8 BIODIVERSITY

8.1 Introduction

Enviroguide Consulting was commissioned by John Connaughton Ltd to prepare the Biodiversity Chapter for an Environmental Impact Assessment Report for the Proposed Development of a Large-Scale Residential Development at Lands at Station Road and Pace Line, Dunboyne, Co. Meath in the townlands of Dunboyne, Clonee, Castle Farm and Loughsallagh. The principal application site is generally bounded by Station Road (L2228) to the south, Dunboyne Train Station and the Iarnród Éireann rail line to the West, cluster of detached houses to the southeast, and greenfield lands to north and east. The application also includes 2 no. roundabouts on the R147 (Old Navan Road).

This Biodiversity Chapter consists of an Ecological Impact Assessment (EcIA), which assesses the potential effects of the Proposed Development on habitats and species; particularly those protected by National and International legislation or considered to be of particular nature conservation importance. This report will describe the ecology of the Proposed Development area, with emphasis on habitats, flora and fauna, and will assess the potential effects of the Construction and Operational Phases of the Proposed Development on these ecological receptors. The report follows Guidelines for Ecological Impact Assessment in the UK and Ireland, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

8.2 Quality Assurance and Competence

Enviroguide Consulting is a multi-disciplinary consultancy specialising in the areas of the Environment, Waste Management and Planning. All of our consultants carry scientific or engineering qualifications and have a wealth of experience working within the Environmental Consultancy sectors, having undergone extensive training and continued professional development.

Enviroguide Consulting as a company remains fully briefed in European and Irish environmental policy and legislation. Enviroguide staff members are highly qualified in their field. Professional memberships include the Chartered Institution of Wastes Management (CIWM), the Irish Environmental Law Association and Chartered Institute of Ecology and Environmental Management (CIEEM).

All surveying and reporting have been carried out by qualified and experienced ecologists and environmental consultants. Dr Sanni Hintikka, Ecologist with Enviroguide, and Liam Gaffney, Senior Ecologist with Enviroguide, undertook the habitat, fauna and flora surveys and desktop research in 2022, 2023 and 2024 for this Report. Liam is also the lead author on this EIAR Chapter. Enviroguide bird surveys were carried out by Brian McCloskey, Ecologist and Ornithologist with Enviroguide. Nicola Byrne and Yumi Mihara, Enviroguide Ecologists, undertook the hedgerow appraisal at the Site.

Liam Gaffney has a B.Sc. in Zoology (Hons) and a M.Sc. (Hons) in Wildlife Conservation and Management from University College Dublin. Liam is a Senior Ecologist with 5 years of experience in Ecological Consultancy and is experienced in desktop research, literature scoping-review, and report writing, as well as practical field experience (e.g., Bat surveys, habitat surveys, invasive species surveys, wintering bird surveys, large mammals, fresh water macro-invertebrates etc.). Liam is experienced in compiling Biodiversity Chapters of EIARs, Ecological Impact Assessments (EcIA), Appropriate Assessment (AA) screening and Natura Impact Statements (NIS) reports, and in the overall assessment of potential impacts to ecological receptors from a range of developments. Liam is also a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

Dr Sanni Hintikka has a B.Sc. (Hons) in Zoology and a Ph.D. in Marine Ecology from University College Dublin, and a wealth of experience in desktop research, bioinformatics analyses, literature review and reporting, as well as practical field and laboratory experience including habitat mapping, invasive species surveys, freshwater and marine

fish surveys and environmental DNA analysis. Sanni has prepared several Stage I and Stage II Appropriate Assessment Reports and Ecological Impact Assessments. Additionally, Sanni has authored and supported the preparations of a number of Biodiversity Chapters for Environmental Impact Assessment Reports.

Brian McCloskey is an experienced Ornithologist with a BSc in Planning and Environmental management from the Technological University of Dublin (TUD) and 12 years of bird survey experience, including three years of professional Ornithology work. Brian is a longstanding and active member of Bird Watch Ireland and is also the author of several articles in UK birding publication *Birdwatch Magazine*. Brian is highly experienced in all survey methodologies and with surveying all species groups of Irish birds and migrants, having provided a range of ornithology survey work for ecological consultancies, e.g., vantage points surveys of gulls, terns, raptors, waders and wildfowl; hinterland surveys of the above as well as riverine species; and breeding waders and country birds.

Nicola Byrne is a Project Ecologist with Enviroguide Consulting, with a B. Sc. (Hons) in Microbiology, an M. Sc. (Hons) in Environmental Microbiology from NUI, Galway and an M. Sc. (Hons) in Biodiversity and Conservation from Trinity College, Dublin. Her experience includes coordinating phytoplankton and zooplankton surveys in the Aquaculture Industry and coordinating research in Teagasc Food Research Centre. She has experience in laboratory management and university teaching, having coordinated and delivered material to a master's Microbiology course in University College Dublin. Nicola has extensive experience completing mammal, habitat, and invasive species surveys, as well as in desktop research, including the production of peer reviewed publications, grant proposals, literature reviews and ecological/environmental reports.

Yumi Mihara is an Ecologist/Botanist with Enviroguide Consulting, with a B.Sc. in Botany from Tokyo University of Agriculture and a M.Sc. in Botany from Hokkaido University. Yumi has a wide range of practical field experience including flora surveys, rare and protected plant species surveys, tree census, phytosociological vegetation surveys and analysis, habitat mapping and invasive species surveys. Yumi was one of lead Botanists for the National Habitat Mapping Project in Japan and the deliverables has been published on the website of the government. In Ireland, Yumi has completed several Hedgerow Appraisal Reports and is also a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and a member of the Botanical Society of Britain and Ireland (BSBI).

8.3 Relevant Legislation and Policy Context

An EcIA is not a statutory requirement, however it is a best practice evaluation process of identifying, quantifying, and evaluating potential effects of development-related or other actions on habitats, species and ecosystems (CIEEM, 2018). When an EcIA is undertaken as part of an Environmental Impact Assessment (EIA) process it is subject to the EIA Regulations (under the Planning and Development Regulations 2001-2023, as amended).

This EIAR Biodiversity Chapter details the EcIA of the Proposed Development and has been prepared to assist the Competent Authority with its decision making in respect of the Proposed Development.

There is a number of pieces of legislation, regulations and policies specific to ecology which underpin this assessment. These may be applicable at a European, National or Local level. Legislation at the International level relevant to the Proposed Development are listed below:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter the 'Habitats Directive'.
- Directive 2009/147/EEC, hereafter the 'Birds Directive'.
- Directive 2011/92/EU, hereafter the 'EIA Directive'.
- EU Regulation 1143/2014, on Invasive Alien Species.

- Convention on the Conservation of European Wildlife and Natural Habitats 1982, hereafter the 'Bern Convention'
- The Convention on the Conservation of Migratory Species of Wild Animals 1983, hereafter the 'Bonn Convention'.
- Ramsar Convention on Wetlands 1971, hereafter referred to as 'Ramsar'.
- Water Framework Directive 2000/60/EC, hereafter the 'WFD'.

National legislation and policy relevant to the Proposed Development are listed below:

- Wildlife Act 1976, as amended.
- Flora (Protection) Order 2022.
- The Planning and Development Act 2000 as amended.
- National Biodiversity Plan 2023-2030.

Additionally, Natural Heritage Areas (NHAs) are designations under the Wildlife Acts to protect habitats, species, or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with Special Areas of Conservation (SAC) and/or Special Protection Area (SPA) sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning policy which normally requires that planning authorities give recognition to their ecological value.
Local plans and policies relevant to the Proposed Development are listed below:

- National Biodiversity Action Plan 2017-2021
- Meath County Development Plan 2021-2027
- Meath County Biodiversity Action Plan (BAP) 2015-2020.

For a full list of legislation and local policy relevant to this Chapter, please refer to Appendix I.

8.4 Summary of Proposed Development

8.4.1 Proposed Development Description

The Proposed Development description is provided in full in **Chapter 2** of this EIAR. Please refer to same for further details.

In summary the Proposed Development will entail a 10-year planning permission for development of a Large-Scale Residential Development on a site of approx 21.9 ha in total and 15.74 ha net developable area respectively, at Lands at Station Road and Pace Line, Dunboyne, Co. Meath in the townlands of Dunboyne, Clonee, Castle Farm and Loughsallagh. The location of the Proposed Development is shown in Figure 8-1 and the Proposed Site Layout is provided in Figure 8-2.

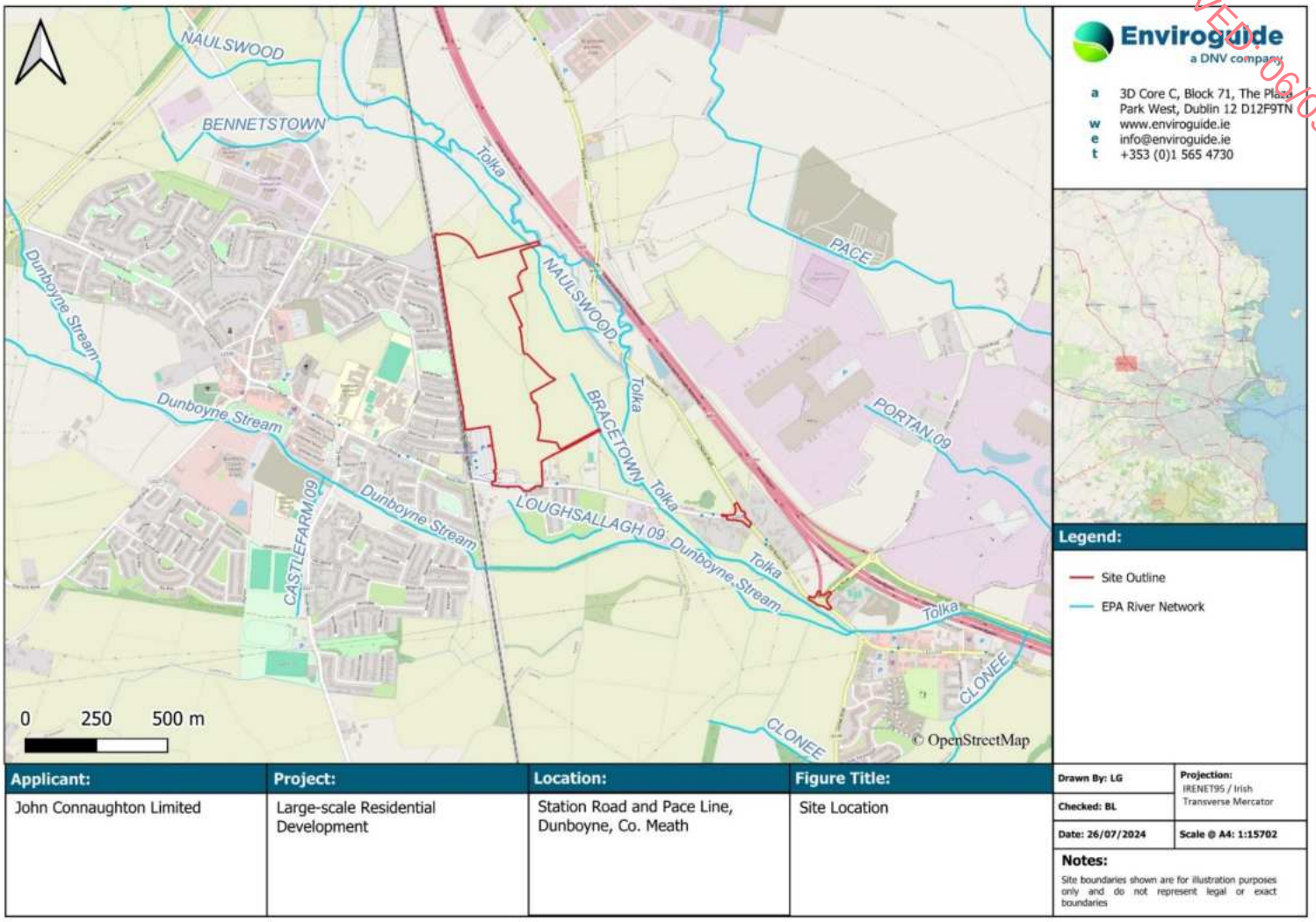

Figure 8-1 Site Location

*Figure 8-2 Proposed Site Layout (MCORM Drwg: **PL 102**).*

8.4.2 Aspects of the Proposed Development Relevant to This Chapter

The following aspects of the proposed development are of relevance to this Biodiversity Chapter:

- Foul water
- Surface water
- Landscape design
- Lighting Design

The details relating to surface and foul water have been extracted from the Engineering Services Report (ESR) prepared by DBFL (2024), and summarised to information relevant to this chapter wherever possible.

The details in section 0 have been extracted from the Landscape Report prepared by KFLA (2024).

Lighting design details in section 0 were extracted from the Outdoor Lighting Report prepared by Sabre (2024).

8.4.2.1 Foul Water

There is an existing 300mm/450mm foul sewer running along the entire length of the western border of the Site. This sewer serves the residential developments to the west of the railway tracks via several existing track crossings. At the southwest corner of the Site, this foul sewer crosses into the Dunboyne Railway Station lands where it then heads west under the railway tracks. As part of the proposals, a portion of the foul sewer will be diverted. Please refer to the ESR for details of the proposed foul sewer diversion.

A pre-connection enquiry (PCE) was made to Uisce Éireann (then Irish Water) in November of 2023 which stated that the Proposed Development was "*feasible without infrastructure upgrade by Irish Water*". Following discussions with Uisce Éireann, the sewer shown in the PCE to serve as a connection point for the development was confirmed to be an error in Uisce Éireann's system with the correct position of the sewer lying substantially further south.

Considering this, a new sewer is to be constructed from the corrected connection point to the location of the Proposed Development which shall be carried out by Uisce Éireann to facilitate the new development. A portion of the development will discharge to the diverted sewer while a portion will discharge to the existing sewer traversing the western boundary. The proposed outfall locations for the foul infrastructure serving the site have been agreed in discussions with Irish Water.

The foul infrastructure for the development will be a standalone gravity sewer system. The site will be divided into two catchment areas and will drain by gravity to the existing 300mm/450mm foul sewer along the western border. Each housing unit will be provided with an individual connection to a new sewer located under the development internal access roads. Foul sewage in apartment blocks will be drained on separate systems via 150mm diameter pipes. The new sewer within the development will be 225mm in diameter unless noted otherwise.

Any surface water from the undercroft car parks in the proposed blocks, generated by incidental spillage only would drain through an underground system of collector pipes, gullies and ACO drains to collect water which will drain through a petrol interceptor prior to discharging into the gravity foul drainage system for the site in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS).

Foul sewers have been designed and will be constructed in accordance with the Irish Water's 'Standard Details for Wastewater Infrastructure' and 'Code of Practice for

Wastewater Infrastructure'. In addition, the foul sewers have been designed in accordance with the Building Regulations and specifically in accordance with the principles and methods set out in EN 752:2008 and DOE 'Recommendations for Site Development Works'. For full details on foul water design and calculations please refer to the ESR (DBFL, 2024).

Foul water at the Site will be directed via the local sewage network to be treated at Ringsend WwTP.

8.4.2.2 Surface Water

8.4.2.2.1 Existing Drainage Ditches and Infrastructure

Similar to the foul infrastructure, there is an existing 450mm-750mm surface water sewer running along the entire length of the western boundary of the site. This sewer serves the residential developments to the west of the railway tracks. At the southwest corner of the site this surface water sewer crosses into the Dunboyne Railway Station lands where it then heads west under the railway tracks. There are a number of dry agricultural channels crossing the development Site. There is also an existing culvert to the northwest of the Site under the railway line which connects into the channels crossing the site.

A Drainage Outfall Assessment (DOA (DBFL, 2024)) has been prepared as part of the response to S247 comments from Meath County Council, and is included as appendix G in the ESR (DBFL, 2024). The technical note discusses the findings of an assessment carried out on the existing drainage ditches around the development. The below paragraph summarises the findings of the DOA. The existing drainage ditches and their catchment areas are shown on Figure 8-3

An existing culvert which crosses the track to the northwest of site drains a small catchment of approximately 1.1 Ha as well as draining approximately 150m of track to the north. Ditch 2 and Ditch 4 convey these flows as well as draining local portions of the greenfield within the development. It is proposed to divert Ditch 4 by providing a 500mm diameter pipe through the development and construct a new outfall drainage ditch to discharge to the river Tolka. The diversion will include a 50m section of daylighting as the route traverses through a new open space area within the development. The pipe returns below ground for approximately 110m before outfalling through a new headwall into the newly constructed ditch. Through the use of SUDS and new drainage infrastructure of the development Ditch 2 and Ditch 3 will be made redundant and are proposed to be abandoned while Ditch 1 traversing the eastern boundary shall be maintained.

Figure 8-3 Existing drainage ditches across the Site and surrounding lands (source: ESR (DBFL, 2024)

8.4.2.2.2 Existing Surface Water Catchment West

The existing surface water pipe traversing the western Site boundary which serves the residential development to the west of the railway track commences as a 450mm pipe which increases to 650mm in diameter as it heads south. The pipe then increases to 750mm in diameter as it flows through the Dunboyne Railway Station carpark where it crosses west beneath the rail in a box culvert. This culvert runs south through third party lands, crosses the L2228 via a double 675mm pipe, then reverts to a culvert to continue to serve existing developments before discharging to the stream south of Dunboyne town. This stream flows eastwards to join with the river Tolka approximately 850m downstream of the discharge location.

To address comments made by Meath CoCo at S247 stage, it is proposed to divert the incoming flow generated from the existing catchment west of the development eastwards to the river Tolka. By diverting these flows, a catchment of approximately 11.4 Ha is removed from the system south of the development thus alleviating reliance on this line and decreasing associated flood risk. Additionally, a more direct route to the river Tolka is achieved which avoids the cumulative flow crossing beneath the rail line west of the development an additional time. The diversion pipe shall be 675mm in diameter which shall outfall to the existing ditch which connects into Ditch 1 as labelled by the Drainage Outfall Assessment. The existing ditch will be reprofiled and regraded to provide an optimum cross-section for flow conveyance.

8.4.2.2.3 Existing Dunboyne Railway Station Carpark Drainage

Design drawings obtained from Irish Rail illustrate drainage routes and attenuation details of the carpark serving Dunboyne Railway Station. According to these drawings carpark

drainage is attenuated in the southwest corner via underground storage cells with discharge rates controlled via a hydrobrake. The outfall pipe from the hydrobrake manhole passes through a petrol interceptor which then discharges into track drainage running south within the rail boundary. Track drainage continues to head south before outfalling to the stream south of Dunboyne town.

As part of the overall proposals for the development, the existing entrance to the station carpark will be removed for the new road serving the development and Eastern Distributor where access to the carpark will be facilitated. Given that the existing entrance will be removed, the attenuation volume generated from this area will be unutilised in the existing system. In order to utilise the natural topography of the site, it is proposed to direct an equivalent area of surface water run-off generated from the southern portion of the development into the existing carpark drainage attenuation system. The remaining run-off generated from the new development shall be directed eastwards as per the global drainage strategy. The area of the access road being removed is approximately 1410m^2 of hardstanding.

8.3.1.1.1 Proposed Surface Water Management Approach

A suite of Sustainable Drainage System (SuDS) measures have been incorporated into the project design in accordance with Meath County Development Plan 2021-2027 policy (See Appendix I). As detailed in the ESR (DBFL, 2024), the following SuDS will be included in the design:

- Wet swales: Swales will be located adjacent to roads and hardstanding areas to receive water from the adjoining roads and footpaths. Swales can also promote biodiversity with appropriate planting.
- Permeable pavement: Located in private driveways and parking areas. Surface water storage within these systems will be further mobilised by providing a 100mm diameter overflow pipe at the outlet to the Site drainage system. The proposed system is a full infiltration system which discharges mainly to the substrata. Permeable paving will reduce the amount of overland run off from the surface and slow down the rate of runoff from pavement in extreme rainfall events. Additionally, permeable paving will improve the quality of water via filtration, biodegradation, pollutant absorption and settlement and retention of solids.
- Green roofs: Green roofs provide ecological, aesthetic, and amenity benefits and intercept and retain rainfall at source, reducing the volume of runoff and attenuating peak flows.
- Extensive/Intensive green roofs: These will be provided on a minimum of 60% of apartment roof space. Extensive green roofs provide ecological, aesthetic, and amenity benefits and intercept, treat, and retain rainfall, reducing the volume of runoff and attenuation peak flows. Extensive roofs are usually only accessed for maintenance. Intensive green roofs require a greater depth of engineered soil build ups and can support a greater range of biodiversity. Intensive green roofs are proposed for podium areas of the proposed blocks where access and maintenance are easier, and the amenity value increased.
- Cellular attenuation system: Proprietary modular block with a maintenance/inspection tunnel for providing underground surface water attenuation storage and can infiltrate runoff to the ground where the subgrade is suitable. These will be the primary attenuation systems for the denser southern portion of the Site and a portion to the north of the Site. The cellular systems will generally be located in open space areas.
- Petrol interceptor: A proprietary oil/water separator which prevents hazardous chemical and petroleum products from entering watercourses and public sewers

are proposed for upstream of each attenuation system in addition to a silt trap chamber.

- Infiltration Blanket and Detention Basins: An attenuation system which utilises a naturally free-draining substrata to dispose of runoff.
- Ponds: Several ponds are proposed to provide attenuation capacity prior to discharge to the Tolka. A linear pond is proposed to cater for the northern half of the Proposed Development and runs parallel to the proposed distributor road. This is proposed to discharge directly to the Tolka at the northern end of the Site. A large open pond is proposed to cater for the central portion of the Site and will discharge to a tributary of the Tolka.
- Bioretention areas and rain gardens: These are proposed throughout the Proposed Development to allow for treatment of runoff from roads and roofs.
- Tree pits (mostly adjacent to roads): Tree pits will be provided with drain down pipes which will convey flows downstream.
- Silt trap manhole: Removes silts and grit from the from the water and thus protects downstream elements of the drainage system, namely the attenuation system. These MHs have been proposed upstream of the attenuation systems to remove silt prior to attenuation.

These features have been designed in accordance with CIRIA documents C753, C697 and C609. Further details of each of these features, as well as the proposed maintenance schedule for any of the above requiring it, can be found in the ESR (DBFL, 2024).

8.3.1.1.5 Greenfield Run-off Rate and Attenuation

The ESR (DBFL, 2024) accompanying this submission calculates the $QBAR_{rural}$ which is the mean annual flood flow from a rural catchment. The calculated $QBAR_{rural}$ is 34.30 l/s. The GDSDS states that the maximum discharge rate shall be the greater value of QBAR or 2 l/s/h. With a developable area of 15.9ha, 2 /ls/h equates to a site discharge rate of 31.80 l/s. Given $QBAR_{rural}$ is larger and in accordance with the GDSDS, this value shall be selected as the permissible site discharge for the Proposed Development. As the Site has been divided into a number of interconnected networks the permissible site discharge rate has been divided between these networks. Please see ESR report (DBFL, 2024) for further details.

Surface water attenuation for a 100-year return period for the Site will be provided within underground Stormtech Attenuation systems, Infiltration Blankets & Detention basins, and open ponds.

The Site has been divided into 13 surface water sub-catchments and each will collect runoff via a combination of SuDS features and traditional piped connections prior to discharge to one of the proposed attenuation storage systems. After attenuation, the surface water is released at a controlled rate via a Hydrobrake manhole or similar approved to a discharge point on an existing surface water sewer or a receiving existing watercourse. As requested by MCC the majority of the Site will discharge to the east, towards the Tolka, with a small portion of the Site in the southwest corner of the Proposed Development unable to outfall to the east given the Site levels. It is proposed for this sub-catchment to discharge to the existing surface water attenuation system within the Dunboyne Rail Station. The run-off directed to the existing network shall be equivalent to the drained area of the removed access road in order to utilise the existing attenuation system.

Also, it should be noted that within the Site, overland flowpaths will be provided to direct run-off from high intensity, short duration storms which might fail to enter the drainage system. Drop kerbs will be provided at road edges at low spots in order to allow overland flow to enter open space areas or discharge to watercourses. Additionally, a minimum

freeboard of 500mm has been provided above the 1 in 100-year flood levels to all building floor levels and critical operational areas.

8.4.2.3 Landscape Design

The proposed landscaping of the Site has been designed by Kennedy Fitzpatrick Landscape Architecture (KFLA). The landscape design for the Proposed Development entails the replacement of the existing arable fields that contains the Site with the mixture of hard and soft landscaping to be expected with a large-scale residential development.

As per the Landscape Report (KFLA, 2024), the character of the landscape proposed is one of large trees, copses of native trees, formal clipped hedges, ornamental shrub and groundcover planting, woodland planting and native hedgerows. The landscape strategy aims to integrate the proposed residential development with the existing landscape and create a network of attractive and useable open spaces while contributing to local biodiversity. The public green areas are designed as landscape spaces that offer the opportunity for meeting, walking and formal and informal play.

Overall, 13 main public open spaces are evenly distributed across the scheme. Details of each are contained in the Landscape Report (KFLA, 2024). Summaries of each are provided below.

- Open Space 1:
  - Tilted lawns, feature paving, specimen trees and formal tree grids.
  - Located at west boundary near train station parking.
- Open Space 2 and 3:
  - Native hedgerow planting is proposed along the eastern boundary of open space 3 connecting into the existing hedgerow network.
  - Located along the eastern boundary of the Site, east of the recently proposed distributor road.
- Open Space 4:
  - Large open lawn space with formal hedging surrounding it.
  - A large copse of native high-canopy woodland is located to the south of the open space.
  - Located at the centre of the Proposed Development.
  - A strip of ornamental and tree planting connects this area to the distributor road and wider landscape.
- Open Space 5:
  - Raised planters and mounds with tree planting.
  - Located west of Open Space 4, linking it to the train station.
- Open Space 6:
  - Low level planting and high canopy trees.
  - Located along the train line.
- Open Space 7:
  - Bands of ornamental planting and copses of native trees.
  - Located centrally within the Site at the end of the homezone.
- Open Space 8:
  - The largest open space within the development.
  - Contains kickabout space, half-sized basketball court and play area.
  - Kickabout space (lawn) is framed by copses of native trees along the internal road to the east.
  - Located approx. halfway along the western boundary, beside the train track.
- Open Space 9:

- Copses of native trees and bands of ornamental planting.
- Located just northeast of Open Space 8.

- Open Space 10:
  - Small lawn area, bands of ornamental planting and copses of native trees.
  - Located along distributor road on the east side of the Site.
- Open Space 11:
  - Linear green route linking homezone areas.
  - Contains pollinator hubs.
  - Bands of ornamental planting, grass and trees.
  - Located centrally in between homezones, with private back gardens and front gardens ornamental hedging connecting to wider landscape to the east.
- Open Space 12:
  - Large formal lawn area.
  - Framed by blocks of ornamental planting and lines of formal hedging.
- Open Space 13:
  - Lawn area, ornamental planting and copses of native trees.
  - Located near the north end of the Proposed Development, along the train track
  - Connects with the western hedgerow boundary.

In addition to the public open spaces, communal open spaces will be provided throughout the Proposed Development. These spaces are defined by bands of ornamental species, multistems and copses of native trees.

8.4.2.3.1 Planting Strategy

All of the various landscape spaces and typologies in the Proposed Development have been designed to consider local biodiversity and ecology. Maintaining and creating natural habitats for native flora and fauna and creating ecological networks is an essential element of the landscape strategy.

The landscape strategy is aimed to retain and strengthen existing native vegetation. It also proposes new native woodland. Creating ecological green corridors which run through the Site and link with external landscape features has been a central focus of the landscape strategy.

The majority of vegetation on Site is that of a parkland landscape and can be found along the Site boundaries and has been retained wherever possible. Where vegetation that is contributing to wildlife corridors and green infrastructure has been removed or fragmented, replacement planting has been proposed to compensate for any loss.

Hedgerow and woodland planting along Site boundaries, together with retained boundary hedgerows, help maintain connectivity of landscape elements throughout the Site and outside of it. Retained elements will also contribute to maintaining the ecological integrity of the Site wherever possible.

The plant species are chosen to respect the local environment while providing suitable vegetation that is harmonious with a residential area and will be successful through all stages of its maturity. Therefore, the planting palette has a limited number of species chosen for their appropriateness and with a preference for native planting where possible. Various types of planting are used to create different atmospheres for certain spaces, and to serve various functions throughout the Site.

Throughout the public open spaces, a mix of broadleaf deciduous trees will be planted that will increase the woodland cover while facilitating safe use of the spaces. Some more ornamental trees will be utilized for their visual quality and to provide interest around the seating areas. There will be areas of dense woodland and understorey planting to create visual screening and improve biodiversity. Formal clipped hedges are used throughout

the Proposed Development to define spaces and create boundaries. These hedges will complement the character of the Site. Evergreen shrub mixes are also used as robust structural planting to define the streetscape and spatial uses. Ornamental and groundcover planting will be used to frame seating areas.

Boundary treatments include native hedgerows, formal hedges and woodland belts. Formal hedges form boundaries to more open public parts of the Site. Particular attention was given to introducing certain pollinator friendly species to various plant mixes in woodland and hedgerow areas as outlined and in referral to the 'Councils: actions to help pollinators; All Ireland Pollinator Plan 2021-2025'.

Full planting schedule can be found in the Lansdcape Report (KFLA, 2024). The species proposed have been reviewed by an experienced botanist from Enviroguide (YM) in the context of the Site and its surrounding ecological landscape, are considered to be suitable for the proposed development.

8.4.2.4 Lighting Design

The public lighting design for the proposed development has been prepared by Sabre Electrical Services Ltd., in consultation with Enviroguide. The lighting design interacts with that of the proposed eastern Dunboyne distributor road which will run along the proposed development's eastern and northern boundaries. The Dunboyne rail line runs along the Site's western boundary, and so there is limited interface between the proposed development and any habitats suitable for bat usage for roosting, commuting and foraging e.g., existing hedgerows, treelines etc., as the Site is currently comprised of large open agricultural fields, with the three sections of existing hedgerow that criss-cross these fields to be removed.

The hedgerow that runs along the length of the Site's western boundary, along the rail line, is to be retained and enhanced where required as per KFLA's landscaping design. In this regard the lighting approach has been designed to limit light-spill along this western hedgerow to 1 lux for the most part. This hedgerow and the darkness of the rail line will provide a future commuting/foraging route for bats using the Site, linking it with adjacent habitat provided by private gardens and Willow Park to the west.

8.4.3 Brief Description of the Construction Phase

As detailed within the Construction Environmental Management Plan (CEMP) prepared by Enviroguide (2024a), It is envisaged that the construction of the Proposed Development will be carried out over 10 years and be sequenced in 4 no. parts as follows:

- Phase 1 – Character area one (315 units); 142 apartments, 50 duplex, 123 houses and includes retail unit and stand-alone creche.
- Phase 2 - Character area two (183 units); 36 duplex and 147 houses.
- Phase 3 - Character area three (213 units); 114 apartments, 26 duplex, 73 houses and creche.
- Phase 4 - Character area one (142 units); 142 apartments.

8.4.4 Brief Description of the Operational Phase

The Operational Phase of the Proposed Development is indefinite in duration and will entail use of the Site as an active residential development, with an associated increase in human activity from the current baseline.

8.4 Methodology

8.5.1 Scope of Assessment

The specific aims and objectives of this Biodiversity Chapter were to:

- Undertake baseline ecological surveys and evaluate the nature conservation importance of the Site;
- Identify and assess the direct, indirect and cumulative ecological implications or impacts of the Proposed Development during its lifetime; and
- Where possible, propose mitigation measures to remove or reduce those impacts at the appropriate stage of the development.

8.5.2 Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation sources pertaining to the Site's natural environment. The desk study, completed in July 2024, relied on the following sources:

- Information on species records and distributions, obtained from the National Biodiversity Data Centre (NBDC) at maps.biodiversityireland.ie;
- Information on Floral Protection Order (FPO) Bryophytes database at dahg.maps.arcgis.com;
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at gis.epa.ie;
- Information on bedrock, groundwater, aquifers and their statuses, obtained from Geological Survey Ireland (GSI) at www.gsi.ie;
- Information on the network designated conservation sites, site boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at www.npws.ie;
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland;
- Information on the existence of permitted development, or developments awaiting decision, in the vicinity of the Proposed Development from the National Planning Application Database (DHLGH, 2024); and
- Information on the extent, nature and location of the Proposed Development, provided by the applicant and/or their design team.

A comprehensive list of all the specific documents and information sources consulted in the completion of this Chapter is provided in Section 8.12, References.

8.5.3 Zone of Influence

The ZOI for a project is the area over which ecological features may be affected by changes as a result of the proposed development and associated activities. This is likely to extend beyond the development site, for example where there are ecological or hydrological links beyond the site boundaries (CIEEM, 2018). The ZOI will vary with different ecological features, depending on their sensitivities to an environmental change.

Furthermore, ZOI in relation to European sites is described as follows in the 'OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management' (OPR, 2021):

> *"The zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances (such as 15 km)."*

8.5.4 Identification of Relevant Designated Sites

To determine the ZOI of the proposed development for designated sites, reference was made to the OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management' (OPR, 2021), a practice note produced by the Office of the Planning Regulator, Dublin. This note was published to provide guidance on screening for AA during the planning process, and although it focuses on the approach a planning authority should take in screening for AA, the methodology is also readily applied in the preparation of ecological impact assessments such as this to identify all relevant designated sites potentially linked to the proposed development.

As noted above, the most recent guidance advises against the use of arbitrary distances that serve as precautionary ZOI (e.g., 15km), and instead recommends the application of the Source-Pathway-Receptor (S-P-R) model in the identification of designated sites, stating that "*This should avoid lengthy descriptions of European sites, regardless of whether they are relevant to the proposed development, and a lack of focus on the relevant European sites and issues of importance*". Although this statement refers to European sites, it is also applicable to other designated sites.

Thus, the methodology used to identify relevant designated sites comprised the following:

- Identification of potential sources of effects based on the proposed development description and details;
- Identification of potential pathways between the Site of the proposed development and any designated sites within the ZOI of any of the identified sources of effects:
    - Water catchment data from the EPA (www.epa.ie) were used to establish or discount potential hydrological connectivity between the proposed development and any designated sites.
    - Groundwater and bedrock information used to establish or discount potential hydrogeological connectivity between the proposed development and any designated sites.
    - Air and land connectivity assessed based on proposed development details and proximity to designated sites.
    - Consideration of potential indirect pathways, e.g., impacts to flight paths, *ex-situ* habitats, etc.
- Review of Ireland's designated sites to identify those sites which could potentially be affected by the proposed development in view of the identified pathways, using the following sources;
    - European sites and nationally designated sites (e.g., NHAs and pNHAs) from the NPWS (www.npws.ie);
    - Ramsar sites from the Irish Ramsar Wetland Committee (https://irishwetlands.ie/irish-sites/);
    - Other internationally designated sites e.g., UNESCO Biosphere's; and
    - Regional development plans to identify any remaining sites or areas designated for nature conservation at a local level.

8.5.5 Field Surveys

A range of surveys have been carried out across the application Site since 2017, including habitat and flora surveys, bat surveys, bird surveys and mammal surveys. Survey data is typically considered to be valid for 3 years at the most for non-mobile constraints (CIEEM, 2019) and 12-18 months for mobile species. As such, field survey dates from 2021 to 2024 are summarised in Table 8-1.). No limitations to field surveys were encountered which would prevent robust conclusions being drawn as to the potential impacts of the proposed development.

		2021	2022	2023	2024
	Habitat surveys (incl. invasive flora)	5th August	12th August	None	23rd July
	Hedgerow Appraisal	None	None	28th June	None
Bat surveys	*Walked transect surveys*	4th June (Dawn) 29th June (Dusk)	15th September (Dusk)	12th June 10th July 15th August	None
	Ground Level PRF surveys	None	15th September	None	None
	Building Inspections	4th June (Dawn) 29th June (Dusk)	None	25th September	None
	Mammal Surveys	None	12th August	None	23rd July
	Breeding Bird Surveys	4th June 16th June	14th and 27th June	28th June	23rd July
	Wintering Bird Survey	27th October 29th November 15th December	18th January 10th February 10th March	None	None

Table 8-1 Field surveys undertaken at the Proposed Development Site. The surveys where dates are underscored were carried out by Enviroguide Consulting. All other surveys were carried out by Scott Cawley Ltd.

The following sections outline the methodology employed by Enviroguide Consulting for each survey carried out. As these methods are based on best practice guidelines, it is anticipated that previous surveys carried out by Scott Cawley Ltd have utilised a similar approach.

8.5.5.1 Habitat Surveys

The most recent habitat survey of the Site was conducted by Enviroguide on the 23rd of July 2024 Habitats were categorised according to the Heritage Council's '*A Guide to Habitats in Ireland*' (Fossitt, 2000) to level 3. The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith *et al.*, 2010) published by the Heritage Council. Any incidental observations of evidence for rare and/or protected flora were recorded.

In addition, the Site was searched for invasive flora with a particular focus on those listed on the Third Schedule of SI No. 477/2011, and their location and extent recorded.

8.5.5.2 Hedgerow Survey

A hedgerow appraisal of the Site was conducted by Enviroguide on the 28th of June 2023 in relation to the Distributor Road Application submitted under Reg. Ref. 2460063. This hedgerow appraisal is also of relevance to the current application due to significant overlap in the application area and the hedgerows that were assessed being within the footprint of the proposed development.

Hedgerows were categorised on their ecological value as ascertained from current research from Hedgerow Appraisal System (HAS) (Foulkes et al, 2013) and the Hedgerow Evaluation and Grading System (HEGS) (Clements and Toft, 1993). These systems follow a standardised methodology that grades hedgerows based on their overall structure, connectivity, botanical diversity and the presence of hedgerow features such as banks and ditches. Each hedgerow is then assigned a grade based on the results.

For full details on the methodology applied during the hedgerow assessment please see 'Appendix VI – Detailed Hedgerow Assessment'.

8.5.5.3 Bat Surveys

Note that new bat survey guidance was published at the end of 2023, and although submission for this proposed development is made after the fact, the bat surveys were carried out under the most recent guidance at the time. As such, methodology and results will also be described as per the previous guidance in this assessment.

8.5.5.3.1 Preliminary Bat Roost Assessment

A preliminary bat roost assessment of Potential Roost Features (PRFs) within trees and buildings was completed by Enviroguide in 2022 on the 15th of September 2022 and updated on 23rd July 2024 in adherence to best practice guidelines available at the time (Collins, 2016 and Marnell et al., 2022).

The preliminary bat roost assessments were undertaken to determine the suitability of the Site for roosting bats and the potential requirement for further surveys to be undertaken. According to bat survey guidance at the time of surveying (Collins, 2016), PRFs can be defined in four broad terms of suitability as detailed below:

- Negligible – No suitable features observed;
- Low – A structure with one or more roost features as used by individual bats or a tree of sufficient size to contain roost features but none observed from the ground;

- Moderate – A structure or tree with one or more roost features and able to support one or more bats but unlikely to support a roost of high conservation status.
- High - A structure or tree with one or more roost features that are obviously suitable for use by a larger number of bats on a regular basis, and potentially for longer periods of time.

8.5.5.3.2 Preliminary Bat Habitat Suitability Assessment

A Bat Habitat Suitability Assessments was carried out in conjunction with the roost assessments. These assessments evaluated the habitats present on the Site and in the wider area for bat foraging and commuting suitability. Habitat suitability is assessed qualitatively from Negligible to High:

- Negligible – No suitable foraging or commuting habitats on Site
- Low – Suitable but isolated habitats that could be used by small numbers of commuting and/or foraging bats, such as poorly connected gappy hedgerows, lone trees, unvegetated streams, etc.
- Moderate – Suitable continuous habitat connected to the wider landscape that could be used by commuting and/or foraging bats, such as treelines, scrub, grassland, water, etc.
- High – Continuous high-quality habitat that is well-connected to the wider landscape, and is likely used regularly by commuting and/or foraging bats, such as river valleys, broadleaved woodland, woodland edge, grazed parkland, etc.

8.5.5.3.3 Bat Landscape Suitability

The Bat Conservation Ireland Landscape Suitability Model (Lundy *et al*., 2011) provides a habitat suitability index for bat species across Ireland. The model divides the country into 1 km grid squares and ranks the habitat within the squares according to its suitability for various bat species. The scores are divided into five qualitative categories of suitability, namely:

- - 13.000000: Low
- 13.000001 - 21.333300: Low – Medium
- 21.333301 - 28.111099: Medium
- 28.111100 - 36.444401: Medium – High
- 36.444402 - 58.555599: High

8.5.5.3.4 Bat Activity Surveys

The dusk transect bat activity surveys were undertaken to best practice guidance during the optimal bat activity season (mid-March to end of September) and in times of suitable weather conditions (Collins, 2016 and Marnell et al., 2022).

In September 2022, the weather conditions were overcast and with temperatures ranging from 10-13°C over the course of the survey. Winds were low averaging 1-2 m/s during both surveys. The surveyors were equipped with a Elekon Batlogger M2 detector and powerful L.E.D. torch and head torches. Survey started 30 minutes before sunset and continued for 2-3 hours. The transect walked followed the linear features of the lands under survey, and crossing over the open field once during each survey.

The surveys in 2023 comprised of dusk transects walked on 12th June, 10th July and 15th August.

The survey conditions during the additional bat surveys carried out in 2023 are outlined in Table 8-2 below.

Date	Sunset	Start Time	Weather at Start	End Time	Weather at End
JCL Lands					
12th June 2023	21:53	21:48	Calm, dry, cloudy, Temp 20c.	00:23	Calm, dry, cloudy, Temp 18c.
10th July 2023	21 :52	21: 51	Calm, cloudy, overcast, very light drizzle. Temp 16c.	00:29	Calm, cloudy, overcast, dry, recently rained. Temp 14c.
15th August 2023	20 :53	20:53	Calm, dry, Temp 19c.	23:00	Calm, dry, Temp 13c.

Table 8-2 Survey conditions during the 2023 Dusk transect Surveys.

8.5.5.3.5 Data Analysis

Species were identified from recordings using Elekon's BatExplorer software (Version 2.1.10.1). Bat data was analysed and species assigned to each record with reference to species identification guides such as Russ (2012).

Each record i.e., a sequence of bat calls/pulses, is noted as a bat pass; to indicate the level of bat activity for each species recorded. Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some bats such as *Pipistrelle* species may continuously fly around a habitat or feature, therefore, it is possible that a series of bat passes within a similar time frame is representative of an individual bat. On the other hand, Leisler's bats (*Nyctalus leisleri*) tend to travel through an area quickly, and as such, an individual sequence or bat pass is more likely to be indicative of individual bats.

8.5.5.4 Bird Surveys

The survey methodology employed was based on that recommended in standard literature used by for example the British Trust for Ornithology (BTO) (Gillings et al, 2007; Bibby et al, 1992 and Gilbert et al, 1998), which has subsequently been adapted into guidelines for ecological consultants by the Bird Survey & Assessment Steering Group. (2022). During the surveys, the Site was walked slowly, approaching all habitat within and adjacent to the Proposed Development and scanning and listening for birds. The locations of birds seen and heard were mapped using standard BTO codes and activity symbols.

8.5.5.4.1 Breeding Bird Survey

To inform an evaluation of the on-site habitats for bird species, two breeding bird survey visits were undertaken at the Site during the breeding bird season in 2022 (Table 8-1). Survey visits were completed in the early morning, commencing at or near dawn.

To ground-truth the survey results from 2022 and ensure no significant changes have occurred to the available habitats and potential bird assemblages due to delays in the design and planning process of the Proposed Development, additional breeding bird survey visits were carried out by Enviroguide during the breeding bird season in 2023 and 2024 (Table 8-1).

8.5.5.4.2 Wintering Bird Survey

Wintering bird surveys were undertaken on six dates over the course of the 2021/2022 winter by Scott Cawley Ltd. (see Table 8-1). The surveys were conducted using a methodology adapted from the Bird Monitoring Methods - *A Manual of Techniques for Key UK Species.* The study area covered all lands within the Site boundary. Birds were observed from a vantage point within the Site and were identified by sight, using a scope and binoculars, and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes.

8.5.5.5 Badger Survey

A systematic search for signs of badgers (*Meles meles*) was conducted in conjunction with the habitat surveys on the 12th of August 2023 and the 23rd July 2024. Furthermore, any incidental observations of evidence for badgers were recorded whenever on Site. The survey followed standard guidelines (Harris, Cresswell & Jeffries, 1989 and NRA, 2005) and included a thorough search for setts or for signs of badger activity, including tracks, latrines, hairs and snuffle holes.

8.5.5.6 Other Fauna

A general fauna survey of the Site was carried out in conjunction with the other field surveys on the 12th of August 2023 and the 23rd July 2024. The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area. Furthermore, the Site was searched for tracks and signs of mammals as per Bang and Dahlstrom (2001) and the National Road Authority (NRA, 2005). In addition, any incidental sightings of protected or notable species during all Site visits were recorded.

This survey considers protected or notable fauna that may occur within the Site or in the adjacent lands, but for which no historical records from the relevant grid square(s) exist or no targeted surveys were carried out.

8.5.6 Ecological Assessment

This Biodiversity Chapter was prepared following the methodology set out in Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018); and with reference to the National Roads Authority 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009) and the Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) and BS 42020:2013 Biodiversity: Code of practice for planning and development (BSI, 2013).

The evaluation of significant effects should be based on available scientific evidence. Based on the precautionary principle, if the available information is not sufficient, then a significant effect may be assumed likely to occur.

8.5.6.1 Evaluation of Ecological Features

The value of the ecological features, i.e., the habitats and species present or potentially present, was determined using the ecological evaluation at different geographical scales (NRA, 2009), presented in Appendix II. This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological receptors of impacts that may ensue from a proposal. Based on best practice (CIEEM, 2018), any features considered to be less than of local value are not assessed within this EcIA.

8.5.6.2 Impact Assessment

As per the NRA guidelines, impact assessment is only undertaken of Key Ecological Receptors (KERs). The assessment of the potential impact of the Proposed Development on the identified KERs was carried out with regard to the criteria outlined in the EPA Guideline (EPA, 2022), presented in Appendix III. These guidelines set out a number of

parameters that should be considered when determining which elements of the Proposed Development could constitute impact or sources of impacts. These include;

- Positive, neutral or negative effect;
- Significance;
- Extent;
- Probability;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process, or feature, e.g., the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to an adverse effect of a sensitive habitat.

8.5.6.3 Assessment of Cumulative Impacts and Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a Proposed Development results in individually insignificant impacts that, when considered in combination with impacts of other proposed or permitted plans and projects, can result in significant effects.

Relevant plans and policies (see Appendix I) were reviewed to identify any potential for negative cumulative impacts with the Proposed Development. Additionally, existing planning permissions from the past five years (from 2019 onwards) within the ZOI of the Proposed Development were reviewed, with particular focus on potential cumulative impacts on the identified KERs. Long-term developments were also considered where applicable.

8.5.6.4 Avoidance, Mitigation, Compensation and Enhancement Measures

Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement. When seeking mitigation or compensation solutions, efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved.

It is important for the EcIA to clearly differentiate between avoidance, mitigation, compensation and enhancement and these terms are defined here as follows:

- **Avoidance** is used where an impact has been avoided, e.g., through changes in scheme design. In practice, avoidance measures are typically implemented during the design stage via discussions and re-design (e.g., avoiding a sensitive habitat by relocating a building). Avoidance measures are therefore rarely reported within an EcIA, which focuses on assessing the final design.
- **Mitigation** is used to refer to measures to reduce or remedy a specific negative impact in situ.

- **Compensation** describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible.
- **Enhancement** is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

8.5.7 Limitations

Every effort has been made to provide a comprehensive description of the site; however, the following specific limitations apply to this assessment:

- An extensive search of available datasets for records of rare and protected species within proximity of the Proposed Development has been undertaken as part of this assessment. However, the records from these datasets do not constitute a complete species list. The absence of species from these datasets does not necessarily confirm an absence of species in the area.
- A number of surveys were carried out by a different ecological consulting prior to and in 2022. While survey data has been made available for assessment purposes, detailed methodologies used by the other operator were not available for all of the surveys listed for all areas of the Site. Therefore, it is assumed in good faith that as a professional and long-standing ecological consulting firm, the other operator would have applied the most recent best practice guidance in place at the time to their survey methods. As such, the gaps in information on methodologies is not considered to be a significant limitation to this assessment.
- Mammal surveys are best carried out during winter months when vegetation has died back. As the search for signs of mammals, particularly of badger, was carried out during the summer, it was somewhat limited by the extent of vegetation in the hedgerow habitats. However, it is considered that due to a very limited number of records of badger signs (e.g., latrines, hairs at trail entrances to hedgerows, etc.), an appropriate evaluation of the importance of the Site to protected mammals, particularly badger, has been achieved. As such, this is not considered to be a significant limitation and further winter surveys were not deemed necessary.
- Amphibian presence is best surveyed for during their breeding season in the spring, while the Site was surveyed during August and September for the presence of any protected species, including amphibians. However, it is considered that due to limited suitable habitats at the Site (mostly dry drains) and by applying a precautionary approach to their potential presence at the Site, an appropriate evaluation of likely significant impacts and appropriate mitigation measures has been carried out.
- As stated previously, CIEEM guidance values survey data for up to 3 years (CIEEM 2019). The assessments detailed in this EcIA have been informed by data collected since 2021. The precautionary principle has been adopted in the assessment of potential impacts to mobile species e.g., birds and bats, which might make use of the Site, and also in the associated mitigation that has been recommended. Furthermore, the surveys conducted in 2023 and 2024 confirmed that there had been no change to the baseline conditions recorded during the 2022 surveys and therefore, age of data is not considered to pose any significant limitations on the survey results or the assessments in this Chapter.
- Winter bird surveys were conducted by Scott Cawley Ltd., at the Site of the Proposed Development over the course of the 2021/2022 winter. No significant usage of the Site by SCI waterbird species was recorded on this arable Site during their surveys. Subsequent visits to the Site during summer 2023 and 2024 confirm that the Site remains as it was in 2021/2022 i.e., under arable crop planting.

Although no subsequent winter bird surveys have been conducted at the Site since the 2021/2022 winter, it is not deemed that the absence of more recent survey data prevents robust conclusions being drawn as to the potential for likely significant effects from the Proposed Development on the relevant European sites. As discussed in more detail in the AA Screening Report (Enviroguide, 2024b), it is deemed highly unlikely that the Site of the Proposed Development is an important *ex-situ* feeding site for any SCI species associated with the SPAs located a minimum of 17km to the east, and therefore there is no potential for likely significant effects to occur that would undermine the integrity of those SPAs in light of their conservation objectives. As such, it is concluded that no significant limitations were encountered in the preparation of this Chapter in this regard.

8.5 Ecological Baseline Conditions

8.6.1 Hydrology, Hydrogeology and Geology

Please refer to Land, Soils, Geology and Hydrogeology Chapters for details on the hydrology, hydrogeology and geology of the Proposed Development Site.

8.6.2 Designated Sites

All European sites potentially linked to the Proposed Amendments have been identified and fully assessed in the AA Screening Report (Stage 1 AA) and NIS (Stage 2 AA) accompanying this submission under separate cover. A summary of the NIS conclusions is given below.

Other nationally or internationally designated sites potentially linked to the Proposed Development are identified in section 0.

8.6.2.1 European sites – Appropriate Assessment

The AA Screening (Enviroguide, 2024b) concluded that a degree of uncertainty exists in whether the Proposed Development could give rise to potentially significant effects on downstream European sites, namely:

- North Dublin Bay SAC (000206)
- South Dublin Bay SAC (000210)
- South Dublin Bay and River Tolka Estuary SPA (004024)
- North Bull Island SPA (004006)

Therefore, a Natura Impact Statement (NIS) has been prepared for the Proposed Development. The purpose of the NIS is to provide information for the relevant competent authority to carry out a Stage 2 Appropriate Assessment in respect of the Proposed Development. The following conclusion is extracted from the NIS accompanying this application under separate cover (Enviroguide, 2024c):

"This NIS details the findings of the Stage 2 AA conducted to further examine the potential direct and indirect impacts of the Proposed John Connaughton Ltd. Development at Station Road and Pace Line, Dunboyne, Co. Meath, on the following European Sites:

- *North Dublin Bay SAC (000206).*
- *South Dublin Bay SAC (000210).*
- *South Dublin Bay and River Tolka Estuary SPA (004024).*
- *North Bull Island SPA (004006).*

The above sites were identified by a screening exercise that assessed likely significant effects of a range of impacts that have the potential to arise from the Proposed Development. The NIS investigated the likely direct and indirect effects of the proposed works, both during construction and operation, on the integrity and qualifying interests of the four above

European Sites, alone and in combination with other plans and projects, taking into account the site's structure, function and conservation objectives, and having regard to best scientific knowledge.

Where potentially significant effects were identified, a range of mitigation and avoidance measures have been suggested to avoid them. This NIS has concluded that, once the avoidance and mitigation measures are implemented as proposed, the Proposed Development will not have an adverse effect on the integrity of the above European sites, individually or in combination with other plans and projects. Where applicable, a suite of monitoring measures have been proposed to confirm the efficacy of said mitigation in relation to ensuring no adverse effects on the habitats or species of the relevant European sites have occurred.

As a result of the complete, precise and definitive findings in of this NIS, it has been concluded, beyond reasonable scientific doubt, that the Proposed Development will have no adverse effects on the integrity and extent of North Dublin Bay SAC (000206), South Dublin Bay SAC (000210), South Dublin Bay and River Tolka Estuary SPA (004024) and North Bull Island SPA (004006). Accordingly, the Proposed Development will not adversely affect the integrity of any relevant European site."

As such, potential impacts on European sites have been assessed fully within the NIS that accompanies this application, with appropriate mitigation measures proposed to address any such impacts. European sites are therefore not considered further in this Chapter.

8.6.2.2 Other Designated sites

A designated site will only be at risk from likely significant effects where a S-P-R link of note exists between the Proposed Development and the designated site. All designated sites considered as part of the S-P-R method (excl. European sites) are listed in Table 8-3 and shown in Figure 8-4.

The AA Screening and NIS (Enviroguide, 2024b & 2024c) assessed and addressed all potential impact pathways linking the Proposed Development to European sites. The other designated sites considered as part of this assessment, and listed in Table 8-3 overlap with those SACs and SPAs assessed in the AA Screening and NIS prepared for this application and are designated for analogous reasons e.g., the same waterbird species, habitats etc. It is deemed that the AA Screening and NIS therefore have assessed the potential impact of the Proposed Development on these other designated sites assessed by proxy.

As such, the potential for likely significant effects to occur to these designated sites has been assessed and mitigated where applicable in the AA Screening and NIS, and they will not be assessed further as part of this EcIA.

SITE NAME & SITE CODE	DESIGNATION RATIONALE / QUALIFYING INTERESTS	POTENTIAL PATHWAYS
Internationally Designated Sites		
Sandymount Strand/Tolka Estuary (832) Ramsar Site	An intertidal system supporting a large bed of eelgrass (Zostera noltii) with extensive areas of sandflats. The site is important for various species of waterbirds, supporting internationally important numbers of Brent Geese and large numbers of roosting gulls and terns. Various species of annalids, bivalves and small gastropods occur. Bait-digging is a regular activity on the sandy flats.	Weak direct hydrological pathway via the surface water network and the RiverTolka. Weak indirect pathway via foul water treatment at Ringsend WwTP. The above impact pathways were assessed and mitigated (where applicable) by proxy in

SITE NAME & SITE CODE	DESIGNATION RATIONALE / QUALIFYING INTERESTS	POTENTIAL PATHWAYS
North Bull Island (406) Ramsar Site	A small island built up over 200 years against a harbour wall and the adjoining foreshore of sandy beaches, saltmarshes and mudflats. The site is unique in Ireland because it supports well-developed saltmarsh and dune systems displaying all stages of development from the earliest phase of colonization to full maturity. The site supports five protected or threatened plant species and nationally important populations of three insect species. The area is important for nesting *Sterna albifrons* (80 pairs, or about 30% of the Irish population) and for numerous species of wintering waterbirds. Human activities include bait digging.	the AA Screening and NIS. No further assessment is therefore required.
Dublin Bay UNESCO Biosphere	In 1981, UNESCO recognised the importance of Dublin Bay by designating North Bull Island as a Biosphere because of its rare and internationally important habitats and species of wildlife. To support sustainable development, UNESCO's concept of a Biosphere has evolved to include not just areas of ecological value but also the areas around them and the communities that live and work within these areas. There have since been additional international and national designations, covering much of Dublin Bay, to ensure the protection of its water quality and biodiversity. To fulfil these broader management aims for the ecosystem, the Biosphere was expanded in 2015. The Biosphere now covers Dublin Bay, reflecting its significant environmental, economic, cultural and tourism importance, and extends to over 300km². Over 300,000 people live within the newly enlarged Biosphere.	
Nationally Designated Sites		
South Dublin Bay pNHA (000210) Linear Distance to Proposed Development: approx. 18.7km ESE	None available, but pNHA overlaps with South Dublin Bay SAC and is designated for similar reasons.	Weak direct hydrological pathway via the surface water network and the RiverTolka. Weak indirect pathway via foul water treatment at Ringsend WwTP. The above impact pathways were assessed and mitigated (where applicable) by proxy
Dolphins, Dublin Docks pNHA (000201)	None available, but pNHA overlaps with South Dublin and River Tolka Estuary SPA and is designated for waterbird species, particularly terns.	

SITE NAME & SITE CODE	DESIGNATION RATIONALE / QUALIFYING INTERESTS	POTENTIAL PATHWAYS
Linear Distance to Proposed Development: approx. 18.3km ESE		in the AA Screening and NIS. No further assessment is therefore required.
North Dublin Bay pNHA (000206). Linear Distance to Proposed Development: approx. 16.6km ESE	None available, but pNHA overlaps with North Dublin Bay SAC and is designated for similar reasons.	
Rye Water Valley/Carton pNHA (001398) Linear Distance to Proposed Development: approx. 5.5km SW	None available, but pNHA overlaps with Rye Water Valley/Carton SAC and is designated for similar reasons.	No direct connectivity to the pNHA. Dust impact pathway were screened out by proxy in AA Screening and therefore no likelihood of significant effects exists for this designated site.

Table 8-3 Designated sites considered with the Source-Pathway-Receptor (S-P-R) method to establish notable links between the sources of effects arising from the Proposed Amendments, and any relevant designated sites. Those sites with notable S-P-R links that are further assessed in this Chapter are highlighted in green (if any).

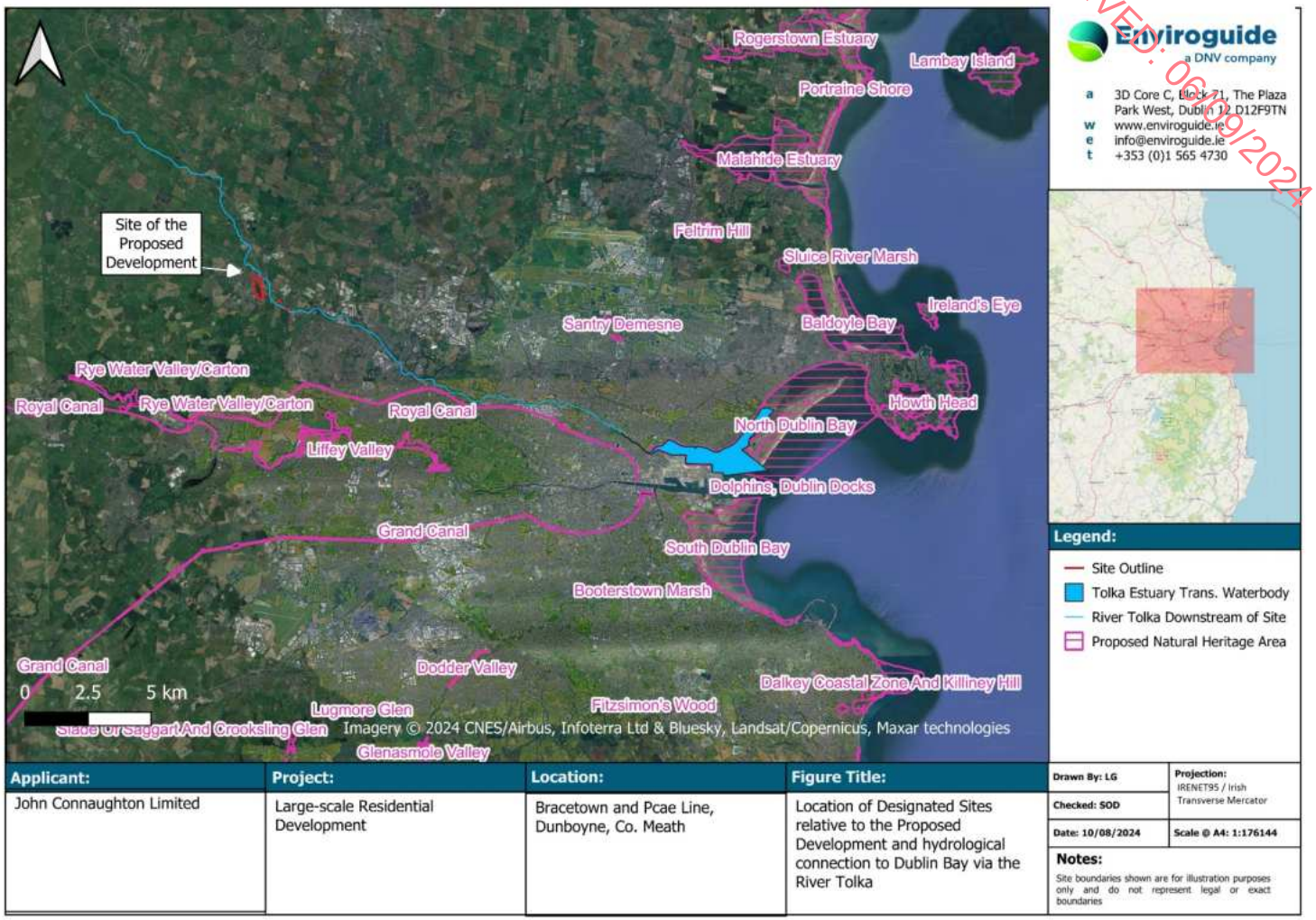

Figure 8-4 Location of designated sites relative to the Proposed Development and hydrological impact pathway via the River Tolka.

8.6.3 Habitats

The habitats present within the Site, as recorded in the survey area during the field surveys, are described in this section and summarised below. Site photographs of these habitats are included in Appendix IV and an overview map of the habitats is presented in Figure 8-5.

The Site contains large, farmed fields of 'Arable crops – BC1'. In addition, mature hedgerows ('Hedgerows – WL1') and drainage ditches ('Drainage Ditches – Fw4') separate the fields. Two small areas of scrub ('Scrub – WS1') are located: a) in the northern end of the Site at the junction of two hedgerows and the trainline, and b) in the south of the Site where an unmanaged plot has become overgrown.

Although, not within the Site proper, dense scrub was noted to be present along the field edge that separates the arable lands containing the Site from the Tolka river floodplain to the east. The floodplain containing the Tolka and the Naulswood Stream falls away from the arable lands and was inaccessible due to the presence of drop in height and a dense scrubby margin. Habitats within the floodplain were observed to be tall, wet grassland in nature. During the Site visit on 23rd July 2024, the channel of the Tolka was observed by the surveyor to the north-east of the Site to be flowing and supporting overgrown riverbank vegetation.

The Naulswood Stream channel was also observed from an agricultural road-bridge leading from the arable field north of the Site to a farm track running along the M3 motorway. The stream channel was dry during the Site visit on 23rd July 2024. As can be seen in Figure 8-5, the EPA waterbody shapefiles have the Naulswood in part running through the arable field to the east of the Site. This was not observed to be the case during Site visits with the arable field appearing uninterrupted along the supposed route of the stream. Google Earth satellite imagery shows that this has been the case since ca.2009 at which point a hedgerow can be seen running along the streams route (Figure 8-6).

A Site visit on the 23rd of July 2024 confirmed no change in the habitats present at the Site. No rare or protected species of flora were recorded during the surveys carried out at the Site.

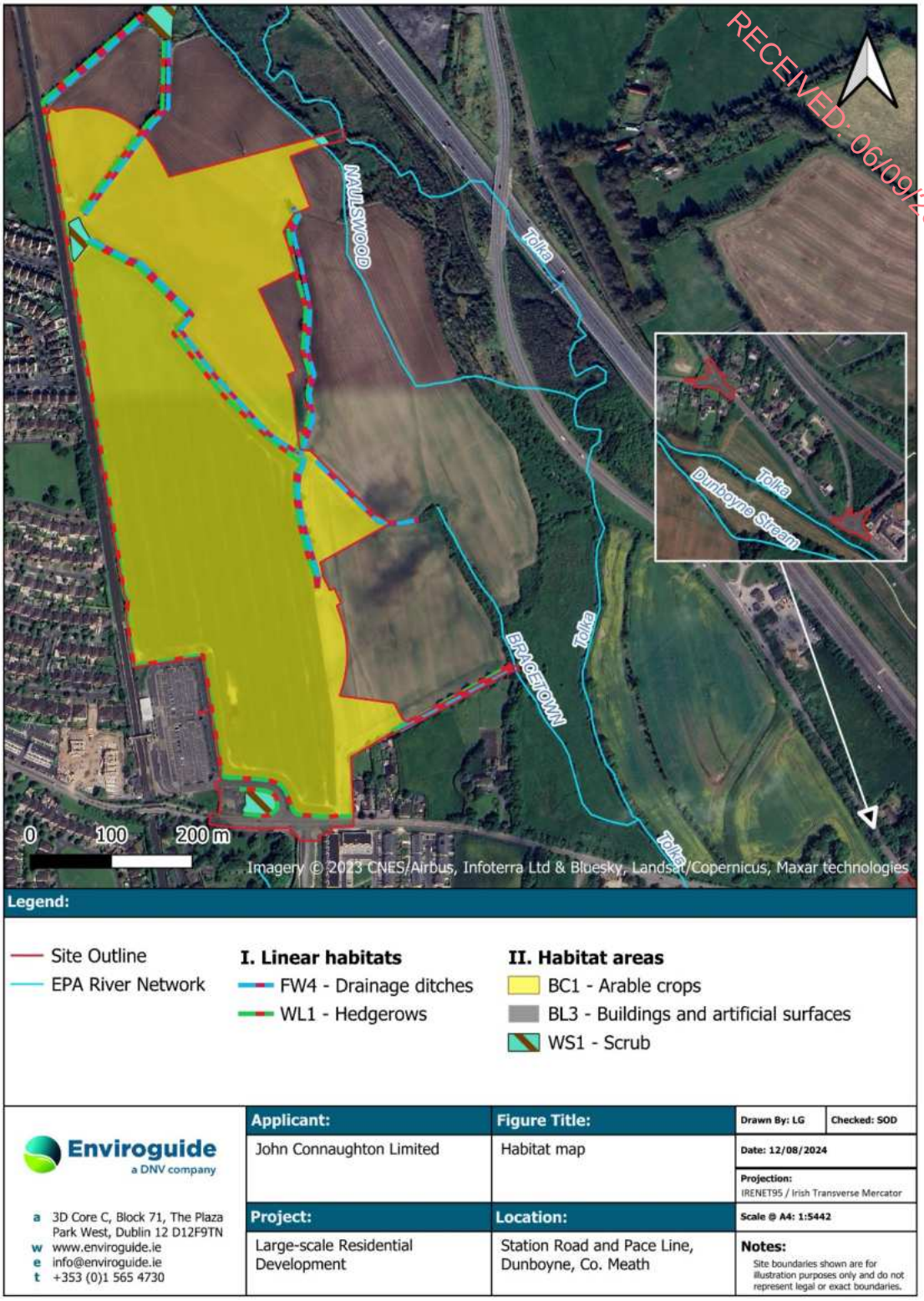

Figure 8-5 Map of habitats across the Proposed Development Site.

Figure 8-6 Satellite Imagery showing the historic route of the Naulswood Stream to the west of the Site as per the EPA waterbody shapefiles. This section of the route is no longer present (A) but was present in 2009 (B) (Source: QGIS/Google Earth).

8.6.3.1 Arable crops – BC1

Majority of the Site consisted of winter wheat (*Triticum aestivum*) crops at the time of the survey (Photograph 1). The areas of this habitat on the JCL lands are farmed year-round. It is not known if or when the fields were last given a rest year, or what their current fertilisation regime is.

8.6.3.2 Hedgerows – WL1 & Drainage Ditches (FW4)

The fields are split by mature hedgerows with dry drainage ditches underneath (Photograph 2). The habitat survey identified a variety of species within the hedgerows, including elder, hawthorn, common hogweed (*Heracleum sphondylium*), great willowherb (*Epilobium hirsutum*), bramble, thistle (*Cirsium sp.*), ash, nettle, wych elm (*Ulmus glabra*), ladys bedstraw (*Galium verum*), crabapple (*Malus sylvestris*) and dogrose (*Rosa canina*). The hedgerows were considered to be mature and in relatively good health.

The results of the Hedgerow Appraisal survey supported an assessment of the ecological value of the hedgerows as 'Medium to High' and 'High to Very High'. For further details on the hedgerow survey results, please see Appendix VI –Hedgerow Appraisal.

8.6.3.3 Scrub – WS1

At the north end of the Site, an area of dense scrub habitat was recorded at the junction of the two main hedgerows and the trainline on the western boundary of the Site (Photograph 3). This scrub was connected to the hedgerow habitat and contained similar species. An overgrown plot of land in the south of the Site is developing into scrub habitat and contained cotoneaster (*Cotoneaster sp.*) and butterfly bush (*Buddleia davidii*).

8.6.3.4 Buildings and artificial surfaces – BL3

This low biodiversity human-made habitat covered the hardstanding areas of road to the south of the Site.

8.6.3.5 Adjacent and Linked Habitats

8.6.3.5.1 Linked River Habitats

The Site is located east of the Naulswood and Bracetown streams, which are linked to the Proposed Development via a network of drainage ditches. These streams in turn are connected to the main channel of the Tolka river. All three are considered to have 'Poor' ecological status (EPA, 2024), and as such their current ecological value is likely to be relatively low. However, due to lack of dedicated surveys along these watercourses in relation to the Proposed Development to determine their current capacity to support notable flora and/or fauna, and in keeping with the County Development Plan policies on river protection, these river habitats are considered further in this assessment.

8.6.4 Species and Species Groups

The Proposed Development Site is located within the O04 10km grid square, and O04F and O04G 2km grid squares (NBDC, 2024). The desk study results for species and species groups are based on records within these grid squares as follows:

- Flora – 2km grid squares
- Bats – 2km grid squares
- Birds – 10km grid square
- Mammals – 10km grid square
- Other fauna – 2km grid squares

8.6.4.1 Flora

8.6.4.1.1 Rare and Protected Flora

The Site of the Proposed Development is located within the Ordnance Survey 2km Grid Squares O04F and O04G. Species records from the NBDC online database show these grid squares were studied for the presence of rare and/or protected species within the last 20 years. This database contained no records of protected flora within the last 20 years. The FPO Bryophytes database was also checked for rare and protected flora records within the vicinity of the Proposed Development, however no records for rare or protected bryophytes exist within 10km of the Proposed Development.

8.6.4.2.2 Invasive Species

There are no records for flora considered to be invasive within the grid squares which encompass the Site of the Proposed Development.

The only invasive floral species recorded at the Site during field surveys were Butterfly bush (*Buddleja davidii*), cotoneaster (*Cotoneaster sp.*) and sycamore (*Acer pseudeplatanus*).

Despite being classified as a *Medium* impact invasive species, sycamore has recently been nominated as a potential replacement for Ash (*Fraxinus excelsior*) due to the similar ecological requirements and ability to support similar species (Short and Hawe 2018). Sycamore is considered to be an invasive species due to its ability to outcompete native tree species, and its supposedly low contribution to local biodiversity by supporting fewer insect species than native tree species. However sycamore's invasiveness is considered to be more of an issue in some sensitive native woodland settings, and this species has been found to support relatively high numbers of lichen species, including rarer species, when compared to native tree species (Leslie, 2005). Sycamore is not considered to pose any risk of impacts at the Site of the Proposed Development and will be removed where required as per the Arborist's Tree Impact Plan.

A per the description given in TII (2020), butterfly bush has established itself as a problem plant in many countries where along watercourses, due to its shallow root system, it is frequently washed away, resulting in erosion of the riverbanks and downstream blockages. In Ireland, Buddleia must be considered an invasive species because of the damage it can cause to hard standings and structures, and to native biodiversity. Butterfly bush produces very large numbers of viable seeds, which are dispersed *via* wind and water. The seeds are relatively short-lived in the soil, rarely lasting longer than four years. The plant can also readily spread by producing roots, and ultimately new plants, where stem nodes come into contact with the ground. It can also spread by fragmentation of stems or roots.

Some cotoneasters are low impact non-native species that can become a nuisance plant if they become established. Cotoneasters represent a large species group of small trees that are evergreen or deciduous, and which produce bright red berries. The majority originate in eastern Asia and have become invasive in Ireland and elsewhere. Seeds are spread over great distances by birds who feed on the berries produced by cotoneasters, while dumping of garden waste can also lead to infestations (Boer, 2014).

8.5.2.2 Bats

8.6.4.2.1 Desk Study Results

A total of five bat species have been recorded within the relevant grid squares which encompasses the Site (Table 8-4).

SPECIES	GRID SQUARE	DATE OF LAST RECORD	DATABASE	DESIGNATION

Brown Long-eared Bat (*Plecotus auritus*)	O04f	02/05/2007	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Leisler's Bat (*Nyctalus leisleri*)	O04f	01/05/2014	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Natterer's Bat (*Myotis nattereri*)	O04F, O04G	02/05/2007	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Common Pipistrelle (*Pipistrellus pipistrellus*)	O04F	01/05/2014	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	O04F, O04G	02/05/2007	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)

Table 8-4 Records of bats for the surrounding 2km grid squares (O04F and O04G) associated with the Site from the NBDC.

The majority of the Proposed Development Site is located within 1km grid squares O0242 and O0241 (Figure 8-7). Grid square O0242 contains the largest proportion of the Site and has an overall Medium-High (36.11) suitability for bats. The suitability index for specific bat species within this 1km grid square is presented in Table 8-5. The landscape suitability index is high for six species of bats; soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auritus*), common pipistrelle (*Pipistrellus pipistrellus*), leisler's bat (*Nyctalus leislerii*), daubenton's bat (Myotis daubentonii) and the natterer's bat (*Myotis nattereri*).

BAT SPECIES	SUITABILITY INDEX (1KM GRID SQUARE)
Soprano pipistrelle *(Pipistrellus pygmaeus)*	46 (High)
Brown Longed-eared bat *(Plecotus auritus)*	47 (High)
Common pipistrelle *(Pipistrellus pipistrellus)*	53 (High)
Lesser horseshoe bat *(Rhinolophus hipposideros)*	0 (Low)
Leisler's bat *(Nyctalus leisleri)*	51 (High)
Whiskered bat *(Myotis mystacinus)*	30 (Medium-High)
Daubenton's bat *(Myotis daubentonii)*	38 (High)
Nathusius' pipistrelle (*Pipistrellus nathusii*)	16 (Low)
Natterer's bat *(Myotis nattereri)*	44 (High)

Table 8-5 Landscape Suitability Index for individual bat species within the Site as recorded for 1km grid square O0242. Those species that have been recorded in the NBDC database within the O04 10km grid square are highlighted in green.

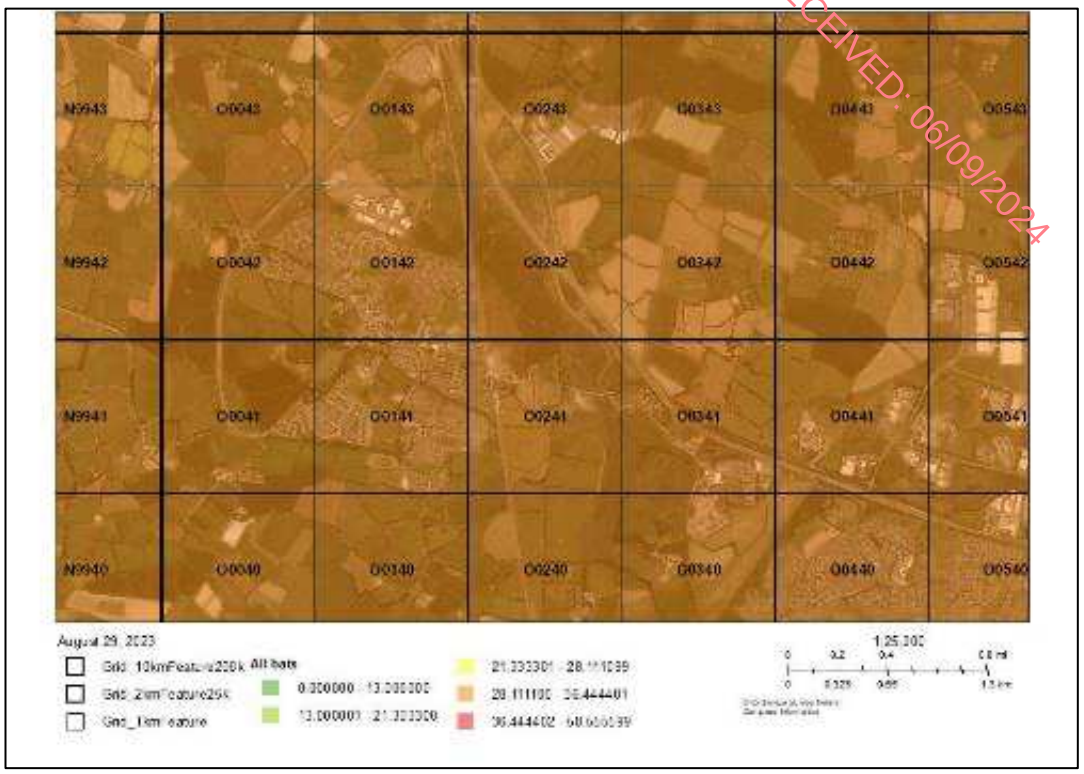

Figure 8-7 Bat Landscape Suitability (source: NBDC)

8.6.4.2.2 *Field Survey Results*

8.6.4.2.2.1 Bat Roost Assessment and Habitat Suitability

The linear features such as the treelines and hedgerows which bound the Site were assessed for bat roost potential and foraging/commuting suitability.

The treelines on-site were composed of a variety of species including birch, ash, elder and hawthorn. The trees within the treelines were considered to be of 'Low' bat roost potential, given the lack of PRFs. No PRFs were identified within the hedgerows across the Site.

The treelines and hedgerows within and surrounding the Site were considered to offer 'Moderate' foraging and commuting suitability to bats given the degree of connectivity of the Site to the surrounding landscape, particularly the Tolka River (Collins, 2016).

8.6.4.2.2.1 Bat Activity Surveys

See Appendix V for full bat survey metadata.

<u>2022 Dusk Transect Surveys</u>

13th of September 2022

During the bat activity survey at the Site, Leisler's Bat and common pipistrelle were recorded. Common pipistrelle was the most common species recorded and accounted for 82% of all records (Table 8-6). The majority of bat activity was associated with the vegetative features on Site (Figure 8-8). In particular, the surveyor noted several foraging and commuting bats utilising the treelines on-site. Several feeding buzzes were emitted from a soprano pipistrelle bat between 20:49 pm and 20:50pm. These feeding buzzes

were emitted from a single bat foraging in circles adjacent to the treeline to the east of the Site. Although the majority of bat activity was associated with the linear vegetative features of the Site, a Leisler's Bat was recorded commuting across open ground towards the centre of the Site at 20:00pm.

SPECIES	COMMON NAME	BAT PASSES
Nyctalus leisleri	Leisler's Bat	3
Pipistrellus pipistrellus	Common Pipistrelle	14

Table 8-6 Summary of bat activity recorded in September 2022 surveys (Non bat "noise" records removed).

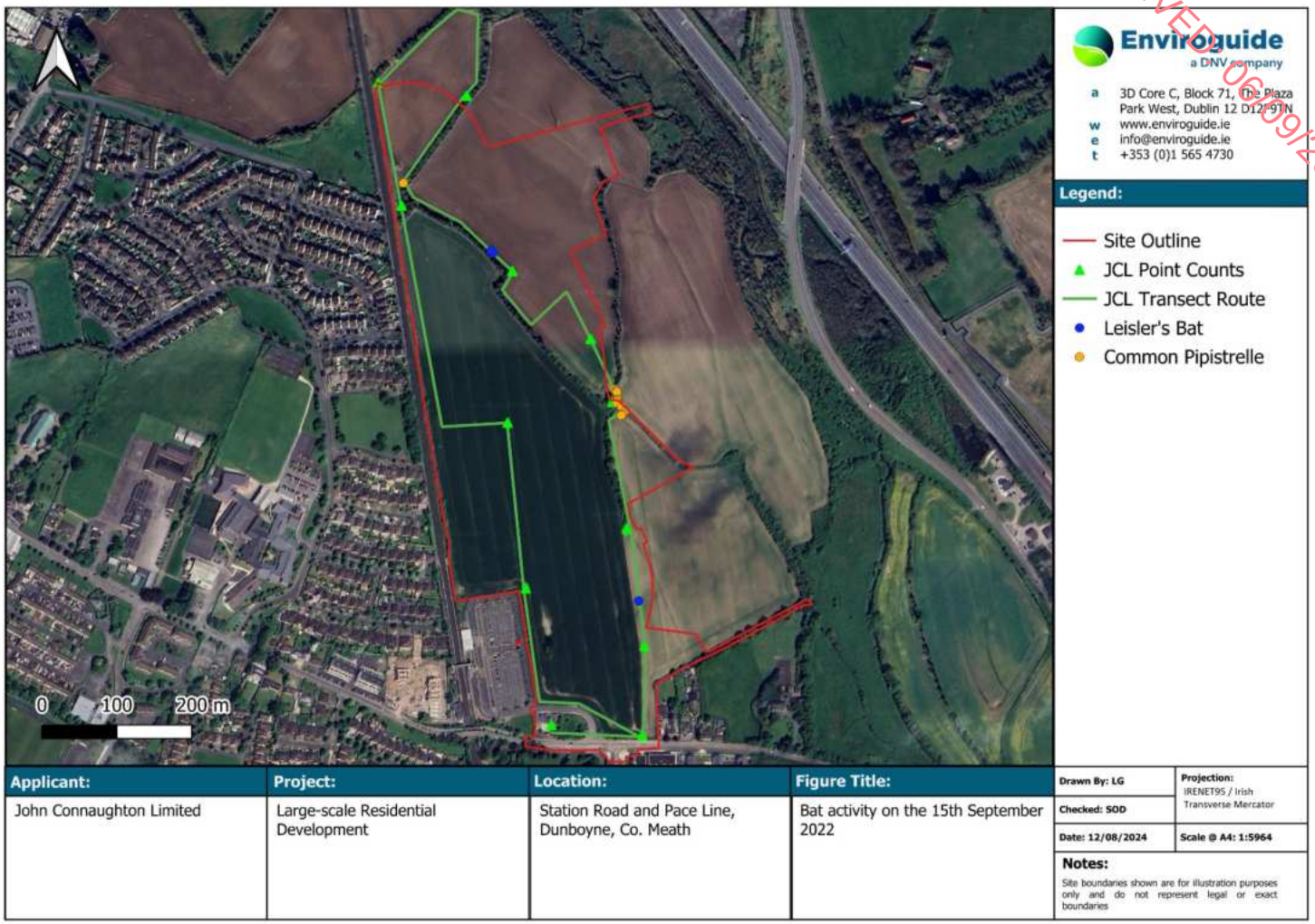

Figure 8-8 Bat survey results – 15th September 2022.

2023 Dusk Transect Surveys

Bat activity was spread throughout the Site across the 2023 surveys, with bats utilizing the Site for foraging and commuting. Foraging activity was concentrated along linear features such as hedgerows and treelines.

12th June 2023

Activity was largely focused in the north of the Site during the first survey on the 12th of June 2023 (Figure 8-9), with bats recorded along the network of hedgerows and their junctions. Leisler's bats were noted over the train station car park early in the survey (approx. 22:07) as the lights in the car park came on. There were a lot of insects noted along the hedgerows in the north of the Site with feeding activity recorded for common pipistrelle. Feeding buzzes were noted at the termination of the hedgerow in the east of the Site also. A total of 53 bat passes were recorded on this survey. Species distribution was relatively even. Leisler's bat (*Nyctalus leisleri*) (*n*=20) was the most frequently recorded species accounting for 38% of all bat passes. Common pipistrelle (*Pipistrellus pipistrellus*) (*n*=17) was the second most recorded species making up 32% of recorded bat passes, followed by soprano pipistrelle (*Pipistrellus pygmaeus*) (*n*=16) accounting for 30%. Bat passes and species composition for this survey are shown in Table 8-7 and Figure 8-9 respectively.

SPECIES	COMMON NAME	BAT PASSES
Pipistrellus pipistrellus	Common pipistrelle	17
Nyctalus leisleri	Leisler's bat	20
Pipistrellus pygmaeus	Soprano pipistrelle	16

Table 8-7 Summary of bat activity recorded on 12th of June 2023.

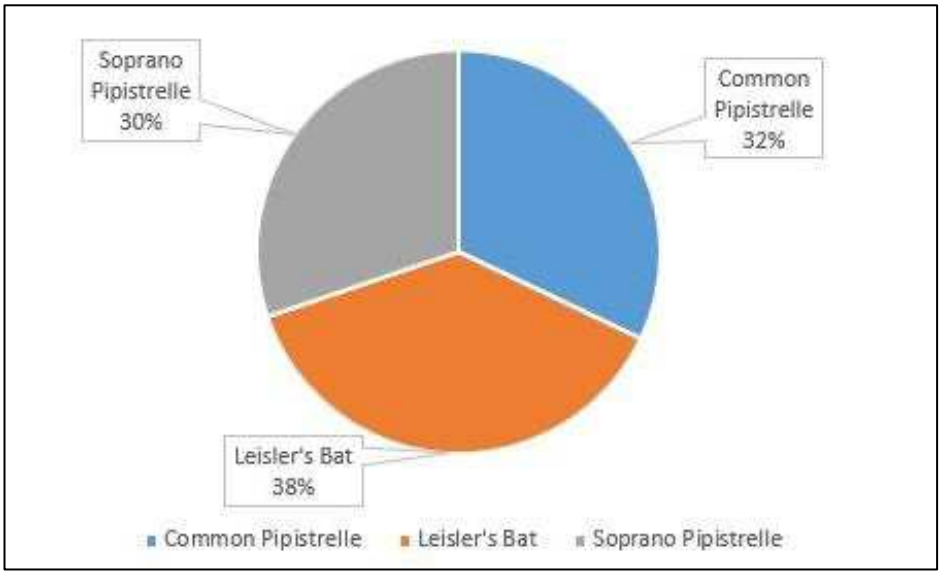

Figure 8-9 Species composition on the 12th of June 2023.

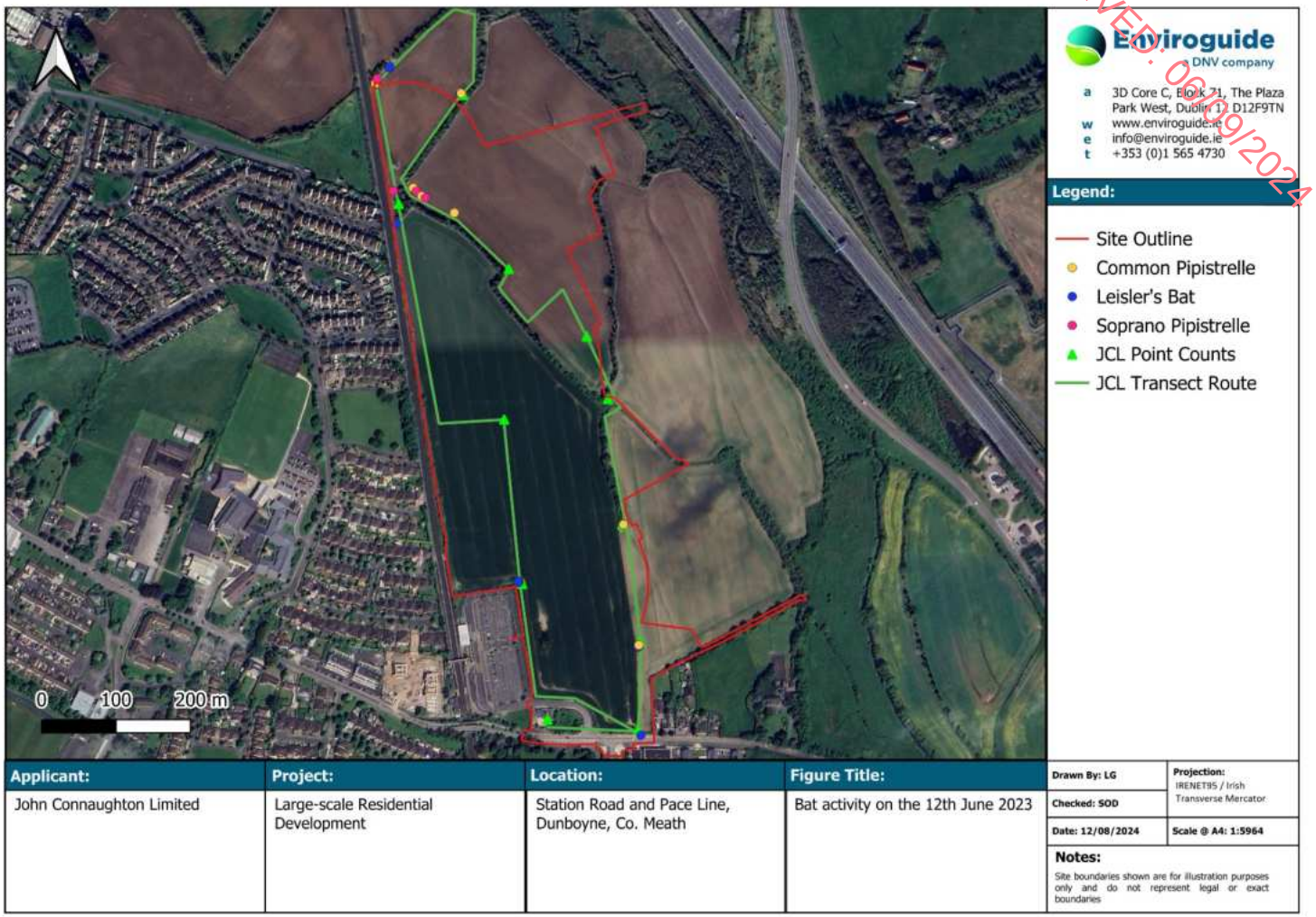

Figure 8-10 Bat activity at the JCL Lands on the 12th of June 2023

10th July 2023

Activity during the 10th of July survey was largely concentrated in the south of the Site, although bats were detected commuting and foraging along the hedgerows in the east and north also. A common pipistrelle was recorded foraging around a streetlamp (approx. 23:00) in the south by the roadside (Figure 8-12). Common pipistrelle (*n*=112) was the most frequently recorded bat species accounting for 99% of all bat passes. One instance of Leisler's bat (*n*=1) was recorded making up <1% of all bat passes. Bat passes and species compositions for this survey are shown in Table 8-8 and Figure 8-11, respectively.

SPECIES	COMMON NAME	BAT PASSES
Pipistrellus pipistrellus	Common pipistrelle	112
Nyctalus leisleri	Leisler's bat	1

Table 8-8 Summary of bat activity recorded on 10th of July 2023.

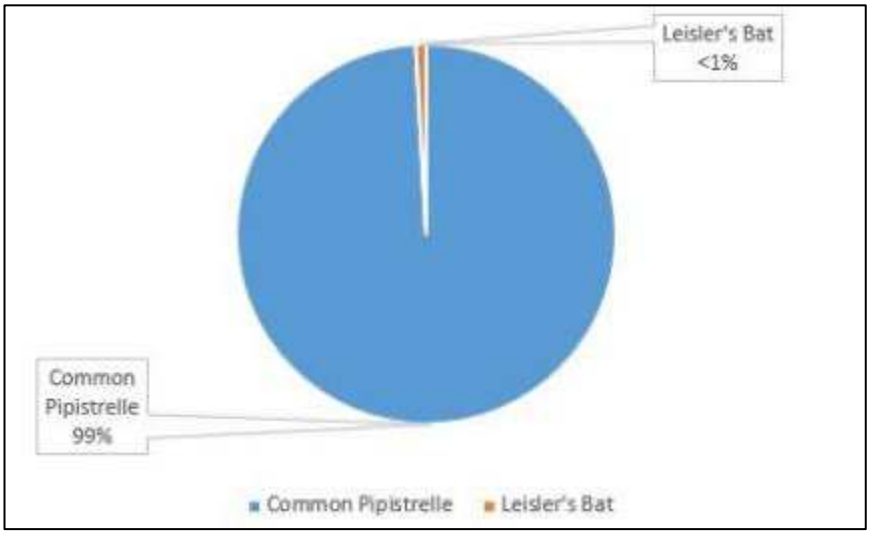

Figure 8-11 Species composition at the Site on the 10th of July 2023.

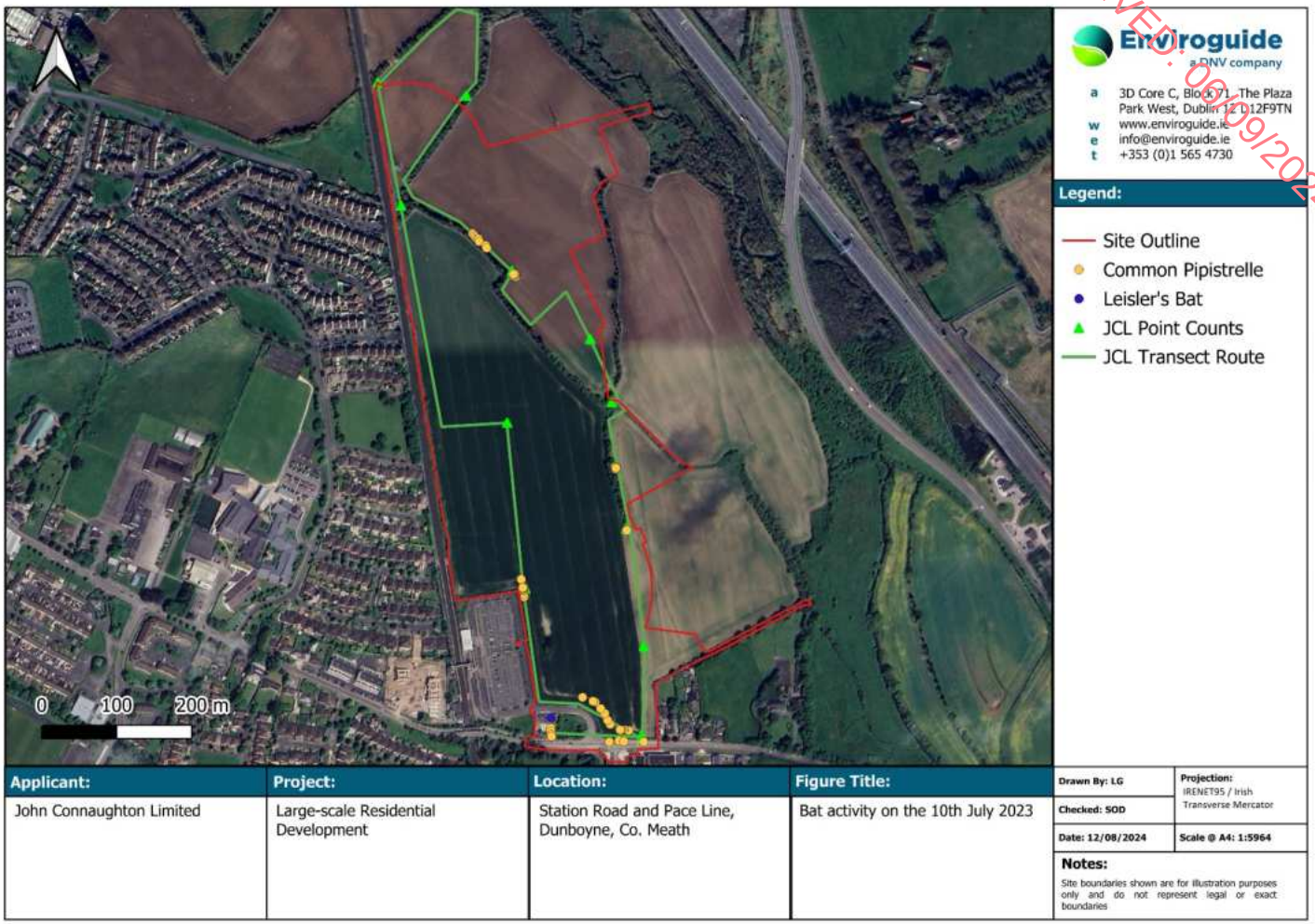

Figure 8-12 Bat activity on the 10th of July 2023

15th August 2023

Activity on the 15th of August was concentrated to the north and east of the Site (Figure 8-13). There was some bat activity recorded at the junction of hedgerows in the north of the Site; with bats noted to be commuting along the hedgerow running north-east. Otherwise very little bat activity was observed. A total of 30 bat passes were recorded on this survey. Soprano pipistrelle (*Pipistrellus pygmaeus*) (*n*=15) was the most frequently recorded species accounting for 50% of all bat passes. Common pipistrelle (*Pipistrellus pipistrellus*) (*n*=9) was the second most recorded species making up 30% of recorded bat passes, followed by Leisler's bat (*Nyctalus leisleri*) (*n*=6) accounting for 20%. Bat passes and species composition for this survey are shown in Table 8-9 and Figure 8-13, respectively.

SPECIES	COMMON NAME	BAT PASSES
Pipistrellus pipistrellus	Common pipistrelle	9
Nyctalus leisleri	Leisler's bat	6
Pipistrellus pygmaeus	Soprano pipistrelle	15

Table 8-9 Summary of bat activity recorded on 15th of August 2023.

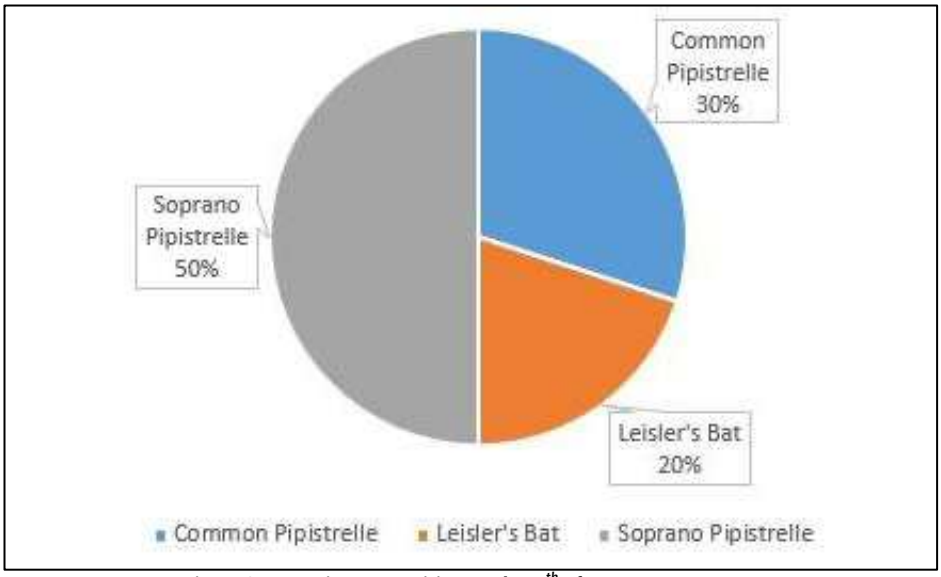

Figure 8-13 Species composition on the 15th of August 2023.

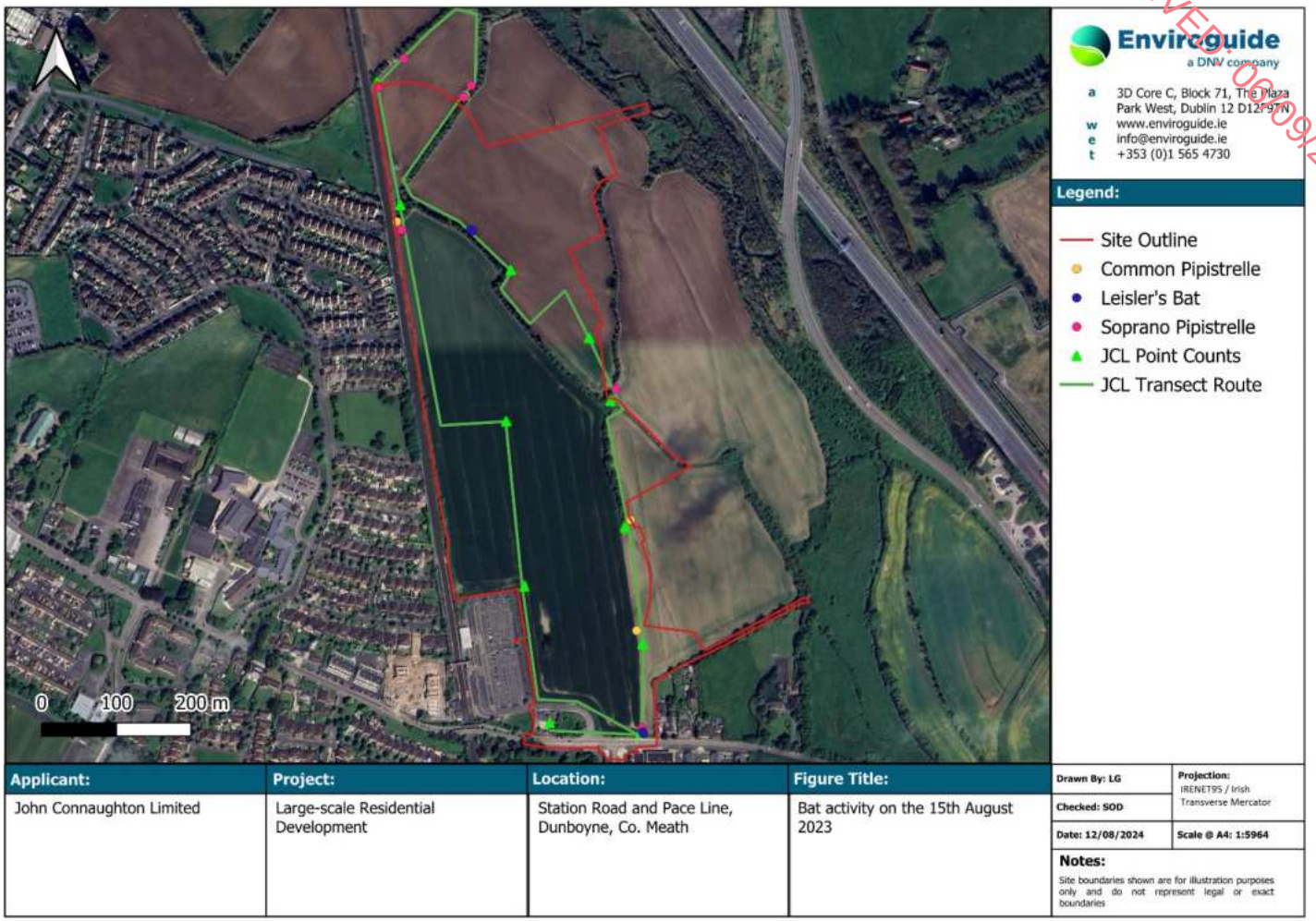

Figure 8-14 Bat activity on the 15th of August 2023.

8.6.4.2.3 Evaluation

Overall bat activity at the Site was largely associated with the hedgerows and treelines that run along the field boundaries (Figure 8-15). Common pipistrelle was the most commonly recorded species, with similar representation of both Leiser's and soprano pipistrelle across the surveys.

The levels of artificial lighting across the survey area were low with some lighting present within the Train station carpark in the south and along the roads in the north-west and south. Relatively low levels of activity were present across the large open arable fields, with bats tending to stick to the hedgerows, as would be expected due to their functions as insect prey resources, shelter and navigational aids. The Site therefore provides suitable unlit habitat for local bat populations.

The network of hedgerows and treelines across the Site are somewhat fragmented; in the west by the short, broken hedgerow along the trainline as it runs through the Site, and in the south-east where a prominent hedgerow has been truncated in the past to join to fields within the Site. Nevertheless, commuting and foraging activity was recorded, with bat activity following the existing hedgerow/treeline network across the Site, and likely linking up with the Tolka's riparian corridor in the north and east.

As such, based on the nature of the habitats present within the wider lands that contain the Site, and the levels of activity recorded over the course of the dusk transect surveys, the Site and associated fields are likely to have the capacity to support locally important populations of bats species protected under the Wildlife Act.

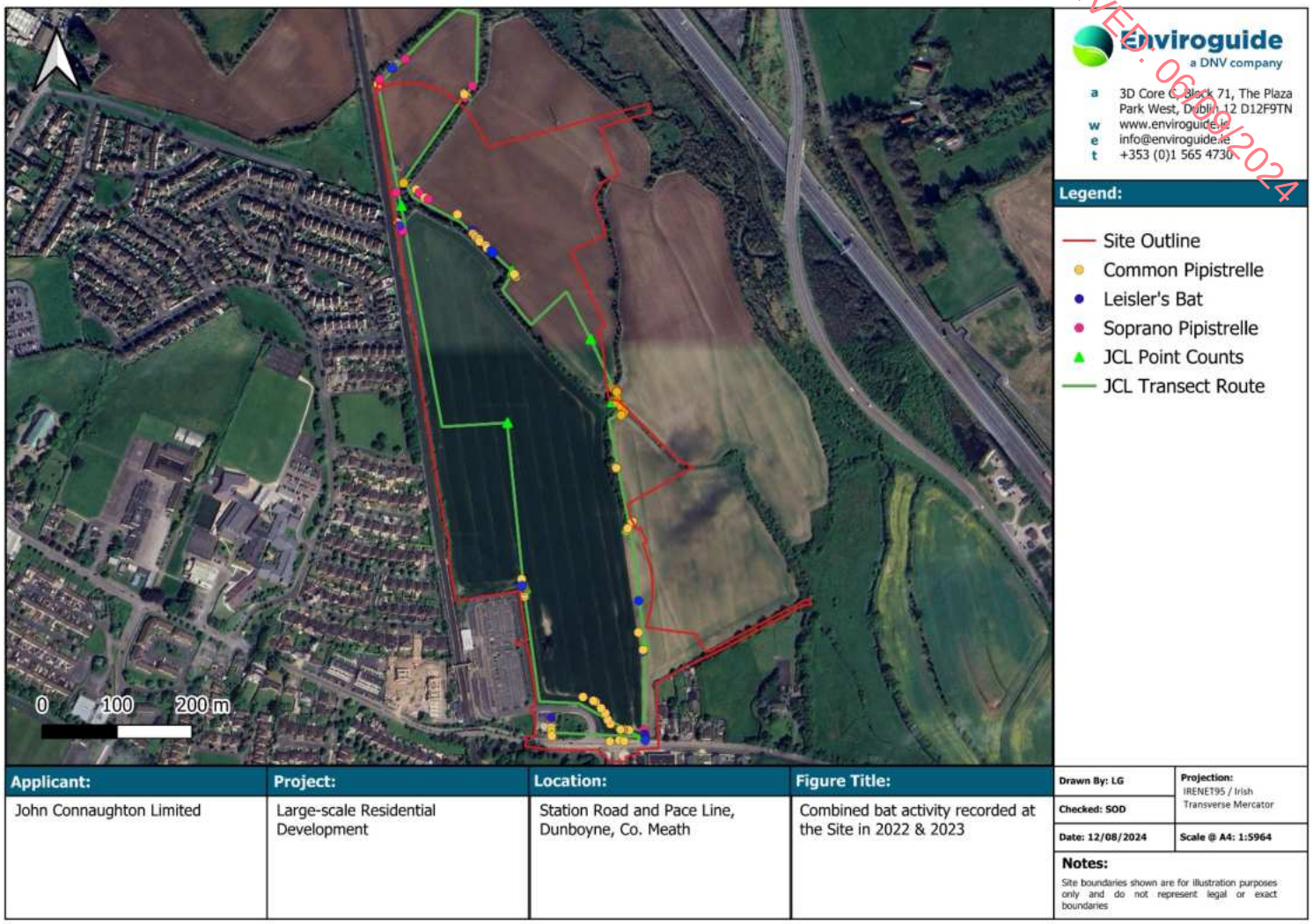

Figure 8-15 Combined bat activity recorded at the Site in 2022 and 2023.

8.5.2.3 Birds

8.6.4.3.1 Desk study Results

A total of 81 bird species have been recorded within the O04 10 km grid square. Of these, 25 are amber listed birds and 14 are red listed birds as identified on the '*Birds of Conservational Concern in Ireland 4*' (BoCCI 4) (Gilbert et al. 2021). Details of amber and red listed species are given in Table 8-10. Of the remaining species 41 are green listed and one, the common pheasant (*Phasianus colchicus*) is not included in BoCCI 4 due to being a relatively recent introduction to Ireland.

SPECIES	SCIENTIFIC NAME	DATE OF RECORD	BOCCI STATUS
Barn Swallow	*Hirundo rustica*	31/12/2011	Amber
Black-headed Gull	*Larus ridibundus*	31/12/2011	Amber
Brambling	*Fringilla montifringilla*	31/12/2011	Amber
Common Coot	*Fulica atra*	31/12/2011	Amber
Common Kingfisher	*Alcedo atthis*	31/12/2011	Amber
Common Linnet	*Carduelis cannabina*	07/01/2018	Amber
Common Starling	*Sturnus vulgaris*	31/12/2011	Amber
Eurasian Teal	*Anas crecca*	31/12/2011	Amber
Eurasian Tree Sparrow	*Passer montanus*	07/01/2018	Amber
European Greenfinch	*Carduelis chloris*	30/03/2023	Amber
Goldcrest	*Regulus regulus*	31/12/2011	Amber
Herring Gull	*Larus argentatus*	31/12/2011	Amber
House Martin	*Delichon urbicum*	25/04/2023	Amber
House Sparrow	*Passer domesticus*	07/01/2018	Amber
Lesser Black-backed Gull	*Larus fuscus*	31/12/2011	Amber
Mallard	*Anas platyrhynchos*	17/04/2023	Amber
Merlin	*Falco columbarius*	31/12/2011	Amber
Mew Gull	*Larus canus*	31/12/2011	Amber
Mute Swan	*Cygnus olor*	31/12/2011	Amber
Northern Wheatear	*Oenanthe oenanthe*	31/12/2011	Amber
Sky Lark	*Alauda arvensis*	31/12/2011	Amber

SPECIES	SCIENTIFIC NAME	DATE OF RECORD	BOCCI STATUS
Spotted Flycatcher	*Muscicapa striata*	31/12/2011	Amber
Swallow	*Hirundo rustica*	07/04/2023	Amber
Tufted Duck	*Aythya fuligula*	31/12/2011	Amber
Willow Warbler	*Phylloscopus trochilus*	31/12/2011	Amber
Barn Owl	*Tyto alba*	22/03/2023	Red
Common Kestrel	*Falco tinnunculus*	02/02/2023	Red
Common Snipe	*Gallinago gallinago*	31/12/2011	Red
Common Swift	*Apus apus*	25/05/2023	Red
Eurasian Curlew	*Numenius arquata*	31/12/2011	Red
Eurasian Woodcock	*Scolopax rusticola*	31/12/2011	Red
European Golden Plover	*Pluvialis apricaria*	03/01/2021	Red
Grey Wagtail	*Motacilla cinerea*	31/12/2011	Red
Meadow Pipit	*Anthus pratensis*	31/12/2011	Red
Northern Lapwing	*Vanellus vanellus*	31/12/2011	Red
Red Kite	*Milvus milvus*	12/03/2023	Red
Redwing	*Turdus iliacus*	04/04/2023	Red
Stock Pigeon	*Columba oenas*	31/12/2011	Red
Yellowhammer	*Emberiza citrinella*	25/02/2023	Red

Table 8-10 Details of amber and red listed bird species within the 10km grid square (O04) encompassing the Site.

8.6.4.3.2 Field Survey Results

8.6.4.3.2.1 Breeding Bird Surveys

The breeding bird surveys carried out at the Site in 2022, together with the ground-truthing surveys in 2023 and 2024, recorded a total of 33 species across the Site. Two of the species recorded are red listed, seven are amber listed, and all the rest are green listed species. All of the recorded species and whether they were considered likely breeders on the Site are outlined below in Table 8-11.

SPECIES	SCIENTIFIC NAME	BOCCI STATUS	DATE RECORDED ON	BREEDING ACTIVITY
Blackbird	*Turdus merula*	Green	14/06/2022 27/06/2022 28/06/2023	Probable breeder
Blackcap	*Sylvia atricapilla*	Green	14/06/2022 27/06/2022 28/06/2023	Possible breeder

SPECIES	SCIENTIFIC NAME	BOCCI STATUS	DATE RECORDED ON	BREEDING ACTIVITY
Blue tit	*Cyanistes caeruleus*	**Green**	14/06/2022 27/06/2022 28/06/2023	Confirmed breeding
Bullfinch	*Pyrrhula pyrrhula*	**Green**	14/06/2022 27/06/2022 28/06/2023	Possible breeder
Buzzard	*Buteo buteo*	**Green**	14/06/2022 27/06/2022	Possible breeder
Chaffinch	*Fringilla coelebs*	**Green**	14/06/2022 27/06/2022 28/06/2023	Possible breeder
Chiffchaff	*Phylloscopus collybita*	**Green**	14/06/2022 27/06/2022 28/06/2023	Possible breeder
Dunnock	*Prunella modularis*	**Green**	14/06/2022 27/06/2022 28/06/2023	Probable breeder
Little egret	*Egretta garzetta*	**Green**	14/06/2022	Flyby only
Goldcrest	*Regulus regulus*	**Amber**	14/06/2022 27/06/2022 28/06/2023	Confirmed breeding
Goldfinch	*Carduelis carduelis*	**Green**	14/06/2022 27/06/2022 28/06/2023	Confirmed breeding
Great tit	*Parus major*	**Green**	14/06/2022 27/06/2022 28/06/2023	Confirmed breeding
Greenfinch	*Chloris chloris*	**Amber**	14/06/2022 27/06/2022	Possible breeder
Hooded crow	*Corvus cornix*	**Green**	14/06/2022 27/06/2022 28/06/2023	Possible breeder
House sparrow	*Passer domesticus*	**Amber**	14/06/2022 27/06/2022 28/06/2023	Confirmed breeding
Jackdaw	*Corvus monedula*	**Green**	14/06/2022 27/06/2022 28/06/2023	Possible breeder
Lesser Redpoll	*Acanthis flammea*	**Green**	28/06/2023	Flyby only
Linnet	*Carduelis cannabina*	**Amber**	14/06/2022 27/06/2022 28/06/2023	Probable breeder
Magpie	*Pica pica*	**Green**	14/06/2022 27/06/2022 28/06/2023	Possible breeder
Reed Bunting	*Emberiza schoeniclus*	**Green**	14/06/2022 27/06/2022 28/06/2023	Possible breeder
Robin	*Erithacus rubecula*	**Green**	14/06/2022 27/06/2022 28/06/2023	Confirmed breeding

SPECIES	SCIENTIFIC NAME	BOCCI STATUS	DATE RECORDED ON	BREEDING ACTIVITY
Rook	*Corvus frugilegus*	**Green**	14/06/2022 27/06/2022 28/06/2023	Probable breeder
Song Thrush	*Turdus philomelos*	**Green**	14/06/2022 27/06/2022	Possible breeder
Sparrowhawk	*Accipiter nisus*	**Green**	28/06/2023	Possible breeder
Starling	*Sturnus vulgaris*	**Amber**	14/06/2022 27/06/2022 28/06/2023	Confirmed breeding
Stonechat	*Saxicola torquatus*	**Green**	14/06/2022 27/06/2022	Possible breeder
Swallow	*Hirundo rustica*	**Amber**	14/06/2022 27/06/2022 28/06/2023	Non-breeder
Swift	*Apus apus*	**Red**	28/06/2023	Non-breeder
Whitethroat	*Curruca communis*	**Green**	14/06/2022 27/06/2022	Confirmed breeding
Willow Warbler	*Phylloscopus trochilus*	**Amber**	14/06/2022 27/06/2022	Possible breeder
Woodpigeon	*Columba palumbus*	**Green**	14/06/2022 27/06/2022 28/06/2023	Probable breeder
Wren	*Troglodytes troglodytes*	**Green**	14/06/2022 27/06/2022 28/06/2023	Confirmed breeding
Yellowhammer	*Emberiza citrinella*	**Red**	14/06/2022 27/06/2022 28/06/2023	Probable breeder

Table 8-11 Bird Species recorded during breeding bird surveys carried out by Enviroguide at the Proposed Development Site during summer 2022 and 2023.

8.6.4.3.2.2 Non-breeding Bird Surveys

Wintering bird surveys were conducted at the Site of the Proposed Development in winter 2021/2022 by Scott Cawley Ltd. Surveys were conducted by Scott Cawley ecologists on the 27th October, 29th November, 15th December, 18th January, 10th February and 10th March.

These surveys recorded black-headed gull (*Chroicocephalus ridibundus*) and herring gull (*Larus argentatus*) as flyovers only, and golden plover (*Pluvialis apricaria*), and snipe (*Gallinago gallinago*) as flyover and on the Site itself. Black-headed gull and herring gull are 'Amber' listed birds, while snipe and golden plover are 'Red' listed species. A peak count flock of approx. 65 golden plover was recorded on one occasion on the 18th of January 2022. A peak count of 6 snipe were flushed at the Site on the 27th of October 2021.

Wintering bird surveys carried out outside of the Site's boundary, on the adjacent Carroll Estate (CE) lands to the east of the Site, were also conducted by Scott Cawley Ltd. over the winter of 2021/2022. A suite of passerine species were recorded using the CE site. However, no species considered to be SCI species associated with European sites were

recorded using the Site based on the results obtained by Enviroguide from Scott Cawley Ltd. The only waterbird species recorded during the winter bird surveys were flyovers; herring gull, black-headed gull and grey heron (*Ardea cinerea*), flying over the Site at heights of 15-30m.

8.6.4.3.3 Evaluation

8.6.4.3.3.1 Breeding birds

Considering the variety of bird species recorded both in the historical records and during the various field surveys, as well as the evidence of breeding along majority of the Site, it is considered that the Site contains resident and regularly occurring, locally important populations of breeding bird species protected under the Wildlife Act.

8.6.4.3.3.2 Non-breeding birds

Although two species of wintering waterbirds: snipe (peak count = 6) and golden plover (peak count = 65) were recorded using the Site, it is considered that the Site of the Proposed Development is not likely to be a significant *ex-situ* foraging resource for these species for the reasons detailed below.

As mentioned, a flock of golden plover were recorded using the Site. It is important to note that this was a single occurrence of 65 birds on one out of six monthly surveys conducted over the 2021/22 winter. However, it is acknowledged that plover species can be difficult to capture within surveys due to their highly mobile and transient nature, as explained later in this section.

Data on the population size of golden plover is available for the SPAs designated for their protection. As shown in Table 8-12 a flock of 65 birds equates to 3%, 3% and 3.5%, of the baseline golden plover populations of *North Bull Island SPA (004006)*, *Baldoyle Bay SPA (004016)* and *Malahide Estuary SPA (004025)* respectively (in the event that the entire flock originates from an individual SPA), with this being significantly below the 1% national threshold of 920 birds. As such, a single occurrence of a flock of 65 birds is not considered to be a significant indication of an important *ex-situ* site in itself.

SPECIES	PEAK COUNT	SPA SCI BASELINE WINTERING POPULATION COMPARISON[1]	1% OF NATIONAL[2]	1% OF INTERNATIONAL[3]
Golden Plover (*Pluvialis apricaria*)	65	**North Bull Island SPA – 2,033** Peak count recorded is 3% of SPA population.	920	12,000
		Baldoyle Bay SPA – 2,120 Peak count recorded is 3% of SPA population.		
		Malahide Estuary SPA – 1,843 Peak count recorded is 3.5% of SPA population.		

Table 8-12 Peak counts of golden plover recorded during 2021/22 winter bird surveys of the Site in comparison to SPA SCI baseline wintering populations, 1% of the national population and 1% of the international population

As discussed in a literature review carried out by Gillings and Fuller (1999), golden plover and other plover species are extremely mobile, widespread and unpredictable in their

[1] Baseline population estimates for SPAs are taken as the 'Baseline Period' provided in the Conservation Objectives Supporting Document (COSD) for each SPA or their Site Synopses if COSD unavailable (Baseline data in both is the 5-year mean peak for the period 1995/96 – 1999/00).

[2] Burke, B., Lewis, L., Fitzgerald, N., Frost, T., Graham, A., & T. Tierney, D. (2019). Estimates of waterbird numbers wintering in Ireland, 2011/12-2015/16. 41. 1-12.

[3] Wetlands International (2024) "Waterbird Populations Portal" (Waterbird Population Estimates (wetlands.org)).

choice of foraging habitats and locations during the winter. The authors also noted that flocks of plovers can be extremely localised across agricultural landscapes, often concentrated into an extremely small proportion of the available farmland at a given time. The authors describe that a typical pattern in many farmland areas seemed to be that birds use one or two particular areas of farmland to forage for several weeks and then move to another area, which may be several kilometres away. This would align with the recorded occurrence of golden plover on the Site on just one occurrence out of the six surveys conducted over the winter. In addition, Gillings and Fuller (1999) note that birds were observed not only to shift foraging locations within winters, but also to use different groups of fields in different winters; meaning that flocks of plover may use a particular feeding site one winter for a short period, and then not return to it for several years.

Given their highly mobile, widespread nature and their propensity to forage across a number of different areas within a given winter (and between different winters) it is highly unlikely that the Site of the Proposed Development is an important *ex-situ* foraging site for golden plover. It is noted that an abundance of analogous suitable *ex-situ* foraging habitat (i.e., pasture and arable fields) exists within proximity to the Site of the Proposed Development.

In addition, the AA Screening accompanying this submission under separate cover posits that "*when considering the loss of what is considered to be insignificant potential ex-situ habitat against the site-specific conservation objectives of the relevant SPAs for golden plover, i.e., relating to achieving long term stable or increasing SCI population trends, and ensuring no significant decrease in range, timing and intensity of use of areas by SCI species; the loss of habitat at the Site of the Proposed Development does not have the capacity to cause any likely significant effects on SCI populations of this species, nor any other species listed for the relevant SPAs assessed in the AA Screening, and thus, will not undermine the integrity of those SPAs in light of their conservation objectives.*"

Therefore, given the above reasoning, the infrequent usage of the Site by any notable non-breeding birds (including by insignificant numbers of golden plover), it is deemed that the site is unlikely to support regularly occurring or locally significant populations of any notable non-breeding birds. The wintering bird population is considered to be insignificant in the local context, particularly taking into consideration the availability of resources in the surrounding landscapes.

8.6.4.4 Mammals (excl. bats)

8.6.4.4.1 Desk Study Results

Records for terrestrial mammals were obtained from the NBDC online database. Table 8-13 lists these species, their date of last record and summarises their protected status/designation. In total, 15 mammal species (ten native and five non-native or invasive) were recorded within the O04 10km grid square which encompass the Proposed Development Site.

SPECIES	DATE OF RECORD	SOURCE	DESIGNATION
Native mammals			
European otter (*Lutra lutra*)	16/09/2004	Otter survey of Ireland 2004 & 2005	• Wildlife Act 1976 (as amended) • EU Habitats Directive – Annex II & IV

SPECIES	DATE OF RECORD	SOURCE	DESIGNATION
Pine marten (*Martes martes*)	04/06/2017	Mammals of Ireland 2016-2025	• Wildlife Act 1976 (as amended) • EU Habitats Directive – Annex V
Eurasian badger (*Meles meles*)	31/03/2023	Mammals of Ireland 2016-2025	• Wildlife Act 1976 (as amended)
Eurasian pygmy shrew (*Sorex minutus*)	11/04/2017	Mammals of Ireland 2016-2025	• Wildlife Act 1976 (as amended)
Red deer (*Cervus elaphus*)	31/12/2008	Deer of Ireland Database	• Wildlife Act 1976 (as amended)
West European hedgehog (*Erinaceus europaeus*)	28/06/2022	Hedgehogs of Ireland	• Wildlife Act 1976 (as amended)
Irish hare (*Lepus timidus subsp. hibernicus*)	12/05/2016	Mammals of Ireland 2016-2025	• Wildlife Act 1976 (as amended) • EU Habitats Directive – Annex V
Irish stoat (*Mustela erminea subsp. hibernica*)	22/06/2015	Atlas of Mammals in Ireland 2010-2015	• Wildlife Act 1976 (as amended)
Red fox (*Vulpes vulpes*)	24/01/2016	Mammals of Ireland 2016-2025	• Not legally protected
Wood mouse (*Apodemus sylvaticus*)	22/11/2017	Mammals of Ireland 2016-2025	• Not legally protected
Non-native and Invasive mammals			
House Mouse (*Mus musculus*)	12/12/2012	Atlas of Mammals in Ireland 2010-2015	• High Impact Invasive Species
Eastern Grey Squirrel (*Sciurus carolinensis*)	02/12/2014	Atlas of Mammals in Ireland 2010-2015	• High Impact Invasive Species • Regulation S.I. 477/2011 (Ireland)
Brown Rat (*Rattus norvegicus*)	16/06/2013	Atlas of Mammals in Ireland 2010-2015	• High Impact Invasive Species • Regulation S.I. 477/2011 (Ireland) – Offshore Islands Only
Sika Deer (*Cervus nippon*)	31/12/2008	Deer of Ireland Database	• High Impact Invasive Species

SPECIES	DATE OF RECORD	SOURCE	DESIGNATION
			• Regulation S.I. 477/2011 (Ireland) - Specified provisions of Regulations 49 and 50
European Rabbit (*Oryctolagus cuniculus*)	16/11/2017	Mammals of Ireland 2016-2025	• Medium Impact Invasive Species

Table 8-13 Records of terrestrial mammals (native and non-native) for the surrounding 10km (O04) grid square associated with the Site from the NBDC.

8.6.4.4.2 Field Survey Results

Rabbit (*Oryctolagus cuniculus*) burrows were observed along majority of the length of the field margin hedgerows within the Site. Several fox (*Vulpes vulpes*) scats were also noted along the hedgerows. Additionally, some evidence of mammals, likely fox, resting on the crop field was also observed, however as no hairs or scat were found in vicinity of these areas and thus it was not possible to confirm what species had been present.

A single badger (*Meles meles*) scat was recorded near the scrub beside the trainline on the Site on two occasions and is assumed to be a marginal territorial mark as no other evidence of badger activity was found at the Site.

The habitats at the Site are considered to be suitable for most of the native mammals listed in Table 8-13.

The records of invasive species may however also limit the potential for some of the native mammals listed. For instance, rabbit and Irish hare (*Lepus timidus subsp. hibernicus*) share similar resources, and typically a high abundance of rabbits can negatively impact on hare populations (Reid et al. 2007). A regularly occurring hare population is not deemed likely to occur at the Site based on habitats present and surveys to date.

8.6.4.4.3 Evaluation

The Site could potentially support resident and regularly occurring and locally important populations of some of the smaller native mammals such as hedgehog (*Erinaceus europaeus*), Irish stoat (*Mustela erminea subsp. Hibernica*), and pygmy shrew (*Sorex minutus*). These species are less likely to be recorded during walkover surveys due to their timid behaviours and small size, as well as the good protection provided by the field margin hedgerows and high crop fields.

None of the other historically recorded mammals are likely to occur within the Site or in its immediate vicinity. However, otter (*Lutra lutra*) may be present within the Tolka and its tributaries that are hydrologically linked to the Site, and as such will be assessed as part of an entity for 'Fauna of the Tolka'.

8.6.4.5 Other Fauna

8.6.4.5.1 Amphibians

Both Common Frog (*Rana temporaria*) and Smooth Newt have been recorded in the 10km (O04) grid square encompassing the Site of the Proposed Development.

No amphibians were recorded at the Site during the field surveys in 2022, 2023 and 2024. Additionally, no wet ditches or areas of long-term pooling water that may provide suitable breeding habitat for these species were noted during the field surveys. However, the

general fauna surveys in conjunction with the habitat surveys were carried out during August and September in 2022 and July in 2024, outside of the amphibian breeding season, which may have limited the detection potential of these species. Nonetheless, the lack of suitable habitat within the Site is likely to limit the potential population of any amphibians at the Site.

8.6.4.5.2 Common Lizard

No records of common lizard (*Zootoca vivipara*, formerly *Lacerta vivipara*) exist for the relevant 10km grid square. However, there is suitable habitat for this species within the Site of the Proposed Development, particularly along the hedgerows. The crop fields and their margins provide suitable hibernacula and locations for warming in the sun for this endothermic species. As no targeted surveys for common lizard were carried out, it is assumed under the precautionary principle that a locally important population of this species may be present at the Site.

8.6.4.5.3 Fish

There are no records of notable fish species within the relevant 10km grid square associated with the Site from the NBDC database. Additionally, there are no waterbodies within the Site of the Proposed Development that could support notable fish species such as salmonids or lampreys. However, the Site is hydrologically linked to the Tolka which is known to support a variety of salmonids, such as brown trout (*Salmo trutta*), as well as lamprey species (*Lampetra spp.*) and European eel (*Anguilla Anguilla*). As such, the fish assemblage of the Tolka will be considered as part of this assessment under the entity of 'Fauna of the Tolka'.

8.6.4.6 Protected and/or Notable Species Unlikely to Occur at the Site

Other notable and/or rare species and species listed on Annex IV of the Habitats Directive that were considered but that are unlikely to occur at the Site include:

Flora

- Marsh Saxifrage (*Saxifraga hirculus*) – Known populations only in Co. Mayo.
- Killarney Fern (*Vandenboschia speciosa*) – Nearest known populations in Co. Wicklow, not recorded at the Site, no suitably sheltered and moist habitats available.
- Slender Naiad (*Najas flexilis*) – A clear water, lowland lake species. No suitable habitat available at the Site or in linked habitats.

Fauna

- White-clawed Crayfish (*Austropotamobius pallipes*) – Not present in the Tolka, adjacent ditches and streams not considered suitable for this species due to low quality.
- Freshwater Pearl Mussel (*Margaritifera margaritifera*) – No known records from the Tolka, and the Tolka is not listed as a *M. margaritifera* sensitive area.
- Marsh Fritillary (*Euphydryas aurinia*) – No records from the 10km grid square O04. No suitable habitats on Site. Nearest record of its food plant, devil's bit scabious (*Succisa pratensis*), is from the Royal Canal approx. 3km south of the Site.
- Natterjack Toad (*Epidalea calamita*) – Distribution restricted to few coastal sites.
- Kerry Slug (*Geomalacus maculosus*) – Distribution restricted to south and west of Ireland.

8.6.5 Evaluation of Ecological Features

Habitats have been evaluated for their conservation importance, based on the NRA evaluation scheme (NRA, 2009b). Those selected as KERs are those which are evaluated to be of at least local importance (higher value).

Fauna that has the potential to utilise the Site and immediate area of the Proposed Development, or for which records exist in the wider area, have been evaluated for their conservation importance. This evaluation follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009b).

The impacts of the Proposed Development on the identified KERs are assessed in section 8.7.

SITE/ HABITAT/ SPECIES / SPECIES GROUP	EVALUATION	RATIONALE	KEY ECOLOGICAL RECEPTOR (KER)
Designated Sites			
Nationally designated sites (pNHAs, NHAs)	National Importance	These designated sites overlap with those SACs and SPAs assessed in the AA Screening and NIS prepared for this application (Enviroguide, 2024b & 2024c) and are designated for analogous reasons e.g., the same waterbird species, habitats etc. It is deemed that the AA Screening and NIS therefore have assessed the potential impact of the Proposed Development on these other designated sites assessed by proxy and no further assessment is required.	No
International sites (Ramsar)	International Importance		
Habitats			
Arable crops (BC1)	Local Importance (Lower Value)	Habitat covers majority of the Site but is abundant in local landscapes. Supports some local wildlife commuting and foraging.	No
Hedgerows (WL1), Scrub (WS1) & Drainage ditches (FW4)	Local Importance (Higher Value)	Natural field margin habitat with relatively high degree of naturalness and biodiversity in local context. Likely to be of importance to locally occurring wildlife as a commuting/foraging corridor, as well as nesting/breeding habitat for birds.	**Yes**
Buildings and artificial surfaces (BL3)	Local Importance (Lower Value)	Low ecological value habitat unlikely to support protected species at the Site.	No
Linked and Adjacent Habitats			
Linked River Habitats (Naulswood, Bracetown, Tolka)	County Importance	Likely to support otter, fish and a variety of aquatic fauna.	**Yes**
Flora			

SITE/ HABITAT/ SPECIES / SPECIES GROUP	EVALUATION	RATIONALE	KEY ECOLOGICAL RECEPTOR (KER)
Rare & Protected Flora	Local Importance (Lower Value)	No rare or protected flora were recorded during the field surveys. Unlikely to be present in notable numbers/densities.	No
Invasive Species	Negligible value	Limited stands that provide little ecological value on their own.	No
Native Fauna			
Bat Assemblage	Local Importance (Higher Value)	Suitable foraging and commuting habitats within the Site of the Proposed Development. Limited roosting opportunities within the Site, however based on activity surveys the Site is likely to have the capacity to support locally important populations of bats.	**Yes**
Breeding Bird Assemblage	Local Importance (Higher Value)	Variety of red, amber and green listed species recorded at the Site during breeding bird surveys, with confirmed breeding within hedgerows by some notable species (e.g., Yellowhammer).	**Yes**
Wintering Bird Assemblage	Local Importance (Lower Value)	Site is not considered to be a significant winter resource for wintering birds.	No
Badger	Local Importance (Higher Value)	Suitable hedgerow habitat present on Site and scat indicates occasional usage of the Site as part of wider territory.	**Yes**
Pine marten	Local Importance (Lower Value)	Limited suitable habitat at the Site for these mammals. Unlikely to be regularly present.	No
Red deer			
Irish hare			
Fox		Not legally protected in Ireland.	
Hedgehog	Local Importance (Higher Value)	Suitable habitats present for these small native mammals at the Site. In the absence of dedicated surveys, assumed Site has capacity to support locally important populations of any of these species. Assessed further under KER entity 'Small mammals'.	**Yes**
Pygmy shrew			
Irish stoat			
Wood mouse			
Amphibians	Local Importance (Lower Value)	No suitable habitats for this species were present at the Site, and as such	No

SITE/ HABITAT/ SPECIES / SPECIES GROUP	EVALUATION	RATIONALE	KEY ECOLOGICAL RECEPTOR (KER)
		any potential occurrences are considered to be incidental.	
Common lizard	Local Importance (Higher Value)	Suitable habitats for this species are present along field margins and drainage ditches. In the absence of targeted surveys, assessed for impacts under the precautionary principle.	**Yes**
Fauna of the Tolka: Otter Fish assemblage	Local Importance (Higher Value)	No suitable habitat is present within the Site, however, may be present in the vicinity of the Proposed Development within the Tolka, which is hydrologically linked to the Site.	**Yes**

Table 8-14 below summarises the evaluation rating assigned to each ecological feature and the rationale behind these evaluations is also provided.

SITE/ HABITAT/ SPECIES / SPECIES GROUP	EVALUATION	RATIONALE	KEY ECOLOGICAL RECEPTOR (KER)
Designated Sites			
Nationally designated sites (pNHAs, NHAs)	National Importance	These designated sites overlap with those SACs and SPAs assessed in the AA Screening and NIS prepared for this application (Enviroguide, 2024b & 2024c) and are designated for analogous reasons e.g., the same waterbird species, habitats etc. It is deemed that the AA Screening and NIS therefore have assessed the potential impact of the Proposed Development on these other designated sites assessed by proxy and no further assessment is required.	No
International sites (Ramsar)	International Importance		
Habitats			
Arable crops (BC1)	Local Importance (Lower Value)	Habitat covers majority of the Site but is abundant in local landscapes. Supports some local wildlife commuting and foraging.	No
Hedgerows (WL1), Scrub (WS1) & Drainage ditches (FW4)	Local Importance (Higher Value)	Natural field margin habitat with relatively high degree of naturalness and biodiversity in local context. Likely to be of importance to locally occurring wildlife as a commuting/foraging corridor, as well as nesting/breeding habitat for birds.	**Yes**

SITE/ HABITAT/ SPECIES / SPECIES GROUP	EVALUATION	RATIONALE	KEY ECOLOGICAL RECEPTOR (KER)
Buildings and artificial surfaces (BL3)	Local Importance (Lower Value)	Low ecological value habitat unlikely to support protected species at the Site.	No
Linked and Adjacent Habitats			
Linked River Habitats (Naulswood, Bracetown, Tolka)	County Importance	Likely to support otter, fish and a variety of aquatic fauna.	**Yes**
Flora			
Rare & Protected Flora	Local Importance (Lower Value)	No rare or protected flora were recorded during the field surveys. Unlikely to be present in notable numbers/densities.	No
Invasive Species	Negligible value	Limited stands that provide little ecological value on their own.	No
Native Fauna			
Bat Assemblage	Local Importance (Higher Value)	Suitable foraging and commuting habitats within the Site of the Proposed Development. Limited roosting opportunities within the Site, however based on activity surveys the Site is likely to have the capacity to support locally important populations of bats.	**Yes**
Breeding Bird Assemblage	Local Importance (Higher Value)	Variety of red, amber and green listed species recorded at the Site during breeding bird surveys, with confirmed breeding within hedgerows by some notable species (e.g., Yellowhammer).	**Yes**
Wintering Bird Assemblage	Local Importance (Lower Value)	Site is not considered to be a significant winter resource for wintering birds.	No
Badger	Local Importance (Higher Value)	Suitable hedgerow habitat present on Site and scat indicates occasional usage of the Site as part of wider territory.	**Yes**
Pine marten	Local Importance (Lower Value)	Limited suitable habitat at the Site for these mammals. Unlikely to be regularly present.	No
Red deer			
Irish hare			
Fox		Not legally protected in Ireland.	

SITE/ HABITAT/ SPECIES / SPECIES GROUP	EVALUATION	RATIONALE	KEY ECOLOGICAL RECEPTOR (KER)
Hedgehog	Local Importance (Higher Value)	Suitable habitats present for these small native mammals at the Site. In the absence of dedicated surveys, assumed Site has capacity to support locally important populations of any of these species. Assessed further under KER entity 'Small mammals'.	**Yes**
Pygmy shrew			
Irish stoat			
Wood mouse			
Amphibians	Local Importance (Lower Value)	No suitable habitats for this species were present at the Site, and as such any potential occurrences are considered to be incidental.	No
Common lizard	Local Importance (Higher Value)	Suitable habitats for this species are present along field margins and drainage ditches. In the absence of targeted surveys, assessed for impacts under the precautionary principle.	**Yes**
Fauna of the Tolka: Otter Fish assemblage	Local Importance (Higher Value)	No suitable habitat is present within the Site, however, may be present in the vicinity of the Proposed Development within the Tolka, which is hydrologically linked to the Site.	**Yes**

Table 8-14 Ecological Evaluation of ecological features relating to the Site of the Proposed Development. Those recognised as KERs are highlighted in green.

8.7 Ecological Impact Assessment

A total of seven distinct KERs were identified in the preceding sections. The identified KERs are summarised below under headings used through the remainder of this Chapter.

- Hedgerows and Scrub
- Linked River Habitats:
  - Naulswood
  - Bracetown
  - Tolka
- Bats
- Breeding Birds
- Badger
- Small mammals
  - Hedgehog
  - Pygmy shrew
  - Irish stoat
  - Wood mouse
- Common lizard
- Fauna of the Tolka
  - Otter
  - Fish assemblage

8.7.1 Avoidance and Mitigation Embedded in Project Design

The Proposed Development includes several embedded design features that may act to avoid or mitigate negative impacts that would likely occur in the absence of these features. However, as opposed to typical mitigation measures, the implementation of these features is integral to the design and completion of the Proposed Development, and as such the impact assessments are performed with consideration of these features as integrated parts of the Proposed Development. All considered embedded design features that may act to mitigate negative impacts on local ecology and environment are listed in Table 8-15.

EMBEDDED DESIGN FEATURE	AVOIDANCE / MITIGATION POTENTIAL
SUDS: • Wet swales • Permeable pavement • Green roofs • Attenuation systems and ponds • Petrol interceptors • Bioretention and rain gardens • Tree pits • Silt traps	The SUDS features included in the Project Design will ensure the surface water discharge from the Proposed Development is reduced to greenfield runoff rates and harmful chemicals (e.g., hydrocarbons) are intercepted prior to release to local surface water drains and networks. These features will be implemented as part of the surface water drainage design.
Lighting Design • The scheme has been designed so that lux levels along the vegetated boundaries and the main road of the Site have been minimised to 1 lux wherever feasible –	The lighting scheme for the Proposed Development has been designed with input from Enviroguide to ensure it is sensitive to local wildlife usage of the Site and the areas around the Site.

particularly along the western boundary. • Lux levels within the open space areas have been minimized and limited to less than 1 lux for the most part.	
Landscape Plan • Extensive planting of hedgerows, wooded areas and ornamental planting within the Site.	The variety of habitat types and native planting will offset the loss of habitats to facilitate the Proposed Development.

Table 8-15 Embedded design features and their potential to act to avoid or mitigate negative impacts on the local ecology and environment.

8.7.2 Construction Phase

8.7.2.1 Impacts on Habitats and Flora

8.7.2.1.1 Hedgerows, Drainage ditches and Scrub

During Construction Phase, sections of the hedgerows, drainage ditches and scrub within the Site will be lost to facilitate the Proposed Development. These habitats currently provide a relatively continuous ecological corridor through the fields of the Site, providing commuting, foraging and resting places for local wildlife – both volant and non-volant.

The Landscape Plan provides for extensive planting across the Site in the form of woodland copses, formal clipped hedges, ornamental shrub and groundcover planting, woodland planting and native hedgerows. The existing hedgerow along the western boundary, backing onto the trainline, will be enhanced where necessary to provide a continuous green corridor. This hedgerow will also act to limit the light spill onto the trainline, which is likely to currently support commuting bats due to darkness and the surrounding already existing gardens.

Therefore, once the proposed landscape plan is taken into account, the loss of parts of the existing linear habitats and their functionality as an ecological corridor as a result of the Proposed Development is considered to have a potential *negative, short-term-medium term, moderate* impact at a *local* scale, with this impact decreasing to *neutral* as the new and enhanced hedgerow planting establishes. There will be a net increase in hedgerows and arboreal habitats at the Site as a result of the Proposed Development.

Additionally, where retained areas of these habitats are located near or within the Construction Site, there is a risk of damage to the roots and overground growths of trees and hedgerow species from construction activity. This represents a potential *negative, short-term, moderate* impact at a *local* scale.

8.7.2.1.2 Linked River Habitats – Naulswood, Bracetown, and Tolka

Due to the risk of water quality impacts in the absence of mitigation on the drainage ditches on Site, there is a slight likelihood of pollutants reaching the nearby streams and eventually the Tolka. The potential impact is considered to be *negative, short-term, slight* at a *local* scale in the absence of appropriate mitigation and surface water protection measures.

8.7.2.1.3 All habitats

Although the extent of invasive floral species at the Site was considered to be relatively small, there exists a risk of spreading butterfly bush within the Site and offsite during site

clearance of vegetation. Where cleared areas are not replanted or developed on within the same botanical season, there is high potential for resprouting of the invasive species at the Site. Additionally, construction vehicles and workers may inadvertently spread invasive species within the Site and/or to the surrounding landscapes on e.g. wheels or boots if driving or walking over cuttings and seeds. As such, in the absence of proper biosecurity measures, this risk represents a potential *negative, long-term, moderate* impact on a *local* scale.

8.7.2.2 Impacts on Native Fauna

8.7.2.2.1 Bats

The loss of linear habitats at the Site has the potential to have a negative impact on bat foraging and commuting through the Site while the new hedgerows are not yet planted and established. Additionally, Construction Phase lighting could potentially disrupt normal foraging and commuting routes, as most bat species avoid strongly lit areas when active. If construction lighting is directed to the retained hedgerows, it is possible for the illumination to disrupt normal commuting routes of local bats. As such, in the absence of precaution, this impact to bats represents a potential *negative, short-term, moderate* impact on the *local* bat assemblage.

No significant PRFs were identified within the hedgerows on the Site. However, adverse weather conditions may alter the status of trees at the Site that are due for removal. In this event, there exists potential risk of injury and/or death to bats potentially present in a tree being felled. This represents a *negative, short-term, slight* impact at a *local* scale in the absence of mitigation.

8.7.2.2.2 Breeding Birds

Several bird species were recorded as potential breeders within the habitats at and in the vicinity of the Site, with red listed yellowhammer also considered as a probable breeder at the Site. Should vegetation be cleared as part of the Construction Phase during the breeding bird season (March 1st to August 31st); there is the potential for direct mortality to bird species and the destruction of nests. This would be in contravention of the Wildlife Act 1976 (as amended) which provides protection to breeding bird species and their nests and young. Therefore, in the absence of any mitigation or precaution, this risk represents a potential *negative, short-term, significant* impact on breeding birds at a *local* scale.

The increased human presence, noise and dust levels associated with the Construction Phase of the Proposed Development may have the potential to cause disturbance impacts to local bird populations, particularly any breeding birds within the hedgerows and treelines at the Site. There is also potential for disturbance from lighting associated with the Construction Phase of the Proposed Development, as lighting may need to be left on over-night to provide security for plant and materials stored at the Site. Considering the above, and in the absence of appropriate Site management and mitigation, disturbance from Construction-related increases in noise, dust and lighting is considered to have the potential to cause *negative, short-term, slight* impacts on *local* bird populations.

The short-term loss of continuous linear habitats is unlikely to severely impact on the breeding bird assemblage, and as such the loss of habitat to facilitate the Proposed Development is considered to be *imperceptible*.

8.7.2.2.3 Small Mammals

The loss of sections of hedgerows and scrub within the Site could lead to a loss of suitable nesting and resting habitat for small mammals (i.e., hedgehog, pygmy shrew, Irish stoat). In addition, the breaks caused in the continuity of the linear habitats could disrupt commuting and foraging behaviours of these species, leading to a magnified impact until

the newly planted hedgerows under the Landscape Plan have been established. As such, the loss of habitats is considered to have a potential *negative, short-term, moderate* impact on small mammals at a *local* scale.

Additionally, Construction Phase activities such as vegetation removal and inappropriate storage of materials (e.g., plastic sheeting) could place small mammals present at the Site at risk of injury or death. In the absence of precautionary mitigation measures this risk represents a potential *negative, short-term, moderate* impact on *locally* occurring small mammals at the Site.

8.7.2.2.4 Badger

No badger setts were present on Site at the time of the Site surveys. However, badgers could take up residence at the Site between the time of the mammal surveys that informed this Chapter and the commencement of works on Site. Should a sett be present when works commence badgers could be subject to disturbance impacts as a result of construction activity. The above could result in *negative, short-term, significant* impacts to badgers at the *Local* scale, in the absence of mitigation.

8.7.2.2.5 Common Lizard

During the Construction Phase, vegetation clearance may place lizards potentially present at risk of injury and mortality. Additionally, lizards can also get caught in inappropriately stored materials (e.g., plastic sheeting) which can cause injury or death. In the absence of any mitigation or precaution, this risk represents a potential *negative, short-term, slight* impact on the common lizard at a *local* scale.

8.7.2.2.6 Fauna of the Tolka

There is potential for negative impacts on fauna within the Tolka (i.e., otter and fish), due to the works which will be undertaken as part of the Proposed Development. Negative impacts could result from water quality deterioration due to surface water run-off from the Site during Construction via the surface water network and the drainage ditches. Potential pollutants could include silt, hydrocarbons, cementitious material and other chemicals used in construction. The pollution of water and consequent potential impact on fish species has the potential to affect otter by reducing prey availability within the linked river habitats (i.e., Naulswood, Bracetown, and Tolka). Due to distance between the Site and the linked river habitats, the risk of water quality deterioration is deemed relatively low, and therefore the potential impact on the fauna within the Tolka is considered *negative, short-term, slight* at the *local* scale in the absence of suitable mitigation.

8.7.3 Operational Phase

8.7.3.1 Impacts on Habitats and Flora

No impacts envisaged.

8.7.3.2 Impacts on Native Fauna

8.7.3.2.1 Bats

It is noted that the most common species recorded within the Proposed Development Site i.e., Leisler's bat, soprano pipistrelle and common pipistrelle bat are some of the least sensitive species to artificial light spill, and are recorded in towns and cities across Ireland (Roche *et al., 2014*). Nevertheless, Operational Phase lighting could potentially have a negative impact on local bat populations, as most bat species avoid strongly lit areas when foraging and/or commuting. However, the lighting plan for the Proposed Development shows low levels (1.0 to 3.0 lux) of light spill at the retained and enhanced hedgerows to the west of the Proposed Development, as well as within majority of the planted open spaces. The hedgerows themselves, after a period of establishment, are

likely to provide screening from light to the far side of the hedgerows, thus providing a relatively dark corridor for commuting and foraging bats and other wildlife. Therefore, considering there is likely to be a slight increase in baseline lighting levels along ecological corridors within the Site, the potential impact from Operational Phase lighting is considered to be *negative, long-term/permanent, moderate* on locally occurring bats.

8.7.3.2.2 Breeding Birds

The Proposed Development will see the planting of a variety of native tree and hedgerow species within the Proposed Development Site as part of the landscaping plan. In the absence of careful consideration of the species mix used, and the management approach, any new native hedgerows may prove less suitable for the current bird assemblage at the Site. This is considered to have a potential *negative, long-term, moderate* impact on the *local* bird assemblage.

Lighting from the Proposed Development may impact on breeding bird success. The current baseline level of light is very low to completely dark along the existing hedgerows, and it is anticipated that some increase in lighting along the retained and newly planted hedgerows is unavoidable as a result of the Proposed Development. However, the lighting plan for the Proposed Development shows low levels (1.0 - 3.0 lux) of light spill at the proposed hedgerows and wooded areas within the Site. The hedgerows themselves, after a period of establishment, are likely to provide screening from light to the far side of the hedgerows, thus providing a relatively dark habitat on at least one side of the new hedgerows. As such, the overall impacts on breeding birds as a result of the Operational Phase lighting is considered to be *negative, long-term, slight* at a *local* scale.

The Proposed Development is residential in nature and entails low-rise housing and apartment blocks with max building heights of 6-storeys in height (Blocks A-C). No significant risk of bird-building collisions is therefore envisaged.

8.7.3.2.3 Small Mammals

The Operational Phase use of the Proposed Development will see an increase in baseline vehicular activity at the Site, and could place small mammals at a heightened risk of accidental death or injury from collisions with vehicles. This risk is magnified for nocturnal species such as hedgehog due to limited visibility at night and their small size. However, the road design includes a number of traffic calming features which will limit the speed of vehicles travelling on the roads, which in turn will reduce the risk of collisions with wildlife. Therefore, the risk of collisions represents a potential *negative, long-term, slight* impact on *local* small mammal populations.

Operational Phase lighting may also reduce available habitats for small mammals at the Site, by affecting their commuting and foraging activity. However, the lighting plan interferes minimally with the boundary habitats at the Site and so this is considered to be a *negative, long-term, imperceptible* impact on *locally* occurring mammals.

8.7.3.2.4 Common Lizard

No potential impacts (positive or negative) on locally occurring lizards were identified as a result of the Operational Phase of the Proposed Development. As such, any impacts on any potentially present lizards are considered to be *imperceptible*.

8.7.3.2.5 Fauna of the Tolka

The embedded measures in the design of the surface water network (i.e., SUDS) ensure that no potential impacts on the Tolka and its associated fauna is likely to occur as a result of the operation of the Proposed Development. Therefore, any impacts on the fauna within the Tolka are considered to be *imperceptible*.

8.7.4 Do Nothing Impact

If the Proposed Development was not to go ahead, the Site would remain in its current condition and likely continue to be farmed for crops. The hedgerows along the field margins would continue to mature and support locally occurring fauna and flora. The small stands of butterfly bush within the Site may spread to adjoining lands, however due to the intensive farming of the fields they are most likely to spread along the margins and hedgerows habitats. It is not anticipated that the ecological condition of the Site would deteriorate or improve significantly should the Proposed Development not go ahead.

8.7.5 Cumulative Impacts

8.7.5.1 Relevant Policies and Plans

The local policies and plans detailed in Appendix I were reviewed and considered for possible in-combination effects with the Proposed Development. Each of these plans has undergone AA, and where potential for likely significant effects has been identified (e.g., in the case of the Meath County Development Plan), an NIS has been prepared which identifies appropriate mitigation. As such, it is considered that the plans and policies listed will not result in in-combination effects with the Proposed Development. The Meath County Development Plan 2021-2027 has directly addressed the protection of European sites and biodiversity through specific objectives. The above listed plans are not being relied upon to rule out potential significant effects on any KERs.

8.7.5.2 Existing Planning Permissions

A search of planning applications located within a 500m radius of the Site of the Proposed Development was conducted using online planning resources such as the National Planning Application Database (NPAD) (MyPlan.ie) and Meath County Council Planning Applications online map. Any planning applications listed as granted or decision pending from within the last five years were assessed for their potential to act in-combination with the Proposed Development and cause likely significant effects on the relevant European sites. Long-term developments granted outside of this time period were also considered where applicable.

Based on the location of the Site in agricultural land on the outskirts of Dunboyne town and the nature and scale of the Proposed Development as a residential project, a 500m radius is deemed sufficient to capture any projects that could act in-combination with the Proposed Development to cause likely significant effects on European sites.

It is noted that many of developments within the vicinity of the Site of the Proposed Development are applications granted for small scale residential upgrades to private dwellings and are unlikely to contribute to any in-combination effects involving the Proposed Development. The larger developments in the vicinity of the Proposed Development are outlined in Table 8-16.

PLANNING REFERENCE	PLANNING AUTHORITY	STATUS	LOCATION
ABP – 248301 (RA160805)	**ABP/ Meath County Council**	**Granted**	**Approx. 400m W of the Proposed Development**
Development Description: "The demolition of a 2 storey shop, ancillary single storey dwelling and a palisade fence (total demolition c. 181 sq m GFA); and the construction of a 1 - 2 storey (c. 8.95m overall height) retail development (total GFA of c. 3,370.6 sq m) in the form of a convenience supermarket (c. 2,107 sq m GFA); 4 no. comparison retail units (c. 169 sq m, c. 109 sq m, c. 136 sqm and c. 202 sq m respectively) all at ground floor level; gym facility (c. 565 sq m) at first floor with associated ground floor access lobby area (c. 50 sq m); metering switchroom (c. 9 sq. m); ESB sub station (c. 14 sq m); and self service laundry (9.6 sq m). The anchor supermarket unit will provide for a net retail floor area of c. 1,390 sq m (GFA), including off licence facility; goods store; delivery and loading dock; office accommodation; service yard			

PLANNING REFERENCE	PLANNING AUTHORITY	STATUS	LOCATION
and entrance lobby. The development shall also provide for 155 no. car parking spaces; 48 no. bicycle parking spaces; advertising structures and signage (c. 62.2 sq m); new pedestrian connections; new retail square; refuse storage and recycling areas; trolley bays; new vehicular entrance via Navan Road; junction upgrade works; and all associated site development, site services and landscape works. Significant further information/revised plans submitted on this application." **Potential for In-combination Effects:** According to the ABP Inspector's report, an AA Screening was carried out for the development and no notable impact pathways were identified linking the development to any European sites, with likely significant effects therefore screened out. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of this development or the Proposed Development individually.			
ABP- 301714	**ABP/ Meath County Council**	**Conditional permission granted**	**Approx. 140m E of the Proposed Development**
Development Description: "Discharge of treated sewage effluent arising at Bracetown Business Park, Bracetown, Clonee, Co. Meath to surface waters of the River Tolka at Bracetown, Clonee, Co. Meath." **Potential for In-combination Effects:** According to the ABP Inspector's report, an AA Screening was prepared for the development and no notable impact pathways were identified linking the development to any European sites, with likely significant effects therefore screened out. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of this development or the Proposed Development individually.			
2460045	**Meath County Council**	**Conditional permission granted**	**Approx. 120m E of the Proposed Development**
Development Description: "To construct a glass recycling facility consisting of a commercial unit (1,646m2) incorporating a warehouse/production area, offices, staff canteen, changing area, WC's and external works to include access road and circulation hardstanding, outdoor storage area, HGV, staff and visitor parking, weighbridge, boundary treatment, signage, proprietary wastewater treatment system and connections to available utilities including all ancillary site works. This Permission Requires a Waste License." **Potential for In-combination Effects:** According to the Meath CoCo Planning report, an AA Screening was carried out for the development and no notable impact pathways were identified linking the development to any European sites, with likely significant effects therefore screened out. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of this development or the Proposed Development individually.			
ABP- 308130	**ABP/ Meath County Council**	**Conditional permission granted**	**Approx. 330m NE of the Proposed Development**
Development Description: "220kV substation with 2 underground transmission cables." **Potential for In-combination Effects:** According to the ABP Inspector's report, an AA Screening was prepared for the development and no notable impact pathways were identified linking the development to any European sites, with likely significant effects therefore screened out. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of this development or the Proposed Development individually.			
ABP- 307546 (RA191593)	**ABP/ Meath County Council**	**Conditional permission granted**	**Approx. 330m NE of the Proposed Development**

PLANNING REFERENCE	PLANNING AUTHORITY	STATUS	LOCATION
Development Description: "Construction of 4, 2 storey data storage buildings, single storey storage centre, single storey MV operations building and two storey office building. EIAR submitted with application." **Potential for In-combination Effects:** An AA Screening was prepared for the development and no notable impact pathways were identified linking the development to any European sites, with likely significant effects therefore screened out. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of this development or the Proposed Development individually.			
221509	**Meath County Council**	**Conditional permission granted**	**Approx. 400m W of the Proposed Development**
Development Description: "The development will consist of: construction of a single storey discount foodstore of 2200 gross floor area (GFA) with a net sales area of 1,409sqms with an ancillary off license sales area; car parking for 119 cars including accessible spaces, cycle parking and electric vehicle parking spaces (circa 20% of spaces will be wired for future EV parking). The store will include photovoltaic panels at roof level; trolley bay with cycle parking; bin store and new ESB Substation building as well as a pedestrian and cycle link connecting to the northern boundary in line with the current termination of the existing pedestrian path extending along the eastern elevation of the Supervalu store to the northern boundary of the subject site. There is also provision for future pedestrian and vehicle link from the proposed access road to lands to the east of the application site. The construction of a single storey café unit (165sqms) positioned adjacent to a proposed plaza area which together are located in the existing car park area to the west of St. Peter and St. Paul's Church ('The Church'). The vehicular entrance to the development will be approximately in the same location as the entrance to the existing car park, west of The Church. The existing ESB substation in this area will remain in place. The café will also have an enclosed bin store. The construction of a new car park (53 spaces) located to the north east of the Church and for its exclusive use. It will be connected to the internal grounds of The Church via a two-way connection. The main entrance and exit will be onto the access road serving the proposed foodstore. This access road in turn will have a footpath along its east side, running parallel with The Church boundary. There will also be a crossing point from the existing pedestrian connection on the north west boundary of The Church. For clarity the majority of the existing north east, walled, boundary of The Church is proposed for removal along most of its length to facilitate the operation of the new Church car park. The application also includes works and road markings to improve traffic management related to Vehicular access to and from the site on Main Street. A right turn lane is proposed on Main Street with works to the public space located to the south west of Main Street including alterations to kerbs lines; minor relocation of one disabled parking space and relocation of bollards and other works to footpaths as required." **Potential for In-combination Effects:** An AA Screening was prepared for the development (ref: 221509) and no notable impact pathways were identified linking the development to any European sites, with likely significant effects therefore screened out. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of this development or the Proposed Development individually.			
2360065	**Meath County Council**	**Conditional permission granted**	**Southern arm of roadworks approx. 410 m to the W of the Proposed Development**
Development Description: "We, McGarrell Reilly Homes intend to apply for a 10-year permission for development in the Townlands of Bennetstown, Pace, and Dunboyne. The subject site (2.79ha) encompasses an area of 0.87ha situated to the south-west of the M3 Parkway and south-east of the Dunboyne Bypass (R157) located in the Townland of Bennetstown, and the balance (1.92ha) located in the Townlands of Pace, Bennetstown and			

PLANNING REFERENCE	PLANNING AUTHORITY	STATUS	LOCATION
Dunboyne including the Dunboyne Bypass (R157) and M3 Parkway access, Kennedy Road and Navan Road for infrastructure works. The development will consist of: i. Construction of a single-storey commercial building with a cumulative gross floor space (GFS) of 2,160 sq.m comprising: a. A supermarket with delivery, store and service area (1,880 sq.m), including net retail floorspace of 1,510 sq.m, and b. 2 commercial units (combined 280 sq.m) to facilitate Class 1 (Shop), Class 2 (Financial, Professional and Other Services) or Café (food and beverage) uses. ii. Provision of a 4-arm signalised junction replacing the existing Pace roundabout to include a new northern arm with segregated cycleway and footpath; iii. Upgrade works to the existing R157 and M3 Parkway access road to facilitate junction improvements; iv. Access to the development is proposed via a new 3-arm priority-controlled junction from the upgraded southern arm of the proposed 4-arm signalised junction, with 6m wide internal access roads to serve the development; v. A total of 118 surface level car parking spaces including 6 disabled access bays and 4 electric car charging points; vi. 20 short-stay bicycle parking spaces; vii. 1 Electricity substation / switch room; viii. Foul sewer connection to existing public system including pumping station on site with rising mains along Kennedy Road and Navan Road; ix. Permission is also sought for hard and soft landscaping, lighting, attenuation and drainage and all ancillary site development works. Significant further information/revised plans submitted on this application." **Potential for In-combination Effects:** The main body of the development (ref: 2360065) is located ca.800m to the north of the Site, with a small section of works on the Navan Road adjacent the Site of the Proposed Development's western boundary. A NIS was prepared for this development following a precautionary approach, with targeted mitigation included to protect the Tolka River during the works and any downstream European sites. No likely significant effects are therefore expected. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of the Proposed Development, the targeted river protection measures included in the NIS prepared for the LRD application (ref: 2360065), and the insignificant nature of the hydrological pathway connecting both Sites to downstream European sites (ca. 20km of the River Tolka).			
23424	**Meath County Council**	**Appealed**	**Southern arm of roadworks approx. 410m to the W of the Proposed Development**
Development Description: "The development will consist of: i. Construction of 3 no. office buildings with a cumulative gross floor area (GFA) of 13,729 sq.m ranging in height from 3 to 4- storeys and shall comprise the following: a. Building 1 (3,597 sq.m GFA) 3-storeys in height (12.35 metres to top of parapet), with a set back louvred screen 2m above parapet level. b. Building 2 (5,336 sq.m GFA) 4-storeys in height (16.125 metres to top of parapet), with a set back louvred screen 2m above parapet level. c. Building 3 (4,796 sq.m GFA) 4-storeys in height (16.125 metres to top of parapet), with a set back louvred screen 2m above parapet level. ii. Roof mounted solar PV panels (c. 180 sq.m combined area); iii. Provision of a 4-arm signalised junction replacing the existing Pace roundabout to include a new northern arm with segregated cycleway and footpath; iv. Access to the development is proposed from the new northern arm, with 6m wide internal access roads to serve the development; v. Upgrade works to the R157 and M3 Parkway access road to facilitate junction improvements; vi. A total of 275 surface car parking spaces including 14 disabled access bays and 55 electric car charging points; vii. 280 bicycle parking spaces in 3 secure cycle storage areas adjacent to the buildings; viii. Site signage is to be erected, all spot-lit and back-lit illuminated, including 2 no. type 1 entrance signs (6.15m x 2.4m) and 3 no. type 2 building signs (1.35m x 2.4m); ix. 3 standalone electricity substations; x. Foul sewer connection to existing public system including pumping station on site with rising mains along Kennedy Road and Navan Road; xi. Watermain connection to the north east of site at Pace for connection to Irish Water Infrastructure; xii. Permission is also sought for associated landscaping, boundary treatments, public lighting, plant, waste storage and all ancillary site and development works. A Natura Impact Statement (NIS) has been prepared in respect of the proposed development. Signficant (sic) further information/revised plans submitted on this application."			

PLANNING REFERENCE	PLANNING AUTHORITY	STATUS	LOCATION
Potential for In-combination Effects: The main body of the development (ref: 23424) is located over 1km to the north of the Site, with a small section of works on the Navan Road adjacent the Site of the Proposed Development's western boundary. A NIS was prepared for this development following a precautionary approach, with targeted mitigation included to protect the Tolka River during the works and any downstream European sites. No likely significant effects are therefore expected. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of the Proposed Development, the targeted river protection measures included in the NIS prepared for the LRD application (ref: 23424), and the insignificant nature of the hydrological pathway connecting both Sites to downstream European sites (ca. 20km of the River Tolka).			
2460063	**Meath County Council**	**FURTHER INFORMATION REQUESTED**	**Overlaps with the Site of the Proposed Development**
Development Description: "The proposed road development comprises of: • Construction of a new carriageway (c.1.46km) between Navan Road and Station Road (L2228); • Construction of a carriageway featuring 1 no. 3-3.5m wide lane of traffic in each direction; • A proposed design speed of 50 km/h; Provision of 2m wide cycle lanes on both sides of the corridor; • Provision of 2m wide footpaths on both sides of the corridor; • 3m landscaped verges to provide a buffer between the proposed cycle facilities and vehicular traffic. These verges could be converted into a potential bus lane in the future; • Construction of a new bridge over the existing railway line including embankments, bridge length c 22.5 m without embankments, height of a bridge underpass c 5.5 m; • Provision of 11 no. new priority junctions off the Eastern Distributor Road to provide a new access to Dunboyne Rail Station, to serve future residential development lands and lands zoned as 'G1- Community Infrastructure' to the east of the subject site. These junctions will be provided as raised tables to ensure priority for pedestrians and cyclists; • Provision of a new signal-controlled junction including a right turn lane off Navan Road in continuation of Dunboyne Business Park Road at the northern end of the proposed distributor road; • Provision of a new signal-controlled junction including turning lanes off Station Road aligned opposite to an already constructed segment of a distributor road (entrance to Castle Farm Residential Development); • Removal of the existing train station car park entrance road from Station Road and its replacement with a new access road off the proposed distributor road. It will also include ancillary works: • Drainage works; • Public lighting; • Traffic signals; • Road marking and signage; • Associated landscaping works; • Miscellaneous ancillary works above and below ground level including soil stabilisation works. Temporary areas necessary for construction phase include: • Provision of 2no. temporary construction compounds necessary for construction phase; • Provision of 2no. temporary storage areas for excavated spoil material with maximum capacities of c.25,000m3 and c.8,000m3; • 5m buffer area at identified locations along the proposed development. This planning application is accompanied by an Environmental Impact Assessment Report". **Potential for In-combination Effects:** The Proposed Development will overlap somewhat with the northern section of this distributor road application. However, an AA Screening was prepared for same and no notable impact pathways were identified linking the distributor road development to any European sites, with likely significant effects therefore screened out. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of either development individually and the insignificant nature of the hydrological pathway connecting both Sites to downstream European sites (ca. 20km of the River Tolka).			
2360290	**Meath County Council**	**Appealed**	**Southern arm of roadworks approx. 410m to the W of the Proposed Development**
Development Description:			

PLANNING REFERENCE	PLANNING AUTHORITY	STATUS	LOCATION
"Permission for the following Large-Scale Residential Development consisting of: i) 267 no. residential units comprising 145 no. dwelling houses and 122 no. apartments/duplexes providing a mix of 2, 3 and 4-bed units. The dwelling houses range in height from 2-3 storeys. The apartments/duplexes are in 8 no. blocks (i.e. Blocks A-H, with Blocks B and C joined) ranging in height from 3 to 5 storeys; ii) a single storey creche; iii) modifications to the R157 regional road including changes to the existing carriageway/traffic lanes and the replacement of an existing roundabout with a new signalised junction; iv) a new signalised junction and link road (including new bridge over the River Tolka) connecting the R157 and the Old Navan Road; v) the provision of footpaths, cycle lanes and 2 no. pedestrian crossings on the existing M3 Parkway access road, vi) a foul pumping station and connection to the existing public sewerage system via the Old Navan Road; vii) a watermain connection to the north of the site at Pace (townland); viii) 3 no. ESB substation/kiosks and the undergrounding/re-routing of existing electricity lines; ix) reprofiling of land and relocation of existing berm adjoining the River Tolka as part of flood mitigation measures; and x) all associated ancillary development works including footpaths, cycle lanes, car and bicycle parking, drainage, public lighting, bin storage, boundary treatments and landscaping/amenity areas at this site measuring 14.17 hectares principally located in Bennetstown (townland) to the south of the M3 Parkway park and ride and rail station, and also extending into Pace & Dunboyne (townlands), Dunboyne North, Co. Meath. Access will be via 2 no. new vehicular access points along the new link road between the R157 and the Old Navan Road. Pedestrian access will also be provided on to the existing M3 Parkway access road. An Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) has been submitted to the planning authority with the application. Significant further information/revised plans submitted with this application." **Potential for In-combination Effects:** The LRD application (ref: 2360290) will include a bridge over the Tolka. As such a NIS was prepared for this development following a precautionary approach, with targeted mitigation included to protect the Tolka River during the works and any downstream European sites. No likely significant effects are therefore expected. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of the Proposed Development, the targeted river protection measures included in the NIS prepared for the LRD application (ref: 2360290), and the insignificant nature of the hydrological pathway connecting both Sites to downstream European sites (ca. 20km of the River Tolka).			
2439	**Meath County Council**	**Granted**	**Approx. 400m NW of Proposed Development**
Development Description: "The development will consist of the following: The removal of post and wire fencing to the front of the site, removal of timber P&R fencing to the rear of the site along with the removal of three existing trees enclosing the site entrance. Permission is also sought for the reduction in the depth of the existing grass verge to accommodate a pedestrian footpath. The development proposes 8. No. dwellings, 4 no. Type A dwellings of 252sqm, and 4 no. Type B dwellings of 234sqm. Provision of 2no. car parking spaces per dwelling including universal access spaces, electric charging points, covered bicycle spaces and bin storage. The development includes an internal hammerhead roadway at 5.5m wide finished in colored asphalt. The development will also include landscaping, SuDS drainage and all ancillary works necessary to facilitate the development. Significant further information/revised plans submitted on this application". **Potential for In-combination Effects:** No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of either development individually and the small scale of this residential development (ref:2439).			
22675	**Meath County Council**	**Conditional permission granted**	**Approx. 100m W of Proposed Development**
Development Description:			

PLANNING REFERENCE	PLANNING AUTHORITY	STATUS	LOCATION
"The proposed development will consist of (a) the construction of 8 no. two storey semi-detached houses with habitable attic accommodation, 2 no. two storey end-terrace houses with habitable attic accommodation, 2 no. two storey mid terrace houses, a three storey apartment building accommodating 9 no. apartments with communal access, a bicycle storage building and a bin storage area (b) provision of public open space, landscaping and public lighting; (c) provision of vehicular and pedestrian access via Elton Grove; (d) provision of pedestrian/cyclist access to Station Road including improvement works to existing public paths; (e) provision of a shared pedestrian/cyclist route to the boundary of the Western platform of Dunboyne Railway Station and (f) associated site works on site. Significant further information/revised plans submitted on this application". **Potential for In-combination Effects:** An AA Screening was prepared for the development (ref: 22675) and no notable impact pathways were identified linking the development to any European sites, with likely significant effects therefore screened out. No likelihood of significant in-combination effects due to the absence of any likely significant effects as a result of this development or the Proposed Development individually.			

Table 8-16 Granted and Pending Development applications within 500 m of the Proposed Development. Location and distance given is relative to the Proposed Development.

8.7.5.3 Interactions with Known Adjacent Proposed Developments

As noted previously, the Proposed Development application Site interacts with a proposed eastern distributor road (ref: 2460063, Submitted and further information requested) which will pass through the Site, linking the Navan Road to the west with the L2228 Road to the south-east. In addition, a second LRD is proposed along the north-western section of the distributor road, on the Carroll Estate (CE) lands (an arable field to the north-west of the Site of the Proposed Development). Enviroguide are working on all three of the above planning applications and so have an in-depth understanding of these projects through regular consultation with their design teams.

The 'CE LRD' application is due to be submitted concurrently with this Proposed Development application. Therefore, there is the potential for the construction phases of the distributor road, the CE LRD and the Proposed Development to overlap if planning is granted for all three projects at around the same time.

All three applications will be accompanied by AA screenings, NIS and either EcIA or EIAR Biodiversity Chapters, to ensure that all potentially significant effects on ecological receptors are identified and assessed appropriately. All three developments overlap on the same land parcels and so their immediate effects are localised in the single area; agricultural fields to the west of the River Tolka. All three developments share the same impact pathway to downstream designated sites in Dublin Bay i.e., a ca. 20km hydrological connection via the River Tolka and its tributaries.

The combined construction phases of the two LRDs and the eastern distributor road will lead to combined impacts on the immediate area of the three sites; through loss of existing farmland habitats, increased noise and dust, and potentially surface water run-off to the Tolka and its tributaries to the east.

The construction activities that pose the highest risk of pollution to the Tolka will be the modification of three surface water outfalls to this River and its tributaries, due the immediate proximity of these new outfalls to the waterbodies. These are relatively minor and short-term interventions and therefore do not have the capacity to cause likely significant effects to designated sites located a considerable distance downstream. The dense overgrown nature of the flood plain and channels of the Naulswood Stream and River Tolka as they pass the lands containing the Site of the Proposed Development and the Distributor Road, would further filter and limit the potential for any pollutants or

sediments to make their way to these waterbodies, with a significant natural vegetated buffer present in the form of the floodplain containing both channels.

However, in an abundance of caution the potential for cumulative impacts in the form of a combined reduction in water quality in Dublin Bay; as a result of a worst-case scenario pollution events at the Site and other unknown ongoing developments located along the route of the River Tolka between the Proposed Development and its outfall in Dublin Bay, have been considered. Any potential for cumulative impacts on downstream European sites (and other overlapping designated sites) are therefore addressed with the mitigation described in the NIS (Enviroguide, 2024c) that accompanies this application under separate cover.

The surface water management systems of all three applications will be linked, with surface waters generated along the distributor road and the two LRD sites managed onsite via their independent SuDS, before being directed west to the Naulswood Stream, the River Tolka and Bracetown Stream via the distributor road's drainage infrastructure, the existing drainage ditches and a new surface water connection for the Proposed Development. As such, the potential for likely significant effects on designated sites in Dublin Bay (ca. 20km downstream) due to Operational Phase surface waters discharging to the River Tolka system is deemed to be negligible.

8.8 Avoidance, Mitigation, Compensation and Enhancement Measures

8.8.1 Avoidance by Design

The Proposed Development does not implement any specific avoidance measures.

8.8.2 Construction Phase

Table 8-17 gives a summary of the best practice development standards and mitigation measures to be implemented during the Construction Phase of the Proposed Development. The measures listed are outlined in more detail in the Construction and Environmental Management Plan (CEMP) (Enviroguide, 2024a) and NIS (Enviroguide, 2024c) accompanying this application under separate cover.

THEME	BEST PRACTICE STANDARDS AND MITIGATION	BIODIVERSITY SPECIFIC MITIGATION REQUIRED?
Control of Fuel and Chemical Storage	Appropriate storage facilities provided on Site, including bunded areas away from any sensitive receptors such as drains and watercourses. Designated refueling areas, site compound and waste storage areas.	No
Control Emissions to Surface Water and Drainage	Silt traps, and silt fences will be provided by the contractor where necessary to prevent silts and soils being washed away by heavy rains during the course of the Construction Phase. Surface water runoff and water pumped from the excavation works will be discharged via a silt trap / settlement pond to the existing foul drainage network.	No

THEME	BEST PRACTICE STANDARDS AND MITIGATION	BIODIVERSITY SPECIFIC MITIGATION REQUIRED?
Control of Emissions to Soil and Groundwater	No direct untreated point discharge of construction runoff to groundwater will be permitted. Groundwater may be encountered during the construction works. Where water must be pumped from the excavations, water will be managed in accordance with best practice standards (i.e., CIRIA – C750) and regulatory consents. Any contaminated soils that are encountered during the works will be excavated and disposed of off-site in accordance with the Waste Management Acts, 1996- 2021, and associated regulations and guidance provided in Guidelines for the Management of Waste from National Road Construction Projects published by the National Roads Authority in 2008.	No
Controls to Protect Biodiversity	***Measures outlined in Final CEMP to include all mitigation outlined in this Biodiversity Chapter and the NIS.***	Yes – see Sections below.
Control of Light	Lighting during construction to be cognizant of nocturnal fauna commuting routes.	Yes – See Section 0 (Mitigation 3)
Control of Noise and Vibration	To comply with Safety, Health and Welfare at work (construction) Regulations 2006 to 2013, Safety Health and Welfare at Work Act 2005, BS 5228:2009: A1:2014 *Parts 1 & 2 - Code of Practice for noise and vibration control on construction and open sites*, Environmental Protection Agency Act 1992 Sections 106-108, and all Local Authority specific requirements for this specific site.	No
Control of Air Quality and Dust	Pro-active management to prevent significant emissions of fugitive dust. Dust Management Plan to include suppression via watering of areas identified as potential dust source; road sweeping to remove aggregate materials; appropriate cover of transported materials; wheel washing; maintenance of public roads in relation to dust; stringent covering of potential dust producing materials during transport; and appropriate monitoring.	No
Control of Traffic	Preparation of a Construction Traffic Management Plan to include dust and dirt control, noise control, facilities for loading and unloading, and facilities for parking.	No

THEME	BEST PRACTICE STANDARDS AND MITIGATION	BIODIVERSITY SPECIFIC MITIGATION REQUIRED?
Control of Resources and Waste Management	Resource and waste management during the Construction Phase will be managed by the dedicated Resource/Waste Manager in compliance with the Waste Management Act 1996 (as amended) and all subordinate legislation; and in line with the Environmental Protection Agency's (2021) publication "Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects". Measures to minimise waste generation, promote re-use of resources and recycling and recovery of materials will be implemented throughout the Construction Phase.	Yes – See Section 0 (Mitigation 6)
Control of Impacts on Archaeology and Heritage	If any archaeological remains are discovered during this project, all works will cease, and an expert archaeologist will be brought to site and all future works will be carried out under the supervision of the archaeologist.	No

Table 8-17 Summary of Best Practice Standards and Mitigation outlined in the Outline Construction and Environmental Management Plan (DBFL 2023). Where specific details relating to protection of Key Ecological Receptors is required under these measures, reference is made to the appropriate section in this Chapter.

In addition, to ensure the CEMP remains 'fit for purpose' for the duration of the project it should be reviewed and updated by the Project Manager in consultation with the Contractor's Ecologist during the life of the project to ensure that it remains suitable to facilitate efficient and effective delivery of the project's environmental commitments. The Contractor shall also designate a Site Engineer/Manager/Assistant Manager as the Construction Waste Manager and who will have overall responsibility for the implementation of the Project Waste Management Plan (WMP). This Plan will be prepared upon appointment of the Main Contractor.

Additional mitigation measures required for sufficient protection of the KERs identified in this chapter, and/or details for the specific implementation of the mitigation measures as per the above table are given in the below sections.

8.8.2.1 Protection of Habitats

8.8.2.1.1 Mitigation 1: Tree Protection Measures

Protective tree fencing in compliance with BS 5837:2012 'Trees in relation to design, demolition and construction – Recommendations' will be erected prior to any Construction works being undertaken to prevent damage to the canopy and root protection areas of existing trees to be retained at the Site.

The fencing will be signed off by a qualified arborist prior to construction to ensure it has been properly erected. No ground clearance, earthworks, stock-piling or machinery movement will be undertaken within these areas.

The project Arborist will be instructed **prior to commencement on Site**; to ensure that appropriate tree protection measures are in place. These measures will entail robust fencing around the root protection zones of all trees and hedgerows being retained on Site. An adequate level of signage will also be provided to highlight 'no work zones' and ensure that Site creep and damage to retained habitats does not occur. The northern and

southern boundary hedgerows must be sufficiently protected for the duration of the Construction Phase to maximise their ecological value in the final landscape plan.

The project Arborist, the project Ecologist and the Site Manager will work together to ensure these sections of hedgerow/woodland are protected for the duration of the works.

8.8.2.1.2 *Mitigation 2: Biosecurity*

The following best practice site hygiene and biosecurity measures will be in place to avoid spread of the butterfly bush and sycamore identified at the Site into the surrounding areas during Construction Phase and to limit the potential for spread of butterfly bush and other invasive species at the Site:

- All soils/materials being introduced to the Site will be sourced from a certified invasive flora-free source site, to ensure no introduction of invasive plant materials to the Site occurs.
- Personnel working on or between sites will ensure their clothing and footwear are cleaned, ensuring they are visually free from soil and organic debris, in order to prevent inadvertent spread of invasive plant material.
- Where possible tracked vehicles should not be used within an area of infestation.
- All vehicles leaving the Site and/or transporting infested soil/materials must be thoroughly pressure-washed in a designated wash-down area before being used for other work. Mud and organic debris will not be allowed accumulate on tyres, wheels or under wheel arches.
- All vehicles containing invasive plant materials for transportation and disposal offsite will be suitably secured with tarpaulins etc., to ensure no inadvertent dissemination of invasive materials enroute.
- Works should be planned to avoid double handling of infected plants materials/soils as far as possible to reduce the risk of spread.
- All vehicles entering or leaving the Site will have been suitably checked and pressure-washed to ensure no introduction of invasive flora to and from the Site. Measures such as a drive through hygiene bath or footbaths will be considered where appropriate.
- Designated wash-down area to be located away from sensitive receptors such as watercourses, ditches, drains etc.
- Material/water left after vehicles have been pressure-washed must be contained, collected and disposed of appropriately (These waters must not under any circumstances be discharged to drains or the eastern ditch).
- All chemicals used for the control of non-native species should be stored and used in a responsible manner.

8.8.2.1.2.1 Removing butterfly bush

As butterfly bush is a plant that favours disturbed sites, physical removal of plants can provide ideal conditions for the germination of seeds that are present in the soil. For this reason, care needs to be taken to ensure that revegetation/development of treated areas is undertaken swiftly. The branches of butterfly bush are capable of rooting as cuttings, so care should also be taken to ensure material is disposed of in a manner to avoid this risk. The following outlines a combination of physical and chemical options for the removal of butterfly bush from the Site:

- Cutting of stands to a basal stump during active growth (late spring to early summer) and appropriate containment, storage and disposal of the cut branches and trunks.
- Brushing of total cut surface with herbicide concentrate (this should not be sprayed to avoid inadvertent negative impacts on surrounding environment).
- Digging out and appropriate disposal of stumps.
- Immediate replanting of ground with native species or commencing development construction.

Note that disturbance and/or removal of butterfly bush should take place prior to the flower heads setting seed, i.e., before July, to minimise risk of seed dispersal across the Site and offsite.

8.8.2.2 Protection of Fauna

8.8.2.2.1 Mitigation 3: Construction Phase Lighting

Any night-time lighting required during the Construction Phase for security etc., will be directed away from the boundary vegetation at the Site (i.e., away from hedgerows), and will not be directed skyward. Lighting will be focused into the centre of the Site and only on equipment and machinery that needs to be illuminated.

The Project Ecologist acting as ECoW for the project will review the Construction Phase lighting with the Contractor regularly during their site visits and make recommendations as required to ensure the lighting is maintained as bat friendly for the duration of the works.

8.8.2.2.2 Mitigation 4: Bat-friendly Tree Felling

Although all trees on Site set for felling have been assessed and confirmed to be of low-negligible bat roost suitability, harm to individual bats is possible should they be present during the felling process. It is also possible that trees can become damaged in the time between the original PBRA survey and the tree felling taking place, and this can sometimes increase the bat roost suitability of a tree, providing new roost features e.g., cracks, holes etc.

As such, a pre-felling check will be conducted by a suitably qualified Ecologist of all trees to be felled at the Site prior to felling taking place; to ensure that no changes have occurred and that no individual bats will be harmed. In the unlikely event that a roosting bat is found, no felling of the tree in question will take place and a derogation licence will be obtained from the NPWS to proceed. The area around the tree will be protected with an appropriate buffer to prevent disturbance of the bat.

It is important to note that permission for the Proposed Development can be granted without any reliance on the potential grant of a derogation licence, and that any references to the potential need to obtain a licence are purely precautionary, as detailed above, and therefore not integral to the decision on whether to grant permission.

8.8.2.2.3 Mitigation 5: Vegetation Clearance – Timing

As the Site has been deemed suitable for bats, breeding birds, small mammals, and reptiles, vegetation clearance, particularly of the hedgerow habitats, will need to be cognisant of any potentially present fauna. Table 8-18 provides guidance for when vegetation clearance is permissible in relation to hibernating and breeding fauna. Information sources include British Hedgehog Preservation Society's *Hedgehogs and Development* and *The Wildlife (Amendment) Act, 2000*. The preferred period for vegetation clearance is within the months of September and October to avoid the main breeding bird and mammal hibernation seasons.

Where this seasonal restriction cannot be observed, a check for active nests will be carried out immediately prior to any Site clearance by an Ecological Clerk of Works (ECoW) and repeated as required to ensure compliance with legislative requirements. Where a breeding bird and an active nest is found, the nest will be protected, and no further works will take place in the vicinity of the nest until the young have fledged.

ECOLOGICAL FEATURE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Breeding Birds	Vegetation clearance permissible		Nesting bird season No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of nesting birds by an ecologist.						Vegetation clearance permissible			
Bats	Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist								Preferred period for tree-felling (late September to November)		Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist	
Hibernating mammals (namely hedgehog)	Mammal hibernation season No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of hibernating mammals by an ecologist.			Vegetation clearance permissible							Mammal hibernation season No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of hibernating mammals by an ecologist.	
Common Lizard	Lizard Hibernation Season No habitat clearance permissible			Active period Habitat (scrub, tall sward grass) clearance permissible							Lizard Hibernation Season No habitat clearance permissible	

Table 8-18 Seasonal restrictions on vegetation removal. Red boxes indicate periods when clearance/works are not permissible.

Additionally, all vegetation clearance will be carried out in sections working in a consistent direction to prevent entrapment of protected fauna potentially present. A phased cutting approach under the supervision of a suitably qualified ECoW will be used to allow wildlife to move away from any suitable habitat that will be removed:

- Phase 1 – Cutting vegetation to 150-200 mm and removing the arisings;
- Phase 2 – After a minimum of one hour, hand-searching the cut areas (conducted by an ECoW) and removing any sheltering habitat (e.g. logs or debris) then cutting vegetation to ground level and removing the arisings; and
- Phase 3 – Soil scrape.

8.8.2.2.4 Mitigation 6: Waste Management

As best-practice all construction-related rubbish on Site e.g., plastic sheeting, netting etc. will be kept in a designated area and kept off ground level so as to prevent small mammals such as hedgehogs from entrapment and death.

Trenches/pits must be either covered at the end of each working day or include a means of escape for any animal falling in e.g., a plank or objects placed in the corner of an excavation (Species such as badgers will continue to use established paths across a site even when construction work has started).

Any temporarily exposed open pipe system will be capped in such a way as to prevent animals gaining access as may happen when contractors are off Site.

8.8.2.2.5 Mitigation 7: Pre-commencement Badger Survey

As a precaution, a **pre-construction badger survey of the Site** will be conducted by a suitably qualified Ecologist prior to any clearance of scrub, cutting back of hedgerows/woodland taking place; to confirm whether badger have occupied the Site between the time of the mammal survey that informed this Chapter and the commencement of works on Site.

8.8.3 Operational Phase

8.8.3.1 Protection of Habitats

No Operational Phase mitigation required.

8.8.4 Biodiversity Enhancement Measures

8.8.4.1 Enhancement 1: Bat Boxes

By way of enhancement a set of 10 bat boxes will be erected at the Site, on suitably mature trees located within the new woodland areas, under the guidance of the Project Ecologist.

The bat box type installed will be the 2F Schwegler Bat Box or a similar durable woodcrete make. It is understood that Schweglers can be particularly difficult to source in Ireland and so suitable alternatives can be used provided the meet the following criteria:

- The bat boxes must be made from a durable, and sufficiently insulated material such as woodcrete.
- The bat boxes must be open bottomed, or contain their entrance point near the bottom of the bat box so that a build up of droppings will not prevent the box being used as a long-term roost.

The location of bat boxes will be advised by a suitably qualified ecologist but must meet the following criteria:

- Be placed a minimum of 4m off the ground.
- The bat boxes will not be placed in areas that are subject to lighting, particularly at night. Consideration should be given to placement of bat boxes on trees that are likely to lose their foliage in winter, and how this might increase light levels on boxes that may be harboured by hibernating bats.
- Bat boxes should ideally face southeast or southwest, provided they are not exposed to light disturbances in doing so.

8.8.4.2 Enhancement 2: Biodiversity Hedgerow and Woodland Management

A **Hedgerow and Woodland Management Plan (HWMP)** will be prepared for the Site by a suitably qualified Ecologist and signed off by Meath CoCo's Biodiversity Department.

The HWMP will specify the management of the retained and newly planted hedgerows and woodland for the Management Company who will take charge of the operational landscape management of the Site. It will also outline the common third Schedule invasive species and their control measures, should any begin to establish at the Site post-Construction.

The Hedgerow and Woodland Management Plan (HWMP) will be based on the recommendations made in the Hedgerow Appraisal Report (Enviroguide, 2024c) appended in Appendix VI of this Report.

The existing hedgerows proposed to be retained along the western boundary of the Site, along with the proposed woodland areas within the open spaces of the Site, will be managed using a low-intervention approach i.e., in a way that maximises the ecological value they provide, with habitat connectivity maintained along the eastern margin and internal green spaces of the Site; connecting it in with the landscaping of the future distributor road's bridge embankments and hedgerow planting and the wider green infrastructure network within lands to the east.

This connectivity is vital for wildlife such as birds, bats, mammals and insect pollinators in a human landscape such as that which will be provided by the Proposed Development. Additionally, by managing hedgerows and woodland in a more natural way, they will provide more in terms of biodiversity; through increased plant diversity, increase provision of food resources and higher quality shelter to wildlife inhabiting and commuting through the area.

A low-intervention management approach may not be appropriate for internal ornamental hedgerows planted within the main residential component of the Proposed Development, due to aesthetic or logistical reasons, however, it is best suited for the external treelines, hedgerows and woodland present along the margins of the Site or larger open spaces.

The following measures will be adopted by the Management Company tasked with maintaining the Site's landscaping into the future:

- The hedgerow and woodland areas located along the outer boundaries of the Site will, as much as is practicable, be allowed to link up with each other. The provision of an almost continuous vegetative margin around the Site; through planted native hedgerows and trees, will maintain habitat connectivity with the surrounding environment.
- The understorey areas within the proposed woodland areas within the Site will be maintained in as wild a state as possible, with minimal intervention, and with areas of dense, scrub habitat allowed to form. This will recreate the natural scrub habitat conditions present within the Site currently.
- Native hedgerows will be maintained with a minimum **natural meadow strip of 1-2m** at their base wherever Site constraints allow. Hedges with plenty of naturally occurring flowers and grasses at the base support will provide higher quality habitat for local wildlife using the hedges.
- The 1-2m strip at the base of the hedgerow will be cut on a reduced mowing regime to encourage wildflower growth and maximise the value of the hedgerow for pollinators. A **two-cut management approach** is ideal for suppressing coarse grasses and encouraging wildflowers. Cut the hedgerow basal strip **once during February and March** (this is before most verge plants flower and it will not disturb ground-nesting birds). Cut the verge **once again during September and October** (this slightly later cutting date allows plants that were cut earlier in the year time to grow and set seed).

- N.B. Raising the cutter bar on the back cut will lower the risk to small mammals.

- Where hedgerow, scrub or woodland understorey trimming needs to occur, delay trimming as late as possible – until **January and February** as the surviving berry crop will provide valuable food for wildlife. The earlier this is cut; the less food will be available to help birds and other wildlife survive through the winter. Any hedgerow/scrub/woodland trimming will be done outside of the nesting season and due consideration of the Wildlife Act 1976 (as amended) must be taken.
- Where possible, cut the native hedgerows on a minimum **3-year cycle** (cutting annually stops the hedgerow flowering and fruiting), and cut in rotation rather than all at once - this will ensure some areas of hedgerow will always flower (blackthorn in March, hawthorn in May etc.).
- Where they occur naturally, bramble and ivy should be allowed grow in hedgerows and along woodland areas, as they provide key nectar and pollen sources in summer and autumn.

Methods to Avoid

Hedgerows and woodland understorey will not be over-managed. Tightly cut hedges and vegetation mean there are fewer flowers and berries, thus reducing available habitats, feeding sources and suitable nesting sites.

Hedgerows and woodland understorey will not be cut between March 1st and August 31st inclusive. It is both prohibited (except under certain exemptions) and very damaging for birds as this is the period they will have vulnerable nests containing eggs and young birds.

Pesticide/ herbicide sprays or fertilisers will not be used near hedgerows or woodland understorey as they can have an extremely negative effect on the variety of plants and animals they support.

8.8.4.3 Enhancement 3: Swift Bricks

It is proposed to include 30 No. swift bricks as part of the Proposed Development. The swift bricks will be installed side by side, with three sets of ten bricks located on the northern and western elevations of Block A (See Figure 8-16 and Figure 8-17). The final location and number of swift bricks will be agreed with Meath County Council.

The bricks are located in groups as swifts are a social nesting species. As per best practice, swift bricks will be installed at least 5 metres above the ground, in safe areas where they will not be disturbed. As the bricks tend not to overheat, they can be placed facing in any direction. Care has been taken to ensure no obstacles or plate glass windows are located below the bricks.

Guidelines for the bird box scheme follow the guidelines published by Swift Conservation Ireland, and those published by Birdwatch Ireland entitle "Saving Swifts" (2009/2010). The incorporation of Swift Bricks will help recover the declining swift population, which are now Red Listed in Ireland (Gilbert et al., 2021).

Swifts are a "clean" bird species which remove their own wastes from their nests periodically. As such, Swift bricks do not require any cleaning by the management company.

A Swift calling system will be installed to attract Swifts and encourage them to take up residence at a new site. A Swift calling system is a small speaker set-up that plays Swift calls during the summer. It will be located close to the brick entrances and has been seen to greatly increase the chances of Swifts using the Swift boxes/bricks. Solar powered options are available.

An Ecologist will be instructed to set up the Swift calling system once the construction of the Proposed Development is complete. This can be with the help of active local Swift groups as required (e.g., Dublin Swift Conservation Group), who can help and advise as to the best set-up etc.

Figure 8-16 Examples of suitable locations for Swift Bricks on Block A (northern elevation) shown in red (adapted from MCORM Drwg: PL207).

Figure 8-17 Examples of suitable locations for Swift Bricks on Block A (western elevation) shown in red (adapted from MCORM Drwg: PL207).

8.9 Monitoring

8.9.1 Construction Phase Monitoring

8.9.1.1 Ecological Clerk of Works (ECoW)

A suitably qualified ECoW will be employed before commencement and for the duration of the Construction Phase; to provide ecological advice and input to the construction team. The ECoW will carry out the monitoring activities listed below and those included within the CEMP (Enviorguide, 2024a) and NIS (Enviorguide, 2024c) for the duration of the Construction Phase of the Proposed Development.

NOTE: The ECoW will be employed several weeks before commencement of works on Site; to allow time for the scope of ECoW works to be reviewed by the ecologist and any necessary pre-construction surveys to be carried out.

- The ECoW will be required to work closely with the Site Manager and Arborist; to arrange to carry out **pre-clearance surveys** of any vegetation present on Site, especially if clearance during the period March 1st – August 31st (i.e., the breeding bird nesting season) is required. It is noted that clearance will be avoided during this period wherever possible through good management of the construction timeline. **Pre-felling checks of trees for bats** will also be conducted by the ECoW.
- This will include a **pre-commencement badger survey** of the Site for evidence of badger usage to ensure no badgers are impacted by the construction works.
- As part of the mitigation recommended in relation to mammals e.g., hedgehogs, the ECoW will liaise with the Site Manager to ensure that an adequate level of **site tidiness** is being maintained, i.e., that construction materials such as netting, plastic sheeting etc., are being stored securely and above ground.
- The ECoW will also liaise with the Site Manager to ensure that **mammal escape measures** are in place across the construction site in terms of excavations such as trenches, basements, foundations i.e., that planks or objects are being left in place at a suitable corner of any excavations each night.
- The ECoW will visit the Site and **assess the night-time lighting measures in place for the Construction Phase**; to ensure that they will not cause any impacts to local bats during the nighttime. The ECoW will consult this Biodiversity Chapter to understand the priority areas for bat commuting/foraging at the Site and make recommendations where required.

8.7.1.2 Project Arborist

The project Arborist will be instructed **prior to commencement on Site**; to ensure that appropriate tree protection measures are in place. The northern boundary hedgerow and treelines and southeastern boundary treeline will be sufficiently protected for the duration of the Construction Phase to maximise their ecological value in the final landscape plan. The ECoW will report any issues relating to failure in the tree protection measures on Site to the project Arborist and the Site Manager throughout the Construction Phase to ensure these sections of habitat are protected for the duration of the works.

8.9.2 Operational Phase Monitoring

8.9.2.1 Ecologist

The ECoW will visit the Site post-construction to check the following are in place:

- **Bat Boxes** – A suitable qualified Ecologist will liaise with the Site Manager to ensure that these measures are in place.
- **Swift-Bricks** – A suitable qualified Ecologist will liaise with the Site Manager to ensure that these measures are in place.
- **Biodiversity Hedgerow and Woodland Management** - A suitable qualified Ecologist will review the Hedgerow and Woodland Management Plan (HWMP) once prepared for the Site and signed off by Meath CoCo's Biodiversity Department. The Ecologist will visit the Site each summer for the first 2-3 years post completion to review the management of the hedgerows and woodland areas at the Site and confirm that the HWMP is being followed by the landscape maintenance company.

8.9.3 Summary of Mitigation and Monitoring

The following Table summarises the mitigation and monitoring measures recommended for the Proposed Development.

ECOLOGICAL RECEPTOR	RELEVANT STAGE OF THE PROPOSED DEVELOPMENT	MITIGATION/ ENHANCEMENT MEASURE	MONITORING TYPE	DETAILS
Hedgerow and Scrub Areas	Construction Phase	**Mitigation 1:** Tree Protection Measures	ECoW & Arborist	The project Arborist will be instructed **prior to commencement on Site;** to ensure that appropriate tree protection measures are in place to protect the western boundary hedgerow habitat being retained on Site. These measures will entail robust fencing around the root protection zones of all trees and hedgerow species being retained on Site. An adequate level of signage will also be provided to highlight 'no work zones' and ensure that Site creep and damage to retained habitats does not occur. The western hedgerow will be sufficiently protected **for the duration of the Construction Phase** to maximise their ecological value in the final landscape plan. The project Arborist, the project Ecologist and the Site Manager will work together to ensure these sections of hedgerow are protected for the duration of the works.
All Habitats	Construction Phase	**Mitigation 2: Biosecurity**	None required.	Biosecurity measures will be implemented at the Construction Site by the Contractor.
Birds, Small Mammals, Amphibians & Lizards	Construction Phase	**Mitigation 5:** Vegetation Clearance - Timing	ECoW	The ECoW will be required to work closely with the Site Manager; to arrange to carry out **pre-clearance surveys** of any vegetation present on Site, especially if clearance during the period March 1st – August 1st (i.e., the breeding bird nesting season) is required. It is noted that clearance will be avoided during this period

ECOLOGICAL RECEPTOR	RELEVANT STAGE OF THE PROPOSED DEVELOPMENT	MITIGATION/ ENHANCEMENT MEASURE	MONITORING TYPE	DETAILS
				wherever possible through good management of the construction timeline.
Small Mammals	Construction Phase	**Mitigation 6:** Waste Management	ECoW	The ECoW will also liaise with the Site Manager to ensure that **mammal escape measures** are in place across the construction site in terms of excavations such as trenches, basements, foundations i.e., that planks or objects are being left in place at a suitable corner of any excavations each night.
Bats	Construction Phase	**Mitigation 3:** Construction Phase Lighting **Mitigation 4:** Bat friendly tree felling.	ECoW	The ECoW will be required **to check all trees to be felled for bats prior to felling.** In the event that a roosting bat is found, no felling of the tree in question will take place and a derogation licence will be obtained from the NPWS to proceed. The Area around the tree will be protected with an appropriate buffer to prevent disturbance of the bat. The ECoW will **assess the lighting measures in place for the Construction Phase**; to ensure that they will not cause any impacts to local bats during the night time. The ECoW will consult this EcIA Report to understand the priority areas for bat commuting/foraging at the Site and make recommendations where required.
Bats	Operational Phase	**Enhancement 1:** Bat Boxes	Ecologist	**Bat Boxes** – A suitably qualified Ecologist will oversee installation of bat boxes and liaise with the Site Manager to ensure that these enhancement measures are functional.
Swifts	Operational Phase	**Enhancement 3:** Swift Bricks	Ecologist	**Swift-Bricks** – A suitably qualified Ecologist will oversee installation of swift calling system and liaise with the Site Manager to

ECOLOGICAL RECEPTOR	RELEVANT STAGE OF THE PROPOSED DEVELOPMENT	MITIGATION/ ENHANCEMENT MEASURE	MONITORING TYPE	DETAILS
				ensure that swift box enhancement measures are functional.
Hedgerow and Woodland Areas	Operational Phase	**Enhancement 2:** Biodiversity Hedgerow and Woodland Management	Ecologist	**Biodiversity Hedgerow and Woodland Management** - A suitably qualified Ecologist will review the **Hedgerow and Woodland Management Plan (HWMP)** once prepared for the Site and signed off by Meath CoCo's Biodiversity Department. The Ecologist will visit the Site each summer for the **first 2-3 years post completion** to review the management of the hedgerows and woodland areas at the Site and confirm that the HWMP is being followed by the landscape maintenance company.

Table 8-19 Summary of Construction and Operational Phase Mitigation and Monitoring

8.10 Residual Impacts

Residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated. Table 8-20 below provides a summary of the impact assessment for the identified KERs and details the nature of the impacts identified, the mitigation measures proposed, and the classification of any residual impacts.

Both standard Construction Phase control measures, and specific mitigation measures, have been outlined to ensure that the Proposed Development does not impact on any species, habitats or designated sites of conservation importance. It is essential that these measures are complied with, in order to ensure that the Proposed Development complies with national conservation legislation.

Provided all recommended measures are implemented in full and remain effective throughout the lifetime of the Proposed Development, no significant negative residual impacts on the local ecology, or on any designated nature conservation sites, will occur as a result of the Proposed Development.

KEY ECOLOGICAL RESOURCE	EVALUATION	POTENTIAL IMPACT	IMPACT WITHOUT MITIGATION				PROPOSED MITIGATION / MITIGATING FACTORS	PROPOSED ENHANCEMENTS	RESIDUAL IMPACT
			QUALITY	MAGNITUDE / EXTENT	DURATION	SIGNIFICANCE			
DESIGNATED SITES									
No impacts to any designated sites will occur as a result of the Proposed Development and therefore no mitigation measures are recommended.									
HABITATS									
Hedgerows (WL1) and Scrub (WS1)	Local Importance (Higher Value)	**Construction Phase:**						**Enhancement 2:** Biodiversity Hedgerow and Woodland Management Plan.	Negative, Short-term, Slight (Initial loss of habitat) Positive, Permanent, Significant (Increase in habitat)
		Loss of habitat.	*Negative*	*Local*	*Short-term-Medium term*	*Moderate*	None required, Landscape Plan offsets majority of losses.		
		Damage to roots and/or overground growth.	*Negative*	*Local*	*Short-term*	*Moderate*	**Mitigation 1:** Tree Protection Measures		
		Net increase in habitat diversity, tree and woodland planting, and floral diversity across the Site	*Positive*	*Local*	*Permanent*	*Significant*	None required.		

KEY ECOLOGICAL RESOURCE	EVALUATION	POTENTIAL IMPACT	IMPACT WITHOUT MITIGATION				PROPOSED MITIGATION / MITIGATING FACTORS	PROPOSED ENHANCEMENTS	RESIDUAL IMPACT
			QUALITY	MAGNITUDE / EXTENT	DURATION	SIGNIFICANCE			
		Operational Phase:							
		None identified.	*None*	*None*	*None*	*None*	None required.		
Linked River Habitats - Naulswood, Bracetown, and Tolka	County Importance	**Construction Phase:**						None	Imperceptible
		Water quality deterioration.	*Negative*	*Local*	*Short-term*	*Slight*	Surface and ground water protection measures as per CEMP.		
		Operational Phase:							
		None identified	*None*	*None*	*None*	*None*	None required.		
All habitats	Local Importance (Higher Value) To County Importance	**Construction Phase:**						Overall increase in hedgerow, tree, shrub and meadow planting as a result of the Landscape Plan.	Imperceptible
		Spread of Invasive Flora	*Negative*	*Local*	*Long-term*	*Moderate*	**Mitigation 2:** Biosecurity		
		Operational Phase:							

KEY ECOLOGICAL RESOURCE	EVALUATION	POTENTIAL IMPACT	IMPACT WITHOUT MITIGATION				PROPOSED MITIGATION / MITIGATING FACTORS	PROPOSED ENHANCEMENTS	RESIDUAL IMPACT
			QUALITY	MAGNITUDE / EXTENT	DURATION	SIGNIFICANCE			
		None identified.	*None*	*None*	*None*	*None*	None required.		
FAUNA									
Bat Assemblage	Local Importance (Higher Value)	**Construction Phase:**						**Enhancement 1:** Bat Boxes Overall increase in hedgerow, tree, shrub and meadow planting as a result of the Landscape Plan. Use of pollinator friendly flora will promote bat usage of the Site.	Negative, Short-term, Slight (Habitat loss) Imperceptible (Vegetation clearance & Lighting) Positive, Permanent, Significant (Bat boxes – new roosting habitat) Negative, Short-term, Slight (Public Lighting)
		Disturbance from Construction Lighting.	*Negative*	*Local*	*Short-term*	*Moderate*	**Mitigation 3:** Construction Phase Lighting		
		Loss of hedgerow habitat	*Negative*	*Local*	*Short-term*	*Moderate*	None required		
		Potential injury/death from tree felling	*Negative*	*Local*	*Short-term*	*Slight*	**Mitigation 4:** Bat-friendly Tree Felling **Mitigation 5:** Vegetation Clearance - Timing		
		Operational Phase:							

KEY ECOLOGICAL RESOURCE	EVALUATION	POTENTIAL IMPACT	IMPACT WITHOUT MITIGATION				PROPOSED MITIGATION / MITIGATING FACTORS	PROPOSED ENHANCEMENTS	RESIDUAL IMPACT
			QUALITY	MAGNITUDE / EXTENT	DURATION	SIGNIFICANCE			
		Disturbance from public lighting.	*Negative*	*Local*	*Permanent*	*Moderate*	Public Lighting Plan designed to be bat friendly (See Section 0)		
Bird Assemblage	Local Importance (Higher Value)	**Construction Phase:**						**Enhancement 2:** Biodiversity Hedgerow and Woodland Management Plan. **Enhancement 3**: Swift Bricks.	Negative, Short-term, Slight. (Vegetation clearance & Noise etc.) Imperceptible (Decrease in habitat suitability) Negative, Long-term/ Permanent, Slight (Public lighting) Positive, Long-term, Significant (Habitat for endangered swifts)
		Injury/death from vegetation clearance.	*Negative*	*Local*	*Short-term*	*Significant*	**Mitigation 6:** Vegetation Clearance - Timing		
		Disturbance from Construction activity, noise, dust and lighting.	*Negative*	*Local*	*Short-term*	*Slight*	**Mitigation 3:** Construction Phase Lighting Standard measures to control noise & dust as outlined in CEMP.		
		Operational Phase:							
		Decreased suitability of habitats due to	*Negative*	*Local*	*Long-term*	*Moderate*	None required.		

KEY ECOLOGICAL RESOURCE	EVALUATION	POTENTIAL IMPACT	IMPACT WITHOUT MITIGATION				PROPOSED MITIGATION / MITIGATING FACTORS	PROPOSED ENHANCEMENTS	RESIDUAL IMPACT
			QUALITY	MAGNITUDE / EXTENT	DURATION	SIGNIFICANCE			
		habitat replacement.							
		Disturbance from public lighting.	*Negative*	*Local*	*Long-term*	*Slight*	Public Lighting Plan designed to be wildlife friendly (See section 0)		
Badger	Local Importance (Higher value)	Harm/mortality during Site clearance if present	*Negative*	*Local*	*Short-term*	*Significant*	**Mitigation 7:** Pre-commencement Badger Survey	None.	Imperceptible
Small Mammals (Hedgehog, pygmy shrew, Irish stoat, wood mouse)	Local Importance (Higher value)	**<u>Construction Phase:</u>**						None.	Negative, Short-term, Slight (Habitat loss & vegetation clearance) Imperceptible (Construction waste) Negative, Long-term/ Permanent, Imperceptible - Slight (Public lighting & vehicle collisions)
		Habitat loss until landscape planting develops.	*Negative*	*Local*	*Short-term*	*Moderate*	None required, Landscape Plan offsets majority of losses.		
		Risk of injury or death during vegetation clearance and / or entrapment in construction-related rubbish.	*Negative*	*Local*	*Short-term*	*Moderate*	**Mitigation 5:** Vegetation clearance – Timing **Mitigation 6:** Waste management		

KEY ECOLOGICAL RESOURCE	EVALUATION	POTENTIAL IMPACT	IMPACT WITHOUT MITIGATION				PROPOSED MITIGATION / MITIGATING FACTORS	PROPOSED ENHANCEMENTS	RESIDUAL IMPACT
			QUALITY	MAGNITUDE / EXTENT	DURATION	SIGNIFICANCE			
		Operational Phase:							
		Injury/death from vehicular collisions.	*Negative*	*Local*	*Long-term*	*Slight*	None identified.		
		Habitat loss due public lighting	*Negative*	*Local*	*Long-term*	*Imperceptible*	Public Lighting Plan designed to be wildlife friendly (See section o)		
Common lizard	Local Importance (Higher Value)	**Construction Phase:**						None.	Imperceptible.
		Risk of injury or death during vegetation clearance and / or entrapment in construction-related rubbish.	*Negative*	*Local*	*Short-term*	*Slight*	**Mitigation 5:** Vegetation clearance – Timing **Mitigation 6:** Waste management		
		Operational Phase:							
		None identified.	*None*	*None*	*None*	*None*	None required.		

KEY ECOLOGICAL RESOURCE	EVALUATION	POTENTIAL IMPACT	IMPACT WITHOUT MITIGATION				PROPOSED MITIGATION / MITIGATING FACTORS	PROPOSED ENHANCEMENTS	RESIDUAL IMPACT
			QUALITY	MAGNITUDE / EXTENT	DURATION	SIGNIFICANCE			
Fauna of the Tolka: • **Otter** • **Fish assemblage**	Local Importance (Higher Value)	**Construction Phase:**						None	Imperceptible.
		Risk of harm/death due to potential water quality deterioration.	*Negative*	*Local*	*Short-term*	*Slight*	Surface and ground water protection measures as per CEMP.		
		Operational Phase:							
		None identified.	*None*	*None*	*None*	*None*	SUDS measures		

Table 8-20 Summary of Potential Impacts On KER(s), Mitigation Proposed And Residual Impacts.

8.11 Conclusion

It is considered that, provided the mitigation measures proposed within this report together with all best practice development standards as outlined in the CEMP are carried out in full, there will be no significant negative impact to any KER habitat, species group or overall biodiversity as a result of the Proposed Development.

The Proposed Development is considered to result in an overall slight positive impact to the floral biodiversity of the site via the landscaping plan, which proposes the retention and enhancement of the existing western hedgerows at the Site and a net increase in total native and non-native trees at the Site through supplementary planting. This will in turn provide additional suitable foraging, commuting and nesting habitat for local populations of fauna including birds, bats and small mammals in an otherwise relatively ecologically poor agricultural landscape, and provide connectivity between the Site and the wider area. The inclusion of bat boxes in the design of the Proposed Development will also provide novel roosting habitat for bats at the Site, and the inclusion of swift bricks in the design of the Proposed Development will provide novel nesting habitat for this endangered bird species. As such, the Proposed Development will provide an overall slight net gain in biodiversity.

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9 AIR QUALITY AND CLIMATE

9.1 Introduction

This chapter describes and assesses the potential impacts on air quality and climate associated with the Proposed Development at lands at Station Road and Pace Line, Dunboyne, Co. Meath.

Taking into account Ambient Air Quality Standards[4], the baseline air quality will be examined along with the potential for release of emissions to the atmosphere and associated effects prior to and following mitigation measures.

This chapter also describes and assesses the potential impacts on micro and macro-climate as a result of the Proposed Development. Attention will be focused on Ireland's obligations under the Paris Agreement in the context of the overall climatic impact of the presence and absence of the Proposed Development.

9.1.1 Author Information and Competency

This chapter was prepared by Laura Griffin, Environmental Consultant, Enviroguide Consulting. Laura has a Master of Science (Hons) in Climate Change from Maynooth University and a Bachelor of Arts (Hons) in English and Geography from Maynooth University. Laura has worked as an Environmental Consultant with Enviroguide since 2021 and has built up experience preparing Environmental Impact Assessment (EIA) Screening Reports, Air Quality and Climate, Noise and Vibration, and Material Assets (Waste and Utilities) assessments and chapters for EIARs.

This chapter has been reviewed and approved by Harry Parker, Technical Director and EIA Lead at Enviroguide. Harry is an environmental consultant with 16 years' experience in consultancy, specialising in EIAs for large-scale residential and commercial developments, working closely with a range of developers, planning consultants and architects within the public and private sector.

9.1.1 Ambient Air Quality Standards

For the protection of health and ecosystems, EU directives apply air quality standards in Ireland and other EU member states for a range of pollutants. These rules include requirements for monitoring, assessment and management of ambient air quality. The first major instrument in tackling air pollution was the Air Quality Framework Directive 96/62/EC and its four daughter Directives. Each of these instruments was repealed with the introduction of Directive 2008/50/EC on ambient air quality and cleaner air for Europe in 2008 (as amended by Decision 2011/850/EU and Directive 2015/1480/EC) (the CAFE Directive), save for the "Fourth Daughter Directive" (Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air). The CAFE Directive lays down measures aimed at:

1) defining and establishing objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole;
2) assessing the ambient air quality in Member States on the basis of common methods and criteria and, in particular, assessing concentrations in ambient air of certain pollutants;
3) providing information on ambient air quality in order to help combat pollution and nuisance and to monitor long-term trends and improvements resulting from national and Community measures;

[4] Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) Irish Statute Book.

4) ensuring that such information on ambient air quality is made available to the public;
5) maintaining air quality where it is good and improve it in other cases;
6) promoting increased cooperation between the Member States in reducing air pollution.

Ambient air quality monitoring and assessment in Ireland is carried out in accordance with the requirements of the CAFE Directive. The CAFE Directive has been transposed into Irish legislation by the Air Quality Standards Regulations (S.I. No. 180 of 2011). The CAFE Directive requires EU member states to designate 'Zones' reflective of population density for the purpose of managing air quality. Four zones were defined in the Air Quality Standards Regulations (2011) and subsequently amended in 2013 to account for 2011 census population counts and to align with coal restricted areas in the Air Pollution Act (Marketing, Sale, Distribution and Burning of Specified Fuels) Regulations 2012. (S.I. No. 326 of 2012) (the 2012 Regulations).

The main areas defined in each zone are:

- **Zone A:** Dublin Conurbation
- **Zone B:** Cork Conurbation
- **Zone C:** Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise.
- **Zone D:** Rural Ireland, i.e., the remainder of the State excluding Zones A, B and C.

The site of the Proposed Development is located at lands at Station Road and Pace Line, Dunboyne, Co. Meath and falls under the 'Zone D' category based on the Air Quality Standards Regulations. The CAFE Directive outlines certain limit or target values specified by the five published directives that apply limits to specific air pollutants. These limits, outlined in Table 9.1, will be referred to as part of the Proposed Development assessment with respect to air quality.

POLLUTANT	*LIMIT VALUE OBJECTIVE*	*AVERAGING PERIOD*	*LIMIT VALUE µg/m3*	*LIMIT VALUE ppb*	*BASIS OF APPLICATION OF THE LIMIT VALUE*	*LIMIT VALUE ATTAINMENT DATE*
SO_2	*Protection of human health*	*1 hour*	*350*	*132*	*Not to be exceeded more than 24 times in a calendar year*	*1 Jan 2005*
SO_2		*24 hours*	*125*	*47*	*Not to be exceeded more than 3 times in a calendar year*	*1 Jan 2005*
SO_2	*Protection of vegetation*	*Calendar year*	*20*	*7.5*	*Annual mean*	*19 July 2001*
SO_2		*1 Oct to 31 Mar*	*20*	*7.5*	*Winter mean*	*19 July 2001*

POLLUTANT	LIMIT VALUE OBJECTIVE	AVERAGING PERIOD	LIMIT VALUE µg/m3	LIMIT VALUE ppb	BASIS OF APPLICATION OF THE LIMIT VALUE	LIMIT VALUE ATTAINMENT DATE
NO_2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1 Jan 2010
NO_2		Calendar year	40	21	Annual mean	1 Jan 2010
$NO + NO_2$	Protection of ecosystems	Calendar year	30	16	Annual mean	19 Jul 2001
PM10	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1 Jan 2005
PM10		Calendar year	40	-	Annual mean	1 Jan 2005
PM2.5 – Stage 1		Calendar year	25	-	Annual mean	1 Jan 2015
PM2.5 – Stage 2		Calendar year	20	-	Annual mean	1 Jan 2020
Lead		Calendar year	0.5	-	Annual mean	1 Jan 2005
Carbon Monoxide		24 hours	10,000	8,620	Not to be exceeded	1 Jan 2005
Benezene		Calendar year	5	1.5	Annual mean	1 Jan 2010

Table 9.1: Terminology used to assess the quality, significance and duration of potential impacts and effects

The Environmental Protection Agency (EPA) is the competent authority for the purpose of the CAFE Directive and is required to send an annual report to the Minister for Environment and the European Commission. The regulations further provide for the distribution of public information. This includes information on any exceedances of target values, the reasons for exceedances, the area(s) in which they occurred, and the relevant information regarding effects on human health and environmental impacts.

9.1.2 Climate Agreements

Climate change is recognised as one of the most serious global environmental problems and arguably the greatest challenge facing humanity today. While natural variations in climate over time are normal, anthropogenic activities have interfered greatly with the global atmospheric system by emitting substantial amounts of greenhouse gases (GHGs). This has caused a discernible effect on our global climate system, with continued change expected due to current and predicted trends of GHG emissions. In Ireland this is demonstrated by rising sea levels, changes in the ecosystem, and extreme weather events.

In March 1994, the United Nations Framework Convention on Climate Change (UNFCCC) was established as an intergovernmental effort to tackle the challenges posed by climate change. The Convention membership is almost universal, with 197 countries having ratified. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices. This information is then utilised to launch national strategies and international agreements to address GHG emissions. Following the formation of the UNFCCC, two major international climate change agreements were adopted: The Kyoto Protocol, and the Paris Agreement.

In April 1994, Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) and subsequently signed the Kyoto Protocol in 1997. The Kyoto Protocol is an international agreement linked to the UNFCCC which commits its parties to legally binding emission reduction targets. In order to ensure compliance with the protocol, the Intergovernmental Panel on Climate Change (IPCC) has outlined detailed guidelines on compiling National Greenhouse Gas Inventories. These are designed to estimate and report on national inventories of anthropogenic GHG emissions and removals. Under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six named GHGs to 13% above the 1990 level, spanning the period 2008 to 2012.

The second commitment period of the Kyoto Protocol was established by the Doha amendment which was adopted in extremis on the 8th of December 2012, to impose quantified emission limitation and reduction commitments (QELRCs) to Annex I (developed country) Parties during a commitment period from 2013 to 2020. 38 developed countries, inclusive of the EU and its 28 member states, are participating. Under the Doha amendment, participating countries have committed to an 18% reduction in emissions from 1990 levels. The EU has committed to reducing emissions in this period to 20% below 1990 levels. Ireland's QELRCs for the period 2013 to 2020 is 80% of its base year emissions. Ireland's compliance with the Doha amendment will be assessed based on the GHG inventory submission in 2022 for 1990-2020 data. As of October 2020, the Doha Amendment has received the required number of ratifications to enter into force. Once in force, the emission reduction commitments of participating developed countries and economies in transition (EITs) become legally binding.

In December 2015, the Paris Climate Change Conference (COP21) took place and was an important milestone in terms of international climate change agreements. The Paris Agreement sets out a global action plan to put the world on track to mitigate dangerous climate change by setting a global warming limit not to exceed 2°C above pre-industrial levels, with efforts to limit this to 1.5°C. As a contribution to the objectives of the agreement, countries have submitted comprehensive national climate action plans (nationally determined contributions, NDCs). Under this agreement, governments agreed to come together every 5 years to assess the collective progress towards the long-term goals and inform Parties in updating and enhancing their nationally determined contributions. Ireland will contribute to the Agreement through the NDC tabled by the EU on behalf of Member States in 2020, which commits to a 55% reduction in EU-wide emissions by 2030 compared to 1990. This is considered to be the current NDC maintained by the EU and its Member States under Article 4 of the Paris Agreement.

The EU has set itself targets for reducing its GHG emissions progressively up to 2050, these are outlined in the 2020 climate and energy package and the 2030 climate and energy policy framework. These targets are defined to assist the EU in transitioning to a low-carbon economy, as detailed in the 2050 low carbon roadmap. The 2020 package is a set of binding legislation to ensure that the EU meets its climate and energy targets for the year 2020. There are three key targets outlined in the package which were set by the EU in 2007 and enacted in legislation in 2009:

- 20% reduction in GHG emissions from 1990 levels;
- 20% of EU energy to be from renewable sources;
- 20% improvement in energy efficiency.

The 2030 climate and energy framework builds on the 2020 climate energy package and was adopted by EU leaders in October 2014. The framework sets three key targets for the year 2030:

- At least 40% cuts in GHG emissions from 1990 levels;
- At least 32% share for renewable energy;
- At least 32.5% improvement in energy efficiency.

The EU has acted in several areas in order to meet these targets, including the introduction of the Emissions Trading System (ETS). The ETS is the key tool used by the EU in cutting GHG emissions from large-scale facilities in the power, industrial, and aviation sectors. Around 45% of the EU's GHG emissions are covered by the ETS.

As part of the European Green Deal, the Commission proposed in September 2020 to raise the 2030 greenhouse gas emission reduction target, including emissions and removals, to at least 55% compared to 1990. The European Climate Law came into force in July 2021 and writes into law the goal set out in the European Green Deal for Europe's economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.

9.1.1.1 National Policy Position and Greenhouse Gas Emissions in Ireland

National climate policy in Ireland recognises the threat of climate change to humanity and supports mobilisation of a comprehensive international response to climate change, and global transition to a low-carbon future. A fundamental national objective aims to achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050.

The Climate Action and Low Carbon Development (Amendment) Act 2021 was adopted in 2021 and sets Ireland on a legally binding path to net-zero emissions no later than 2050, and to a 51% reduction in emissions by the end of this decade. The Act provides the framework for Ireland to meet its international and EU climate commitments and to become a leader in addressing climate change.

The Irish Government recently published its Climate Action Plan (2021) which provides a detailed framework for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting Ireland on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and as required by the Climate Act 2021. The plan lists the actions needed to deliver on national climate targets and sets indicative ranges of emissions reductions for each sector of the economy. It will be updated annually, next in 2022, to ensure alignment with Ireland's legally binding economy-wide carbon budgets and sectoral ceilings.

The Climate Action Plan 2024 (CAP24) is the third annual update to Ireland's Climate Action 2019 (the plans are to be updated annually to ensure alignment with Ireland's legally binding economy-wide carbon budgets and sectoral ceilings). A draft plan was agreed by the Irish Government in December 2023 and, following the completion of Strategic Environmental Assessment and Appropriate Assessment (in accordance with the European Union Directives), the finalised version of the CAP24 was approved by the Irish Government on 21st May 2024.

CAP24 builds on the previous plans by refining and updating the measures and actions required to deliver the carbon budgets and sectoral emissions ceilings and is focused on:

- Underpinning delivery of the established pathways by conducting a stock-take of progress to date, in order to identify gaps and potential corrective actions;

- Identifying measures to address unallocated emission savings; and
- Identifying an approach to achieving emissions reduction and to reporting in the Land Use, Land Use Change and Forestry (LULUCF) sector.
-

The supplementary Annex of Actions which accompanies the Climate Action Plan has also been approved by the Irish Government. For 2024, a new approach to the Annex has been implemented that will see only new, high-impact actions included in the Annex, while the full roadmap of actions to support the delivery of our climate targets remains within the Climate Action Plan itself.

The Environmental Protection Agency (EPA) Ireland published Ireland's first Climate Change Impact Assessment Report (ICCA) in January 2024. This major scientific assessment serves to complement and localise the global assessments undertaken by the Intergovernmental Panel on Climate Change (IPCC). Its findings build upon these assessments and add important local and national context. The ICCA is the first comprehensive and authoritative assessment of knowledge of climate change in Ireland.

The Meath County Council (MCC) Climate Action Strategy was officially launched on the 16th September 2019 by Chief Executive, Cathaoirleach, Senior Management, Chair of the Climate Action Forum and Climate Action Team.
A key driver for the development of the Climate Action Plan is the need to respond to international, European, and national climate change action through a wide range of agreements, directives, legislation, and regulations. This includes the Irish Government's Climate Action and Low Carbon Development Act 2015, National Mitigation Plan, National Adaptation Framework, and National Planning Framework.

The plan is linked to the County Development Plan and covers the period from 2019-2025. The main purpose of the MCC Climate Action Strategy is to outline the practical actions that will help County Meath adapt to and mitigate against climate change, and specifically across the key sectors over which Meath County Council exercise at least some level of operational control or influence. The MCC Climate Action Strategy has the following targets:

- Reducing Meath County Councils emissions by 33% by 2020;
- Reducing CO_2 emissions of the county by at least 40% by 2040;
- Increasing resilience by adapting to the impacts of climate change;
- Sharing the vision, results, experience and know-how with fellow local and regional authorities within the EU and beyond through direct cooperation and peer-to-peer exchange, namely in the context of the Global Covenant of Mayors.

The MCC Climate Action Strategy sets out over 150 actions and addresses both adaptation and mitigation, covering eight thematic areas (Economy, Mobility, Built Environment, Clean Energy, Resource Management, Water, Natural Resources and Planning). The implementation of the measures promoted in the MCC Climate Action Strategy will enable County Meath to adapt to climate change and will assist in bringing Ireland closer to achieving its climate related targets in future years. New developments need to be cognisant of the MCC Climate Action Strategy and incorporate climate friendly designs and measures where possible.

Ireland's latest greenhouse gas (GHG) emissions 1990-2022 are provisional figures based on the Sustainable Energy Authority Ireland's (SEAI's) final energy balance released in September 2023 (EPA, 2024). In 2022, Ireland's GHG emissions are estimated to be 60.60 million tonnes carbon dioxide equivalent (Mt CO_2 eq), which is 1.9% lower (or 1.15 Mt CO_2 eq) than emissions in 2021 (61.75 Mt CO_2 eq) and follows a 5.1% increase in emissions reported in 2021. Emissions are 0.4% below pre-COVID, 2019 figures.

In 2022, emissions in the stationary Emissions Trading Scheme (ETS) sector decreased by 4.1% and emissions under the ESR (Effort Sharing Regulation) decreased by 1.1%. When Land Use, Land Use Change and Forestry (LULUCF) is included, total national emissions decreased by 2.7%.

Decreased emissions in 2022 compared to 2021 were observed in the largest sectors except for transport and waste. These two sectors showed increases in emissions (+6.0%, +6.6%, respectively).

Emissions per capita decreased from 12.4 tonnes CO_2 eq per person in 2021 to 11.9 tonnes CO_2 eq per person in 2022. Ireland's average tonnes of GHG per capita over the last ten years were 12.7 tonnes. With recent Central Statistics Office (CSO) preliminary 2022 census data showing a population of 5.12 million people and with population projected to increase to 5.5 million in 2030, 5.9 million in 2040 and 6.2 million by 2050, per capita emissions need to reduce significantly. At current per capita emission levels, each addition 500,000 people would contribute an additional 6 million tonnes of CO_2eq annually.

Arresting growth in emissions is a challenge in the context of a growing economy but one which must continue to be addressed by households, business, farmers and communities if Ireland is to reap the benefits of a low-carbon economy.
The greenhouse gas emission inventory for 2022 is the second of ten years over which compliance with targets set in the European Union's Effort Sharing Regulation (EU 2018/842) will be assessed. This Regulation sets 2030 targets for emissions outside of the Emissions Trading Scheme (known as ESR emissions) and annual binding national limits for the period 2021-2030. Ireland's target is to reduce it's greenhouse gas emissions by at least 42% by 2030 compared with 2005 levels, with a number of flexibilities available to assist in achieving this. The ESR includes the sectors outside the scope of the EU Emissions Trading System (ETS) (such as Agriculture, Transport, Residential, Public Services and Commercial Services and Waste).

Ireland's ESR emissions annual limit for 2022 is 42.36 Mt CO_2eq. Ireland's final 2022 greenhouse gas ESR emissions are 45.90 Mt CO_2eq, this is 3.54 Mt CO_2eq more than the annual limit for 2022. This value is the national total emissions less emissions generated by stationary combustion i.e. power plants, cement plants, and domestic aviation operations that are within the EU's emissions trading scheme. Using both the ETS and LULUCF flexibilities, Ireland is in compliance with its 2022 Effort Sharing Regulation annual limit with a surplus of 1.05 Mt CO_2eq. It should be noted that using the ETS flexibility alone Ireland would be in non-compliance, exceeding the allocation by 1.63 Mt CO_2eq, and that the final quantity of LULUCF flexibility available to Ireland will be finalised in 2032. Agriculture and Transport accounted for 76.4% of total ESR emissions in 2022.

The latest projections (May 2024) indicate that currently implemented measures (With Existing Measures) will achieve a reduction of 9% on 2005 levels by 2030, significantly short of the 42% reduction target. If measures in the higher ambition (With Additional Measures) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 25% by 2030, still short of the 42% reduction target.

In terms of the 2030 targets, the ESR provides two flexibilities (use of ETS allowances and credit from action undertaken in the land use, land use change and forestry (LULUCF) sector) to allow for a fair and cost-efficient achievement of the targets. New regulations in 2023 mean there are new rules around LULUCF flexibility that incorporates split budget 2021-2025 to 2026-2030[5]. Additional analyses are needed to estimate the impact of the new rules on flexibilities. In the interim, based on latest LULUCF inventory and projections

[5] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02018R0842-20230516&qid=1710343267770 Article 7 (1) (a) and (aa)

data, the maximum amount of LULUCF flexibility now projected to be available is 13.4 Mt CO_2eq in the first 5-year period (or 2.68 Mt CO_2eq per annum), with no flexibility available in the second 5-year period.

Ireland's greenhouse gas (GHG) emissions increased in the period from 1990 to 2001 where it peaked at 71.48 Mt CO_2 equivalent, before displaying a downward trend to 2014. Emissions increased by 4.2% and 3.7%, respectively in the years, 2015 and 2016 and remained relatively stable in 2017 and 2018, followed by a 4.1% decrease in 2019. In 2020 total national GHG emissions were 3.5% lower than 2019 emissions largely driven by the covid restrictions. The gradual lifting of covid restrictions in 2021 along with an increase in the use of coal and less renewables within electricity generation resulted in a 5.1% increase in emissions in 2021 compared to 2020. A 1.9% decrease in emissions was seen in 2022 compared to 2021, mainly due to a substantial decrease in residential sector emissions combined with decreases from industry, agriculture and electricity generation. Ireland's GHG emissions have increased by 9.7% from 1990-2022.

In relation to the greenhouse gases; carbon dioxide (CO_2) accounted for 60.6% of the total, with methane (CH_4) and nitrous oxide (N_2O) contributing 29.1% and 9.1% as CO_2 equivalent, respectively and F-gases contributing 1.2% of the total as CO_2 equivalent.

In 2022, the energy industries, transport and agriculture sectors accounted for 74.6% of total GHG emissions. Agriculture is the single largest contributor to the overall emissions, at 38.5%. Transport, energy industries and the residential sector are the next largest contributors, at 19.4%, 16.6% and 9.5%, respectively (EPA, 2024).

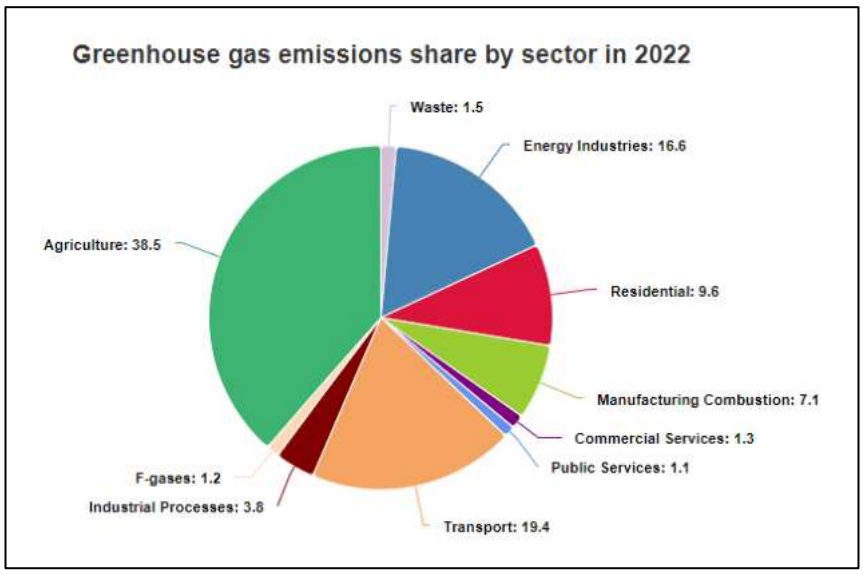

Figure 9.1 – Ireland's Greenhouse Gas Emissions Share by Sector 2022 (Source: EPA, 2024)

The Climate Change Advisory Council submitted their Annual Review 2023 to the Minister of the Environment, Climate and Communications on 21st of July 2023. Detailed key messages, including observations and recommendations for each sector (electricity; transport; built environment; enterprise and waste; agriculture, forestry and other land use; and biodiversity), can be found at the beginning of each chapter in the annual review. The overall recommendations are as follows:

- Government must address areas of uncertainty in how Ireland will reduce its emissions. The sectoral emissions ceilings for the LULUCF sector must be set, and it must be clear how each sector must reduce its emissions;
- Government needs to identify and remove barriers to policy implementation by ensuring adequate funding and planning reform at scale and speed;

- Key actions need to be implemented now to prevent longer term drainage and increased costs to society and the economy;
- Government must adopt new approaches to address emission reductions, creating investment and enhancing skills across the economy, particularly in areas such as retrofitting and renewable energy;
- The establishment of a Just Transition Commission is recommended to ensure that Ireland achieves its climate objectives in a way that is fair and equitable and protects vulnerable people and communities; and
- The Government should support opportunities that reduce emissions and make Ireland better prepared for the impacts of climate change.

9.2 Study Methodology

The study methodology is best practice and understood approach. Taking into account Ambient Air Quality Standards, the baseline air quality of the site is examined using EPA monitoring data. Air quality impacts from the Proposed Development are then determined by a qualitative assessment of the nature and scale of dust generating activities associated with the Construction Phase of the Proposed Development in accordance with relevant guidance (Institute of Air Quality Management (IAQM) 2024).
A desktop study involving various national and international documents on climate change and analysis of synoptic meteorological data from the nearest Met Eireann station (Casement Aerodrome Synoptic Station) was also carried out in order to compile this report. Attention has been focused on Ireland's obligations under the Paris Agreement in the context of the overall climatic impact of the presence and absence of the Proposed Development.

9.2.1 Construction Phase

9.2.1.1 Construction Phase Dust Impact Assessment

The main air quality impacts that may arise during demolition and construction activities are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes, which are evidence of dust emissions;
- Elevated PM10, PM2.5 concentrations from demolition and construction activities (including earthworks and trackout); and
- An increase in concentrations of PM10, PM2.5 and nitrogen dioxide due to exhaust emissions from vehicles and equipment used on site (non-road mobile machinery) and vehicles accessing the site.
-

As with any impact, the risk will be determined by the magnitude of the source, the effectiveness of the pathway and the sensitivity of the receptor.
The IAQM Guidance on the assessment of dust from demolition and construction (2024) provides a framework for the assessment of risk.
Activities on construction sites have been divided into four types in the guidance:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

The potential for dust emissions is assessed for each activity that is likely to take place.

The assessment methodology considers three separate dust impacts:

- Annoyance due to dust soiling;
- The risk of health impacts due to an increase in exposure to PM10; and

- Harm to ecological receptors with account being taken of the sensitivity of the area that may experience these effects.
-

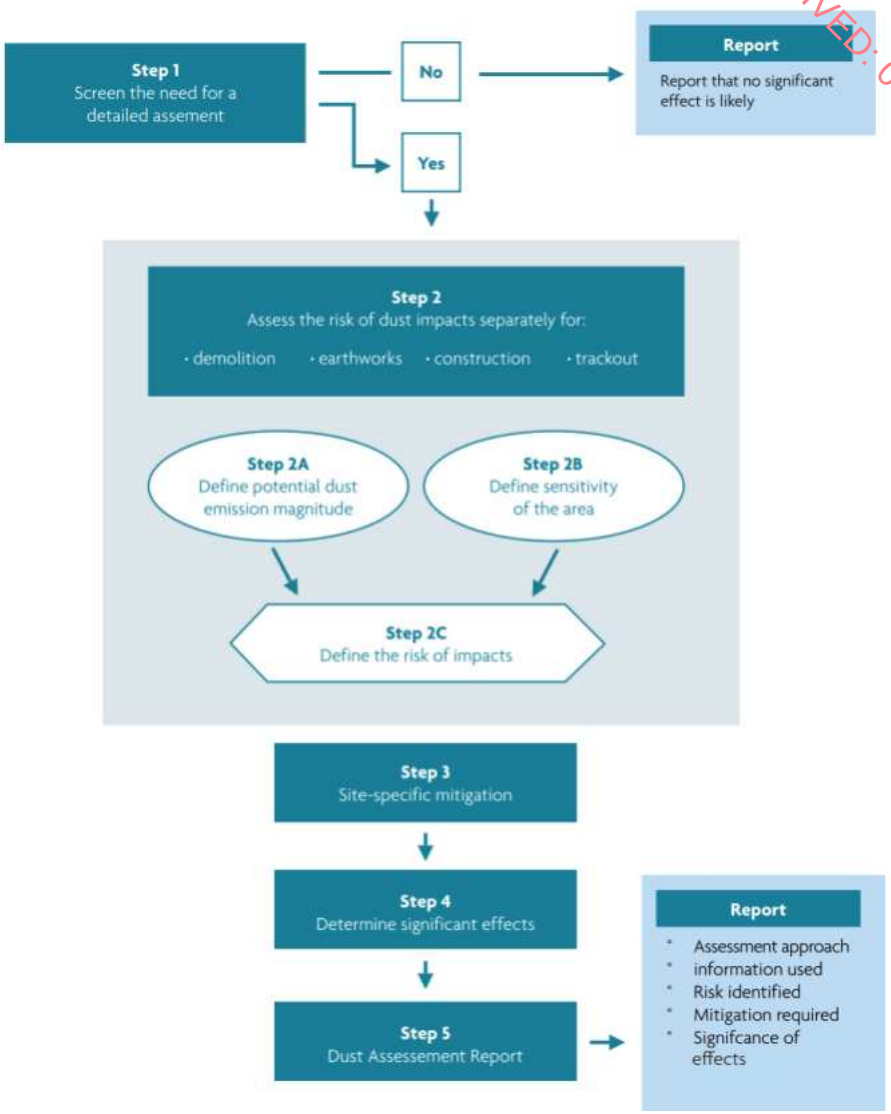

Figure 9.2 – Steps to Perform a Dust Assessment (IAQM, 2024)

Step 1 - Screening the Need for a Detailed Assessment

Step 1 is to screen the requirement for a more detailed assessment. An assessment will normally be required where there is:

- A human receptor within:
  - 250m of the boundary of the site; and/or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).
- An 'ecological receptor' within:
  - 50m of the boundary of the site; and/or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).
-

A review of publicly available information indicates that there are no statutory (international or national) ecological receptors within 50m of the site or applicable

construction routes. The hedgerows on site have been considered to have high ecological value (see chapter 8 – Biodiversity), however, they are not considered to be sensitive to dust deposition as per the IAQM Guidance (2024). The Tolka would be considered a sensitive receptor, however is outside of the 50m distance from the proposed development. It can therefore be concluded, as there are no statutory receptors within the distance defined by the criteria, that the level of risk to ecological sites is negligible, and impacts will not be significant.

Therefore, assessment of potential impacts to ecological receptors has been scoped out and is not considered further in this assessment. As such, a detailed assessment of the potential impacts on ecological receptors is not required.

Figure 9. 3 – Map Showing 20m Buffer for Site Boundary

Figure 9.4 – Map Showing 50m Buffer for Site Boundary

Figure 9.5 – Map Showing 100m Buffer for Site Boundary

Figure 9.6 – Map Showing 250m Buffer for Site Boundary

Step 2 - Assess the Risk of Dust Impacts

Step 2 of the assessment is to assess the risk of dust impacts. This is carried out separately for each of the activities; as there are no demolition works proposed as part of the Proposed Development, the dust impacts are assessed for the remaining three activities (earthworks; construction; and trackout). According to the IAQM (2024), the risk of dust arising in sufficient quantities to cause annoyance and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high. 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 and large (Step 2A); and
- The sensitivity of the area to dust impacts (Step 2B), which is defined as low, medium or high sensitivity.
-

These two factors are combined in Step 2C to determine the risk of dust impacts with no mitigation applied. The risk category assigned to the site can be different for each of the four potential activities (earthworks, construction and trackout). More than one of these activities may occur on a site at any one time. Risks are described in terms of there being a low, medium and high risk of dust impacts for each of the four separate potential activities. Where there are low, medium and high risks of an impact, then site-specific mitigation will be required, proportionate to the level of risk.

Step 2A – Define the Potential Dust Emission Magnitude

The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium or Large.

Earthworks: Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium and large based on the definitions from the IAQM guidance:

- Large: Total site area >110,000m2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6m in height;
- Medium: Total site area 18,000m2 – 110,000m2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3m – 6m in height; and
- Small: Total site area <18,000m2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds >3m in height.
-

The dust emission magnitude for the proposed earthwork activities can be classified as large as a worst-case scenario, as the net developable site area is 15.79 hectares.
Construction: The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The IAQM example definitions for construction are:

- Large: Total building volume >75,000 m3, on site concrete batching, sandblasting;
- Medium: Total building volume 12,000 m3 – 75,000 m3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume <12,000 m3, construction material with low potential for dust release (e.g. metal cladding or timber).
-

Due to the size of the Proposed Development, as well as the fact that potentially dusty construction material (e.g. concrete) will be used, the dust emission magnitude for the proposed construction activities can be classified as medium.
Trackout: Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology and duration. As with all other potential sources, professional judgement must be applied when classifying trackout into one of the dust emission magnitude categories. IAQM definitions for trackout are:

- Large: >50 HDV (>3.5t) outward movements[6] in any one day[7], potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- Medium: 20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m; and
- Small: <20 HDV (3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.
-

[6] A vehicle movement is a one-way journey i.e., from A to B, and excludes the return journey.

[7] HDV movements during the construction project vary over its lifetime, and the number of movements is the maximum, not the average.

These numbers are for vehicles that leave the site after moving over unpaved ground, where they will accumulate mud and dirt that can be tracked out onto the public highway. The dust emission magnitude for the proposed trackout activities can be classified as large as a worst-case scenario.

Table 9.2 provides a summary of the dust emission magnitude of the site.

ACTIVITY	*DUST EMISSION MAGNITUDE*
Earthworks	**Large**
Construction	**Medium**
Trackout	**Large**

Table 9.2: Dust Emission Magnitude for the site

Step 2B – Define the Sensitivity of the Area

The sensitivity of the area takes account of a number of factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM_{10}, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Sensitivities of People to Dust Soiling Effects

For the sensitivity of people and their property to soiling, the IAQM (2024) recommends that the air quality practitioner uses professional judgment to identify where on the spectrum between high and low the sensitivity of a receptor lies, taking into account the following general principles set out in Table 9.3.

SENSITIVITY	*FEATURES*	*INDICATIVE EXAMPLES*
High	• ***Users can reasonably expect enjoyment of a high level of amenity; or*** • ***The appearance, aesthetics or value of their property would be diminished by soiling; and*** • ***The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of the use of the land.***	• ***Dwellings;*** • ***Museums and other culturally important collections; and*** • ***Medium and long-term car parks and show rooms.***
Medium	• ***Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to***	• ***Parks; and*** • ***Places of work.***

SENSITIVITY	*FEATURES*	*INDICATIVE EXAMPLES*
	enjoy the same level of amenity as in their home; or • *The appearance, aesthetics or value of their property could be diminished by soiling; or* • *The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.*	
Low	• *The enjoyment of amenity would not reasonably be expected;* • *Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or* • *There is a transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use for the land.*	• *Playing fields;* • *Farmland (unless commercially sensitive horticultural);* • *Footpaths;* • *Short-term carparks[8]; and* • *Places of work.*

Table 9.3: Sensitivities of People to Dust Soiling Effects (IAQM, 2024)

Sensitivities of People to Health Effects of PM_{10}

For the sensitivity of people to the health effects of PM_{10}, the IAQM (2024) recommends that the air quality practitioner assumes that there are three sensitivities based on whether or not the receptor is likely to be exposed to elevated concentrations over a 24-hour period, consistent with the Defra's advice for local air quality management, Defra LAQM Technical Guidance LAWM.TG (2022).

[8] Car parks have a range of sensitivities depending on the duration and frequency that people would be expected to park their cars there, and the level of amenity they could reasonably expect whilst doing so. Car parks associated with workplace or residential parking might have a high level of sensitivity compared to car parks used less frequently and for shorter durations, such as those associated with shopping. Cases should be examined on their own merits.

SENSITIVITY	*FEATURES*	*INDICATIVE EXAMPLES*
High	• *Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day)*[9].	• *Residential properties;* • *Hospitals;* • *Schools; and* • *Residential care homes.*
Medium	• *Locations where the people exposed are workers*[10]*, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).*	• *Offices and shop owners.* *(Workers occupationally exposed to PM_{10} are generally not included as protection is covered by Health and Safety at Work Legislation)*
Low	• *Locations where human exposure is transient*[11]*.*	• *Public footpaths;* • *Playing fields; and* • *Shopping streets.*

Table 9.4: Sensitivities of People to Health Effects of PM_{10} (IAQM, 2024)

Table 9.5 and 9.6 illustrate how the sensitivity of the area may be determined for dust soiling and human health impacts, respectively. It should be noted that the highest level of sensitivity from each table should be considered, as recommended by the IAQM.
The criteria detailed in 9.5 and 9.6 were used to determine the sensitivity of the area to dust soiling effects and human health impacts.

[9] This follows Defra guidance as set out in LAQM.TG (2022)

[10] Notwithstanding the fact that the air quality objectives and limit values do not apply to people in the workplace, such people can be affected by the exposure of PM_{10}. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers. For this reason, workers have been included in the medium sensitivity category.

[11] There are no standards that apply to short-term exposure, e.g. one or two hours, but there is still a risk of health impacts, albeit less certain.

RECEIVER SENSITIVITY	NUMBER OF RECEIVERS	DISTANCE FROM THE SOUCE (M)			
		<20M	<50M	<100M	<250M
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 9.5: Sensitivity of Dust Soiling Effects on People and Property

RECEIVER SENSITIVITY	ANNUAL MEAN PM_{10} CONCENTRATION	NUMBER OF RECEPTORS	DISTANCE FROM THE SOURCE (M)			
			<20	<50	<100	<250
High	>32 µg/m^3	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low

RECEIVER SENSITIVITY	ANNUAL MEAN PM_{10} CONCENTRATION	NUMBER OF RECEPTORS	DISTANCE FROM THE SOURCE (M)			
			<20	<50	<100	<250
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m³	>100	High	Medium	Low	Low
		10-100	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m³	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m³	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 µg/m³	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Table 9.6: Sensitivity of the Area to Human Health Impacts

Step 2C – Define the Risk of Impacts

In accordance with the IAQM Guidance, the dust emission magnitude (Step 2A) and sensitivity of the area (Step 2B) have been combined and the risk of impacts from construction, earthworks and trackout have determined (before mitigation is applied).

Table 9.7 to 9.9 illustrate how the dust emission magnitude should be combined with the sensitivity of the area to determine the risk with no mitigation measures applied.

POTENTIAL IMPACT	DUST EMISSION MAGNITUDE		
	LARGE	MEDIUM	SMALL
High	High Risk	Medium Risk	Medium Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible Risk

Table 9.7: **Risk of Dust - Earthworks**

POTENTIAL IMPACT	DUST EMISSION MAGNITUDE		
	LARGE	MEDIUM	SMALL
High	High Risk	Medium Risk	Medium Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible Risk

Table 9.8: **Risk of Dust – Construction**

POTENTIAL IMPACT	DUST EMISSION MAGNITUDE		
	LARGE	MEDIUM	SMALL
High	High Risk	Medium Risk	Medium Risk
Medium	Medium Risk	Low Risk	Negligible Risk
Low	Low Risk	Low Risk	Negligible Risk

Table 9.9: **Risk of Dust – Trackout**

The risk of dust impacts is based on the potential dust emissions magnitude and the sensitivity of the area. These two factors are then combined to determine the risk of dust impacts with no mitigation applied. In the absence of any site-specific information, a higher risk category has been applied to represent a worst-case scenario.
The risk of dust soiling and the impact on human health before mitigation, is summarised in Section 9.5.1.

9.2.1.2 Construction Phase Traffic Emissions

Construction vehicles and machinery during this phase will temporarily and intermittently generate exhaust fumes and consequently potential emissions of volatile organic compounds, nitrogen oxides, sulphur oxides, and particulate matter (dust). Dust emissions associated with vehicular movements are largely due to the resuspension of particulate materials from ground disturbance. According to the IAQM (2024), experience from the assessment of exhaust emissions from on-site machinery and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. Air pollutants may increase marginally due to construction-related traffic and machinery from the Proposed Development. However, any such increase is not considered significant and will be well within relevant ambient air quality standards. According to TII (2011), the significance of impacts due to vehicle emissions during the construction phase will be dependent on the number of additional vehicle movements, the proportion of HGVs and the proximity of sensitive receptors to site access routes. If construction traffic would lead to a significant change (> 10%) in Annual Average Daily Traffic (AADT) flows near to sensitive receptors, then concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ should be predicted in line with the methodology as outlined within TII guidance. Construction traffic is not expected to result in a significant change (> 10%) in AADT flows near to sensitive receptors (see Volume 3 - Appendices for Construction Phase Traffic AADTs). Therefore, a detailed air quality assessment is not required.

9.2.2 Operational Phase

9.2.2.1 Road Traffic Emissions

Operational phase traffic impact assessment involved air dispersion modelling using the UK Design Manual for Roads and Bridges Screening Model (DMRB, UK Highways Agency 2007) (Version 1.03c), the NO_x to NO_2 Conversion Spreadsheet (UK Department for Environment, Food and Rural Affairs, 2017), and following all relevant guidance (TII, 2011; HA, 2007; EPA; UK DEFRA; IAQM).

In terms of associated impacts on air quality, Table 9.10 outlines the typical criteria that are pre-requisite for an air quality assessment:

POTENTIAL CHANGE RESULTING FROM PROPOSED DEVELOPMENT	*INDICATIVE CRITERIA TO PROCEED TO AN AIR QUALITY ASSESSMENT*
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors	***A change of LDV flows of more than 1000 Annual Average Daily Traffic (AADT)***
Cause a significant change in Heavy Duty Vehicle (HGV) flows on local roads with relevant receptors	***A change of HGV flows of more than 100 Annual Average Daily Traffic (AADT)***
Cause a change in Daily Average Speed (DAS)	***Where the change is 5m or more***
Cause a change in peak hour speed	***Where the peak hour speed will change by 20km/h or more.***

Table 9.10: **Indicative Criteria for Requiring an Air Quality Assessment (Source: IAQM, 2017)**

The UK Highways Agency Design Manual for Roads and Bridges (DMRB) air quality guidance (LA 105) provides a framework for assessing, mitigating, and reporting the

effects of road schemes on air quality; however, this can be adapted to any development which results in a change in traffic.
The criteria as set out in Table 9.11 have been used to determine the project's risk potential to the receiving environment, and whether a simple or detailed air quality assessment is re-quired. If the receiving environment is determined to be of low sensitivity, then the project's risk potential is low.

SENSITIVITY	*FEATURES OF THE ENVIRONMENT*
High	*1) Large number of receptors (human or ecological) within 50m of roads triggering traffic change criteria;* *2) Baseline monitoring data indicates concentrations above the AQS Objective / EU limit value;* *3) Monitoring indicates exceedances of short term AQS Objectives / EU value limit;* *4) Projecting forward monitored concentrations to the opening year, indicates exceedances of AQS Objectives / EU limit value;* *5) AQMAs or reported EU limit value exceedances within project's study area.*
Medium	*1) Receptors (human or ecological) within 50m of roads triggering traffic change criteria;* *2) Baseline monitoring data illustrates annual mean NO_2 concentrations >36µg/m³;* *3) Projections indicate annual mean NO_2 concentrations >36µg/m³ in opening year;* *4) AQMAs or EU limit value exceedances within project's study area.*
Low	*1) Few receptors located close to roads triggering traffic change criteria;* *2) Baseline monitoring data illustrates concentrations in base year below an annual mean of >36µg/m³;* *3) No AQMAs or EU limit value exceedances within project's study area.*

Table 9.11: **Receiving Environment Sensitivity (Source: DMRA LA 105)**

The baseline pollutant concentrations are well below an annual mean of 36 µg/m³ and there are no exceedances of EU limit values within the study area. Therefore, in accordance with Table 9.11, it is considered that the receiving environment of the Proposed Development is of a 'Low Sensitivity' and the inclusion of the Proposed Development can be considered low risk. Therefore, in line with DMRB LA 105 guidance, it has been determined that simple air quality assessment is required in this case.

9.2.2.1.1 Traffic generation data

The estimated vehicle trips that will be generated by the Proposed Development has been estimated by DBFL Consulting Engineers; A full copy of the annual average daily traffic (AADT) generated during the Operational Phase of the Proposed Development can be found in Volume 3 – Appendices. Table 9.5 shows the AADTs from the seven (7) link roads which will have change of Light Duty Vehicle (LDV) flows of more than 1000 Annual Average Daily Traffic (see Table 9.10 for the typical criteria that are prerequisite for an air quality assessment).

Three different year scenarios are presented in Table 9.12 for the Operational Phase vehicle trip generation data. The Baseline Year Scenario (2023), the Opening Year 'Do Minimum' and 'Do Something' scenarios (2026) and the Design Year (which is Opening Year plus 15 years, as per TII Guidance) (2041).

LINK	ROAD NAME	BASE YEAR (2023)	OPENING YEAR (2026)		DESIGN YEAR (2041)		SPEED (KM/H)
			DO MINIMUM	DO SOMETHING	DO MINIMUM	DO SOMETHING	
		AADT	AADT	AADT	AADT	AADT	
Q	Rooske Road	6,407 (0.8% HGV)	7,311 (0.7% HGV)	7,629 (0.7% HGV)	8,299 (0.7% HGV)	9,345 (0.6% HGV)	50
R	L2228 West	11,574 (1.3% HGV)	12,378 (1.3% HGV)	12,534 (1.3% HGV)	10,786 (1.4% HGV)	12,170 (1.2% HGV)	50
S	L2228 East	11,557 (1.2% HGV)	12,681 (0.5% HGV)	13,236 (1.1% HGV)	11,006 (1.3% HGV)	12,390 (1.1% HGV)	50
T	Station Road	11,957 (1.1% HGV)	13.562 (1.2% HGV)	14,931 (1.3% HGV)	14,790 (1.2% HGV)	16,871 (1.4% HGV)	60
U	R147 South	17,381 (1.3% HGV)	18,855 (1.4% HGV)	19,335 (1.4% HGV)	20,737 (1.4% HGV)	21,765 (1.5% HGV)	50
W	R147 North	16,450 (1.5% HGV)	18,097 (1.5% HGV)	19,072 (1.6% HGV)	19,993 (1.5% HGV)	21,925 (1.6% HGV)	80
AD	Eastern Distributor Road	0 (N/A HGV)	0 (N/A% HGV)	2,530 (0.9% HGV)	5,402 (0.7% HGV)	8,545 (0.8% HGV)	50

Table 9.12: **Operational Traffic Data Applied to DMRB Model**

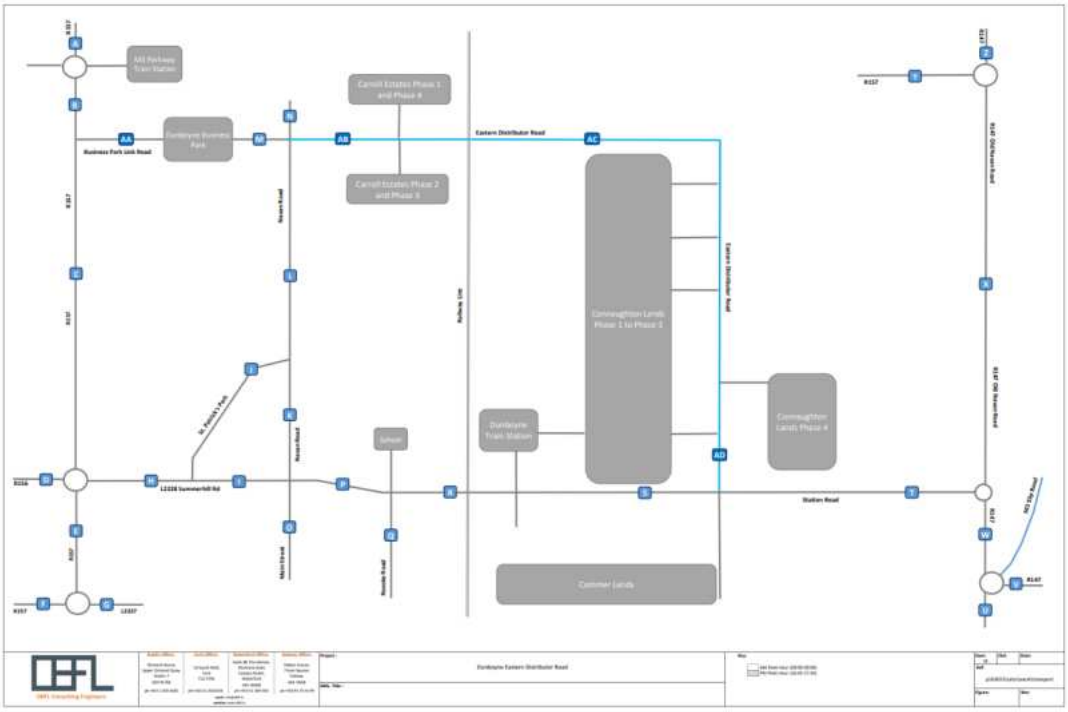

Figure 9.7 – Link Roads Assessed by DBFL Consulting Engineers (Source: DBFL Consulting Engineers)

9.2.2.1.2 *UK Design Manual for Roads and Bridges Screening Model (V. 103c 2007)*

The impact of the Operational Phase of the Proposed Development has been assessed by use of the UK DMRB screening model (Version 1.03c, 2007). The DMRB screening model provides a simple and straightforward means of predicting pollutant concentrations associated with road traffic emissions from the Proposed Development. According to Transport Infrastructure Ireland Guidelines (TII, 2011), this method is a suitable approach in circumstances where the predicted environmental concentrations (i.e., ambient background + predicted concentration) lie sufficiently below the air quality standards (<90% of the standard). Where predicted concentrations approach or exceed the air quality standards/limit values, a detailed air quality assessment must be carried out.
The DMRB modelling tool requires the following inputs to complete the assessment: road types, receptor locations, annual average daily traffic movements (AADT), percentage heavy goods vehicles (%HGV), annual traffic speeds and background pollutant concentrations. This input data is utilised by the model in predicting the Proposed Development's road traffic contribution to ambient ground level concentrations at the worst-case sensitive receptor. The DMRB modelling tool predicts annual mean concentrations of NO_x and PM_{10}. The road NO_x concentration is then converted to NO_2 using the latest-available version of the UK Department for Environment, Food and Rural Affairs (DEFRA) NO_x to NO_2 conversion spreadsheet (version 8.1). Concentrations of carbon monoxide (CO) and benzene (Bz) are consistently and significantly below their air quality limit values, even in urban centres, therefore modelling of these pollutants is no longer necessary (EPA Annual Air Quality Reports).

As the tool does not account for electric or hybrid vehicle use, vehicle emissions applied in this study are likely to overestimate the actual vehicle emissions experienced from the Proposed Development. The worst-case contributions predicted by the tool are added to the existing background concentration to provide a worst-case predicted ambient concentration. The predicted emissions from the Proposed Development compared to the relevant ambient air quality standards is subsequently assessed by comparison with the worst-case ambient concentrations.

9.2.2.1.3 *Sensitive Receptors*

TII (2011) define sensitive receptor locations as: residential housing, schools, hospitals, places of worship, sports centres, and shopping areas, i.e., locations where members of the public are likely to be regularly present. According to the DMRB LA 105 guidance, sensitive receptors shall be chosen within 200m of the Affected Road Network (ARN) (i.e., the link roads listed in Table 9.12) 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, then sensitive receptor locations including gardens and playing fields shall be assessed. In the current assessment, a number of high-sensitivity receptors such as residential properties and schools were identified within 200m of the ARN.

According to the DMRB LA 105 guidance, it is not necessary to model all receptors within 200m or an excessive number of receptors in the same area to determine whether there is likely to be any exceedances in the do minimum or do something scenarios.

For the purpose of determining local air quality impacts, eight (8) receptors were included in this modelling assessment, and these have been identified in Table 9.13. The receptors modelled will represent the worst-case locations in the vicinity the Proposed Development and were chosen based on proximity (within 200m) to the road links affected by the Proposed Development.

NAME	TYPE	COORDINATES	
		X	Y
R1	Residential	701650	742571
R2	Residential	701644	741920
R3	Residential	701861	741866
R4	Residential	702043	741733
R5	Residential	702334	741775
R6	Residential	703002	741599
R7	Residential	703198	741492
R8	Residential	703445	741121

Table 9.13: **Operational Traffic Data Applied to DMRB Model**

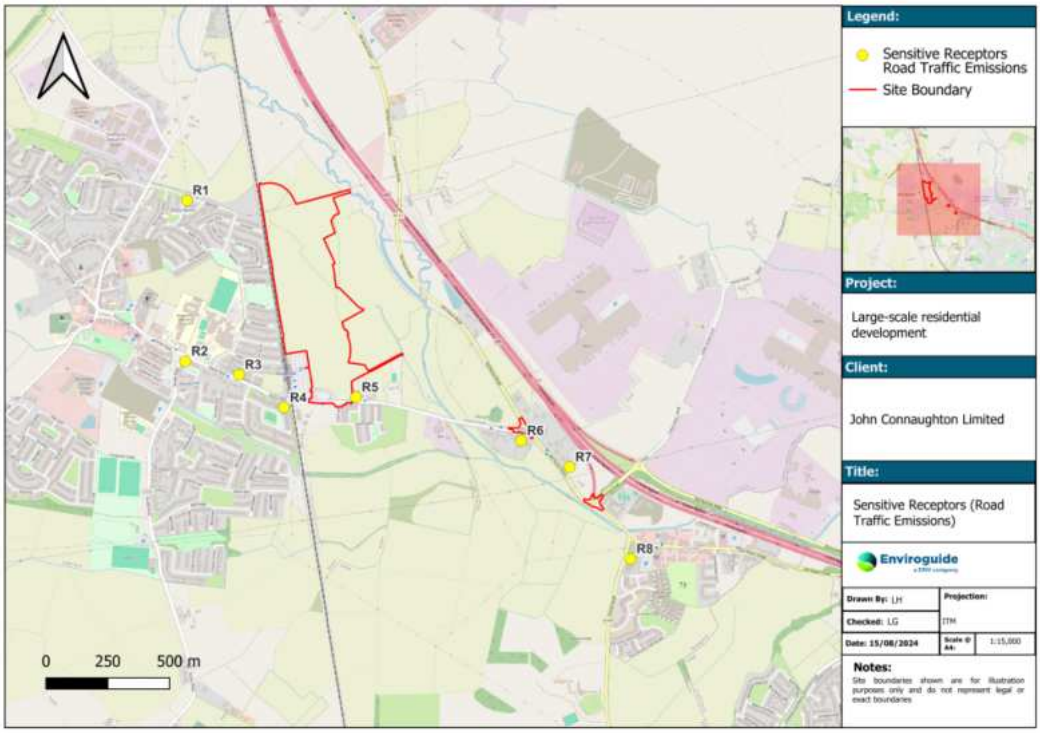

Figure 9. 8 – Road Traffic Emissions Sensitive Receptors

Designated sites of ecological conservation importance within 200m of the ARN are required to be included in the air quality assessment. This includes Special Protection Areas, Special Areas of Conservation, Natural Heritage Areas, and nature reserves. Only sites that are sensitive to nitrogen deposition are included in the assessment, it is not necessary to include sites such as those which have been designated as a geological feature. No sites of ecological conservation importance have been identified within 200m of the ARN; therefore, this analysis has been excluded in the air quality assessment.

9.2.2.1.4 *Pollutants and Background Concentrations*

The DMRB modelling tool predicts annual mean concentrations of NO_x and PM_{10}. The road NO_x concentration has then been converted to NO_2 using the latest published version of DEFRA's NO_x to NO_2 conversion spreadsheet (version 8.1). Concentrations of carbon monoxide (CO), and benzene (Bz) are consistently and significantly below their air quality limit values, even in urban centres, therefore modelling of these pollutants is no longer necessary (EPA Annual Air Quality Reports). According to the DMRB LA 105 guidance, it is only necessary to model PM_{10} for the base year to demonstrate that there is no impact on achievements of the PM_{10} air quality thresholds as a result of the project. Where air quality monitoring indicates exceedances of the PM_{10} air quality thresholds in the base year, PM_{10} should then be included in the model for both the 'do nothing' and 'do something' scenarios. As Ireland currently meets its legal requirements for the achievement of the $PM_{2.5}$ air quality thresholds, there is no requirement to model this parameter. Additionally, the modelling of PM_{10} can be used to demonstrate that the project does not impact on the $PM_{2.5}$ air quality threshold.

Annual mean of NO_2 and PM_{10} for the years 2021 and 2022 have been obtained for Zone D stations (see Section 9.3.1). For both parameters, annual limits are well below the threshold limits contained within the regulations.

Background concentrations for the opening year (2026) and design year (2041) have been predicted for the air quality assessment. Baseline year (2023) background concentrations have been used in combination with correction factors to estimate annual average NO_2 concentrations in future years. These factors have been adapted from both TII (2011) and DEFRA roadside NO_2 projection factors.

Adjustments to the verified modelled NO_2 concentrations are required to be made in order to account for future roadside NO_2 concentrations. An additional scenario known as the projected base year is to be included in the air quality modelling to enable a gap analysis to be completed. The gap analysis is the application of adjustment factors which take into consideration the assumed roadside rates of reduction in NO_x and NO_2 by DEFRA's modelling tools compared to observed roadside monitoring trend i.e., the gap between the predicted reductions and those observed (DMRB LA 105 guidance). This methodology has been applied to the current assessment in order to predict future NO_2 concentrations as a result of the Proposed Development and ensure that these concentrations are not under-estimated.

9.2.2.1.5 *Determining the Impact*

The TII guidance document 'Guidelines for the Treatment of Air Quality during the Planning and Construction of Road Schemes (2011)' outlines a clear methodology for determining the magnitude and significance of air quality impacts associated with road schemes; however, this remains applicable to any project which results in a change to traffic volumes. The TII significance criteria have been applied to the Proposed Development and adapted as necessary within Tables 9.14 to 9.17.

Tables 9.14 to 9.17 have been designed to assist in describing the air quality impacts at each receptor. They are applicable to the pollutants which are relevant to the Proposed Development and the standards or limit values against which they are being assessed (TII, 2011). The criteria focus on NO_2 and PM_{10} as these pollutants are most likely to exceed the annual mean limit values (40 $\mu g/m^3$).

The definition of 'impact magnitude' is exclusively related to the degree of change in pollutant concentrations, expressed as micrograms per cubic metre ($\mu g/m^3$). 'Impact description' takes account of the impact magnitude and of the absolute concentrations and how they are linked to the air quality standards or limit values. The descriptors for the magnitude of change due to the Proposed Development are set out in Table 9.14:

MAGNITUDE OF CHANGE	*ANNUAL MEAN NO2/PM10*	*NO. DAYS WITH PM10 CONCENTRATIONS GREATER THAN 50 µg/m³*
Large	*Increase/decrease ≥4 µg/m³*	*Increase/decrease >4 days*
Medium	*Increase/decrease 2 - <4 µg/m³*	*Increase/decrease 3 or 4 days*
Small	*Increase/decrease 0.4 - <2 µg/m³*	*Increase/decrease 1 or 2 days*
Imperceptible	*Increase/decrease <0.4 µg/m³*	*Increase/decrease <1 day*

Table 9.14: **Definition of Impact of Magnitude in Changes in Ambient Pollutant Concentrations (Source: Adapted from TII, 2011)**

The subsequent impact descriptors are set out in Table 9.15 and Table 9.16.

ABSOLUTE CONCENTRATION IN RELATION TO OBJECTIVE/LIMIT VALUE	*CHANGE IN CONCENTRATION*[12]		
	SMALL	*MEDIUM*	*LARGE*
INCREASE WITH SCHEME			
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	*Negligible*	*Slight Adverse*	*Slight Adverse*

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ABSOLUTE CONCENTRATION IN RELATION TO OBJECTIVE/LIMIT VALUE	CHANGE IN CONCENTRATION[12]		
	SMALL	MEDIUM	LARGE
INCREASE WITH SCHEME			
(30-<36 µg/m^3 of NO_2 or PM_{10})			
Well Below Objective/Limit Value with Scheme (<30 µg/m^3 of NO_2 or PM_{10})	Negligible	Negligible	Slight Adverse
DECREASE WITH SCHEME			
Above Objective/Limit Value with Scheme (≥40 µg/m3 of NO2 or PM10)	Slight beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value with Scheme (36-<40 µg/m3 of NO2 or PM10)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value with Scheme (30-<36 µg/m3 of NO2 or PM10)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value with Scheme (<30 µg/m3 of NO2 or PM10)	Negligible	Negligible	Slight Beneficial

Table 9.15: **Air Quality Impact Descriptors for Changes for Annual Mean NO_2 and PM_{10} Concentrations at Receptors (Source: Adapted from TII, 2011)**

ABSOLUTE CONCENTRATION IN RELATION TO OBJECTIVE LIMIT VALUE	***CHANGE IN CONCENTRATION[13]***		
	SMALL	***MEDIUM***	***LARGE***
INCREASE WITH SCHEME			
Above Objective/Limit Value with Scheme (≥35 DAYS)	***Slight Adverse***	***Moderate Adverse***	***Substantial Adverse***
Just Below Objective/Limit Value with Scheme (32-<35 days)	***Slight Adverse***	***Moderate Adverse***	***Moderate Adverse***
Below Objective/Limit Value with Scheme (26-<32 days)	***Negligible***	***Slight Adverse***	***Slight Adverse***
Well Below Objective/Limit Value with Scheme (<26 days)	***Negligible***	***Negligible***	***Slight Adverse***
DECREASE WITH SCHEME			
Above Objective/Limit Value with Scheme (≥35 days)	***Slight beneficial***	***Moderate Beneficial***	***Substantial Beneficial***
Just Below Objective/Limit Value with Scheme (32-<35 days)	***Slight Beneficial***	***Moderate Beneficial***	***Moderate Beneficial***

[13] Where the impact magnitude is Imperceptible, then the impact description is negligible.

ABSOLUTE CONCENTRATION IN RELATION TO OBJECTIVE LIMIT VALUE	*CHANGE IN CONCENTRATION*[13]		
	SMALL	*MEDIUM*	*LARGE*
Below Objective/Limit Value with Scheme (26-<32 days)	*Negligible*	*Slight Beneficial*	*Slight Beneficial*
Well Below Objective/Limit Value with Scheme (<26)	*Negligible*	*Negligible*	*Slight Beneficial*

Table 9.16: **Air Quality Impact Descriptors for Changes to Number of Days with PM_{10} Concentration Greater than 50 µg/m³ at a Receptor (Source: TII, 2011)**

In terms of 'significance of effects', professional judgment has been applied in making this determination. The TII Guidance (2011) outlines that the overall air quality impact of the Proposed Development should be described as either 'insignificant', 'minor', 'moderate', or 'major'; and a number of factors, as listed in Table 9-17, are set out which should be taken into account:

FACTORS
Number of people affected by increases and/or decreases in concentrations and a judgement on the overall balance.
The number of people exposed to levels above the objective or limit value, where new exposure is being introduced.
The magnitude of the changes and the descriptions of the impacts at the receptors i.e., using the findings based on Boxes Tables 9.14 to 9.16.
Whether or not an exceedance of a standard or limit value is predicted to arise in the study area where none existed before or an exceedance area is substantially increased.
Whether or not the study area exceeds a standard or limit value and this exceedance is removed, or the exceedance area is reduced.
Uncertainty, including the extent to which worst-case assumptions have been made.
The extent to which a standard or limit value is exceeded, e.g., an annual mean NO2 of 41 µg/m³ should attract less significance than an annual mean of 51 µg/m³.

Table 9.17: **Factors to Consider when Determining Air Quality Significance (Source: Adapted from TII, 2011)**

The modelling results are discussed in Section 9.5.1.2.1 for this chapter.

9.2.2.2 Operational Plant and Machinery

The Proposed Development will be a Nearly Zero Energy Building (NZEB) in accordance with the Part L 2021 requirements. In terms of energy ratings, all units on site will have a Building Energy Rating (BER) of A2/A3. that will comply with the Part L requirements. The proposed approach to achieving Part L (2021) compliance will be based on a combination of the solutions, as detailed in the Energy Statement prepared for the Proposed Development by McElligott Consulting Engineers (2024). The following measures, or similar will be incorporated into the Proposed Development to achieve a more energy efficient (i.e., less carbon intensive) design:

- Solar Photovoltaic (PV);
- Combined Heat and Power (CHP);

- Heat Recovery Ventilation;
- Heat pumps: air to water heat pumps are being considered for the houses; and
- E-car charging.
-

The building fabric standards and technology solutions listed will be assessed in greater detail during the detailed design stage and the most appropriate options will be implemented to achieve an A2/A3 BER rating. Plant and machinery will not cause any likely significant air quality or climate effects due to the implementation of such measures as those listed.

9.3 The Existing and Receiving Environment (Baseline Situation)

The site is generally bounded by y Station Road (L2228) to the south, Dunboyne Train Station and the Iarnród Éireann rail line to the west, cluster of detached houses to the southeast, greenfield lands to north and east. The application includes also two (2) roundabouts on the R147 (Old Navan Road).

9.3.1 Air Quality

According to the 2012 Regulations (S.I. No. 326 of 2012) the proposed site falls into 'Zone D' of Ireland which is described by the EPA as 'Rural Ireland'. It is expected that existing ambient air quality in the vicinity of the site is characteristic of a rural location with the primary source air emissions (such as particulate matter (dust), NO_2, and hydrocarbons) likely to be of local domestic and agricultural origin. Local agricultural activities may exert a higher or lower influence on dust generation in the vicinity of the site on a seasonal basis.
The EPA launched a national air quality forecast in November 2023, to provide greater information to the public regarding expected air quality in Ireland for up to three days - "Today", "Tomorrow" and the "Day after Tomorrow".

Forecasts include daily Air Quality Index for Health (AQIH), Particulate Matter (PM), nitrogen dioxide (NO_2) and ozone (O_3). PM, NO_2 and O_3 are the three main air pollutants impacting human health in Ireland. All pollutants mapped are presented on the Air Quality Index for Health (AQIH) scale (1 – 10). The forecast maps are uploaded twice daily, once in the morning and once in the evening.

In conjunction with individual local authorities, the EPA undertakes ambient air quality monitoring at specific locations throughout the country in the urban and rural environment; an Air Quality Report based on data from monitoring stations and a number of mobile air quality units is developed on an annual basis. The EPA's most recent publication 'Air Quality in Ireland, 2022' reports the quality of the air in Ireland based on the data from the National Ambient Air Quality Monitoring Network throughout the year 2022.

STATION	***OBJECTIVE***	***CONENTRATION***		***LIMIT OR THRESHOLD VALUE***
		2021	***2022***	
Emo Court	***Annual Mean NO_2***	***3.6***	***3.3***	***40 µg/m³***
	Days > 200 µg/m³	***0***	***0***	***35 Days***

STATION	OBJECTIVE	CONENTRATION		LIMIT OR THRESHOLD VALUE
		2021	2022	
Birr	Annual Mean NO_2	12.8	12.4	40 µg/m³
	Days > 200 µg/m³	0	0	35 Days
Castlebar	Annual Mean NO_2	6.3	7.5	40 µg/m³
	Days > 200 µg/m³	0	0	35 Days
Carrick-On-Shannon	Annual Mean NO_2	11.2	11.5	40 µg/m³
	Days > 200 µg/m³	0	0	35 Days
Kilkitt	Annual Mean NO_2	2.4	2.0	40 µg/m³
	Days > 200 µg/m³	0	0	35 Days
Edenderry	Annual Mean NO_2	-	7.3	40 µg/m³
	Days > 200 µg/m³	-	0	35 Days

Table 9.18: **Mean Concentrations of No_2 at Zone D Monitoring Stations**

Based on the data summarised in Table 9-18, existing baseline air quality for the area in which the site is located be characterised as being of good quality with no exceedances of the Air Quality Regulations limit values of specific pollutants. The results show that current levels of NO_2 are well below the annual mean and 1-hour maximum limit values. In the year 2021, annual mean concentrations of NO_2 ranged from 2.4 – 12.8 ug/m³ across all Zone D stations, with no exceedance of the maximum hourly limit (EPA, 2022). In the year 2022, annual mean concentrations of NO_2 ranged from 2.0 – 12.4 ug/m³ across all Zone D stations, with no exceedance of the maximum hourly limit (EPA, 2023).

The average concentration of NO_2 in 2022 was 7.3 µg/m³. EPA 2022 background concentrations have been used in combination with correction factors to estimate annual average NO_2 concentrations in the region of the Proposed Development for the base year (2023). These factors have been adapted from both TII (2011) and DEFRA roadside NO_2 projection factors. Based on these correction factors, the estimated base year (2023) NO_2 concentration in the region of the Proposed Development is 6.9 µg/m³.

Measured concentrations of PM_{10} for the years 2021 and 2022 are presented in Table 9-19 for Zone D monitoring stations.

STATION	OBJECTIVE	CONCENTRATION		LIMIT OR THRESHOLD VALUE
		2021	2022	
Tipperary Town	Annual Mean PM_{10}	12.7	12.7	40 µg/m³

STATION	OBJECTIVE	CONCENTRATION		LIMIT OR THRESHOLD VALUE
		2021	2022	
	Days > 50 µg/m³	3	3	35 Days
Carrick-On-Shannon	Annual Mean PM_{10}	9.4	9.4	40 µg/m³
	Days > 50 µg/m³	0	0	35 Days
Enniscorthy	Annual Mean PM_{10}	13.7	13.7	40 µg/m³
	Days > 50 µg/m³	1	1	35 Days
Birr	Annual Mean PM_{10}	12.2	12.2	40 µg/m³
	Days > 50 µg/m³	2	2	35 Days
Askeaton	Annual Mean PM_{10}	8.7	8.7	40 µg/m³
	Days > 50 µg/m³	0	0	35 Days
Macroom	Annual Mean PM_{10}	14.6	14.6	40 µg/m³
	Days > 50 µg/m³	2	9.8	35 Days
Castlebar	Annual Mean PM_{10}	9.8	9.8	40 µg/m³
	Days > 50 µg/m³	0	0	35 Days
Cobh Carrignafoy	Annual Mean PM_{10}	12	12	40 µg/m³
	Days > 50 µg/m³	1	1	35 Days
Claremorris	Annual Mean PM_{10}	9.5	9.5	40 µg/m³
	Days > 50 µg/m³	1	1	35 Days
Kilkitt	Annual Mean PM_{10}	7.8	7.8	40 µg/m³
	Days > 50 µg/m³	0	0	35 Days
Cavan	Annual Mean PM_{10}	10.6	10.6	40 µg/m³
	Days > 50 µg/m³	0	0	35 Days

STATION	OBJECTIVE	CONCENTRATION		LIMIT OR THRESHOLD VALUE
		2021	2022	
Roscommon Town	Annual Mean PM_{10}	10.3	10.3	40 µg/m³
	Days > 50 µg/m³	0	0	35 Days
Edenderry	Annual Mean PM_{10}	17.8	17.8	40 µg/m³
	Days > 50 µg/m³	4	4	35 Days
Mallow	Annual Mean PM_{10}	14.7	14.7	40 µg/m³
	Days > 50 µg/m³	2	2	35 Days
Longford	Annual Mean PM_{10}	13.9	13.9	40 µg/m³
	Days > 50 µg/m³	1	1	35 Days
Cobh Cork Harbour	Annual Mean PM_{10}	13.4	13.4	40 µg/m³
	Days > 50 µg/m³	1	1	35 Days
Kilarney, Co. Kerry	Annual Mean PM_{10}	-	9.1	40 µg/m³
	Days > 50 µg/m³	-	0	35 Days

Table 9.19: **Concentrations of PM10 at Zone D Monitoring Stations**

As is evident from the results shown in Table 9.19, current levels of PM_{10} are well below the annual mean limit value. In the year 2021, annual mean concentrations of PM_{10} ranged from 7.8 – 17.8 ug/m³ across all Zone D stations, with no exceedance of short-term limit values (EPA, 2022). In the year 2022, annual mean concentrations of PM_{10} ranged from 7.9 – 17.7 ug/m³ across all Zone D stations, with no exceedance of short-term limit values (EPA, 2023).

The average concentration of PM_{10} in 2022 was 12.7 µg/m³. EPA 2022 background concentrations have been used in combination with correction factors to estimate annual average PM_{10} concentrations in the region of the Proposed Development for the base year (2023). These factors have been adapted from both TII (2011) and DEFRA roadside PM_{10} projection factors. Based on these correction factors, the estimated base year (2023) background PM_{10} concentration in the region of the Proposed Development is 12.6 µg/m³.

9.3.2 Macroclimate

Ireland has a typical maritime climate, largely due to its proximity to the Atlantic Ocean and the presence of the Gulf Stream. Due to the moderating effects of the Gulf Stream, Ireland does not suffer the temperature extremes that are experienced by many other countries at a similar latitude. Mean annual temperatures generally range between 9°C and 10°C. Winters tend to be cool and windy while summers are mostly mild and less windy. The prevailing wind direction is between the south and west with average annual

wind speeds ranging between 6 knots in parts of south Leinster to over 15 knots in the extreme north. Rainfall in Ireland occurs throughout the year with reasonable frequency. The highest rainfall occurs in the western half of the country and on high ground, and generally decreases towards the northeast. As the prevailing winds are from the west-southwest, the west of Ireland experiences the largest number of wet days. The area of least precipitation is along the eastern seaboard of the country.

9.3.3 Microclimate

The synoptic meteorological station at Baldonnel (Casement) Aerodrome is located approximately 12km south of the Proposed Development; and for the purposes of this chapter, weather data collected here may be considered similar to that which is experienced in the area of the site.

The weather in the area of the site is generally dominated by cool oceanic air masses, with cool winters, mild humid summers, and a lack of temperature extremes. Based on meteorological data at Baldonnel (Casement) Aerodrome over the last 3 years, the mean January temperature is 5 degrees Celsius (° C), while the mean July temperature is 16.3°C. The prevailing wind direction is from a quadrant centred on the southwest. These are moderately warm winds from the Atlantic and they habitually bring rain. The expected annual rainfall for the eastern half of the country ranges between 750mm and 1000mm. Easterly winds are less frequent, weaker, and tend to bring cooler weather from the northeast in spring and warmer weather from the southeast in summer.

Table 9.20 outlines the average climate conditions at Casement Aerodrome over a 30-year period:

PARAMETER	*30 YEAR AVERAGE*
Mean Temp (° C)	*9.7*
Mean Humidity at 0900UTC (%)	*83.6*
Mean Daily Sunshine (Hrs)	*3.7*
Mean Annual Rainfall (mm)	*754.2*
Mean Windspeeds (Knots)	*10.7*

Table 9.20: **Latest 30-year Averages at Casement Aerodrome (1981-2010)(Source: Met Eireann)**

9.3.3.1 Rainfall

Rainfall is a key indicator of changes in climate, as measurements of rainfall are fundamental to assessing the effects of climate change on the water cycle and water balance. Table 9-21 illustrates the monthly and annual rainfall data collected over a 3-year period (2021-2023) at Casement Aerodrome Station. The annual rates of precipitation ranged from 696.9 in 2021 to 870.0 in 2023 with distribution of the highest monthly rainfall values falling mainly in the autumn and winter months. This is broadly within the expected range of the eastern half of the country.

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
2023	52.1	15.7	109.3	67.3	24.3	45.0	124.2	84.5	112.5	116.0	41.2	77.9	870.0
2022	21.0	99.3	40.1	46.9	59.6	78.3	40.4	18.7	119.2	100.6	51.9	92.2	768.2
2021	95.8	69.7	29.6	17.9	112.7	17.8	94.0	47.3	42.1	77.2	16.4	76.4	696.9
LTA[14]	63.8	48.5	50.7	51.9	59.1	62.5	54.2	72.3	60.3	81.6	73.7	75.7	754.3

Table 9.21: **Monthly Rainfall Values (mm) for Casement Aerodrome Weather Station January 2021 to December 2023 (Source: Met Eireann)**

9.3.3.2 Wind

Wind at a particular location can be influenced by a number of factors, such as obstructions by trees or buildings, the nature of the terrain, and deflection by nearby mountains or hills. Wind blows most frequently from the south and west for open sites while winds from the northeast and north occur less often. The analysis of hourly weather data from Casement Aerodrome synoptic weather station over a period of 30 years suggests that the predominant wind direction blows from the southwest, with windspeeds of between 7 and 10 knots occurring most frequently.

Figure 9 provides a wind speed frequency distribution which represents wind speed classes and the frequency at which they occur (% of time) at Casement Aerodrome weather station over a period of 30 years. Wind speeds of 7 knots have the highest frequency, occurring approximately 6.7% of the time.

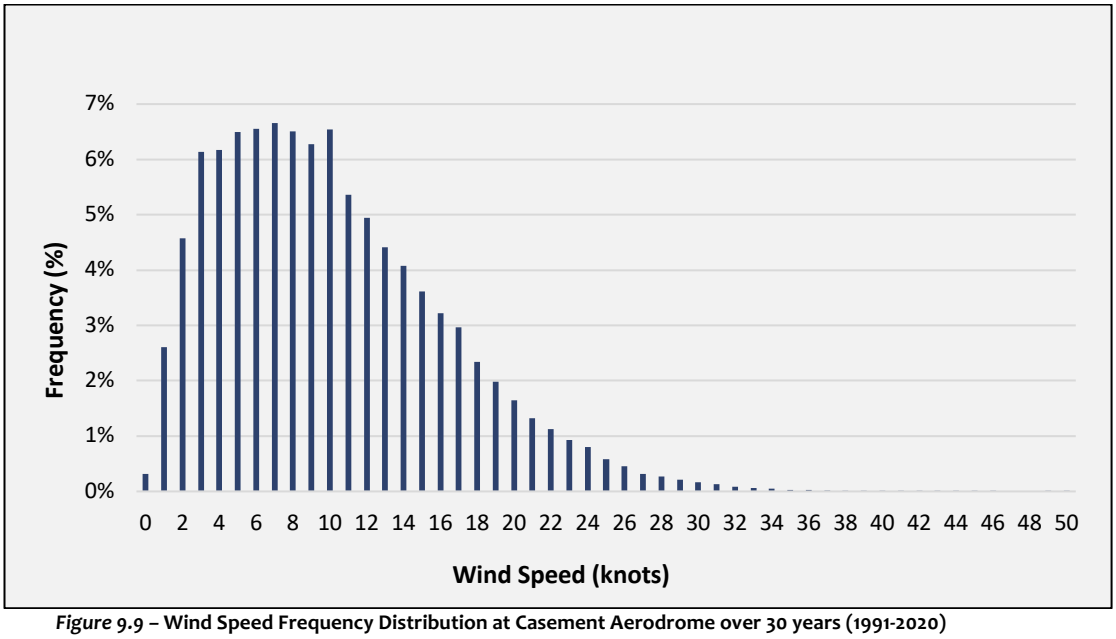

Figure 9.9 **– Wind Speed Frequency Distribution at Casement Aerodrome over 30 years (1991-2020)**

Figure 10 provides a wind rose of the predominant wind directions and associated wind speeds at Casement Aerodrome weather station. As is visible from Figure 10, the

[14] The 'LTA' is average for the climatological long-term-average (LTA) reference period 1981-2010

prevailing wind is from a south-westerly direction with an annual incidence of 45.86% for winds between 200 and 250 degrees. The most frequent wind speed associated with this wind direction is between 11 and 16 knots which is considered a 'moderate breeze' in terms of the Beaufort scale, this wind direction and wind speed occurs in combination approximately 15.45% of the time. The overall most common windspeed is also between 7 and 10 knots, occurring in 25.98% of incidences, and wind speeds of between 11 and 16 knots occurring in 25.42% of incidences.

The lowest frequency is for winds blowing from the northern quadrant at approximately 2.4% of the time. Wind speeds of above 17 knots (8.7 m/s) occurring in just 15.53% of incidences. The influence of topography can be seen in the low frequency of winds from a southerly direction at Casement Aerodrome, which occur at 7.41% of the time; this is due to the sheltering effect of the mountains to the south. This wind rose is broadly representative of the prevailing conditions experienced at the site.

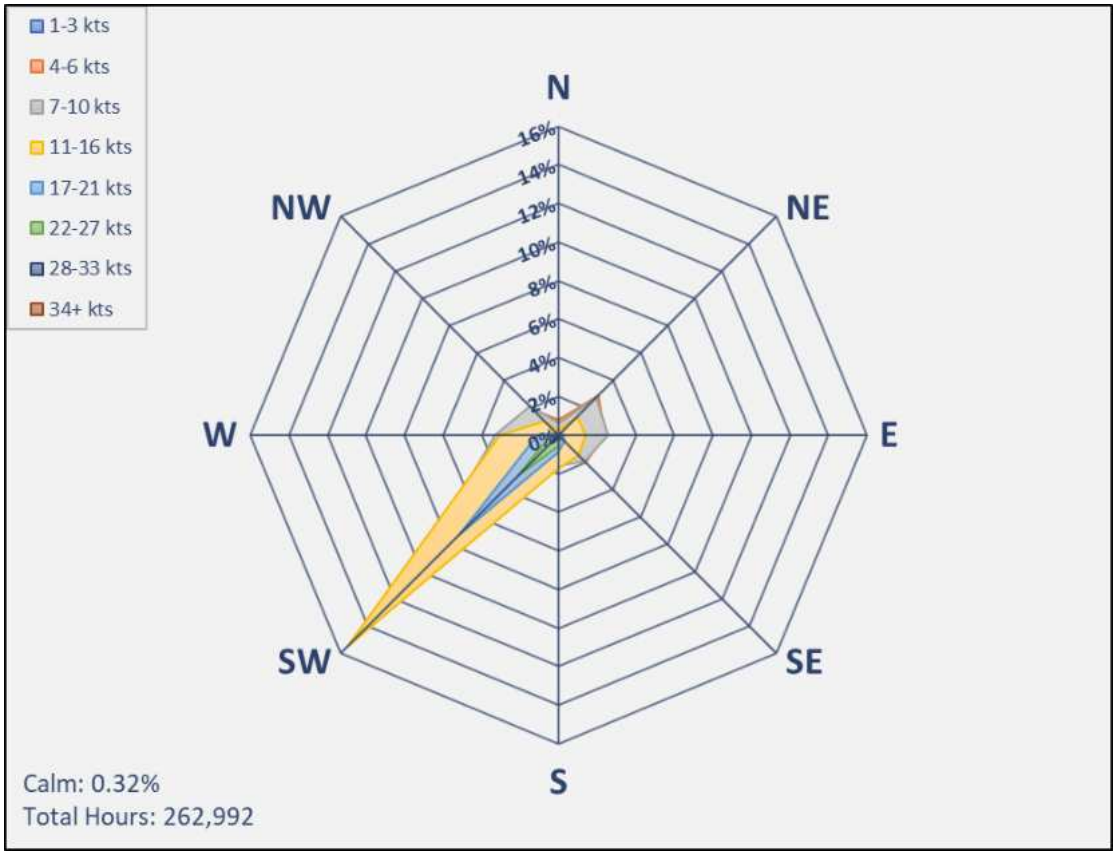

***Figure 9.10* – 30-year Windrose at Casement Aerodrome Weather Station 1991-2020 (Developed using Met Eireann Hourly Data)**

9.4 Characteristics of the Proposed Development

See Chapter 2 for a description of all components of the Proposed Development. The dwellings will be required to minimise overall energy use and to incorporate an adequate proportion of renewable energy in accordance with Building Regulations Part L 2021, Conservation of Energy and Fuel.

9.5 Potential Impact of the Proposed Development

9.5.1 Potential Impacts on Air Quality

9.5.1.1 Construction Phase

9.5.1.1.1 *Dust*

There is potential for construction related air emissions to impact on local air quality as a result of the Proposed Development. The IAQM *Guidance on the Assessment of Dust from Demolition and Construction* (2024) provides a framework for the assessment of risk, details of which are provided in Section 9.2 of this chapter.

Potential Dust Emission Magnitude (Step 2A)

The potential magnitude of dust emissions from construction, earthworks and trackout has been assessed, as identified in Table 9-22.

ACTIVITY	*DUST EMISSION MAGNITUDE*
Earthworks	*Large*
Construction	*Medium*
Trackout	*Large*

Table 9.22: **Dust Emission Magnitude of the site**

Sensitivity of the Area (Step 2B)

SENSITIVITY TYPE	*FACTORS*	*SENSITIVITY OF THE AREA*	
		ON-SITE	*TRACKOUT*
Dust Soiling	*Residential areas are considered to be highly sensitive to dust soiling. There are between 10-100 highly sensitive residential receptors within 20m of the site boundary. Therefore, the sensitivity of the area surrounding the site has been classified as high to dust soiling for on-site activity (earthworks and construction).* *With regard to trackout, it is anticipated that construction traffic will approach via the R147 or M3*	*High*	*High*

SENSITIVITY TYPE	FACTORS	SENSITIVITY OF THE AREA	
		ON-SITE	TRACKOUT
	motorway and Station Road. There are between 10-100 highly sensitive receptors within 20m of these routes. Therefore, the sensitivity has been classified as high to dust soiling for trackout.		
Human Health	*EPA 2022 background concentrations for Zone D have been used in combination with correction factors to estimate annual average NO_2 concentrations in the region of the Proposed Development for 2026, when works are anticipated to start, is 5.9 µg/m³. There are between 10-100 highly sensitive receptors within 20m of the site boundary and between 10-100 highly sensitive receptors within 20m of the R147, M3 motorway and Station Road where people could be exposed to PM10 for an extended period of time.* *As the PM10 concentration is less than 24 µg/m³, the sensitivity of the area to human health impacts is considered to be low.*	*Low*	*Low*
Ecology	*Not applicable – no ecological receptors within the study area*		

Table 9.23: **Sensitivity of the Area**

Risk of Dust Impacts (Step 2C)

The outcomes of the assessments of potential magnitude of dust emissions and the sensitivity of the area are combined to determine the risk of impact. This risk is then used to inform the selection of appropriate mitigation. Table 9-24 details the risk of dust impacts for earthworks, construction and trackout activities.

POTENTIAL IMPACT	SENSITIVITY	MAGNITUDE		
		EARTHWORKS	CONSTRUCTION	TRACKOUT
		LARGE	MEDIUM	LARGE
Dust Soiling Impacts	High	High Risk	Medium Risk	High Risk
Human Health Impacts	Low	Low Risk	Low Risk	Low Risk
Ecological Impacts	Not applicable – no ecological receptors within the study area			

Table 9.24: **Summary of Unmitigated Risks**

The dust risk categories for each of the four activities determined in STEP 2C have been used to define the appropriate, site-specific, mitigation measures to be adopted in Section 9.6.1 of this chapter (Step 3 as per the IAQM *Guidance on the assessment of dust from demolition and construction* (2024) (see Section 9.2 of this chapter)).
For those cases where the risk is assigned as 'negligible', no mitigation measures beyond those required by legislation are required. However, additional mitigation measures as defined in Section 9.2 may be applied as part of good practice.

9.5.1.2 Operational Phase

The greatest potential effect on air quality during the Operational Phase of the Proposed Development is from traffic-related air emissions.

Operational traffic will use regional and local roads to access the facility with potential increases of traffic flow on some roads and subsequent associated emissions of VOCs, nitrogen oxides, sulphur dioxides and increased particulate matter concentrations.

The DMRB LA 105 guidance has been outlined in Section 9.2 of this Chapter; in accordance with Table 9.11, it is considered that the receiving environment of the Proposed Development is of a 'Low Sensitivity' and the inclusion of the Proposed Development can be considered low risk. Therefore, it has been determined that a simple air quality assessment is required in this case, as per Table 9.25.

RISK POTENTIAL OF PROJECT	RECEIVING ENVIRONMENT SENSITIVITY			
	RISK	HIGH	MEDIUM	LOW
	HIGH	Detailed	Detailed	Simple
	LOW	Detailed	Simple	Simple

Table 9.17: **Table for Determination of Simple or Detailed Assessment (Source: DMRB LA 105 Guidance)**

9.5.1.2.1 *Modelling Results*

The impact of the Proposed Development has been determined by modelling traffic-related air emissions resulting from the presence or absence of Proposed Development.

RECEPTOR	ITM COORDINATE	RECEPTOR TYPE	PARAMETER	TOTAL (µg/m³)	ROAD TRAFFIC COMPONENT
R1	701650, 742571	Residential	PM_{10}	12.6	0
			NO_2	6.9	0
R2	701644, 741920	Residential	PM_{10}	13.39	0.79
			NO_2	10.41	3.51
R3	701861, 741866	Residential	PM_{10}	13.24	0.64
			NO_2	9.77	2.87
R4	702043, 741733	Residential	PM_{10}	13.23	0.63
			NO_2	9.72	2.82
R5	702326, 741798	Residential	PM_{10}	13.28	0.68
			NO_2	10.12	3.22
R6	703002, 741599	Residential	PM_{10}	13.39	0.79
			NO_2	10.65	3.75
R7	703198, 741492	Residential	PM_{10}	13.32	0.72
			NO_2	10.29	3.39
R8	703445, 741121	Residential	PM_{10}	12.73	0.13
			NO_2	7.47	0.57

Table 9.26: **Modelled Baseline NO_2 and PM_{10} Concentrations (2023)**

Concentrations of NO_2 and PM_{10} were modelled for the baseline year of 2023. As is evident from Table 9-26, the model has indicated that concentrations for all pollutants were in compliance with the annual limit of 40 µg/m³. Therefore, in line with DMRB LA 105 guidance, further modelling of PM_{10} for the opening and design years is not required. The highest road increment of PM_{10} experienced at receptors was 0.79 µg/m³ (R2 and R6). When this is assessed in combination with the 2023 background concentration of 12.6 µg/m³ (total µg/m³ is 13.39 µg/m³), an overall impact of 33.48% of the annual limit is experienced at the worst-case receptor.

The impact of NO_2 was predicted for the opening and design years at the nearest receptors to the affected road network (ARN). The degree of impact has been determined based on both the absolute and relative impact of the Proposed Development. A 'Do-Minimum Scenario', which assumes that the Proposed Development does not exist in future years, has also been assessed within the model and results have been compared in order to determine the degree of impact.

RECEPTOR	BACKGROUND	OPENING YEAR (2026) NO_2 µg/m^3				
		DO MINIMUM	DO SOMETHING	PROPOSED DEVELOPMENT CONTRIBUTION	MAGNITUDE	IMPACT DESCRIPTION
R1	5.9	5.9	6.58	0.68	Small	
R2		11.03	11.16	0.13	Imperceptible	Negligible Increase
R3		8.94	9	0.06	Imperceptible	Negligible Increase
R4		8.87	9	0.13	Imperceptible	Negligible Increase
R5		9.5	10.2	0.7	Small	Negligible Increase
R6		9.91	10.15	0.24	Imperceptible	Negligible Increase
R7		9.4	9.49	0.09	Imperceptible	Negligible Increase
R8		6.49	6.5	0.01	Imperceptible	Negligible Increase

Table 9.27: **Predicted Annual Mean Concentrations of NO_2 (Opening Year 2026)**

RECEPTOR	BACKGROUND	DESIGN YEAR (2041) NO_2 µg/m^3				
		DO MINIMUM	DO SOMETHING	PROPOSED DEVELOPMENT CONTRIBUTION	MAGNITUDE	IMPACT DESCRIPTION
R1	5	6.4	7.23	0.83	Small	Negligible Increase
R2		9.9	10.44	0.54	Small	Negligible Increase
R3		7.65	7.95	0.3	Imperceptible	Negligible Increase
R4		7.66	7.99	0.33	Imperceptible	Negligible Increase
R5		9.47	10.2	0.73	Small	Negligible Increase
R6		9.21	9.45	0.24	Imperceptible	Negligible Increase
R7		8.6	8.76	0.16	Imperceptible	Negligible Increase

RECEPTOR	BACKGROUND	DESIGN YEAR (2041) NO_2 µg/m³				
		DO MINIMUM	DO SOMETHING	PROPOSED DEVELOPMENT CONTRIBUTION	MAGNITUDE	IMPACT DESCRIPTION
R8		5.61	5.63	0.02	Imperceptible	Negligible Increase

Table 9.28: **Predicted Annual Mean Concentrations of NO_2 (Design Year 2041)**

The impact of the Proposed Development on annual mean NO_2 concentrations in the opening year (2026) and design year (2041) has been assessed relative to the 'Do Minimum' levels. The results shown in Tables 9.27 and 9.28 determine that there may be some 'imperceptible' and 'small' increases in concentrations of NO_2 at worst-case receptors assessed when compared with 'Do Nothing' levels; with the highest predicted increase of 0.7 µg/m³ measured at R5 in the Opening Year and the highest predicted increase of 0.83 µg/m³ at R1 in the Design Year 'Do Something' scenarios.

Concentrations of NO_2 at all sensitive receptors are less than 12 µg/m³ with the inclusion of the Proposed Development in both the opening and design years, and as such, are well below the objective/limit value of 40 µg/m³. Therefore, it is considered that the impact of the Proposed Development is minor at sensitive receptors and insignificant in terms of overall ambient air quality standards.

Having regard to the assessment criteria set out in Section 9.2.2.5 and the modelling results outlined in Table 9.27 and 9.28, the impact of the Proposed Development on NO_2 concentrations in the locality is likely to be 'long-term', 'negative' and 'imperceptible'.

9.5.2 Potential Impacts on Climate

A Climate Change Impact Assessment (CCIA) has been prepared for the Proposed Development by Enviroguide (2024) and has been included in this EIAR in Volume 3 – Appendices. The contents of this Report provide dual duty to the requirements as set out in Regulation (EU) 2020/852 of the European Parliament and of the Council (the 'Taxonomy Regulation') for a Climate Risk and Vulnerability Assessment and Meath County Council (MCC) requirements for a Climate Change Impact Assessment.
Additionally, the CCIA provides information to support the relevant public body in carrying out its functions in a manner consistent with national climate plans and strategies and furthering the achievement of the national climate objective as set out under Section 15 of the Climate Action and Low Carbon Development Act 2015, as amended in 2021.

The full Climate Change Impact Assessment can be found in Volume 3 - Appendices.

9.5.2.1 Construction Phase

There is the potential for combustion emissions from onsite machinery and traffic derived pollutants of CO_2 and N_2O to be emitted during the construction phase of the development. However, due to the size and duration of the Construction Phase, the effect on national GHG emissions will be insignificant in terms of Ireland's obligations under the Paris Agreement. The Contractor will seek to achieve the greatest standards of sustainable construction and design and will incorporate sustainable design criteria from the outset which supports overall climate change mitigation. The following mitigation measure will further reduce the effect on national GHG emissions:

- Ensure all vehicles switch off engines when stationary – no idling vehicles; and

- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.

9.5.2.2 Operational Phase

9.5.2.2.1 *Flood Risk*

A Flood Risk Assessment has been undertaken for the Proposed Development by JBA Consulting (2024) to ensure sustainability and effective management of flood risk. The Flood Risk Assessment was undertaken in accordance with 'The Planning System and Flood Risk Management' guidelines and is in agreement with the core principles contained within.

The Flood Risk Assessment:

- Identifies potential sources of flood risk;
- Confirms the level of risk and identifies key hydraulic features;
- Assesses the impact that the Proposed Development on flood risk; and
- Develops appropriate flood risk mitigation and management measures which will allow for the long-term development of the site.

The full Flood Risk Assessment can be found in Volume 3 - Appendices.

9.5.2.2.2 *Sustainability and Energy Statement*

Building energy has been long understood as contributing a major component of GHG emissions which was acknowledged within the 2030 Communication published by the European Commission (2014) which stated that "the majority of the energy-saving potential (for the EU) is in the building sector. The EU Energy Performance of Buildings Directive set out the target that all new developments should be Nearly Zero-Energy Buildings (NZEB) by the end of 2020.

Richard McElligott have prepared a Sustainability and Energy Statement for the Proposed Development (2024). This report identifies the energy standards with which the Proposed Development will have to comply and also sets out the overall strategy that will be adopted to achieve these energy efficiency targets.

The Proposed Development will be required to minimise overall energy use and to incorporate an adequate proportion of renewable energy in accordance with Building Regulations Part L 2021, Conservation of Energy and Fuel.

In developing the energy strategy for the Proposed Development, the incorporation of energy efficient strategies into the project deliverables will encourage the commitment to sustainable design at a very early stage and ensure that the Proposed Development will meet the principles of the Government's 'National Climate Change Policy' and the Nearly Zero Energy Building (NZEB) criteria as set out in the Part L Regulations 2022 and will maximise the reduction in Carbon Dioxide (CO_2) emissions thus demonstrating the commitment to Climate Change.

The full Sustainability and Energy Statement can be found in Volume 3 - Appendices.

9.5.2.2.3 *Traffic*

Increased LDV and HGV traffic flow as a result of the Proposed Development is likely to contribute to increases in GHG emissions such as CO_2 and N_2O. However, these contributions are likely to be marginal in terms of overall national GHG emission estimates and Ireland's obligations under the Paris Agreement, and therefore unlikely to have an adverse effect on climate.

9.5.3 Potential Cumulative Impacts

Cumulative impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor.
Cumulative air quality impacts have the potential to arise locally when construction activities associated with the Proposed Development take place at the same time as other developments in a specific location.

A review of other off-site developments and proposed developments (listed in Chapter 16 – Cumulative Impacts) was completed as part of this assessment.

The cumulative effects on the air quality and climate of the Proposed Development and other permitted or existing developments have been considered, in particular through the generation of air pollutants and GHG emissions.
The potential impacts on air quality and climate are assessed in Section 9.5.1 and it is considered that there are no other potential significant cumulative impacts associated with the Proposed Development and considered offsite permitted developments.

In terms of dust, no significant impacts are predicted; good construction practice, which incorporates the implementation of the identified mitigation measures, will be employed at the Proposed Development site. Due to the implementation of good construction practices at the Site of the Proposed Development and these offsite permitted developments, it is not anticipated that significant cumulative impacts will occur.
Assessment of operational stage impacts on air quality involved traffic data which is inclusive of traffic associated with other existing and permitted developments on the road networks surrounding the site both in current and future years. Therefore, cumulative impacts have been assessed in this regard and the impact on ambient air quality has been determined as insignificant.

It is considered that there are no other potential significant cumulative impacts associated with the Proposed Development and considered offsite permitted developments.

9.5.4 "Do Nothing" Impact

A do-nothing scenario would result in the site remaining undeveloped. If the Proposed Development were not to proceed there would be no immediate impact on the air quality in the area or the macro and microclimate.

9.6 Avoidance, Remedial & Mitigation Measures

9.6.1 Air Quality

9.6.1.1 Construction Phase

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager;

- Display the head or regional office contact information; and
- Develop and implement a Dust Management Plan (DMP), the final dust management plan will form part of the overall construction management plan which will formally be prepared and submitted to MCC post grant of planning permission.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book; and
- Hold regular liaison meetings with other high risk construction sites within 250m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the MCC when asked; and
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Preparing and Maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable; and
- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved haul roads.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site log book;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from receptors where possible.

9.6.1.2 Operational Phase

It has been determined that the Operational Phase air quality impact is negligible and therefore no site-specific mitigation measures are proposed.

9.6.2 Climate

As negative climatic impacts associated with the Construction and Operational Phases of the Proposed Development are negligible, no mitigation measures are proposed. Best practice measures will be implemented to minimise exhaust emissions from construction and operational vehicles and machinery by avoidance of engines running unnecessarily, as idle engines will not be permitted for excessive periods.

9.6.3 "Worst Case" Scenario

A worst-case scenario has been applied Step 2A (defining the potential dust emission magnitude) of the construction dust impact assessment and the highest risk category has been applied when selecting the mitigation measures that are general for the Proposed Development (i.e., the site is medium risk for construction, but a high risk for earthworks and trackout, therefore, the high-risk site mitigation measures apply).

It is expected that adequate mitigation measures, as outlined in Section 9.6.1, will assist in preventing nuisance dust from resulting in any significant effects. However, even with the most rigorous DMP in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time, and if, for example, dust emissions occur under adverse weather conditions, or there is an interruption to the water supply used for dust suppression, the local community may experience occasional, short-term dust annoyance. The likely scale of this would not be considered sufficient to change the conclusion that with mitigation the effects will be 'not significant'.

A worst-case scenario has been applied to the Operational Phase traffic emissions assessment in terms of traffic volumes experienced on the surrounding road network and associated air emissions. The worst-case contributions predicted by the tool are added to the existing background concentration to provide a worst-case predicted ambient concentration. The compliance of the Proposed Development with the relevant ambient air quality standards is subsequently assessed by comparison with the worst-case ambient concentrations. Associated impacts have been determined as negligible in this case.

9.7 Residual Impacts

The IAQM recommends that significance is only assigned to effect after considering the construction activity mitigation. The risk of dust impacts has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3 (Section 8.6.1 of this chapter) and the final step is to determine whether there are significant effects arising from the construction phase of the Proposed Development. The proposed mitigation measures will ensure that a potential significant adverse effect will not occur, therefore, the residual effect will not be significant.

The traffic generated by the Proposed Development has been assessed for its impact on air quality and it has been determined to have an overall not significant impact in terms of local air quality with the implementation of the proposed mitigation measures. Furthermore, it is considered that the effects of the Proposed Development on climate is considered to be not significant. Therefore, no significant adverse residual impacts are anticipated from the proposed scheme in the context of air quality and climate.

9.8 Monitoring

The monitoring of construction dust during the Construction Phase of the Proposed Development is recommended to ensure that impacts are not experienced beyond the Site boundary. Monitoring of dust can be carried out by using the Bergerhoff Method. This involves placing Bergerhoff Dust Deposit Gauges at a strategic locations along the Site boundaries for a period of 30 +/- 2 days. The selection of sampling point locations should be carried out in consideration of the requirements of *VDI 2119* with respect to the location of the samplers relative to buildings and other obstructions, height above

ground, and sample collection and analysis procedures. After the exposure period is complete, the Gauges should be removed from the Site; the dust deposits in each Gauge will then be determined gravimetrically and expressed as a dust deposition rate in mg/m^2/day in accordance with the relevant standard.

Due to the negligible impact on air quality and climate from the Operational Phase of the Proposed Development, no specific monitoring is recommended.

9.9 Interactions

Interactions between Air Quality and Climate and other aspects of this Environmental Impact Assessment Report have been considered and are detailed below.

9.9.1 Population and Human Health

Interactions between Air Quality and Population and Human Health have been considered as the Proposed Development has the potential to cause health issues as a result of impacts on air quality from dust nuisances and potential traffic derived pollutants. However, the mitigation measures employed at the Proposed Development will ensure that all impacts are compliant with ambient air quality standards and human health will not be affected. Furthermore, traffic-related pollutants have been assessed and determined as having an overall insignificant impact, therefore air quality impacts from the Proposed Development are not expected to have a significant impact on population and human health.

9.9.2 Traffic

There can be a significant interaction between air quality, climate and traffic. This is due to traffic-related pollutants that may arise. In the current assessment, traffic derived pollutants which may affect Air Quality and Climate have been deemed as not significant. Therefore, the impact of the interaction between air quality and climate is not significant.

9.9.3 Biodiversity

Interactions between Air Quality and Biodiversity have been considered as the construction phase has the potential to interact with flora and fauna in adjacent habitats and designated sites due to dust emissions arising from the construction works. However, the mitigation measures employed at the Proposed Development will ensure that the impacts to flora and fauna are not significant.

9.10 Difficulties Encountered When Compiling

No difficulties have been encountered while compiling this chapter.

9.11 References

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