail (*Coturnix coturnix*), Redshank (*Tringa totanus*), Sandpiper (*Actitis hypoleucos*), Scoter (*Melanitta nigra*), Shelduck (*Tadorna tadorna*), Snipe (*Gallinago gallinago*), Starling (*Sturnus vulgaris*), Swift (*Apus apus*), Tern (*Sterna hirundo*), Corn Crake (*Crex crex*), Dunlin (*Calidris alpina*), Curlew (*Numenius arquata*), Marsh Harrier (*Circus aeruginosus*), Oystercatcher (*Haematopus ostralegus*), *scirpaceus*), Teal (*Anas crecca*), Tree Sparrow (*Passer montanus*), Wigeon (*Anas penelope*), Woodcock (*Scolopax rusticola*), Golden Plover (*Pluvialis apricaria*), Shag (*Phalacrocorax aristotelis*), Gadwall (*Anas strepera*), Great Black-backed Gull (*Larus marinus*), Great Cormorant (*Phalacrocorax carbo*), Great Crested Grebe (*Podiceps cristatus*), Great Northern Diver (*Gavia immer*), Great Skua (*Stercorarius skua*), Greater Scaup (*Aythya marila*), Greater White-fronted Goose (*Anser albifrons*), Grey Partridge (*Perdix perdix*), Grey Plover (*Pluvialis squatarola*), Hen Harrier (*Circus cyaneus*), Herring Gull (*Larus argentatus*), House Martin (*Delichon urbicum*), House Sparrow (*Passer domesticus*), Jack Snipe (*Lymnocryptes minimus*), Lesser Black-backed Gull (*Larus fuscus*), Lesser Whitethroat (*Sylvia curruca*), Little Egret (*Egretta garzetta*), Little Grebe (*Tachybaptus ruficollis*), Little Gull (*Larus minutus*), Little Tern (*Sternula albifrons*), Long-tailed Duck (*Clangula hyemalis*), Mallard (*Anas platyrhynchos*), Manx Shearwater (*Puffinus puffinus*), Mediterranean Gull (*Larus melanocephalus*), Merlin (*Falco columbarius*), Mew Gull (*Larus canus*), Mute Swan (*Cygnus olor*), Northern Goshawk (*Accipiter gentilis*), Northern Lapwing (*Vanellus vanellus*), Yellowhammer (*Emberiza citrinella*), Northern Pintail (*Anas acuta*), Northern Shoveler (*Anas clypeata*), Northern Wheatear (*Oenanthe oenanthe*), Peregrine Falcon (*Falco peregrinus*), Razorbill (*Alca torda*), Red Kite (*Milvus milvus*), Red Knot (*Calidris canutus*), Red-breasted Merganser (*Mergus serrator*), Red-throated Diver (*Gavia stellata*), Ringed Plover (*Charadrius hiaticula*), Rock Pigeon (*Columba livia*), Roseate Tern (*Sterna dougallii*), Ruff (*Philomachus pugnax*), Sand Martin (*Riparia riparia*), Sandwich Tern (*Sterna sandvicensis*), Short-eared Owl (*Asio flammeus*), Sky Lark (*Alauda arvensis*), Slavonian Grebe (*Podiceps auritus*), Spotted Flycatcher (*Muscicapa striata*), Stock Pigeon (*Columba oenas*), Tufted Duck (*Aythya fuligula*), Twite (*Carduelis flavirostris*), Water Rail (*Rallus aquaticus*) and Whooper Swan (*Cygnus cygnus*).

Fauna of note within the tetrad O25 include the protected species Common Frog (*Rana temporaria*), Smooth Newt (*Lissotriton vulgaris*), Basking Shark (*Cetorhinus maximus*), Common Lizard (*Zootoca vivipara*), Common Seal (*Phoca vitulina*), Grey Seal (*Halichoerus grypus*), Minke Whale (*Balaenoptera acutorostrata*), Northern Bottlenose Whale (*Hyperoodon ampullatus*), Striped Dolphin (*Stenella coeruleoalba*), Brown Long-eared Bat (*Plecotus auritus*), Daubenton's Bat (*Myotis daubentonii*), Badger (*Meles meles*), Pygmy Shrew (*Sorex minutus*), Otter (*Lutra lutra*), Lesser Noctule (*Nyctalus leisleri*), Nathusius's Pipistrelle (*Pipistrellus nathusii*), Pine Marten (*Martes martes*), Hedgehog (*Erinaceus europaeus*), Pipistrelle (*Pipistrellus pipistrellus sensu lato*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*).

Fauna records for the previous thirty years were reviewed on the NBDC website for the 2km square (O25D) in which the proposed development is located. Bird species of note recorded include Swallow (*Hirundo rustica*), Black-headed Gull (*Chroicocephalus ridibundus*), Black-tailed Godwit (*Limosa limosa*), Kestrel (*Falco tinnunculus*), Linnet (*Carduelis cannabina*), Pheasant (*Phasianus colchicus*), Snipe (*Gallinago gallinago*), House Martin (*Delichon urbicum*), Starling (*Sturnus vulgaris*), Swift (*Apus apus*), Wood Pigeon (*Columba palumbus*), House Sparrow (*Passer domesticus*), Eurasian Curlew (*Numenius arquata*), Eurasian Teal (*Anas crecca*), Eurasian Tree Sparrow (*Passer montanus*), Mallard (*Anas platyrhynchos*), Red Kite (*Milvus milvus*), Rock Pigeon (*Columba livia*), Sky Lark (*Alauda arvensis*), Stock Pigeon (*Columba oenas*) and Yellowhammer (*Emberiza citrinella*). There were no other fauna species of note recorded within the O25D 2km Tetrad.

National Parks and Wildlife Services Records

The National Parks and Wildlife Service (NPWS) were contacted in relation to protected species records. Panther were informed in relation to a separate development, that the NPWS are experiencing technical issues which may be causing the delay. To date, Panther have not received a response in relation to data for this development.

9.4.7 WATER QUALITY

The proposed development is located within the Nanny-Delvin catchment (08) and the Palmerstown 010 Sub Catchment.

The Palmerstown 08 stream is located approximately 80m north of the site at its closest point. Stormwater from the site would be attenuated by two detention basins to the south of the site, which would provide a combined storage capacity of 2,453.62m^3. Stormwater from the site is ultimately directed to a drainage ditch to the south that is likely connected to the Palmerstown 08 stream. The Palmerstown flows in a mostly south-easterly direction for approximately 5km where it enters the Rogerstown Estuary and becomes part of the Rogerstown Estuary SAC and SPA. From here, the Rogerstown Estuary enters the Northwestern Irish Sea. The Rathmooney (EPA code: 08R18 – Order 1) is located approximately 447m to the south-west of the proposed development. It flows in a mostly south-easterly direction for approximately 4.9km downstream where it joins the Palmerstown confluence. The site is, thus, connected to the Rogerstown Estuary, which is designated as an SAC and pNHA (Site Code: 000208), SPA (Site Code: 004015), RAMSAR site (ID: 412) and Nature Reserve.

No watercourse within the Nanny-Delvin catchment is designated as a Salmonid Water under EC (Quality of Salmonid Waters) Regulations (S.I. No. 293 of 1988).

The Environmental Protection Agency (EPA) does not undertake surface water monitoring within the Palmerstown 010 Sub Catchment. The most recent WFD Status for the Palmerstown 010 river was assessed by a modelling technique which yielded a Poor value, albeit with a low confidence. The risk of the Palmerstown 010 failing to meet its WFD objectives by 2027 is currently under review.

Significant pressures have been identified for waterbodies that are At Risk of not meeting their water quality objectives under the Water Framework Directive. Within the Palmerstown_SC_010 subcatchment, pressures to a number of waterbodies have been identified, including impacts from urban run-off or diffuse urban pressures and from hydromorphology, which include sediment/siltation pollution and alteration to the physical environment. None of these pressures have been identified at the Palmerstown 08 stream or to any watercourse which would be considered downstream from the proposed development.

The proposed site would require an Industrial Emissions Licence issued by the Environmental Protection Agency (EPA), which would establish surface water monitoring points locations for its stormwater discharge.

9.5 IMPACTS

9.5.1 DETERMINATION OF ECOLOGICAL VALUE

The ecological value of the habitat types and species identified at the proposed development site has been assessed following the criteria outlined in the National Roads Authority (NRA) guidelines (2009). **Tables 9.13** and **9.14** below detail the habitats recorded and potential species, and their associated ecological value.

Table 9.13: Ecological Value of Identified Habitats at the Proposed Development

HABITAT TYPE	HABITAT RATING	KEY ECOLOGICAL RECEPTOR?
Arable crops (BC1)	Local importance, lower value	No. Species poor modified habitat. Low ecological value.
Recolonising bare ground (ED3)	Local importance, lower value	No. Area of disturbed ground with recolonising vegetation. Low ecological value.
Spoil and bare ground (ED2)	Local importance, lower value	No. Species poor modified habitat. Low ecological value.
Dry meadows and grassy verges (GS2)	Local importance, low to moderate value	No. While this is a semi-natural habitat, no works will be undertaken in this area.
Hedgerows (WL1)	Local importance, higher value	No. While this habitat is a semi-natural habitat and may provide opportunities for bird nesting and foraging for bats, no works are proposed within this area.
Buildings and artificial surfaces (BL3)	Local importance, lower value	No. Comprised of existing buildings and structures and yard areas. Little to no vegetation present. Low ecological value.
Drainage ditch (FW4)	Local importance, moderate value	Yes. While this is a modified habitat with limited potential to support protected species (Amphibians), it is hydrologically connected to watercourses downstream that may support protected species.

Table 9.14: Ecological Value of Species Present / within the Vicinity of the Development

SPECIES	SPECIES RATING	KEY ECOLOGICAL RECEPTOR?
Badger	Local importance, higher value	Yes. While no evidence of badger was recorded within the vicinity of the development site, it is possible that areas of the site are used for foraging.
Otter	Local importance, higher value	Yes. While no evidence of Otter was recorded within the vicinity of the development site, it is possible that areas of the site are used for foraging. The closest mapped watercourse is located 80m to the north.
Pine Marten	Local importance, higher value	No. No evidence of pine marten was recorded within the vicinity of the development site. No areas of woodland within the boundary.
Bats (foraging and commuting habitat only – no bat roosts identified)	Local importance, higher value	Yes. While bats are likely to utilise the areas of hedgerows at the site, no works are proposed for these areas.
Hare	Local importance, higher value	No. Not recorded within the vicinity of the proposed site. Site has limited potential to support this species.
Other Fauna	Local importance, low to high value	No. Limited sightings / evidence of other fauna. Site has limited potential to support other fauna species.
Breeding Birds	Local importance, higher value	Yes. All birds, their nests, eggs and young are protected under the Wildlife Act.
Aquatic Fauna	Local importance, low to high value	Yes. The drainage ditches are hydrologically connected to the Palmerstown and Rathmooney watercourses.
Common Lizard	Local importance, higher value	Yes. Presumed present, but likely in low numbers. Protected under the Wildlife Act.

9.5.2 CONSTRUCTION PHASE

Designated Sites – SAC and SPA Sites

The proposed development does not directly impinge on any part of a European site and as such would not be expected to have any in-situ effects upon a protected site through loss or destruction of habitat, fragmentation of habitat, disturbance of habitat or direct reduction in species density or diversity.

As discussed in detail in the Natura Impact Statement prepared for the project (Ref. No. PE_NIS_10228), and within **Section 8.4.1** above, the European sites considered to be within the zone of influence of the proposed development are Rogerstown Estuary SAC (Site Code:

000208), the Rogerstown Estuary SPA (Site Code: 004015) and the North-west Irish Sea SPA (Site Code: 004236), due to hydrological connectivity and / or distance from the proposed development site. The Rogerstown Estuary SAC and Rogerstown Estuary SPA are the closest protected sites to the development, located approximately 4.4km to the south while the North-west Irish Sea SPA is located approximately 4.9km to the south-east. The Rogerstown Estuary is also designated as a pNHA. Given the presence of designated sites within the vicinity of the development and direct hydrological connection, potential ex-situ impacts must also be considered.

During the construction phase of projects, a deterioration in water quality can arise through the release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils). A deterioration in water quality has the potential to have an adverse impact upon the qualifying interests of the Rogerstown Estuary SAC, Rogerstown Estuary SPA and the north-west Irish Sea SPA, particularly qualifying interests which have conservation objectives relating to water quality. Minor in-stream works will be required within a drainage ditch to the south. These works will include the installation of two new pre-cast concrete headwalls as part of the surface water drainage network. In-stream works have the potential to cause a deterioration in water quality due to the release in sediments and chemicals downstream.

It is not considered that the proposed development site would contain the habitats or species for which the Rogerstown Estuary SAC is designated for. There are no coastal or marine habitats present onsite, therefore the site does not have any potential links to estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], *Salicornia* and other annuals colonising mud and sand [1310], Atlantic salt meadows [1330], Mediterranean salt meadows [1410], white dunes [2120], grey dunes [2130]. Therefore, no direct impact is to these protected habitats is anticipated. However, given that the proposed development will require minor in-stream works within a drainage ditch to the south, there is potential for a deterioration in water quality to occur. Threats and pressures to these habitats include the modification of hydrological flow or physical alteration of waterbodies for agriculture, residential/recreation activities/structures, agricultural activities and marine aquaculture generating marine pollution. There will be no alteration to the hydrological flow of watercourses downstream as the drainage ditch will not be dammed. While the risk for a potential deterioration in water quality is considered low, there is potential for a deterioration in water quality of some of the qualifying habitats downstream.

With regards wildfowl species, none of the special conservation interests of the Rogerstown Estuary SPA or North-west Irish Sea SPA were recorded during the site walkover. The proposed development would not offer suitable breeding or nesting habitat for any of the qualifying interests. The drainage ditch would also provide very limited foraging opportunities. The proposed development is also absent of any potential foraging habitat for a majority of the listed species. However, Greylag Geese and Black-headed Gull are known to feed on the roots of plants and insects within arable lands. Common Gull are also known to feed upon terrestrial and aquatic invertebrates while the Lesser Black-backed Gull is known to feed on small birds. There are NBDC records for special conservation interests for the 2km square (O25D) in which the development is located: Black-tailed Godwit (*Limosa limosa*) and Black-headed Gull (*Chroicocephalus ridibundus*). While the proposed development could support the foraging habitats of the aforementioned species, given the surrounding arable lands and lands within proximity of the SPA, it is not anticipated that the proposed development would significantly limit suitable foraging habitat. However, an indirect impact could occur via a deterioration in water quality during the construction phase of the development.

The potential disturbance on protected species due to construction noise would not be considered significant, given the transient nature of works, the construction timeframe (18 months) and given the distances between the development site and designated sites (with the nearest site located approximately 4.4km from the development). Fauna in the area with be accustomed to noise from human, commercial (food processing facility), vehicular and agricultural activities during the operational phase of the development. Much of the processes during the operational phase that could generate noise would be internal as opposed to external noise.

The potential disturbance on protected habitats due to dust during the construction phase would not be considered significant, given the transient nature of construction works, the construction timeframe (18 months) and given the distance to the nearest European site (greater than 4km).

Activities as part of the construction of the development would not have the potential to cause a significant impact upon designated sites due to invasive species. There would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used for site levelling and site landscaping, therefore no importation of topsoil or subsoil would be required as part of the development works. In addition, no third schedule invasive species were recorded onsite.

Construction works would be approximately 18 months in duration. Construction works would be confined to the proposed development footprint. With regards to the proposed stormwater drainage network, two headwalls will be installed at the drainage ditch to the south, with potential for impacts caused by run-off from construction activities. With appropriate control measures implemented during the construction stage, it is deemed that the risk of the development impacting upon water quality would be greatly reduced.

It is considered that much of the suspended solids onsite would be retained onsite during the construction phase as surface water run-off would percolate to ground. However, during the proposed instream works, there is potential for suspended solids and hydrocarbons/chemicals to be carried downstream and into the Natura 2000 sites. A deterioration in water quality has the potential to have an indirect impact on the qualifying interests of the Rogerstown Estuary SPA and the North-west Irish Sea SPA by having a significant impact on prey.

The risk of water quality deterioration as a result of uncured concrete would be considered low, given that precast concrete would be used where possible and surplus concrete would be returned to the batching plant. The proposed headwalls will be comprised of pre-cast concrete.

While the risk is considered low, given that in-stream works will be required within a drainage ditch that is hydrologically connected to the Rogerstown Estuary SAC/pNHA, the Rogerstown Estuary SPA and the North-west Irish Sea, construction mitigation measures will be implemented to prevent a deterioration in water quality.

Designated Sites – Skerries Islands NHA

As noted in **Section 9.4.1**, one NHA site, Skerries Islands NHA (Site Code: 001218), is considered to be within the potential zone of influence of the proposed development site. This NHA is also designated as Skerries Islands SPA, which is discussed above.

The proposed development does not directly impinge on this NHA site and therefore would not be expected to have any in-situ effects through loss or destruction of habitat, fragmentation of habitat or disturbance of habitat.

It is not considered that the proposed development has the potential to impact upon this NHA site due to invasive species, given that there would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used in site levelling and landscaping, therefore there would be no requirement for importation of topsoil or subsoil.

It is not considered that the proposed development would have the potential to impact upon Skerries Islands NHA due to a potential deterioration in water quality, given that the NHA site is not located directly downstream from the proposed development site and therefore it is considered that there is a weak hydrological connection to the development.

Habitats and Flora

The construction phase of the development would result in a direct and permanent loss of the existing habitats as follows: Arable crops (BC1) and spoil and bare ground (ED2). There are no additional vegetation or hedgerow removals planned as part of this development. The habitats onsite are not linked to any protected habitat or Natura 2000 site. There will be no demolition works as part of the proposed development.

The total area of the proposed development is approximately 71,600 m^2 with Arable crops (BC1) occupying most of the site. Arable crops (BC1) habitat is considered modified and of low ecological value, therefore the loss of this habitat would not be considered significant. The landscape plan seeks to enhance the existing hedgerows with additional hedgerow planting proposed. It also incorporates new tree, wildflower meadows, wetland planting and woodlands. The planting schedule includes native and non-native non-invasive species within its design. The landscape plan will increase the overall species diversity and biodiversity of the area.

No rare plant species or protected flora under the Flora (Protection) Order 2022, were recorded within the proposed development area. Therefore, the proposed development would not be considered to impact upon any rare or protected flora species.

During construction works, there is potential for invasive species to be introduced to the development site through the movement of materials, such as soil and stone and the arrival of construction plant and equipment from an area with invasive species.

Under Regulation 49(2) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to any plant which is included in Part 1 of the Third Schedule shall be guilty of an offence. Materials containing invasive species such as Japanese Knotweed are considered "controlled waste" and, as such, there are legal restrictions on their handling and disposal. Under Regulation 49(7) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), it is a legal requirement to obtain a license to move "vector materials" listed in the Third Schedule, Part 3.

The potential risk of introducing invasive species during the construction phase would be considered low, as no invasive flora species of concern were recorded during the site assessment and given that there would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used for site levelling and site landscaping, therefore no importation of topsoil or subsoil would be required as part of the development works. Any stone required would be sourced locally where possible and would be inspected prior to arrival onsite for the presence of invasive species.

The construction works contractor would also ensure that all equipment and plant would be thoroughly washed and inspected prior to arriving to the development site. Therefore, it is considered that there would be no significant risk of introducing invasive species during construction works from importation of materials or the arrival to site of construction plant and equipment.

Dust emissions may arise during construction activities, in particular during earth-moving works, which may have the potential to impact upon photosynthesis, respiration and transpiration processes of flora due to the blocking of leaf stomata. However, given the transient nature of construction works, the construction timeframe (18 months) and standard working practices including dust control, the potential impact to flora would not be considered significant.

The potential impact upon habitats and flora due to a deterioration in water quality is discussed in detail below, while further information on potential impacts on water quality is addressed in **Section 10**.

Fauna and Avifauna

As noted above, most of the proposed development footprint would take place within the arable crops (BC1) habitat. Arable crops habitat is considered modified and of low ecological value, therefore, the potential impact upon fauna due to habitat loss or habitat fragmentation would be reduced. As noted above, there is potential that the Arable crops habitats could support some of the qualifying interests of the Rogerstown Estuary SPA and the North-west Irish Sea SPA however, these species are most likely to find more suitable habitat within the vicinity of the SPA's. Also, the arable land within the surrounding area would still be available. Therefore the proposed development would not be expected to significantly limit potential foraging habitat. None of the qualifying interests were recorded during the site assessment.

The Rogerstown Estuary is designated as a Ramsar site. This site is important is important for a number of wading birds, particularly Light-bellied Brent Geese (*Branta bernicla hrota*). During the autumn and winter months it is found on coastal estuaries and grassland habitats. The grasslands onsite are not significant and therefore would not support this species. This is a winter migrant and therefore, leaves Ireland during the breeding season. Therefore, no direct impact is expected for any species utilising this site. Water quality impacts are discussed further below.

There will be no demolition works or as part of the proposed development.

Direct mortality of fauna may occur due to the use of heavy construction plant and machinery. Mortality of fauna is most likely to occur during the mammal and bird breeding season, when young are at their most vulnerable.

In the event any hedgerows are to be removed (although not proposed), tree removal would not take place during the bird nesting season (1st of March – 31st of August), greatly reducing the potential for mortality. If it is necessary to undertake some hedgerow / scrub removal works during the bird nesting season then in such instances, a suitably qualified ecologist would be engaged to carry out inspections for the presence of breeding birds prior to any clearance works taking place. Where nests are present, the ecologist would make a decision as to whether a "Licence to interfere with or destroy the breeding places of any wild animals", is required from the NPWS. Alternatively, the ecologist may establish a suitable buffer zone around an active nest, with removal works rescheduled until chicks have fledged. Where no evidence of nests are found during inspection, hedgerow / scrub removal works must be undertaken within three days of inspection.

No protected fauna, or evidence of protected fauna, were noted as present on the development site. There was no evidence of badger, including setts or latrines, or evidence of otter including holts, slides, tracks or spraints. Should protected fauna be present, it is not anticipated that construction works would have a significant impact owing to the extent of the development footprint, the habitat types impacted upon and the short duration of construction works.

In the event a protected species is encountered during construction works, all works will immediately cease and an investigation will be undertaken by an ecologist. Where required, an officer of the NPWS would be notified prior to the resumption of construction works.

Construction work has the potential to disturb fauna due to the generation of construction noise. However, construction noise would not be considered to pose a significant risk to fauna owing to the transient nature of works, the construction timeframe (18 months) and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice. Where possible, no construction works would be conducted outside of normal working hours, therefore there would be no disturbance to nocturnal species.

The potential impact upon fauna due to a deterioration in water quality is discussed in the "*Water and Biodiversity*" section below.

Bats

Construction works have the potential to result in direct and indirect impacts on local populations of bats through habitat loss (vegetation clearance, tree felling) and disturbance (increased lighting) potentially affecting existing foraging areas and commuting routes.

The majority of bat species utilise linear features, such as hedgerows and treelines and areas of mature vegetation for foraging and commuting. There will be no hedgerow or tree removal as part of the proposed development. Therefore, it is not anticipated a potential impact upon bat species due to habitat loss.

The proposed planting of new hedgerows and trees will create new foraging/commuting and potential bat roost habitats. While the linear features will ensure continued connectivity to the surrounding landscape. The areas of wildflower meadows and retention of existing drainage ditches will increase invertebrates in the area to support bats.

Artificial lighting during the construction phase has the potential to negatively impact upon bat species, as illumination can impact upon their roosting sites, commuting routes and foraging areas. While some bat species, such as Leisler's bats (*Nyctalus leisleri*), may take advantage of prey concentrating around light sources, other bat species are sensitive to lighting and will avoid artificially lit up areas. This can potentially sever commuting and foraging routes. As noted above, construction works would not be conducted outside of normal working hours where possible, which would considerably reduce the potential impacts upon bat species. Measures with regards artificial lighting, as outlined in **Section 9.6.1**, would be required to be implemented to reduce the potential impact of light pollution.

Water Quality and Biodiversity

The construction phase of projects has the potential to impact upon flora and fauna due to a deterioration in water quality. Risks to water quality could arise due to the potential release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils).

Suspended solids could become entrained in surface water run-off and could affect aquatic habitats through deposition. An increase in sediments has the potential to impact upon fish by damaging gravel beds required for spawning, smothering fish eggs and in extreme cases, by interfering with the gills of fish. An increase in suspended solids has the potential to reduce water clarity, which can impact the light penetration of water and may also affect certain behaviours of aquatic fauna such as foraging success. Aquatic flora and fauna could also be impacted upon by an increase in nutrients which are bound to suspended solids. A significant increase in nutrients can result in excessive eutrophication, leading to deoxygenation of waters and subsequent asphyxia of aquatic species.

A potential source of chemical contamination of surface water would be from the release of hydrocarbons (oils, fuels) from construction plant and equipment. Hydrocarbons can affect water quality, potentially resulting in toxic and / or de-oxygenating conditions for aquatic flora and fauna. Pollution could occur in a number of ways, such as neglected spillages, the storage handling and transfer of oil and chemicals and refuelling of vehicles.

Another potential source of contamination of surface water would be the release of uncured concrete. In the event of uncured concrete entering a waterbody, the pH would be altered locally, potentially leading to the death of aquatic flora, fish and macroinvertebrates and alteration to the waterbody substrate.

During the construction phase, in-stream works are proposed within a drainage ditch along the southern boundary. This will include the installation of two new headwalls as part of the surface water drainage network. This drainage ditch flows eastwards where it enters the Palmerstown watercourse. The proposed development will also be constructed in proximity to a drainage ditch along the western boundary. This drainage ditch ultimately connects to the Rathmooney watercourse. Both watercourses flow into the Rogerstown Estuary. This provides a direct hydrological connection to the Rogerstown Estuary SAC/pNHA, the Rogerstown Estuary SPA and the North-west Irish Sea SPA. While the Conservation Objectives reports for these Natura 2000 sites does not include water quality attributes, the threats and pressures for the Rogerstown Estuary SAC include pollution as a result of residential and agricultural activities. The habitats that could potentially be impact upon by the proposed in-stream works include Estuaries [1130], Mudflats and Sandflats [1140], Salicornia and other annuals colonising mud and sand [1310], Atlantic Salt Meadows [1330] and Mediterranean Salt Meadows [1410]. A deterioration in water quality can also impact upon the prey species of the avifauna listed in the aforementioned SPA's. This would indirectly have an impact on the qualifying bird species.

There are no anticipated impacts due to a deterioration in water quality during the operational phase. As detailed in the above sections, there is potential for an impact to occur during the construction phase as a result of the in-stream works. Construction mitigation measures will be implemented during the course of the construction and in-stream works to prevent any deterioration in water quality of protected sites downstream. These measures are outlined in **Section 9.6.1**, and are further detailed in **Section 10**.

9.5.3 OPERATIONAL PHASE

Designated Sites – SAC and SPA Sites

The potential impacts of the proposed development upon designated sites due to land-take is discussed in **Section 9.5.2**. As the development site does not directly impinge upon any part of a European site, no in-situ effects upon designated sites are expected due to loss or destruction of habitat, fragmentation of habitat, disturbance of habitat or direct reduction in species density.

It is considered that there would be no potential for any adverse impacts upon the special conservation interests of Rogerstown Estuary SPA and the North-west Irish Sea SPA due to a change in land-use at the development site. No areas of lakes, reservoirs, significant areas of grassland, estuaries, mudflats, sandy coasts, marshes, coastal habitats, machair, wet grassland, cliffs, caves or rivers occur within or adjacent the red line boundary. The drainage ditches onsite would be of limited value to qualifying interests in terms of nesting, breeding and their diet. While the arable land could offer potential foraging habitat for some of the qualifying interests, the loss of this habitat would not be significant given the distance to the SPA, the availability of arable land within the surrounding environment and the availability of more suitable habitats in proximity of the SPA's.

It is not envisaged that protected species would be adversely impacted upon by the proposed development due to noise generated by the proposed development or by noise generated from the associated site traffic, given the nature of the proposed development and the distances to the designated sites (approximately 4.4km). Fauna would be accustomed to noises commonly audible within the surrounding environment such as agricultural and commercial activities. In addition, much of the processes during the operational phase that could generate noise would be internal as opposed to external noise.

It is considered that the proposed development would not have the potential to significantly impact upon air quality within the area, with the potential to adversely impact upon Rogerstown Estuary SAC/pNHA, the Rogerstown Estuary SPA, the North-west Irish Sea SPA or any Ramsar site. Combustion processes from the proposed boilers, the CHP unit and from the exceptional use of the emergency flare will generate ammonia emissions to the atmosphere. Emissions of ammonia to the atmosphere is undesirable from an ecological point of view, as it can have toxic, eutrophic and acidifying effects on certain ecosystems. In particular, the presence of high ammonia levels in peatland ecosystems has been found to inhibit the growth of certain moss species, allowing sedge and grass species to outcompete.

An Air Quality Impact assessment Report was undertaken by Katestone Environmental Ireland Ltd. It states that "*In Ireland, The Environmental Protection Agency (EPA) guidance entitled Assessment of the impact of ammonia and nitrogen on Natura 2000 Sites from intensive agricultural installations. (EPA, 2023) stipulates that the dispersion modelling predictions of emissions of ammonia from intensive agricultural facilities at sensitive ecological locations on Natura 2000 sites should be assessed against a threshold of 1% of:*

- *The critical load of nitrogen*
- *The critical level for ammonia*".

While ammonia emissions would increase in response to the combustion processes to be carried out at the proposed development site, according to the Air Quality Assessment report, predicted emissions will not result in significant concentrations in areas beyond the site (as discussed in **Section 5**). The report also stated that predicted deposition rates of nitrogen are below the 1% threshold of significance at all sensitive ecological locations for the operation of sources of emissions at the proposed development in isolation. Therefore, no potential significant impacts are anticipated upon designated sites due to the proposed development in relation to air emissions.

It is not anticipated that the operational phase of the development has the potential to impact upon the listed habitats and species of the Rogerstown Estuary SAC, the Rogerstown Estuary SPA and the North-west Irish Sea SPA due to deleterious effects on water quality. Only clean surface water will be discharged to the drainage ditch along the southern boundary. Both detention basins will be sealed and impermeable. There will be no process effluent discharge from the site. Soiled water would be spread on lands owned by the applicant, will be in compliance with setback distances and application rates defined within the Nitrates Regulations (as amended) and calculated within the annual Nutrient Management Plans. This is discussed further below in the ***Water quality and Biodiversity*** section.

Designated Sites – Skerries Islands NHA

The proposed development does not directly impinge on Skerries Islands NHA (Site Code: 001218) site and therefore would not be expected to have any in-situ effects through loss or destruction of habitat, fragmentation of habitat, disturbance of habitat or direct reduction in species density.

It is not considered that the proposed development would have the potential to significantly impact upon air quality within the area, with the potential to adversely impact upon the NHA. As discussed in the "*Designated Sites – SAC and SPA Sites*" section above, while ammonia emissions would increase in response to the combustion processes to be carried out at the proposed development site, these are not anticipated to result in a significant impact to any designated sites.

The proposed development site has a weak hydrological connection to the Skerries Islands NHA. Therefore, the proposed development would not have the potential to impact upon the NHA due to a potential deterioration in water quality.

The development could result in a potential impact upon the biodiversity of designated sites through the landspreading of digestate as organic fertiliser, either through pollution of waterbodies or the enrichment of natural vegetation. However, as noted in the section above, digestate is and would continue to be, collected by registered contractors / farmers, for application to lands held by the applicant and delivered to partner farmers in compliance with the Nitrates Regulations (S.I. No. 113 of 2022) and Nutrient Management Plan.

Habitats and Flora

The proposed development would result in a change of habitat use at the proposed development footprint, resulting in the loss of arable crops (BC1) and spoil and bare ground (ED2). The loss of BC1 and ED2 habitat would not be considered significant, given that these habitats are modified and of low ecological value. The hedgerows (WL1) and dry meadows grassy verges (GS2) and recolonising bare ground (ED3) are mostly comprised of native species. The hedgerows would be considered as having a higher ecological value. The GS2 and ED3 habitats do not encompass a significant area with species commonly found throughout Ireland. However, there will be no removal of any boundary vegetation including hedgerows and trees as part of the proposed development. The landscape plan includes for the planting of native and non-native species within its design. New hedgerows, tree planting, wetland planting, wildflower meadows and woodland are proposed. This will create new opportunities for nesting birds, foraging bats, commuting mammals and invertebrates.

As discussed in the "*Designated Sites – SAC and SPA Sites*" section above, the proposed development would generate potential air quality pollutants. However, the air quality impact assessment report has determined that "*Predicted concentrations of NO_3 comply with the 1% threshold of significance at all sensitive ecological locations for the operation of sources of emissions at the proposed development in isolation. Predicted concentrations of NH_3 comply with the 1% threshold of significance at all sensitive ecological locations for the operation of sources of emissions at the proposed development in isolation. Predicted deposition rates of nitrogen comply with the 1% threshold of significance at all sensitive ecological locations for the operation of sources of emissions at the proposed development in isolation.*"

Fauna and Avifauna

The alteration in habitat type at the site due to the proposed development would not be anticipated to have a significant impact upon the fauna of the area. A majority of the proportion of the land take would comprise of arable crops (BC1) which is considered modified and of low ecological value and therefore this land take would not be considered significant. As noted in **Section 8.5.2**, the loss of this habitat would not be considered to have a significant impact on any birds listed within the Rogerstown Estuary SPA and the North-west Irish SEA SPA in terms of foraging habitat. These species were not recorded onsite during the site assessment.

The new proposed landscaping will have a positive impact on fauna and avifauna by creating more diversity in habitats, retaining the boundary vegetation, providing new nesting opportunities and retaining a wildlife corridor along the existing hedgerows. Therefore, the proposed development would not be expected to limit foraging habitat for any protected mammals in the area.

It is not envisaged that fauna would be significantly impacted upon by the development due to noise. No significant additional noise would be anticipated from the proposed AD Plant. Fauna present within the proposed site or immediate area would likely be accustomed to the noise environment from the existing Country Crest's facilities to the west of the proposed site and agricultural activities.

The proposed development will include the handling of organic materials which could attract rodents. Wastes will be properly managed and any rodenticide usage will be in accordance with the Campaign for Responsible Rodenticide Use (CRRU) Code.

The potential impact upon fauna due to a deterioration in water quality is discussed in the ***Water Quality and Biodiversity*** section below.

Bats

As noted in **Section 9.5.2** above, artificial lighting can potentially impact upon bat roosting sites, commuting routes and foraging areas. In the absence of mitigation measures, operational lighting has the potential to result in an adverse impact upon bat species.

Operational phase impacts on bats would be associated with permanent lighting associated with the facility. It is proposed to install 6m high luminaires in the external areas of the site. These would be strategically located and tilted to avoid direct lighting of linear features, such as hedgerows or treelines, that may be used by bats for commuting or foraging. It is therefore considered that the proposed development would not have significant impact upon bat species, should they be present within the immediate vicinity of the development site.

The existing hedgerows are to be retained. While these were considered as having negligible bat roost potential, they may be used by foraging and commuting bats. The retention and addition of linear features will allow for continued connectivity to the surrounding landscape and provide new foraging opportunities.

The operational phase of developments can result in an increase in human activity, which can potentially impact upon bat species due to increased noise and increased traffic. However, the proposed development would not be considered to cause a significant increase in human activity, given the nature of the development (anaerobic digestion). Therefore, no significant impact upon bat species is anticipated.

Water Quality and Biodiversity

It is not anticipated that the operation of the proposed development would have a significant impact upon aquatic flora or fauna.

As discussed in **Section 8.5.2**, no significant impact on water quality would take place due to drainage from the site. Stormwater from the site comprises of clean rainwater run-off from the roofs and hardstanding areas.

The proposed surface water drainage network will be divided into two catchments within the red line boundary of the proposed development. In Catchment 1, surface water comprised of rainwater runoff from roofs and hardcore areas will be directed to an impermeable detention basin to the south. From here, surface water will pass through a Klargester by-pass interceptor prior to dicharging into an existing drainage ditch along the southern boundary of the site. A hydrobrake will be fitted to restrict the flow of water at a rate of 8.47 l/sec. A penstock valve is to be installed upstream of the flow control to stop flow in the event of an emergency. This will be connected to a SCADA alarm system in the event of a leak occurring and to prevent any contaminated surface water from leaving ths site by automatically closing the valve. The detention basin will be sealed. The total attentuation required for Catchment 1 is 1101.9m^3 for the 1 in 30 year return period and 1504.5m^3 for the 1 in 100 year return period which includes the additional increment in accordance with GDSDS requirements. The detention basin will provide a total storage volume of 1841.12m^3.

In catchment 2, surface water comprised of rainwater run-off from roofs and hardstanding areas (paths, roads and lagoons) will be directed to the impermeable detention basin 2 to the south. Surface water from this detention basin will discharge to the drainage ditch to the south and pass through the same interceptor as in catchment 1. The allowable outflow for the Catchment 1 has been calculated for the 1 in 30 year return period and the 1 in 100 year return period using the GDSDS and is 12.80l/sec and 15.85l/sec respectively. Due to the unfavourable infiltration rates and the limited space available onsite where long-term storage can be provided the allowable outflow from the site will be restricted to QBAR. QBAR for the proposed site was calculated as 6.101l/sec and this will be adopted for the allowable outflow rate. The total attenuation volume required for Catchment 1 is 334.7m3 for the 1 in 30 year return period and 472.6m3 for the 1 in 100 year return period which includes the additional increment in accordance with GDSDS requirements. Detention Basin 2 provides a total storage volume of 612.5m3.

Surface water entering the drainage ditch will be clean prior to discharging into the Palmerstown watercourse.

There are no process effluent emissions from the site, with all liquid digestate stored within covered earth lagoons, awaiting collection for landspreading activities. The two lagoons have been designed to ensure the site has sufficient storage capacity for the volume of liquid digestate generated onsite. The extraction location of the proposed lagoons will include a spill collection chamber, as discussed in **Section 2**.

It is intended to use the solid and liquid fractions of the digestate generated by the proposed development as organic fertilisers, which would have the potential to impact upon biodiversity of designated sites either through pollution of waterbodies or the enrichment of natural vegetation. The transport and spreading of the organic fertiliser would be managed in compliance with the Nitrates Regulations (S.I. No. 113 of 2022) and Nutrient Management

Plan (See Attachment 2.4). The regulations provide for controls designed to protect groundwater and surface water from impacts due to the application of fertiliser on agricultural lands. Acceptable spreading times are limited, prohibitions on weather and ground conditions are defined and set back distances from waterbodies and wells/springs and limitations for areas of extreme groundwater vulnerability are established. This would minimise the risk of any pollution occurring and protected sites being impacted due to the spreading of organic fertilisers.

As digestate from the development is a replacement for other chemical and organic fertilisers on the current, proposed and any future potential spreadlands, it is considered that the impact of manure being used as a fertiliser would have a neutral to no significant additional impact upon the biodiversity of landspreading areas.

The landspreading of organic fertilisers has the potential to impact upon biodiversity, either through pollution of waterbodies or the enrichment of natural vegetation. However, as discussed in the "*Designated Sites*" sections above, digestate is, and would continue to be, collected by registered contractors / farmers, for application to lands held by the applicant and by third parties in the area. The transport and spreading of the manure is managed in compliance with the Nitrates Regulations (S.I. No. 113 of 2024) and Nutrient Management Plan. The regulations provide for controls designed to protect groundwater and surface water from impacts due to the application of fertiliser on agricultural lands. Acceptable spreading times are limited, prohibitions on weather and ground conditions are defined and set back distances from waterbodies and wells/springs and limitations for areas of extreme groundwater vulnerability are established. This would minimise the risk of any pollution occurring and protected sites being impacted due to the spreading of organic fertilisers. As digestate from the development is a replacement for other chemical and organic fertilisers on the current, proposed and any future potential spreadlands, it is considered that the impact of digestate being used as a fertiliser would have a neutral to no significant additional impact upon the biodiversity of landspreading areas.

The concrete yard where the anaerobic digestion will take place will be fully bunded. The site would be operated in accordance with an Environmental Management System and spill clean-up materials would be available onsite to be used in the event of a spill. All drainage basins to this bunded area will be equipped with automatic shutoff valves to stop any liquid transfer outside. All drainage basins to this bunded area will be equipped with automatic shutoff valves to stop any liquid transfer outside. Surface water will pass through a hydrocarbon interceptor before discharging to the existing ditch via the proposed headwall.

While no adverse impacts upon water quality, and thus aquatic biodiversity, are anticipated, measures are currently and would continue to be implemented by the applicant as a matter of good environmental management at the site, as outlined in **Section 9.6.2**, and further discussed in **Section 10**.

9.5.4 CUMULATIVE IMPACTS

The following plans and projects were reviewed and considered for in-combination effects with the proposed development:

- Fingal Development Plan 2023 - 2029;
- Proposed and permitted developments in the area available on Fingal County Council planning system.

The proposed development is located in a rural area, with some nearby residential properties located along the local road network. The land use of the area is mainly arable land, with some areas of agricultural pasture. The nearest settlements to the proposed development are Lusk town located approximately 1.5km to the south, Skerries town c. 3.8km to the north-east, Loughshinny town c. 3.8km to the east and Rush town c. 4.0 km to the south-east. There are few commercial enterprises within the general area, with the exception of agricultural enterprises.

There are three EPA waste licenced facility located within 5km of the development, two of which are operated by Fingal County Council (Waste Licence Ref. Nos. W0231-01 and W0009-03), located approximately 3.44km to the north-west and 4.24km to the south of the site, respectively. There are also a number of EPA IE / IPC licenced facilities located within 15km of the development site, as shown in the table below.

Table 9.15: EPA Licenced Facilities within 15km of the Development

LICENCE NO.	LICENCE NAME	LICENCE TYPE (FIRST SCHEDULE OF EPA ACT, 1992, AS AMENDED)	APPROX. DISTANCE FROM DEVELOPMENT SITE
P0780-01	Brooks Group Ltd.	8.3 Wood, Paper, Textiles and Leather	3.41 km NW
W0231-01	Fingal County Council	11.5 Waste	3.44 km W
W0009-03	Fingal County Council	11.5: Waste	4.24 km S
W0222-01	Bord Na Móna Recycling Ltd.	11.4 (b)(ii): Waste	4.94 km S
P1175-01	Woodburn Farms Ltd.	6.1 (a): Intensive Agriculture	5.71 km E
P1014-01	Pacon Waste & Recycling Ltd	11.4 (b)(ii): Waste	5.81 km N
P0014-04	Sk Biotek Ireland Ltd.	5.16: Chemicals	9.72 km S
P0060-01	Arch Chemicals BV	5.12 (g): Chemicals	10.1 km S
P1106-01	MSD International GmbH t/a MSD Ireland (Biotech Dublin)	5.16: Chemicals	10.9 km S
P1091-01	Mr. Pat Rooney	6.1 (a): Intensive Agriculture	11.1 km SW
P0189-01	Anglo Beef Processors Ireland Unlimited Company	-	13.1 km S
P0921-01	International Aerospace Coatings Ltd.	12.2.2: Surface Coatings	13.7 km S
P0480-02	Dublin Aerospace Ltd.	12.3: Surface Coatings	13.8 km S

Potential cumulative impacts are discussed under the following headings.

Habitat Loss / Fragmentation

As discussed in **Section 8.5.3**, "*Habitats and Flora*", the proposed development would result in a change of habitat use at the proposed development footprint, resulting in the loss of arable crops (BC1) and spoil and bare ground (ED2) habitats. The loss of these habitats would not be considered significant, given that ED22 and BC1 habitats are modified and of lower ecological value.

The surrounding land-use of the proposed development site is mainly arable land, (best characterised as arable crops (BC1) habitat), with some areas of agricultural pasture land, which can be considered modified and of low biodiversity value.

None of the habitats identified onsite are protected under the Habitats Directive or listed within a Natura 2000 site.

While no proposed developments by other parties other than the applicant were identified on the Fingal County Council planning site within the immediate vicinity of the applicant's proposed site, should future planning applications be submitted for the area, it is likely that they would also be located on agricultural land, which would likely be of low ecological value. Additionally, recently granted planning applications by Country Crest are mainly located on already built areas with no significant loss of ecologically important habitats. Therefore, there would be no cumulative habitat loss or fragmentation impacts which could pose a significant risk to biodiversity.

Disturbance to Species

Disturbance to species may arise through noise emissions and human activity. The main in-combination noise and human activity effects would be from any commercial activities within the area. However, as noted above, there are few commercial enterprises located within the vicinity of the development site, with the general area around the development site mainly used for agricultural purposes and for some dispersed one-off housing. Therefore, owing to the distances of commercial activities and the EPA licenced facilities detailed in the table above from the development site, and given the nature of activities at the proposed development site (anaerobic digestion), it is considered that there would be no cumulative noise impacts, or other disturbance effects due to human activity, which would have the potential to adversely impact upon fauna in the area.

Air Quality

The main cumulative impacts of the proposed development with regards air emissions upon biodiversity would be the potential generation of air emission during the operational phase of the development. Ammonia emissions within the general area would be mainly associated with intensive agricultural facilities and the existing Food Processing Facility to the west. The nearest EPA licensed facility is located approximately 3.4km from the proposed development.

In addition, the Air Quality Impact Assessment report has determined that the predicted air emissions would be below the 1% threshold of significance for all sensitive ecological receptors.

Deterioration in Water Quality

Continued implementation of the Water Framework Directive would result in achieving, or maintaining, improvements to water quality in the Nanny-Delvin Catchment. Developments such as this proposed development could act in combination with existing environmental pressures on the Nanny-Delvin Catchment, including: agriculture, anthropogenic, domestic and urban waste water, urban run-off, industry (including extractive) and forestry. In particular, the proposed development could act in combination with other projects which are hydrologically connected with the Rogerstown Estuary.

The proposed development could act in combination with other developments with regards to the landspreading of digestate / manure / sludges. As discussed in **Section 8.5.3**, "*Water Quality and Biodiversity*", digestate from the development site would be landspread on the applicant's lands as well as on third party lands in the area. The landspreading of digestate would be undertaken in accordance with the Nitrates Regulations, such as complying with the timing of the landspreading, nutrient management planning and set-back distances around sensitive receptors and transport vectors. At least three of the facilities (Woodburn Farms Ltd., Mr. Pat Rooney and Anglo Beef Processors Ireland Unlimited Company) in **Table 8.18** above generate sludges from wastewater treatment or poultry litter, with the sludges / litter landspread by farmers or contractors. However, the landspread of these sludges / manure would be required to be undertaken in compliance with the Nitrates Regulations. Therefore, no cumulative impacts upon water quality due to landspreading would be anticipated.

It is considered that the proposed development would not have a significant impact on water quality during the operational phase as discussed previously. However, there is a potential for a deterioration in water quality during the proposed in-stream works. Mitigation measures to prevent a deterioration in water quality will be implemented during the construction phase (Refer to **Section 8.6).** This will prevent any potential indirect impact on the qualifying interests of the Rogerstown Estuary SAC/pNHA, the Rogerstown Estuary SPA and the North-west Irish Sea SPA.

9.5.5 "DO-NOTHING" SCENARIO

Should the development not be built, there would be no change to the environmental impacts of the existing site. The proposed development footprint would likely remain as arable crops habitat. Surface water from the site would continue to naturally flow into the existing drainage ditches. Given the current use of the development site and ongoing activities, it is unlikely that the proposed site would be of significant ecological value in the future.

9.5.6 POTENTIAL IMPACTS PRE-MITIGATION

Table 9.16 below provides a summary of the potential impacts of the proposed development pre-mitigation, during the construction and operational phases.

Table 9.16: Summary of Predicted Impacts Pre-Mitigation

IMPACT	DEVELOPMENT PHASE	DIRECT / INDIRECT	LIKELIHOOD	DURATION	REVERSIBLE	SIGNIFICANCE	IMPACT TYPE
Habitat Loss	Construction & Operational	Direct	Certain	Permanent	No	Not significant	Neutral
Introduction of Invasive Flora Species	Construction	Direct	Unlikely	Temporary	Yes	Slight significance	Negative
Fauna Disturbance	Construction	Indirect	Possible	Temporary	Yes	Slight significance	Negative
	Operational	Indirect	Unlikely	Permanent	Yes	Not significant	Neutral
Fauna Mortality	Construction	Direct	Dependent upon timing of works relevant to breeding season	Permanent	No	Moderate significance	Negative
Bats – Disturbance / Severance of Habitat	Construction	Indirect	Unlikely (no hedgerow/tree removal)	Temporary	Yes	Slight significance	Neutral
	Operational	Indirect	Possible	Permanent	Yes	Slight significance	Negative
Surface Water Quality Deterioration	Construction	Indirect	Possible	Temporary	Yes	Moderate significance	Negative
	Operational	Direct	Unlikely	Permanent	Yes	Not significant	Neutral
Designated Sites	Construction & Operational	Indirect	Possible	Permanent	No	Slight significance	Negative

9.6 MITIGATION MEASURES

9.6.1 CONSTRUCTION PHASE

The mitigation measures outlined below would be implemented to ensure there is no significant impact upon the biodiversity of the area and designated sites during the construction phase of the development.

General Mitigation Measures

- Training of relevant personnel on monitoring and mitigation measures that will be implemented during the construction phase at the development site by way of a toolbox talk;
- All construction works would be confined as far as possible to the development footprint;
- All plant machinery and equipment would be maintained in good working order and regularly inspected;
- Where possible, no construction works would be conducted outside of normal working hours.

Habitats and Flora

- Regular site inspections will be undertaken to ensure that no growth of invasive species has taken place;
- The construction works contractor will ensure that all equipment and plant is inspected for the presence of invasive species and thoroughly washed prior to arriving to the development site;
- In the event of any invasive species listed in Part 1 of the Third Schedule appearing onsite, works within the immediate vicinity would cease until the invasive plant has been appropriately treated and disposed of, in accordance with Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011;
- Cognisance would be taken of National Roads Authority's Guidelines on "*The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*";
- Excavated soil during earth-moving activities and excavations will be segregated into subsoil and topsoil and reused in reinstatement and landscaping activities where possible. Natural recolonisation would be allowed to take place where possible;
- All planting of trees and hedges to be undertaken during bare root season November to April. The balance of tree planting and lawn seeding to be completed within 12 months of the completion of construction work of the development.
- Only native and non-native invasive species will be used as part of the landscape plan.

Fauna

- No hedgerow or tree removal is proposed. In instances where hedgerow / tree removal is required during the bird nesting season (1st of March – 31st August inclusive), the trees required for removal would be inspected by a suitably qualified ecologist prior to any removal works for the presence of breeding birds. Where nests are present, the ecologist would make a decision as to whether a "Licence to interfere with or destroy the breeding places of any wild animals", is required from the NPWS. Alternatively, the ecologist may establish a suitable buffer zone around an active nest, with removal works rescheduled until chicks have fledged. Where no evidence of nests is found during inspection, hedgerow / tree removal works must be undertaken within three days of inspection;
- Should a protected fauna species such as badger be found during the construction phase of the project, construction works will immediately cease, an investigation will be undertaken by an ecologist and where required, an officer of the NPWS would be notified prior to the resumption of construction works;
- The landscape plan proposes new hedgerow, tree, wetland, wildflower meadow and woodland planting. These will include the use of native and non-native non-invasive species;
- The planting of new linear features to connect to the surrounding environment;
- The maintenance of an unmanaged area along hedgerows and around the perimeter to provide a safe wildlife commuting route for fauna;
- Lighting will be sensitive to nocturnal species and will be directed away from hedgerows, trees and drainage ditches;
- To reduce the potential for disturbance due to noise, all plant and machinery will be maintained in good working order and regularly inspected, where possible vehicles would be equipped with mufflers to suppress noise and where possible, no construction works would be conducted outside of normal working hours.
- In-stream works will be undertaken outside the Amphibian breeding season (Spring/Summer months) to ensure no impact in the event they are using the onsite drainage ditches.

Bats

Artificial Lighting during construction phase

- Construction works in the hours of darkness, when bats are active (April – October), would be kept to a minimum;
- Lighting of hedgerows / trees / woodlands will be avoided where possible;
- Should lighting be required during construction works, it will be of a low height (without compromising safe working conditions) to ensure minimal light spill. Where possible and where practicable to do so, timers or motion sensors would be used;
- Directional lighting would be used where possible, by use of louvres or shields fitted to the lighting;

- White light emitting diode (LED) will be used where possible, which is considered to be low impact in comparison to other lighting types;
- Site lighting will be provided with the minimum luminosity sufficient for safety and security purposes to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas.

Artificial Lighting during operational phase

- Lighting will be directed to where it is required only;
- Lighting of hedgerows / trees/ woodlands will be avoided by directional lighting;
- Buildings, carparks and site entrance lighting will be angled away from hedgerows, trees and woodlands;
- The use of specialist bollard or low-level downward directional luminaires to retain darkness above should be considered;
- All lanterns calculated at 0° tilt;
- Lighting would be of low height where possible, to minimise light spill;
- Where possible and practicable to do so, timers or motion sensors would be used;
- All luminaires will lack UV elements when manufactured. Metal halide, fluorescent sources should not be used;
- Dark buffer zones can be used to separate habitats or features from lighting by forming a dark perimeter around them;
- Light spill into the surrounding environment is minimal;

Water Quality

As noted in **Section 9.5.2**, no adverse impacts upon water quality are anticipated. However, the following mitigation measures would be implemented by the construction works contractor as standard practice:

Mitigation measures prior to commencement of the proposed In-Stream works

- Training of relevant personnel on monitoring and mitigation measures that will be implemented during the construction phase at the development site by way of a toolbox talk;
- Daily visual inspection of proposed development/construction works and pumping operations will be completed and signed by suitably trained staff member;
- Record of all visual inspections to be kept on file and available for review by relevant authorities;
- The contractor will maintain effective communication with the operating foremen through the toolbox talk to ensure there will be no risk of water pollution and all measures are enacted during the proposed works;

- In-stream works within the southern drainage ditch will be undertaken outside periods of heavy rainfall.

Mitigation measures during the proposed In-Stream Works

The dry cut open method may be used for such developmental works where minor works within a watercourse or drainage ditch is required. Prior to any works, the site is prepared by stripping topsoil from the banks at the location of the proposed headwalls. Works will then begin on the installation of the precast concrete headwall including excavation of the banks where necessary to fit the headwall. The water flow will be dammed using sandbags to create the seal / dam across the drain as per design. Pumps would be set up to take the flow from upstream to downstream of the location of the proposed headwall. The water will be filtered to limit silt carry over and reduce disturbance to the bed before pumped water is released back into the drainage ditch. Once completed, all materials used within the construction will be removed from site and bank profile reinstated. It should be noted that this method may be altered to suit site-specification requirements. Mitigation measures have been included below:

- The construction works contractor will adhere to standard construction best practice, taking cognisance of the Construction Industry Research and Information Association (CIRIA) guidelines "*Control of Water Pollution from Construction Sites; guidance for consultants and contractors*" 2001 and "*Control of Water Pollution from Construction Sites – Guide to Good Practice*", 2002;
- Cognisance will be taken of the 2016 guidelines published Inland Fisheries Ireland, "*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*";
- Excavations and earth-moving activities will be planned outside periods of heavy rainfall, to limit the potential for suspended solids to become entrained within surface water run-off;
- A filter will be provided at the pump inlet to prevent the entry of any potential aquatic fauna into the pump, and to limit the potential disturbance to the watercourse bed due to sediments;
- Pumping operations will be supervised at all times by the contractor;
- Excavation of the bank of the drainage ditch will then proceed, with the excavated material stockpiled for later reinstatement.
- Where possible, heavy machinery will only operate within an access strip set back 5m from the top of the bank of the drainage ditch;
- Excavated materials will not be allowed to fall into the watercourse and will not be stored or placed near the drainage ditch;
- Only clear vegetation when works are required to prevent leaving exposed ground for long periods of time;
- Any vegetation cuttings should be removed from the site and not stored near the banks of the drainage ditch;
- Following the completion of reinstatement works, including any required bank reinstatement works, the sandbags would be removed;
- In the unlikely event of a suspected deterioration in water quality within the Palmerstown watercourse due to construction/in-stream works at the development site,

works will immediately cease, an investigation into the cause undertaken and the relevant NPWS and Inland Fisheries Ireland personnel informed;

- Where spoil is generated, this will only be stored temporarily. A designated spoil area will be established by the construction works contractor within the site footprint. This will be located away from the watercourse.

Mitigation Measures Once In-Stream Works Have Ceased

- The contractor will ensure all machinery and equipment has been taken from the construction area and that no materials associated with the in-stream works remain.

Water Quality Mitigation Measures For Duration Of Construction Works

- The construction works contractor will adhere to standard construction best practice, taking cognisance of the Construction Industry Research and Information Association (CIRIA) guidelines "*Control of Water Pollution from Construction Sites; guidance for consultants and contractors*" 2001 and "*Control of Water Pollution from Construction Sites – Guide to Good Practice*", 2002;
- Cognisance will be taken of the 2016 guidelines published Inland Fisheries Ireland, "*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*";
- Stockpiling of loose materials will be kept a minimum of 20m from drains and watercourses,
- Fuel, oil and chemical storage will be stored within a bunded area, which will be at least 50m away from drains, excavations and other locations where it may cause pollution;
- Excavations, earth-moving activities will be planned outside periods of heavy rainfall, to limit the potential for suspended solids to become entrained within surface water run-off;
- Regular visual inspections will be undertaken of the site access road to ensure no silt-laden surface water runoff leaves the site, with the potential to either join with any adjacent surface water drainage systems within the vicinity or travel along the road network;
- Where spoil is generated, this will only be stored temporarily. A designated spoil area will be established by the construction works contractor within the site footprint. This will be located away from any watercourse or any drainage ditch;
- Silt fencing will be placed around spoil areas until such time as the excavated soil has been used in landscaping / re-instatement works or removed offsite by a licenced waste contractor;
- Where possible, spoil will be covered or alternatively, graded to avoid ponding or water saturation;
- Manhole covers and stormwater gullies will be protected by silt blankets and additional measures such as sandbags to be incorporated on steeper gradients if required

- Sandbags will be placed beneath any steep gradient where required to prevent surface water from entering a drainage ditch or watercourse;
- Should water be encountered during excavation works, water will be pumped to a silt control feature, such as a lagoon/infiltration area used for settlement;
- This lagoon/infiltration area must have adequate capacity and water must be filtered before discharging. Water must not be directly discharged to a drainage ditch or a watercourse;
- The lagoon/infiltration area will be located away from any steep sloping ground;
- Pumping operations will be supervised at all times;
- All construction plant machinery and equipment will be maintained in good working order and regularly inspected;
- The construction works contractor will ensure the relevant site personnel are trained in spillage control;
- Where construction plant shows signs of hydrocarbon leakage, site personnel will cease the operation of the item in question. Any defective construction machinery will be kept out of service until the necessary repairs are undertaken;
- A designated area for the storage of hydrocarbons will be established by the construction works contractor and inspected on a regular basis;
- Spill kits, adequately stocked with spill clean-up materials such as booms and absorbent pads, will be readily available onsite;
- Any fuels, oils or chemicals will be stored in accordance with the EPA guidance on the storage of materials, in designated bunded areas at the temporary site compound, with adequate bund provision to contain 110% of the largest drum volume or 25% of the total volume of containers;
- Material storage areas will be appropriately labelled and marked;
- Should a protected fauna species such as Otter (*Lutra lutra*) or Badger (*Meles meles*) be found during the construction phase of the project, all construction works will be halted and an investigation will be undertaken. Where required, an officer of the NPWS will be notified prior to the resumption of construction works;
- If weed control is required then herbicide application will only be carried out by suitably qualified contractors or operators with strict reference to the product label, local land use, health and safety considerations and any pertinent regulations. All herbicide treatment must comply with the pesticide regulations S.I. No. 155/2012 - European Communities (Sustainable Use of Pesticides) Regulations 2012 or any amended or current regulations at the time of use.

Biosecurity Measures

During all phases of the proposed development, biosecurity protocols must be followed to ensure non-native invasive species and diseases such as crayfish plague are not introduced to the proposed construction area;

- All personnel must implement the 'Clean – Check – Dry' principles, ensuring that all personal protective equipment (PPE), and equipment and machinery is clean and dry upon arrival at the proposed construction area;
- Upon completion of the proposed works, the contractor must check and clean all PPE, equipment and machinery visually by inspecting all equipment that has come into contact with the water for evidence of attached plant or animal material, or adherent mud or debris. This should be done before leaving the proposed activity area. Remove any attached or adherent material (vegetation and debris) before leaving the construction area of operation;
- High-pressure steam cleaning, with water > 40 degrees C, is recommended for machinery that will be moved from one watercourse to another. Many roadside garages provide these facilities. After cleaning, visually inspect the equipment to ensure that all adherent material and debris has been removed;
- It is recommended to apply disinfectant to the undercarriage and wheels of the vehicle/machine after steam cleaning or power hosing;
- Wet or live wells and other water retaining compartments in machinery must be cleaned, rinsed or flushed with a 1% solution of Virkon Aquatic or another proprietary disinfection product. Alternatively, a 5% solution (100 ml / 20 litre solution) of chlorine bleach should be used. Rinse thoroughly with clean water;
- Prior to commencement of any new activity, the contractor must ensure that all PPE, equipment and machinery are dry.
- If drying out of PPE, equipment and machinery is not feasible, disinfection using Virkon Aquatic must be carried out, as per the manufacturer's instructions.

Reference documents:

- *Control of Water Pollution from Construction Sites; guidance for consultants and contractors*" 2001;
- Construction Industry Research and Information Association (CIRIA) guidelines "*Control of Water Pollution from Construction Sites; guidance for consultants and contractors*" 2001;
- *Guidelines for the treatment of Otters prior to the construction of national road schemes*, (National Roads Authority, 2008).

9.6.2 OPERATIONAL PHASE

The following mitigation measures would be implemented to ensure there would be no significant impact upon the biodiversity of the area and designated sites during the operational phase of the development;

- Good housekeeping practices would be observed throughout the site during the operational phase;
- An Environmental Management System would be put in place for the proposed AD Plant;

- Native flora species would be incorporated in the landscaping of the site as much as possible;
- Rodent populations on the farm would be controlled by a combination of rodenticide (managed by the applicant as per the Campaign for Responsible Rodenticide Use (CRRU) Code), high spec buildings, good housekeeping and well-designed storage.

As noted in **Section 9.5.3**, no adverse impacts upon water quality are anticipated during the operational phase. However, the following measures in relation to the protection of water quality would be implemented by the applicant as a matter of good environmental management at the site:

- The site would ensure that any fuels, oils or chemicals would be stored in accordance with the EPA guidance on the storage of materials, in designated, bunded areas, with adequate bund provision to contain 110% of the largest drum volume or 25% of the total volume of containers. Bunds and bunded areas would undergo integrity testing every three years, as is best practice;
- The site would ensure that an adequate supply of spill clean-up material is readily available, in the event of any spillages onsite;
- The site will ensure the alarm system to detect any potential leaks and the valve is inspected regularly to ensure no issues;
- Only clean surface water will be discharged to the drainage ditch;
- Soiled waters will not be allowed to enter any drainage ditch or watercourse;
- The applicant intends to apply for an Industrial Emissions Licence, which would require monitoring of stormwater emissions from the site. Monitoring results would be presented on an Annual Environmental Report (AER).

9.6.3 "WORST CASE SCENARIO"

If the proposed development proceeded without the mitigation measures outlined in **Section 9.6.1**, there could be a potential slight to moderate impact upon bat species due to lighting during the construction phase and operational phase. This risk varies depending on the proposed lighting plan. No impact to as a result of habitat loss is anticipated as all boundary vegetation and hedgerows are to be retained with no removal of any mature trees.

In the absence of mitigation measures, there would be a slight impact upon all other fauna due to habitat loss. The arable lands are of lower ecological value. There would be a potential moderate to high impact upon fauna, should vegetation clearance be undertaken during the mammal and bird breeding season. However, this is unlikely to occur, given that there are legal restrictions under the Wildlife Act 1976 as amended, with regards the removal of vegetation from uncultivated land. In addition, no hedgerows or tree removal is proposed.

During construction works, there would be potential to inadvertently introduce invasive species to the area. However, even in the absence of mitigation measures, this would be considered unlikely given that there would be no significant import of materials to the site and given that delivery of materials would be inspected prior to removal from the site of origin. Where invasive species are confirmed, the loads would be required to be adequately treated or disposed of appropriately and therefore, would not be transported to the proposed development site.

Without mitigation measures, there is potential for a significant impact on Natura 2000 sites and protected species located downstream given the proposed in-stream works. In-stream works have the potential to cause a deterioration in water quality due to the release of suspended solids and chemicals/hydrocarbons.

9.7 RESIDUAL IMPACTS

Table 9.17: Summary of Residual Impacts Post-Mitigation

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
Habitat Loss	Construction & Operational	Slight significance	• Excavated soils will be segregated into subsoil and topsoil, and reused in reinstatement and landscaping works. Where possible, natural recolonisation would be allowed to take place. • The planting of native and non-native non-invasive species only; • The landscape plan includes for additional planting of hedgerows, trees, woodland, meadows and wetland planting.	Not significant	Positive
Introduction of Invasive Flora Species	Construction	Slight significance	• Construction plant would be inspected and washed prior to arriving onsite; • Regular site inspections for the presence of invasive species would be undertaken; • Should third scheduled invasive species appear onsite, works would immediately cease until the plant was appropriately treated and disposed of;	Not significant	Neutral
	Operational	Not significant	• None required	Not significant	Neutral
Fauna Disturbance	Construction	Slight significance	• Where possible, no construction works will be conducted outside of normal working hours;. • All plant machinery and equipment would be maintained in good working order and regularly inspected; • Where possible, vehicles would be equipped with mufflers to suppress noise;	Slight significance	Minor Negative (Temporary)

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
			• Should a protected fauna species be found during the construction phase, works will immediately cease, an investigation will be undertaken by an ecologist, and where required, the NPWS would be notified prior to the resumption of construction works.		
	Operational	Not significant	None required	Not significant	Neutral
Fauna Mortality	Construction	Moderate significance	• As a minimum, the construction work contractor will comply with all legislative provisions relating to any vegetation removal; • Where hedgerow / tree removal works are required during the bird nesting season (1st March to 31st August), the sections / trees for removal would be inspected by an ecologist for the presence of breeding birds. Where nests are present, a decision would be made as to whether a licence is required from the NPWS, or whether a suitable buffer zone could be established around the active nest with removal works rescheduled until chicks have fledged.	Slight significance	Minor Negative
	Operational	Not significant	• None required	Not significant	Neutral
Bats – Disturbance / Severance of Habitat	Construction	Slight Significance	• The Landscape plan will take into consideration the connectivity of the site and would take steps to enhance the boundaries with suitable planting of native species; • Measures would be implemented to reduce the potential for light pollution during the construction phase;	Not significant	Neutral

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
			• Lighting will be angled away from trees and hedgerows; • Construction works in the hours of darkness will be kept to a minimum; • Existing boundary trees and hedgerows to be retained.		
	Operational	Slight significance	• Lighting design measures will be implemented to reduce the potential for light pollution; • All lanterns calculated at 0° tilt; • Lights will be directed away from sensitive areas i.e. woodland, hedgerows and trees within the development and outside the boundary; • Light spill into the surrounding area is minimal.	Minor	Minor
Surface Water Quality Deterioration	Construction	Slight to moderate significance	• Water quality mitigation measures to be implemented during the construction phase to prevent a deterioration in water quality.	Negative	Neutral
	Operational	Not significant	• None required, however measures have been included with **Section 8.6.2** which would be implemented by the applicant as a matter of good environmental management at the site.	Not significant	Neutral
Designated Sites	Construction	Slight to Moderate significance (water quality)	• Water quality mitigation measures to be implemented during the construction phase to prevent a deterioration in water quality.	Not significant	Neutral
Designated Sites	Operation	Not significant	None required	Not significant	Neutral

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10.0 LAND – SOILS, GEOLOGY & HYDROLOGY

10.1 INTRODUCTION

This chapter describes the soils, geology, hydrology and hydrogeology of the existing environment surrounding the site for the proposed extension to an existing piggery and all ancillary site works and services. The objective of this chapter is to determine the likely significant impacts on the soils, geology, hydrology and hydrogeology of the area arising from the proposed development and to propose measures to mitigate these impacts, if required.

This chapter has been prepared in accordance with guidelines from the Environmental Protection Agency (EPA) and the Institute of Geologists of Ireland (IGI):

EPA (2002). *Guidelines on Information to be contained in Environmental Impact Statements.*
EPA (2022). *Guidelines on the Information to be contained in Environmental Impact Assessment Reports.*
IGI (2013). *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.*

A detailed description of the existing and proposed development is outlined in **Section 2** of this EIAR.

10.2 METHODOLOGY

The following works were undertaken to complete the assessment of the potential effects on soils, geology, hydrology and hydrogeology:

- Desk study to collate and examine available existing information on soils, geology, hydrology and hydrogeology for the proposed development site and surrounding area;
- Review of information for the proposed development with particular regard to proposed soil/subsoil excavations;
- Management of water, stormwater and water usage;
- Site walkover and drive over of the surrounding catchment on 5th November 2024;
- Interpretation of all data, assessment and reporting.

10.3 DESCRIPTION OF THE EXISTING ENVIRONMENT

This section describes the existing baseline environment in terms of the soils, geology, hydrology and hydrogeology of the proposed development site and the surrounding area. Based on this information, the potential impacts of the proposed development are identified, as are the measures required to mitigate any identified negative impacts.

10.3.1 LAND & SOILS

SUBSOILS:

The subsoils beneath the proposed site are mapped as till derived from Namurian sandstones and shales. This subsoil type is the dominant subsoil type in the immediate surrounding area see **Figure 10.1**. These rock types are widespread in Ireland and generally have a low permeability.

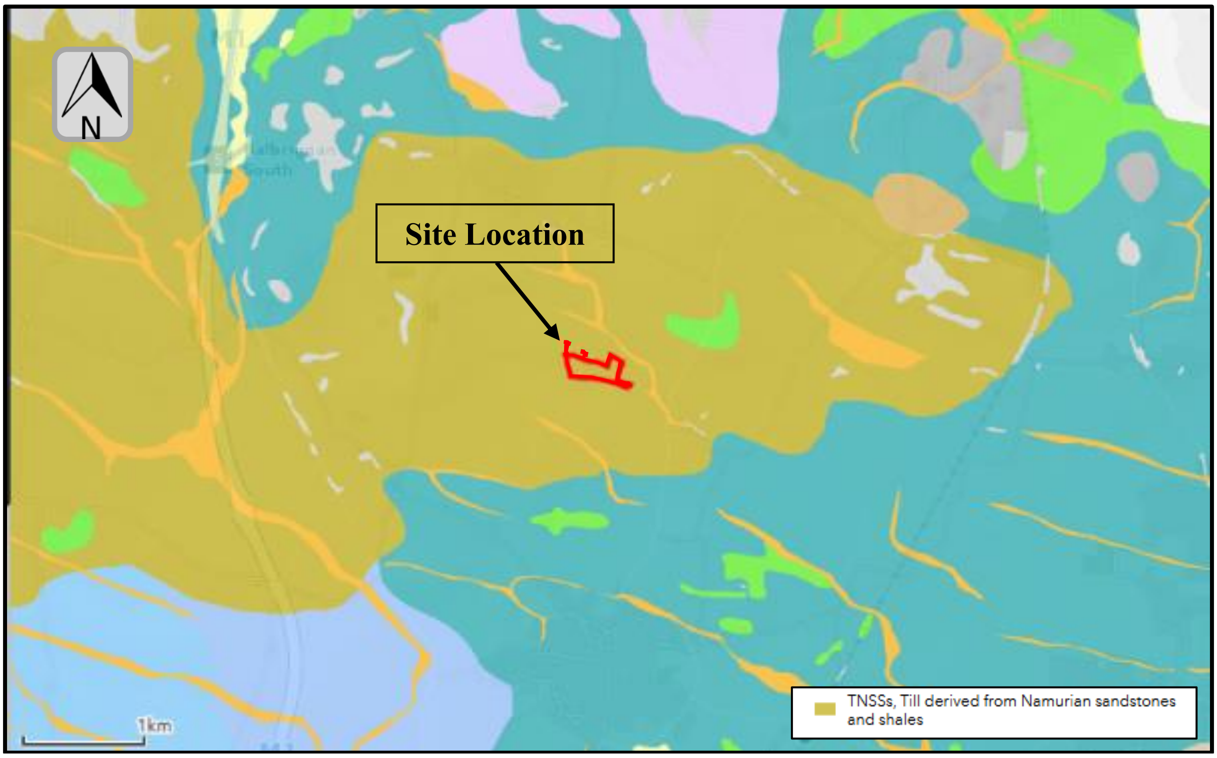

Figure 10.1: Subsoils (GSI map)

The subsoils within a 15km radius of the site are primarily composed of Namurian sandstones and shales to the west; Lower Palaeozoic sandstones and shales to the north, east and south; and limestones to the south-west. Smaller areas of Lower Palaeozoic sandstones and shales are located to the north-west.

Conforming to the River networks in the area are alluvium subsoils, including along the Palmerstown 08 stream to the east of the site, which discharges into the Rogerstown estuary. The alluvium is reshaped by water action and made up of unconsolidated soils and sediments. There are also areas of gravels derived from Namurian sandstones and shales and bedrock outcrops dotted around the landscape.

A Site Characterisation Report was undertaken by Hydrocare Environmental Ltd. Trial hole excavations indicate that the subsoils of the site ranged from gravelly clay/silt and gravel with high clay content.

REGIONAL SOILS:

According to GSI online mapping, the soil where the site is located is mapped as mineral poorly drained mainly acidic (AminPD). This is the predominant soil type to the north and east of the site, whereas to the west, the soils are mostly mapped as deep well drained mineral mainly acidic. A mix of deep well drained mineral mainly basic and mineral poorly drained mainly basic soils are found further south of the site.

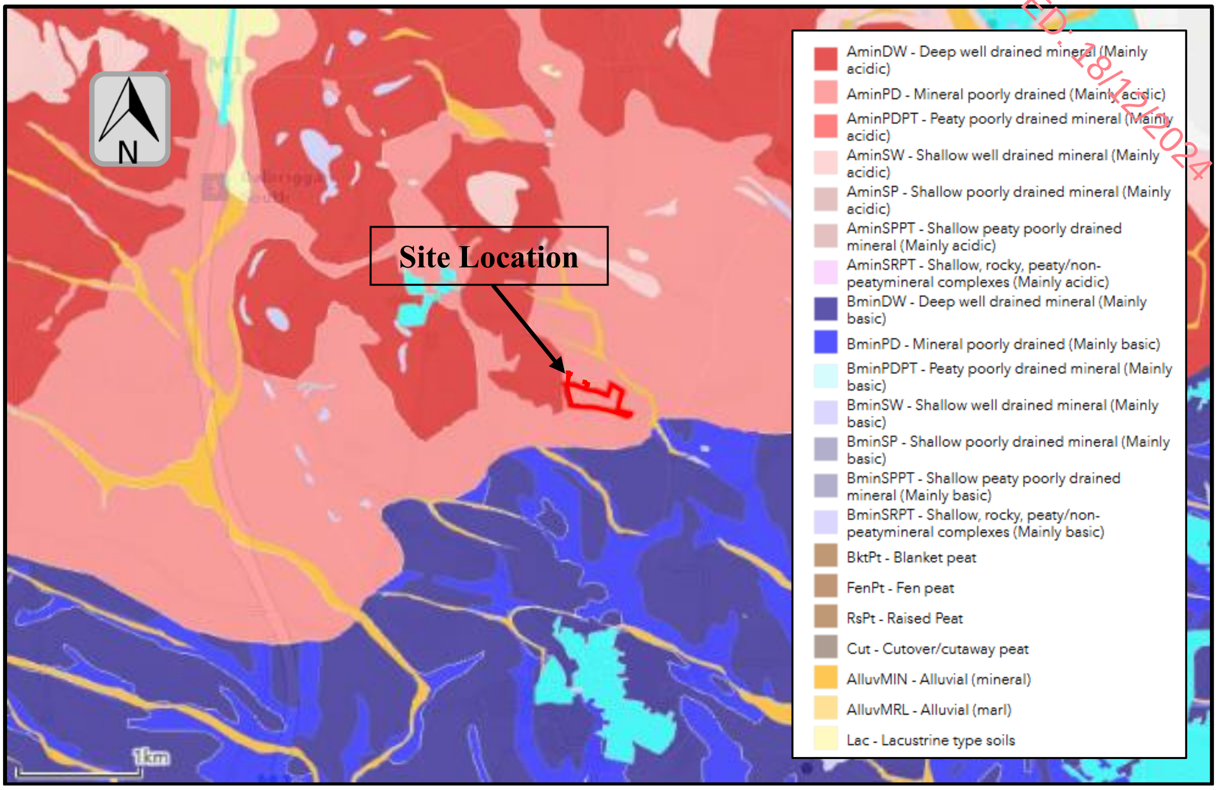

Figure 10.2: Teagasc Soils (GSI map)

Figure 10.3 below shows the regional soil types in the area surrounding the proposed site.

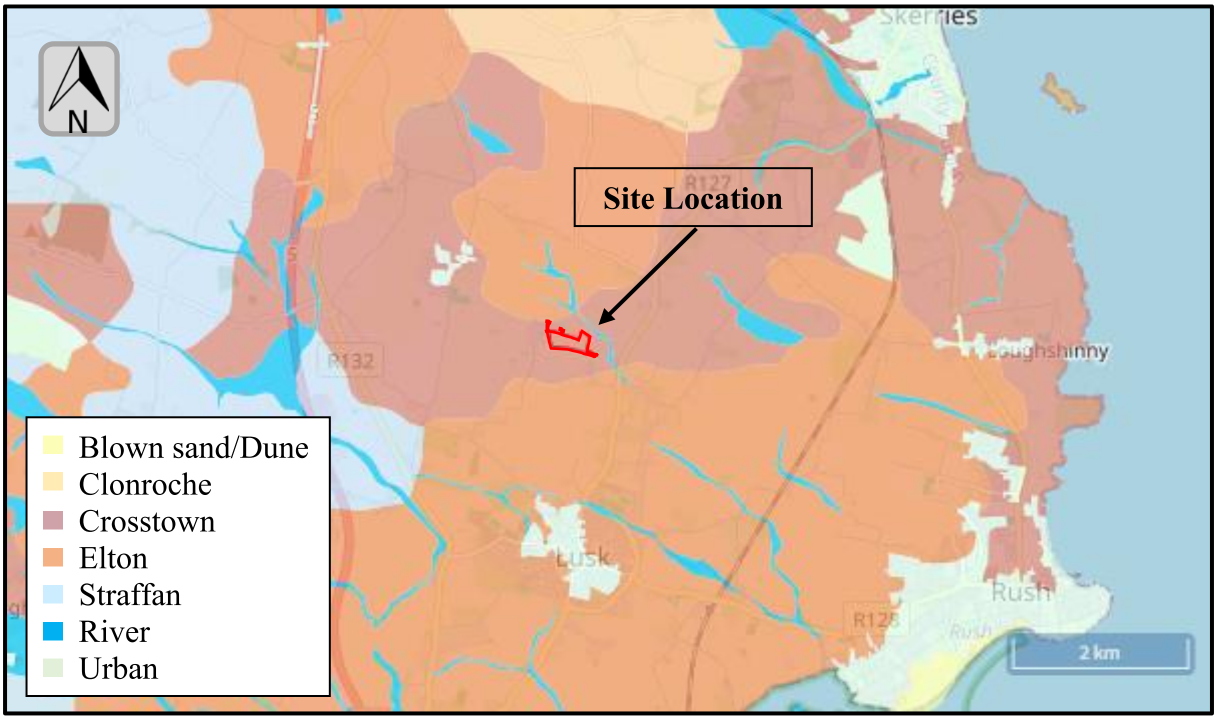

Figure 10.3: SIS Soils (EPA map)

According to the SIS Soils map, the soil underlying the proposed site is part of a Crosstown association with a substrate type described as fine loamy drift with siliceous stones.

BEDROCK GEOLOGY:

GSI and OS maps indicate the site of the proposed development is located on bedrock which is part of the Loughshinny Formation as per **Figure 10.4**. The Loughshinny Formation is described as mainly of dark micrite and calcarenite, shale, and is included as part of the simplified rock unit group named as Dinantian Upper Impure Limestones.

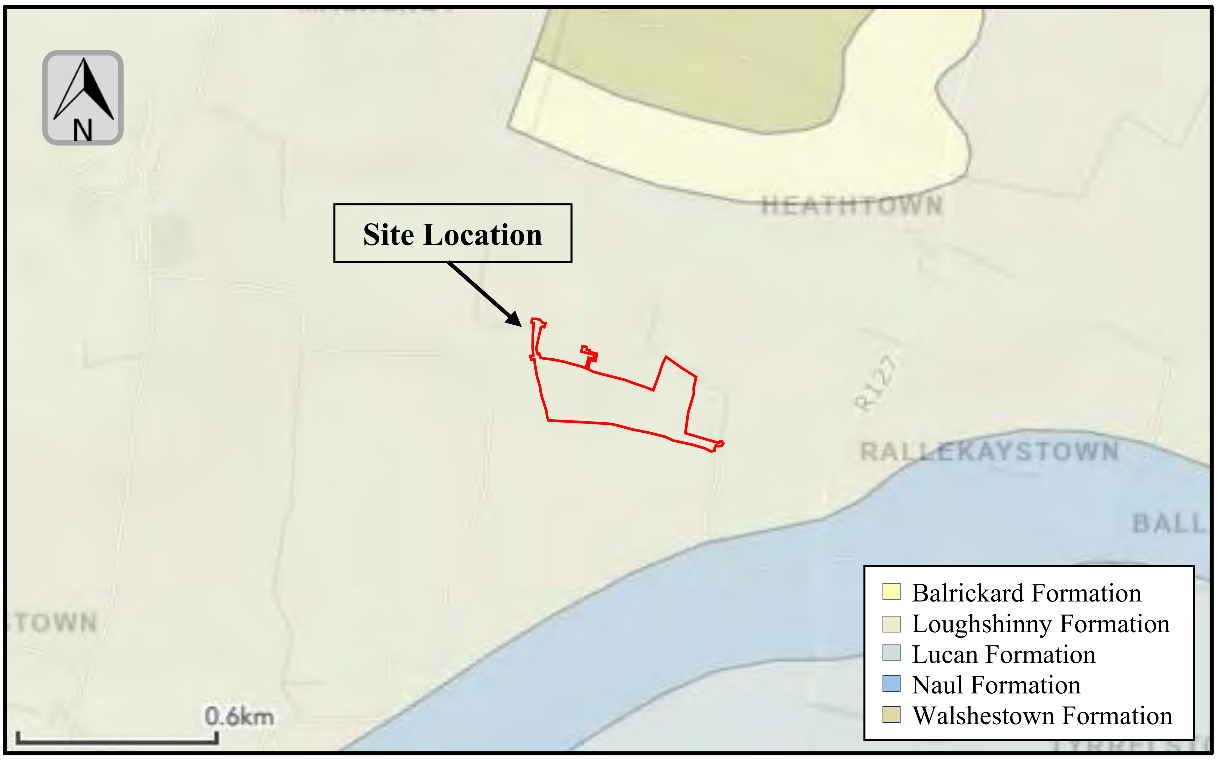

Figure 10.4: Bedrock Geology 100k (GIS map).

The Lucan Formation is the prevalent type of bedrock in County Dublin, while the Loughshinny Formation extends from the coast to the east of the site to the outskirts of Navan town to the north-west.

10.3.2 GEOLOGICAL HERITAGE

The Irish Geological Heritage (IGH) Programme identifies and selects a complete range of sites that represent Ireland's geological heritage under sixteen themes ranging from Karst features to Hydrogeology.

The IGH Programme is a partnership between the GSI and the National Parks and Wildlife Service (NPWS) and sites identified as important for conservation are conserved as Natural Heritage Areas (NHA).

The proposed development is not located on any geological heritage site. Reference to the GSI online database confirms there are no geological heritage sites within the perimeter of the site or within a 3.0 km radius of the site.

The closest geological heritage site is located c. 3.5 km north-east of the proposed development. The site's name is the Milverton Quarry. The heritage site is located in the townland of Milverton and is summarily described by the GSI as a "working quarry".

CURRENT & HISTORIC LAND USE:

The available historic maps, aerial images and Fingal Co. Co. online planning files were reviewed. The land in the immediate vicinity of the site and surrounding area is mainly used as agricultural land with once off housing and occasional farmyards. Agriculture and sporadic settlement have been the predominant historic land use of the area.

10.3.3 ECONOMIC GEOLOGY

According to the GSI's online Pits and Quarries database (2014) there are no active operational quarries in the immediate vicinity of the site. There are also no active quarries within 10 km of the site.

The nearest record on the GSI's database of an active quarry is c. 12 km north-west of the site in the townland of Sarsfieldstown. The database does not include the quarry name nor the site address. Activities on the site include excavations and dry screening.

10.3.4 GEOHAZARDS

LANDSLIDES:

The GSI's online landslide database indicates there are no historic landslides recorded on the site or within a 20 km radius. The nearest recorded landslide is located c. 23.4 km south-west of the site and occurred in 2014 at J4 Clonee on the M3 inbound.

KARST:

The GSI's karst database indicates there are karst features mapped within 5.0 km of the proposed site. The closest identified karst feature to the site is a spring c. 1.1 km south-east in the townland of Greatcommon. **Figure 10.5** shows the Karst landform in the area.

A number of other springs have been recorded within 10 km of the site. Two caves have also been recorded: one located approximately 7.9 km to the south-east and the other approximately 8.9 km to the north-west in Naul town.

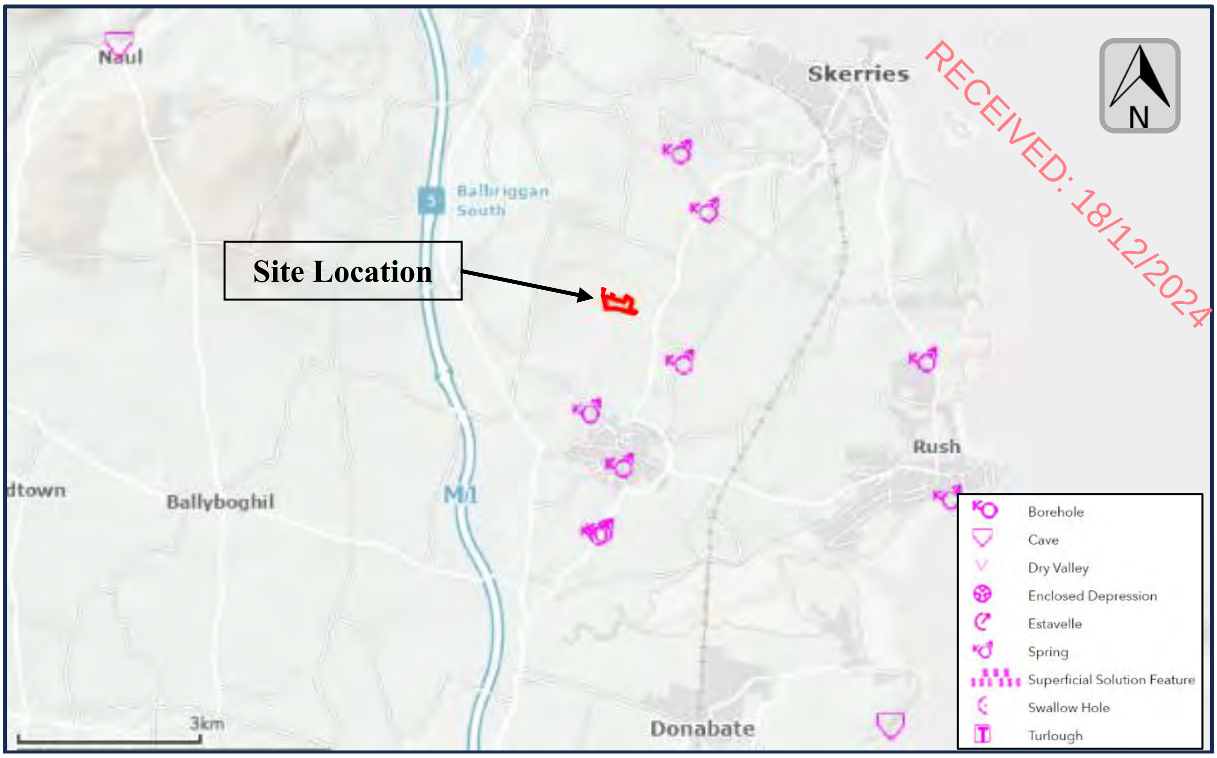

Figure 10.5: Groundwater Karst Data (GIS map)

The GSI's karst database is by no means comprehensive, and other karst features that are not mapped may be present in the area. No surface expression of karst depressions or collapse features have been observed on the site. However, such karst features may be present but not visible at surface. Detailed karst studies and site investigation would be required to establish this.

10.3.5 WATER

TOPOGRAPHY:

The topographic features of the region consist of high-lying agricultural lands.

The site is c. 45-55m above sea level on an area that is gently sloped down to the south-east. **Figure 10.6** below shows the topography in the surrounding area of the site.

In the wider region, areas of elevation include a number of hills, the closest being located in the townland of Palmerstown (1.5 km NW) which rises to 105m, and also the Knockbrack Mountain (6.3 km NW) which rises to 176m.

Figure 10.6: Elevation Data (Topography map).

RIVER BASIN & NEARBY SURFACE WATER FEATURES:

According to Cycle 2 of the River Basin Management Plan for Ireland, the site lies within the Ireland's River Basin District (RBD), which has been identified as the one which is wholly within the state. Five other RBD have been identified on the island of Ireland, two of which are shared with Northern Ireland and three of which are wholly within Northern Ireland.

Ireland's RBD covers an area of 70,273 km^2, with 46 catchment management units. The 46 catchment management units have been broken down further into 583 sub-catchments, which contain a total of 4,829 water bodies. Within the River Basin District (RBD), there are 140 designated bathing waters, 64 shellfish waters, 42 nutrient-sensitive areas, 358 special areas of conservation (SACs) with water dependency and 154 special-protection areas (SPAs). The SACs are geographically quite concentrated, in particular along the western seaboard. The SPAs are to some extent more dispersed, but they are also found in particular concentrations along the western seaboard.

The most significant influence on water quality management, and any risk to water status, is the land use within the water catchment. Land use across Ireland's RBD is dominated by agriculture – 55% pastures, 7% principally agricultural land, 5% arable land and 1% complex cultivation. Forestry accounts for 6% of land use.

According to the water framework directive (WFD) the proposed site is positioned within the Nanny-Delvin 08 Catchment, the Palmerstown 010 Sub Catchment and the Palmerstown 010 River Sub Basin.

The main surface water features in the vicinity of the site are the Palmerstown 08 stream and the Rathmooney stream, which are located approximately 80m north and 415m south-west of the site, respectively.

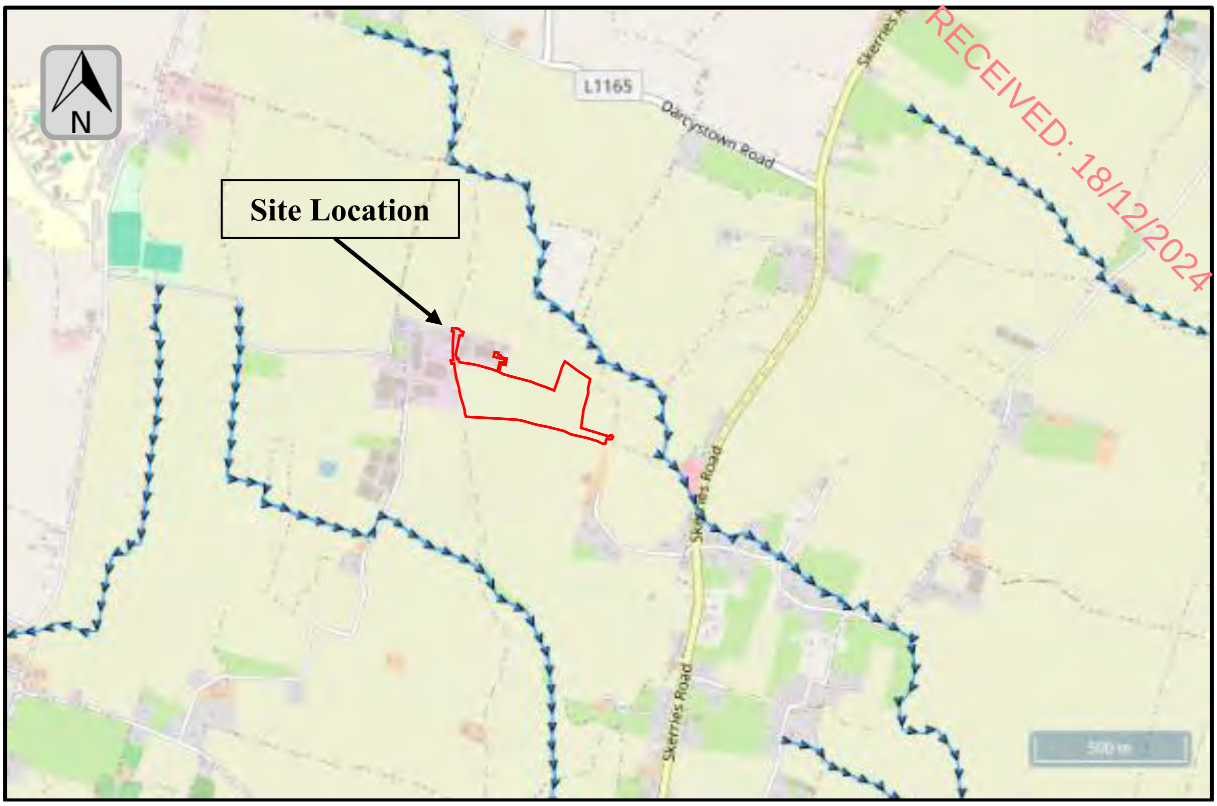

Figure 10.7: Surface Water Features (EPA map).

The Palmerstown 08 is the closest mapped surface water feature to the Country Crest site. Other surface water features include associated streams, such as the Collinstown 08 stream.

The Palmerstown 08 stream flows in a generally south-east direction for c. 3.92 km before it reaches the confluence with the Collinstown 08 stream. The Palmerstown 08 then continues on for c. 2.68 km before it is met by the Rathmooney stream and a further c. 530m before it eventually discharges into the Rogerstown estuary.

Stormwater from the site will be directed to two detention basins south of the site and ultimately discharged to the drainage ditch south of the site. There is a likely connection between the site and the Palmerstown 08 stream via the drainage ditch. **Figure 10.7** shows some of the surface water features in the area.

<u>SURFACE WATER BODY STATUS, PRESSURES & WATER QUALITY:</u>

For the purposes of the Water Framework Directive (WFD) the water quality 'status' of the nearby surface water bodies has been categorised (2010-2022). In addition, the 'risk' of each water body not achieving 'good status' has also been assessed.

The Environmental Protection Agency (EPA) does not undertake surface water monitoring within the Palmerstown 010 Sub Catchment. The most recent WFD Status for the Palmerstown 010 river was assessed by a modelling technique which yielded a Poor value, albeit with a low confidence. The risk of the Palmerstown 010 failing to meet its WFD objectives by 2027 is currently under review. There are no watercourses within the Nanny-Delvin catchment indicated as being a salmonid protected river (S.I. 293: European Communities (Quality of Salmonid Waters) Regulations, 1988) on the EPA'S Catchment website.

<u>SITE DRAINAGE:</u>

Stormwater from roofs and clean yards is collected by the surface water drainage network and directed to the detention basins in the south of the site. Stormwater from the northern site and from the easternmost fields will be left natural, while stormwater from the proposed mound to the south of the site will drain directly to the drainage ditch.

The drainage network ultimately discharges to the drainage ditch to the south of the site which is likely connected to the Rogerstown Estuary via the Palmerstown 08 stream.

Based on the topography of the site (i.e. gently sloped down to the south-east) it would appear that the ground water flow is toward the Rogerstown Estuary. However, because of the complexities of groundwater flow direction it is possible that underground drainage and groundwater flow do not simply follow surface topography.

The applicant intends to apply for an Industrial Emissions Licence, which would require monitoring of stormwater emissions from the site. Monitoring results would be presented on an Annual Environmental Report (AER).

<u>FLOOD RISK:</u>

A preliminary assessment of the risk of flooding at the site was undertaken as part of this EIAR. GSI have developed a Surface Water Flooding map during the winter 2015/2016 flood event. According to this map, the nearest pluvial flooding to the development site was in a small agricultural field located c. 3.8km to the north-west.

The Catchment Flood Risk Assessment and Management (CFRAM) Programme was developed to meet the requirements of the EU Floods Directive 2007/60/EC. Has created flood risk and hazard maps for these areas which are available online at (www.floodmaps.ie). In order to assess the flood risk to the site, the Office of Public Works (OPW) indicative flood mapping website was consulted.

The proposed development is not situated within the flood plain of any watercourse and would not alter the flood characteristics of any waterbody during high flow **Figures 10.8** and **10.9**.

Figure 10.8: National Indicative Fluvial Map – Present (Medium Probability).

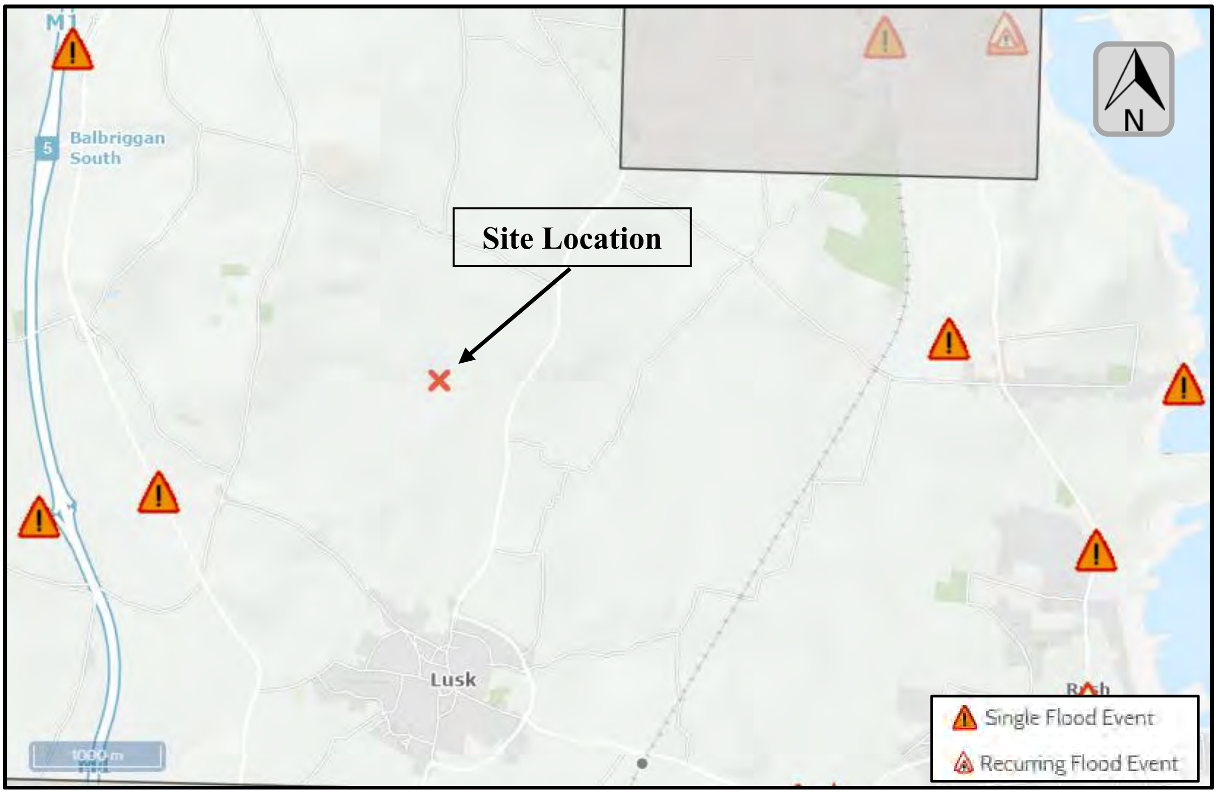

Figure 10.9: Past Flood Events (OPW map).

The nearest flood zones delineated under the National CFRAM Programme are c. 1.1 km south-east of the site on the Palmerstown 08 stream, and c. 1.7 km south of the site on a small agricultural field near Lusk town.

According to the OPW, there have not been recorded any other flood events in the area surrounding the site. The nearest recorded recurring flood events are in the Palmerstown 08 stream approximately 4.1 km to south-east in the outskirts of Rush town.

The alluvial deposit maps (Quaternary sediments) from the Geological Survey of Ireland (GSI) were consulted to assess the extent of any alluvial deposits in the vicinity of the proposed development site.

Alluvial deposits can be an indicator of areas that have been subject to flooding in the recent geological past. Alluvial deposits do occur east and north of the site and correspond to the Palmerstown 08 stream (**Figure 10.10**).

In summation, based on the collated mapping above, flood risk to the site is considered to be 'Low'. There are no mapped flood zones or no recorded flood events within or in the immediate vicinity of the site.

There is no perceivable conveyance or discharge mechanism based on the local topography that would permit floodwater to directly inundate the site.

In short, the proposed development would not be expected to result in an adverse impact to the hydrological regime of the area or to increase flood risk elsewhere and is therefore considered to be appropriate from a flood risk perspective.

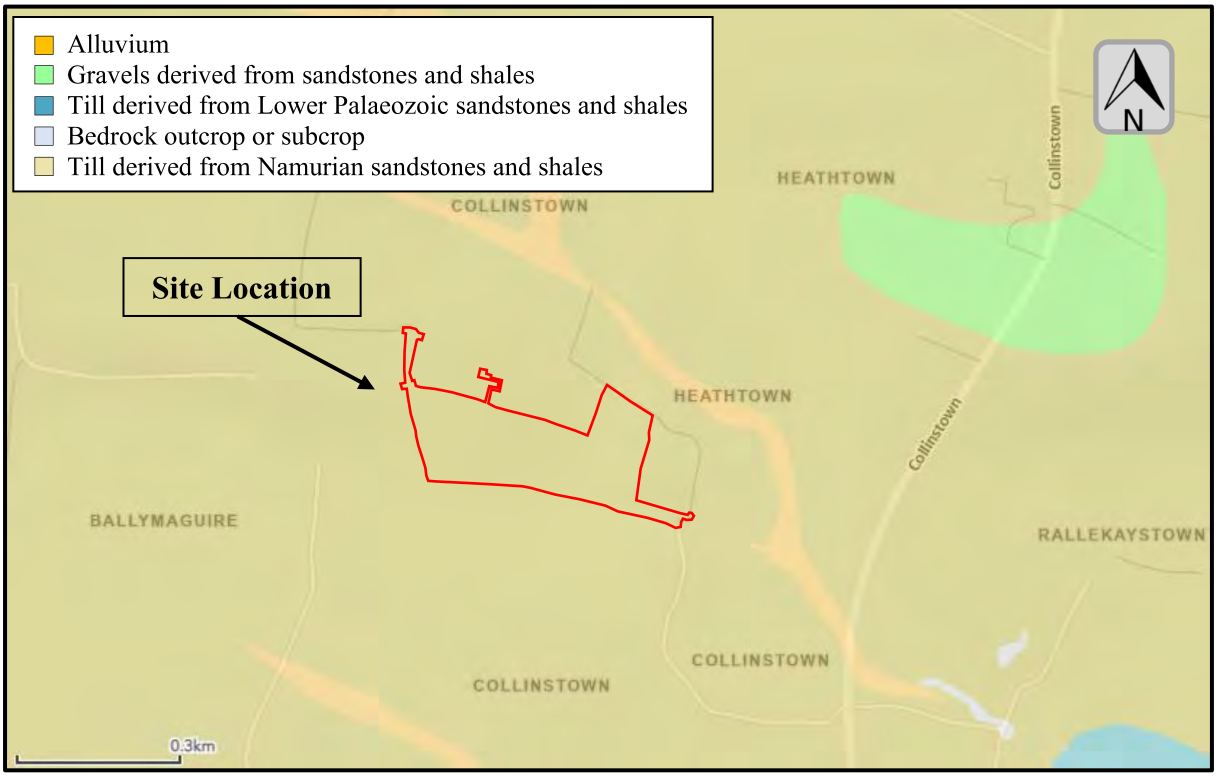

Figure 10.10: Quaternary Sediments (GSI map).

WFD GROUNDWATER BODY STATUS:

The EU Water Framework Directive (2000/60/EC) (WFD) establishes a framework for the protection, improvement and management of surface and groundwater. The overall aim for groundwater was to achieve at least ‘good quantitative status’ and ‘good chemical status’ by 2015, or at the latest by 2027, as well as preventing deterioration in those waters that have been classified as ‘good’ status.

The EC Environmental Objectives (Groundwater) Regulations 2010 (S.I No. 9 of 2010) as amended by Environmental Objectives (Groundwater) (Amendment) Regulations 2016 (S.I. No. 366 of 2016) give effect to the criteria and standards to be used for classifying groundwater in accordance with the requirements of the WFD.

The Lusk-Bog of the Ring groundwater body (GWB) underlies the proposed development site and covers an area c. 232.9 km^2. The GWB is classified as being a bedrock which is generally moderately productive.

The hydrochemical analyses of groundwater indicate a very hard water (355 - 435 mg/l (CaCO3)), with a high alkalinity (310 - 325 mg/l (CaCO3)). Conductivities are also high ranging from 520 - 810 µS/cm. Alkalinity values range from 200 to 350mg/l with the majority of values around 300mg/l. This groundwater can be classed as a calcium bicarbonate water.

GROUNDWATER LEVELS & FLOW DIRECTION:

The GWB is composed of moderate permeability limestone, which in some places is karstified. Very small areas of low permeability impure limestones are incorporated with this GWB, since they are isolated and do not alter significantly the flow system. Karstification of the limestone and increased transmissivity has been found in the north close to the fault, which displaces the Lower Paleozoic rocks alongside the limestone. This area has undergone structural deformation. Groundwater flow occurs along fractures and in place through solutionally enlarged karst conduits. Recharge occurs diffusely through the subsoils and via outcrops.

The aquifers within the GWB are generally unconfined, but may become locally confined where the subsoil is thicker and/or lower permeability and where the aquifer is overlain by Namurian Strata. Most flow in this aquifer will occur in a zone near the surface. In general, the majority of groundwater flow occurs in the upper 30 m, comprising a weathered zone of a few metres and a connected fractured zone below this. Flow path lengths are variable, from examining the drainage density it is clear that in some instances groundwater flow paths of up to a couple of kilometres may exist, although distances of a few hundred metres area more likely. The groundwater discharges directly to the Irish Sea in the east and also to the north and south via baseflow to rivers. Analysis of water levels in the area of the Bog of the Ring has shown a direct connection between the bog and the water table in areas where the subsoil is composed of permeable material.

The site is underlain by Loughshinny Formation, mainly of dark micrite and calcarenite, shale and the subsoil where the development site is located has a low permeability.

According to the GSI Groundwater data viewer, the area where the proposed site is located does not contain boreholes nor wells. Available borehole information suggests that there is a highly variable thickness of subsoil overlying the aquifer. There are large areas where the subsoil is less than 5 metres thick, whereas other evidence suggests subsoil thickness of up to 40m in places.

The higher elevations are in the order of 160 m OD. Elevation falls off from these hills along the centre of the body to the north and south and also towards the coast. In the area of the GWB where the site is located it is likely that groundwater is forced to discharge to the surface as the system reaches capacity. The water from these springs forms streams which flow east towards the coast.

In general, flow directions are expected to approximately follow the local surface water catchments. The Site Characterisation Report concluded that groundwater within the site area likely flows in a southerly direction.

GROUNDWATER/ AQUIFER/ VULNERABILITY:

Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities.

All land area is assigned one of the following groundwater vulnerability categories:

- Rock near surface or karst (X)
- Extreme (E)
- High (H)
- Moderate (M)
- Low (L)

These categories indicate the likelihood of groundwater contamination and help to ensure that a groundwater protection scheme is not unnecessarily restrictive on human activities.

Where the subsoil thickness is less than 3.0 m, the vulnerability is rated as Extreme (the highest risk situation). Where the subsoil thickness is greater than 3.0 m, the vulnerability is rated as High, Moderate or Low (depending on the permeability and thickness of the subsoil).

The GSI's National Groundwater Vulnerability map indicates that the proposed site is located within an area with a groundwater vulnerability rated as Low.

The vulnerability of the groundwater within much of the site is interpreted as being low due to the low permeability of the subsoil (**Figure 10.11**).

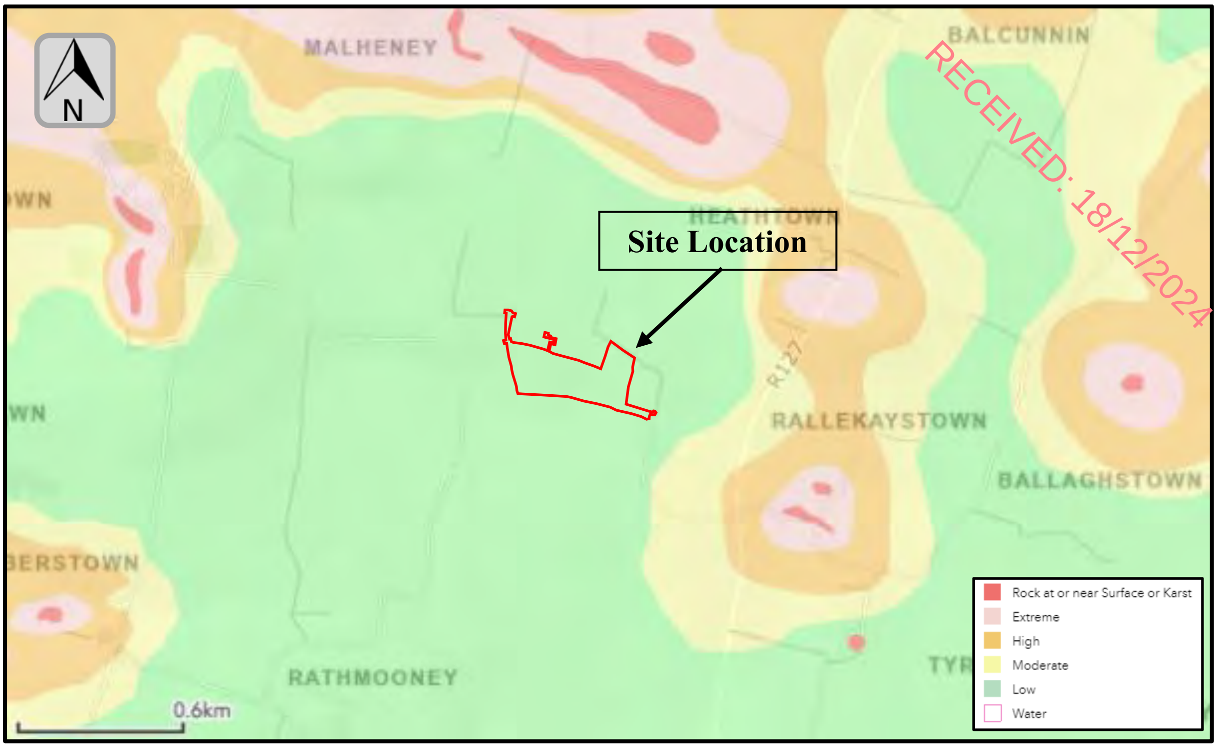

Figure 10.11: Groundwater Vulnerability (GIS map).

The site has always been an agricultural field and there is no historical evidence of groundwater contamination.

In Ireland, the Geological Survey (GSI) classifies aquifers in terms of nine different categories which can be used to define the relative value of aquifers.

The classification system is based on the UNESCO-IHP system and on progressive developments within the GSI in consultation with the Irish hydrogeological community.

Different aquifers have differing abilities to store and transmit water. This means that the chances of obtaining large new groundwater supplies would vary with location. In risk terms, the environmental consequences of, for example, a groundwater pollution incident, would also vary.

GSIs aquifer classification map indicates that the site of the proposed development is situated on a bedrock aquifer, which is moderately productive. The groundwater flow is through fractures and fissures in the bedrock (secondary flow) and groundwater yields available from the sandstone and shale rocks within the succession are generally moderately productive (Lm) (**Figure 10.12**).

The site is not located within or in the vicinity of a surface or groundwater source protection area. Bog of the Ring PWS is c. 1.4 km north-west of the proposed site, which would be considered upstream. The designated area has variations in altitude, ranging approximately between 40m and 170m at the Knockbrack Hill. There are no other drinking water protection areas within 15 km from the site.

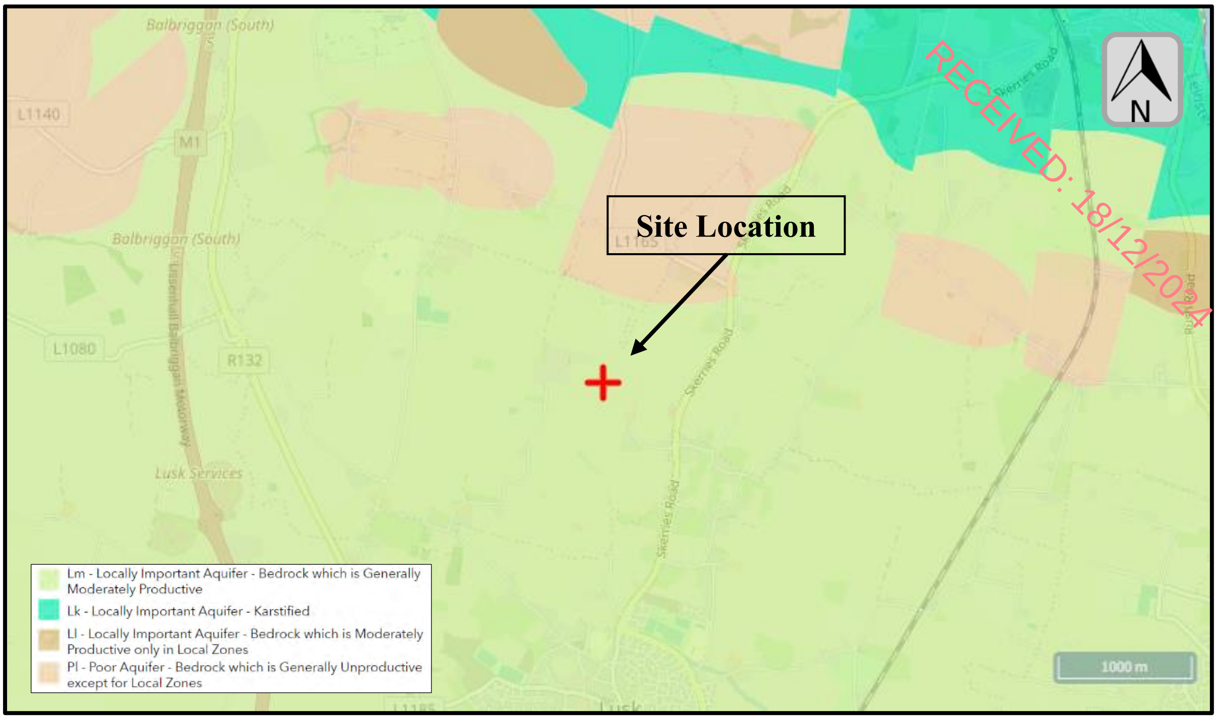

Figure 10.12: Groundwater Resources – Aquifer (GIS map).

There are also several known springs and groundwater wells in the region. The closest point downstream of the proposed site from which drinking water is abstracted is a spring located near the Palmerstown 08 stream in an agricultural field approximately 265m from the site (**Figure 10.13**).

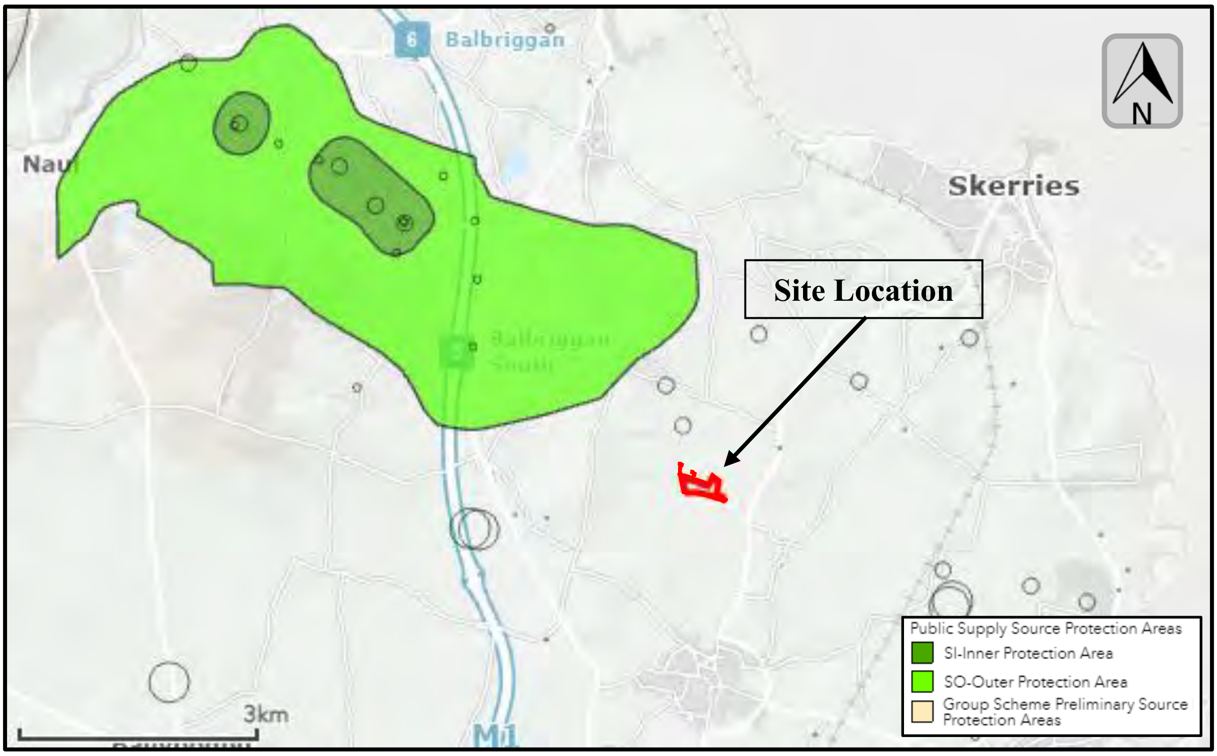

Figure 10.13: Source Protection Areas and Well & Springs (GIS map).

GROUNDWATER ABSTRACTION:

There are 2 existing water sources on site – a dedicated firefighting ring main and a well supply of potable water. A connection will be taken from the existing firefighting main adjacent to the site boundary in the northeast corner of the site. The estimated amount of water to be used at the site as feedstock would be c. 8,000 m3/year. Minor volumes of water would be used at the site for other purposes, such as washing activities and staff facilities. This would be sourced from the existing Country Crest complex supply of potable water and would not be expected to significantly impact upon local groundwater abstractions processes due to increased demand.

Groundwater recharge in the area of the site is c. 22.79 mm/y, which is considered to have a low permeability and vulnerability.

GROUNDWATER QUALITY:

The excavation of and exposure of the subsoil layer during the construction phase will result in an increased risk to the groundwater vulnerability. Subsoils are between 3.0 and 5.0 m deep beneath the site so excavation of bedrock should not be required. Additionally, subsoil permeability at the proposed site is considered to be low, which would further limit the increase in groundwater vulnerability.

Mitigation measures are included in Section 10.5.

DESIGNATED SITES & GROUNDWATER DEPENDENT TERRESTRIAL ECOSYSTEMS:

There are no known protected groundwater dependant terrestrial ecosystems (GWDTEs) within 10.0 km of the proposed development site.

The nearest sites of ecological importance are the Rogerstown Estuary SAC and SPA which are 4.19 km south of the site, North-West Irish Sea SPA which is 4.39 km north-east, Skerries Islands SPA which is 5.30 km north-east, Rockabill to Dalkey Island SAC which is 6.39 km east, Rockabill SPA which is 7.26 km north-east, Malahide Estuary SAC and SPA which are 7.82 km south.

None of these sites have been designated for any Annex I habitats and Annex II species that are groundwater-dependent terrestrial ecosystems. The nearest known protected GWDTE is the North Dublin Bay SAC, which is located approximately 17.8 km to the south of the site. The humid dune slacks [2190] habitat for which this site has been designated has been listed as a GWDTE.

10.4 IMPACTS

10.4.1 CONSTRUCTION PHASE

The construction phase holds a number of activities which could potentially impact on the soils, geology and water environment. Potential construction phase impacts are detailed in the following sections.

SOIL REMOVAL:

It would be necessary to create some excavation on the site for pad foundations and to accommodate the proposed buildings. These excavations would generally be between 1.0 m and 4.0m deep.

Suitable fill, in most cases hardcore or non-hazardous building rubble would be used to screen the bottom of the excavated area prior to the installation of the concrete floor and mass concrete walls.

The areas outside the tank would be backfilled with suitable fill and concrete footing / foundations would be poured to accommodate the steel make-up of the site's structures.

There would be no permanent removal of soil and subsoils from the proposed development site. During the site levelling and excavation phase it is expected that a large amount of soil and subsoil would be disturbed.

It is proposed to re-use all of the excavated soils and subsoils on the site for levelling and landscaping. The excavations would extend into the natural subsoils on the site.

The excavation on the proposed development site itself would at its deepest point be c. 3.7 m deep to accommodate the proposed digester. Subsoils are between 3.0 and 5.0 m deep beneath the site so excavation of bedrock should not be required.

The removal and disturbance of soils and subsoils during the construction phase may also temporarily increase the risk to groundwater as the protective soil/subsoil layer is removed and the vulnerability of the groundwater to surface contaminants is increased.

Given the depth of the subsoil at the site and the short period of time it would take to finish the excavation phase of the project there should only be a *slight to moderate temporary impact* on groundwater vulnerability. The vulnerability would not change following backfilling and reinstatement.

BEDROCK EXCAVATION:

The excavation and construction of the proposed development would take place within the natural subsoils of the site. Bedrock excavation would not be required.

VEHICULAR MOVEMENT & SOIL COMPACTION:

Soil compaction can occur due to movement of construction and maintenance traffic on the site. The majority of the areas to be trafficked will be hardcore yard areas. Similar hardcore surfaces would be installed surrounding and leading to proposed structures. This area would be moderate in size, therefore it would be considered to be a *negative moderate long-term impact* on the soil and in-situ earth materials. Construction traffic occurring outside of planned road and yard areas would be minimal and any compaction of soils would be considered to be short term and not significant.

ACCIDENTAL HYDROCARBON LEAKAGE / SPILLAGE FROM MOBILE PLANT & EQUIPMENT:

Possible contamination of soil, subsoils, surface water and groundwater by accidental leakage or spillage of hydrocarbons from mobile plant and associated equipment has the potential to occur during the construction phase.

Because of the low permeability of the till derived from Namurian sandstones and shales subsoil beneath the site, and resulting low groundwater vulnerability, the contamination of the underlying groundwater is considered to be unlikely to occur in the event of an accident / spill. The excavation of and exposure of the subsoil layer during the construction phase will result in an increased risk to the groundwater vulnerability.

Any uncontrolled spillages/leaks would likely infiltrate through the subsoils and eventually move down slope towards the Palmerstown 08 stream south-east of the site or move deeper into the ground towards groundwater bodies.

Depending on the magnitude of any uncontrolled leakages or spillages, they would have a *negative slight-moderate short-medium term impact* on the surface water quality of the Palmerstown 08 stream, if not quickly contained and removed. An accidental hydrocarbon spillage would also have a *negative moderate short-medium term impact* on soil quality and groundwater quality.

Sediment Laden Run-off:

The construction of the proposed development would involve stripping and removal of some portion of topsoil and earthworks to facilitate the construction of the proposed buildings. There is potential for erosion of temporarily exposed soil during the excavation stage and consequently the generation of run-off with high levels of silt / sediment. If uncontrolled, this run-off would infiltrate through the subsoils and impact on Palmerstown 08 stream or groundwater bodies.

A headwall will be installed at the drainage ditch to the south, with potential for impacts caused by run-off from construction activities. All rainwater (excluding that falling on roofs and clean yard areas) percolates to ground. In the event of sediment contamination of rainwaters, the sediment would be deposited to the surface of existing soils within the construction site.

It is expected that there would be very little run-off from uncovered soils on site given the limited time that soils would be exposed.

There would be *no impact* on downstream surface water bodies (e.g. Palmerstown 08 stream).

Spillage of Concrete / Cement Material:

The spillage of concrete/cement material poses a potential risk to surface water and groundwater quality as this material is alkaline and corrosive. During the construction phase, this risk may be realised during the construction of buildings and equipment washdown.

As stated above with regard to sediments, cement material from a spill would be entrained within soils as rainwaters percolate to groundwater. In the event of a spill, there would be a *negative long-term significant* impact on the composition of the soil in the small area underlying the spill. However, this would have a similar effect to overlying soils with hardcore.

Such a spill would increase the alkalinity of the underlying groundwater. However, it is likely that there would be a degree of dilution with groundwater and percolating rainwater. Depending on the magnitude of any spills, the release of such cement material into nearby surface water would have a *negative slight-moderate short-term impact* on groundwater quality and potentially downstream in the Palmerstown 08 stream.

10.4.2 OPERATIONAL PHASE

During the operational phase of the proposed development, there is a potential for impact on soils, geology and water. Potential operational phase impacts are detailed in the following sections.

DETENTION BASINS:

The proposed development will include two detention basins to the south of the site, which will be used for attenuating surface water run-off before discharging to the existing ditch. This will comprise of clean water and there will be no process emissions to any water body from the site.

FOUL WATER:

Wastewater from the proposed staff facilities on the site would discharge to groundwater via a septic tank system, which has been designed to cater for 18 staff members (Population Equivalent: 6). The treated effluent will ultimately discharge to ground and percolate through the soil and no connection to the public sewer will be required. The septic tank would undergo regular maintenance to ensure proper functioning. Therefore, no significant impacts to hydrogeological receptors are anticipated.

STORAGE OF SOILED WATER:

Silage will be stored in clamps where, through compaction and fermentation, soiled water will be generated. This effluent will be collected by a buried tank and may be further used as feedstock for the anaerobic digestion process. This will minimise the amount of waste generated at the site and reducing potential runoff. The soiled water tanks will also collect rainwater from feedstock feeding locations and the solid digestate bunker.

STORAGE OF DIGESTATE:

Digestate produced at the site has the potential to negatively impact on the water quality in the surrounding environment if not collected, stored and recovered appropriately.

The concrete yard where the anaerobic digestion will take place will be fully bunded with a retaining concrete wall as well as with an earth berm to the south. All drainage basins to this bunded area will be equipped with automatic shutoff valves to stop any liquid transfer outside. There will be sufficient berm capacity to account for the leakage demand of the site.

The solid fraction of the digestate will be stored in a bunker to the south of the silage clamps. This bunker will be roofed over to prevent emissions and contamination.

The liquid fraction of the digestate will be stored within sealed lagoons in the eastern section of the site, which will be fenced. Buried collection chambers will be installed to collect any spillage of digestate that might occur.

An estimated 9.342 tonnes of solid digestate and 49.045 tonnes of liquid digestate will be generated per year. The storage areas have been designed to provide sufficient storage capacity for both fractions of the digestate with anticipated peak stored volumes between mid-October and mid-February when landspreading is prohibited in Dublin.

LANDSPREADING OF DIGESTATE:

Digestate from the development site would be landspread on applicant's lands as well as delivered to partner farmers as detailed within the Nutrient Management Plan. Digestate will constitute a nutrient-rich organic fertiliser with the potential to impact upon soils and waterbodies connected to the site, and associated habitats and species. The landspreading of digestate would be undertaken in accordance with the Nitrates Regulations (S.I. No. 113 of 2022), such as complying with the timing of the landspreading, nutrient management planning and set-back distances around sensitive receptors and transport vectors. The usage of digestate for landspreading activities provides benefits by promoting a circular economy and presenting itself as an alternative to other classes of fertilisers considered to be more damaging to the environment, such as traditional chemical fertilisers.

Therefore, there would be no significant impact to soils, groundwaters and surface waters if carried out in accordance with good practice.

ACCIDENTAL LEAKAGE / SPILLAGE OF HYDROCARBONS:

Possible localised contamination of soils, subsoils, groundwater and the drainage ditch by accidental leakage or spillage of hydrocarbons from vehicles, other machinery or on-site fuel tanks may occur during the operational phase.

All tank, container and drum storage facilities will be appropriate to the material contained and bunded. It is not considered likely that there would be a significant risk of leaks or spillages of hydrocarbons during the operation of the proposed development.

It is unlikely, other than in exceptional circumstances or prolonged uncontrolled releases, that there would be significant contamination of the Palmerstown 08 stream or of any ecological receptors downstream, such as the Rogerstown estuary.

SOIL SEALING:

The proposed development would occur on a site with a total area of approximately 71,600 m^2. The soil within the area of the proposed developments is currently arable land. Most of the area of the site would be effectively sealed.

This sealing effect can impact on natural exchanges occurring between soils and the atmosphere which influence the natural function and associated biodiversity of soils. This would have *a negative slight permanent impact* on the soil.

FLOOD RISK:

The sealing of soil would also lead to an increase in surface water runoff and consequently in flood risk. The proposed surface water drainage network on the site would discharge to the drainage ditch to the south and is expected to have sufficient capacity to accommodate any new storm-water produced from the proposed development.

The proposed development site is not located within any identified Flood Zone. Overall, it is assessed that there would be no increased risk of flooding on the site itself or downstream of the site arising from the proposed development. Thus, the impact would be a neutral long term imperceptible impact and no further mitigation is required.

WATER USAGE:

The water for the proposed development would be supplied from a connection to the existing firefighting main adjacent to the site boundary in the northeast corner of the site. An underground tank will also be installed to harvest rainwater falling over the roofs of the proposed buildings to be used in the event of a fire breakout. The proposed development would not be expected to significantly impact upon local groundwater abstractions processes due to increased demand.

DISRUPTION OF GROUNDWATER FLOW PATHS:

Subsurface structures have the potential to impact on groundwater flow regimes if they are built in the aquifer's flow path. Theoretically, groundwater mounding can occur where large impermeable structures are placed perpendicular to groundwater flow paths.

The depth of the proposed excavations is unlikely to penetrate to bedrock. Taking this into account there would be a *neutral slight imperceptible impact* on the groundwater flow paths.

AMMONIA AND NITROGEN DEPOSITION

Ammonia and Nitrogen will be emitted into the atmosphere from combustion processes associated with the biogas boilers, CHP unit and the exceptional use of the emergency flare. Nitrogen deposition resulting from these emissions may impact receptor surfaces, including soil, water and ecologically important receptors such as the Rogerstown estuary. According to Katestone's Air Quality Assessment report, predicted emissions will not result in significant concentrations in areas beyond the site. Therefore, no significant impacts associated with ammonia and nitrogen deposition are anticipated. For more detailed information, see Section 5.

10.4.3 "DO-NOTHING" SCENARIO

Should the proposed development not be built, Country Crest ULC. would continue current operations at the site and the immediate area where the proposed development would have taken place would remain as farmyard.

10.5 MITIGATION MEASURES

This section describes a range of mitigation measures designed to avoid, reduce or offset any potential adverse impacts identified. The main objective of the mitigation measures is to avoid any potential adverse impacts in the first instance, and where this is not possible then to reduce the effects of any impacts on the receiving environment.

Many of the mitigation measures below have been based on CIRIA (Construction Industry Research and Information Association, UK) technical guidance on water pollution control and on currently accepted best practice.

10.5.1 CONSTRUCTION PHASE

<u>CONSTRUCTION MANAGEMENT:</u>

In order to reduce the impacts on the soils, geology and water environment a number of mitigation measures would be adopted as part of the construction works on site as follows:

- The construction works contractor would adhere to standard construction best practice, taking cognisance of the Construction Industry Research and Information Association (CIRIA) guidelines "*Control of Water Pollution from Construction Sites; guidance for consultants and contractors*" 2001, "*Control of Water Pollution from Construction Sites – Guide to Good Practice*", 2002, and the 2016 guidelines published Inland Fisheries Ireland, "*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*";
- Excavations and earth-moving activities would be planned outside periods of heavy rainfall, to limit the potential for suspended solids to become entrained within surface water run-off;
- All construction plant machinery and equipment would be maintained in good working order and regularly inspected;
- Existing topsoil would be retained on site to be used for the proposed development. Topsoil would be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works;
- Top-soiling and landscaping of the works would take place as soon as finished levels are achieved, in order to reduce weathering and erosion and to retain soil properties;
- Stockpiled material would be covered/dampened during dry weather to prevent spreading of sediment/dust;
- The temporary site compound would be used for the storage of all machinery and plant when not in use, the re-fuelling of plant and the storage of all associated oils and fuels for plant;
- Handling, transport and storage of fuel and chemicals would be controlled e.g. oil and fuel stored on site would be stored in designated areas. These areas would be bunded and located away from any surface water drainage. Refuelling of construction machinery would be undertaken in designated areas located away from surface water drainage;
- Where construction plant shows signs of hydrocarbon leakage, site personnel would cease the operation of the item in plant in question and notify the Project Manager. Any defective plant would be kept out of service until the necessary repairs are undertaken;
- Spill kits shall be kept in these areas in the event of spillages;
- Controls for storage of any other potentially polluting materials/chemicals on-site e.g. any chemicals used on site would be required to be stored in designated bunded areas and the construction manager would be responsible for ensuring that a copy of all relevant material safety data sheet for each product is available at the site office;
- Any uncured concrete works would be supervised at all times, and would be scheduled outside of periods of expected heavy rainfall;
- The wash-out of Ready-Mix Truck drums would not be permitted onsite, in the environs of the site, or at a location which could result in a discharge to surface water;

- Surplus uncured concrete would be returned to the batching plant where possible;
- Wheel wash facilities to prevent soil and mud being tracked onto the adjoining roads would be provided.

CONTROLS ON DAMAGE TO UNDERLYING GEOLOGICAL MATERIALS:

The disturbing of soils and subsoils is an unavoidable impact of the development. One of the primary mitigation measures already employed at the preliminary design stage has been the minimisation of volumes of subsoil and bedrock that would be excavated.

It is proposed that all of the excavated subsoils removed during construction would be re-used on site in the form of landscaping. Any subsoils that cannot be re-used on-site will be treated, recycled or disposed of where suitable using a licenced waste contractor. Specialist machinery (such as tracked machinery) would be used to minimise compaction of the subsoils and would be confined to designated routes. Additionally, traffic flows on site would be minimised as much as possible.

CONTROL AND RE-USE OF POTENTIALLY CONTAMINATED MATERIAL ON-SITE:

It is not anticipated that any contaminated materials would be produced during construction of the proposed development.

Should any material appear to be contaminated, samples would be analysed by an appropriate testing laboratory.

All potentially contaminated material would be either left in situ and characterised through laboratory testing; or segregated and stockpiled in a contained manner and characterised through laboratory testing. Any contaminated material would be appropriately disposed of or treated using a licensed waste contractor and in accordance with the Waste Management Regulations, 1998.

CONTROL ON SOURCES OF FILL AND AGGREGATES:

All fill and aggregate imported for use on the proposed development site would be sourced from reputable suppliers. All suppliers would be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the project;
- Environmental Management status;
- Regulatory and Legal Compliance status of the Company.

10.5.2 OPERATIONAL PHASE

OPERATIONAL MANAGEMENT:

In order to reduce the impacts on the soils, geology and water environment, a number of mitigation measures would be adopted as part of site operations as follows:

FEEDSTOCK DELIVERY

Feedstock will be delivered to the site from HGVs, which will access the reception building by high-speed roller shutter doors, which will promptly close prior to the offload of feedstock. Feedstock will be safely stored in silos while liquid feedstock, which will be imported but also sourced via an underground slurry feeding line from the existing cattle building to the north of the site, will be stored in a 500m^3 tank located within the bunded area of the site. The liquid feedstock feeding line will be twin walled to prevent leakage.

STORAGE & LANDSPREADING OF FERTILISER:

The concrete yard in the western section of the site where the anaerobic digestion will take place will be fully bunded with a concrete wall as well as with an earth berm to the south. This yard will be kept at a lower FFL than the middle and eastern sections of the site where the digestate will be stored.

The bunker where the solid fraction of the digestate will be stored will be roofed to prevent emissions and contamination. The lagoons where the liquid fraction of the digestate will be stored will be on a lower FFL than the surrounding areas, covered with a lid and fenced all around. Buried chambers will be installed to collect any spillages of digestate that might occur.

The landspreading of digestate would be undertaken in accordance with the Nitrates Regulations (S.I. No. 113 of 2022), such as complying with the timing of the landspreading, nutrient management planning and set-back distances around sensitive receptors and transport vectors.

TREATMENT & MONITORING OF STORM-WATER:

The site levels and gradients have been planned to maximise gravity-based stormwater drainage to the proposed detention basins to the south.

As indicated previously, it is proposed that only rainwater from roofs and clean hardstanding areas would be collected and diverted to the existing surface water drainage network. The applicant intends to apply for an Industrial Emissions Licence, which would set surface water monitoring requirements.

All soiled water would be diverted and collected in the soiled water tanks to be further used in the anaerobic digestion process. This would include effluent from the silage clamps as well as rainfall from the solid digestate bunker and feedstock feeding locations. During months of intense rainfall where soiled water supply is expected to exceed the needs of the anaerobic digestion process, soiled water tanks will store water to be used during dry periods. 1200 m^3 soiled water tank capacity (accounting for 20% safety margin) will be provided to the site. There will be control valves installed to direct the clean water system as required to complement the water demand in the dry months. In the case of an emergency, the upper soiled water tank is to be let discharged into the bunded area. The connection of lower tank and upper tank to be provided with a non-return valve so that it stops filling the lower tank when it is full, preventing the surcharge.

Chemical and fuels would be adequately bunded and spill clean-up materials would be available onsite in the event of a spill. All drainage basins to this bunded area will be equipped with automatic shutoff valves to stop any liquid transfer outside. Surface water will pass through a hydrocarbon interceptor before discharging to the existing ditch via the proposed headwall.

FOUL WATER:

A Site Characterisation Report has been prepared by Hydrocare Environmental Ltd. on the 13th November 2024, as per the *EPA Code of practice: Wastewater Treatment Systems for Single Houses*. Results from the assessment indicated that the type of system is appropriate for development. The septic tank that services staff facilities would be regularly inspected and maintained in good working condition.

FLOOD RISK:

Due to the fact that there is no perceivable flood risk and that there will be an adequate surface water drainage network in place that would accommodate the new development, the flood risk remains low. As a result of this it is unnecessary to propose any mitigation measures.

10.6 RESIDUAL IMPACTS

The predicted residual impacts of the proposed development are described in **Tables 10.1 and 10.2** below in terms of quality, significance and duration. The relevant mitigation measures are detailed and the corresponding residual impacts are determined, which take into account of these mitigation measures.

Table 10.1: *Summary of Predicted Construction Phase Impacts*

Activity/ Source	Environmental Receptor	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual Impact
Earthworks	Soils	Natural soil excavation for building foundations	Negative	Slight	Permanent	Material will be reused on site where possible	Negative slight
Earthworks	Soils	Vehicular movement and soil compaction.	Negative	Slight-moderate	Short term	Specialist machinery (such as tracked machinery) will be used to minimise compaction of the subsoils.	Slight
Storage of potentially polluting materials	Soils / Bedrock	Potential leak or spillage from vehicles/machinery or construction related liquids on site resulting in soil/bedrock contamination	Negative	Slight-Moderate	Short-medium term	Good housekeeping during construction and proper handling, storage and disposal of any potentially polluting substances. Designated and bunded storage areas will be used and maintained. Designated refuelling areas will be used. Spill kits retained on-site.	Imperceptible
Earthworks	Surface Water (site drain)	Erosion of exposed soils/subsoils and entry of sediment laden run-off to nearby surface water	Negative	Slight-moderate	Temporary	Stockpiles of topsoil/soils will be covered/dampened during dry weather to prevent spreading of sediment/dust. Run-off from the site will pass through settlement ponds prior to discharge to the site drain. Top-soiling and landscaping of the works will take place as soon as finished levels are achieved.	Negative slight
Earthworks/ Excavations	Groundwater in the Lm aquifer	Temporary removal of part of the protective soil/subsoil cover thus increasing groundwater vulnerability to contamination	Negative	Slight-moderate	Temporary	Excavations would be backfilled as soon as is possible to prevent any infiltration of potentially polluting compounds to the subsurface and the aquifer.	Negative slight
Hydrocarbons from construction vehicles/	Surface Water (site drain)	Potential accidental leakage or spillage of hydrocarbons from	Negative	Slight-moderate	Short term	Oil and fuel will be stored on-site in designated bunded areas located away from any surface water drainage. Refuelling of	Slight

Activity/ Source	Environmental Receptor	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual Impact
machinery/ equipment		vehicles/machinery resulting in surface water contamination				construction machinery will be undertaken in designated areas located away from surface water drainage. All machinery will be inspected at the start of each work shift for signs of leaking hydrocarbons. Parking areas will be inspected on a daily basis for evidence of hydrocarbons leaking from machinery. Spill kits will be kept on-site.	
Cement material of other potentially polluting substances	Surface Water (site drain)	Potential leakage or spillage of cement or other potentially polluting substances resulting in soil/bedrock/groundwater contamination	Negative	Slight-moderate	Short term	Good housekeeping during construction and proper handling, storage and disposal of any potentially polluting substances. Designated and bunded storage areas will be used and maintained. Spill kits retained on-site. Cement mixing will take place in designated areas on-site with impervious surface.	Negative slight

Table 10.2: *Summary of Predicted Operational Phase Impacts*

Activity/Source	Environmental Receptor	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual impact
Oil/Hydrocarbons from Vehicles. Machinery	Soils/groundwater and surface water	Accidental leakage/spillage of hydrocarbons resulting in localised contamination of soils/subsoils/surface water	Negative	Slight-Moderate	Temporary	All new oil/hydrocarbon storage facilities will be designed and maintained in accordance with best practice and standards (BS 5410 and BS799-5).	Imperceptible
Site Drainage	Soils/groundwater and surface water	Run-off from impermeable areas within the site resulting in localised contamination of soils/subsoils/surface water.	Negative	Moderate	Temporary	Programme of inspection and maintenance of the site drainage network will ensure that any issues are identified and remedied.	Imperceptible-Slight
Storage/use of potentially polluting materials/chemicals	Soils/groundwater and surface water	Accidental leakage or spillage resulting in localised contamination of soils/subsoils/surface water.	Negative	Slight-Moderate	Temporary	All potentially polluting/waste storage areas will be designed to afford adequate containment for any liquid or solid waste or by-product	Imperceptible
Wastewater from staff facilities	Soils/groundwater and surface water	Uncontrolled release could result in localised contamination	Negative	Moderate	Short term	Regular inspection and maintenance of the septic tank will ensure good working condition.	Imperceptible-Slight
Landspreading of Digestate	Soils/groundwater and surface water	Uncontrolled release of could result in localised contamination	Negative	Slight	Short term	Landspreading of digestate to be undertaken in accordance with the Nitrates Regulations (S.I. No. 113 of 2022)	Imperceptible

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SECTION C - MATERIAL ASSETS

This section of the Environment Impact Assessment Report deals with material assets that would potentially be affected by the proposed development of a proposed Anaerobic Digester and all ancillary site works and services at Collinstown, Lusk, Co Dublin.

Material assets are grouped into:

Material Assets:	**Agriculture** including all agricultural enterprises.
Material Assets:	**Waste Management**, including all potential waste streams during both the construction and operational phases.
Material Assets:	**Utilities** including electricity, gas, foul sewer and telecommunications.
Material Assets:	**Natural or other resources** including mineral resources, land and energy.

Material Assets are generally considered to be the physical resources in the environment which may be either of human or natural origin. The object of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

Agricultural enterprises interact, to a large extent, with the natural environment in terms of climate, aid quality, soil, hydrology and hydrogeology. Some domestic animals, such as horses and milking cows, may be impacted by traffic-generated noise.

Resources required for the proposed development include existing land, fill material which would have to be sourced from quarries and electricity required for the operation of the proposed development.

11.0 MATERIAL ASSETS – UTILITIES & TRAFFIC

11.1 INTRODUCTION

This section outlines the utilities that would potentially be affected by the proposed development during both the construction and operational phases. Material assets are generally considered to be the physical resources in the environment, which may be either of human or natural origin.

The objective of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

Economic assets of human origin, i.e. utilities are considered in this section. Economic assets of natural origin are addressed in other sections of this EIAR, namely: *Land - Soils, Geology and Hydrogeology; Archaeological, Architectural and Cultural Heritage and Material Assets - Waste Management/Natural resources and Agriculture*. The purpose of this section is to assess the impacts of the proposed development on the existing utility network, which includes the following infrastructure:

- Electricity;
- Water;
- Wastewater;
- Natural Gas;
- Telecommunications;
- Road Network (Traffic).

11.2 METHODOLOGY

A desktop study was undertaken to assess the potential impact of the proposed development on the utilities of the area.

11.3 DESCRIPTION OF EXISTING ENVIRONMENT

11.3.1 ELECTRICITY

The proposed development would be connected to the electrical mains supply. There is a power line system within the existing Country Crest site to the west of the proposed site.

Electricity supply and transmission is available throughout the county on the low (38kV, 20kV, and 10kV) and high transmission networks. High voltage transmission within the county is available at 110kV. There is one 110kV station in Swords town. There are no 400 kv power line systems in the vicinity of the development. The closest power generation station is the gas powered Huntstown station in County Fingal (**Figure 11.1**).

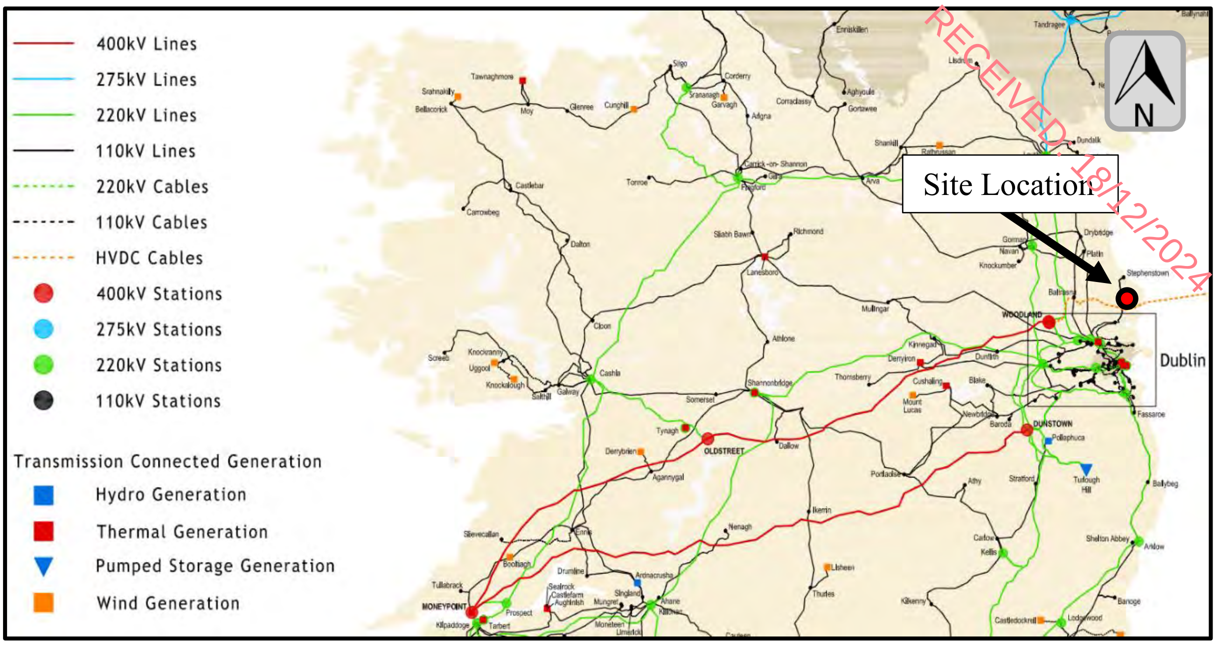

Figure 11.1: Irish Electrical Grid Map.

The biogas produced will be used to supply electricity and heat energy to the site. Electricity would also be supplied to buildings by roof mounted solar arrays / photovoltaic panels.

11.3.2 WATER

The proposed development would require c. 8,000 m^3 of water per year to be used as part of the anaerobic digestion process, with minimal volumes used by staff in onsite facilities. There are 2 existing water sources on site – a dedicated firefighting ring main and a well supply of potable water. It is estimated that water abstraction from the existing well will be approximately $0.5m^3$/day. A connection will be taken from the existing firefighting main adjacent to the site boundary in the northeast corner of the site. Further information regarding water usage at the site is included in the Description of Development Section.

Groundwater recharge in the area of the site is c. 22.79 mm/y, which is considered to represent a low permeability and vulnerability. The site is not located within a surface or groundwater source protection area.

The site is located within a locally productive aquifer which is moderately productive and it is anticipated that it would be able to accommodate the increased water abstraction associated with the proposed development. It is not anticipated that there would be any impact to other wells in the area.

11.3.3 WASTEWATER

Wastewater from the proposed staff facilities on the site would discharge to groundwater via a septic tank system, which has been designed to cater for 18 staff members (Population Equivalent: 6). The treated effluent will ultimately discharge to ground and percolate through the soil and no connection to the public sewer will be required. The septic tank would undergo regular maintenance to ensure proper functioning. The percolation area of the septic tank is the source of the only emission to the ground from this facility.

The applicant intends to apply for an Industrial Emissions Licence, which would require the proposed percolation area to satisfy EPA criteria. The installation of the WWTS & SPF shall be constructed, under supervision, strictly in accordance with EPA COP 2021. All works to be certified by a suitable qualified person.

There would be no planned impact upon municipally operated wastewater schemes from the proposed development. The nearest Waste Water Treatment Plant (WWTP) to the site which caters to a population equivalent (P.E.) of over 500 is the Balbriggan UWWTP in the townland of Barnageeragh c. 4.2 km north-east of the site with a design P.E. of 70,000.

Balbriggan UWWTP is operated by the Fingal Co. Council and holds a Waste Water Discharge Licence with the EPA (D0023-01). There is also an UWWTP plant in Portrane, which serves a p.e. of up to 65,000. Both discharge their treated effluents to the Northwestern Irish Sea.

The proposed development would include an effective stormwater drainage network. This system would easily accommodate any new stormwater generated by the roof and hardstanding areas of the proposed buildings and site structures.

11.3.4 GAS

The proposed development would include the integration of gas services via a proposed connection to an existing gas line located at the Country Crest site.

Gas Networks Ireland has responsibility for developing, maintaining and operating the natural gas transmission and distribution networks in Ireland. The region in which the site is serviced by the Interconnector Gas Pipeline IC1 which connects Scotland to Loughshinny in County Dublin (**Figure 11.2**).

Figure 11.2: Gas Network of Ireland.

11.3.5 TELECOMMUNICATIONS

The county broadband services have improved significantly over the past number of years. The area has a number of broadband, phone and television channel providers, including Digiweb®, Eir®, pure-telecom®, Sky®, Virgin® and Vodafone®.

The Government's 2020 National Broadband Plan will provide high speed broadband services to all premises in Ireland. According to the Irish government's national broadband plan, high speed broadband has already been made available to c. 77% of Irish premises and significant additional investment is expected over the coming years.

11.3.6 TRAFFIC

The site is accessed by a private road (speed limit set at 30 km/hr) c. 1.2 km to the west off the L1155 local road. The L1155 local road connects to the R132 regional road, to the L1165 local road north of the site and to the R127 regional road to the east. The site is c. 45-55m above sea level on an area that is gently sloped down to the south-east. The private road to the west is relatively straight for c. 280m. When accessing the L1155 from the private road, there is a visibility of 90m to the left and 90m to the right at the intersection.

A Transportation Assessment Report has been compiled by NRB Consulting Engineers to address Traffic and Transportation issues associated with the operation of the proposed development, the capacity of the existing road network and the impact of the development locally. The assessment took account of the effect of traffic associated with the 2 x recently permitted and proposed developments (FCC Ref F22A-0077 and F24A/0896E), with the traffic associated with both of these applications considered as 'committed' for assessment purposes. The report established the projected occupation on the local road network for the 15 years following commissioning of the AD Plant (2026 and 2041).

The proposed activity would generate an increase of approximately 44 PCUs per day. Considering the current 262 PCUs deemed 'committed', the proposed development would result in approximately 306 PCUs per day combined. The breakdown of the estimated daily traffic journeys is included below in **Table 11.1**.

Table 11.1: Estimated Annual Average Daily Traffic at the Site.

ESTIMATION OF DIGESTATE PLANT RAW MATERIALS USED (IN)			
Materials	**Total Tonnage**	**Generated Internally**	**Imported**
Chicken Manure	7,000	0	7000
Cattle Manure	1080	600	480
Grain / Grain Product	400	0	400
Slurries	17080	2000	15080
Total Tonnage Imported to Plant Per Annum =			22960
Total Tonnage Imported to Plant Per Week =			442
Total Tonnage Imported to Plant Per Day =			63
Worst Case Max Number of 28T Truckloads Per Day =			3
Resulting Worst Case Max AM / PM Peak Hour Trucks Arriving =			1
ESTIMATION OF DIGESTATE PRODUCT (OUT)			
Materials	**Total Tonnage**	**Utilised / Spread Internally**	**Exported By Road**
Solids Output	9,342	1400	7942
Liquid Output	49045	4904.5	44141
Total	58,387	6304.5	52083
Total Tonnage Exported from Plant Per Annum =			52083
Total Tonnage Exported from Plant Per Allowable Week (36 Spreading Weeks) =			1447
Total Tonnage Exported from Plant Per Day =			207
Worst Case Max Number of 28T Truckloads Per Day =			8
Resulting Worst Case Max AM / PM Peak Hour Trucks Departing =			2
CONVERSION TO PEAK HOUR AND 24HR AADT (PCUS - Car Equivalents)			

Network Period	Arrivals	Departures	2-Way Flow
Weekday AM Peak Hr 8-9	6	6	12
Weekday PM Peak Hr 5-6	6	6	12
24 Hour Day	22	22	44

TII Traffic and Transport Assessment Guidelines requires a Threshold Assessment of the impact on the local roads to be provided in order to determine whether additional more detailed modelling and assessment of particular critical junctions is necessary. If an increase of 5% is noted for networks that are considered heavily trafficked or congested, then further analysis is warranted. The absolute worst case traffic increase on the adjacent road network junctions for the weekday AM/PM Peak Hours and 24 Hr basis are as summarised below as **Table 11.2** below.

Table 11.2: Threshold Assessment, Worst-Case Impact of Proposed AD Development

Assessed Road or Junction	Traffic Increase %			COMMENT
	AM	PM	24H	
Established Site Access	5.3%	4.7%	5.0%	>5%, Therefore Junction Assessed
Local Rd/L1155 Junction to South	4.8%	3.6%	1.1%	<5% No Further Analysis Required
L1155/Q'penny Road Junction	1.6%	1.1%	0.3%	<5% No Further Analysis Required
L1155/R132 T Junction	0.6%	2.5%	0.3%	<5% No Further Analysis Required

Beyond the site access, the worst case traffic increase as a result of the proposed development are in all cases way below the TII recommended lower threshold level of 5%. A detailed capacity modelling of the Site Access Junction has been undertaken as the threshold has been exceeded.

A summary of the results is included below as **Table 11.3**.

Table 11.3: PiCADY Summary Results, L1155/Site Access Junction With ALL Permitted and Proposed Developments

Modelled Scenario	*Period Mean Max Q (PCUs)*	*Period Max RFC*
2026 Opening Year AM Peak Hr	0.2	0.13
2026 Opening Year PM Peak Hr	0.1	0.11
2041 Design Year AM Peak Hr	0.2	0.14
2041 Design Year PM Peak Hr	0.1	0.12

NRB Consulting Engineers have also prepared a Planning Stage Travel Plan (TP), or Mobility Management Plan (MMP), for the proposed development. The plan contains measures to promote sustainable travel modes and to reduce private car borne journeys to and from the site.

11.4 IMPACTS

11.4.1 CONSTRUCTION PHASE

Electricity and water would be required during construction activities. The development site would be connected to the local electricity grid network system and water supply. Given the scale and short-term nature of construction works, the electrical demand on the local electrical network would not be considered significant and would not be anticipated to impact upon local power supply.

Facilities including toilets, showers and a canteen are already provided at the Country Crest site which would easily accommodate the extra persons on site during the construction phase.

Telecommunications requirements during the construction phase would be provided using mobile phones/broadband. There would be no anticipated impacts to the local telecommunications system.

The construction works contractor would liaise with the relevant utilities provider prior to works commencing, with ongoing consultation throughout the proposed development. Where new services would be required, the construction works contractor would apply to the relevant utility provider and adhere to the requirements outlined in the connection permit/licence.

11.4.2 OPERATIONAL PHASE

Following site clearance and excavations, works would commence on the installation of underground utilities to the site required for water supply, domestic wastewater, electricity and telecommunications.

11.4.3 POTENTIAL CUMULATIVE EFFECTS

The proposed development is located within an agricultural landscape, with sparse residential properties located to the east and west of the site along local roads.

The area also supports a number of small-scale agricultural holdings. The proposed site is in an area designated as rural in the Fingal Development Plan 2023 – 2029.

It is considered that the main potential cumulative impacts would be an increased demand on groundwater abstraction, electrical utilities and a slight increase in traffic volumes.

The biogas produced will be used to supply electricity and heat energy to the site. Electricity would also be supplied to buildings by roof mounted solar arrays / photovoltaic panels. This would reduce the use of other fossil fuels at the proposed site.

The proposed site uses will generate low traffic volumes in the context of the road network and the long established nature of the business. The Transportation Assessment report concluded that the road network and the proposed access junction arrangement is more than adequate to accommodate the worst case traffic associated with the now-proposed development along with committed / permitted elements of previous planning applications. The proposed Development will have an acceptable and unnoticeable impact on traffic conditions locally. It is anticipated that a negligible and unnoticeable impact upon the operation of the adjacent road network, given that all traffic increases beyond the site access would be below the TII threshold levels.

It is considered that electrical utilities in the area have adequate capacity to accommodate the estimated requirements of the proposed development, during both the construction and operational phases, and therefore there would be no significant cumulative impact upon local utilities. No significant cumulative traffic impacts are anticipated. The increase in water demand would not be expected to cause a significant demand on the groundwater resources of the area, and would not be expected to impact upon other abstractions locally.

11.5 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

11.5.1 CONSTRUCTION PHASE

The Contractor would be obliged to put measures in place to ensure that there are no interruptions to existing services unless this has been agreed in advance with the relevant service provider.

All works in the vicinity of utilities apparatus would be carried out in ongoing consultation with the relevant utility company or local authority and would be in compliance with any requirements or guidelines they may have.

Where new services or diversions to existing services are proposed, the Contractor would apply to the relevant utility company for a connection permit where appropriate, and would adhere to their requirements.

11.5.2 OPERATIONAL PHASE

The proposed development would be serviced by existing utilities, with the capacity to accommodate the proposed development. Therefore, no mitigation measures are necessary.

The development would require power during the operational development for normal day-to-day operations. The estimated power requirement would not be considered significant in the overall context of the proposed development, and would not be anticipated to significantly impact upon the local power supply.

Given the range of telecommunications providers in the area, the proposed development would not have a significant impact upon local telecommunications.

There will be no Irish Water water supply on site, as an existing on site well will supply the potable water. Therefore, water demand during the operation of the development would not be anticipated to have a significant impact on the regional water supply.

The proposed development would result in an increase in traffic and would involve private vehicle movements from employees and visitors. The MMP includes measures to promote and improve the attractiveness of using public transport, cycling, walking, car sharing, flexible working, or a combination of these as alternatives to single-occupancy car journeys to work. To achieve its objectives, a Travel Plan Coordinator responsible for implementing the plan would be appointed for the development. The MMP would be reviewed annually. With proper implementation of the MMP, and considering the main conclusions of the Transportation

Assessment, no adverse traffic/transportation capacity or operational issues associated with the operation of the proposed development have been identified.

11.5.3 POTENTIAL CUMULATIVE EFFECTS

Considering the nature of the proposed development, it is considered that the main potential cumulative impacts would be an increased demand on local utilities, including mains power, telecommunications and water supply within Country Crest's complex, in addition to increased traffic volumes.

However, it is considered that utilities in the area have adequate capacity to accommodate the estimated requirements of the proposed development, during both the construction and operational phases, and therefore there would be no significant cumulative impact upon local utilities.

11.5.4 "DO-NOTHING" SCENARIO

Should the proposed development not take place, there would be no changes or impacts upon utilities including the road network, national power grid, local water supply and telecommunications.

11.6 RESIDUAL IMPACTS

Given the nature of the proposed development and following the implementation of mitigation measures it is considered that residual impacts would be imperceptible to insignificant.

11.7 REFERENCES

Environmental Protection Agency (2022) *Guidelines on the information to be contained in Environmental Impact Assessment Reports*.

Gas Networks Ireland, available at: https://www.gasnetworks.ie/home/. Accessed November 2024.

Fingal Development Plan 2023 – 2029. Available at: https://www.fingal.ie/development-plan-2023-2029 Accessed November 2024.

Environmental Protection Agency Licence public access information, Available at: http://www.epa.ie/licensing/iedipcse/ Accessed November 2024.

EPA Online Mapping, Available at: https://gis.epa.ie/EPAMaps/ Accessed November 2024.

Myplan.ie Web Map Portal. Available at: https://www.myplan.ie/ Accessed November 2024.

12.0 MATERIAL ASSETS – NATURAL & OTHER RESOURCES

12.1 INTRODUCTION

This section of the EIAR outlines the potential impacts on natural and other resources of the proposed development and all ancillary site works and services at Collinstown, Lusk, Co Dublin.

The proposed development is for the construction of an anaerobic digester and all ancillary site works and services.

12.2 METHODOLOGY

A desktop study was undertaken to assess the potential impact of the proposed development on the natural and other resources of the area. This included a review of available data on the Geological Survey Ireland Spatial Resources, Teagasc Subsoil Mapping and EPA Envision Online Mapping websites.

12.3 DESCRIPTION OF THE ENVIRONMENT

The area in the immediate vicinity of the proposed development is rural in nature, with much of the land in agricultural use. A network of utilities associated with residential houses, agricultural and commercial operations are all available in the general hinterland.

12.3.1 LAND USE AND SOIL

The proposed development would occur on a site with a total area of approximately 71,600 m^2.

The land within c. 1 km of the site is predominantly used for arable land and pasture with the existing Country Crest site to the west of the proposed site. The Palmerstown 08 stream is the most notable watercourse in the vicinity of the site. There are some areas of land occupied by complex cultivation patterns to the south-east.

On a larger scale, the most frequent land uses in the region are still pastures and agricultural lands, with discontinuous urban fabric in nearby towns (Lusk, Rush and Skerries), major road network to the west corresponding to the M1 motorway, and sports and leisure facilities to the north-east corresponding to Skerries golf club. Other land cover within 15km of the proposed site includes Intertidal flats, Estuaries, patches of Broad-leaved forests, agricultural land with significant areas of natural vegetation, Industrial and commercial units, continuous urban fabric and Dublin airport.

According to the Geological Survey of Ireland's online mapping tool the soil underlying the site are classed as mineral poorly drained minerals which are mainly acidic. A detailed description of the existing soil environment is provided in the Land – Soils, Geology and Hydrogeology section.

12.3.2 TRANSPORT NETWORK

The proposed development site is located in the townland of Collinstown, c. 2.3 km north of Lusk town centre, c. 5.0 km south-west of Skerries town centre and c. 5.3 km north-west of Rush town centre.

The site is access by a private road (speed limit set at 30 km/hr) c. 1.2 km to the west off the L1155 local road. The L1155 local road connects to the R132 regional road, to the L1165 local road north of the site and to the R127 regional road to the east.

The nearest motorway is M1, c. 2.9km to the west, which is part of the road network that connects Dublin towards Belfast, and is accessed by R132 that services Balbriggan town.

The nearest Irish Rail station is Rush & Lusk station, c. 3.15 km south-east of the site, and is part of the railway network that connects Dublin to Belfast.

Bus Éireann and a number of private operators provide daily express services to Dublin City centre as well as local bus services within the county. Bus Eireann Bus Route 101 provides regular Dublin-Drogheda Commuter Service, which link to other towns such as Dublin City and Balbriggan with stops at other locations in between. At a more local, rural level, the National Transport Authority funded Local Link Rural Transport Programme services, which are managed by Local Link Louth Meath Fingal aimed at addressing rural social exclusion and the integration of rural transport services with other public transport services.

12.3.3 ECONOMIC MINERALS

There are one active quarries within the immediate vicinity of the site. Two operational quarries are located within 15 km of the proposed development site, as detailed in the table below.

Table 12.1: Operational Quarries Within 15 km of the Proposed Development.

Quarry Name	Quarry Type	Approx. Distance From Proposed Development
Gormanston	Sand and Gravel	12.0 km north-west
Roadstone Feltrim Quarry	Crushed Rock	12.2 km south

GSI online web mapping indicates the following mineral localities within the vicinity (5.0 km) of the proposed development:

- Area of Clay, Brick, 1.3 km north of the site; (Non Metallic)
- Area of Coal, 2.5 km north-east of the site; (Non Metallic)
- Area of Limestone, 3.5 km north-east of the site; (Non Metallic)
- Area of Pyrite, 4.1 km north-east of the site; (Metallic)

12.4 IMPACT & MITIGATION

Overall, the proposed development would have a minor negative impact on natural and other resources. Any disruption to services and existing transport networks would be minimal and of a short-term nature during the construction phase of the development.

12.4.1 LAND & SOIL

In total, the proposed AD Plant would occupy an estimated 7.28 hectares of existing agricultural land within lands owned by the applicant. The northern field of the site, where excess topsoil would be laid, will not be altered and the middle section of the site will be occupied by the silage clamps and solid digestate storage bunker. The easternmost fields of the site will be landscaped with native woodland areas, treelines and meadows. Therefore, it is considered that there would be a moderate impact on land or soil material assets. Impacts on the agricultural use of land are discussed in Section 10.

12.4.2 TRANSPORT NETWORK

During the construction stage, the presence of HGVs and small commercial vehicles for deliveries of construction materials and transport of construction workers would be noted.

Upon completion of the construction phase, there would be a worst case increase of 44 PCUs on the site per day. However, as discussed in previous chapters, the estimated traffic movements would result in a negligible and unnoticeable impact upon the operation of the adjacent road network.

Therefore, the expected volume of traffic on the road network would have a negligible additional effect on the structural integrity of the road network and its on-going maintenance costs.

12.4.3 ECONOMIC MINERALS

It is considered that the proposed development would have no significant impact on mineral resources in the vicinity of the area.

12.4.4 RAW MATERIALS REQUIRED

Construction material, when needed, would be sourced from nearby sources such as local quarries where practical. The amount of raw materials needed is not expected to place any stress on natural resources.

12.5 RESIDUAL IMPACTS

Given the nature of the proposed development and following the implementation of mitigation measures as outlined in previous sections, it is considered that residual impacts would be imperceptible.

12.6 POTENTIAL CUMULATIVE IMPACTS

It is considered that the main potential cumulative impacts would be a slight increase in traffic volumes. Although, no significant cumulative traffic impacts are anticipated.

12.7 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

No difficulties were encountered during the assessment of potential impacts of the proposed development on natural or other resources.

12.8 REFERENCES

Environmental Protection Agency Licence public access information, Available at: http://www.epa.ie/licensing/iedipcse/ Accessed November 2024.

Teagasc Subsoil Mapping. Available at: http://gis.teagasc.ie/soils/map.php Accessed December 2024.

Environmental Protection Agency (2022). *Guidelines on the information to be contained in Environmental Impact Assessment Reports*.

Gas Networks Ireland, available at: https://www.gasnetworks.ie/home/. Accessed November 2024.

Fingal County Council (2022) Fingal Development Plan 2023-2029. Available online: https://www.fingal.ie/development-plan-2023-2029 Accessed November 2024

Environmental Protection Agency Licence public access information, Available at: http://www.epa.ie/licensing/iedipcse/ Accessed November 2024.

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SECTION D – CULTURAL HERITAGE

This section of the EIAR examines the impacts of the proposed development on archaeology, architecture and cultural heritage.

Archeologically important sites, buildings of historic, artistic or architectural interest and sites of cultural heritage form part of the landscape of County Fingal. As part of the scope and examination of alternatives phases of this development, every effort has been made to avoid known Archaeological, Architectural and Cultural Heritage sites.

This section of the EIAR examines the impacts of the development on known sites (which could not be avoided) or potential sites which have come to light during the field survey of the proposed development.

13.0 ARCHAEOLOGICAL, ARCHITECTURAL & CULTURAL HERITAGE

13.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the archaeological, architectural and cultural heritage effects of the proposal to carry out the construction of an anaerobic digester and all ancillary site works and services in Collinstown, Lusk, Co Dublin (**Figure 13.1**).

The purpose of the chapter is to provide an archaeological, architectural and cultural heritage assessment of the receiving environment, to identify the likely and significant effects on the receiving environment and to propose ameliorative measures to mitigate these effects.

The assessment involved a desk study and risk assessment based on information in EIAR sections and was carried out by Panther Environmental Solutions Ltd. and onsite Geophysical Survey carried out by ACSU, in support of a planning application to Fingal County Council.

13.1.1 Definition of Archaeological, Architectural & Cultural Heritage

The term 'cultural heritage' is broadly used to describe any combination of archaeological, architectural and cultural heritage features.

- Archaeological heritage comprises objects, monuments, buildings or landscapes that generally pre-date AD1700.
- Architectural heritage, also referred to as built heritage, comprises structures, buildings, their settings and contents that generally post-date AD1700.
- Cultural heritage also comprises less tangible aspects of heritage such as folklore and cultural associations.

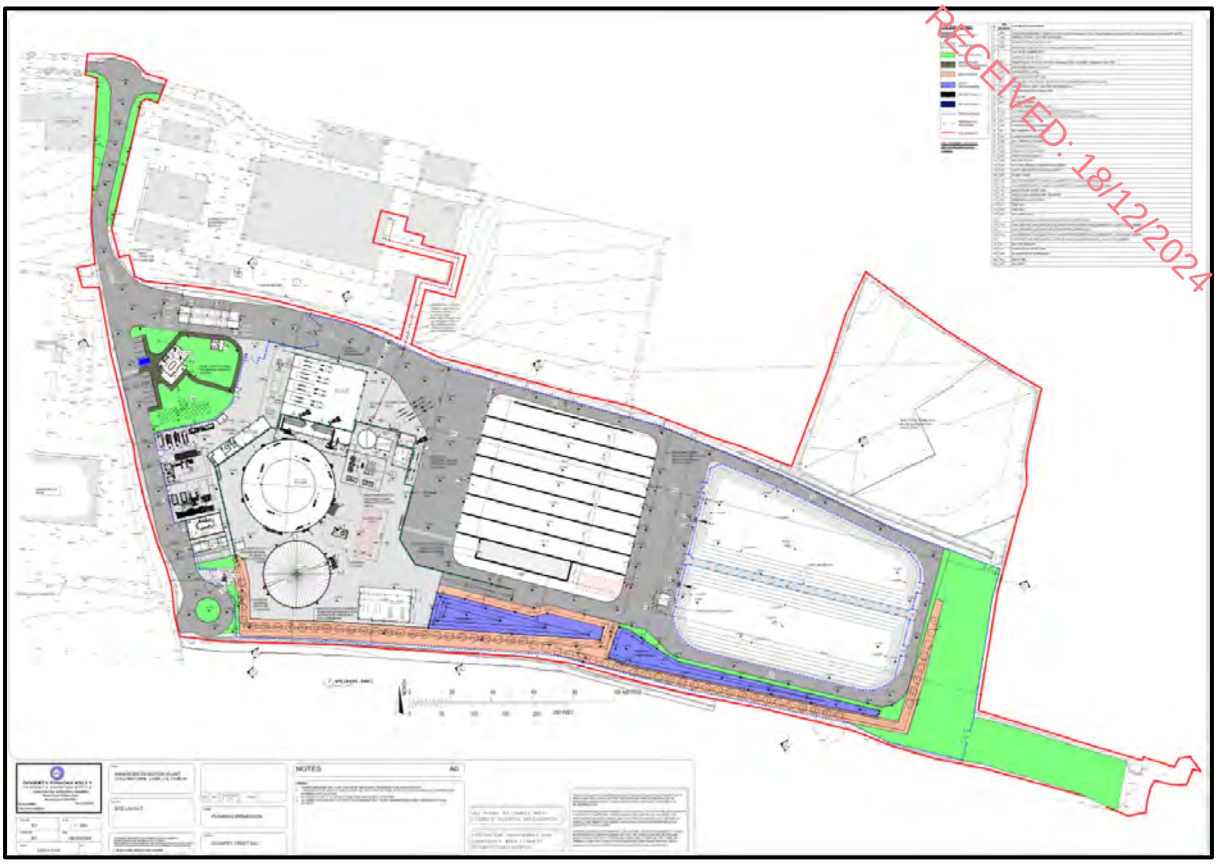

Figure 13.1: Proposed site layout plan (*site boundary in red*).

13.2 LEGISLATIVE FRAMEWORK & POLICY

13.2.1 LEGISLATIVE CONTEXT

Ireland has ratified several international and European conventions on the protection of cultural heritage, principally:

- UNESCO World Heritage Convention 1972;
- Charter for the Conservation and Restoration of Monuments ad Sites (Venice) 1964;
- European Convention on the Protection of the Archaeological Heritage (Malta Convention) 1992;
- European Convention on the Protection of the Architectural Heritage (Grenada Convention) 1985;
- EIA Directive.

National legislation protecting cultural heritage comprises:

- National Monuments Act 1930, amended 1954, 1987, 1994 and 2004;
- Heritage Act 1995;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999; and

- Planning and Development Act 2000 (as amended).

In addition to standards and guidelines relating to the preparation of EIAR's, the following cultural heritage guidelines were consulted as part of this assessment:

- Frameworks and Principles for the Protection of the Archaeological Heritage (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- Policy and Guidelines on Archaeological Excavation (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- The Heritage Council, 2000. Archaeology & Development: Guidelines for Good Practice for Developers, The Heritage Council;
- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes (2005), National Roads Authority; and
- Guidelines for the Assessment of Architectural Heritage Impacts of National Roads Schemes (2005), National Roads Authority;

Architectural Heritage Protection Guidelines for Planning Authorities (2011), Department of Arts, Heritage, Gaeltacht & the Islands.

13.2.2 PLANNING POLICIES

The Fingal Development Plan 2023-2029 contains policies of relevance to archaeology, architecture and cultural heritage. **Table 13.1** compiles relevant policies present in the Heritage, Culture and Arts Chapter. Relevant policies are not restricted to that particular Chapter.

Table 13.1. Policy Objectives for Archaeological Heritage.

Policy Objective	Description
HCAP3	Safeguard archaeological sites, monuments, objects and their settings listed in the Record of Monuments and Places (RMP), Sites and Monuments Record (SMR), underwater cultural heritage including protected wrecks and any additional newly discovered archaeological remains.
HCAP4	Favour the preservation in-situ (or at a minimum preservation by record) of all sites and features of historical and archaeological interest.
HCAO1	Protect the intrinsic value, character, integrity and settings of monuments and places in the Record of Monuments and Places (RMPs) and any forthcoming statutory register and protect Zones of Archaeological Potential against inappropriate development.
HCAO2	Protect all archaeological sites and monuments, underwater archaeology, and archaeological objects, which are listed in the Record of Monuments and Places, Wreck Inventory of Ireland and all sites and features of archaeological and historic interest discovered subsequent to the publication of the Record of Monuments and Places, and to seek their preservation in situ (or at a minimum, preservation by record) through the planning process.
HCAO3	Encourage and promote the appropriate management and maintenance of the County's archaeological heritage, including historical burial grounds and underwater cultural heritage in accordance with conservation principles and best practice guidelines.

HCAO4	Secure the preservation in-situ of significant examples of industrial or military heritage.
HCAO6	Co-operate with other agencies in the investigation of climate change on archaeological sites and monuments and to develop suitable adaptation measures to strengthen resilience and reduce the vulnerability of archaeological heritage in line with the National Climate Change Sectoral Adaptation Plan for Built and Archaeological Heritage 2019.
HCAP5	Incorporate heritage features into infrastructure design at an early stage in the development planning and management process to protect and promote the cultural heritage resource and create awareness and interpretation.
HCAO7	Ensure archaeological remains are identified and fully considered at the very earliest stages of the development process, that schemes are designed to avoid impacting on the archaeological heritage.
HCAO9	Ensure that in general development will not be permitted which would result in the removal of archaeological monuments with above ground features, protected wrecks and that this will be especially the case in relation to archaeological monuments which form significant features in the landscape.
HCAO10	Ensure that development within the vicinity of a Recorded Monument or Zone of Archaeological Notification does not seriously detract from the setting of the feature and is sited and designed appropriately.
HCAO11	Ensure that proposals for large scale developments and infrastructure projects consider the impacts on the archaeological heritage and seek to avoid them.
HCAO13	Encourage reference to or incorporation of significant archaeological finds into development schemes, where appropriate and sensitively designed, through layout, in situ and virtual presentation of archaeological finds and by using historic place names and the Irish language where appropriate.
HCAO14	Retain and manage appropriately archaeological monuments within open space areas in or beside developments, ensuring that such monuments are subject to an appropriate conservation management plan, are presented appropriately and are not left vulnerable, whether in the immediate or longer term, to dangers to their physical integrity or possibility of loss of amenity.
HCAO15	Promote best practice for archaeological excavation by ensuring that they are undertaken according to best practice as outlined by the National Monuments Service, Department of Housing, Local Government and Heritage, The National Museum of Ireland and the Institute of Archaeologists of Ireland.
HCAO16	Manage the archaeological sites and monuments that Fingal County Council owns or is responsible for according to best practice and according to Conservation Plans where they exist.

13.3 METHODOLOGY

The assessment of archaeological, architectural, and cultural heritage effects is based on a desk-top study of relevant archaeological, architectural and cultural heritage sources. The following were the principal desk-based sources consulted:

National Monuments
Under the National Monuments Act 1930 (as amended), archaeological sites in the ownership or guardianship of the State or a local Authority and sites under Preservation Orders are

designated as National Monuments. Such sites are offered the highest level of protection under Irish legislation.

Record of Monuments & Places and Sites & Monuments Record
The Record of Monuments and Places (RMP) was established under Section 12 of the 1994 National Monuments (Amendment) Act. The statutory RMP is a list of archaeological monuments known to the National Monuments Service, and is based on the earlier Sites and Monuments Record (SMR) files housed at the National Monuments Service. The record is updated on a constant basis.

Topographical Files
The topographical files of the National Museum of Ireland (NMI) are the national archive of all known antiquities recorded by the NMI. These files relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous excavations. The find-spots of artefacts can be an important indication of the archaeological potential of an area.

Any archaeological object found without a known owner at the time it was found is protected under National Monument's legislation and is deemed to be in the ownership of the State.

Excavations Bulletin and Excavations Database
The Excavations Bulletin is a published annual directory and an on-line database (www.excavations.ie) that provides summary accounts of all the excavations carried out in Ireland – north and south – from 1969. The on-line database has been compiled from the published Excavations Bulletins from the years 1970-2010, with additional online-only material from 2011 onwards, and is updated on a constant basis.

Assessing Fingal's Archaeological Resource
Fingal County Council, in partnership with The Heritage Council, carried out an assessment of Fingal's archaeological resource through a review of the existing Record of Monuments and Places (RMP) and a collation of information from all archaeological investigations within the county (assessments, testing and excavations) for the period 1999-2009 inclusive. The project was initiated to develop a corpus of information relating to archaeological sites in Fingal. The project was conceived primarily as an in-house tool to inform proper planning and safeguard the county's archaeological resource in future planning strategies.

Fingal Development Plan 2023-2029
Each City and County Development Plan is compiled in accordance with the requirements of the Planning and Development Act 2000 (as amended) and contains lists of national monuments, recorded monuments, a Record of Protected Structures (a list of buildings which cannot be materially altered or demolished without grant of permission under the Act) and Conservation Areas and Architectural Conservation Areas (to protect and enhance the special character of an area). The Fingal Development Plan 2023-2029 sets out the policies and objectives of the Council in respect of archaeology, architecture and cultural heritage in Chapter 10 of the Plan. The Fingal Heritage Plan 2024-2030 adopted by Fingal County Council was also consulted.

National Inventory of Architectural Heritage
The National Inventory of Architectural Heritage (NIAH) is an ongoing survey within the Department of Culture, Heritage and the Gaeltacht. The work of the NIAH involves identifying

and recording the architectural heritage of Ireland, from AD1700 to the present day and includes country houses, churches, mills, bridges and other structures of note. As well as a survey of buildings and structures, the NIAH has also carried out a survey of historic gardens and designed landscapes. The objective of the latter is to better understand the extent of the countries historic gardens and designed landscapes. The National Inventory of Architectural Heritage (NIAH) has conducted a field survey which has listed a number of historic gardens in County Dublin such as Kenure Park near Rush.

Cartographic Sources
Information gathered from cartographic sources is fundamental to the identification of archaeological and architectural heritage sites, including cultural landscapes e.g. demesne landscapes, which, based on the level of landscape change, are now often identified from cartographic records alone. The earliest Ordnance Survey maps date to the late 1830s and early 1840s, but much change has occurred in the use and treatment of the landscape in the intervening years, particularly during the second half of the 20th century, making these a valuable resource in tracing the development of a study area.

Aerial Photographs
Aerial photographs are a useful aid in identifying archaeological monuments that are not visible at ground level. Variations in the way plants grow can indicate sub-surface remains and can indicate the location of subsurface monuments such ranging from enclosures to deserted villages. No LiDAR imagery for the area of the site is available.

Toponomy Sources
A townland name may preserve information relating to its archaeology, history, folklore, ownership, topography or land use. Most placenames were anglicised by the Ordnance Survey, which begun in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable. The Placenames Database of Ireland website (wwww.logainm.ie) hosts online bi-lingual placename research and archival records for townlands. P. W. Joyce's (1910) *The Origin and History of Irish Names of Places*, is also an invaluable source for townland name meanings.

An onsite Geophysical Survey was carried out by Donald Murphy, Robert Breen and Jeanne Rochford of ACSU under licence 24R0586 issued by the Department of Housing, Local Government and Heritage. The following briefly describes the methodology used:

Geophysical Survey
A full detailed gradiometer survey was undertaken throughout the application area with a sample interval of 0.25m and a traverse interval of 1m. All work was carried out in accordance with the *IAI Code of Professional Conduct* and in accordance with the *EAC Guidelines for the Use of Geophysics in Archaeology*, as well as English Heritage's *Geophysical Survey In Archaeological Field Evaluation*.

13.3.1 IMPACT ASSESSMENT CRITERIA

The impact assessment undertaken in this chapter is based on the methodologies presented in the Environmental Protection Agency (EPA) *Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)*, published May 2022.

A potentially significant effect in terms of archaeology, architecture and cultural heritage is described as an effect to a potential feature/area of archaeological, architectural or cultural heritage that could be significant without mitigation measures being implemented e.g. potential sub-surface archaeological remains.

13.4 DESCRIPTION OF EXISTING ENVIRONMENT

13.4.1 SITE DESCRIPTION

The proposed site is situated in a rural setting in Collinstown townland, predominantly under arable land. It is located approximately 2.3 km north of Lusk town centre, c. 5.0 km south-west of Skerries town centre and c. 5.3 km north-west of Rush town centre, less than 10 km south-east of the county boundary with Meath. The site is accessed by a private road (speed limit set at 30 km/hr) c. 1.2 km to the west off the L1155 local road. The L1155 local road connects to the R132 regional road (**Figure 13.2**).

Collinstown townland is situated in the Holmpatrick Electoral Division and is bordered by several townlands including: Rathmooney to the west; Palmerstown, Heathtown and Balcunnin to the north; Greatcommon and Rallekaystown to the east; and Causestown and Lusk to the south. The site is c. 45-55m above sea level on an area that is gently sloped down to the south-east.

There are four previous planning applications relating to the proposed site. There are also seven recently granted and one registered planning applications submitted by Country Crest Ltd. and Ballymaguire Foods Ltd. in the vicinity of the proposed site. No Archaeological Impact Assessment (AIA) has ever been carried out as part of any planning process.

The proposed buildings would be situated to the east of existing facilities in lands under the ownership of the applicant. The field boundaries are mostly thick mature hedgerows, treelines and drainage ditches.

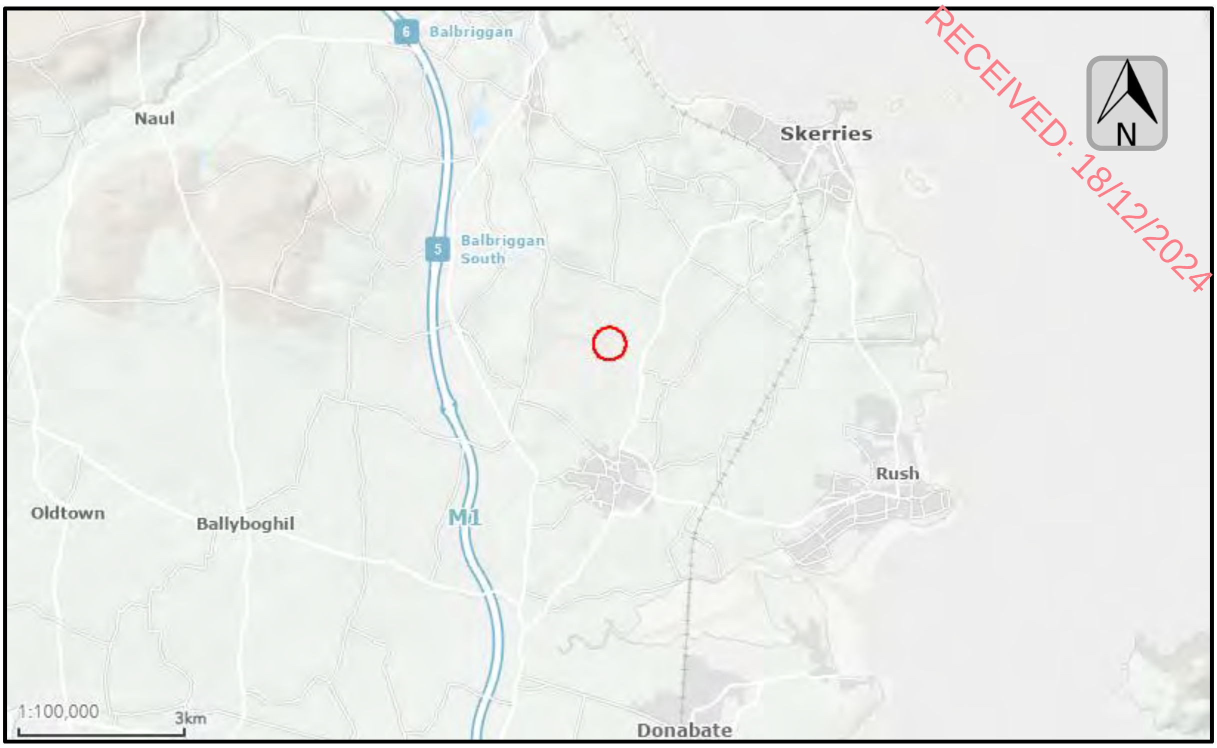

Figure 13.2: Location of site (circled red) within wider context (OSI Map Public).

13.4.2 ARCHAEOLOGICAL & HISTORICAL BACKGROUND

Prehistoric Period (7000BC-500AD)

There are no definitely dated prehistoric monuments within 1km of the proposed piggery extension. There are three enclosures (DU008-002, DU008-114 and DU005-180) and one ring-ditch (DU008-113) located within 1 km of the site that could date to any period in history, including the prehistoric period.

Historic Period (500AD onwards)

Early Medieval Period (c.500AD-1100AD)

The introduction of Christianity to Ireland occurred during the 5th century A.D., and secular settlement during this era is represented by the ringfort, alternatively referred to as 'rath' 'lios' or 'dún' - to indicate an earthen bank and exterior ditch enclosing a central area - or 'cashel' to indicate a stone-walled enclosure. Usually circular or sub-circular and often sited on raised ground, there are over 45,000 currently identified in Ireland, making this the most common site type in the country. Smaller, 'univallate' examples were homesteads for lower ranks of society, while larger bi- or tri-vallate examples were used by lords or wealthy landowners.

A small number of ringforts are located in the wider landscape and indicate the presence of rural population during the period supported by the fertile nature of the area. There are no ringforts within 1km of the proposed site. The ring-ditch and the three enclosures could date to any period in history, including the early medieval period.

Medieval Period to Late Medieval (c.1100AD-1650AD)

The late medieval period dates from the mid-12th century to the mid-16th century. This is a time of much change in Ireland, with the invasion of Anglo-Normans at Wexford in 1169, the introduction of the first parliament and coinage and the 12th century reform of the church. It is also the period of castle building, from early motte-and-bailey castles of timber construction, to great Anglo-Norman stone castles and later tower houses. The ring-ditch and the three enclosures could date to any period in history, including the late medieval period.

Early Modern Period (c.1650AD-c.1850AD)

There is a record that could be dated to this period within 1km of the proposed site, a Castle - unclassified (DU008-001) located to the south-east of the site. There are no visible remains of this structure.

13.4.3 CARTOGRAPHIC ANALYSIS

Analysis of historic mapping shows how landscapes evolve. Comparing successive historic maps can show how archaeological and architectural sites have been created, altered or removed over a period of time. The following historic maps were consulted, of which relevant extracts are presented below.

- Down Survey map of Co. Dublin, 1656-58 (**Figure 13.3**);
- Down Survey map of Barony of Nethercross, 1656-58 (**Figure 13.4**);
- Down Survey map of Parish of Lusk, 1656-58 (**Figure 13.5**);
- First edition Ordnance Survey 6" map, 1844 (**Figure 13.6**);
- Revised Ordnance Survey 25" map, 1905 (**Figure 13.7**), and
- Revised Ordnance Survey 6" map, c. 1935 (**Figure 13.8**).

Down Survey Maps 1656-58

The Down Survey is a mapped survey carried out between 1656 - 1658 under the direction of Sir William Petty that recorded land confiscated from Irish Catholics to facilitate Cromwellian settlement. The survey recorded townland boundaries, their areas and proprietors with precision throughout Ireland. The resultant maps contain other detail, such as on roads, rivers, towns, churches, castles, houses and fortifications, as well as topographic and landuse detail.

The Down Survey map of County Dublin (**Figure 13.3**), the map of the Barony of Nethercross (**Figure 13.4**) and the map of the Civil Parish of Lusk (**Figure 13.5**) depict Collinstown (Coolinstowne).

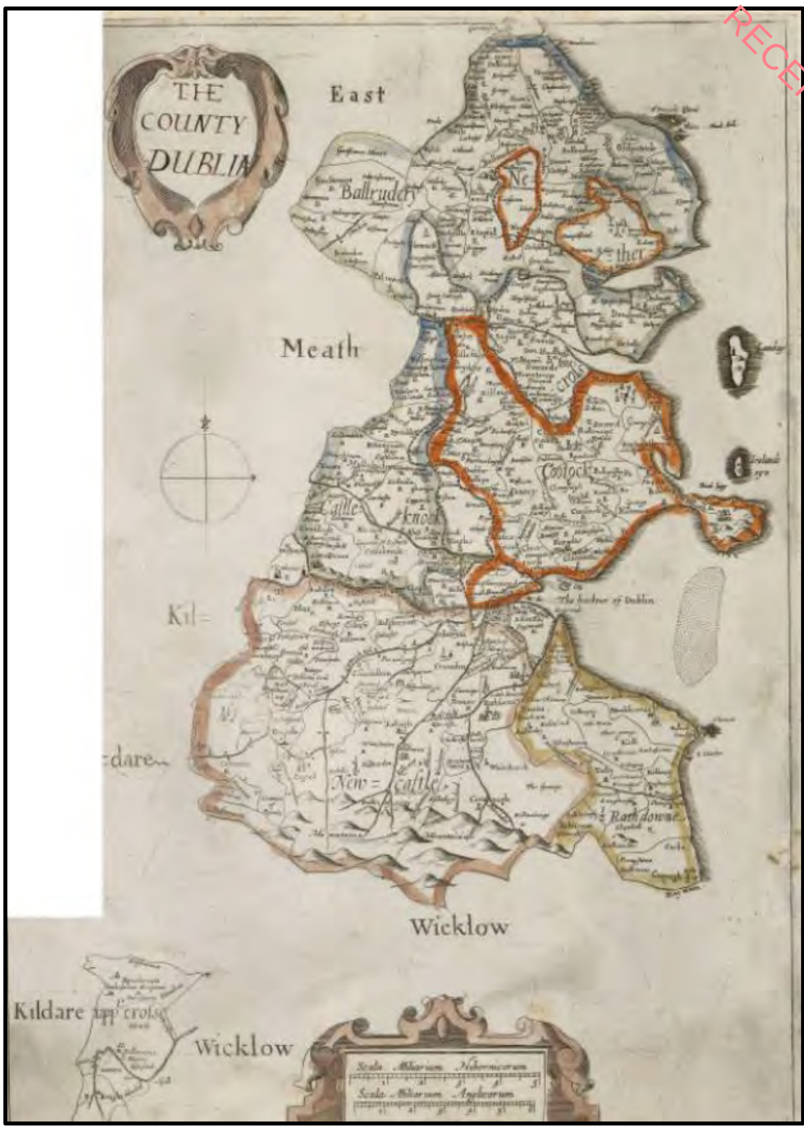

Figure 13.3: Down Survey map of County Dublin, 1656-58.

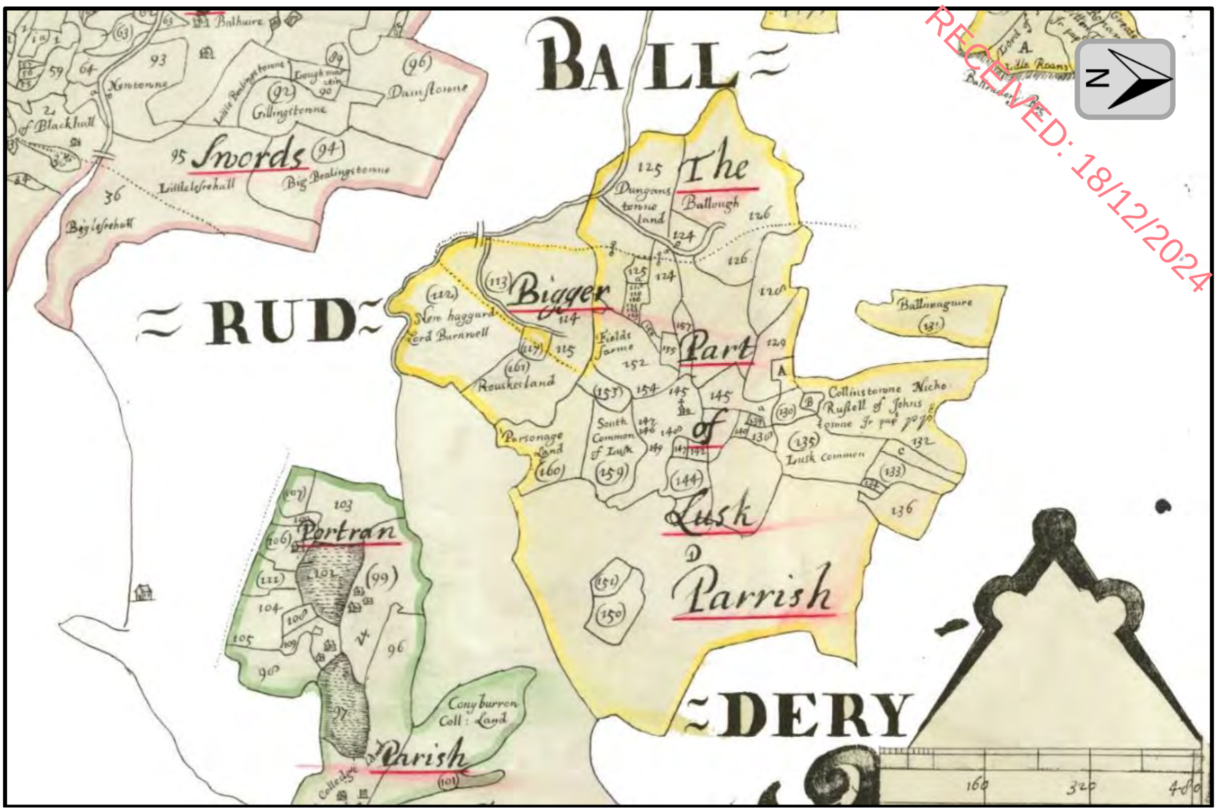

Figure 13.4: Extract from Down Survey map of Barony of Nethercross, 1656-58.

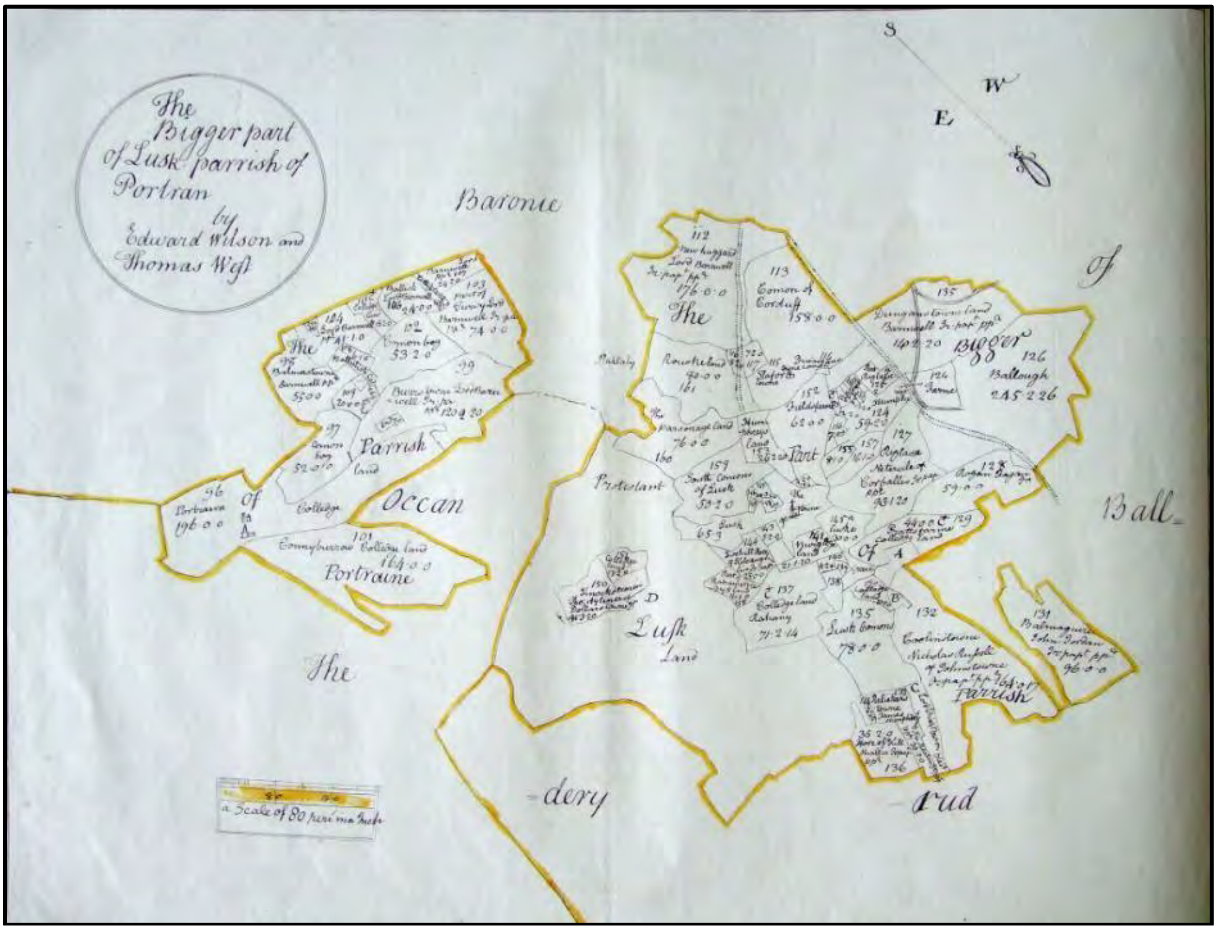

Figure 13.5: Down Survey map of Civil Parish of Lusk, 1656-58.

Ordnance Survey Maps

The first ever large-scale survey of Ireland was undertaken by the Ordnance Survey between 1829 and 1842, producing highly accurate maps at different scales. The 1st edition 6-inch OS map was surveyed in 1840 and published in 1844 and is the first map to the show the existing fields where the proposed site is located in any detail (**Figure 13.6**).

The proposed site, on the 1st edition 6-inch OS map, is represented by a number of agricultural fields with an access track to the south-east. The access track accompanies the eastern boundary of the site and leading to two agricultural buildings. Collinstown townland boundaries are marked in read, which partially align with the western boundary of the proposed site.

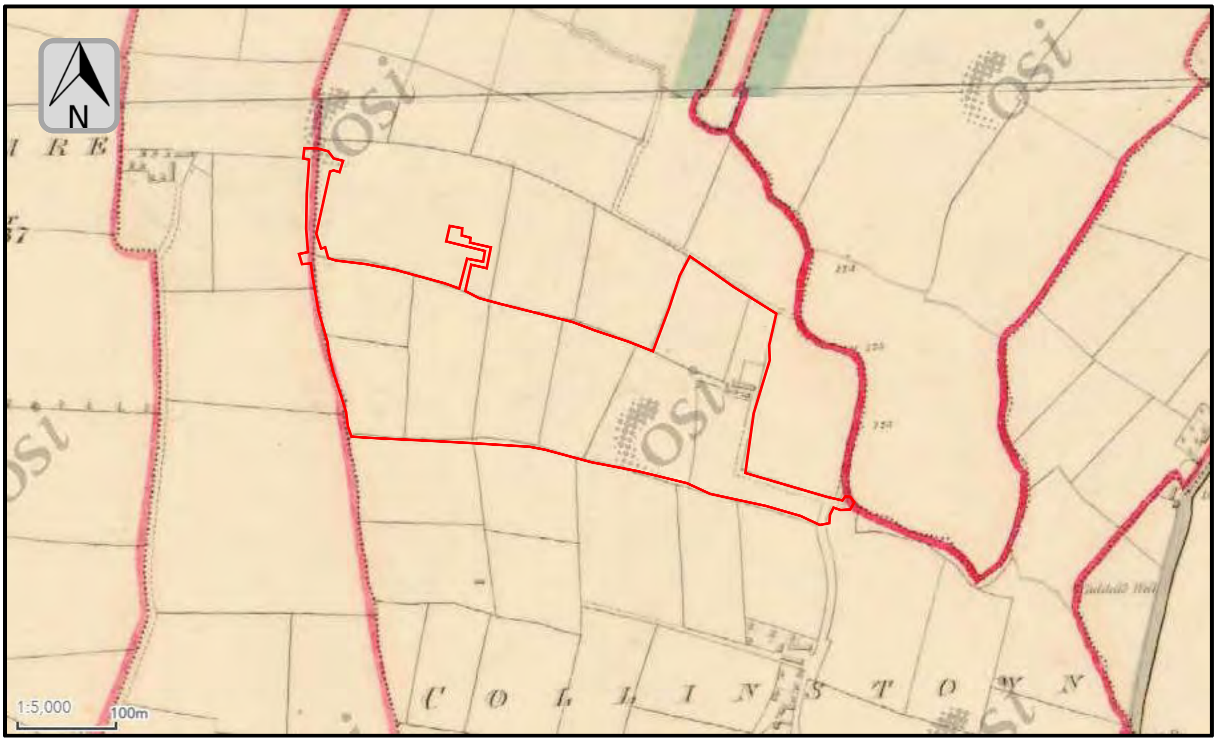

Figure 13.6: Extract from first edition 6-inch Ordnance Survey map, published 1844, showing approximate site area (*in red*).

The 25-inch OS map was surveyed in 1903 and published 1905 (**Figure 13.7**). Collinstown townland boundaries are marked in dotted lines, which align with the site's western boundary. Relatively to the previous map, the 1905 map omits any structure within the site and the access track crosses the fields and leads to the current Country Crest site.

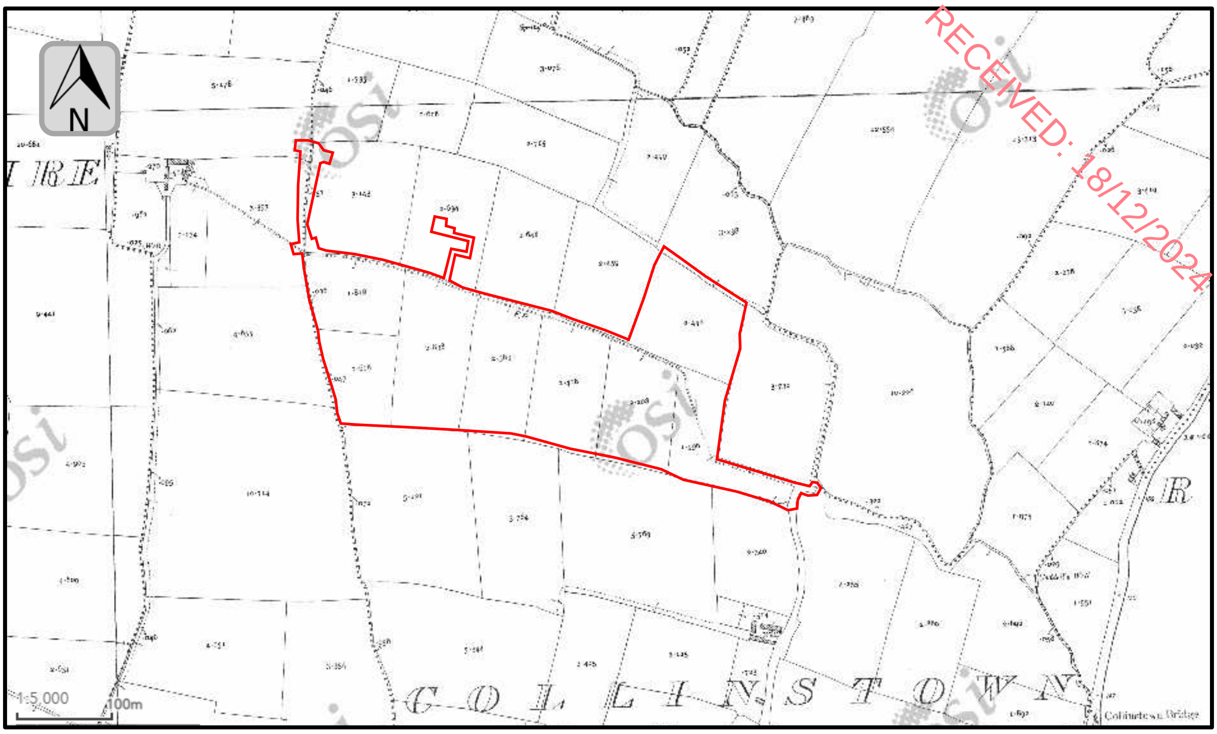

Figure 13.7: Extract from revised 25-inch Ordnance Survey map, published 1905, showing approximate site area (*in red*).

The last historic 6-inch edition OS map was published in 1935 (**Figure 13.8**). It shows a similar situation.

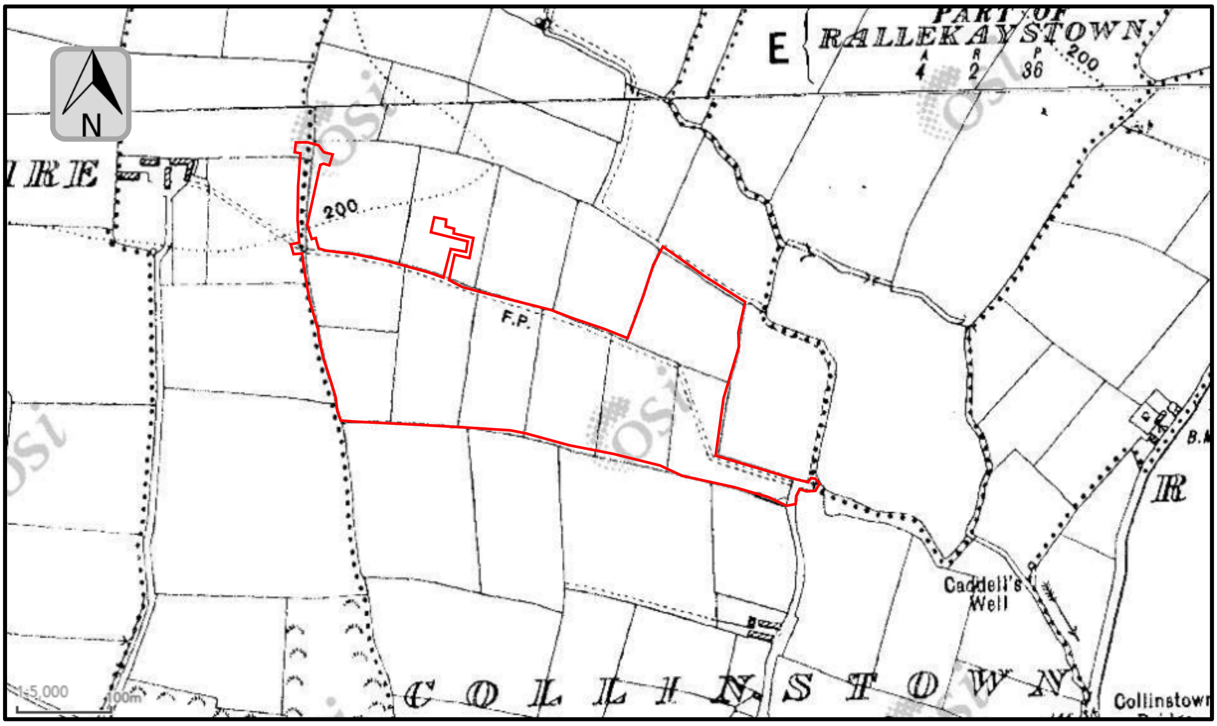

Figure 13.8: Extract from revised 6-inch Ordnance Survey map, published 1945, showing approximate site area (*in red*).

No archaeological monuments have been recorded in historical maps

13.4.4 AERIAL PHOTOGRAPHS

The Geophysical Survey Report by ACSU assessed the Aerial photographs dating between 1995 and 2018 from the Ordnance Survey of Ireland (OSi) and Google Earth imagery dating between 2005 and 2024.

The successful detection of archaeological sites through aerial photography varies depending on several factors, including the position of the sun, the type of crop growing and the amount of rainfall in a growing season. In some years, such as during the drought of 2018, sites were clearly visible, while in others the same site would be undetectable from the air.

The field divisions depicted on the Ordnance Survey maps in Field 1 are visible on the Google Earth aerial imagery in 2009, they are aligned north-south across the field. The field has been arable throughout the aerial imagery. Between 2013 and 2015, an additional extension to the food processing site was developed to the northwest of Field 1.

No archaeological monuments can be seen in aerial photographs.

13.4.5 TOPONOMY

The townland name, Collinstown, is a placename whose official, legal Irish version is *Bhaile Choilín* (www.loganim.ie; accessed 20/11/2024).

The archives of the Placenames Database of Ireland contain documentation on research results of the Branch. The archive has traced the placename Collinstown back to 1326, when it was referred to as Colyneston and since that time the placename has been recorded under a range of spellings (https://www.logainm.ie/en/16889; accessed 20/11/2024). Alternate spellings include the reference to *Quilkynston* (1546-7), *Collenston* (1586), *Colmstowne* (1664) and *Coolinstowne* (1670c).

13.4.6 PREVIOUS ARCHAELOGICAL INVESTIGATIONS

According to the excavations database (www.excavations.ie; accessed 20/11/2024), no previous licensed archaeological work has been carried out at the proposed site, in the townland of Collinstown. No excavation licence was held for Rathmooney or Ballymaguire townlands relating to the existing Country Crest footprint and the grant of planning under any previous planning reference.

The Geophysical Survey Report by ACSU (Attachment 13.1) listed two previous archaeological investigations within the environs of the proposed site, although a large number have taken place within Lusk and along the footprint of the M1. One excavation took place in 2009 and was carried out on the site of two ring-ditches at Baldrumman 1 which were exposed during testing of the proposed M1 South motorway service area (West) near Lusk, Co. Dublin. The second listed excavation took place in 2002 and revealed a number of substantial linear ditches and a possible stone surface in the south-eastern part of an extensive residential housing development site.

13.4.7 ARCHAEOLOGICAL HERITAGE

National Monuments

No National Monument either in the ownership or guardianship of the State or of Fingal County Council is located in close proximity to the proposed site in Collinstown. There are no topographical files listed for the townlands of Collinstown or Ballymaguire.

Record of Monuments and Places (RMP)

Two archaeological monuments, an unclassified – castle (DU008-001) and an enclosure (DU008-002), are located in Collinstown townland, as recorded in the Record of Monuments and Places (RMP). The castle is also the closest monument to the proposed site, approximately 240m to the south-east. RMP sites within a 2km radius of the proposed site are indicated on **Figure 13.9** and listed in **Table 13.2**.

Table 13.2: RMP sites within a 2km radius of the proposed development site.

RMP No.	Site Type	Townland	ITM Reference	Prox. & Direction
DU008-001	Castle - unclassified	Collinstown	721737, 756460	240m SE
DU008-002	Enclosure	Collinstown	721764, 756208	500m SE
DU005-180	Enclosure	Ballymaguire	720544, 757343	690m NW
DU008-113	Ring-ditch	Collinstown	722236, 757127	655m NE
DU008-114	Enclosure	Rallekaystown	722331, 757085	735m NE
DU005-113	Field system	Palmerstown	720613, 758538	1.36 km NW
DU005-220	Earthwork	Courtlough	720064, 758043	1.48 km NW
DU008-054	Excavation - miscellaneous	Raheny	722324, 755222	1.63km SE
DU005-110	Field system	Loughbarn	722059, 758690	1.71 km N
DU008-125	Earthwork	Raheny	722467, 755172	1.73 km SE
DU008-124	Earthwork	Oberstown	719527, 756308	1.75 km SW
DU008-124	Earthwork	Oberstown	719527, 756308	1.75 km SW
DU005-212	Earthwork	Courtlough	719647, 757915	1.75km NW
DU005-097	Field system	Baldongan	723539, 757255	1.76 km NE
DU008-008	Mound	Regles	720965, 755046	1.77 km S
DU005-213	Earthwork	Jordanstown	719473, 757643	1.80 km NW
DU005-088	Enclosure	Balcunnin	723047, 757990	1.83 km NE
DU005-085	Field system	Balcunnin	723041, 758110	1.83 km NE
DU005-086	Metalworking site	Balcunnin	723410, 757881	1.84 km NE
DU008-057002	Habitation site	Tyrrelstown little	722944, 755362	1.85 km SE
DU008-057001	Fulacht fia	Tyrrelstown little	722946, 755365	1.85 km SE

RMP No.	Site Type	Townland	ITM Reference	Prox. & Direction
DU005-084	Ring-ditch	Balcunnin	722995, 758241	1.91 km NE
DU005-087	Enclosure	Balcunnin	723011, 758265	1.92 km NE
DU008-082	Fulacht fia	Lusk	721991, 754812	1.92 km S
DU008-010001	Bullaun stone	Greatcommon	721292, 754855	1.93km S
DU005-210	Enclosure	Courtlough	719503, 757983	1.93km NW
DU005-036	Ritual site - holy well	Balcunnin	722840, 758414	1.94 km NE
DU005-093	Ring-ditch	Salmon	720808, 758979	1.95 km N
DU008-092	Fulacht fia	Jordanstown	719205, 756978	2.00 km W

Figure 13.9: RMP sites (*red dots*) in relation to the proposed site (*in red*).

13.4.8 ARCHITECTURAL & CULTURAL HERITAGE

National Inventory of Architectural Heritage

No sites listed in the National Inventory of Architectural Heritage (NIAH) are located within the proposed site. Eight structures are listed within 2km, mainly in the townland of Greatcommon in Lusk town to the south. The nearest NIAH site is a house built c.1860 named Rose Cottage located within the townland of Greatcommon, approximately 735m to the south-east. NIAH sites within a 2km radius of the proposed AD plant are listed in **Table 13.3**.

Table 13.3: NIAH sites within a 2 km radius of the proposed development site.

NIAH Reg	Name	Townland	Rating	Prox. & Direction
11323022	Rose Cottage	Greatcommon	Regional	735m SE
11317002	Post Box	Courtlough	Regional	1.61 km NW
11317001	Man of War	Courtlough	Regional	1.63 km NW
11323001	Lusk National School	Greatcommon	Regional	1.89 km S
11323002	Water Pump	Greatcommon	Regional	1.89 km S
11323003	Saint MacCullin's Catholic Church	Greatcommon	Regional	1.92 km S
11323004	Water Pump	Greatcommon	Regional	1.93 km S
11323005	Lusk Community Hall	Greatcommon	Regional	2.00 km S

No garden or landscape features are listed within a 2 km radius of the proposed site, as per the Garden Survey of the National Inventory of Architectural Heritage (NIAH).

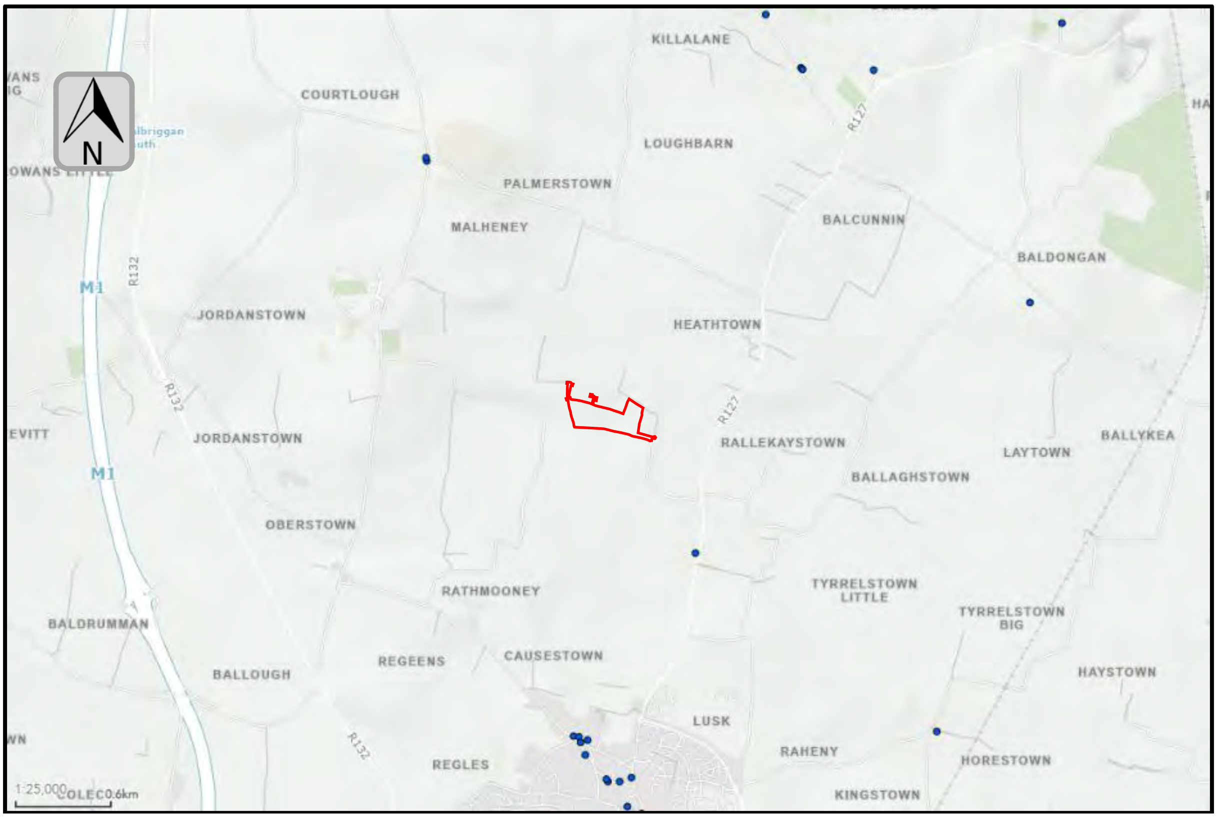

Figure 13.10: NIAH sites (blue dots) in relation to the proposed development site (outlined in red).

13.4.9 INVENTORY OF ARCHAEOLOGY, ARCHITECTURE & CULTURAL HERITAGE & FEATURES, INCLUDING AREAS OF ARCHAEOLOGICAL POTENTIAL

No recorded archaeological monument, or potential unrecorded archaeological monument, and no structure listed in the NIAH has been identified in the proposed site. As per the site layout plan, part of the western boundary of the proposed site is aligned with the townland boundary.

Though not regarded as monuments, townland boundaries are an important cultural and social element in the Irish landscape. It is thought that the locations of some have their origins in prehistory. Others have their origins in the early medieval period. The townland boundary between Collinstown and Rathmooney is marked with hedgerows, treelines and a drainage ditch. These features are not clearly depicted in any of the historical maps consulted.

Co. Dublin has 372 enclosures recorded, most of which are located in Fingal. Their presence indicates a predominantly rural population. However, a number of these structures have no surface trace. Though no surface trace of archaeological monuments was noted from desk-based research, it is not possible to entirely rule out the occurrence of subsurface archaeological monuments existing in the area of the proposed site, particularly given the linear features that correspond with field divisions depicted on the Ordnance Survey maps of 1835 and 1906. Details of the results of the Geophysical Survey carried out by ACSU are included in the following section.

13.4.10 GEOPHYSICAL SURVEY

The onsite Geophysical Survey carried out by ACSU revealed variations in soil magnetism indicating archaeological potential. Some recorded anomalies may be of natural origin or may represent features of archaeological significance (possible pits or kilns). A number of other detected anomalies may be attributed to linear features corresponding to former field boundaries or potentially earlier field systems. Anomalies were also detected within the site which could be associated with magnetic interference from modern ferrous material.

13.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

A full description of the proposed development and all works to the proposed AD Plant is detailed in **Chapter 2** of the EIAR.

13.6 IMPACTS

13.6.1 CONSTRUCTION PHASE

Potential Direct Impacts

The proposed anaerobic digester will not directly affect any known recorded monuments or any recorded structures of architectural or built heritage interest. The closest recorded monument is located to the south-east of the site (DU008-001) in the townland of Collinstown with no visible remains. Two other monuments have been recorded for the townland of Collinstown (DU008-002 and DU008-113).

The proposed AD Plant will have a direct, permanent and negative effect on any unknown sub-surface archaeological features that may be present across the site.

Potential Indirect Impacts

No indirect effects on archaeological, architectural and cultural heritage have been identified.

13.6.2 OPERATIONAL PHASE

Potential Direct Impacts

No potential direct impacts are anticipated in respect of the proposed development at the site during the operational phase. The majority of the proposed works are sited on agricultural land. The proposed structures will be erected in previously undeveloped ground to the east of the existing Country Crest site. These will be screened from public view by filling the gaps in the hedgerow and treeline along the boundaries of the site. The townland boundary, aligned with the site's western boundary and is not expected to be negatively impacted from any alterations arising from either construction or operational phase.

Potential Indirect Impacts

No indirect effects on archaeological, architectural and cultural heritage have been identified.

13.6.3 "DO-NOTHING" SCENARIO

There will be no effects on archaeology, architecture and cultural heritage if the proposed AD Plant is not developed.

13.7 MITIGATION MEASURES

Mitigation measures are required to be undertaken in compliance with national policy guidelines and statutory provisions for the protection of archaeological and architectural heritage, including the National Monuments Act 1930 (as amended), the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 and the Planning and Development Acts 2000 (as amended).

13.7.1 PRE-CONSTRUCTION PHASE

Avoidance of Impact

Avoidance of direct effects on the archaeological, architectural and cultural heritage resource identified in relation to the proposed AD Plant is the preferred mitigation option.

A geophysical survey has been carried out. In order to better ascertain the archaeological potential of the footprint of the proposed development area, targeted test trenching is recommended. If archaeological monuments are identified at this stage, their preservation *in-situ* should be considered during the planning phase.

Archaeological Test Excavation

It is recommended that pre-construction archaeological test excavation be undertaken to address the sub-surface archaeological potential of the proposed development site. Pre-construction archaeological test excavation will target the areas of archaeological potential identified by the geophysical survey. Archaeological testing should be undertaken well in advance of the construction phase. This will allow a satisfactory timeframe in which the mitigation measures can be undertaken and the results assessed without causing construction delays.

This work must be carried out under licence in accordance with Section 26 of the National Monuments Act 1930 (as amended), and with a method statement agreed in advance with the National Monuments Service (Department of Culture, Heritage and the Gaeltacht) and the National Museum of Ireland. The results of this investigation will determine whether redesign to allow for preservation *in-situ*, full archaeological excavation and/or monitoring are required. The investigation report will include mitigation proposals for dealing with the discovery of archaeological deposits and material during development.

It is envisaged that the following will apply:

i. Should investigation yield evidence of archaeologically significant material or structures, preservation in situ may be recommended. Strategies for the in situ preservation of archaeological remains are conducted in consultation with the statutory authorities, and may include avoidance, if possible, of the remains during construction, or preservation through redesign.

ii. Should investigation yield evidence of archaeologically significant material or structures that cannot be preserved in situ, archaeological excavation and recording, to full resolution, is recommended.

iii. Should archaeological features or material be uncovered, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.

13.7.2 CONSTRUCTION PHASE

Archaeological Monitoring

The extent of further archaeological monitoring at the construction phase will be informed by the results of pre-construction archaeological testing.

It is envisaged that the following will apply:

i. In the event of archaeological features or material being uncovered during the construction phase, it is crucial that machine work cease in the immediate area to allow the archaeologist to assess, excavate and record any such material.

ii. Should archaeological features or material be uncovered during the construction phase, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.

iii. This work must be carried out under licence in accordance with Section 26 of the National Monuments Act 1930 (as amended), and with a method statement agreed in advance with the National Monuments Service (Department of Arts, Heritage and the Gaeltacht) and the National Museum of Ireland.

13.7.3 OPERATIONAL PHASE

There are no direct physical archaeological, architectural and cultural heritage impacts to recorded heritage assets to be resolved at the operational phase of the development. Once the development has been completed, including the resolution of any archaeological material that may have been exposed, there is no need for further monitoring of the project.

13.8 RESIDUAL IMPACTS

Residual impacts are the degree of environmental change that will occur after the proposed mitigation measures have taken effect. No residual impacts are envisaged as all archaeological, architectural and cultural heritage issues will be resolved at the construction stages of the proposed development.

13.9 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

No difficulties were encountered in compiling information for this report.

13.10 REFERENCES

Electronic Sources

www.excavations.ie	Summary of archaeological excavations
www.archaeology.ie	DoCHG website listing RMP sites and NIAH sites
www.logainm.ie	Placenames database
www.downsurvey.tchpc.tcd.ie	Down Survey maps
www.buildingsofireland.ie	NIAH website listing recorded architectural sites
https://dcenr.maps.arcgis.com	LiDAR data https://www.geohive.ie/ Aerial imagery
https://www.fingal.ie	County Development Plan
https://www.epa.ie	EIAR Guidelines 2022

Cartographic Sources

Down Survey maps, 1656-58

Ordnance Survey of Ireland 6 and 25 inch maps, 19th and 20th centuries

SECTION E – INTERACTIONS & INTER-RELATIONSHIPS

In line with requirements of EC Directive 85/337/EC (as amended) and the Planning and Development Regulations 2001, any interactions/inter-relationship between the various environmental factors was also taken into account as part of the EIAR scoping and assessment.

Where a potential exists for interaction between two or more environmental topics, the relevant specialists have taken the potential interactions into account when making their assessment and where possible complementary mitigation measures have been proposed. An overview of these potential interactions is provided in **Table 14.1**, with the main interactions or inter-relationships discussed in **Sections 14.1 to 14.13** below.

14.0 INTERACTIONS & INTER-RELATIONSHIPS

Table 14.1: Summary of Potential Interactions/Inter-Relationships.

Receptor / Source	Human Beings	Air	Noise	Landscape & Visual	Biodiversity	Water	Soils	Climate	Material Assets	Cultural Heritage
Human Beings		✓	✓	✓	✓	✓	✓	✓	✓	✓
Air	✓		x	x	✓	x	x	✓	✓	x
Noise	✓	x		x	✓	x	x	x	✓	x
Landscape & Visual	✓	x	x		x	x	x	x	x	✓
Biodiversity	✓	✓	✓	✓		✓	x	✓	x	x
Water	✓	x	x	x	✓		✓	x	x	x
Soils	✓	✓	x	✓	✓	✓		x	✓	✓
Climate	✓	✓	x	x	✓	x	x		x	x
Material Assets	✓	✓	✓	x	✓	x	x	x		✓
Cultural Heritage	✓	x	x	✓	x	x	x	x	✓	

14.1 AIR & SOILS

Excavations and earth moving operations during construction works may generate quantities of dust, which have the potential to impact upon air quality in the vicinity of the proposed development. Consequently, an impact upon air quality has the potential to impact upon human health, cause dust nuisance and cause disturbance to fauna (further discussed in **Section 5.6**).

The extent of dust generation depends on the nature of the construction dust (soils, sands, gravels, silts etc.) and the construction activity. The potential for dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

Mitigation measures to control dust emissions would be implemented, which would include good working practices, dust suppression measures and the undertaking of reinstatement works as soon as practicable.

14.2 AIR & CLIMATE

The proposed development has the potential to impact upon air quality and climate of the area through air emissions, including potential greenhouse gases, arising from inefficiencies or leaks during the anaerobic digestion process and exhaust fumes from traffic.

The greenhouse gases, methane and ammonia, would be generated from cattle manure and slurry used as feedstock. Despite these potential emissions, anaerobic digestion can significantly reduce overall greenhouse gas emissions by capturing methane that would otherwise be released from decomposing organic waste in agricultural holdings. The greenhouse gases potentially released to the atmosphere from the proposed development would be typical of the industry and would be anticipated to have no significant impacts on air quality or climate in the regional context.

There would be a small increase in traffic during the construction phase, however, this would not be considered significant given the transient nature of works. The operation of the proposed development would result in an estimated increase of 44 PCUs a day at the site.

The proposed development would result in a negligible impact upon the operation of the adjacent road network, with all traffic increases beyond the site access being below the TII threshold levels. The potential impact of the operational phase of the proposed develop on air quality due to changes in traffic is, therefore, found to be imperceptible, negative and long-term. Overall, the potential impact of the operational phase of the proposed develop on climate is found to be imperceptible, positive and long-term.

14.3 AIR, HUMAN HEALTH & BIODIVERSITY

An adverse impact on air quality has the potential to impact upon human health, cause dust nuisance to humans and fauna and has the potential to adversely impact upon flora by blocking leaf stomata, interfering with photosynthesis, respiration and transpiration processes. The risk to air quality as a result of the proposed development would not be considered significant, both at the local community level and on a broader national/global scale.

During the construction phase of the development, there would be potential for dust emissions, which could impact upon the communities and residents on the roads to the site and flora in the surrounding area. The potential impact of dust would be short-term, given the short-term nature of construction works. Dust control would be an integral part of construction management practices, with mitigation measures implemented where required, including sweeping of roads and hardstand areas, appropriate storage and transport of material and dust suppression measures where required.

Odour is another aspect of air quality with the potential to impact upon human beings, in the context of nuisance. The high standard of design of the proposed AD Plant, coupled with continued good housekeeping practices currently in place at the site, would serve to ensure the effective control odour and air emissions, and mitigate the risk of environmental impact and nuisance to sensitive receptors associated with the site.

It should be noted that an important interaction exists between air quality and flora, whereby vegetation can play an important role in acting as an air purifier by absorbing carbon dioxide and giving out oxygen. It would therefore be anticipated that potential carbon dioxide emissions discharged via vehicle exhausts would be somewhat mitigated by vegetation in the environs of the site.

The proposed development would generate ammonia emissions to atmosphere. Emissions of ammonia to atmosphere is undesirable from an ecological point of view, as it can have toxic, eutrophic and acidifying effects on certain ecosystems. In particular, the presence of high ammonia levels in peatland ecosystems has been found to inhibit the growth of certain moss species, allowing sedge and grass species to outcompete. The proposed development would result in an increase of ammonia emissions in response to the anaerobic digestion process to be carried out at the proposed development site, no adverse significant impact upon habitats, and thus biodiversity, is anticipated, given that there are few peatland ecosystems in the area. The nearest bog, Bog of the Ring, approximately 3.87 km north-west of the site is located at a significant distance, and the land use of the area is mainly arable and pasture land, which would not be particularly sensitive to ammonia emissions.

14.4 NOISE, HUMAN HEALTH & BIODIVERSITY

Noise generated during the construction and operational phases of the proposed development has the potential to impact upon human beings and fauna within the vicinity of the site.

During the construction phase, it would be anticipated that there would be an impact, for a limited period of time, on local residences and commercial dwellings within close proximity to the proposed development. Control and mitigation measures to reduce the potential for noise are outlined in **Section 7.0** Noise. Given the transient nature of construction works and provided the recommended control and mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings, or upon fauna, in the area.

No significant additional noise impact would be anticipated during the operational phase of the proposed development. During the normal operation of the proposed development, noise levels at the nearest noise sensitive locations would not cause a significant impact.

While noise occurring during the construction phase of the development may disturb fauna in the area, high noise levels would be intermittent and would only occur over brief periods of the planned 18 month construction works. Noise from the operation of the AD Plant would be similar to that generated by the existing Country Crest site and would be unlikely to have a negative impact upon biodiversity.

14.5 MATERIAL ASSETS & HUMAN BEINGS

The proposed development would be constructed within the bounds of an agricultural grassland site in the ownership of Country Crest ULC. Therefore, there would be land use change from agricultural activities to built land at the proposed development site. The biogas produced would be a renewable energy source to the national grid with associated economic benefits. Additionally, the proposed development would improve the efficiency of the existing operations of Country Crest by supplying digestate generated during the anaerobic digestion process to be used as a nutrient-rich fertiliser.

During the construction phase, there would be an increase in traffic volume using the local road network. However, given the nature of activities and short-term duration of construction works, this would not be considered significant. The full operation will have a negligible and unnoticeable impact upon the operation of the adjacent road network, with all traffic increases beyond the site access being below the TII threshold levels. Therefore, there should be no major impact upon traffic volumes during the operational phase of the proposed development.

The potential of the proposed development to create short-term employment during the construction phase and additional permanent employment during the operational phase would positively impact on the material assets/human beings of the region.

The development will be served from the existing Country Crest Complex potable water. There will be no Irish Water water supply on site, as an existing on site well will supply the potable water. Therefore, the proposed development is not anticipated to have a potential impact on the existing public water supply infrastructure network.

Should waste be incorrectly handled or stored at the development site, it has the potential to cause an adverse impact upon human beings through nuisance, including visual, odour, pests, and pollution to groundwater and surface-water.

During the construction phase, wastes would be segregated and stored in suitably contained waste receptacles at the site compound. This would considerably reduce the potential risk of pollution to groundwater. Waste would be removed from the development on a regular basis, to avoid the accumulation of high waste volumes, which could cause nuisance. It should also be noted that given the inert nature of the majority of C&D waste types, it is unlikely that issues regarding odour or pests would arise.

Any hazardous waste generated during the construction phase would be managed in accordance with the Waste Management (Hazardous Waste) Regulations 1998 and 2000, and would be stored separately from non-hazardous waste, appropriately labelled and stored upon bunds where appropriate.

The operational phase of the proposed development would give rise to a variety of waste types, with waste management undertaken by suitably licenced waste contractors. Collections of waste / recyclables would be undertaken on a regular basis, therefore the potential for odour and pest nuisance would not be considered significant.

14.6 MATERIAL ASSETS, BIODIVERSITY, WATER QUALITY & SOILS

The proposed development would result in a change of habitat use at the proposed development footprint, resulting in the loss of arable crops (BC1) and spoil and bare ground (ED2). However, this would not be considered significant, given that these habitats are modified and of low ecological value, given that there will be no removal of any boundary vegetation including hedgerows and trees as part of the proposed development and given that the landscape plan includes for the planting of native and non-native species within its design

Waste has the potential to impact upon water quality and biodiversity during both the construction phase and operational phase, by causing pollution to soils and water through leaching of materials, and subsequently to aquatic biodiversity, and by potentially attracting pests / vermin to the site. However, as discussed in **Section 14.5**, wastes generated during the construction phase would be stored in suitably contained waste receptacles at the site compound, with the majority of the waste inert in nature, reducing the potential of pollution to soils and water.

It is not considered that there would be any significant impact upon soils and water, and thus biodiversity, due to waste management during the operational phase, given that waste would be collected by licenced waste contractors and recovered, recycled or disposed of at appropriately licenced waste facilities, which would have environmental controls in place as standard.

14.7 MATERIAL ASSETS & NOISE

The proposed development is located in a rural agricultural area, primarily dominated by arable land. Increased noise emissions during the construction or operational phases would have the potential to impact upon livestock due to disturbance. The potential for noise associated with the proposed development on livestock would be considered low, given the short term duration of construction works and given that no significant increase in noise emissions would be anticipated for the operation of the proposed development. Furthermore, the character of noise from the existing and proposed site would be similar and any livestock within the immediate area of the proposed development would be acclimatised to the existing noise environment of Country Crest operations.

14.8 MATERIAL ASSETS & AIR

As noted above, the proposed development is located in a rural agricultural area. The proliferation of dust during construction has a nuisance value and livestock would be at risk to eye irritation from high levels of wind blowing dust particles. Given the proposed mitigation measures for dust control and dust suppression, in addition to the transient nature of construction works, the potential for dust to impact upon livestock would be considered low.

14.9 WATER QUALITY & SOILS

It is considered unlikely that there would be a potential impact on water quality during the construction phase of the proposed development due to the potential release of suspended solids during soil disturbance works. A headwall will be installed at the drainage ditch to the south, with potential for impacts caused by run-off from construction activities. With appropriate control measures implemented during the construction stage, it is deemed that the risk of the development impacting upon water quality would be greatly reduced.

Once the earth berm to the south has been established and planted over, it is not anticipated a potential for significant volumes of suspended solids in rainwater to enter the drainage ditch.

14.10 WATER QUALITY & HUMAN BEINGS

A deterioration in groundwater quality has the potential to impact upon human beings by adversely affecting drinking water quality. The proposed development would have the potential to impact on groundwater quality during both the construction and operational phases.

During the construction phase, the development would have a potential impact on groundwater quality due to potential hydrocarbon and uncured concrete spillages. Groundwater would be protected through the implementation of mitigation measures, which include the appropriate storage of potentially polluting substances, the regular inspection and maintenance of construction plant, the provision of spill kits onsite and supervised concrete works.

The operational phase of the development has the potential to impact upon groundwater and surface water quality through surface-water run-off emissions. The main concrete yard where the digester will be located will be bunded by retaining walls and a 2m high earth berm. The storm-water falling on hard areas of the site would be directed to a suitably designed storm-water drainage system. This water should be uncontaminated and therefore should have no impact on surface or groundwater.

There will be a septic tank present, servicing the staff toilet/facilities on site. The septic tank will be in place for the disposal of domestic sewage from the site. The percolation area of the septic tank is the source of the only emission to the ground from this facility.

14.11 WATER QUALITY & BIODIVERSITY

The construction phase of projects has the potential to impact upon flora and fauna due to a deterioration in water quality. Risks to water quality could arise due to the potential release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils).

As discussed in Section 10.5.3 above, there would be no process emissions from the site. Surface-water run-off from roofs and hardstanding areas would be collected and discharged to the drainage ditch along the southern boundary of the site via a suitably designed drainage system. This water should be uncontaminated and therefore should have no impact on the ground. Soiled water from the feedstock feeding areas, solid digestate bunker and silage clamps will be directed to soiled water tanks to be further used in the anaerobic digestion process. Additionally, the site will be fully bunded. Therefore, no significant impact on water quality would take place due to drainage from the site.

The landspreading of organic fertilisers has the potential to impact upon biodiversity, either through pollution of waterbodies or the enrichment of natural vegetation. However, digestate would be collected by registered contractors / farmers for application to lands held by the applicant and delivered to partner farmers as detailed within the Nutrient Management Plan. The transport and spreading of organic fertilisers is managed in compliance with the Nitrates Regulations (S.I. No. 113 of 2022).

As noted above, digestate would be suitably stored onsite until time to be collected by an appointed contractor and applied within the applicant's lands and delivered to partner farmers as detailed within the Nutrient Management Plan. The spreading of digestate would be undertaken in accordance with the setback distances from surface waterbodies and abstraction points specified in the Nitrates Regulations. Therefore, there would be no risk to water quality from the spreading of digestate from the site. This would also minimise the risk of any protected sites being impacted due to the spreading of organic fertilisers. As digestate from the development is a replacement for other chemical and organic fertilisers on the current, proposed and any future potential spreadlands, it is considered that the impact of digestate being used as a fertiliser would have a neutral to no significant additional impact upon the biodiversity of landspreading areas.

No adverse potential impacts upon water quality would be anticipated due to accidents and potential spills and leaks, given the buffer distances to the drainage ditches along the boundaries of the site, the proposed storm and soiled water management and given that the site will be effectively bunded.

14.12 LANDSCAPE & VISUAL, SOILS & HUMAN BEINGS

There would be no significant effect on the visual landscape due to the proposed development as, according to the Visual Impact Assessment, no element would be visible due to the intervening topography and field boundaries.

This character proposed development would be in conformance with the character of the existing agricultural environment. The use of gradiated colours would help the development blend into the skyline, particularly given its proximity to the existing Country Crest structures, warehouses and sheds. Additionally, light fixtures should be unidirectional or have shields to minimise light pollution and should preferably incorporate energy-efficient lamps.

Given the nature, location and design features of the proposed buildings, it is considered that the proposed development would have an Imperceptible effect on the level of landscape and visual impact in the area.

14.13 CULTURAL HERITAGE, SOILS & HUMAN BEINGS

Archeologically important sites, buildings of historic, artistic or architectural interest and sites of cultural heritage form part of the landscape of County Fingal. Potential impacts to archaeological, architectural and cultural sites may occur during excavation and soil movements during the construction phase of the development.

There are no protected archaeological, architectural or cultural heritage sites within the proposed development site or within its immediate environs. The nearest recorded monument is approximately 240m from the site, however, no visible remains survive. No protected structures are located within 500m of the proposed site. The majority of the proposed site would be completely disturbed during the construction phase. Aerial imagery and cartographic evidence show no monuments or features of archaeological significance within the site.

Therefore, it is not anticipated that the proposed expansion of the farm would have any adverse physical or visual impacts upon the known cultural heritage of the area.